

Day-ahead Metered Energy Adjustment Factor Fall 2016 Release

What is the metered energy adjustment factor (MEAF)?

- In bid cost recovery, the MEAF is used to align day-ahead bid cost recovery (DA BCR) payments with energy produced by a resource.
- Scales a resource's BCR to the extent the resource operates below its DA schedule.

Why the change?

- The current DA MEAF needs to be updated to resolve some flaws that caused inappropriate results

Effective Day-Ahead Scheduled Energy (Effective DASE)

The minimum of the Expected Energy and the Day-Ahead Scheduled Energy

MEAF modifications for generating units and resource specific system resources

Step	Condition and action
Step 1	If (Effective DASE \geq DA Min Load Energy) and Effective DASE >0 Then Step 2 <i>Otherwise proceed to step 6</i>
Step 2	If ((Metered Energy - Regulation Energy $<$ DA Minimum Load Energy – Tolerance Band) or (Metered Energy – Regulation Energy ≤ 0)) Then DA MEAF = 0 <i>Otherwise proceed to step three</i>

* Does not apply to non-generation resources (NGR)

MEAF modifications for generating units and resource specific system resources

Step	Conditions and Actions
Step 3	<p>If (ABS(Metered Energy – Regulation Energy – Effective DASE) <= Performance Metric Tolerance Band) Then DA MEAF = 1 <i>Otherwise proceed to Step 4</i></p>
Step 4	<p>If (ABS(Effective DASE – DA Minimum Load Energy)) <=0 Then DA MEAF = 1 <i>Otherwise proceed to Step 5</i></p>
Step 5	<p>DA MEAF =</p> $\text{Min} \left[1, \text{Max} \left(0, \frac{\text{Metered Energy} - \text{DA Minimum Load Energy} - \text{Regulation Energy}}{\text{Effective DASE} - \text{DA Minimum Load Energy}} \right) \right]$

MEAF modifications for generating units and resource specific system resources

Step	Conditions and Actions
Step 6	If (Effective DASE < DA Minimum Load Energy) and (Effective DASE >0) Then DA MEAF = 1 <i>Otherwise proceed to Step 7</i>
Step 7	If Effective DASE > 0 and Expected Energy <= 0 and Metered Energy <= 0 Then DA MEAF = 1 <i>Otherwise the DA MEAF = 0</i>

MEAF calculation step 1

Step 1:

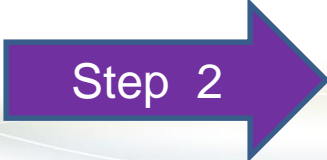
If (Effective DASE \geq DA Min Load Energy)
and Effective DASE > 0

Then  Step 2.... *Otherwise proceed to step 6*

Remember
... Effective
DASE is the
minimum of
the TEE and
the DASE

CMRI results	HE20
Energy	46.90 MWh
DASE	46.90 MWh
DMLE	19.92 MWh
TEE	26.88 MWh


$$\left(26.88 \text{ MWh} \geq 19.92 \text{ MWh} \right) \text{ and } 26.88 \text{ MWh} > 0$$

 Step 2

MEAF calculation step 2

Step 2:

If ((Metered Energy – Regulation Energy < DA Minimum Load Energy – Tolerance Band) or (Metered Energy – Regulation Energy <=0))

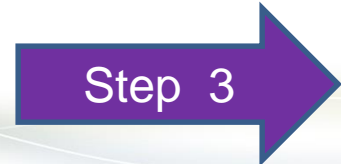
Then  DA MEAF = 0.... Otherwise proceed to step 3

CMRI results	HE 20
Reg up	26.90 MWh
Effective DASE	26.88 MWh
DMLE	19.92 MWh
Tolerance Band	> of 3% of Pmax or 5MW /#intervals

METER	HE20
Int 1 -12	46.90 MWh

Resource Characteristics	HE 20
Pmin 20	Pmax 100

$$\left(\left(46.90 \text{ MWh} - 26.90 \text{ MWh} < 19.92 \text{ MWh} - .42 \text{ MWh} \right) \text{ or } \left(46.90 \text{ MWh} - 26.90 \text{ MWh} \leq 0 \right) \right)$$



MEAF calculation step 3

Step 3:

If $(ABS(\text{Metered Energy} - \text{Regulation Energy} - \text{Effective DASE}) \leq \text{Performance Metric Tolerance Band})$

Then \longrightarrow DA MEAF = 1... *Otherwise proceed to Step 4*

CMRI results	HE 20
Energy	46.90 MWh
Reg up	26.90 MWh
DASE	46.90 MWh
DMLE	19.92 MWh
TEE	26.88 MWh
Tolerance Band	> of 3% of Pmax or 5MW /12 intervals

METER	HE20
Int 1 -12	46.90

Resource Characteristics	HE 20
Pmin 20	Pmax 100

Greater of $(3\% \times 100 = 3 \text{ MW})$ or 5 MW divided by 12 intervals = .41666

$(ABS(46.90 \text{ MWh} - 26.90 \text{ MWh} - 26.88 \text{ MWh}) \leq .42 \text{ MWh})$

Step 4 

MEAF calculation step 4

Step 4:

If (Effective DASE – DA Minimum Load Energy) ≤ 0

Then  DA MEAF = 1 ... *Otherwise proceed to Step 5*

CMRI results	HE 20
Energy	46.90 MWh
Reg up	26.90 MWh
DASE	46.90 MWh
DMLE	19.92 MWh
TEE	26.88 MWh
Tolerance Band	> of 3% of Pmax or 5MW /#intervals

METER	HE20
Int 1 -12	46.90

Resource Characteristics	HE 20
Pmin 20	Pmax 100

$$(26.88 \text{ MWh} - 19.92 \text{ MWh}) \leq 0$$



MEAF calculation step 5

Step 5:

DA MEAF =

$$\text{Min} \left[1, \text{Max} \left(0, \frac{\text{Metered Energy} - \text{DA Minimum Load Energy} - \text{Regulation Energy}}{\text{Effective DASE} - \text{DA Minimum Load Energy}} \right) \right]$$

CMRI results	HE 20
Energy	46.90 MWh
Reg up	26.90 MWh
DASE	46.90 MWh
DMLE	19.92 MWh
TEE	26.88 MWh
Tolerance Band	> of 3% of Pmax or 5MW /#intervals

METER	HE20
Int 1 -12	46.90
Resource Characteristics	HE 20
Pmin 20	Pmax 100

$$\text{Min} \left[1, \text{Max} \left(0, \frac{46.90 \text{ MWh} - 19.92 \text{ MWh} - 26.90 \text{ MWh}}{26.88 \text{ MWh} - 19.92 \text{ MWh}} \right) \right] = .0114$$

MEAF calculation step 6

Step 6:

If (Effective DASE < DA Minimum Load Energy) and (Effective DASE >0)

Then

DA MEAF = 1 ... *Otherwise proceed to Step 7*

CMRI results	HE 20
Energy	46.90 MWh
Reg up	26.90 MWh
DASE	46.90 MWh
DMLE	50 MWh
TEE	26.88 MWh
Tolerance Band	> of 3% of Pmax or 5MW /#intervals

METER	HE20
Int 1 -12	46.90

Resource Characteristics	HE 20
Pmin 20	Pmax 100

(26.88 MWh < 50.00 MWh) and (26.88 MWh >0)

Step 7

MEAF calculation step 7

Step 7:

If Effective DASE is positive and Expected Energy ≤ 0

Then

$DA\ MEAF = 1$... *Otherwise the DA MEAF = 0*

CMRI results	HE 20
Energy	46.90 MWh
Reg up	26.90 MWh
DASE	46.90 MWh
DMLE	50 MWh
TEE	26.88 MWh
Tolerance Band	> of 3% of Pmax or 5MW /#intervals

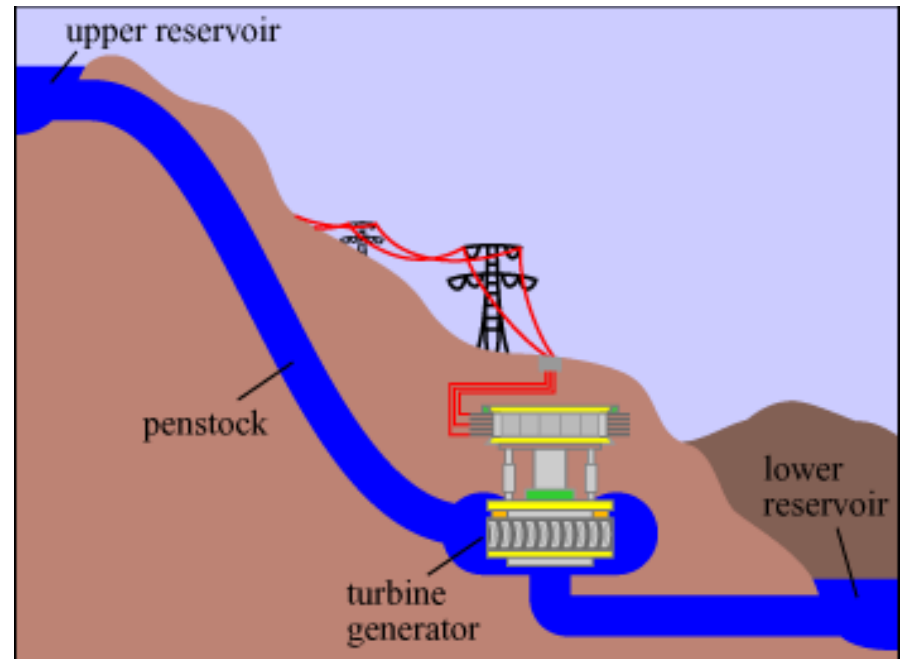
METER	HE20
Int 1 -12	46.90

Resource Characteristics	HE 20
Pmin 20	Pmax 100

Done!

New rules for application of MEAF to pumped storage bid cost recovery

In the day-ahead market these resources may, under certain circumstances, have negative day – ahead energy and still be eligible for BCR.



MEAF modifications for pumping energy

- The system shall formulate the MEAF for Pump Storage resources in 2 steps

Step	Conditions and Actions
Step 1	If DA Pumping Energy is negative, and Expected Energy is negative Then DA MEAF = $\text{Min} \left[1, \text{Max} \left(0, \frac{\text{Metered Energy}}{\text{Expected Energy}} \right) \right]$

MEAF modifications for pump energy

Step	Conditions and Actions
Step 2	<p>If DA Pumping Energy is negative, and Expected Energy is ≥ 0 and Metered Energy ≥ 0 Then MEAF = 1</p> <p>Otherwise, its Day-ahead MEAF = 0</p>