Objectives

- After this training, the attendee will be able to:
  - Identify what information can be identified when an Operating Instruction is sent to ADS by ISO operator
  - Identify upcoming dates for implementation
Review terminology: Eligible Intermittent Resources (EIR)

- Eligible Intermittent Resource (EIR)
  - A Variable Energy Resource (VER) that is a Generating Unit or Dynamic System Resource subject to a Participating Generator Agreement (PGA), Net Scheduled PGA, Dynamic Scheduling Agreement for Scheduling Coordinators, or Pseudo-Tie PGA
A command by operating personnel responsible for the Real-time operation of the interconnected Bulk Electric System to change or preserve the state, status, output, or input of an Element of the Bulk Electric System, a Facility of the Bulk Electric System or the facilities of a Participating Generator. An Operating Instruction will be communicated consistent with the practices described in NERC Reliability Standard COM-002-4.
To review, in 2018 -

- Eligible Intermittent Resources (a form of Variable Energy Resources) at times can pose an operational risk when certain system conditions persist:
  - Overgeneration, transmission constrained
- Updates and clarifications on Tariff Section 34.13.1 Response Required by Resources to Dispatch Instructions and BPM Appendices to Market Operations A.12.1 EIR Self-Schedules, Economic Bids, and Dispatch
- Stakeholder Initiative – comments/revisions/FERC approval
Dispatch Operating Target Tariff (DOTT) Clarification Project for implementation with Fall Release 2020

- Operating Instructions currently given through verbal instruction
- Project includes changes to allow for EIRs to receive Operating Instructions for EIRs in ADS
- Project to incorporate changes to allow EIRs to automate responses to operational instructions that may require a resource to not exceed their DOT

- Business Requirements Specification 1.1
Tariff section 34.13.1

- Notwithstanding the requirements to comply with and respond to Dispatch Instructions, *when an Eligible Intermittent Resource’s Dispatch Operating Target is equal to its forecasted output, it may produce to its capability*. An Eligible Intermittent Resource in the process of developing a CAISO forecast pursuant to Section 3.1 of Appendix Q may produce to its capability when its Dispatch Operating Target is equal to its scheduled output.

```
If...EIR Market DOT MW = EIR Forecast MW → Generate as capable
```
• Consistent with Section 34.13.1 of the Tariff, the EIR must not exceed its Dispatch Operating Target when the SUPP component of the Dispatch Instruction is negative. Scheduling Coordinators that repeatedly and intentionally deviate from their Dispatch Operating Target may be investigated and referred to FERC for violations of the CAISO tariff. See section 7.8.3.1.3 of the Market Operations BPM for more information about SUPP component of the DOT.
BPM – Appendices to Market Operations A.12.1

• The CAISO may issue an Operating Instruction directing an Eligible Intermittent Resource not to exceed its Dispatch Operating Target if necessary to maintain system reliability consistent with Section 7.6 or 7.7 of the CAISO tariff. Operating Instructions are communicated pursuant to NERC Standard COM-002-4. The CAISO will issue written or verbal communications to relevant Scheduling Coordinators when an Operating Instruction directs EIRs not to exceed Dispatch Operating Targets. Failure to follow an Operating Instruction is a violation of the CAISO Rules of Conduct (CAISO Tariff Section 37).
Example:

Calculations show transmission or system concerns

EIRs may be effective to mitigate the concerns (reduced output) and market dispatches DOT

Some EIRs have negative RT Suppl Energy values
DOT < Forecast

See Appendices for Market Operations BPM section A.12.1 and Market Operations BPM sections 7.2.3.4 and 7.8.3.1.3 for more information about dispatch instructions and the SUPP component of the DOT
If experiencing system issues, CAISO generation desk may issue Operating Instructions

- The operator may issue an Operating Instruction to not exceed DOTs.
- Operating Instructions require communication per *NERC Standard COM-002-4
- Resources must not exceed DOTs until the Operating Instruction is changed.

*Operating Instructions have NERC compliance implications
With DOT Tariff Clarification Project, two new flags introduced in new ADS Replacement

• Operating Instruction Flag
  – Indicating an Operating Instruction is in place
• Follow DOT Flag
  – Indicated scenario where EIR not to exceed DOT
  – Can flag in two scenarios:
    • Flags for market optimization Resource DOT < Forecast (i.e Negative SUPP) OR
    • When an Operating Instruction in place
Under challenging local or system conditions, additional needed control of resources can trigger an operating instruction by the ISO operator.

- Operating Instruction
  - Yes: Do not exceed DOT
  - No: Generate as capable
Operating Instruction issued and sent from RTM to ADS

Operating Instruction placed into Real Time Market by Operator

- **Resources**
  - Individual EIR resources
  - EIRs by group (Trans Access Charge Area/Trading hub)
  - All EIRs in system (CAISO BAA)

- **Reason**
  - Congestion
  - System Reliability
  - Over generation

- **Start/End Time**
Operating Instruction Received by ADS

• New Instruction Type: OP Instruction
• Message Notification/Pop up in UI
  – Will remain until acknowledged
  – Acknowledgement recorded
  – If any changes are made, this would re-appear
• Operating Instruction Flag
• Reason
  – Congestion
  – System Reliability
  – Over generation
• Start Time
• End Time

Note: API v8 will have similar notification type with these data fields
Operating Instruction Example

Operator identifies operational issue on Resource A at 0850 PPT and issues an operating instruction to the resource through 1900 PPT.

SC for Resource A sees the operating instruction in the ADS UI, the data populates to the Opr Ins Start Time, Opr Inst End Time and also sees the Opr Inst Flag to Y and Follow DOT Flag.
Instruction grid after selecting resource in the Resource data grid

If you registered for Market Sim participation, validate viewing this data as part of structured scenario
Data supported in new ADS UI & ADS v8 API
Under normal system conditions, market dispatch is able to control supply/demand balance (Tariff section 34).

See Tariff Section 34, Appendices for Market Operations BPM section A.12.1 and Market Operations BPM sections 7.2.3.4 and 7.8.3.1.3 for more information about dispatch instructions and the SUPP component of the DOT.
Follow DOT Flag (previously described as EIR flag)

- FOLLOW_DOT flag is set by the *market optimization*
  - *When resource DOT < Forecast* due to reasons such as (*but not limited to*):
    - Congestion
    - Overgeneration
  - *Operating Instruction* is applied

Note: if for some reason, the resource DOT < Forecast due to an outage or de-rate, it is not expected for the FOLLOW_DOT flag to be set

See Tariff Section 34, Appendices for *Market Operations BPM section A.12.1* and Market Operations BPM sections 7.2.3.4 and 7.8.3.1.3 for more information about dispatch instructions and the SUPP component of the DOT
Example 1

RES_A_SLR is generating as capable. Operator recognizes an operational system condition and issues an operating instruction for Resource A from 0850 - 1900 PPT via the market UI due to Reason: Congestion

<table>
<thead>
<tr>
<th>Scenario for RES_A_SLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Output</td>
</tr>
<tr>
<td>Market DOT</td>
</tr>
<tr>
<td>Forecast</td>
</tr>
<tr>
<td>Current time</td>
</tr>
</tbody>
</table>

What does ADS UI show in the next RTD Dispatch?
Example 1

<table>
<thead>
<tr>
<th>Scenario for RES_A_SLR</th>
<th>Actual Output</th>
<th>17 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market DOT</td>
<td>15 MW</td>
<td></td>
</tr>
<tr>
<td>Forecast</td>
<td>15 MW</td>
<td></td>
</tr>
<tr>
<td>Current time</td>
<td>0850 PPT</td>
<td></td>
</tr>
</tbody>
</table>

What does ADS UI show?

- Operating Ins column = Y
- Opr Ins Reason column: Congestion
- Opr Ins Start time column: 08:50
- Opr Ins End time column: 19:00
- Follow DOT Flag: Y
Example 2

<table>
<thead>
<tr>
<th>Scenario for RES_B_SLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Output</td>
</tr>
<tr>
<td>Market DOT</td>
</tr>
<tr>
<td>Forecast</td>
</tr>
<tr>
<td>Current time</td>
</tr>
</tbody>
</table>

In this case, RES_B_SLR is generating as capable, and operational issues not observed by the operator. Market has began to economically dispatch DOT < Forecast due to congestion.

What does ADS UI show in the next RTD Dispatch?
Currently, what do you see in ADS?
### Scenario for RES_B_SLR

<table>
<thead>
<tr>
<th>Actual Output</th>
<th>20 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market DOT</td>
<td>15 MW</td>
</tr>
<tr>
<td>Forecast</td>
<td>20 MW</td>
</tr>
<tr>
<td>Current time</td>
<td>0955 PPT</td>
</tr>
</tbody>
</table>

What does ADS UI show?
- Operating Ins column = [Blank]
- Opr Ins Reason column: [Blank]
- Opr Ins Start time column: [Blank]
- Opr Ins End time column: [Blank]
- FOLLOW_DOT Flag: Y
Example 3

RES_C_SLR is generating as capable. Forecast and Market DOT are both 15 MW. No operational issues identified, no operation instruction issued.

<table>
<thead>
<tr>
<th>Scenario for RES_C_SLR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Output</td>
<td>20 MW</td>
</tr>
<tr>
<td>Market DOT</td>
<td>15 MW</td>
</tr>
<tr>
<td>Forecast</td>
<td>15 MW</td>
</tr>
<tr>
<td>Current time</td>
<td>1010 PPT</td>
</tr>
</tbody>
</table>

What is seen in the ADS UI?
Example 3

<table>
<thead>
<tr>
<th>Scenario for RES_C_SLR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Output</td>
<td>20 MW</td>
</tr>
<tr>
<td>Market DOT</td>
<td>15 MW</td>
</tr>
<tr>
<td>Forecast</td>
<td>15 MW</td>
</tr>
<tr>
<td>Current time</td>
<td>1010 PPT</td>
</tr>
</tbody>
</table>

What does ADS UI show?
- Operating Ins column = [Blank]
- Opr Ins Reason column: [Blank]
- Opr Ins Start time column: [Blank]
- Opr Ins End time column: [Blank]
- FOLLOW_DOT Flag: [Blank]
ADS Replacement Phases – UI and API v8 releases

Market Simulation
• July 27-September 4, 2020
• MAPStage Environment with Structured Scenarios
• MAPStage Environment will remain available until Nov 4

Parallel Operations
• September 1 - September 30
• Stage Environment, streaming Production data
• Stage Environment will remain available until Nov 4

Production Go-Live!
• October 1
• Production Environment
• Current (old) ADS will be decommissioned on Feb 1st

For more information on the transition, refer to ADS CPG from July 9, 2020
www.caiso.com >> Stay Informed >> Meetings >> Customer Partnership Group >> ADS 7/9/2020
# Cutover activities at a glance by date and environment

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>MAPStage Environment</th>
<th>Stage Environment</th>
<th>Production Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/27/2020</td>
<td>New Code Available</td>
<td>New ADS UI ADS API V8 Begin Market Sim</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7/27/2020</td>
<td>Hard Cut-Over *Decommissioning</td>
<td>ADS API V6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>09/01/2020</td>
<td>New Code Available</td>
<td>-</td>
<td>New ADS UI ADS API V8 Begin Parallel Operations</td>
<td>-</td>
</tr>
<tr>
<td>09/01/2020</td>
<td>Hard Cut-Over</td>
<td>-</td>
<td>ADS API V6</td>
<td>-</td>
</tr>
<tr>
<td>09/04/2020</td>
<td>Milestone</td>
<td>End Market Sim</td>
<td>-</td>
<td>-</td>
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<tr>
<td>09/30/2020</td>
<td>Milestone</td>
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<td>End Parallel Operations</td>
<td>-</td>
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<tr>
<td>10/1/2020</td>
<td>New Code Available</td>
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<td>-</td>
<td>New ADS UI ADS API V8 Production Go-Live</td>
</tr>
<tr>
<td>10/1/2020</td>
<td>Hard Cut-Over *Decommissioning</td>
<td>-</td>
<td>-</td>
<td>ADS API V6</td>
</tr>
<tr>
<td>11/04/2020</td>
<td>Hard Cut-Over *Decommissioning</td>
<td>Current ADS Delphi Client</td>
<td>Current ADS Delphi Client</td>
<td>-</td>
</tr>
<tr>
<td>02/01/2021</td>
<td>Hard Cut-Over *Decommissioning</td>
<td>-</td>
<td>-</td>
<td>Current ADS Delphi Client</td>
</tr>
</tbody>
</table>
Stay tuned in the Release User Group - DOT Tariff Clarification Snapshot

## Fall 2020 – Dispatch Operating Target Tariff Clarification

<table>
<thead>
<tr>
<th>Project Info</th>
<th>Details/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application Software Changes</strong></td>
<td><strong>Scope:</strong> Allow Energy Intermittent Resources (EIRs) to automate their response to operational instructions that require the resource not to exceed their Dispatch Operating Target. <strong>Impacted Systems:</strong> RTM: Operator can select EIR resources, system to send Operating instruction Flag to ADS ADS: Receive Operating instruction flag for EIRs. Broadcast message to EIRs operator.</td>
</tr>
<tr>
<td><strong>BPM Changes</strong></td>
<td>Market Instruments, Market Operations</td>
</tr>
<tr>
<td><strong>Tariff Change</strong></td>
<td>Changes tariff language from “Operating Order” to “Operating Instruction” in multiple sections.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Milestone Type</th>
<th>Milestone Name</th>
<th>Dates</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board Approval</td>
<td>Obtain Board of Governors Approval</td>
<td>Jul 26, 2018</td>
<td>✔</td>
</tr>
<tr>
<td>External BRS</td>
<td>Posted External BRS</td>
<td>Dec 26, 2018</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Posted revised External BRS</td>
<td>Apr 30, 2020</td>
<td>✔</td>
</tr>
<tr>
<td>Config Guides</td>
<td>Design review - BPM and Tariff SMEs</td>
<td>N/A</td>
<td>✔</td>
</tr>
<tr>
<td>Tech Spec</td>
<td>Publish Technical Specifications</td>
<td>May 22, 2020</td>
<td>✔</td>
</tr>
<tr>
<td>Tariff</td>
<td>Draft Tariff</td>
<td>Sep 04, 2018</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>File Tariff</td>
<td>Oct 29, 2018</td>
<td>✔</td>
</tr>
<tr>
<td>BPMs</td>
<td>Post Draft BPM changes</td>
<td>Jul 20, 2020</td>
<td>✔</td>
</tr>
<tr>
<td>External Training</td>
<td>Deliver External Training</td>
<td>Jul 16, 2020</td>
<td>✔</td>
</tr>
<tr>
<td>Market Sim</td>
<td>Market Sim Window</td>
<td>Jul 27, 2020 - Sep 04, 2020</td>
<td>✔</td>
</tr>
<tr>
<td>Production Activation</td>
<td>Dispatch Operating Target Tariff Clarification</td>
<td>Oct 01, 2020</td>
<td>✔</td>
</tr>
</tbody>
</table>
Online References

• Training Webinars (DOTT & ADS Rep)
  – www.caiso.com Participate Learning Center New Modules

• Project information - www.caiso.com Stay Informed Release Planning
  – Business Requirements Specification 1.1 (BRS 1.1)
  – Market Simulation Structured Scenarios

• Stakeholder Meetings/Materials (caiso.com Stay informed)
  – Stakeholder process for this project, including initial DOT Tariff Clarification Training
  – Release User Group (Ongoing)
  – ADS Customer Partnership Group (July 9th, 2020)
  – Technical User Group (May 26, 2020) and ongoing

• API information/Technical Specifications
  – Developer.caiso.com Apps ADS

• Rules & procedures
  – Tariff: www.caiso.com Rules Regulatory
  – Business Practice Manuals: www.caiso.com Rules Business Practice Manuals
For more detailed information on anything presented, please visit our website at:

www.caiso.com

Or send an email to:
CustomerReadiness@caiso.com
Q&A from the session:

• Q: If I am interested in participating in Market Simulation, but did not register in time – how can I find out if I can register late?
  – Please email marketsim@caiso.com to find out if you may still register to participate in Market Simulation.

• Q: I currently don’t use ADS, but I’m wondering how to manage changing DOTs through the full Operating Instruction window for DOTs that may change every 5 minutes over the course of many hours
  – You may look into accessing ADS to view DOTs. The ADS instruction panel however, will only show your next 5 min DOT. Resource Owners/operators should work with your Scheduling Coordinator to determine how to best manage not exceeding the DOT during these time frames. Also, please note the forecast is available on OASIS.

• Q: Would an EIR resource see a Negative Supp to follow DOT based on 3 scenarios?
  – Two main scenarios, either based on market optimization or Operating Instruction. To reiterate though on the flag functionality - if the market optimization results in DOT < Forecast, then the Follow DOT flag column will display Y in ADS. If an operating instruction is issued through the interface, this will show both the OI & the Follow DOT flag columns as Y in ADS.

• Q: Will ADS continue to give us a visual curve regarding DOT instructions
  – The Trajectory plot is still provided in new ADS UI. Please refer to Part 1 training for more information on the new UI.