



California ISO

Eligible Intermittent Resource Dispatch Operating Target EIR DOT

CSSA Training

August 2018

Stakeholder Learning Objectives

- Explain the difference between an Operating Instruction and a Dispatch Instruction
- Understand changes to the ISO Tariff and Market Operations BPM
- Recognize NERC COM-002-4 requirements

Terminology

The terms VER and EIR are slightly different. We will use EIR in this presentation.

- **VER** Variable Energy Resource

A device for the production of electricity that is characterized by an Energy source that: (1) is renewable; (2) cannot be stored by the facility owner or operator; and (3) has variability that is beyond the control of the facility owner or operator.

Solar and Wind generation are commonly called VERs.

Terminology

- **EIR** Eligible Intermittent Resource

A Variable Energy Resource 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.

Terminology

- **DOP** Dispatch Operating Point

The expected trajectory of the resource operating point as it ramps from one Dispatch Operating Target to the next; the ramping across Dispatch Intervals is linear, unless the operational ramp rate of the resource changes during the ramp or achievement of the trajectory is not physically possible.

Terminology

- **DOT** Dispatch Operating Target

The expected operating point of a resource that has received a Dispatch Instruction.

The resource is expected to operate at the Dispatch Operating Target after completing the Dispatch Instruction, taking into account any relevant Ramp Rate and time delays.

Terminology

- **DOT** Dispatch Operating Target (cont.)

Energy expected to be produced or consumed above or below the Day-Ahead Schedule in response to a Dispatch Instruction constitutes Instructed Imbalance Energy.

For resources that have not received a Dispatch Instruction that have a Day-Ahead Schedule, the Dispatch Operating Target defaults to the corresponding Day-Ahead Schedule.

Terminology

- Dispatch Instruction

An instruction by the CAISO for an action with respect to specific equipment, or to a resource for increasing or decreasing its Energy Supply or Demand to a specified Dispatch Operating Target pertaining to Real-Time operations.

Terminology

- **Operating Instruction**

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.

Note: COM-002-4 is discussed later in the presentation.

Common Phrases

- Do not exceed your DOT or Do not exceed DOTs

The phrase “Follow your DOT” is typically used for traditional generation sources.

Because some EIRs are not capable of following their DOT values, the expression “Do not exceed your DOT” is the preferred phrase.

The BPM language emphasizes not exceeding DOTs, and Operating Instructions will instruct EIRs to not exceed their DOTs.

Common Phrases

- **Generate as Capable**

The phrase “Generate as Capable” means that EIRs may generate to their full capability.

When an EIR’s DOT is equal to its forecasted output, it may produce to its capability, even if that capability exceeds the DOT/forecast.

In this case, producing at full capacity gives the market updated production information that results in better future forecasts.

Common Phrases

- Generate as Capable

Note: When generating as capable, resources should not deviate to follow or chase prices.

Common Phrases

Negative RT Supplemental Energy

- Negative Suppl (or Supp)

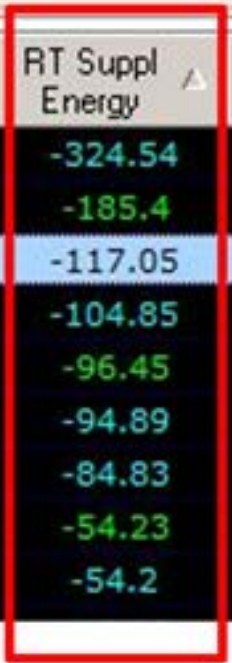
When the Real-Time DOT is below the forecast value, a negative number will show up in the “RT Suppl Energy” field of ADS.



Clear All Alarms	RT DOT	Hourly DOT	Exceptional	Commitment	RT AS	Hourly
Current Interval	08:25-08:30	08:00-09:00	Active	08:15-08:30	08:15-08:30	08:00-
Dispatch Interval	08:30-08:35	09:00-10:00	Min Max	08:45-09:00	08:45-09:00	09:00-
Received/Status	08:26:24	01:50	08:26:25	08:18:59	08:19:13	08:00-
Filter Resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Real Time |
 Hourly Pre-Dispatch |
 GEN |
 Startups/Shutdowns |
 RIGS

DOT Start Time	SC ID	Res Type	Resource ID	RT Prev DOT	RT DOT	RT DOT Delta	RT Suppl Energy	Co
08:32		GEN		-324.54	-324.54	0	-324.54	
08:32				61.86	1	-60.86	-185.4	
08:32				45.18	15	-30.18	-117.05	
08:32				10	10	0	-104.85	
08:32				48.26	0	-48.26	-96.45	
08:32				0	0	0	-94.89	
08:32				0.1	0.1	0	-84.83	
08:32				61.32	24.45	-36.87	-54.23	
08:32				10	10	0	-54.2	



Common Phrases

- Negative Suppl (or Supp)

Three reasons why a resource may have a Negative Suppl Energy value in ADS include:

- 1) Ramp rate – when a units ramp rate restricts the amount of the forecast that can be achieved in the next interval, the difference is displayed as Negative Suppl Energy
- 2) The market is dispatching into economic bids
- 3) The market is dispatching into self-schedules

Tariff Changes

34.13.1 Response Required by Resources to Dispatch Instructions

Resources must:

- a) unless otherwise stated in the Dispatch Instruction, comply with a Dispatch Instruction immediately upon receipt;
- b) respond to all Dispatch Instructions in accordance with Good Utility Practice;
- c) meet voltage criteria in accordance with the provisions in the CAISO Tariff;
- d) meet any applicable Operational Ramp Rates;

Tariff Changes (cont.)

- e) respond to Dispatch Instructions for Ancillary Services within the required time periods and (in the case of Participating Generators providing Regulation) respond to AGC from the EMS;
- f) if a time frame is stated in a Dispatch Instruction, respond to a Dispatch Instruction within the stated time frame; and
- g) not intentionally generate below their Dispatch Operating Target.

Tariff Changes (cont.)

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.

Tariff Changes (cont.)

In any event , 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.

Upon receiving such an Operating Instruction, an Eligible Intermittent Resource must not generate in excess of its Dispatch Operating Target until the Operating Instruction expires, except when physically impossible.

Tariff Changes (cont.)

When such an Operating Instruction is in effect, Eligible Intermittent Resources should follow a linear ramp between Dispatch Operating Targets, except when physically impossible.

Updated BPM language regarding EIRs following DOT

Updates to section

“A.12.1 EIR Self-Schedules, Economic Bids, and Dispatch”

Scheduling Coordinators for EIRs must either submit a forecast of output with five-minute granularity that is updated every five minutes, or use the forecast provided by CAISO’s forecast service provider which is also produced at a five-minute granularity and updated every five minutes.

BPM language regarding EIRs following DOT

A.12.1 (cont.)

The Scheduling Coordinator may choose to either self-schedule or submit economic bids for an EIR. If an EIR is self-scheduled, the self-schedule for each 15-minute interval in the FMM and for each 5-minute interval in RTD is derived from the forecast values. If Scheduling Coordinator submits economic bids for an EIR, the bid's upper limit will be automatically adjusted and bound by the EIR forecast.

BPM language regarding EIRs following DOT

A.12.1 (cont.)

After each market run, the Scheduling Coordinator for an EIR receives a Dispatch Instruction for the EIR as defined in section 7.2.3.4 of the Market Operations BPM. All EIR Dispatch Instructions will be at or below the EIR's forecasted output. The obligation of an EIR not to exceed its Dispatch Operating Target will be indicated by the SUPP component of the Dispatch Instruction.

BPM language regarding EIRs following DOT

A.12.1 (cont.)

If the Scheduling Coordinator for an EIR receives a Dispatch Instruction with a non-negative SUPP component, this means that the EIR Dispatch Operating Target is equal to the forecasted output, and the EIR can produce as capable, as provided in Section 34.13.1 of the CAISO tariff.

BPM language regarding EIRs following DOT

A.12.1 (cont.)

CAISO market will consider submitted effective economic bids in determining whether to issue a Dispatch Instruction with a negative SUPP. If the Scheduling Coordinator for an EIR receives a Dispatch Instruction with a negative SUPP component, this means that the EIR Dispatch Operating Target is below the EIR's forecasted output, and then the EIR must not exceed its Dispatch Operating Target as provided in Section 34.13.1 of the CAISO tariff. If an EIR is considered to be non-conforming, the SC for the resource concerned shall be subject to Uninstructed Imbalance Energy as stated in CAISO Tariff 34.13.12.

BPM language regarding EIRs following DOT

A.12.1 (cont.)

Failure to follow a Dispatch Instruction is not a violation of the CAISO Rules of Conduct (CAISO Tariff Section 37). However, Scheduling Coordinators for EIRs 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 language regarding EIRs following DOT

A.12.1 (cont.)

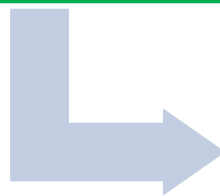
The CAISO may issue an Operating Instruction directing an Eligible Intermittent Resource not to exceed its Dispatch Operating Target if necessary to maintain system reliability consistent with Section 7.6 or 7.7 of the CAISO tariff. Operating Instructions are communicated pursuant to NERC Standard COM-002-4. 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 is close to being overloaded



EIRs can reduce output to mitigate the potential overload



Some of the EIRs have negative RT Suppl Energy values

Generation Desk:

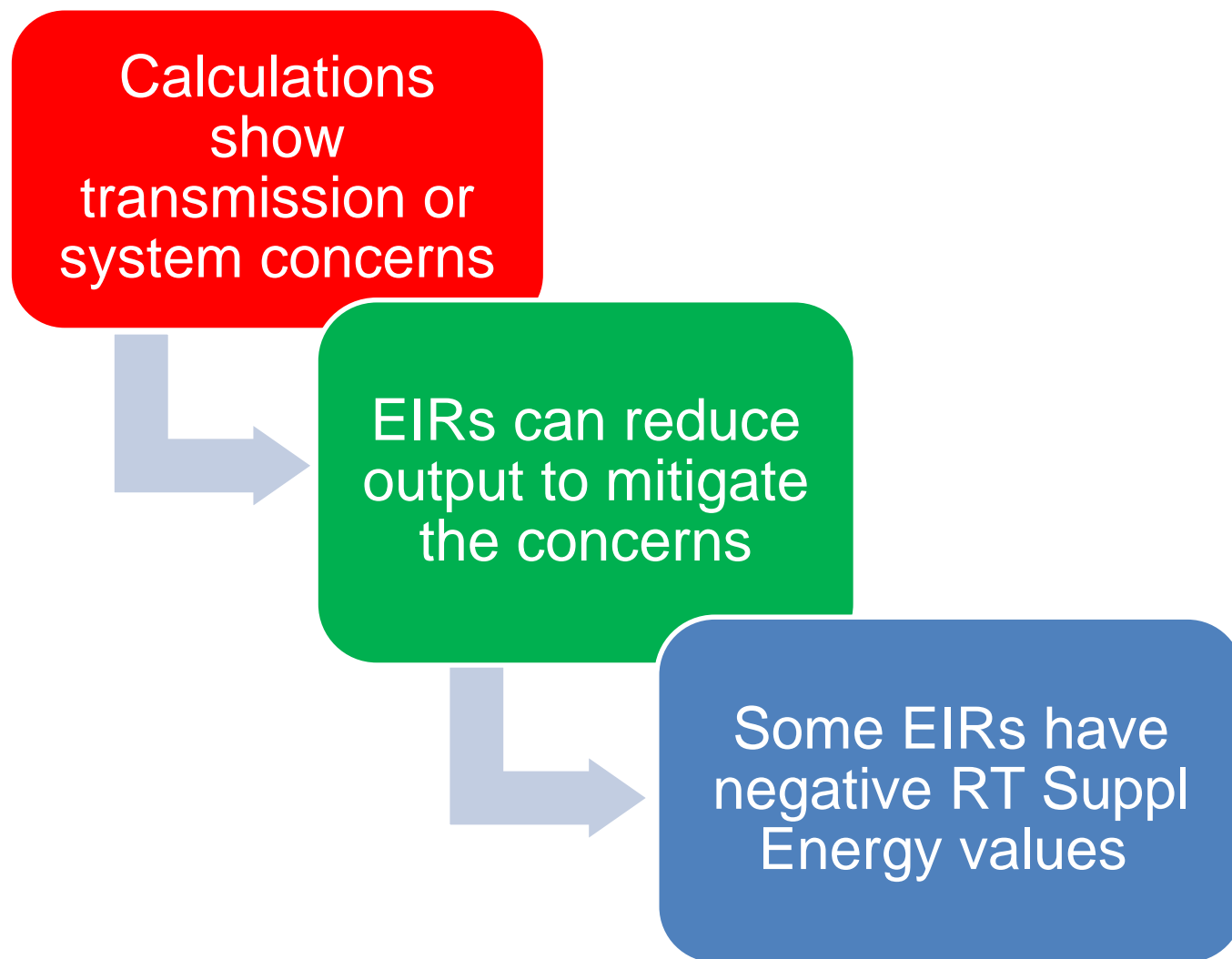
The operator can call the EIRs and give a verbal **Dispatch Instruction** to not exceed their *DOTs.

If the resources follow DOTs there should be no further issues.

This is not an Operating Instruction.

*DOTs are Dispatch Instructions

Example:



CAISO Generation Desk example:




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

Example: Local 100 MW Transmission Line

<u>Resource</u>	<u>Bid</u>	<u>Forecast</u>	<u>Neg Suppl</u>	<u>DOT</u>
	\$(10)	10 MW	No	10 MW
	\$(20)	35 MW	No	35 MW
	SS	40 MW	No	40 MW




No congestion to be resolved

Example: Local 100 MW Transmission Line

<u>Resource</u>	<u>Bid</u>	<u>Forecast</u>	<u>Neg Suppl</u>	<u>DOT</u>
	\$(10)	20 MW	Yes	0 MW
	\$(20)	55 MW	Yes	50 MW
	SS	50 MW	No	50 MW




Potential for
Operating Instruction
if DOTs are exceeded

System oversupply creating reliability issues

<u>Resource</u>	<u>Bid</u>	<u>Forecast</u>	<u>Neg Supp</u>	<u>DOT</u>
	\$(10)	10 MW	Yes	0 MW
	\$(20)	35 MW	Yes	10 MW
	SS	40 MW	Yes	30 MW

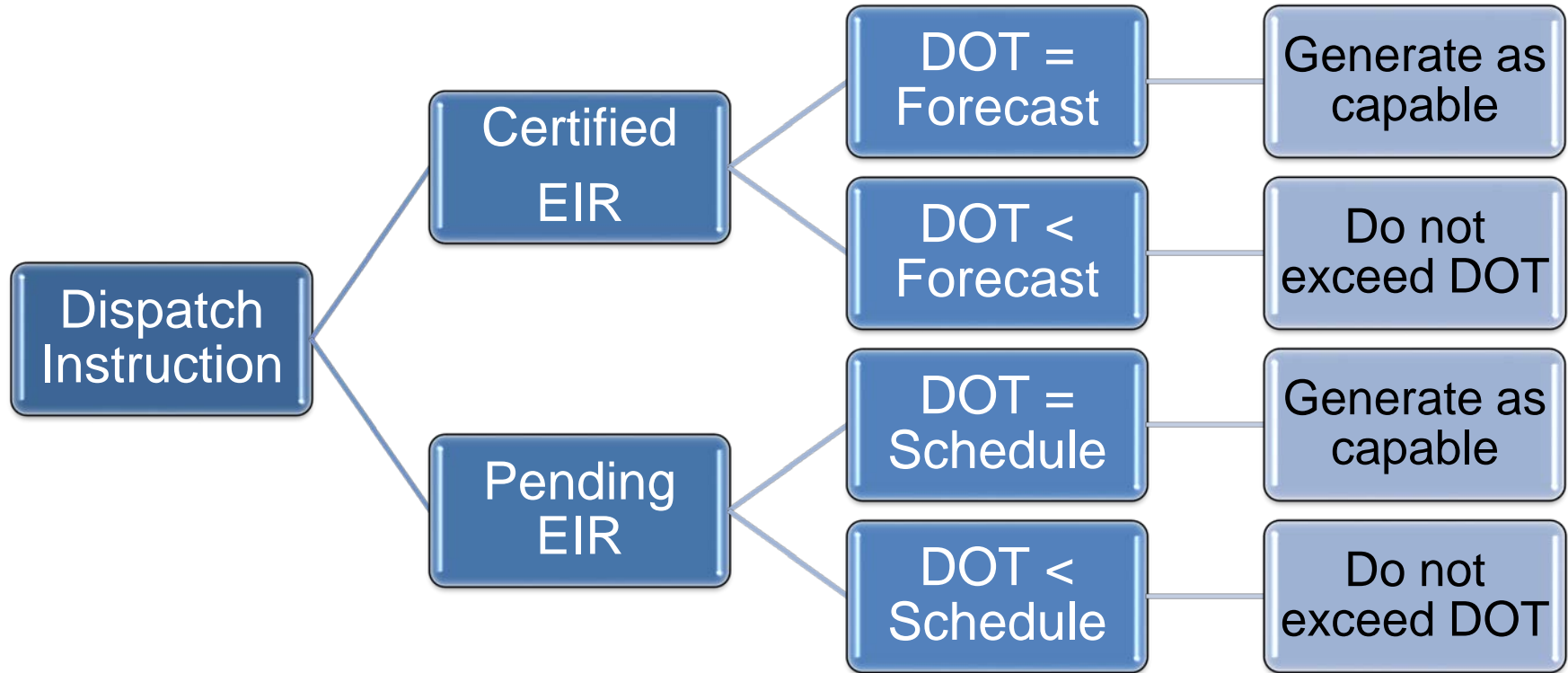
An Operating Instruction
can be issued if additional system
control is needed

System oversupply creating reliability issues

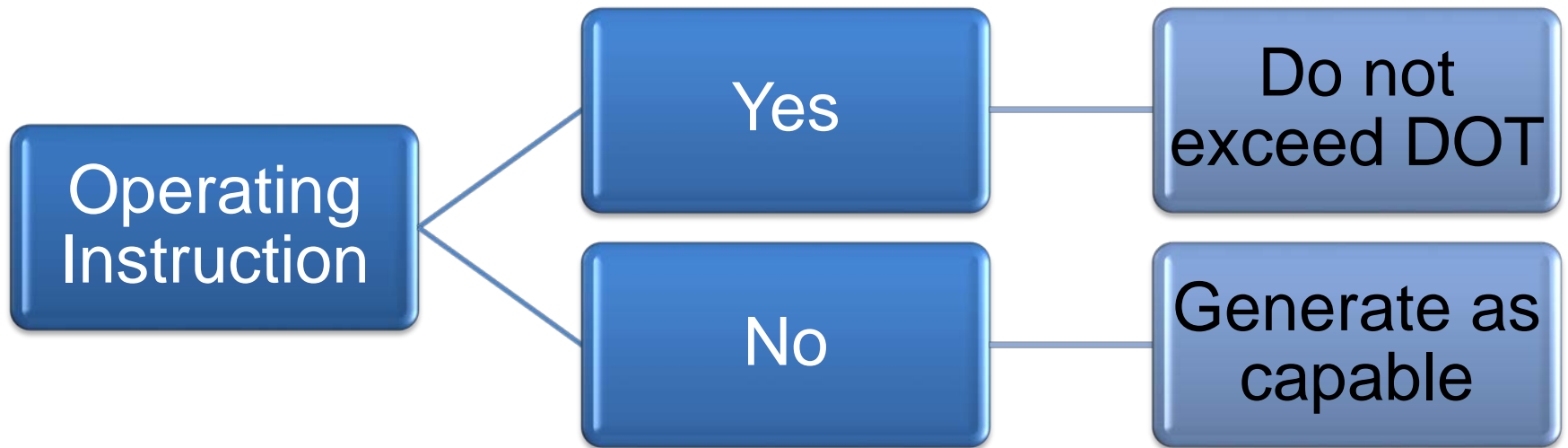
<u>Resource</u>	<u>Bid</u>	<u>Forecast</u>	<u>Neg Supp</u>	<u>DOT</u>
	\$(10)	10 MW	No	10 MW
	\$(20)	35 MW	No	35 MW
	SS	40 MW	No	40 MW

An Operating Instruction
may still be issued even if there are no
negative RT Suppl Energy values

Under normal system conditions, market dispatch is able to control supply/demand balance



Under challenging local or system conditions, additional needed control of resources can trigger an operating instruction



Operators Evaluate System Conditions

An Operating Instruction is appropriate any time local or system reliability is impacted by transmission constraints and/or generation levels, or when the market is providing a solution in which the operator does not have confidence.

- All resources must follow Operating Instructions
 - Operating Instructions are issued in accordance with NERC Standard COM-002-4
 - Operating Instructions may be given orally or via electronic distribution with confirmation of receipt by at least one entity
 - Operating Instructions remain in effect until the specified time period is completed, or until changed by the operator
 - Operating Instructions may be issued without negative RT Supply Energy values

Questions?