

# Excluding A Constrained Day 1 MGBRT From a Day 2 DA-PCG Calculation



## Introduction

At the request of the Design Working Group, this paper describes the DA-PCG calculation of an EDAC start that includes a schedule to Minimum Loading Point (MLP) for the remainder of a previous day's minimum generation block run time (MGBRT).

## Response

The following are the DA-PCG formulas used for calculating a guarantee in Day 2 when there is a constraint to respect MGBRT related to a Day 1 start. The minimum generation block for the constrained hours related to a Day 1 start will not be included in the Day 2 DA-PCG calculation. As a result, Component 1 and Component 3 for Constrained-on CMSC must include a claw-back term. The claw-back allows the standard DA-PCG formulas to be used while removing from the calculation the as-offered costs for the constrained MLP, revenue and CMSC (occurs when real-time unconstrained schedule (RTUS) is less than MLP), for the remaining MGBRT of a Day 1 start. The remaining formulas for Component 2, Component 3 - Constrained-off CMSC, and Component 4 remain unchanged from a standard DA-PCG calculation. Start-up cost will not be included in this DA-PCG calculation. For units continuing to operate over the end of the previous day into the current EDAC day, (HE 24 indicates on-line status) the DA-PCG calculation will include only Components 1 through 4 with no start-up costs. Also, note that if MLP or MGBRT is altered as a result of an update to daily generator data, the revised values will be excluded from the Day 2 guarantee calculation.

As previously presented the DA-PCG = Component 1 + Component 2 + Component 3 + Component 4 + Start-up

### Component 1

$$\text{Component 1} = \left( \int_0^{\text{Min}((DACs, RTCS, AQEI))} DAO \right) - RTP \cdot \text{min}(DACs, RTCS, AQEI) - \left( \left( \int_0^{MLP} DAO \right) - RTP \cdot MLP \right)$$

We will continue to calculate Component 1 using the two terms previously presented on a 5 minutes basis. For units identified as being constrained on to complete a Day 1 MGBRT, a claw-back will be completed for the minimum generation block costs and revenue associated with the remaining MGBRT duration. This claw-back will be calculated on a 5 minute basis and will require a new charge type. Presenting the settlement data as separate charge types on your preliminary and final settlement statements will allow for reconciliation. As part of your settlements details file, Participants will receive the necessary information to identify the constrained duration hours and MLP related to the completion of a previous days start. As a point of completeness, DA-PCG formula calculation could also be shown as follows:

$$\text{Component 1} = \left( \int_{MLP}^{\text{Min}((DACs, RTCS, AQEI))} DAO \right) - RTP \cdot \text{min}((DACs, RTCS, AQEI) - MLP)$$

## Component 2

$$\text{Component 2} = \left( \int_{\text{Min}((DACs, OpCap, \text{max}(RTCS, AQEI)))}^{\text{Min}((DACs, OpCap))} DAO \right) - \max(0, \left( \int_{\text{Min}((DACs, OpCap, \text{max}(RTCS, AQEI)))}^{\text{Min}((DACs, OpCap))} RTO \right))$$

In Component 2, it is assumed that the DACS, OpCap, RTCS and AQEI are greater than or equal to MLP and therefore a constraint to complete MGBRT will not result in any changes from the previously presented formula (or DA-PCG calculation). However, the formula has been updated to show that term 2 of the Component will use the minimum of zero or real-time offer.

On another note, a Participant questioned how the IESO might account/limit offer changes between day-ahead and real-time when restrictions on dispatch capability e.g. transmission outages occurs between day-ahead and real-time. A review of other jurisdictions revealed that the operating caps (OpCap) could be used, that is to say this variable is not limited to only a unit de-rating. The IESO may apply OpCaps in situations where other circumstances, such as transmission outages, preclude the IESO from dispatching a generator in real time at its full day-ahead energy schedule. The Participant will receive the OpCap value along with necessary reason code in the Settlement details file.

### Component 3

$$\text{Constrained On CMSC} = \int_{RTUS}^{RTCS} RTO - RTP \cdot (RTCS - RTUS) - \int_{RTUS}^{MLP} RTO - RTP \cdot (MLP - RTUS)$$

We will continue to calculate Component 3 using the two terms previously presented on a 5 minutes basis. For units identified as being constrained on to complete a Day 1 MGBRT, CMSC paid when the RTUS < MLP will be clawed back. This claw-back will be calculated on a 5 minute basis and will require a new charge type. Presenting the settlement data as separate charge types on your preliminary and final settlement statements will allow for reconciliation. As part of your settlements details file, Participants will receive the necessary information to identify the constrained duration hours and MLP related to the completion of a previous day start. As a point of completeness, the DA-PCG formula calculation could also be shown as follows:

$$\text{Constrained On CMSC} = \int_{\max(MLP, RTUS)}^{RTCS} RTO - RTP \cdot (RTCS - \max(MLP, RTUS)),$$

$$\text{Constrained Off CMSC} = RTP \cdot (RTUS - RTCS) - \int_{RTCS}^{RTUS} RTO$$

There will no change to formula or DA-PCG calculation for constrained off CMSC as a unit constrained to complete a previous day MGBRT will not be constrained off below MLP (RTCS ≥ MLP)

Looking specifically at the six different possible scenarios, the following illustrates the formula changes:

Component 3	Scenario	CMSC Payments
1	RTCS > RTUS > DACS	0
2	RTUS > RTCS > DACS	0
3	RTCS > DACS > RTUS and RTUS < MLP	Y (Partial CMSC)
4	RTUS > DACS > RTCS	Y (Partial CMSC)
5	DACS > = RTCS > RTUS and RTUS < MLP	Y (All CMSC)
6	DACS > = RTUS > RTCS	Y (All CMSC)

$$\text{Component 3, Scenario 3} = \int_{RTUS}^{DACS} RTO - RTP \cdot (DACS - RTUS) - \int_{RTUS}^{MLP} RTO - RTP \cdot (MLP - RTUS)$$

(Constrained On Partial CMSC)

CMSC paid when the RTUS < MLP will be clawed back. This claw-back will be calculated on a 5 minute basis and will require a new charge type. As a point of completeness, the DA-PCG formula calculation could also be shown as follows:

**Component 3, Scenario 3=**

(Constrained On Partial CMSC

$$\int_{\max(MLP, RTUS)}^{DACs} RTO - RTP \cdot (DACs - \max(MLP, RTUS)),$$

**Component 3, Scenario 4=**

(Constrained Off Partial CMSC

$$RTP \cdot (DACs - RTCS) - \int_{RTCS}^{DACs} RTO$$

There will be no change to the formula or DA-PCG calculation for constrained off CMSC as a unit constrained to complete a previous day MGBRT will not be constrained off below MLP (RTCS ≥ MLP)

**Component 3, Scenario 5=**

(Constrained On CMSC)

$$\int_{RTUS}^{RTCS} RTO - RTP \cdot (RTCS - RTUS) - \int_{RTUS}^{MLP} RTO - RTP \cdot (MLP - RTUS)$$

CMSC paid when the RTUS < MLP will be clawed back. This claw-back will be calculated on a 5 minute basis and will require a new charge type.

As a point of completeness, the DA-PCG formula calculation could also be shown as follows:

**Component 3, Scenario 5=**

(Constrained On CMSC

$$\int_{\max(MLP, RTUS)}^{RTCS} RTO - RTP \cdot (RTCS - \max(MLP, RTUS)),$$

**Component 3, Scenario 6=**

(Constrained Off CMSC)

$$RTP \cdot (RTUS - RTCS) - \int_{RTCS}^{RTUS} RTO$$

There will be no change to formula or DA-PCG calculation for constrained off CMSC as a unit constrained to complete a previous day MGBRT will not be constrained off below MLP (RTCS ≥ MLP)

**Component 4**

**Component 4 = Net OR Revenue = Revenue<sub>OR</sub> - Cost<sub>OR</sub> + CMSC<sub>OR</sub>**

$$\text{Net OR Revenue} = RTP_{or} \cdot RTUS_{or} - \int_0^{RTUS_{or}} RTO_{or}$$

The RTUSes used in calculating Component 4 are:

$$RTUS_{10S} = \text{Max} [0, \min(\text{DACS} - RTUS_E, RTUS_{10S})]$$

$$RTUS_{10NS} = \text{Max} [0, \min(\text{DACS} - RTUS_E - RTUS_{10S}, RTUS_{10NS})]$$

$$RTUS_{30R} = \text{Max} [0, \min(\text{DACS} - RTUS_E - RTUS_{10S} - RTUS_{10NS}, RTUS_{30R})]$$

There will no change to formula or DA-PCG calculation for Component 4