Joint Parties Interim Flexible RA Proposal

Determining the Flex RA Requirements

Presented by SCE

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CAISO's Need for Flexibility

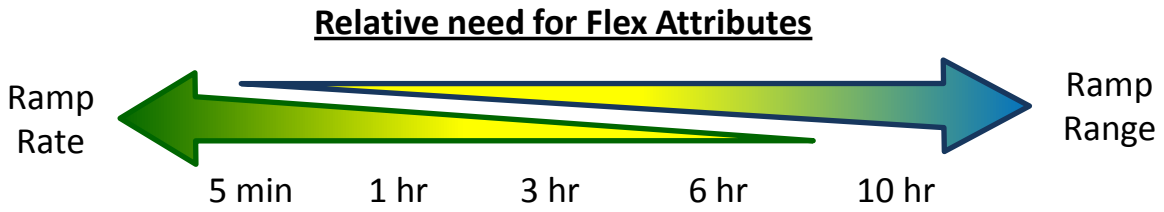
- Current RA Program
  - Sets procurement targets for two capacity attributes: System and Local
  - No explicit accounting of or requirements for "flexible" capacity attributes
- What is Changing
  - New renewable resources are being added to the CAISO system, increasing the CAISO's need for flexibility,
    - Most renewable resources do not contribute additional flexibility
  - New renewable resources count for RA and are assumed, along with all existing RA-eligible renewables, to be included in LSEs' RA showings
  - If RA procurement practices remain unchanged, new renewables can potentially "crowd out" flexible resources that would otherwise have been used to meet LSEs' RA requirements
  - Insufficient flexibility can result in the inefficient use of some resources, greater price volatility in ISO markets and, in the extreme, puts the CAISO as risk of not meeting established WECC operating reliability criteria
- Solutions
  - Interim (2014-2017): Introduce an explicit requirement for flexible capacity attributes compatible with existing CPUC and LRA RA programs
  - Long-term: Comprehensive redesign of RA programs into multi-year forward mechanism

Key Objectives of an Interim Flex RA Solution

- The design of interim RA flexible capacity attributes and requirements should be such that they:
  - Ensure a portfolio of flexible RA resources are made available to the CAISO that possess the attributes necessary to reliably operate the grid
  - Are compatible with key elements of the existing CPUC RA framework
    - One year forward
    - Does not change the form, function, processes or requirements of existing RA capacity attributes (i.e., System & Local)
    - Allocates discrete procurement requirements to individual LSEs
  - Result in efficient bilateral RA procurement
    - Does not create significant need to grandfather existing RA contracts
    - Maintains the fungible capacity benefits of Standard Capacity Product
    - Does not create or increase ability to exercise market power
- This interim Flex RA solution may help reduce, but does intentionally eliminate risk of uneconomic retirement
  - Requires minimal if any change to ISO's CPM
  - Managing risk of uneconomic retirement is explicitly left to some other procurement mechanism (e.g., LTPP, ISO ROR backstop)

Establish System Flexibility Requirements

- ISO's need for flexibility
  - ISO's actual needs are "two-dimensional" and differ by variable periods of time
    - Both "ramp range" and "ramp rate" capacity attributes are needed
    - Combination of range and rate needs vary greatly by interval of time



    - ISO must meet all period needs whenever they occur
    - ISO's spot markets determine how best to use available flexible resources to meet these multiple needs
- Forward procurement challenge
  - Identifying and meeting ISO's specific needs through forward bilateral procurement is impractical
    - Needed combinations of range and rate attributes are highly variable and difficult to forecast
    - Resource range and rate attributes are highly fungible in ISO markets which makes forward procurement of separate attributes imprecise and inefficient
- Interim Solution
  - Define a "one-dimensional" requirement measured over a fixed period of time, that produces a portfolio of Flex RA resources which is most likely able to meet all of ISO's flexibility needs

Proposed Definition of Flex Requirement

- Proposed requirement is the combined need for ramping over a defined period of time and contingency reserves
  - Ramping Needs
    - **Max 3-hr net monthly load ramp**
  - Contingency Reserves
    - **Greater of monthly MSSC or 3.5% peak load**
- Why is this requirement definition appropriate?
  - Crafting a "comprehensive" definition of flexibility requirements proved more difficult than first imagined
  - Designing product(s) to satisfy a "comprehensive" requirement proved impractical in the existing bilateral procurement RA framework
  - The proposed "partial" definition of flexibility requirements targets and prevents the main near-term threat to reliability – the crowding out of existing dispatchable resources as new renewables come on line
- Why 3-hr max net load ramp?
  - See next slide
- Why are the two requirements additive?
  - Same pool of "Flex" resources must used to meet both ramping and reserve requirements
- Why 3.5% instead of 5-7% reserves?
  - Unlike MSSC, which can happen at any time, max 3-hr ramp and peak load are never coincident
  - Other resources non

Proposed Definition of Flex Requirement (cont.)

- Why 3-hr max net load ramp?
  - Cannot assess reliability implications of any given time period in isolation, must also consider how time period impacts resource eligibility
    - If a 5-hr net load ramp is 50% larger than 3-hr ramp, but the pool of eligible resources is also 50% larger, then no relative change in reliability or procurement opportunity between the two periods
  - Shorter period ramps are more consistent with identified interim need
    - Risk of Flex shortfalls during interim period is largest in non-summer months, where max ramps tend to be in the 2-4 hour range
  - Ramp Rate "gaps" are smallest in shorter periods
    - Multiple Flex RA portfolios can meet a defined ramp range, but each with different ramp rate characteristics
    - Analysis of the existing fleet of dispatchable resources suggests the "gap" between best and worst portfolio ramp rates is minimized with a 1-hr requirement, with relative gaps @ 2-hr and 3-hr requirements not materially larger