Southern California Edison
Stakeholder Comments

CAISO Load Granularity Refinements Issue Paper
Dated September 22, 2014

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Southern California Edison’s (SCE) hereby comments on the California Independent System Operator’s (CAISO) “Load Granularity Refinements Issue Paper” issued on September 22, 2014 (LGR Paper). The LGR Paper includes an outline of CAISO’s plan to comply with the Federal Energy Regulatory Commission (FERC) order denying the CAISO’s request for a permanent waiver to disaggregate existing load aggregation points (LAPs) at which load purchases energy from the CAISO.1 The CAISO “is seeking stakeholder input on these theoretical pricing granularity constructions”.2 While SCE supports the CAISO’s effort to comply with the FERC order, SCE has concerns that the LGR Paper is too narrowly focused on theory rather than the practical (e.g., the proposal to study a full nodal pricing for purchases by load serving entities). In addition, SCE responds to specific questions in the LGR Paper seeking the type of costs that will be required to implement increased levels of load granularity.

1. The full nodal pricing model may not be feasible given the design of the electrical distribution system and FERC Standards of Conduct.

   To provide reliable service the sub-transmission and distribution system is built with a level of redundancy to allow for equipment outage and maintenance. For example, if a substation transformer needs to be replaced, circuits can be switched to another substation source during the repair. Circuit reconfiguration also occurs to balance transformer loading. Some circuit switching may also be automatic given an unexpected outage. Therefore, the load at a given node is not necessarily static but dynamic in

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1 FERC order ER06_615 issued June 3, 2014.
2 LGR Paper page 4.
nature. If the load total for a given node is not correct, then both the forecast and settlement at the node will be inaccurate. CAISO’s theoretical proposal to improve efficiency and price signals may actually be worse off using sub-LAPs. The solution to improve the accuracy is not simple because the numerous systems and processes used to forecast, schedule, submit bids for, measure, and settle load with the CAISO, as well as submit retail customer bills, was never designed for such detailed granularity and its dynamic nature.

There is also a legal issue regarding FERC’s Standard of Conduct regarding transmission information and the marketing functions. To forecast and submit bids at a nodal level, SCE’s Marketing Function Employees would need to know the current configuration of the distribution system and, potentially, the sub-transmission system. FERC’s Standard of Conduct rules may prohibit the automation of information necessary to effectively participate in bidding for load at the nodal level.

The LGR Paper suggests the disaggregation level could be determined by minimizing historical error, but does not provide much detail on exactly how this would be performed. If this approach is minimizing the sum of squares in a regression model, then the addition of additional nodes will naturally reduce the sum of squares, but without offering any improved explanatory power. As recognized in the LGR Paper, any test to compare different number of LAPs cannot use minimized error, but must rely on another metric. The CAISO should conduct more research in this area, and studies or techniques used to develop costing periods may be useful.

SCE disagrees with the CAISO’s interpretation of the MSC’s 2010 study on LGR. Based on footnote 5 in the CAISO’s issue paper, the MSC neither (a) analyzes several different ways of disaggregation, nor (b) provides support that full nodal pricing is the best way to disaggregate. Thus, the CAISO should explain how it justifies its claim that, “The MSC concluded that the results showed that full nodal pricing was the best way to disaggregate.”

2. List of utility systems that would be impacted by LGR.

SCE is reviewing the various processes and systems that would be impacted by

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LGR. The items below are issues that have been currently identified; there may be more items that are discovered as the project continues. In determining the cost impacts in the next phase, the requirements for CAISO’s customers in each scenario should be defined. A contractor cannot provide a bid to build a house without knowing at least the square footage and what quality of furnishing is desired. For each scenario, the CAISO should define what would be required from CAISO participants and the level of detail at each node.

a. **Load Forecasting**

SCE forecasts its bundled load and excludes load from Direct Access customers or municipal customers located within SCE’s service area (currently this is aggregated). If load is required to be bid into the CAISO by sub-LAPs, the impacts are:

i. Capital (IT) Projects: (1) Upgrade customer usage data warehouse (Edison Smart Connect Data Warehouse) to store raw interval meter data; (2) develop systems to estimate usage for customers with monthly meter readings; (3) upgrade demand forecasting systems to store data by sub-LAP; (4) upgrade interfaces that bring the customer usage data from the data warehouse to the demand forecasting system; (5) create interfaces to bring real-time load measurement at substations/sub-LAPs from the data historian (measures load at circuits/substations) to the demand forecasting system; and (6) upgrade the system that creates validated and Net Energy Metering adjusted meter reads for Direct Access customers to provide aggregate DA usage by sub-LAP.

ii. Audit process: mapping of SCE customer meters to sub-LAPs.

iii. O&M Labor Costs: (1) develop new load forecasting models for sub-LAPs; (2) update daily operational forecasting processes to produce and review increased number of load forecasts; and (3) potentially forecast weather at more or different weather stations.
b. **Demand Response**

   Break down SCE’s bundled customer load forecast into sub-LAPs (*potentially different than today*)

   i. O&M Labor Costs: (1) develop demand response forecasting models for the new sub-LAPs; (2) update daily operational forecasting processes to produce and review potentially higher number of load forecasts; (3) forecast weather at potentially more or different weather stations; (4) map Service Accounts to the new Aggregate Locations (ALOCs) and re-register the Demand Response resources in the CAISO’s Demand Response System (DRS)

c. **Bidding and Scheduling**

   Systems to submit load and generation bidding by sub-LAPs

   i. Process Impacted: Day-ahead load bidding and scheduling (assumes load is not bid in real-time).

   ii. High-Level Description: SCE currently verifies, generates, and submits a bid curve for one SCE DLAP.

   iii. Process Impact of LGR: If CAISO implements this initiative then SCE would be required to verify, generate, and submit a bid curve for each LAP or node depending on the granularity CAISO specifies for SCE’s load area.

d. **Meter Data**

   The capability of SCE’s retail meter system (SCE Smart Connect) to map to proper sub-LAPs is unclear as the sub-LAPs detail has not been defined. The problem of meter data aggregation accuracy is a possible issue for the Load Granularity initiative, even at the Sub-LAP level. If Load Granularity is taken to the extreme of the Full Nodal proposal, the meter data aggregation accuracy will be worse. As mentioned previous the redundancy of SCE system could allow customers to move between nodes or possible sub-LAPS. The mapping of a customer meter to a specific circuit is not more than monthly. If the mapping of a meter to a circuit (therefore sub-LAP) changes dynamically, SCE must either
tolerate the reduced accuracy of the meter aggregation, or develop systems to track the mapping over time. SCE does not have such a mapping system in place today. Depending on the granularity of the sub-LAPs, the current system may need significant modification and upgrade which would involve labor and possibly capital.

e. **Price Forecasting**

SCE forecasts wholesale energy prices at the trading hubs, SP DLAP and various generation nodes. If load is required to be bid into the CAISO by sub-LAPs, the impacts are:

i. O&M Labor Costs: (1) develop new price forecasting models to capture load at the sub-LAPs, (2) update daily operational forecasting processes to produce and review increased number and complexity of price forecasts,

ii. Capital (IT) Projects: Develop systems capability to gather, vet, analyze and capture sub-LAP load data in price forecasting models

f. **Load Research**

Assuming that (1) total load at each sub-LAP is available; (2) each sub-LAP area can be mapped to individual retail customers’ meter sites and permanently fixed (this might not be feasible at the circuit level since certain customers could potentially switch from one circuit to another); and (3) retail rates (CPUC) are out of scope, the impacts are:

i. Daily CAISO settlements: Currently SCE’s Load Research group provides aggregated load for six rates/voltage levels. With the granularity requirement, this must be done at each of the sub-LAPs.

ii. Dynamic Load Profiles: Currently Load Research estimates and posts hourly load profiles for various rate groups daily on SCE’s web site for the ESPs’ use. Assuming that ESPs will also be impacted by the proposed granularity, Load Research must then provide these profiles for each sub-LAP.
iii. Distribution Line losses: The current method should be updated and revised by SCE’s Electric System Planning group, and new replacement formulas posted on SCE’s web site. Load Research would also be required to update its line loss studies.

With different assumptions, the impacts to load research would change. The most significant impact would be if retail rates are included in scope, as studies to support appropriate rate design could need modification.

g. Congestion Revenue Rights (CRR) procurement

SCE is still evaluating the possible impacts to congestion revenue rights with the creation of sub-LAPs.

h. Rates and Tariffs

If the current retail rates are maintained, then there should be limited changes as a result of sub-LAPs. If different rates are applied to sub-LAPs, then significant changes to the rate determination processes would necessarily occur. This includes marginal cost studies, revenue allocation models, and rate design models.

i. Data Storage and Information Systems

Data storage needs will likely increase with additional sub-LAPs. The required increase will depend on how many sub-LAPs that SCE’s DLAP is split into. Depending on the degree and definition of sub-LAPs, significant system modifications could be required.

j. Billing System

If the current status quo of non-geographic (i.e., sub-LAP) based rates is maintained, then impacts to the billing system may be minor. However, if retail rates become geographical then this would represent a significant change to the billing system, as it would have to be more tightly integrated into other systems to track a customer’s electrical location in relation to sub-LAPs.
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k. **Settlements and Accounting Impact**

Much of the cost drivers are dependent on the changes CAISO will make due to the disaggregated LAP that will lead to corresponding settlements changes, specifically:

- CRR allocations and auctions
- Ancillary Services procurement and cost allocations
- RUC procurement and cost allocations
- Exceptional Dispatch and cost allocations
- Virtual Bidding by Sub-laps

Currently there are 174 charge codes; of which 60 are related directly or indirectly to DLAP. The cost of implementing settlements changes are proportionally correlated to the changes CAISO will make to support the disaggregated LAP.