Constraint Management Charge Allocation Factor Study

The Constraint Management Charge (CMC) Allocation Factor Study determines the share of Real-Time Revenue Sufficiency Guarantee (RSG) Credits attributable to Resources committed in any RAC processes or the LAC process for Active Transmission Constraints pursuant to Section 40.3.3.2.a. The CMC Allocation Factor Study will be conducted quarterly using the data from the prior twelve months in order to reflect changes to the system that may affect the Constraint Management Charge (CMC) Allocation Factor. The CMC Allocation Factor will be updated on the first of the month following the completion of the Study.

The Study shall be completed in four steps. The first step shall map all Hours Resources are committed in any RAC processes or the LAC process to a reason – Capacity commitments, Active Transmission Constraint commitments or VLR Commitments. The second step shall calculate the historical headroom available and the Capacity commitment need. The third step shall estimate the Production Costs for available, similar Resources to those committed for Active Transmission Constraints, then determine the most efficient Capacity-based commitments, and calculate the RSG cost savings. The fourth step shall determine the CMC Allocation Factor, using the RSG Credits for Active Transmission Constraint commitments and the RSG Credits for the least-cost substitute Capacity commitments.

1. Step One: Commitment Type Mapping

a. Prior to September 1, 2012, VLR Commitments were designated as Active Transmission Constraint commitments, including the selection of a constraint name. After September 1, 2012 the Transmission Provider Real-Time operations analyzed each Active Transmission Constraint commitment and based on the constraint name identified the VLR Commitment(s).

b. For each Hour (h), for each Active Transmission Constraint commitment, the Resource CMC Real-Time RSG Credit (i.e., make-whole payment) (CMC_RES_MWP) is equal to the Hourly Real-Time RSG Credit.

c. For each Hour (h), the amount of CMC capacity committed (CMC_CAP_COM) is equal to the integrated sum of all Active Transmission Constraint commitments' Real-Time Hourly Economic Maximum Limit (RT_ECO_MAX):

CMC_CAP_COMh = ΣTransmission Provider RT_ECO_MAX × (1/12)

2. Step Two: Headroom and Capacity Need Calculation

a. For each Dispatch Interval (i), calculate the Headroom available on each Resource using the Unit Dispatch System (UDS) data. A Resource is considered to be online and injecting energy if (i) the Dispatch Target for Energy, or Basepoint (BP), is greater than zero; and (ii) its Dispatch Interval Actual Energy Injection, or Resource Load Profiled Volume (RES_LP_VOL), is greater than zero. If the Resource is online and injecting energy, the Resource Headroom (RES_HR) is equal to the positive difference between the adjusted Real-Time Hourly Economic Maximum Limit (RT_ECO_MAX) and the sum of the Dispatch Target for Energy, or Basepoint (BP), Dispatch Target for Regulating Reserve (REG_MW), Dispatch Target for Spinning Reserve (SPIN_MW), and Dispatch Target for Supplemental Reserve (SUPP_MW). If the Resource is not online or not injecting energy, the RES_HR is set to zero. The following formula shows how the RES_HR is calculated:

IF (BP > 0 **AND** RES_LP_VOL > 0) **THEN**
RES_HR = MAX [RT_ECO_MAX – (BP + REG_MW +
SPIN_MW + SUPP_MW), 0]
ELSE
RES_HR = 0
END IF

b. The RES_HR is then integrated for all Resources to calculate the hourly Headroom Available (HR_AVAIL):

HR_AVAIL = ΣTransmission Provider RES_HR × (1/12)

c. Next the Operations Headroom Need (HR_NEED) is calculated as the greater of: (1) Unloaded Capacity Requirement or (2) 60% of the hourly Load change. The hourly Load change is equal to the greater of (i) the difference between the Transmission Provider next Hour (TP_Next_Hour) Load (measured as the total generation needed to meet the Load) plus Net Actual Interchange (“NAI”) and the Transmission Provider current Hour (TP_Current_Hour) Load plus NAI and (ii) 0. The total generation needed to meet the Load considers the Actual Energy Injections for Resources, or the Real-Time Billable Meter ($RT\_BLL\_MTR_{GEN}$).

HR_NEED = MAX { Unloaded Capacity Requirement,
[60% × MAX (ΣTP_Next_Hour MAX (RT_BLL_MTRGEN + NAI, 0) –
ΣTP_Current_Hour MAX (RT_BLL_MTRGEN + NAI, 0), 0)] }

d. The Capacity MW Needed (CAP_MW_NEED), adjusted for constraints on the system, is then calculated as the HR_AVAIL minus the HR_NEED minus the CMC_CAP_COM.

CAP_MW_NEED = HR_AVAIL – HR_NEED – CMC_CAP_COM

e. For each Hour (h), if the CAP_MW_NEED is negative, it represents an Hour in which there was a capacity-related commitment needed in that Hour. If the CAP_MW_NEED is greater than or equal to zero, it represents an Hour in which there was no need for a capacity-related commitment. Therefore, for a given Hour (h), the Capacity Commitment Needed (CAP_COM_NEED) is 0 (or False) when the CAP_MW_NEED is greater than or equal to zero and the CAP_COM_NEED is 1 (or True) when the CAP_MW_NEED is less than zero.

IF CAP_MW_NEEDh >= 0 **THEN**
CAP_COM_NEEDh = 0
ELSE
CAP_COM_NEEDh = 1
END IF

3. Step Three: Capacity Resource Commitment Logic

a. For the purposes of this study, all Commitment Periods are bounded by a given Operating Day. For each Active Transmission Constraint commitment, determine the set of Hours in which there exists a Capacity Commitment Need (*i.e.*, CAP_COM_NEED = 1). For each Active Transmission Constraint commitment, the Capacity Resource Commitment Analysis Period (CAP_RES_COM_AP) will be from the earliest to the latest hour within the Active Transmission Constraint commitment for which the CAP_COM_NEED is 1 (*i.e.*, True).

b. The next step is to identify those Resources that would have been committed for Capacity, had they been selected on a least-cost basis, rather than those that had been selected for an Active Transmission Constraint commitment. For each CAP_RES_COM_AP, the list of potential Resources available for commitment shall include Resources that meet the following criteria:

i. Economically available in the Real-Time Energy and Operating Reserve Market for each Hour of the CAP_RES_COM_AP;

ii. Does not have a commitment for any Hour in the Operating Day;

iii. The Real-Time Hourly Economic Maximum Limit (RT_ECO_MAX) of the potential Capacity Resource (CAP_MAX) is similar to the RT_ECO_MAX of the Active Transmission Constraint committed Resource (CMC_MAX) for the CAP_RES_COM_AP

CAP_MAX > MAX (50% × CMC_MAX, CMC_MAX – 50 MW) **AND** CAP_MAX < MIN (150% × CMC_MAX, CMC_MAX + 50 MW);

iv. Has a Maximum Runtime greater than or equal to the number of hours in the CAP_RES_COM_AP;

v. Has a Minimum Runtime less than or equal to the number of hours in the CAP_RES_COM_AP;

vi. All startup times plus notification times (hot, intermediate, and cold) are less than or equal to 1 hour; and

vii. Has all startup times plus notification times less than or equal to the difference between the call on time and commitment decision time of the CAP_RES_COM_AP

Startup TimeType + Notification TimeType <= Call On Time – CAP_RES_COM_AP

c. The Capacity Commitment Cost (CAP_COM_COST) for each potential Resource is calculated for the CAP_RES_COM_AP. The (CAP_COM_COST) is equal to the cold startup cost plus No Load Cost plus Incremental Energy Cost up to the Capacity Resource Real-Time Hourly Economic Minimum Limit (CAP_MIN) during the CAP_RES_COM_AP.

CAP_COM_COSTCAP_RES_COM_AP = [Cold StartupCost + ΣCAP_RES_COM_AP (
NoLoadCost + Σ0
CAP_MIN IncrementalEnergyCost)]

d. To determine the cost per unit of Capacity, the CAP_COM_COST are then divided by the sum of the Real-Time Hourly Economic Maximum Limits for the CAP_RES_COM_AP.

CAP_COM_COST MW = CAP_COM_COST / ΣCAP_RES_COM_AP
RT_ECO_MAX

e. The Resource with the smallest CAP_COM_COST per MW of Capacity is selected as the CMC Replacement Resource (CMC_RR). The Capacity Commitment MWP (CAP_COM_MWP) for the CMC_RR is calculated for the CAP_RES_COM_AP, using the Real-Time Hourly Economic Minimum Limit for both the Incremental Energy Cost calculation and the revenue.

CAP_COM_MWP = MAX [CAP_COM_COST –ΣCAP_RES_COM_AP (CAP_MIN * RT_LMP) , 0]

4. Step Four: CMC Allocation Factor Calculation

a. For each Hour, the Capacity Commitment Need (CAP_COM_NEED) and CMC Replacement Resource (CMC_RR) are used to determine the Capacity Contribution (CAP_CON) and CMC Contribution (CMC_CON). For any Hour where the CAP_COM_NEED = 0, the CMC_CON is equal to the CMC_RES_MWP. For any Hour where the CAP_COM_NEED = 1 and a CMC_RR does not exist, the CAP_CON is equal to the CMC_RES_MWP. In any Hour where the CAP_COM_NEED = 1 and a CMC_RR exists, CAP_CON is equal to the lesser of the CMC_RES_MWP or CAP_COM_MWP and the CMC_CON is equal to the positive difference between the CMC_RES_MWP and the CAP_COM_MWP.

IF CAP_COM_NEED = 0
THEN CMC_CON = CMC_RES_MWP

ELSE IF CAP_COM_NEED = 1 **AND** CMC_RR **NOT EXIST**
THEN CAP_CON = CMC_RES_MWP
ELSE CAP_CON = MIN (CMC_RES_MWP , CAP_COM_MWP)
CMC_CON = MAX (CMC_RES_MWP – CAP_COM_MWP , 0)
END IF

b. For the allocation study time period, the amount attributable to the Active Transmission Constraints commitment (*i.e.*, the CMC Allocation Factor) is equal to the total CMC_CON divided by the sum of the total CMC_CON plus the CAP_CON.

CMC Allocation Factor = ΣTransmission Provider CMC_CON / (ΣTransmission Provider CMC_CON + ΣTransmission Provider CAP_CON)

c. The CMC Allocation Factor will be displayed on the RT Market Settlement Statement.