Clarification for ADS DOT breakdown

This document is intended to clarify the various MW components in CAISO's ADS DOT breakdown. Relevant business functions and usages of these components are also described as well.

1. Business Purpose

The DOT breakdown that CAISO provides to market participants through ADS is to illustrate the energy component in terms of MW capacity constituting the DOT MW. It can be used for two different purposes:

1. Operational Purpose including but not limited to, compliance checking, available operating reserve calculation, etc.;
2. Shadow settlement purpose.

Although these components are used to represent energy component, they are calculated and represented in terms of MW capacity and hence they do not represent the energy difference due to ramping effect between intervals.

There are two types of real-time dispatch instructions that CAISO sends out through ADS, i.e., hourly pre-dispatch instruction and real-time dispatch instruction. There are some subtle differences in how to interpret and use those MWs between those two types of instructions.

2. DOT Breakdown in Hourly Pre-dispatch Instruction

The hourly pre-dispatch instructions apply to hourly pre-dispatch resources, i.e., the inter-tie system resources. There are two critical components,

SCHED: The SCHED MW reflects the final day-ahead energy schedule;
SUPP: This MW is the difference between DOT and SCHED calculated by (DOT – SCHED). It is effectively the incremental (positive) or decremental (negative) from the final day-ahead energy schedule MW.

Although the standard ramp RMPS is also calculated for the inter-tie resources in the DOT breakdown, the standard ramp has little relevance to the ultimate energy settlement of hourly pre-dispatched system resources since such energy is accounted for on a block basis. There will not be any Spin or Non-spin MWs for hourly pre-dispatched resources since we do not model AS import on the hourly pre-dispatched resources. It is also worth mentioning that, there are two scenarios under which the SCHED will be equal to the final day-ahead energy schedule,

Scenario 1, for the market participants who elects to submit a real-time self schedule and/or real-time energy bid curve on top of the real-time self schedule;

Under Scenario 1, the SCHED value stays as the day-ahead energy schedule MW regardless of the real-time self-schedule MW value. The Supp value is then representing effectively the incremental or decremental offer in real-time.

Scenario 2: no explicit real-time energy bid curve or self schedule is submitted. SIBR will convert the final DA energy schedule into a real-time self schedule.

Under Scenario 2, the SCHED value stays as the day-ahead energy schedule MW. Most likely the SUPP will be zero or a negative MW. The negative MW represents a potential curtailment in HASP from the DA schedule.

Following examples assume a final day-ahead energy schedule MW as 80MW,

Example 2.1 (incremental),
DOT: 100MW
DOT breakdown is,
SCHED: +80MW
SUPP: +20MW

Example 2.2 (decremental),
DOT: 60MW
DOT breakdown is,
SCHED: +80MW
SUPP: -20MW

2.1 ADS Decline Functionality For Hourly Pre-dispatch Instruction

In ADS, we allow the market participants to decline or partially accept a pre-dispatch instruction[1]. It is CAISO's policy that only the SUPP component MW in the DOT breakdown can be rejected or partially accepted. In other words, the SCHED MW component can not be changed after the HASP run. A final accepted DOT is recorded in ADS and available to market participant as "Accept DOT".

Decline/Partial Accept for example 2.1,
Market participants can decline the 20MW or partially accept any portion of the 20MW. Therefore the Accept DOT will be any number between 80MW to 100MW.

Decline of 20MW: Accept DOT will become 80MW;
Partially acceptance of 10MW out of 20: Accept DOT will become 90MW;
Full acceptance of 20MW: Accept DOT will stay as 100MW.

[1] Excessive declines of hourly pre-dispatched instructions for System Resources can be subject to penalties.

Decline/Partial Accept for example 2.2,
Market participants can decline the -20MW or partially accept any portion of the -20MW. Therefore the Accept DOT will be any number between 60MW to 80MW.

Decline of -20MW: Accept DOT will become 80MW;
Partially acceptance of -10MW out of -20: Accept DOT will become 70MW;
Full acceptance of -20MW: Accept DOT will stay as 60MW.

3. DOT Breakdown in Real-time Dispatch Instruction

The real-time dispatch instructions apply to non hourly pre-dispatch resources, i.e., the generators, tie generators (including dynamic resources and the resources used to model AS import on the ties) and participating loads (using the pump-storage model). There are five critical components here,

SCHED: The SCHED MW reflects the real-time self energy schedule for that resource in the SIBR clean bid;
-- This is different from the HASP SCHED case in which the SCHED represents DA energy schedule.

SUPP: This MW is the difference between DOT and SCHED calculated by (DOT – SCHED). It reflects the incremental (positive) or decremental (negative) from the self schedule MW. SUPP is inclusive of the SPIN and NSPN MWs and MSSLF whichever applicable;

SPIN: If this resource gets dispatched out of spin capacity (either in contingency or non-contingency mode[2]), this value will reflect dispatched SPIN capacity amount. Otherwise, this amount is zero. SPIN MW can be used for available reserve calculation;

NSPN: If this resource gets dispatched out of non-spin capacity (either in contingency or non-contingency mode[3]), this value will reflect dispatched Non-Spin capacity amount. Otherwise, this amount is zero. Non-SPIN MW can be used for available reserve calculation;

MSSLF: This only applies to MSS load following resources. If market participants submit MSS load following instructions for those resources, the validated load following instructions will be sent back through this component. For all non load following resources, this amount will be zero.

Although the standard ramp RMPS is also provided for the real-time dispatch instructions in the DOT breakdown, it is recommended the value of RMPS be determined outside of the dispatch instruction based on the standard ramp 20 minute cross-hour ramp between

[2] Although it is not the scope of this document, it is worth mentioning that a contingency AS can only be dispatcheded in a contingency dispatch run or if the resource is flagged as contingency individually. A non-contingent AS can be dispatched in a normal real-time interval dispatch.
[3] See Note 1.

Day-Ahead schedules. It is also worth mentioning that, there are two scenarios under which the SCHED will be equal to the final day-ahead energy schedule,
Scenario 1, for the market participants who elects to protect their day-ahead final energy schedule from IFM, i.e., the DA energy schedule MW is used to submitted as real-time self schedule;
Scenario 2: no explicit real-time energy bid curve or self schedule is submitted. SIBR will convert the final DA energy schedule into a real-time self schedule.

Following examples assume a real-time self schedule MW as 80MW,

Example 3.1 (incremental without dispatch out of Spin or Non-Spin),
DOT: 100MW
DOT breakdown is,
SCHED: +80MW
SUPP: +20MW

Example 3.2 (incremental with dispatch out of Spin and Non-Spin),
DOT: 100MW
DOT breakdown is,
SCHED: +80MW
SUPP: +20MW
SPIN: +5MW
NSPN: +5MW
In example 3.2, the 5 MWs for dispatched out of Spin and Non-spin are part of the SUPP as the incremental amount. Besides the 5 MWs from Spin and Non-spin, it implies the 20 – 5 -5 = 10MW as the market energy dispatch component. This is different from the current ADS in production in which the SUPP is exclusive from the Spin and Non-spin amount.

Example 3.3 (decremental),
DOT: 60MW
DOT breakdown is,
SCHED: +80MW
SUPP: -20MW

Example 3.4 (incremental with dispatch out of Spin, Non-Spin And Load following),
DOT: 100MW
DOT breakdown is,
SCHED: +80MW
SUPP: +20MW
SPIN: +5MW
NSPN: +5MW
MSSLF: +5MW

In example 3.4, the 5 MWs for dispatched out of Spin, Non-spin and MSS load following are part of the SUPP as the incremental amount. Besides the 5 MWs from Spin, Non-spin and MSSLF, it implies the 20 – 5 -5 – 5 = 5MW as the market energy dispatch component not associated with any other capacity.

Example 3.5 (decremental with MSS load following),
DOT: 60MW
DOT breakdown is,
SCHED: +80MW
SUPP: -20MW
MSSLF: -5MW
In example 3.5, the -5 MWs for MSS load following are part of the SUPP as the decremental amount. Besides the -5 MWs from MSSLF, it implies the -20 – (-5) = -15MW as the market energy dispatch component.