California ISO
Shaping a Renewed Future

Reliability Services Initiative

Incentive Calculation Model

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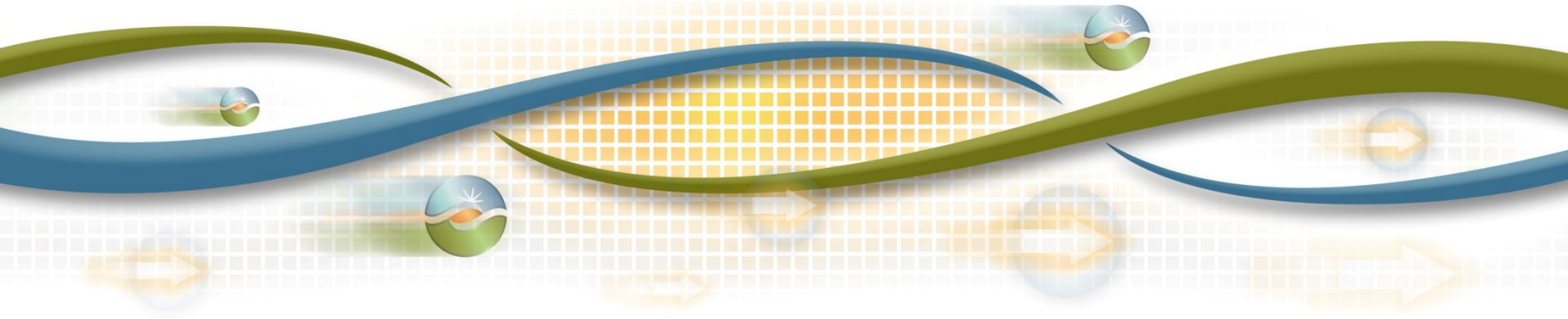


Agenda

- Incentive model summary
- Example 1- conventional flexible RA resource
- Example 2 – conventional generic and flexible RA resource
- Example 3 – solar generic resource

Incentive Model Summary

1. Determination of hour obligation (generic, flex, or both)
2. Hourly assessment of availability based on bids
3. Daily resource specific percentage availability calculated
4. Resource specific MW charge and payment thresholds calculated
5. Resource paid for MW's above threshold
6. Resource charged for MW's below threshold

EXAMPLE 1: CONVENTIONAL FLEXIBLE RA RESOURCE

Example 1: Conventional flexible resource

- Resource characteristics:
  - Pmin = 0
  - NQC = 100
  - EFC = 100
- Resource is shown as:
  - Flexible 70 MW in category 1

Example 1: Hour* evaluation by day

- Weekend day: Flexible assessment only
- Hours of evaluation 5am – 10pm

*Hours are illustrative

Example 1: Hourly assessment

Flexible showing: 70 MW

- **Bidding in 15 hours of day:**
  - Self-schedule = 90 MW
  - Economic bid = 10 MW
  - Qualified available MW = 10 MW
- **Bidding in 2 hours on day:**
  - Economic bid = 60 MW
  - Qualified available MW = 60 MW

Example 1: Daily availability assessment

- Total assessment hours: 17 hours
- Daily incentive capacity = 70 MW
- Total availability:
  - 15 hours * 10 MW + 2 hours * 60 MW = 270 MW
- Daily incentive availability:
  - 270 MW / 17 hours = 15.88 MW
- Daily incentive availability reflects the daily MWs that the ISO will compared against the charge and payment MW thresholds.

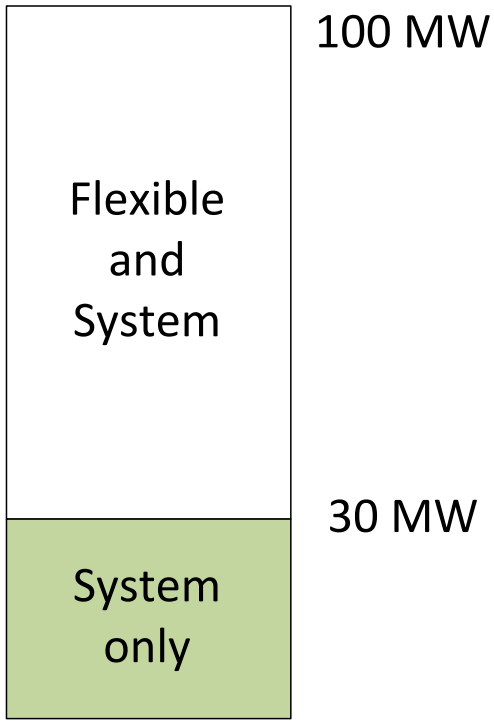
Example 1: Daily availability payment/charge assessment

- Thresholds are calculated using the percentage bands around 96.5%
  - Charge Threshold:
    - 70 MW * 94.5% = 66.15 MW
  - Payment Threshold:
    - 70 MW * 98.5% = 68.95 MW
- Non-availability Charge MW:
  - 66.15 MW – 15.88 MW = 50.27 MW
- 50.27 MW * $112.9 = $5,675 (using $3.5/kW-mo)

EXAMPLE 2: CONVENTIONAL FLEXIBLE AND GENERIC RA RESOURCE

Example 2: Conventional flexible and generic resource

- Resource characteristics:
  - Pmin = 0
  - NQC = 100
  - EFC = 100
- Resource is shown as:
  - System 100 MW
  - Flexible 70 MW in category 1



Example 2: Hour* evaluation by day

- Weekday: Flexible and generic assessment
- Hours of evaluation 5am – 11pm
  - Flexible only: 5am – 6pm
  - Flexible and generic: 6pm – 10pm
  - Generic only: 10pm – 11pm

*Hours are illustrative

Example 2: 5am – 6pm characteristics

- Resource characteristics:
  - EFC = 100
- Flexible showing: 70 MW
- Bidding in 13 hours of day:
  - Self-schedule = 0 MW
  - Economic bid = 50 MW

Example 2: 5am – 6pm hourly assessment

Flexible showing: 70 MW

- Bidding in 13 hours of day:
  - Self-schedule = 0 MW
  - Economic bid = 50 MW
- Assessment:
  - Qualified available MW = 50 MW
  - Total RA incentive capacity = 70 MW

Example 2: 6pm – 10pm characteristics

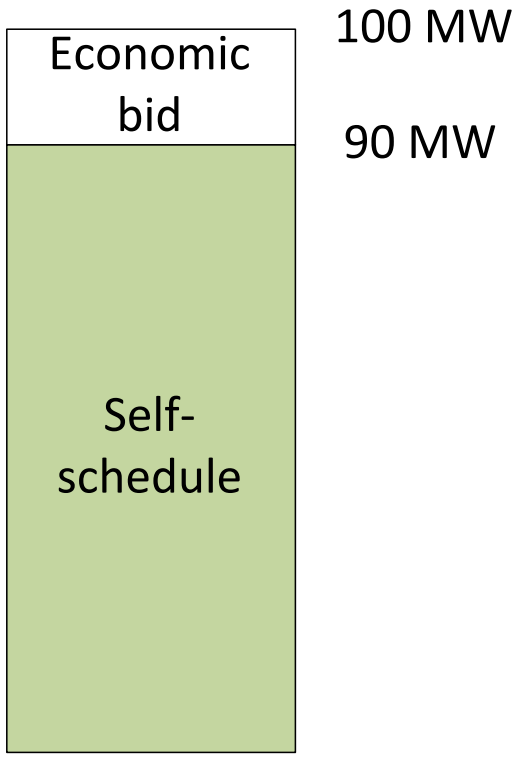
Flexible showing: 70 MW

Generic showing: 100 MW

- Bidding in 4 hours of day:
  - Self-schedule = 90 MW
  - Economic bid = 10 MW

Example 2: 6pm – 10pm overlapping hour bidding behavior

- Resource is bid in:
  - Self-schedule = 90 MW
  - Economic bid = 10 MW



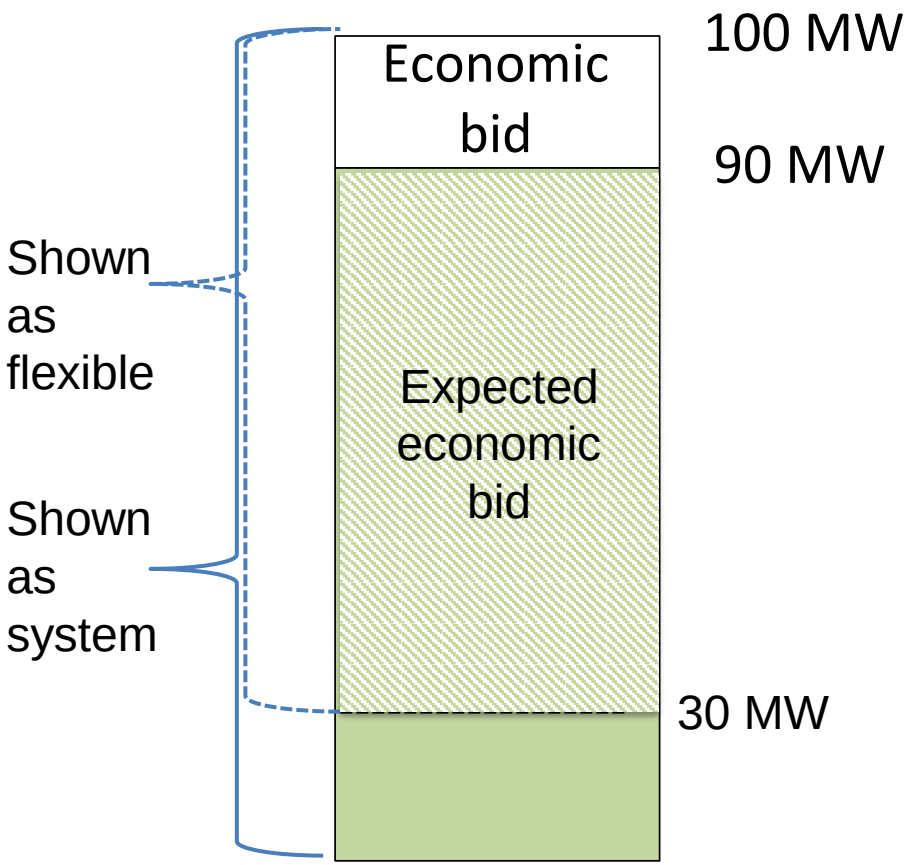
Example 2: 6pm – 10pm hourly assessment set up

Flexible showing: 70 MW

Generic showing: 100 MW

- Total RA:
  - Max(flexible requirement, generic requirement)
  - Max (70 MW, 100 MW) = 100 MW
- Target RA quantities:
  - Flexible RA: flexible showing MW amount
  - Generic RA that can be met through a self-schedule: Minimum {(Max RA – flexible showing amount MW), generic showing MW}

Example 2: 6pm – 10pm overlapping hour bidding behavior and showing



Example 2: 6pm – 10pm hourly assessment

- Total RA:
  - Max (70 MW, 100 MW) = 100 MW
- Maximum qualified bid amounts:
  - Flexible RA: 10 MW
  - Generic RA met through self-schedule: 30 MW
- Assessment:
  - Qualified available MW = 40 MW
  - Total RA incentive capacity = 100 MW

Example 2: 10pm – 11:00pm characteristics

- Resource characteristics:
  - NQC = 100
- Generic showing: 100 MW
- Bidding in final hour of day:
  - Self-schedule = 90 MW
  - Economic bid = 10 MW

Example 2: 10pm – 11pm hourly assessment

Generic showing: 10 MW

- Bidding in final hour of day:
  - Self-schedule = 90 MW
  - Economic bid = 10 MW
- Assessment:
  - Qualified available MW = 100 MW
  - Total RA incentive capacity = 100 MW

Example 2: Daily assessment

- Daily incentive capacity: 78.82 MW
  - 5am to 6pm : 70 MW
  - 6pm to 10pm: 100 MW
  - 10pm to 11pm: 100 MW
- Total availability: 50.59 MW
  - 5am to 6pm : 50 MW
  - 6pm to 10pm: 40 MW
  - 10pm to 11pm: 100 MW

Example 2: Daily assessment

- Daily MW thresholds based on 2% band around 96.5%
- Charge threshold:
  - 78.82 MW * 94.5% = 74.49 MW
- Payment threshold:
  - 78.82 MW* 98.5% = 77.64 MW
- Non-availability charge MW:
  - 74.79 MW – 50.59 MW = 23.90 MW
- Non-availability charge:
  - 23.90 MW * ($3.5 / 31 days)*1000 = $2,698

EXAMPLE 3: SOLAR GENERIC RA RESOURCE

Example 3: Solar generic resource

- Resource characteristics:
  - Pmin = 0
  - NQC = 100
- Resource is shown as:
  - Generic 100 MW
- Resource forecast:
  - ISO

Example 3: Hour* evaluation by day

- Weekday: Generic assessment only
- Hours of evaluation 6pm – 11pm

*Hours are illustrative

Example 3: Hourly assessment

Generic showing: 100 MW

Hour	Forecast	Bid
7	100	100
8	120	120
9	110	110
10	80	80
11	70	70

Example 3: Daily availability assessment

- Total assessment hours: 5 hours
- Total incentive capacity:
  - 100 +120 + 110 + 80 + 70 = 480 MWh
- Total availability:
  - 100 +120 + 110 + 80 + 70 = 480 MWh
- Daily incentive capacity:
  - 480 MWh / 5 hours = 96 MW
- Daily incentive availability:
  - 480 MWh / 5 hours = 96MW

Example 3: Daily availability payment/charge assessment

- Thresholds are calculated using the percentage bands around 96.5%
  - Charge Threshold:
    - 96 MW * 94.5% = 90.72 MW
  - Payment Threshold:
    - 96 MW * 98.5% = 94.56 MW
- Availability Payment MW:
  - 96 MW – 94.56 MW = 1.44 MW
- 1.44 MW will be paid through pool of non-availability charges