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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Policies, Procedures and Rules for Development of Distribution Resources Plans Pursuant to Public Utilities Code Section 769.	Rulemaking 14-08-013 (Filed August 14, 2014)
And Related Matters.	Application 15-07-002 Application 15-07-003 Application 15-07-006
(NOT CONSOLIDATED)	
In the Matter of the Application of PacifiCorp (U901E) Setting Forth its Distribution Resource Plan Pursuant to Public Utilities Code Section 769.	Application 15-07-005 (Filed July 1, 2015)
And Related Matters.	Application 15-07-007 Application 15-07-008

ASSIGNED COMMISSIONER'S RULING PROPOSING SCOPE AND SCHEDULED FOR CONTINUED LONG TERM REFINEMENT DISCUSSIONS PERTAINING TO THE INTEGRATION CAPACITY ANALYSIS AND LOCATIONAL NET BENEFITS ANALYSIS IN TRACK ONE OF THE DISTRIBUTION RESOURCES PLAN PROCEEDINGS

Summary

This Assigned Commissioner's Ruling (ACR) proposes a scope and schedule for continued long-term refinement discussions pertaining to the Integration Capacity Analysis (ICA) and Locational Net Benefits Analysis (LNBA) in Track 1 of the Distribution Resources Plan (DRP) proceeding. Parties are invited to comment on the scope and schedule proposed herein.

This ACR also modifies the previous June 30, 2017 deadline for the Final ICA and LNBA Long-Term Refinement reports, and establishes a November 15, 2017 deadline by which to complete the proposed scope of issues. The Commission will then consider recommended refinements to ICA and LNBA methodologies in a subsequent decision.

A subsequent ACR will finalize the scope and schedule the of long-term refinement discussions, pre-Working Group deliverables, and status reporting and final reporting milestones.

Finally, a separate ruling inviting comments on short-term scope items in the Final ICA and LNBA Short-Term Working Group reports is forthcoming.

1. Background

The May 2, 2016 Assigned Commissioner's Ruling (1) Refining Integration Capacity and Locational Net Benefit Analysis Methodologies and Requirements; and (2) Authorizing Demonstration Projects A and B1 (ACR) provided an initial list of suggested long-term refinement topics and a preliminary schedule for

[1] And subsequent rulings, e.g. *Assigned Commissioner's Ruling Granting the Joint Motion of San Diego Gas & Electric Company, Southern California Edison Company, and Pacific Gas & Electric Company To Modify Specific Portions of the Assigned Commissioner's Ruling (1) Refining Integration Capacity and Locational Net Benefit Analysis Methodologies and Requirements; and (2) Authorizing Demonstration Projects A and B*, issued August 23, 2016.

considering these topics, culminating in a Final Long-Term Refinement report due in Q2 2017[2]. The ACR clarified that ICA and LNBA Working Group activities were to be organized by:

1. Short-term work related to the [Demonstration Projects] and improvements to the [analyses] that could be adopted in a Q1 2017 [Decision]; and
2. Longer-term work related to ongoing refinements to [the methodologies] beyond that time frame conducted in parallel, but not directly related, to the [Demonstration Projects]. Short term work should be addressed by the time of the submittal of the final Demonstration [Project] report[s]. Longer-term work may be addressed in the final report and may continue beyond the timeframe of [the Demonstration Projects][3].

Accordingly, the ICA and LNBA Working Groups held preliminary long-term refinement discussions in parallel with short-term Demonstration Project work over the course of Q3-Q4 2016 and submitted Interim Long-Term Refinement reports[4] documenting progress on the ACR-defined topics as well as new topics that were raised during discussions. Furthermore, the Final Short-Term ICA and LNBA Working Group reports submitted in March 2017[5] included a number of additional proposed long-term refinement topics. The long-term refinement topics discussed in those reports are summarized below.

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[2] ACR at 20-21, 35-38.

[3] ACR at 18-19.

[4] *Locational Net Benefit Analysis Working Group First Intermediate Status Report on Long-Term Refinements*, filed November 10, 2016; *Integration Capacity Analysis Working Group First Intermediate Status Report on Long-Term Refinements*, filed December 22, 2016.

[5] *Locational Net Benefit Analysis Working Group Final Report*, filed March 8, 2017; *Integration Capacity Analysis Working Group Final Report*, filed March 15, 2017.

2. Integration Capacity Analysis

The May 2, 2016 ACR directed the ICA Working Group to consider seven long-term refinement issues for resolution via a Long-Term Refinement report to be issued by Q2 2017:[6]

Table 1. ACR ICA Long-Term Refinement Items

Item No.	Description
A	Expansion of the ICA to single phase feeders
B	Ways to make ICA information more user-friendly and easily accessible (data sharing)
C	Interactive ICA maps
D	Market sensitive information (type and timing of the thermal, reactance, or protection limits associated with the hosting capacity on each line)
E	Method for reflecting the effect of potential load modifying resources on integration capacity
F	Development of ICA validation plans, describing how ICA results can be independently verified
G	Definition of quality assurance and quality control measures, including revision control for various software and databases, especially for customized or "in-house" software

The ICA Working Group issued an Interim Long-Term Refinement report on December 22, 2016 documenting progress on these topics to date. Certain Working Group members provided initial questions and considerations on ACR items A, E, and F that provide a framework for further long-term refinement

[6] ACR at 20.

discussions. The Interim Long-Term Refinement report also documents substantive discussions on, amongst other topics, expanding ICA modeling to "allow DERs to serve peak load conditions, while maintaining grid stability during low-load conditions."

Besides these issues, the ICA Working Group Short-Term Final Report submitted March 15, 2017 contains a number of consensus recommendations for topics to be considered in the scope of long-term refinement discussions. The Working Group has requested Commission guidance in prioritizing these recommended topics within the scope of long-term refinement discussions. The ICA Working Group final report's consensus recommendations for long-term refinements include:

Table 2. Working Group Report Recommendations for ICA Long-Term Refinement Items

Item No.	Report Section	Consensus Recommendation
1	4	Further define ICA planning use case and methodologies
2	9	Develop standard PV generation profile for use in online maps, which will include monthly variation in solar production
3	10.1	Incorporate findings and recommendations from DRP Track 3 Sub-track 1 on DER and load forecasting into ICA as appropriate, especially with regards to: how forecasts are developed and allocated across various system resolutions; the weather assumptions behind high and low forecast hours; the representativeness of Pacific Gas and Electric Company/San Diego Gas & Electric Company's (PG&E/SDG&E) synthetic days;" etc.
4	10.2.2	Develop a non-heuristic approach to modeling operational flexibility

Item No.	Report Section	Consensus Recommendation
5	11.1.2	Develop methods and tools to model smart inverter functionality in ICA calculations
6	11.2	Consider how online maps could reflect queued projects on a given circuit and if an earlier-queued project has absorbed the stated available capacity since the most recent ICA update
7	11.2	Incorporate single-phase line sections as a high-priority long-term refinement item. Identify locations of all single-phase line sections and their points of connection with three-phase feeders with a unique color in the first system-wide rollout.
8	11.4	Perform comparative assessment of investor-owned utilities' (IOU) implementation of ICA methodology on representative California reference circuits
9	11.5	Explore divergences and tradeoffs between the methods employed by Southern California Edison Company and PG&E v. SDG&E to create load shapes at the feeder, transformer, and customer levels using smart meter and other customer and system load data

From the long-term refinement items in the ACR, the Interim Long-Term Refinement report, and recommendations in the ICA Working Group final report, I hereby establish the following proposed scope and prioritization of issues for continued ICA long-term refinement discussions:

Table 3. Proposed Scope and Prioritization of ICA Long-Term Refinement Items

Group	Items: explanations/clarifications
I	**WG Report** • **Item 1**: Further define ICA planning use case and methodologies • **Item 2**: Develop standard PV generation profile for use in online maps o Near-term relevance to interconnection use case and online map display of ICA results • **Item 5**: Develop methods and tools to model smart inverter functionality in ICA calculations

II	**ACR**
	• **Item A**: Expansion of the ICA to single phase feeders
	  o Should be considered the same as Item 7; requires creation of network models for single-phase feeders
	• **Item E**: Method for reflecting the effect of potential load modifying resources on integration capacity
	WG Report
	• **Item 4**: Develop a non-heuristic approach to modeling operational flexibility
	• **Item 6**: Consider how online maps could reflect queued projects on a given circuit
	  o Requires coordination with Rule 21 rulemaking and public interconnection queue
	• **Item 7**: Identify locations of all single-phase line sections and their points of connection with three-phase feeders with a unique color
	  o Should be considered the same as Item A; requires creation of network models for single-phase feeders
	Interim Report
	• DERs that Serve Peak Load

III	**ACR**
	• **Item B**: Ways to make ICA information more user-friendly and easily accessible (data sharing)
	• **Item C**: Interactive ICA maps
	• **Item D**: Market sensitive information
	  o **Items B, C, and D**: pertain to IT requirements for data sharing, access to market sensitive information, and expanding the functionality and range of data displayed on ICA maps
	WG Report
	• **Item 3**: Incorporate findings and recommendations from DRP Track 3 Sub-track 1 on DER and load forecasting into ICA as appropriate
	  o Requires coordination with DER growth and load forecasts under development in DRP Track 3 Sub-track 1, which will be occurring concurrently with ICA long-term refinement discussions

Group	Items: explanations/clarifications

IV	**ACR**
	• **Item F**: Development of ICA validation plans, describing how ICA results can be independently verified
	• **Item G**: Definition of quality assurance and quality control measures
	  o **Items F and G**: need to solidify ICA methodologies for interconnection and planning use cases before developing validation and QA/QC methods
	WG Report
	• **Item 8**: Perform comparative assessment of IOUs' implementation of ICA methodology on representative California reference circuits
	• **Item 9**: Explore divergences and tradeoffs between the methods employed by SCE and PG&E v. SDG&E to create load shapes at the feeder, transformer, and customer levels
	  o Working Group reached consensus on utilizing IOUs' Demo A load shape development methodologies for initial system-wide rollout

3. Locational Net Benefits Analysis

Similarly, the ACR directed the LNBA Working Group to consider four suggested long-term refinement issues for ultimate resolution *via* a Long-Term Refinement report to be issued by Q2 2017.[7] The LNBA Working Group issued an Interim Long-Term Refinement report on November 10, 2016 documenting progress on these topics to date and providing relevant considerations for further discussions. The long-term LNBA refinements suggested by the ACR are:

Table 4. ACR LNBA Long-Term Refinement Items

Item No.	Description
A	Methods for evaluating location-specific benefits over a long term horizon that matches with the offer duration of the DER project. For example, there may be economic benefits in deferring network augmentations in the far future; however the benefits are likely to be discounted due to uncertainty. This work should explore whether / how probability estimates, based on the utility's past and current distribution planning experience, could be made that (1) an

[7] ACR at 35 – 37.

Item No.	Description
	as-yet undetected need for upgrades will be required during the distribution planning period and (2) procurement of DERs that have a timescale greater than the distribution planning period will avoid future upgrades subsequent to the distribution planning period.
B	Methods for valuing location-specific grid services provided by advanced smart inverter capabilities. Examples include the following seven smart inverter functions identified by the Smart Inverter Working Group: (i) DER Disconnect and Reconnect Command, (ii) Limit Maximum Real Power Mode, (iii) Set Real Power Mode, (iv) Frequency-Watt Emergency Mode, (v) Volt-Watt Mode, (vi) Dynamic Reactive Current Support Mode, and (vii) Scheduling Power Values and Modes
C	Consideration, and if feasible, development of, alternatives to the avoided cost method, such as distribution marginal cost or other methods.
D	The IOUs shall determine a method for evaluating the effect on avoided cost of DER working "in concert" in the same electrical footprint of a substation. Such DER may complement each other operationally using a distributed energy resource management system (DERMS).

Besides these issues, the LNBA Working Group Short-Term Final Report submitted March 8, 2017 contains a number of consensus and non-consensus recommendations for topics to be considered in the scope of long-term refinement discussions. A number of the non-consensus recommendations represent topics that the Working Group was not able to adequately address over the course of short-term refinement discussions, and for which the Working Group has requested Commission guidance in prioritizing within the scope of

long-term refinement discussions. Consensus and non-consensus recommendations for long-term refinements include the following:

Table 5. Working Group Report Recommendations for LNBA Long-Term Refinement Items

Item No.	Report Section	Recommendation	Consensus/ non-consensus
1	3.2.2	Spend significant time to determine how LNBA tool and map may be expanded to meet future use cases	Non-Consensus
2	4.1	Improve heat map and spreadsheet tool by: i) including options to automatically populate DER generation profile input; ii) enabling modeling of a portfolio of DER projects at numerous nodes to respond to a single grid need; and iii) allowing hourly VAR profiles to be input in order to capture DERs' ability to inject or absorb reactive power	Consensus
3	4.1	Clarify Renewable Integration Cost component ordered by ACR	Non-Consensus
4	4.2.1	Incorporate additional locational granularity into Energy, Capacity, and Line Losses system-level avoided cost values	Consensus
5	4.2.2	Form technical subgroup in LT refinements to develop methodologies for non-zero location-specific transmission costs	Consensus
6	5.1.1	Examine methods to reduce uncertainty in planning and utility investment	Non-Consensus
7	5.1.1	Incorporate a (forecasting) uncertainty metric in LNBA tool for planned deferrable projects	Non-Consensus

Item No.	Report Section	Recommendation	Consensus/ non-consensus
8	5.1.1	Develop a methodology to quantify the likelihood of an unplanned grid need (deferrable project) emerging in a given location, given forecasted conditions, forecast uncertainty, or long-term (>10 years) forecasting horizons	Non-Consensus
9	5.1.2	Value locational value of DERs beyond 10 years	Non-Consensus
10	5.2.1	LNBA should include the cost of DER penetration by testing ICA hosting capacity limits under different DER growth scenarios	Non-Consensus
11	5.2.1	Only use base DER growth scenario, not high growth scenario	Non-Consensus
12	5.2.2	Explore asset life extension/reduction value provided by DERs	Non-Consensus
13	5.2.2	Explore possible value of situational awareness or intelligence. This service identified in IDER CSF WG final report and in Demo B reports but not formally defined.	Non-Consensus
14	5.2.2	Include benefits of increased reliability (non-capacity related) provided by DERs, e.g., reducing frequency/duration/magnitude of customer outages	Non-Consensus
15	5.2.2	Evaluate planned upgrades meant to accommodate additional DER growth as potential deferral opportunities	Non-Consensus
16	5.2.2	LNBA should value benefits of DERs reducing the frequency/scope of maintenance projects	Non-Consensus
17	5.2.2	LNBA should include benefits of DER penetration allowing for downsized replacement equipment due to be installed in the case of equipment failure	Non-Consensus

From the long-term refinement items in the ACR and recommendations in the LNBA Working Group final report, I hereby establish the following proposed scope and prioritization of issues for continuing LNBA long-term refinement discussions:

Table 6. Proposed Scope and Prioritization of LNBA Long-Term Refinement Items

Group	Items: explanations/clarifications
I	**ACR** • **Item B**: Methods for valuing location-specific grid services provided by advanced smart inverter capabilities • **Item D**: Method for evaluating the effect on avoided cost of DER working "in concert" in the same electrical footprint of a substation o Should be considered the same item as Item 2.ii **WG Report** • **Item 2**: Improve heat map and spreadsheet tool by: i) including options to automatically populate DER generation profile input; ii) enabling modeling of a portfolio of DER projects at numerous nodes to respond to a single grid need; and iii) allowing hourly VAR profiles to be input in order to capture DERs' ability to inject or absorb reactive power o Item 2.ii should be considered the same as Item D • **Item 4**: Incorporate additional locational granularity into Energy, Capacity, and Line Losses system-level avoided cost values • **Item 5**: Form technical subgroup in LT refinements to develop methodologies for non-zero location-specific transmission costs o Requires coordination/co-facilitation with CAISO o **Items 2, 4, and 5**: consensus recommendations that should constitute the Working Group's primary focus
II	**WG Report** • **Item 3**: Clarify Renewable Integration Cost component ordered by ACR • **Item 7**: Incorporate a (forecasting) uncertainty metric in LNBA tool for planned deferrable projects o Requires coordination with development of deferral screening criteria under development in DRP Track 3 Sub-track 3 • **Item 11**: Only use base DER growth scenario, not high growth scenario o May entail substantive discussion but likely will not entail incremental methodology development; requires coordination with DER growth scenarios under development in DRP Track 3 Sub-track 1 • **Item 12**: Explore asset life extension/reduction value provided by DERs
III	**ACR** • **Item A**: Methods for evaluating location-specific benefits over a long term horizon that matches with the offer duration of the DER project o Should be considered the same as Items 8 and 9, as valuing unplanned grid

Group	Items: explanations/clarifications
	needs encompasses long-term (>10-year) grid needs. However, such values are speculative and likely difficult to quantify for practical use in the LNBA **WG Report** • **Item 8**: Develop a methodology to quantify the likelihood of an unplanned grid need (deferrable project) emerging in a given location • **Item 9**: Value locational value of DERs beyond 10 years o **Items 8 and 9**: Should be considered the same as Item A, as valuing unplanned grid needs encompasses long-term (>10-year) grid needs. However, such values are speculative and likely difficult to quantify for practical use in the LNBA • **Item 13**: Explore possible value of situational awareness or intelligence o Value of data-as-service for situational intelligence is likely hard to quantify on avoided or marginal cost basis, and is driven to some degree by Commission policy on the use of DER data for grid operations and/or planning • **Item 14**: Include benefits of increased reliability (non-capacity related) provided by DERs • **Item 16**: LNBA should value benefits of DERs reducing the frequency/scope of maintenance projects • **Item 17**: LNBA should include benefits of DER penetration allowing for downsized replacement equipment due to be installed in the case of equipment failure o **Items 14, 16, and 17**: Value proposition is speculative and potentially low; Working Group should only address these issues if time permits
Out of scope	**ACR** • **Item C**: Consideration, and if feasible, development of, alternatives to the avoided cost method, such as distribution marginal cost or other methods o Alternatives to the avoided cost method would entail developing new methodological approaches from that which was required for Demo B. As long-term refinement discussions should build on the Demo B methodology, alternatives to the avoided cost method will be considered in a parallel track outside of the LNBA Working Group. Further discussions on this topic will be held in coordination with the Integrated Distributed Energy Resources (IDER) proceeding, where this topic is part of Phase 3 of the IDER Cost-Effectiveness plan. **WG Report** • **Item 1**: Spend significant time to determine how LNBA tool and map may be expanded to meet future use cases o Similar to the rationale for excluding Item C, long-term refinement discussions should focus on improving the LNBA valuation methodology developed for Demo B through introducing more locational granularity to system-level values (e.g., Item 4), exploring values that were unable to be quantified for Demo B (e.g., Item 5), and exploring values that were not included in Demo B (e.g., Item 12). Modifications to the underlying modeling approach employed for Demo B that help achieve broader applications of the LNBA will be considered in a parallel track outside of the LNBA Working Group.

Group	Items: explanations/clarifications
	• **Item 6**: Examine methods to reduce uncertainty in planning and utility investment o Examining methods to reduce uncertainty in utility planning and investment is in scope for DRP Track 3 Sub-tracks 1 and 3 • **Item 10**: LNBA should include the cost of DER penetration by testing ICA hosting capacity limits under different DER growth scenarios o The LNBA calculates estimated avoided costs (or deferral benefits) and does not include DER integration costs. To the extent that planned upgrades to accommodate autonomous DER growth can be evaluated as a DER deferral opportunity, this process would occur between the Grid Modernization and Distribution Investment Deferral Frameworks in scope for DRP Track 3 Sub-tracks 2 and 3, respectively • **Item 15**: Evaluate planned upgrades meant to accommodate additional DER growth as potential deferral opportunities o Similar to the rationale for excluding Item 10, evaluating planned DER integration-related system upgrades as deferral opportunities is in scope for DRP Track 3 Sub-tracks 2 and 3

4. Working Group Schedule, Pre-Working Group Deliverables, and Process for Rescinding Items from Consideration

Long-term refinement discussions shall span six months from the date of the first Working Group meetings, resulting in the submission of the Final Long-Term Refinement reports. I propose the Working Groups hold their first meetings no later than May 15, 2017, resulting in a Final Long-Term Refinement report deadline of November 15, 2017. The proposed groupings of ICA and LNBA long-term refinement items attempt to front-load work on topics of relatively high complexity and/or importance to the further development of ICA and LNBA. The Working Group is to initiate discussions on long-term refinement topics in the order in which they are grouped.

The Working Group has documented a number of arguments, questions, and considerations for framing further discussions on proposed ICA and LNBA long-term refinement topics through the Interim Long-Term Refinement reports and Final Short-Term Working Group reports. I propose that the Working Group develop succinct scoping documents, no longer than ten pages in length, that briefly summarize discussions on these topics to date and detail relevant

framing questions or considerations to move discussions forward from the outset. This will help the Working Group initiate long-term refinement discussions in an efficient manner and would maximize utilization of the six-month Working Group process.

Interim status reporting milestones will assist the Working Group in fostering long-term refinement discussions through to successful outcomes. Status Reports shall briefly summarize the progress on each of the issues discussed to date and are not to be considered final proposals. Each scope issue should be covered within a maximum of one page. A proposed schedule for reporting milestones is as follows:

Status Report on Group(s)	**Deadline**
I	July 15, 2017
II	August 15, 2017
III, IV	September 15, 2017

A number of proposed long-term refinement items were the focus of extensive discussions leading up to the Final Short-Term Working Group report. For instance, LNBA ACR Item A, "Methods for evaluating location-specific benefits over a long term horizon," has been a topic of discussion since the LNBA workshop held February 1, 2016. Conversely, there are also a number of topics that represent relatively unexplored areas where there has been little to no substantive discussion to date. For instance, a number of the proposed LNBA value categories have not been properly vetted, and there is no obvious indication that any such values are imminently quantifiable or would result in a value proposition that would justify significant Working Group effort. I expect the Working Group to pursue and develop the scoped topics to the fullest extent

possible, but also recognize that certain items may prove unworkable at this stage of ICA and LNBA development. In such cases, the Working Group is directed, in the status reports and Final Long-Term Refinement report, to document the extent of discussions, reason(s) for rescinding or tabling the topic, and relevant considerations (if any) for further discussions beyond the Working Group.

A subsequent ruling will finalize the scope of long-term refinement discussions, pre-Working Group deliverables, and interim and final reporting milestones.

5. DRP Working Group Governance

All DRP Working Groups, including those for ICA and LNBA long-term refinement discussions and DER Growth Scenario development in Track 3 Sub-track 1, shall be open to the public and informal in nature. Energy Division staff will have oversight responsibility of the Working Groups, but they shall be managed by the utilities and interested stakeholders on an interim basis. The Energy Division may at its discretion assume direct management of the Working Groups or appoint a Working Group manager.

6. Comments

Parties are invited to provide comments on the proposed scope and schedule of ICA and LNBA long-term refinement discussions, including the various pre-Working Group and interim and final reporting deliverables and process for rescinding/tabling consideration of a given topic as described in Section V.

Comments are due two weeks from the date of this ruling and are not to exceed ten pages, including attachments.

Reply comments will not be accepted.

IT IS SO RULED.

Dated April 19, 2017, at San Francisco, California.

/s/ MICHAEL PICKER
Michael Picker
Assigned Commissioner