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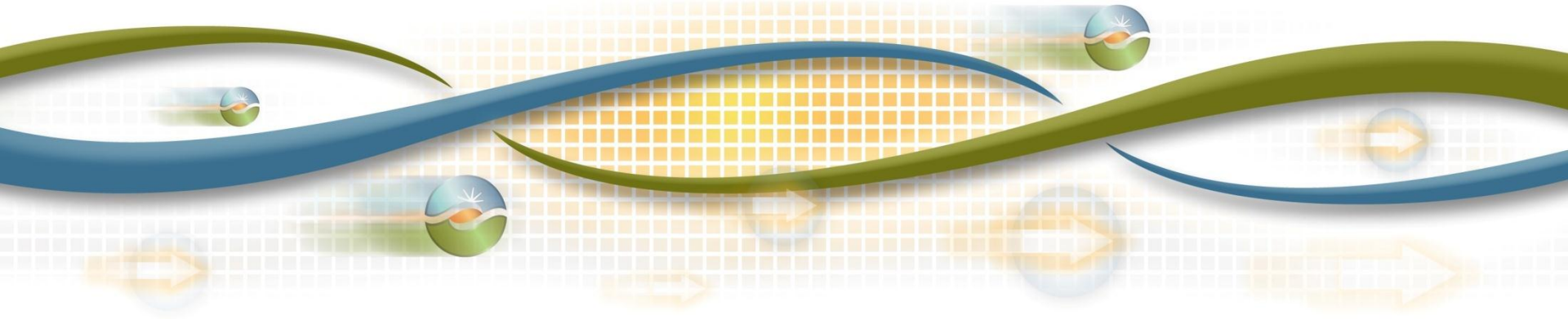
Flexible Resource Adequacy Criteria and Must-Offer Obligation

February 13, 2014

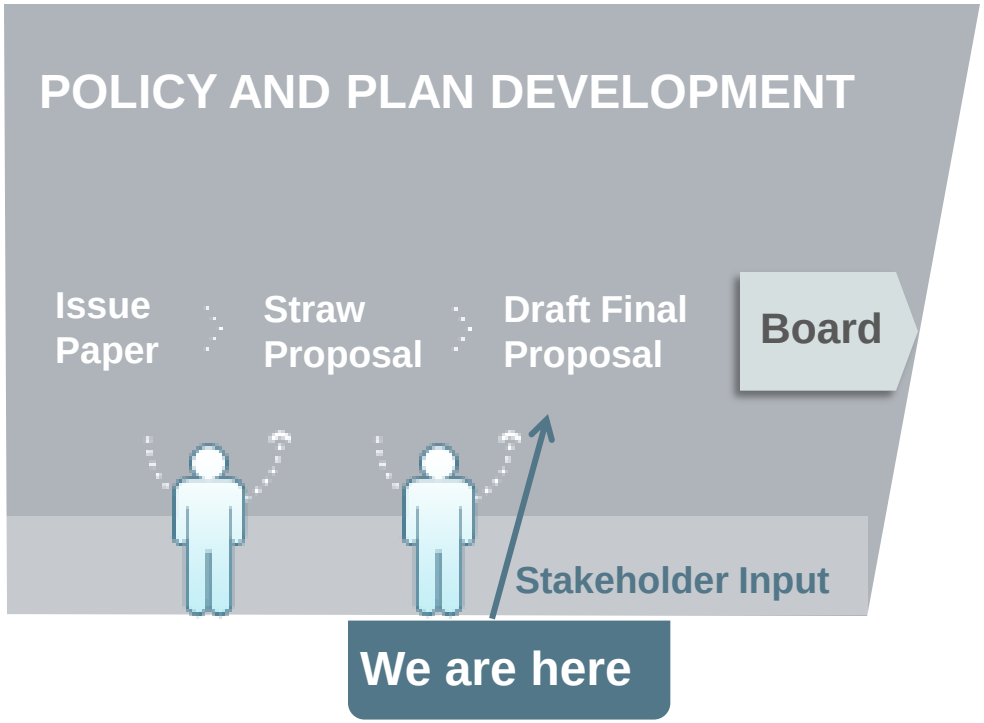
Karl Meeusen, Ph.D.
Market Design and Regulatory Policy Lead



Stakeholder Meeting – Agenda – 2/13/14

Time	Topic	Presenter
12:30 – 12:40	Introduction	Tom Cuccia
12:40 – 1:00	Overview and Meeting Objectives	Karl Meeusen
1:00 – 1:30	Clarifications and Changes to the Proposed Allocation Methodology and EFC Counting Criteria	
1:30 – 2:15	Defining the ISO's New Flexible Capacity Categories	
2:15 – 2:30	Break	
2:30 – 3:15	Defining the ISO's Flexible Capacity Category Must-Offer Obligation	Karl Meeusen
3:15 – 3:45	Backstop Procurement Authority	
3:45 – 4:00	Next Steps	Tom Cuccia

ISO Policy Initiative Stakeholder Process



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Flexible Resource Adequacy Criteria and Must-Offer Obligation: Draft Final Proposal

Karl Meeusen, Ph.D.
Market Design and Regulatory Policy Lead

Overview and Meeting Objectives

Initiative scope includes ISO tariff changes to address ISO system flexible capacity requirements

- Stakeholder process targeted to be completed by March 2014 for 2015 implementation
- Initiative scope includes:
  - ISO study process to determine flexible capacity requirements
  - Allocation of flexible capacity requirements
  - RA showings of flexible capacity to the ISO
  - Flexible capacity must-offer obligation
    - (Some provisions for use-limited resources may occur in 2016)
  - Backstop procurement of flexible capacity

The ISO has made the following changes from the fifth revised straw proposal

- Consolidated the four flexible capacity categories into three categories
  - This change combines “unlimited” and “limited flexibility” categories into “base flexibility” category
- The ISO will conduct on-going assessments to determine how well the categories function to meet flexible capacity needs for reliable grid operations
  - ISO will initiate a stakeholder process in Q1 2016 to discuss with stakeholders the findings and evaluate whether modifications to the flexible capacity requirements are needed

The ISO has made the following changes from the fifth revised straw proposal

- Provided additional clarity regarding the minimum eligibility criteria and must-offer obligations for each of the flexible capacity categories.
- Proposes revisions to the EFC counting criteria for
  - Combined heat and power (CHP) resources
  - Energy storage resources selecting the full flexible capacity option
- Clarified backstop procurement when there are simultaneous collective deficiencies in both system/local RA and flexible RA

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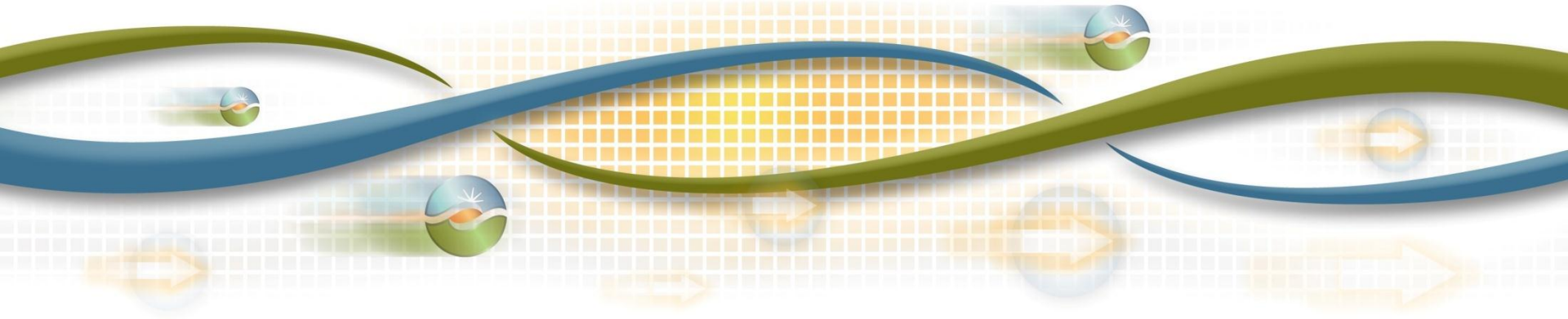
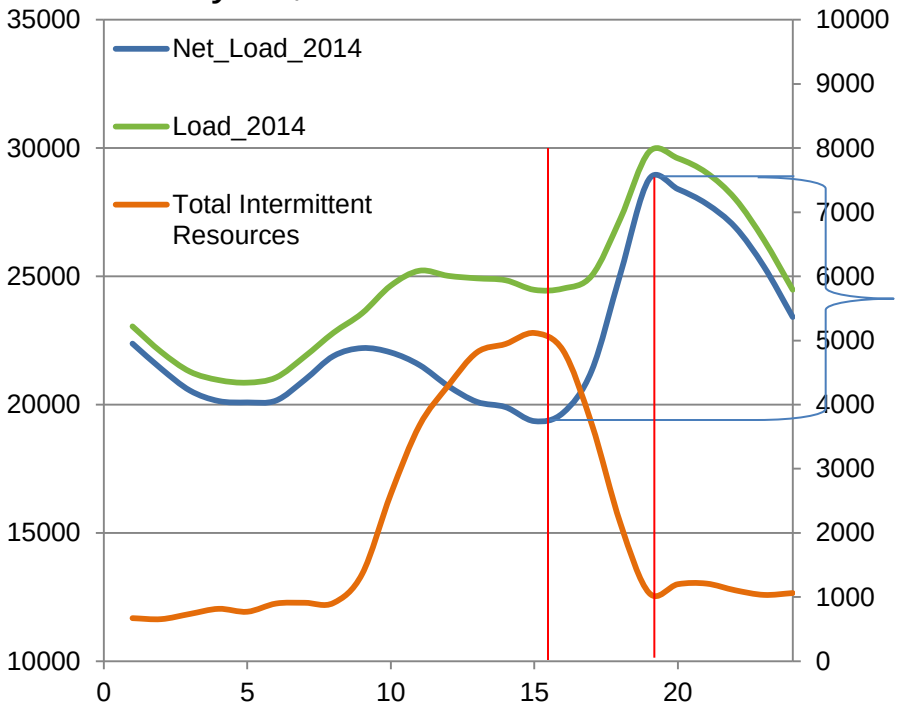
Proposal for Allocating ISO System Flexible Capacity Requirements and Resource Counting Criteria



Allocating flexible capacity requirements is based on LRA's contribution to system's monthly maximum 3-hour net-load ramp

- 3-hour maximum net-load ramp used is the coincident 3-hour maximum net-load ramp
  - Not each individual LSE's or LRA's maximum 3-hour ramp

Forecasted Load and Net load Curves: January 15, 2014



Flexible capacity requirement is split into its two component parts to determine the allocation

- Maximum of the Most Severe Single Contingency or 3.5 percent of forecasted coincident peak
  - Allocated to LRA based on peak-load ratio share
- The largest 3-hour net-load ramp is decomposed into four components to determine the LRA's allocation

  Allocation* =

  Δ Load – Δ Wind Output – Δ Solar PV** – Δ Solar Thermal

  * Changes in customer side DG component captured in Δ Load as identified in CEC load forecast

  ** Δ Solar PV should also capture changes in solar resource connected to the distribution system not already captured by CEC load forecast

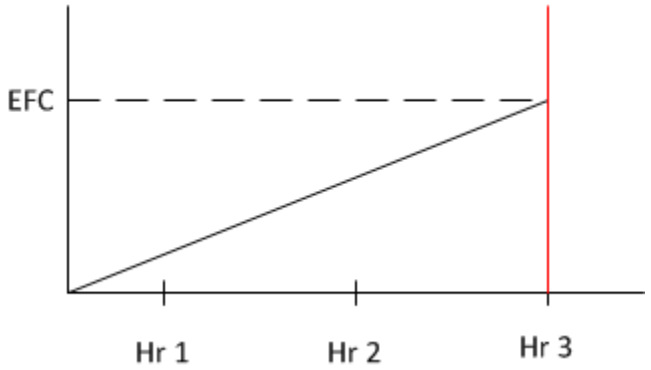
The ISO proposes to calculate the EFC for CHP resources in the same manner as proposed for other conventional resources

- There are a variety of different type of CHP resources
  - Same EFC calculation may not fully capture specific industrial that can impact the EFC of a CHP resource might wish to sell for a given month or year.
- CHP resources can designate any of its EFC range as “generic capacity”
  - Generic RA capacity can submit self-schedules or economic bids
  - Flexible capacity that is self-scheduled will be subject to charges under the flexible capacity availability incentive mechanism, once put into place.
- “Reliability-must-take” capacity should be considered by the SC for the CHP resource when selling flexible capacity
- EFC for CHP resources limited by the resource’s NQC.

The EFC of energy storage resources selecting the full flexible capacity option based on a three-hour discharge

- Storage resources may still elect one of two options:
  - Regulation Energy Management or
  - fully flexible capacity.

- The EFC of energy storage resources selecting the full flexible capacity option based on the MW output the resource can deliver after three hours of discharge at a constantly increasing discharge rate (i.e. ramp rate).



- Storage resources selecting the full flexible capacity option will be required to submit economic energy and ancillary service bids for the time period applicable to the category for which they are shown for flexible capacity

The ISO will require two RA showings for month-ahead and year-ahead RA showings

- LSE's must provide RA showings for:
  - System and local capacity and
  - Flexible capacity
- Resources can be on one or both showings
  - A resource can be shown as flexible and not count towards meeting a generic RA requirement
  - Resources shown only on the flexible capacity RA showing will be subject to the flexible capacity provisions but not the generic RA provisions

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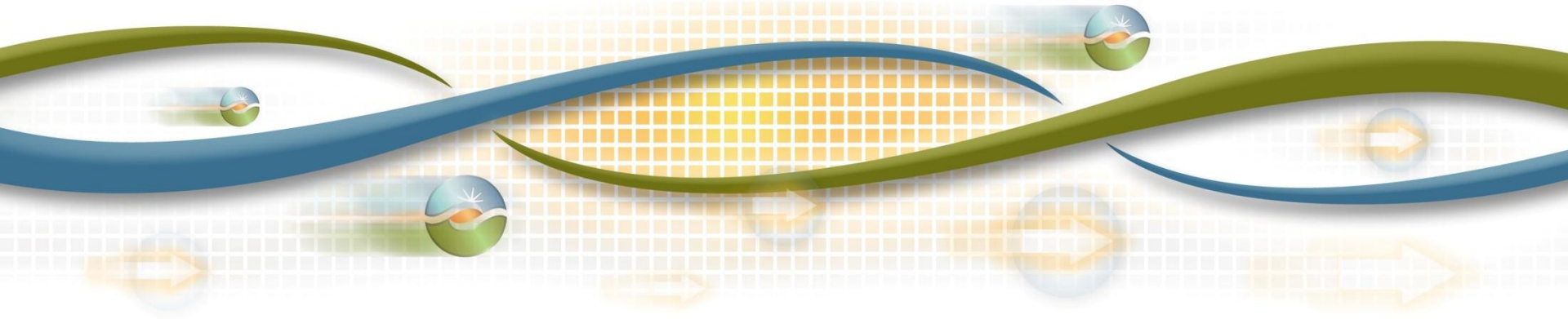
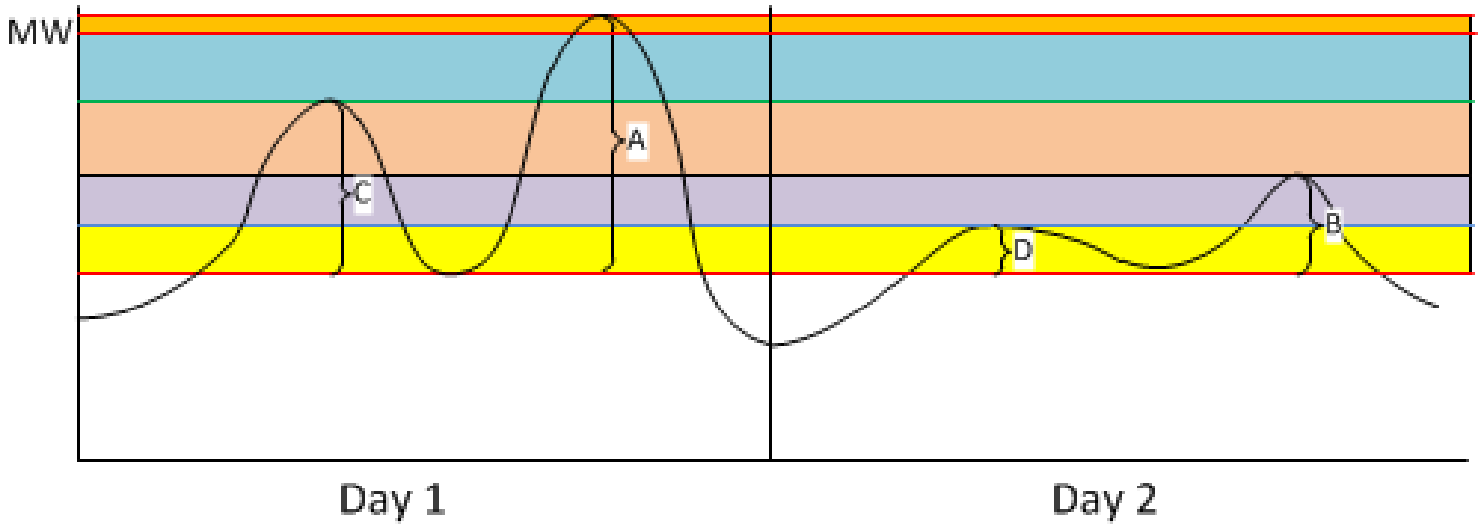
Defining the ISO's Flexible Capacity Categories and Flexible Capacity Category Must-Offer Obligation



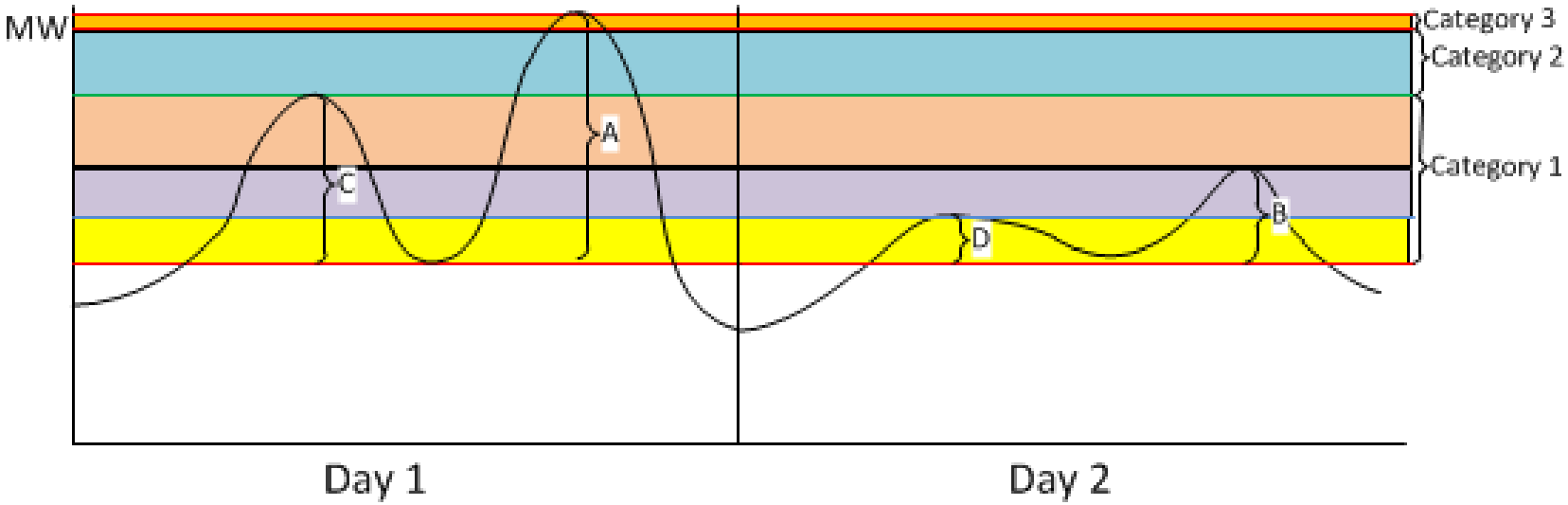
Categorizing the 3-hour net-load ramping needs



- A: The maximum 3-hour net-load ramp for a month
- B: The smallest daily maximum daily 3-hour net-load ramp in a month
- C: The largest secondary 3-hour net-load ramp of the month (i.e. the largest ramp on days that have bimodal ramping)
- D: The smallest secondary 3-hour net-load ramp in a month

Ramps are representative of publically available net-load forecast data

Flexible capacity categories allow LSEs to meet flexible capacity requirements with differing resource availabilities



Category 1 (Base Flexibility): Set at level of the largest secondary 3-hour net-load ramp in a month

Category 2 (Peak Flexibility): Set at difference between largest secondary 3-hour net-load ramp of the month and 95% of maximum 3-hour net-load ramp for a month

Category 3 (Super-Peak Flexibility): Set at 5% of maximum 3-hour net-load ramp for a month

Categories can provide lower cost solutions to meeting flexible capacity requirements and allow a broader portfolio of resources to provide flexible capacity

- The ISO has developed these categories acknowledging not all resources are available all the time
- The must-offer obligation for a resource corresponds to the category in which it is shown
  - The SC for the LSE can select the category in which a resource is shown
  - A resource capable of providing category 1 or 2 capacity could be shown in either or have some portion of the capacity in each depending on the LSE SC's flexible capacity showing
- Maximum of 3.5 percent expected peak load or most significant single contingency piece of the flexible capacity requirement allocated proportionately to each of the flexible capacity categories

Previously proposed “unlimited” and “limited” categories have been combined into “base flexibility” category

- ISO has reviewed 2014 RA showings from CPUC jurisdictional LSEs
  - Demonstrate it is not necessary to include an explicit category with 17 hour energy requirements
    - Limited number of energy limited resources provided in the 2014 showings that would qualify for the new base flexibility category
      - If all resources in the new base flexibility category had a six hour energy limit, it would result in operational concerns
- There is not yet sufficient information available to explicitly define a requirement for more than six hours of energy

ISO will conduct assessments to determine how well the categories provide the needed flexible capacity

- On-going assessments needed to:
  - Provide information about how well the designed categories meet system's operational needs and
  - Identify areas where adjustments or improvements could be made
    - ISO may identify need for an additional flexible capacity category requiring more than six hours of energy
    - Opportunities to refine the categories to better accommodate preferred resource participation
- ISO will initiate a stakeholder process in Q1 2016 to discuss with stakeholders the findings and recommend potential modifications to the flexible capacity requirements

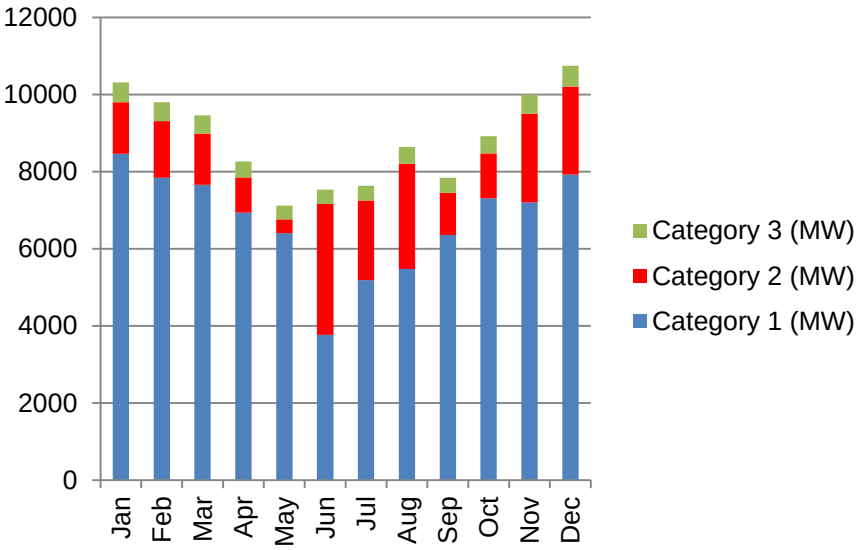
Proposed offer-obligations associated with each category

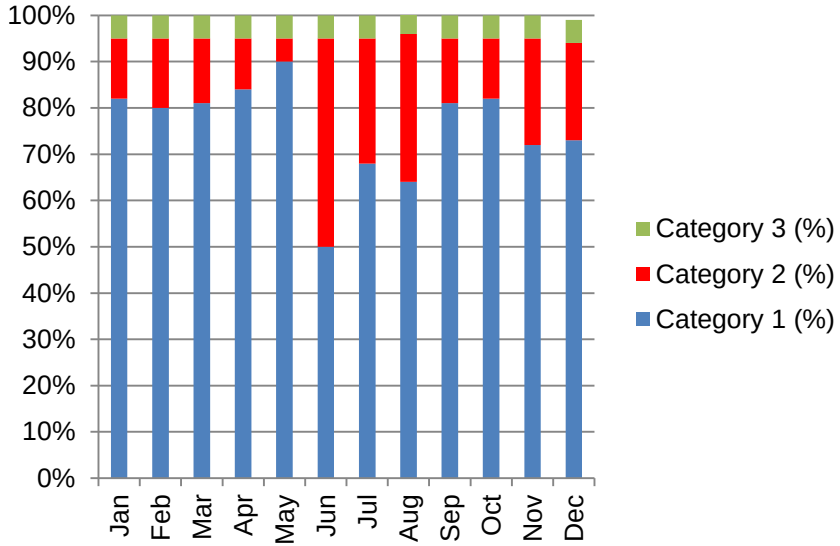
Parameter	Category 1 (Base Ramping)	Category 2 (Peak Ramping)	Category 3 (Super-Peak Ramping)
Economic Bid Must-Offer Obligation	5:00 a.m. – 10:00 p.m.	5 hour block (determined seasonally)	5 hour block (determined seasonally)
Energy Requirement	Minimum 6 hours at EFC	Minimum 3 hours at EFC	Minimum 3 hours at EFC
Daily Availability	7 days/week	7 days/week	Non-holiday weekdays
Maximum or Minimum Quantity of Capacity Allowed in Category	Minimum requirement set monthly based on largest secondary net load ramp	Maximum set based on difference between the 100% of the requirement and category 1	Maximum of 5% per month of the total requirement per month

Proposed offer-obligations associated with each category (Cont.)

Parameter	Category 1 (Base Ramping)	Category 2 (Peak Ramping)	Category 3 (Super-Peak Ramping)
Daily Start-Up Capability	The minimum of two starts per day or the number of starts allowed by operational limits as determined by minimum up and down time	At least one start per day	At least one start per day
Other Limitations	No monthly or annual limitations on number of starts or energy limits that translate to less than the daily requirements	No monthly or annual limitations on number of starts or energy limits that translate to less than the daily requirements	Must be capable of responding to at least 5 dispatches per month
Examples of resource Types that Could Qualify for Category	Conventional gas fired resources, wind resources hydro resources, and storage resources with long discharge capabilities	Use-limited conventional gas fired resources, solar resources and conventional gas fired peaking resources	Short discharge battery resources providing regulation and demand response resources

Monthly minimum capacity requirements for category 1 and maximum capacity limits for categories 2 and 3 (2014 forecast)

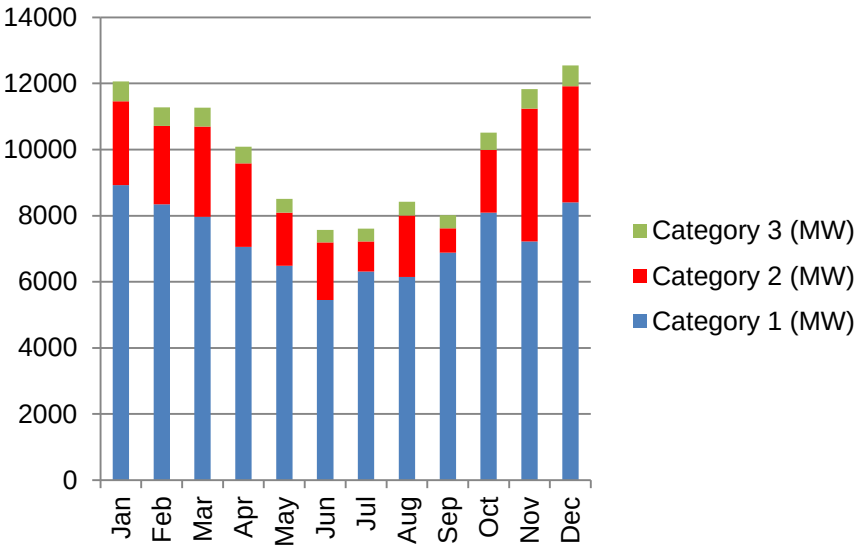


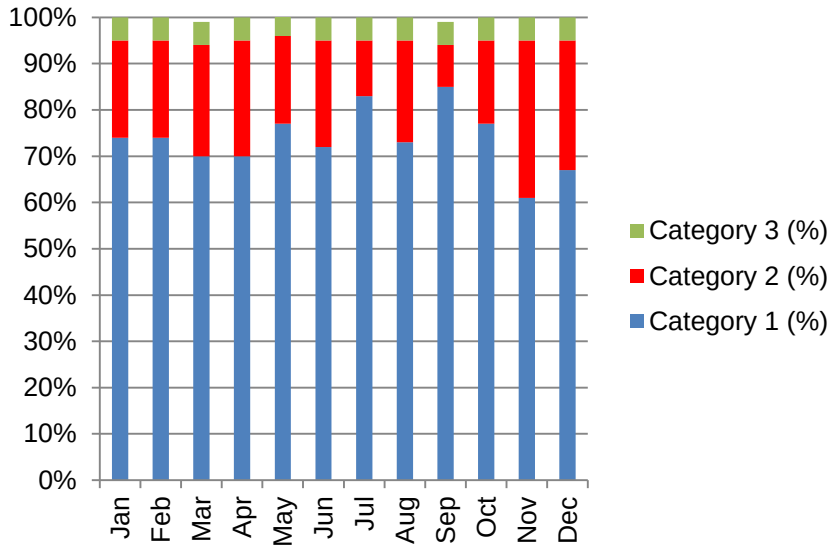


Category 1 can be used to meet cumulative quantities for categories 1, 2, and 3 requirements

Category 2 can be used to meet cumulative quantities for categories 2 and 3 requirements

Monthly minimum capacity requirements for category 1 and maximum capacity limits for categories 2 and 3 (2016 forecast)

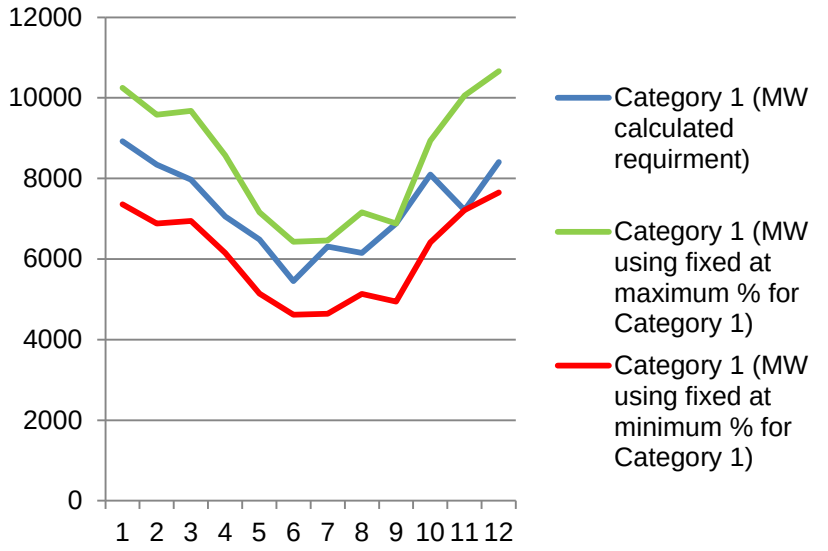


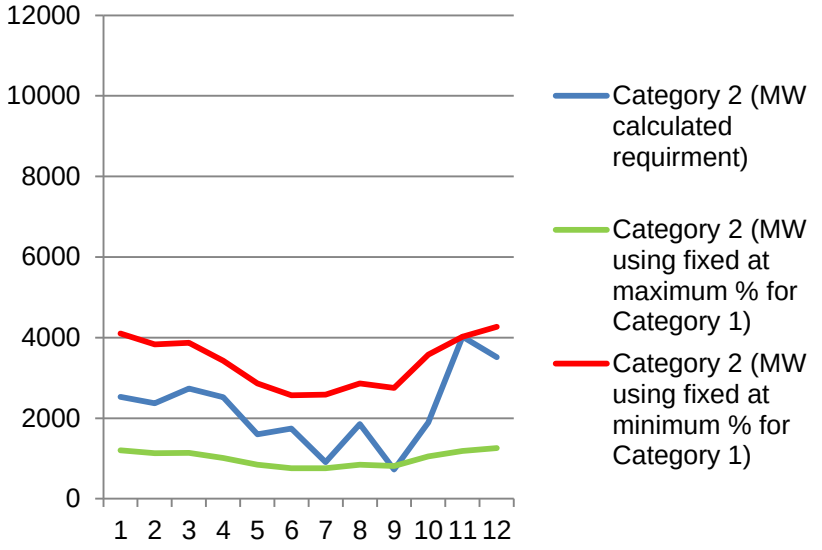


Category 1 can be used to meet cumulative quantities for categories 1, 2, and 3 requirements

Category 2 can be used to meet cumulative quantities for categories 2 and 3 requirements

Using fixed percentages over the whole year would lead to over or under procurement (2016 forecast)





- Quantity of MWs required in each category differs month to month regardless of percentage in each category
- A fixed percentage at the highest/lowest percentage will lead to over/under procurement of base flexibility resources in all months but one
- A fixed percentage at the average will result in over procurement of base flexibility resources in some months and under procurement in others

The addition of the categories does not necessitate changes to the ISO's proposed allocation methodology

- The ISO looked at LRAs' contributions to each category to determine if a more complicated allocation methodology is warranted and more consistent with causation principles.
- Preliminary assessment does not indicate a significant difference between the ISO proposed allocation methodology and one that examines a specific LRA's contribution to each category

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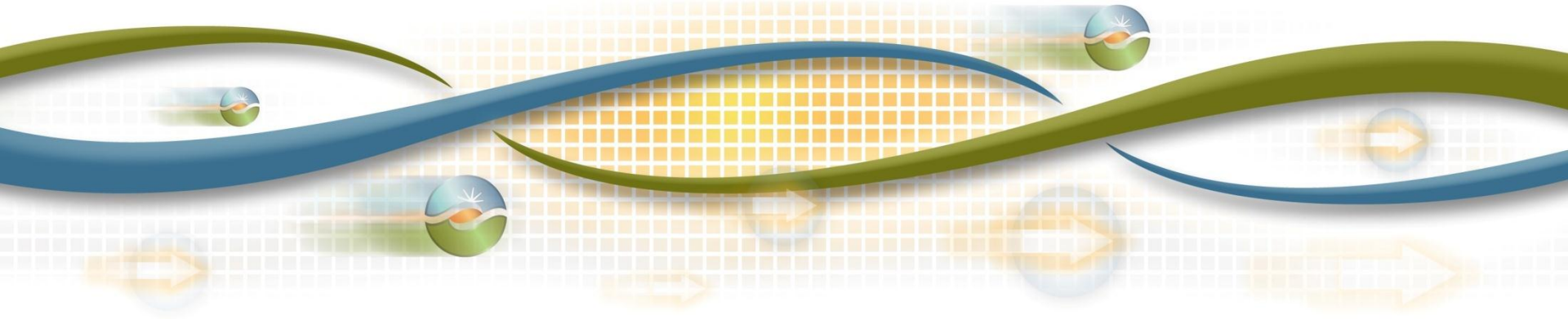
Proposed Flexible Capacity Backstop Procurement Authority



The ISO will look to minimize the amount of capacity procured through backstop mechanism

- When there are simultaneous collective deficiencies in both system/local RA and flexible RA, each caused by different LSEs the ISO will:
  - Backstop for the flexible capacity deficiency first and allocate costs
  - Count this capacity towards the collective system deficiency to determine if it is sufficient to cover the collective capacity deficiency
    - If yes, no additional backstop procurement
    - If no, procure any additional system capacity and allocate costs according to the existing backstop procurement provisions
- Resources accepting this designation would be subject to both the generic and flexible capacity must-offer obligations
  - As with any CPM designation, acceptance by a resource is voluntary

Reliability Services Initiative will ultimately be the initiative where primary backstop procurement mechanism is designed

- Will provide market based mechanism to procure flexible capacity shortfalls
- Will likely have to maintain mechanism similar to CPM for more limited circumstances

The ISO will defer further development of several components to the Reliability Services stakeholder initiative

- Standard Flexible Capacity Product
  - Included value of flexible capacity availability
- Opportunity cost bidding for start-up and minimum load costs for conventional use-limited resources
  - ULR required to submit economic bids for their flexible capacity category into the real time market consistent with applicable use-limitations
- Substitution and replacement rules for flexible capacity resources on planned or forced outages
  - Existing substitution and replacement rules for generic capacity will still apply

Next Steps

- Comments on Draft Final proposal
  - Due February 21, 2014
  - Submit comments to fcp@caiso.com
- Board of Governors
  - March 2014