BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to consider policy and implementation refinements to the Energy Storage Procurement Framework and Design Program (D.13-10-040, D.14-10-045) and related Action Plan of the California Energy Storage Roadmap	Rulemaking 15-03-011 Filed March 26, 2015

NOTICE OF EX PARTE COMMUNICATION BY THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

Pursuant to Article 8 of the California Public Utilities Commission ("Commission") Rules of Practice and Procedure, the California Independent System Operator Corporation ("CAISO") hereby files this notice of the following written *ex parte* communication. On August 19, 2015, CAISO staff consisting of Thomas Doughty, Director of State Regulatory Strategy; Thomas Flynn, Storage and Distributed Energy Resource Policy Manager; and Delphine Hou, External Affairs Manager; met with Matthew Tisdale, Energy Advisor to Commissioner Florio, at the CPUC for approximately one hour to discuss the CAISO's progress in two of its public stakeholder proceedings: (1) Expanding Metering and Telemetry Options,[1] and (2) Energy Storage and Distributed Energy Resources ("ESDER").[2] CAISO staff only reiterated the CAISO's written and public comments in these proceedings and relevant stakeholder concerns.

Specifically, Mr. Flynn explained the CAISO's proposal enabling distribution connected resources to participate in the ISO market and why different rules apply to single Pricing Node

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[1] http://www.caiso.com/informed/Pages/StakeholderProcesses/ExpandingMetering-TelemetryOptions.aspx.

[2] http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorage_AggregatedDistributedEnergyResources.aspx.

("PNode") versus multiple PNode aggregations to accurately predict congestion effects. Mr. Flynn also explained the metering rules and the minimum threshold of 0.5 MW to participate in the CAISO market that would apply to distribution connected resources.

Regarding the ESDER stakeholder process, Mr. Flynn explained that, among other enhancements, the CAISO has proposed to explore alternative performance evaluation methods for demand response resources. These alternative performance evaluation methods would be based on those that meet North American Energy Standards Board ("NAESB") measurement and validation standards. Mr. Flynn also noted that some CAISO stakeholders have raised general jurisdictional concerns regarding behind-end-use-customer-meter resources participating in the wholesale market, but that no specific issues have been identified.

The slides attached hereto as Exhibit A were used as reference during the discussion. To request a copy of this notice, please contact Anna Pascuzzo (916-351-2212).

Respectfully submitted,

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Dated: August 21, 2015

Exhibit A

California ISO
Shaping a Renewed Future

CAISO storage and DER initiatives

Tom Flynn, Storage and DER Policy Manager

August 19, 2015

Presentation topics

- ISO initiative: Expanding Metering and Telemetry Options
- ISO initiative: Energy Storage and Distributed Energy Resources
- ISO initiative: Energy Storage Interconnection
- Proxy Demand Resource
- Non-Generator Resource

ISO initiative: Expanding Metering and Telemetry Options

Background

- Began in 2013 with a focus on reducing metering and telemetry barriers for resource participation and supporting emerging business models for resources interconnecting to the distribution grid.
- Identified that the ISO's tariff does not offer a clear platform for smaller (i.e., those < 0.5 MW) distribution connected resources to participate in ISO markets.
- Led to development of a proposal allowing aggregations of distribution connected resources to participate in the ISO market as a single market resource.
- Proposal was approved by the ISO Board of Governors on July 16, 2015.
- Next steps: Implementation including development and filing of tariff amendments, making changes to relevant business practice manuals, and making and implementing changes to market systems.

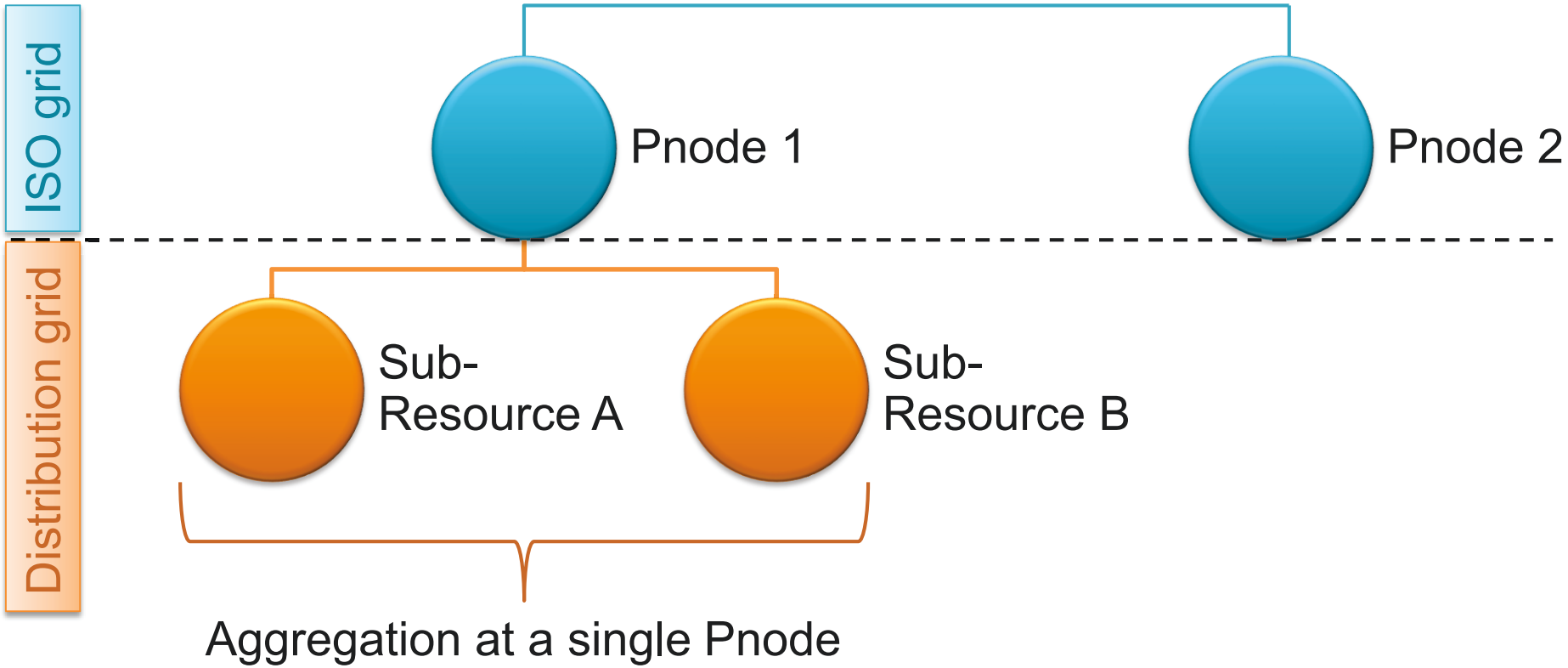
Proposal provides new provisions to enable distribution connected resources to participate in ISO market.

- Aggregations of distribution resources (distributed energy resources or DER) may include resources connected behind or in front of the end-use customer meter.
- The sub-resources in DER aggregations will be scheduling coordinator metered entities (SCME) which avoids having each sub-resource engaged in a direct metering relationship with the ISO.
- Sub-resources in DER aggregations must comply with applicable distribution company tariffs and requirements of the local regulatory authority.

Proposal limits geographic dispersion of an aggregation of distribution connected resources to meet ISO operational needs.

- Aggregations of distribution connected resources may be at a single pricing node or across multiple pricing nodes.
- Each resource aggregation must be within a single sub load aggregation point.
- Different rules apply to single versus multiple pricing node aggregations to accurately predict congestion effects.

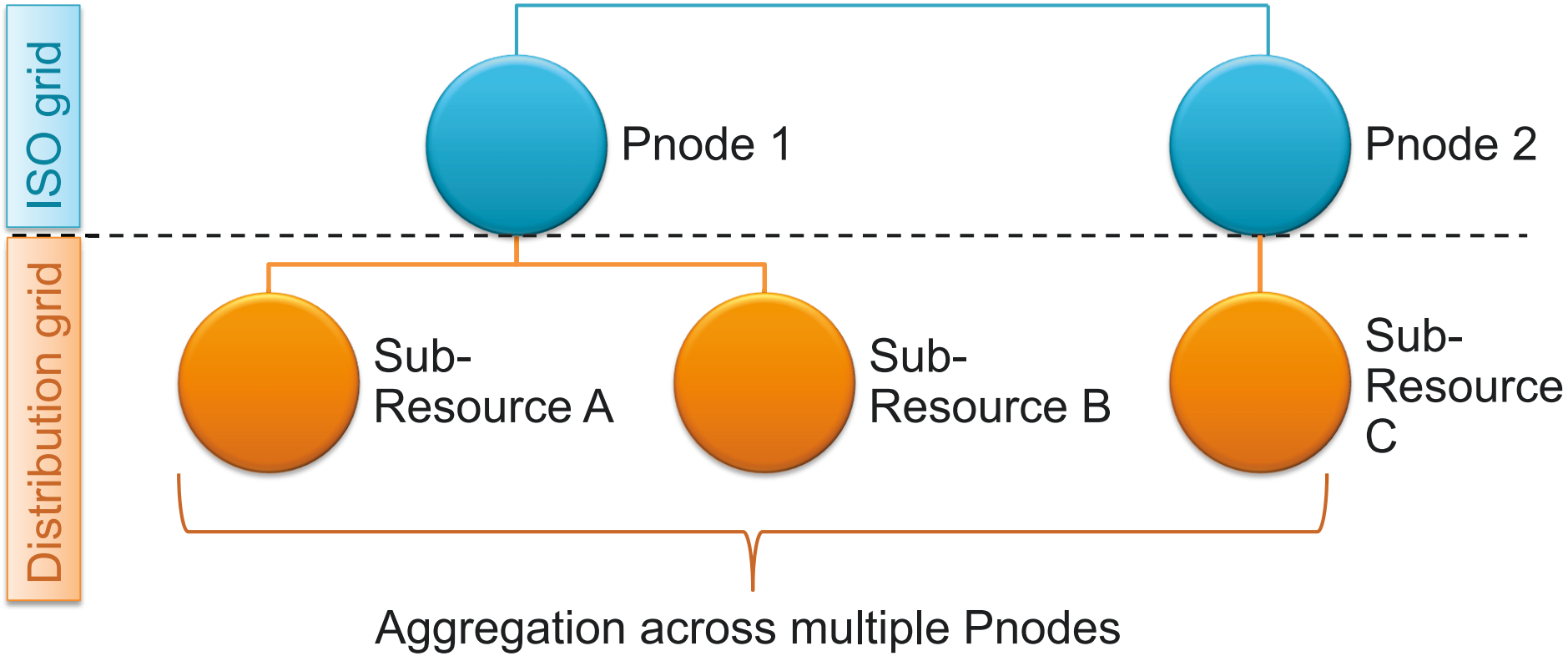
Illustration of an aggregation at a single pricing node.



For aggregations limited to a single pricing node, greater flexibility is provided due to predictability of its effect on congestion management.

- No maximum size limitation.
- A mixture of sub-resource types is allowed.
- All sub-resources do not have to move in the same direction as the ISO dispatch instruction.

Illustration of an aggregation across multiple pricing nodes.



For aggregations across multiple pricing nodes, additional rules are needed to limit adverse effects on ISO's ability to accurately predict congestion.

- Aggregations may not exceed 20 MW.
- Sub-resources must be homogenous and must move in the same direction as the ISO dispatch instruction.
- Energy storage aggregations must have all sub-resources operating in the same mode (i.e., charging or discharging) in response to an ISO dispatch instruction.

ISO initiative: Energy Storage and Distributed Energy Resources ("ESDER")

Background

- In 2013, CPUC established an energy storage procurement target of 1,325 MW by 2020.
- Developers responded with requests to interconnect storage to the ISO grid.
  - Queue cluster 7: 780 MW of energy storage (13 projects).
  - Queue cluster 8: 7,300 MW of energy storage (66 projects).
- In 2013-14, ISO conducted effort to clarify interconnection rules for grid-connected storage.
- In 2014, the California Energy Storage Roadmap was published.
  - Identified several high priority action items for the ISO on clarifying existing rules and identifying potential enhancements.

Background (continued)

- Focus of the ESDER initiative is on enhancing participation of grid connected storage and distribution connected resources in the ISO market.
- Scope and schedule of ESDER is divided into
  - Issues for potential policy resolution in 2015 (phase 1)
  - Issues for potential policy resolution in 2016 and beyond (phase 2)
- Presently working on the 2015 scope of issues.
- Work on the 2016 scope of issues will begin early next year.

Scope of issues for potential policy resolution in 2015.

1. Non-generator resource (“NGR”) model enhancements.
   - Update and improve public documentation.
   - Clarify how the ISO uses state of charge in market optimization and consider limited changes (e.g., make initial state of charge a submitted parameter in the day-ahead market).
2. Proxy Resource (“PDR”) and Reliability Demand Response Resource (“RDRR”) enhancements.
   - Consider use of alternative baselines.
3. Multiple use applications for non-resource adequacy (“non-RA”) resources.
   - Provides services to the distribution system or to end-use customers and participates in wholesale market.

Policy development on issues in 2015 scope to be completed by year end.

- Objective is to bring proposed resolutions to policy issues in the 2015 scope to the Board by December.
- This schedule does not include implementation steps.
  - Development and filing of tariff amendments.
  - Making changes to relevant business process manuals.
  - Making and implementing changes to market system software and models.

Scope of issues for potential policy resolution in 2016 and beyond.

1. Additional enhancements to the NGR and PDR market participation models.
2. Open policy issues from the Expanding Metering & Telemetry Options initiative.
3. Open policy issues from CPUC demand response working groups.
4. Distinction between wholesale charging energy and station power.
5. Additional multiple use applications, including RA cases.
6. Alignment between distribution level interconnection and the ISO new resource implementation process.
7. Pseudo-tie or dynamic scheduling arrangements for storage resources.

ISO initiative: Energy Storage Interconnection

Purpose was to clarify interconnection rules for ISO grid-connected storage

- Interconnection requests to the ISO grid are governed by the Generator Interconnection and Deliverability Allocation Procedures (GIDAP) approved by FERC in 2012.
- The initiative concluded in late 2014 and found that GIDAP can accommodate interconnection of storage projects to the ISO grid that want to be treated as generators.
  - Generator that produces positive energy during discharge mode and negative energy during charge mode
  - This is consistent with how storage participates in ISO wholesale markets under the non-generator resources (NGR) model.
  - Must respond to ISO dispatch instructions, including curtailment to manage congestion, during both charge and discharge modes.

Proxy Demand Resource (PDR)

The ISO offers several market models to enable load participation

Model	General Application
Participating load	• Large pumps • Loads
Pumped storage	• Large pumped storage • Small storage devices
Proxy demand resource (PDR)	• Aggregated, economically bid demand response
Reliability demand response resource (RDRR)	• Aggregated, emergency demand response

PDR provides demand response load curtailment participation comparable to supply resources

- Implemented in 2010.
- Allows for load reduction to be optimized across other supply resources.
- PDR can bid into the following markets:
  - Energy: day-ahead and real-time.
  - Ancillary services: non-spinning reserve and spinning reserve in day-ahead and real-time.
- PDR are scheduling coordinator metered entities (SCME).
- Demand Response Providers (DRPs) bid the demand response portion of LSE load into the ISO market.
  - Executes a DRP agreement with the ISO.
  - Must be a scheduling coordinator or obtain services of a scheduling coordinator.

Baselines

- PDR performance measurement and verification is calculated using a standard baseline type and methodology.
- Only the physical load can be metered and not the demand response quantity.
- A baseline calculates a “counter-factual” value, a theoretical measure of how much energy a customer would have consumed had there not been a demand response event.
- The baseline calculation compares the customer’s counter-factual energy use to actual energy use during the demand response event.
- The difference between the two is the “nega-watts” a demand response resource delivered during the event.
- The result serves as the meter data to financially settle the energy not consumed from a demand response resource.

Aggregation

- Unlike traditional generation, demand response resources are comprised of an aggregation of locations (aka “sub-resources”) to meet minimum participation requirements.
- PDR aggregations are permissible
  - Across multiple pricing nodes
  - Within the same ISO defined sub-LAP
  - With the same load serving entity

Non-Generator Resources (NGR)

Non-generator resources (NGR) model

- Developed as the initial model for energy storage devices to participate in ISO markets and implemented during 2011-2012.
  - Applies to ISO-grid and distribution connected resources
- NGRs are generation resources with a MWh limitation that can be seamlessly moved within an operation range consisting of
  - positive generation only
  - negative generation only, or
  - positive and negative generation
- ISO settles the energy dispatches for positive or negative energy (i.e., when discharging or charging) at the locational marginal price (LMP).

NGR characteristics

- Executes both a participating generator agreement and a participating load agreement with the ISO.
- Modeled as a generator with positive and negative energy.
- Constrained by an upper and lower capacity (MW) limit to inject or withdraw energy at a sustainable rate.
- Constrained by an energy (MWh) limit to inject or withdraw energy on a continuous basis.
- Can be dispatched seamlessly within their entire capacity range subject to their state of charge (SOC).
  - SOC is the amount of energy (MWh) remaining in the resource available for market participation.
- Any resource with a MWh constraint that can be seamlessly moved within its operational range can use this functionality.