

PJM AGC Transition to Regulation Up / Down

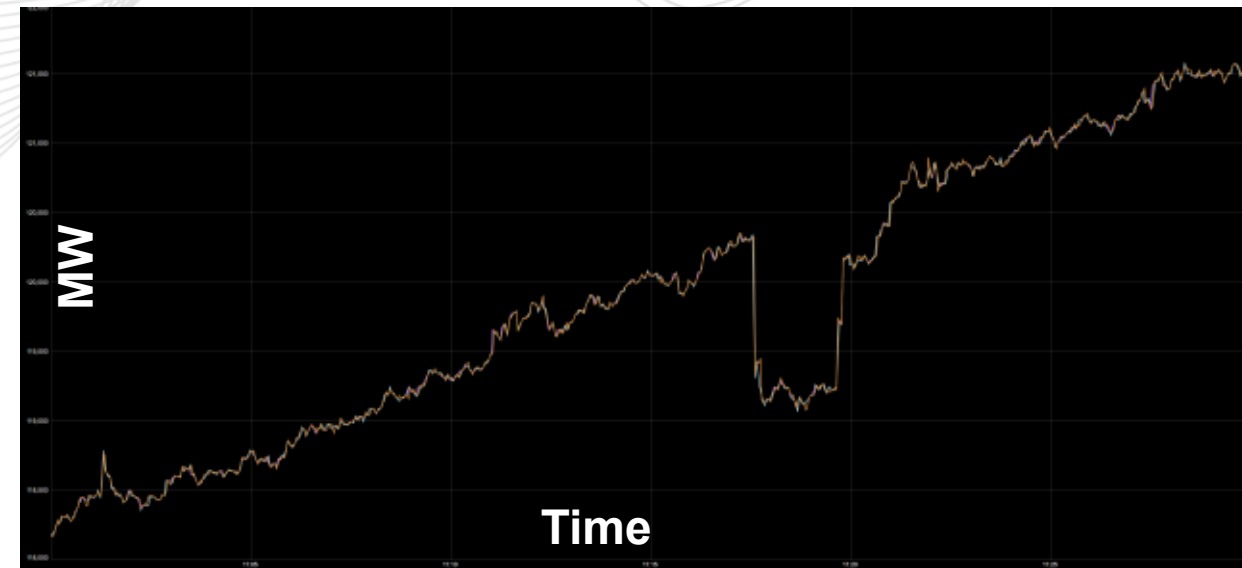
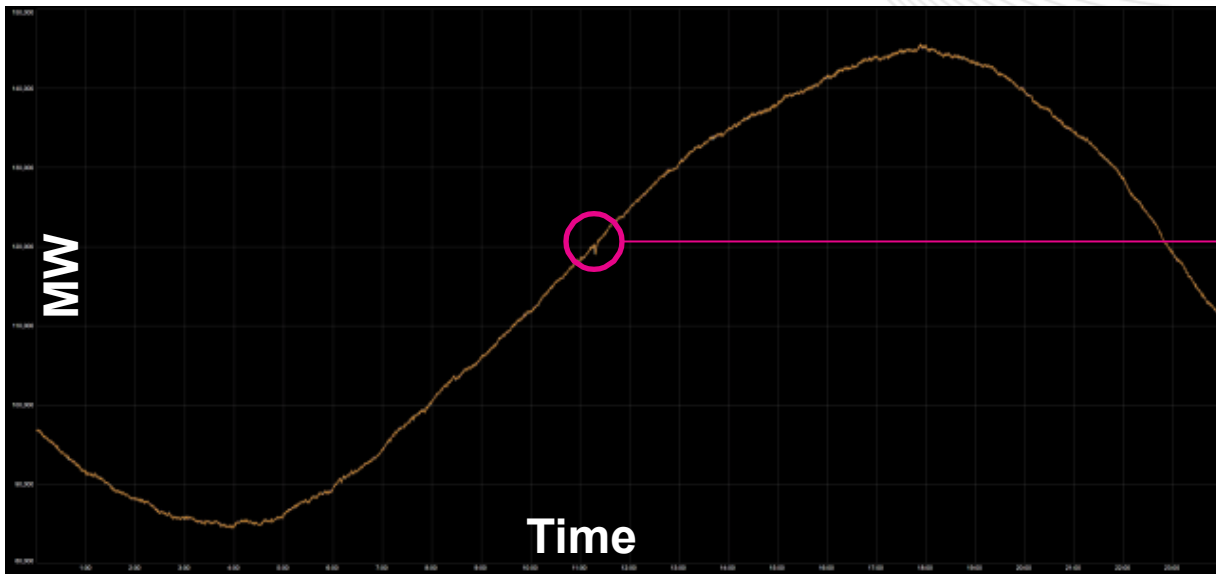
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Tech Change Forum
August 10, 2026

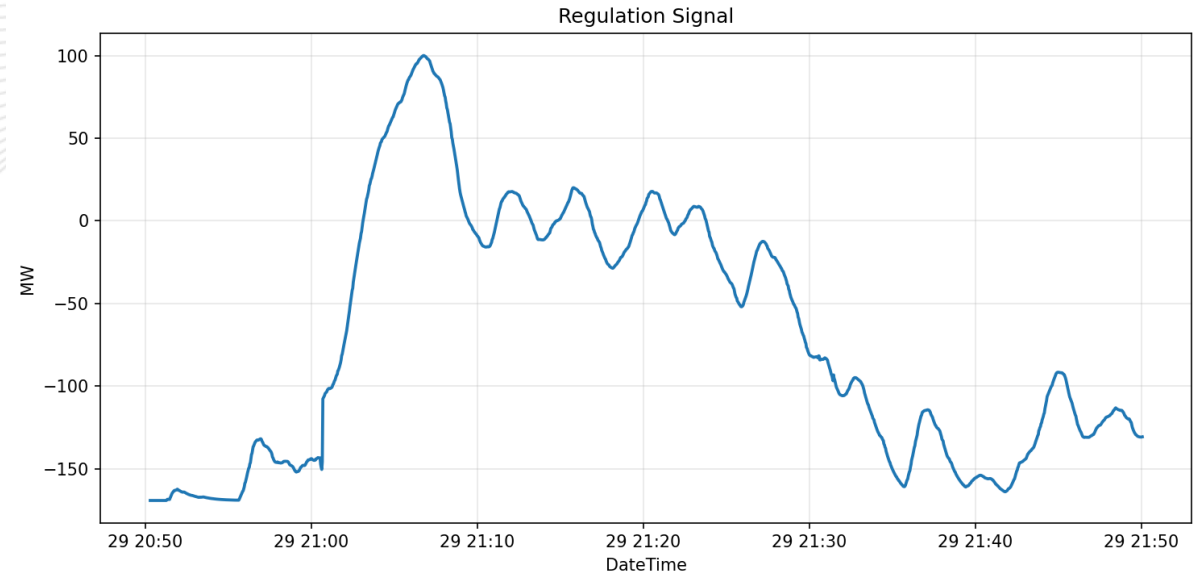
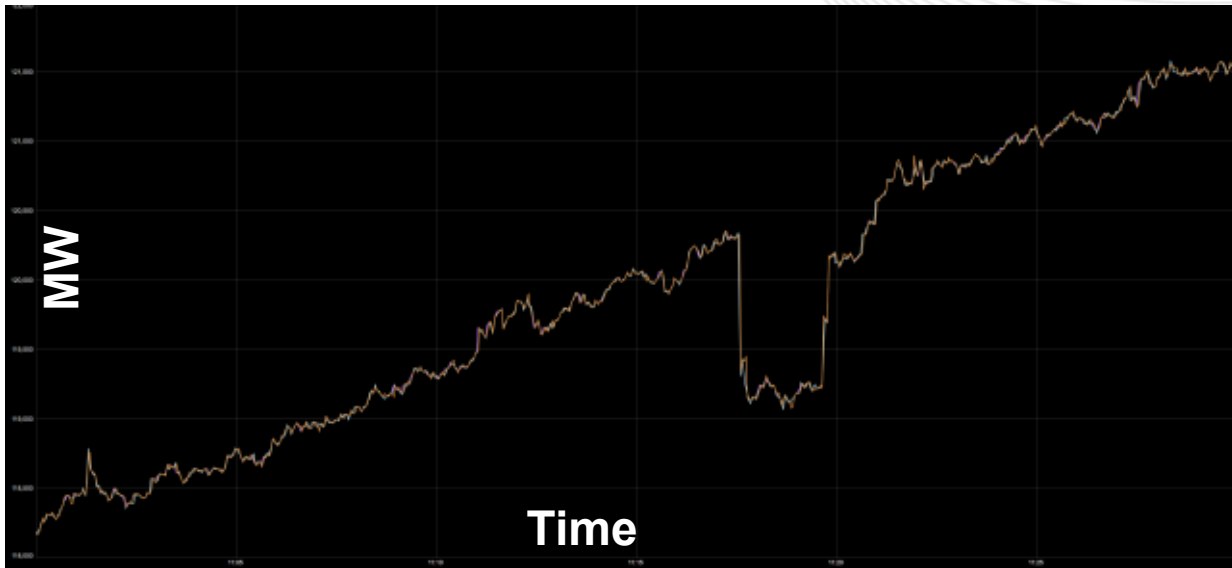
Disclaimer: While materials are current at the time of publishing, applicable requirements may change. PJM Governing Documents control.

Subheading/lead in text

- What is Regulation, ACE
- Current Single Regulation Signal Implementation
- New Regulation Up / Down Signal Implementation



**Sudden Drop in Generation
PJM Needs a sudden increase in Gen**



PJM utilizes a 'Regulation Signal' to handle such events

It tells gens to ramp MW output up or down

Examples

The natural variance of PJM Load

Tripping – Gens or Large Loads

The natural variance of Eastern Interconnection Frequency

PJM **DOES NOT** use load as a direct input to calculate a Regulation Signal.

Use **AREA CONTROL ERROR (ACE)**

$$ACE = \text{Actual Net Interchange} - \text{Scheduled Net Interchange} - 10B (\text{Actual Frequency} - \text{Scheduled Frequency}) - IME$$



Conceptually – measures two things:

1. How well PJM is matching power generation to load demand in its footprint
2. How well is PJM performing its proportion of frequency control for the Eastern Interconnection

$$\text{Reporting ACE} = (\text{NIA} - \text{NIS}) - 10\text{B} (\text{FA} - \text{FS}) - \text{IME}$$

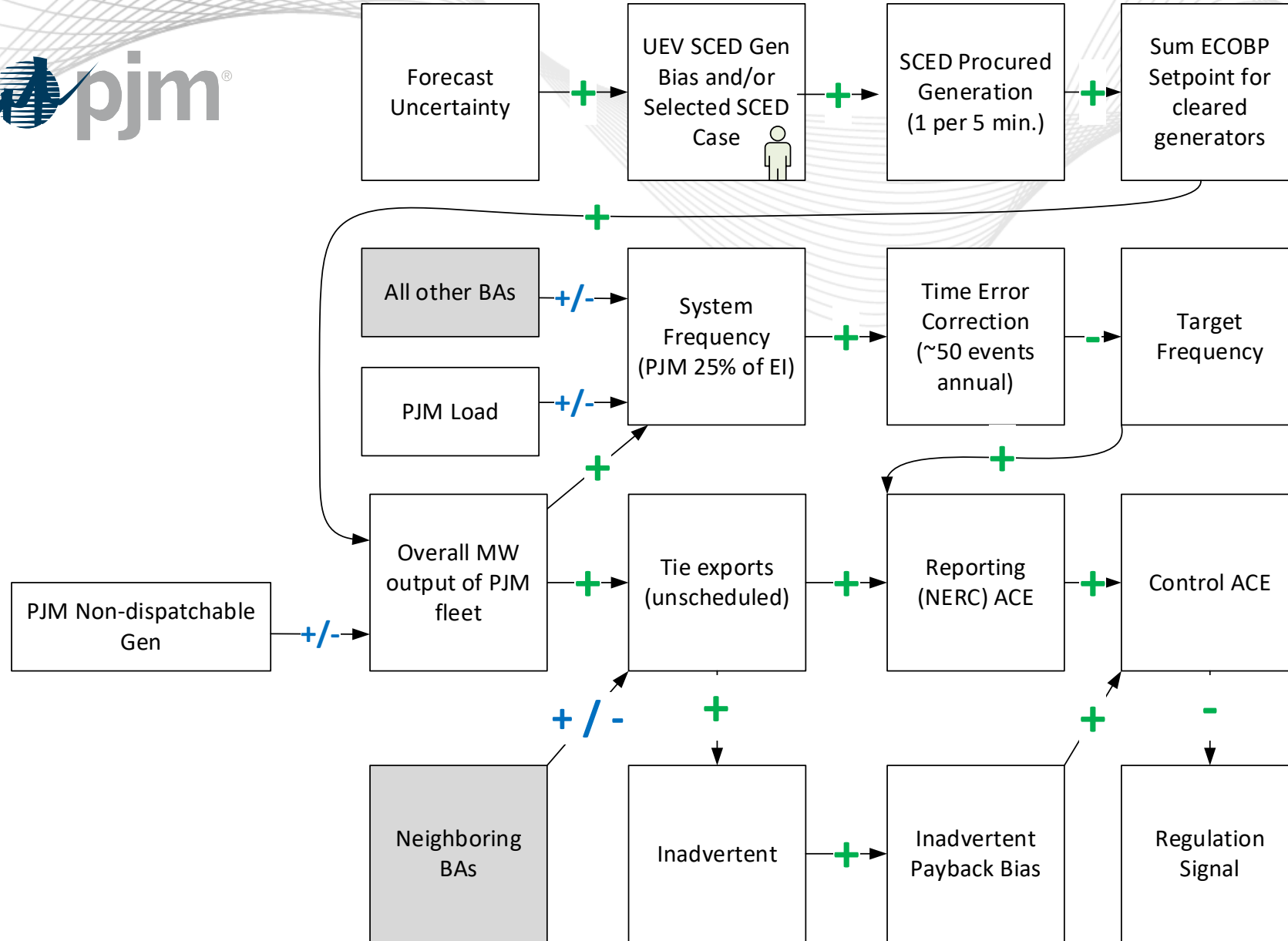
= Interchange Error – 10**B** (Frequency Error) – *Known Meter Errors*

= Interchange Error – (PJM's relative contribution to EI frequency)

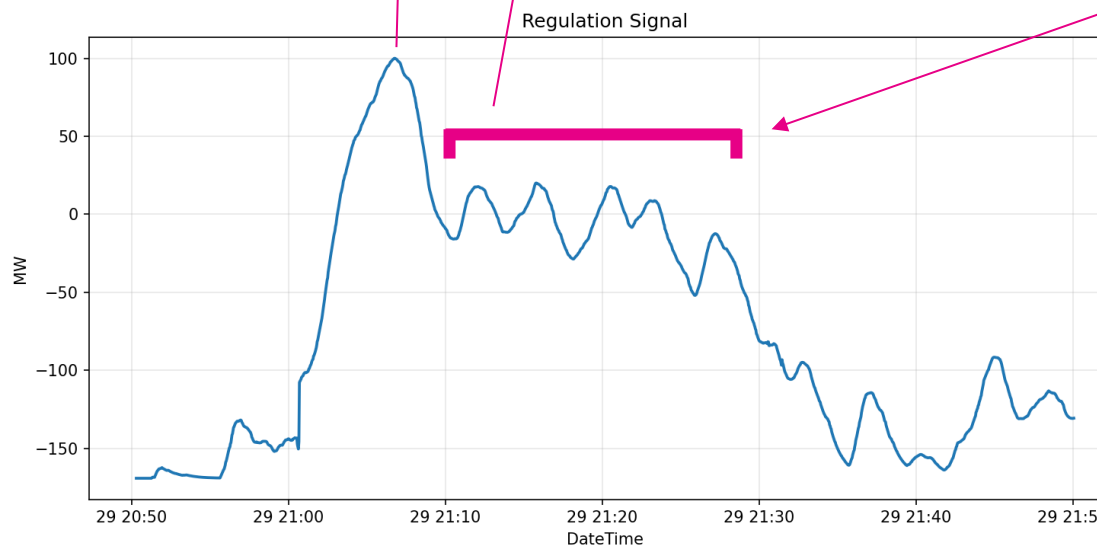
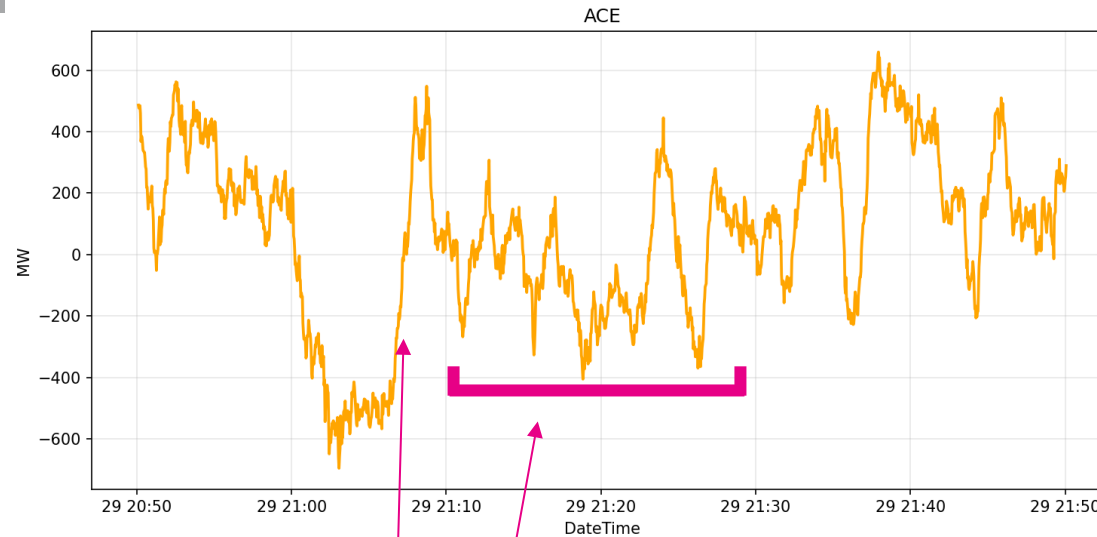
B = Frequency Bias Setting (MW/0.1HZ)

- NERC Calculates a total IFRO (Interconnection Frequency Response Obligation)
 - Complicated, but largely determined by 1. the low frequency at which auto relays start shedding load, and 2. the largest contingency gen-loss

$$FRO_{BA} = IFRO \times \frac{\text{Annual Gen}_{BA} + \text{Annual Load}_{BA}}{\text{Annual Gen}_{Int} + \text{Annual Load}_{Int}}$$



Current PJM Regulation Product



Regulation signal increases when ace dips to -600

Reg signal peak slightly delayed

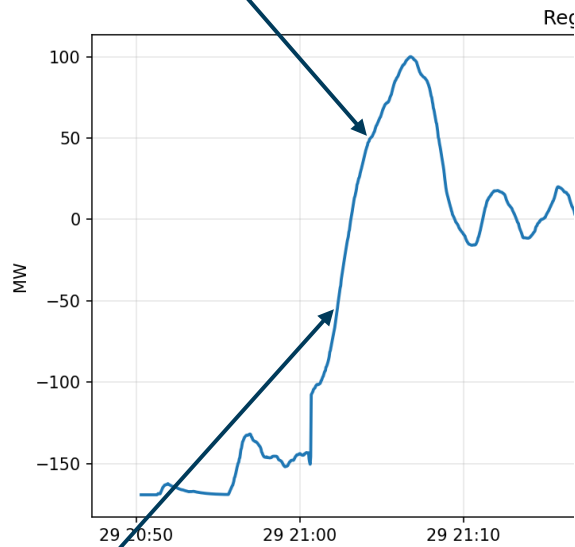
(ACE is main input for Reg Signal)

Goal of Reg Signal is Drive ACE to 0

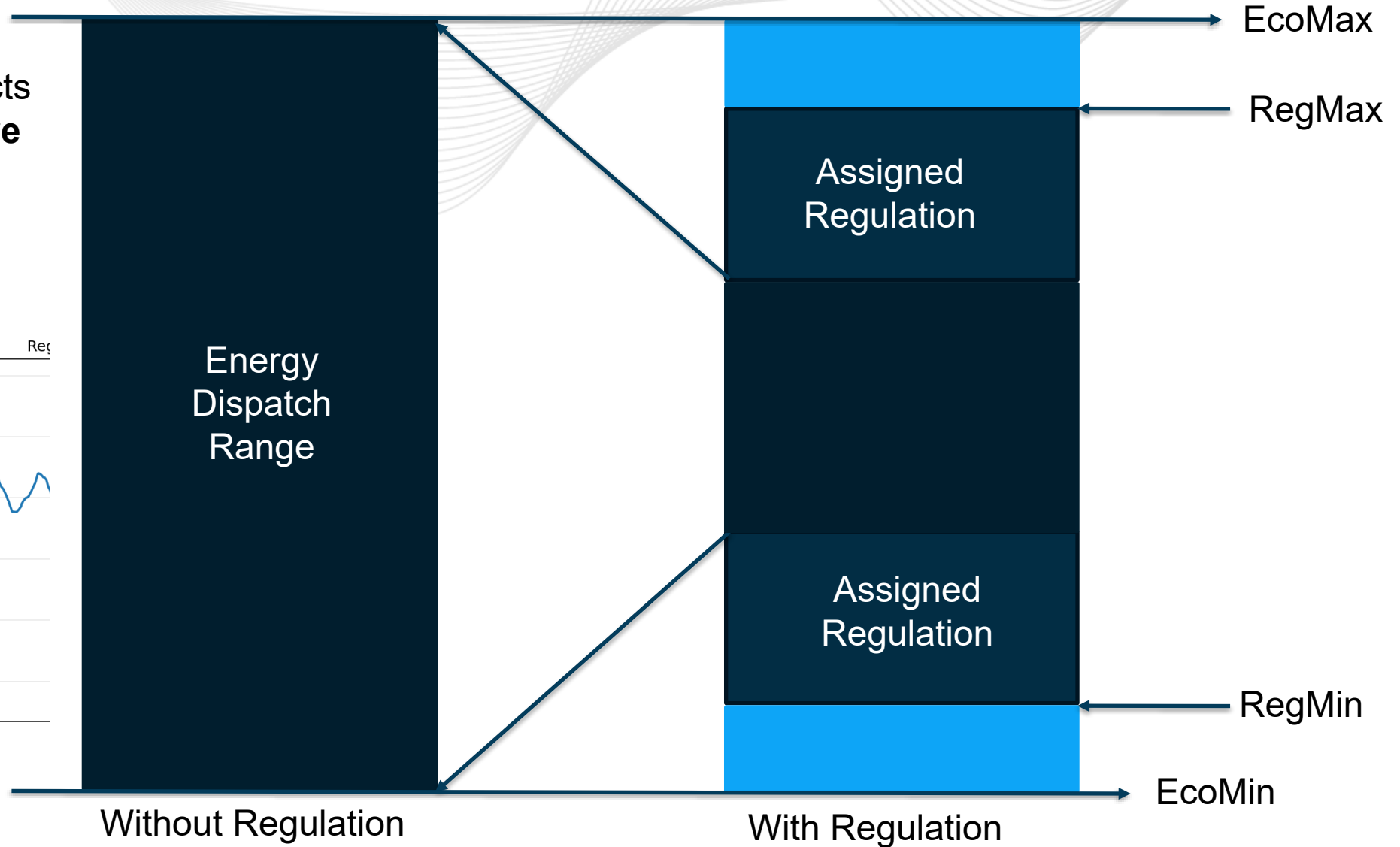


The Regulation Signal instructs your unit how to move **relative to its basepoint**

50MW above BP



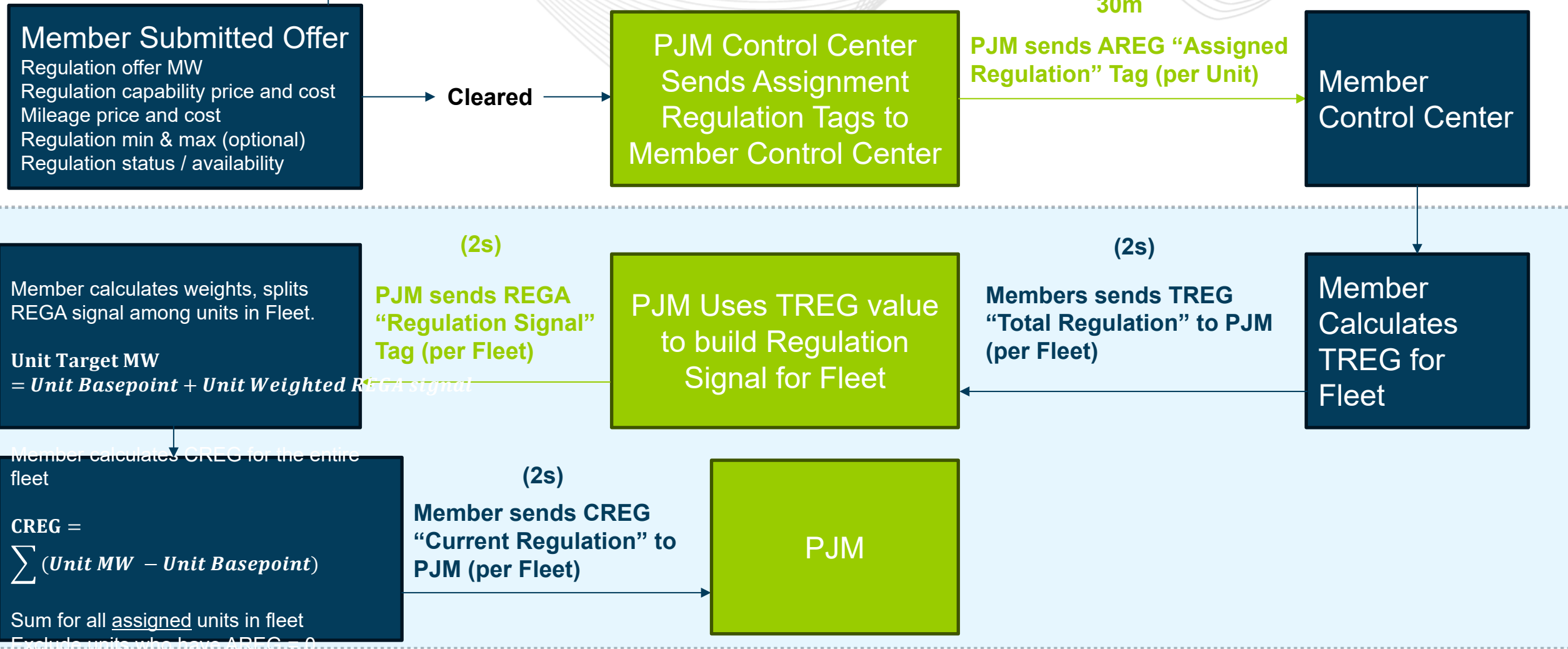
50MW below BP





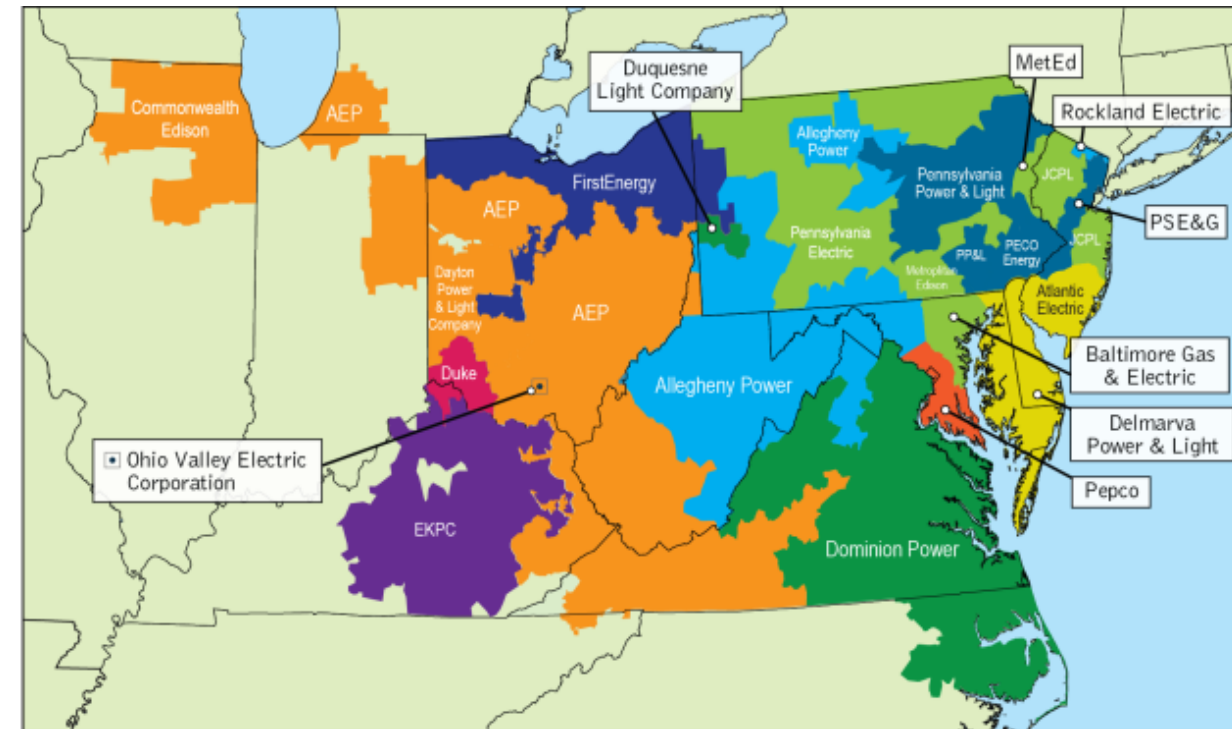
Didn't clear. Try for next 30-minute window

Current Configuration in PJM EMS

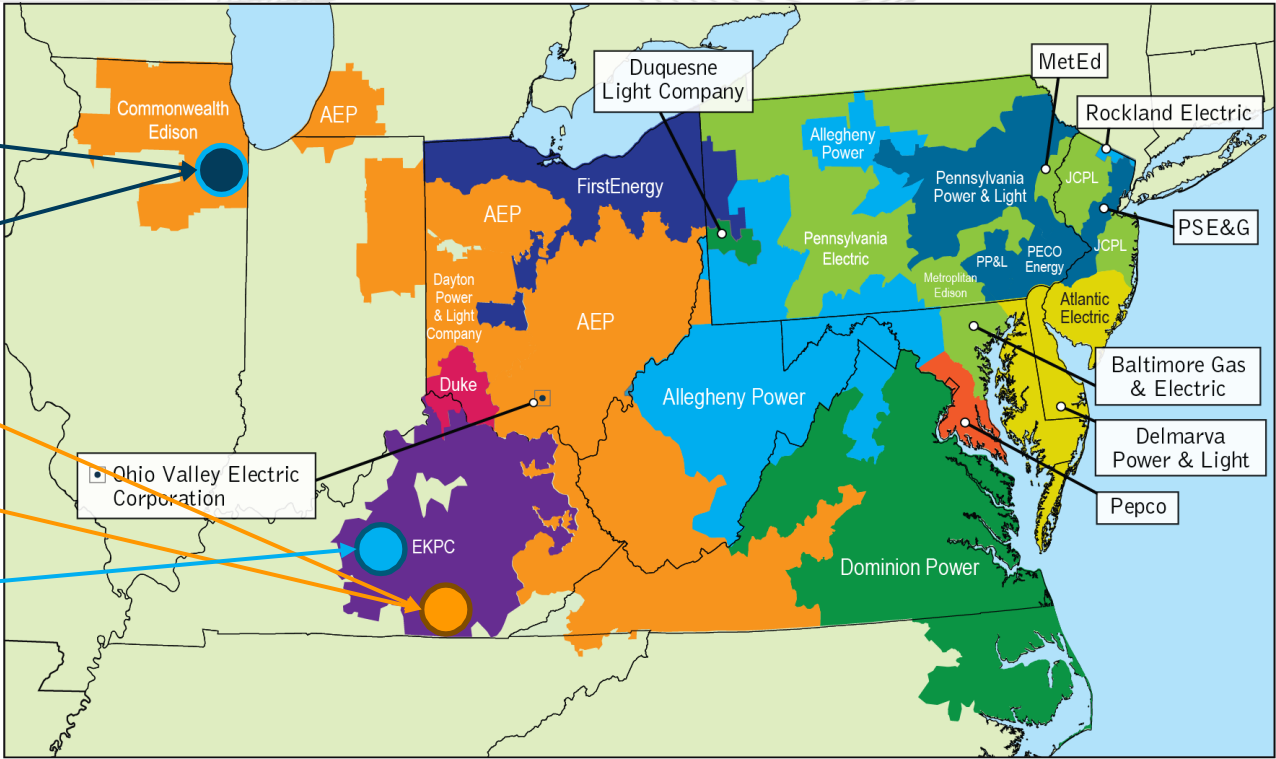


A “Fleet” is a group of Regulating Units

- A Fleet must contain generators in the same Control Zone (similar geographic region)
- PJM **Automatic Generation Control (AGC)** works using **Control Zones** and **Fleets**
- A Control Zone is a defined area in the PJM Footprint. PJM gives them all a name
 - AEP
 - Dominion
 - ComEd
 - Allegheny
 - Duke
 - Dayton
 - EKPC
 - First Energy
 - “Mid-Atlantic” (PENELEC, PPL, PECO, PEPCO, JCPL, MetEd, BGE, ACE/DPL, PSEG)
 - Duquesne
- A Fleet requires a minimum of 1 unit



- Combustion Turbine 1
- Combustion Turbine 2
- Solar 1
- Solar 2
- Hydro 1



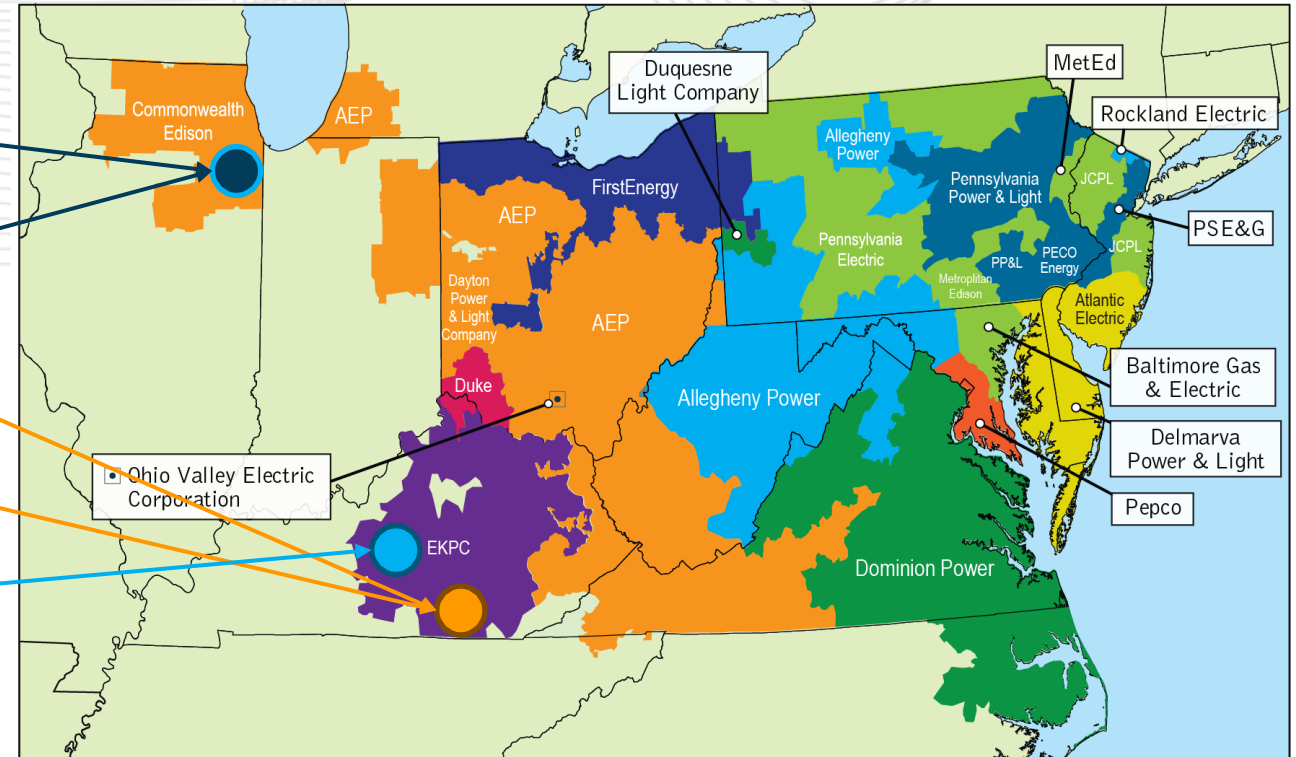
I own a company: Sweet's Generation

Control Zones and Fleets

Invalid

"Sweets Mega Fleet"

- Combustion Turbine 1
- Combustion Turbine 2
- Solar 1
- Solar 2
- Hydro 1



My CT's can never be in the same fleet as my Solars or Hydro unit, they are in a different Control Zone

Valid

"Sweets ComEd Fleet"

Combustion Turbine 1

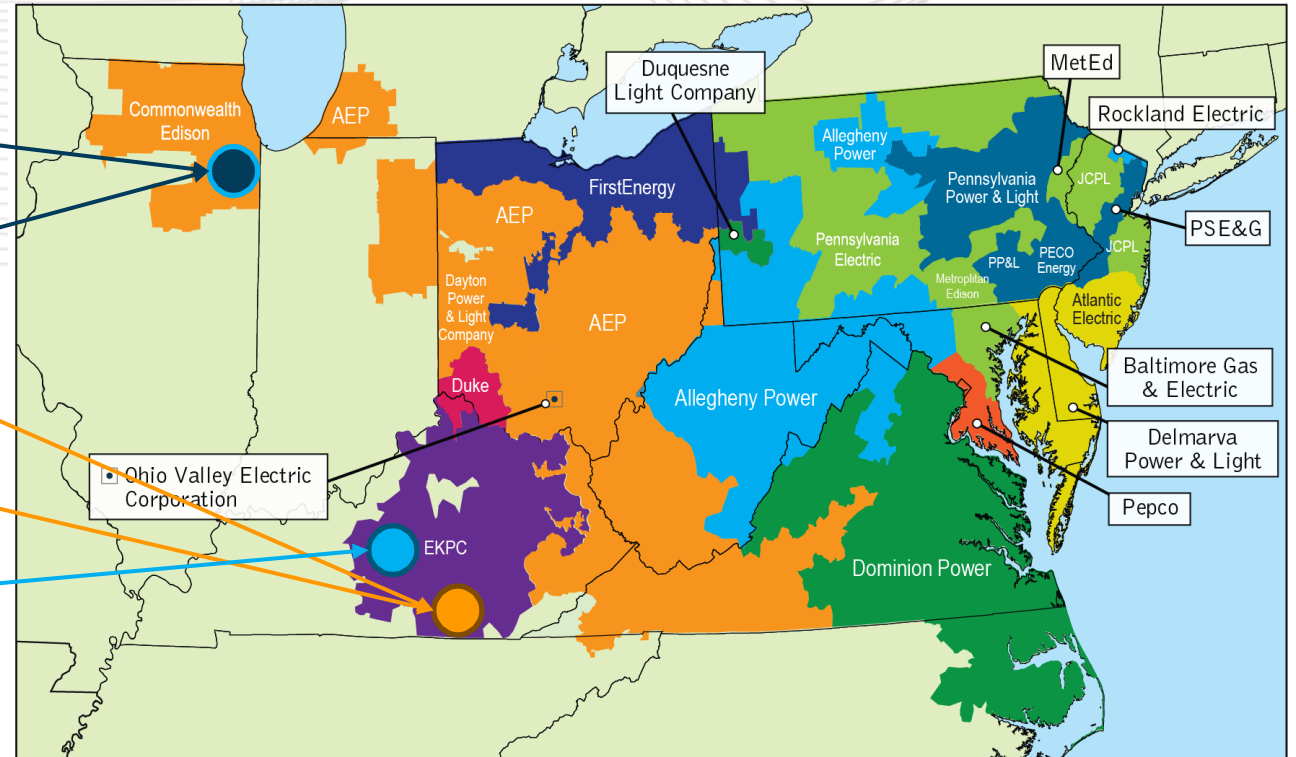
Combustion Turbine 2

Solar 1

Solar 2

Hydro 1

"Sweets EKPC Fleet"



My CT's in the ComEd zone in one fleet
My Renewables in the EKPC zone in another fleet

I own a company: Sweet's Generation

Valid

"Sweets ComEd Fleet"

Combustion Turbine 1

Combustion Turbine 2

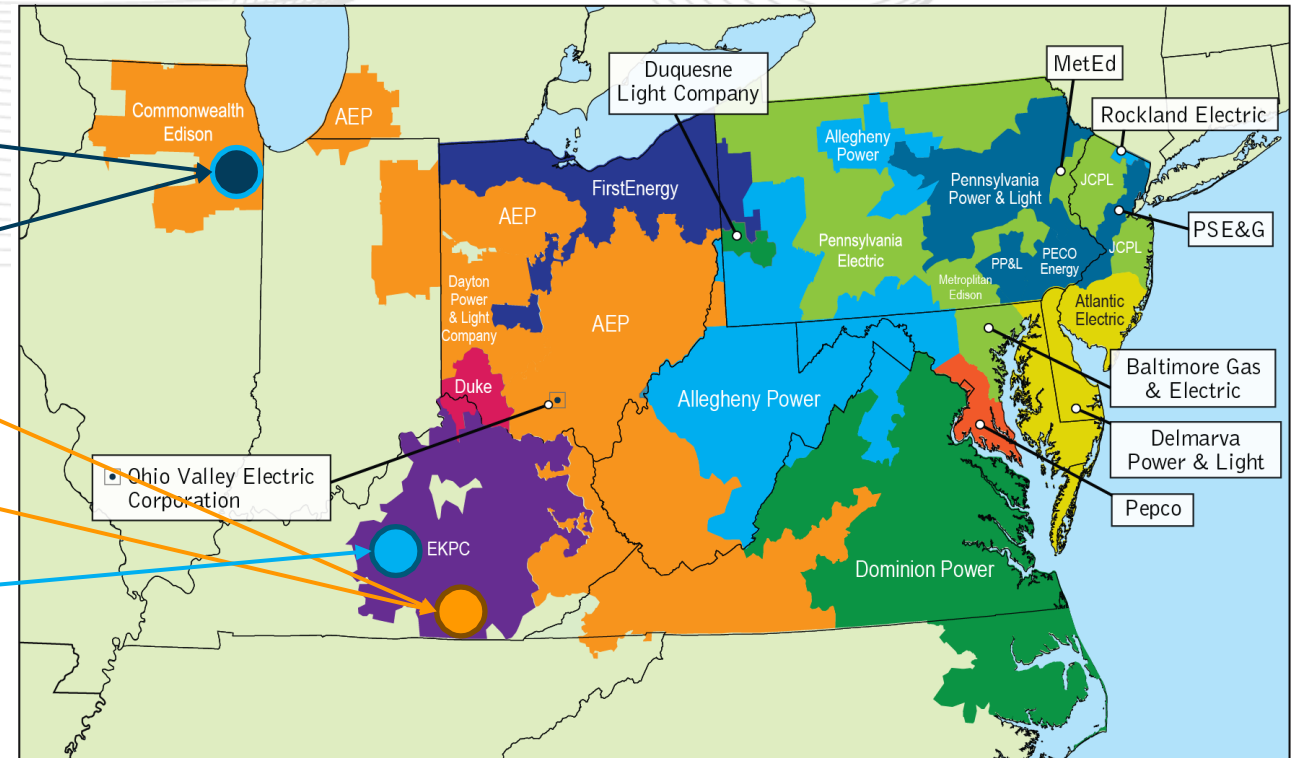
"Sweets EKPC Solar Fleet"

Solar 1

Solar 2

"Sweets EKPC Hydro Fleet"

Hydro 1



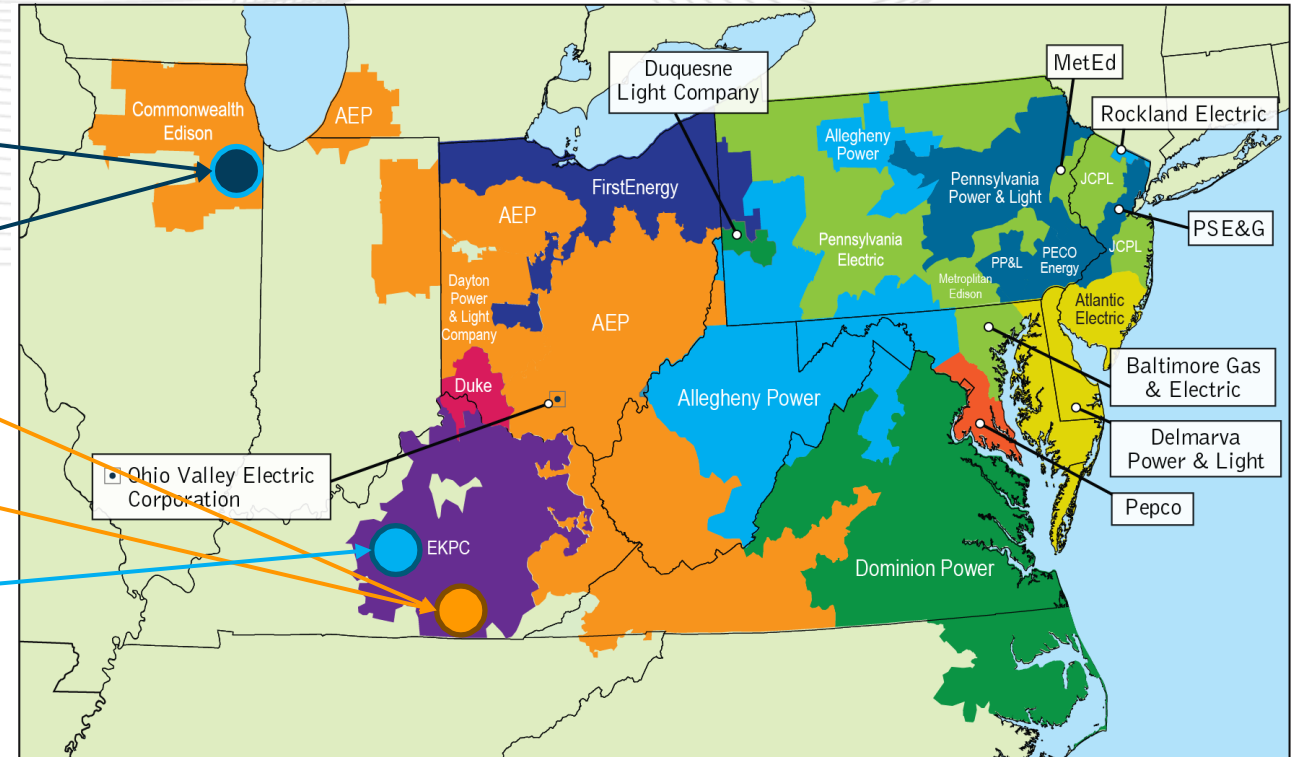
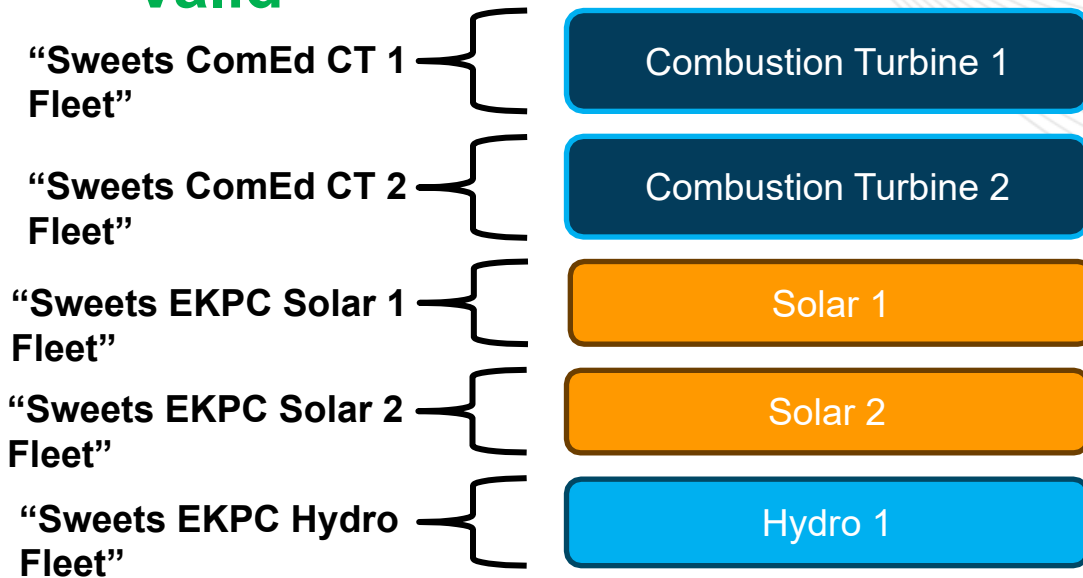
Don't need to put all of my EKPC units in the same fleet

I can have multiple fleets that operate in the same Control Zone.

Minimum is 1 unit in a Fleet – Hydro 1 is the only unit in it's fleet (valid)

I own a company: Sweet's Generation

Control Zones and Fleets



Technically you can do this – but PJM will heavily discourage. Defeats the purpose of a 'Fleet'

I own a company: Sweet's Generation

FLEET TAGS

Valid

"Sweets ComEd Fleet"

Combustion Turbine 1

Combustion Turbine 2

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREG
PJM_SWEET_COMED_GENA_CREG

"Sweets EKPC
Solar Fleet"

Solar 1

Solar 2

PJM_SWEET_EKSOLAR_GENA_REGA
PJM_SWEET_EKSOLAR_GENA_TREG
PJM_SWEET_EKSOLAR_GENA_CREG

"Sweets EKPC
Hydro Fleet"

Hydro 1

PJM_SWEET_EKHYDRO_GENA_REGA
PJM_SWEET_EKHYDRO_GENA_TREG
PJM_SWEET_EKHYDRO_GENA_CREG

Each **Fleet** Currently has 3 Associated Tags

- "REGA" Regulation Signal – **PJM sends Member Company** a single regulation signal for the entire fleet
- "TREG" Total Available Regulation – **Member Company sends PJM** a value indicating how much regulation the fleet can provide
- "CREG" Current Regulation – **Member Company sends PJM** a value indicating how much regulation the fleet is currently providing

FLEET TAGS

UNIT TAGS

Valid

“Sweets ComEd Fleet”

Combustion Turbine 1

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREG
PJM_SWEET_COMED_GENA_CREG

PJM_SWEET_CT1_GENA_AREG

Combustion Turbine 2

PJM_SWEET_CT2_GENA_AREG

“Sweets EKPC
Solar Fleet”

Solar 1

PJM_SWEET_EKSOLAR_GENA_REGA
PJM_SWEET_EKSOLAR_GENA_TREG
PJM_SWEET_EKSOLAR_GENA_CREG

PJM_SWEET_SLR1_GENA_AREG

Solar 2

PJM_SWEET_SLR2_GENA_AREG

“Sweets EKPC
Hydro Fleet”

Hydro 1

PJM_SWEET_EKHYDRO_GENA_REGA
PJM_SWEET_EKHYDRO_GENA_TREG
PJM_SWEET_EKHYDRO_GENA_CREG

PJM_SWEET_HYD1_GENA_AREG

Each UNIT Currently has 1 Associated Tag for Regulation

- “AREG” Assigned Regulation – PJM sends Member MW of Regulation each unit has been assigned for the given 30-minute interval



"Sweets ComEd Fleet"

Combustion Turbine 1

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREG
PJM_SWEET_COMED_GENA_CREG

Combustion Turbine 2

PJM_SWEET_CT1_GENA_AREG
PJM_SWEET_CT2_GENA_AREG

"Sweets EKPC Solar Fleet"

Solar 1

PJM_SWEET_EKSOLAR_GENA_REGA
PJM_SWEET_EKSOLAR_GENA_TREG
PJM_SWEET_EKSOLAR_GENA_CREG

Solar 2

PJM_SWEET_SLR1_GENA_AREG
PJM_SWEET_SLR2_GENA_AREG

"Sweets EKPC Hydro Fleet"

Hydro 1

PJM_SWEET_EKHYDRO_GENA_REGA
PJM_SWEET_EKHYDRO_GENA_TREG
PJM_SWEET_EKHYDRO_GENA_CREG

PJM_SWEET_HYD1_GENA_AREG

$$TREG = \sum_{All\ Units\ in\ Fleet} AREG$$

AREG is always 0 or positive
(0 = Didn't get assigned)

If you send a 0 TREG, you will
receive a Regulation Signal of 0
It needs to be correct

Sweets ComEd Fleet

$$\begin{array}{rcll} \text{PJM_SWEET_CT1_GENA_AREG} & + & \text{PJM_SWEET_CT2_GENA_AREG} & = \text{PJM_SWEET_COMED_GENA_TREG} \\ 30 & + & 15 & = 45 \end{array}$$

Sweets EKPC Solar Fleet

$$\begin{array}{rcll} \text{PJM_SWEET_SLR1_GENA_AREG} & + & \text{PJM_SWEET_SLR1_GENA_AREG} & = \text{PJM_SWEET_EKSOLAR_GENA_TREG} \\ 0 & + & 5 & = 5 \end{array}$$

Sweets EKPC Hydro Fleet

$$\begin{array}{rcll} \text{PJM_SWEET_HYD1_GENA_AREG} & = & \text{PJM_SWEET_EKHYDRO_GENA_TREG} \\ 15 & = & 15 \end{array}$$



"Sweets ComEd Fleet"

Combustion Turbine 1

Combustion Turbine 2

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREG
PJM_SWEET_COMED_GENA_CREG

Calculating Weights

PJM_SWEET_CT1_GENA_AREG
PJM_SWEET_CT2_GENA_AREG

"Sweets EKPC Hydro Fleet"

Hydro 1

PJM_SWEET_EKHYDRO_GENA_REGA
PJM_SWEET_EKHYDRO_GENA_TREG
PJM_SWEET_EKHYDRO_GENA_CREG

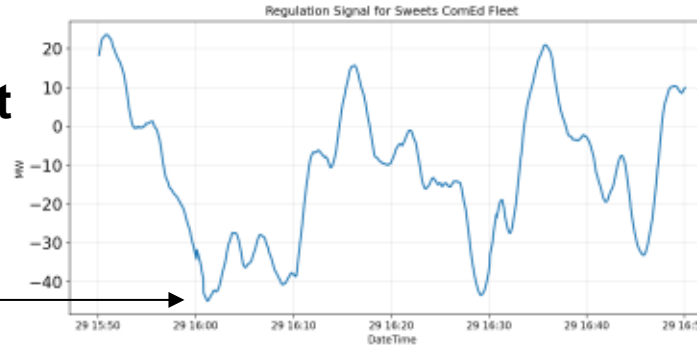
PJM_SWEET_HYD1_GENA_AREG

Sweets ComEd Fleet

PJM_SWEET_CT1_GENA_AREG
PJM_SWEET_CT2_GENA_AREG
PJM_SWEET_COMED_GENA_TREG

30 → 30/45 = 0.66
15 → 15/45 = 0.33
45

Unit Weight



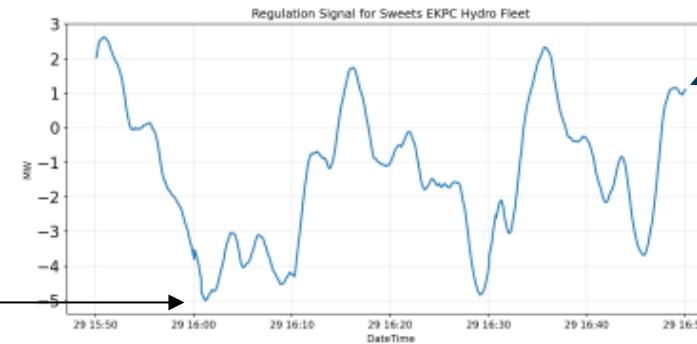
PJM_SWEET_COMED_GENA_REGA = ~ 10

Weighted REGA = 0.66 * 10 = 6.6MW
Weighted REGA = 0.33 * 10 = 3.3MW

Sweets EKPC Hydro Fleet

PJM_SWEET_HYD1_GENA_AREG
PJM_SWEET_EKHYDRO_GENA_TREG

5 → 5/5 = 1.0
5



PJM_SWEET_EKHYDRO_GENA_REGA = ~ 1

Weighted REGA = 1.0 * 1 = 1.0MW



“Sweets ComEd Fleet”

Combustion Turbine 1

Combustion Turbine 2

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREG
PJM_SWEET_COMED_GENA_CREG

PJM_SWEET_CT1_GENA_AREG
PJM_SWEET_CT2_GENA_AREG

“Sweets EKPC Hydro Fleet”

Hydro 1

PJM_SWEET_EKHYDRO_GENA_REGA
PJM_SWEET_EKHYDRO_GENA_TREG
PJM_SWEET_EKHYDRO_GENA_CREG

PJM_SWEET_HYD1_GENA_AREG

Calculating Target MW

$$\text{Unit Target MW} = \text{Unit Basepoint} + \text{Unit Weighted REGA signal}$$

Sweets ComEd Fleet

PJM_SWEET_CT1_GENA_AREG 30
PJM_SWEET_CT2_GENA_AREG 15
PJM_SWEET_COMED_GENA_TREG 45

Unit Weight

→ 30/45 = 0.66
→ 15/45 = 0.33



Weighted REGA

6.6MW +
3.3MW +

Basepoint

PJM_CT1_GENECON 100
PJM_CT2_GENECON 90

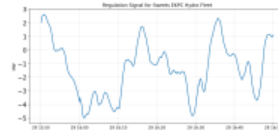
New Unit Target MW

= 106.6
= 93.3

Sweets EKPC Hydro Fleet

PJM_SWEET_HYD1_GENA_AREG 5
PJM_SWEET_EKHYDRO_GENA_TREG 5

→ 5/5 = 1.0



1.0MW +

PJM_HYD1_GENECON 12

= 13.0



“Sweets ComEd Fleet”

Combustion Turbine 1

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREG
PJM_SWEET_COMED_GENA_CREG

PJM_SWEET_CT1_GENA_AREG
PJM_SWEET_CT2_GENA_AREG

Combustion Turbine 2

Hydro 1

PJM_SWEET_EKHYDRO_GENA_REGA
PJM_SWEET_EKHYDRO_GENA_TREG
PJM_SWEET_EKHYDRO_GENA_CREG

PJM_SWEET_HYD1_GENA_AREG

$$\text{CREG} = \sum_{\text{Fleet Units with Assigned Regulation}} (\text{Unit MW} - \text{Unit Basepoint})$$

Sweets ComEd Fleet

PJM_SWEET_CT1_GENA_AREG	30
PJM_SWEET_CT2_GENA_AREG	15
PJM_SWEET_COMED_GENA_TREG	45

Basepoint

PJM_CT1_GENECON	100
PJM_CT2_GENECON	90

New Unit Target MW

106.6
93.3

Current MW Output

101.1
91.4

Delta

1.1
1.4

PJM_SWEET_COMED_GENA_CREG = 2.5 MW

Sweets EKPC Hydro Fleet

PJM_SWEET_HYD1_GENA_AREG	5
PJM_SWEET_EKHYDRO_GENA_TREG	5

PJM_HYD1_GENECON 12

13.0

12.3

0.3

PJM_SWEET_EKHYDRO_GENA_CREG = 0.3 MW

$$\text{CREG} = \sum_{\text{Fleet Units with Assigned Regulation}} (\text{Unit MW} - \text{Unit Basepoint})$$

- CREG is not used to score performance
- Metric for PJM, tells dispatchers how much regulation they are receiving from a fleet in realtime
- Basepoints change every 5 minutes, Reg signal changes 2s, Units constantly moving, CREG quantifies how much Regulation PJM is receiving in realtime
- **Important that calculation only uses units who have been assigned regulation, (AREG > 0)**

New Configuration in PJM EMS

Member Submits an Offer for RegUp and RegDn



*Weight calculation method changes slightly

Member calculates weights, splits REGA signal among units in Fleet.

Unit Target MW
= $Unit\ Basepoint + Unit\ Weighted\ REGA\ signal$

Member calculates CREGUP/DN for the entire fleet

CREG = $\sum (Unit\ MW - Unit\ Basepoint)$

Only include assigned up / down units in the respective CREGUP/DN calculations

(2s)
PJM sends REGA "Regulation Signal" Tag (for Fleet)

(2s)

PJM Uses TREG value to build Regulation Signal for Fleet

Member sends two CREG tags for Fleet

CREGUP (Current Regulation Up)

CREGDN (Current Regulation Down)

PJM

(2s)

Member sends two TREG tags for Fleet

TREGUP (Total Available Regulation Up)

TREGUP (Total Available Regulation Down)

Member Calculates TREGUP and TREGDN for Fleet

Currently Planned for
December 1 2026



“Sweets ComEd Fleet”

Combustion Turbine 1

Combustion Turbine 2

“Sweets EKPC
Solar Fleet”

Solar 1

Solar 2

“Sweets EKPC
Hydro Fleet”

Hydro 1

FLEET TAGS

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREGUP
PJM_SWEET_COMED_GENA_TREGDN
PJM_SWEET_COMED_GENA_CREGUP
PJM_SWEET_COMED_GENA_CREGDN
PJM_SWEET_COMED_GENA_TREG
PJM_SWEET_COMED_GENA_CREG

PJM_SWEET_EKSOLAR_GENA_REGA
PJM_SWEET_EKSOLAR_GENA_TREGUP
PJM_SWEET_EKSOLAR_GENA_TREGDN
PJM_SWEET_EKSOLAR_GENA_CREGUP
PJM_SWEET_EKSOLAR_GENA_CREGDN
PJM_SWEET_EKSOLAR_GENA_TREG
PJM_SWEET_EKSOLAR_GENA_CREG

PJM_SWEET_EKHYDRO_GENA_REGA
PJM_SWEET_EKHYDRO_GENA_TREGUP
PJM_SWEET_EKHYDRO_GENA_TREGDN
PJM_SWEET_EKHYDRO_GENA_CREGUP
PJM_SWEET_EKHYDRO_GENA_CREGDN
PJM_SWEET_EKHYDRO_GENA_TREG
PJM_SWEET_EKHYDRO_GENA_CREG

UNIT TAGS

PJM_SWEET_CT1_GENA_AREGUP
PJM_SWEET_CT1_GENA_AREGDN
PJM_SWEET_CT1_GENA_AREG

PJM_SWEET_CT2_GENA_AREGUP
PJM_SWEET_CT2_GENA_AREGDN
PJM_SWEET_CT1_GENA_AREG

PJM_SWEET_SLR1_GENA_AREGUP
PJM_SWEET_SLR1_GENA_AREGDN
PJM_SWEET_SLR1_GENA_AREG

PJM_SWEET_SLR2_GENA_AREGUP
PJM_SWEET_SLR2_GENA_AREGDN
PJM_SWEET_SLR2_GENA_AREG

PJM_SWEET_HYD1_GENA_AREGUP
PJM_SWEET_HYD1_GENA_AREGDN
PJM_SWEET_HYD1_GENA_AREG

Each UNIT has 2 Associated Tags for Regulation

- “AREGUP” Assigned Regulation Up – **PJM sends Member** MW of Regulation Up each unit has been assigned for the given 30-minute interval
- “AREGDN” Assigned Regulation Down – **PJM sends Member** MW of Regulation Up each unit has been assigned for the given 30-minute interval

Each FLEET has 4 Associated Tags for Regulation

- “CREGUP” “CREGDN” Current Regulation Up / Down – **Member sends PJM** MW of Regulation Up / Down that assigned units in fleet are providing in realtime
- “TREGUP” “TREGDN” Total Available Regulation Up / Down – **Member sends PJM** Total Available Up/Down MW that assigned Up/Down fleet units can provide



"Sweets ComEd Fleet"

Combustion Turbine 1

Combustion Turbine 2

FLEET TAGS

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREGUP
PJM_SWEET_COMED_GENA_TREGDN
PJM_SWEET_COMED_GENA_CREGUP
PJM_SWEET_COMED_GENA_CREGDN

UNIT TAGS

PJM_SWEET_CT1_GENA_AREGUP
PJM_SWEET_CT1_GENA_AREGDN

PJM_SWEET_CT2_GENA_AREGUP
PJM_SWEET_CT2_GENA_AREGDN

Sweets ComEd Fleet

$$\begin{array}{rccccccc} \text{PJM_SWEET_CT1_GENA_AREGUP} & + & \text{PJM_SWEET_CT2_GENA_AREGUP} & = & \text{PJM_SWEET_COMED_GENA_TREGUP} \\ 15 & & 10 & & 25 \end{array}$$

$$\begin{array}{rccccccc} \text{PJM_SWEET_CT1_GENA_AREGDN} & + & \text{PJM_SWEET_CT2_GENA_AREGDN} & = & \text{PJM_SWEET_COMED_GENA_TREGDN} \\ 12 & & 0 & & 12 \end{array}$$

$$TREGUP = \sum_{\text{All Units in Fleet}} AREGUP$$

$$TREGDN = \sum_{\text{All Units in Fleet}} AREGDN$$

AREGUP and *AREGDN* will always be sent as positive values

If you send a 0 TREGUP or TREGDN, you will receive a Regulation Signal of 0. It needs to be correct



"Sweets ComEd Fleet"

Combustion Turbine 1

Combustion Turbine 2

FLEET TAGS

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREGUP
PJM_SWEET_COMED_GENA_TREGDN
PJM_SWEET_COMED_GENA_CREGUP
PJM_SWEET_COMED_GENA_CREGDN

UNIT TAGS

PJM_SWEET_CT1_GENA_AREGUP
PJM_SWEET_CT1_GENA_AREGDN

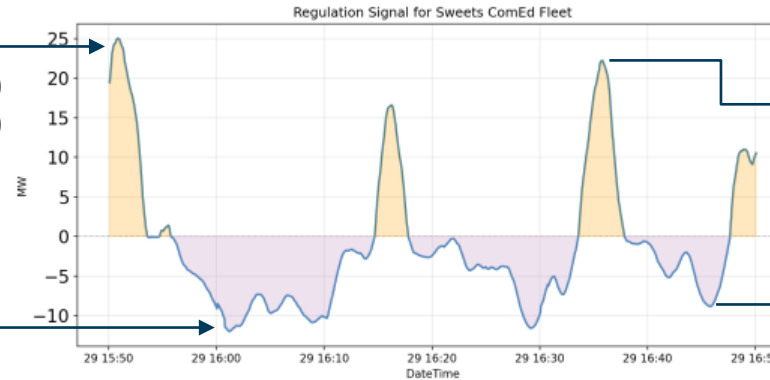
PJM_SWEET_CT2_GENA_AREGUP
PJM_SWEET_CT2_GENA_AREGDN

Sweets ComEd Fleet

PJM_SWEET_CT1_GENA_AREGUP 15
PJM_SWEET_CT2_GENA_AREGUP 10
PJM_SWEET_COMED_GENA_TREGUP 25

PJM_SWEET_CT1_GENA_AREGDN 12
PJM_SWEET_CT2_GENA_AREGDN 0
PJM_SWEET_COMED_GENA_TREGDN 12

15	→	15/25 = 0.60
10	→	10/25 = 0.40
12	→	12/12 = 1.0
0	→	0/12 = 0.0



Weighted REGA UP = 22 * 0.60 = 13.2MW
Weighted REGA UP = 22 * 0.40 = 8.8 MW

Weighted REGA DN = -7 * 1.0 = -7.0 MW
Weighted REGA DN = 0 * 0 = 0.0 MW

Member Logic Required:

if REGA > 0: Deploy Reg Up Assigned Resources – all other units in fleet should target their basepoint

if REGA < 0: Deploy Reg Down Assigned Resources – all other units in fleet should target their basepoint



“Sweets ComEd Fleet”

Combustion Turbine 1

Combustion Turbine 2

FLEET TAGS

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREGUP
PJM_SWEET_COMED_GENA_TREGDN
PJM_SWEET_COMED_GENA_CREGUP
PJM_SWEET_COMED_GENA_CREGDN

UNIT TAGS

PJM_SWEET_CT1_GENA_AREGUP
PJM_SWEET_CT1_GENA_AREGDN

PJM_SWEET_CT2_GENA_AREGUP
PJM_SWEET_CT2_GENA_AREGDN

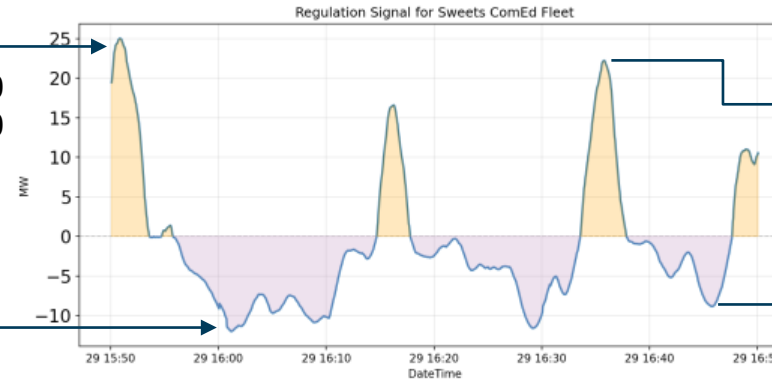
Sweets ComEd Fleet

PJM_SWEET_CT1_GENA_AREGUP
PJM_SWEET_CT2_GENA_AREGUP
PJM_SWEET_COMED_GENA_TREGUP

15 → 15/25 = 0.60
10 → 10/25 = 0.40
25

PJM_SWEET_CT1_GENA_AREGDN
PJM_SWEET_CT2_GENA_AREGDN
PJM_SWEET_COMED_GENA_TREGDN

12 → 12/12 = 1.0
0 → 0/12 = 0.0
12

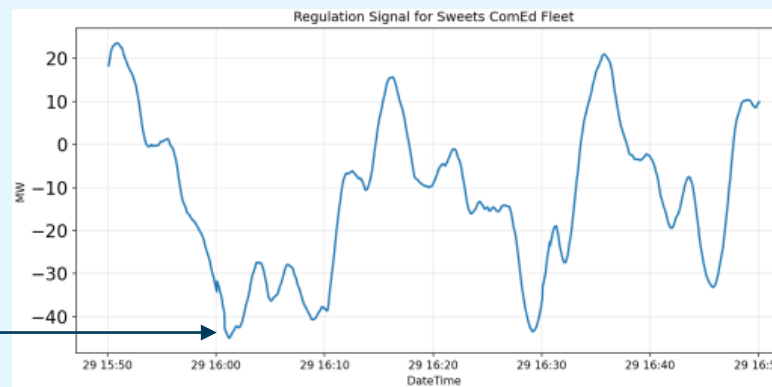


Weighted REGA UP = 22 * 0.60 = 13.2MW
Weighted REGA UP = 22 * 0.40 = 8.8 MW

Weighted REGA DN = -7 * 1.0 = -7.0 MW
Weighted REGA DN = 0 * 0 = 0.0 MW

Remember this from Slide 19?

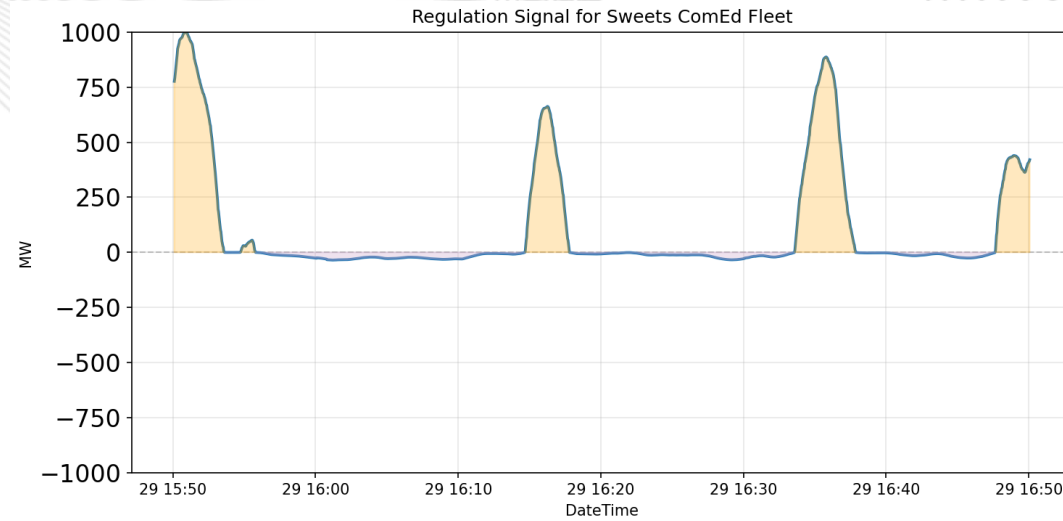
PJM_SWEET_COMED_GENA_TREG 45



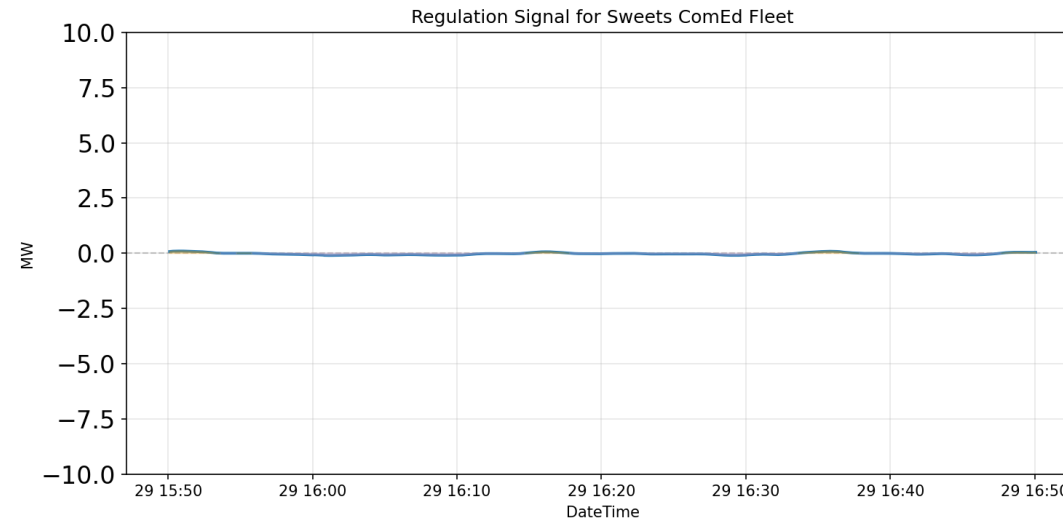
New Scaling Method (TOP)
v Old Scaling Method (BOT)
Same starting point, signal just
scaled differently with TREGs

Sending Correct TREGUP / TREGDN is CRITICAL

PJM_SWEET_COMED_GENA_TREGUP 999
PJM_SWEET_COMED_GENA_TREGDN -35



PJM_SWEET_COMED_GENA_TREGUP 0.1
PJM_SWEET_COMED_GENA_TREGDN 0.1

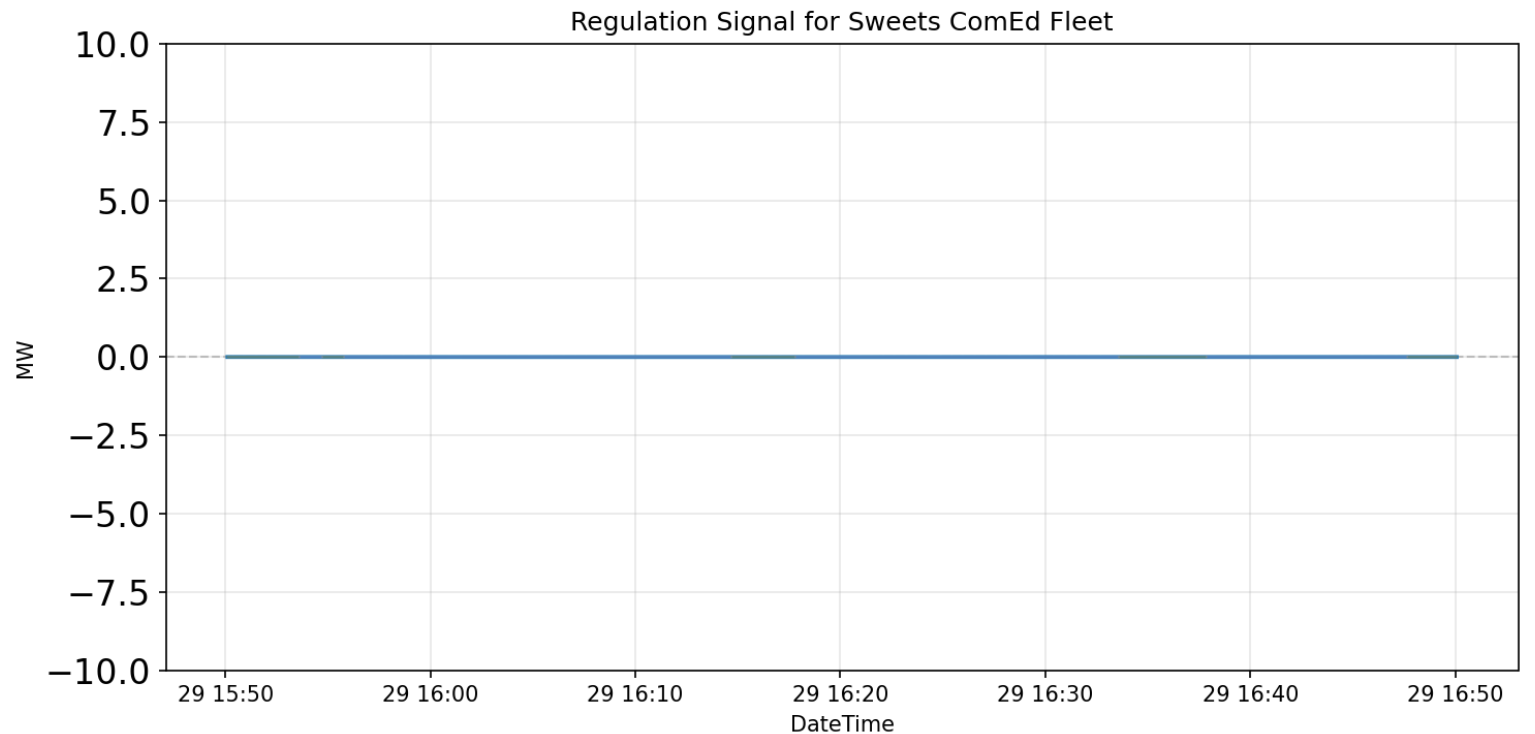


If All Assignments are 0, Make Sure TREGUP/DN is 0

PJM_SWEET_CT1_GENA_AREGDN 0
 PJM_SWEET_CT2_GENA_AREGDN 0

 PJM_SWEET_CT1_GENA_AREGDN 0
 PJM_SWEET_CT2_GENA_AREGDN 0

 PJM_SWEET_COMED_GENA_TREGUP 0
 PJM_SWEET_COMED_GENA_TREGDN 0





“Sweets ComEd Fleet”

Combustion Turbine 1

Combustion Turbine 2

FLEET TAGS

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREGUP
PJM_SWEET_COMED_GENA_TREGDN
PJM_SWEET_COMED_GENA_CREGUP
PJM_SWEET_COMED_GENA_CREGDN

UNIT TAGS

PJM_SWEET_CT1_GENA_AREGUP
PJM_SWEET_CT1_GENA_AREGDN

PJM_SWEET_CT2_GENA_AREGUP
PJM_SWEET_CT2_GENA_AREGDN

Sweets ComEd Fleet

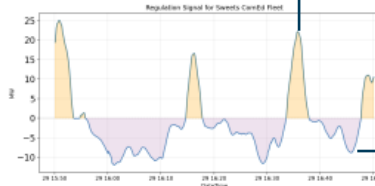
PJM_SWEET_CT1_GENA_AREGUP	15
PJM_SWEET_CT2_GENA_AREGUP	10
PJM_SWEET_COMED_GENA_TREGUP	25

Up Weight

15/25 = 0.60
10/25 = 0.40

Weighted REGA UP

13.2MW	+
8.8 MW	+



Basepoint
at 16:35

New Unit Target MW

PJM_CT1_GENECON	93	=	106.2 MW
PJM_CT2_GENECON	86	=	94.8 MW

Dn Weight

PJM_SWEET_CT1_GENA_AREGDN	12
PJM_SWEET_CT2_GENA_AREGDN	0
PJM_SWEET_COMED_GENA_TREGDN	12

12/12 = 1.0
0/12 = 0.0

Weighted REGA DN

-7.0 MW	+
0.0 MW	+

Basepoint
at 16:45

New Unit Target MW

PJM_CT1_GENECON	96	=	89.0 MW
PJM_CT2_GENECON	87	=	87.0 MW

$$\text{CREG} = \sum_{\text{Fleet Units with ANY Assigned Regulation}} (\text{Unit MW} - \text{Unit Basepoint})$$

Same Calc

$$\text{CREGUP} = \text{CREG if } \text{CREG} > 0 \text{ else } 0$$

New Calcs

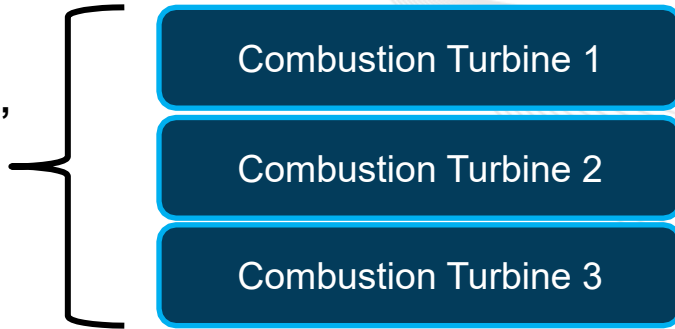
$$\text{CREGDN} = \text{CREG if } \text{CREG} < 0 \text{ else } 0$$

- **CREGUP and CREGDN are not used to score performance**
- Metric for PJM, tells dispatchers how much Up or Down regulation they are receiving from a fleet in realtime
- **Important that CREG calc only uses units with assigned regulation, (AREGUP > 0 or AREGDN > 0)**

not "and" ↗



"Sweets ComEd Fleet"



FLEET TAGS

PJM_SWEET_COMED_GENA_REGA
PJM_SWEET_COMED_GENA_TREGUP
PJM_SWEET_COMED_GENA_TREGDN
PJM_SWEET_COMED_GENA_CREGUP
PJM_SWEET_COMED_GENA_CREGDN

UNIT TAGS

PJM_SWEET_CT1_GENA_AREGUP
PJM_SWEET_CT1_GENA_AREGDN

PJM_SWEET_CT2_GENA_AREGUP
PJM_SWEET_CT2_GENA_AREGDN

PJM_SWEET_CT3_GENA_AREGUP
PJM_SWEET_CT3_GENA_AREGDN

Sweets ComEd Fleet

PJM_SWEET_CT1_GENA_AREGUP	15
PJM_SWEET_CT2_GENA_AREGUP	10
PJM_SWEET_CT3_GENA_AREGUP	0
PJM_SWEET_COMED_GENA_TREGUP	25

CT3 AREGUP and AREGDN are 0.
Do not include CT3 in CREG calc

PJM_SWEET_CT1_GENA_AREGDN	12
PJM_SWEET_CT2_GENA_AREGDN	0
PJM_SWEET_CT3_GENA_AREGDN	0
PJM_SWEET_COMED_GENA_TREGDN	12

Basepoint at 16:35

PJM_CT1_GENECON	93
PJM_CT2_GENECON	86
PJM_CT3_GENECON	72

Basepoint at 16:45

PJM_CT1_GENECON	96
PJM_CT2_GENECON	87
PJM_CT3_GENECON	71

New Unit Target MW

=	106.2 MW
=	94.8 MW
=	---

At 16:35

Current MW Output

101 MW
92 MW
74 MW

Delta

8 MW
6 MW

CREG = 14 MW

PJM_SWEET_COMED_GENA_CREGUP = 14 MW
PJM_SWEET_COMED_GENA_CREGDN = 0 MW

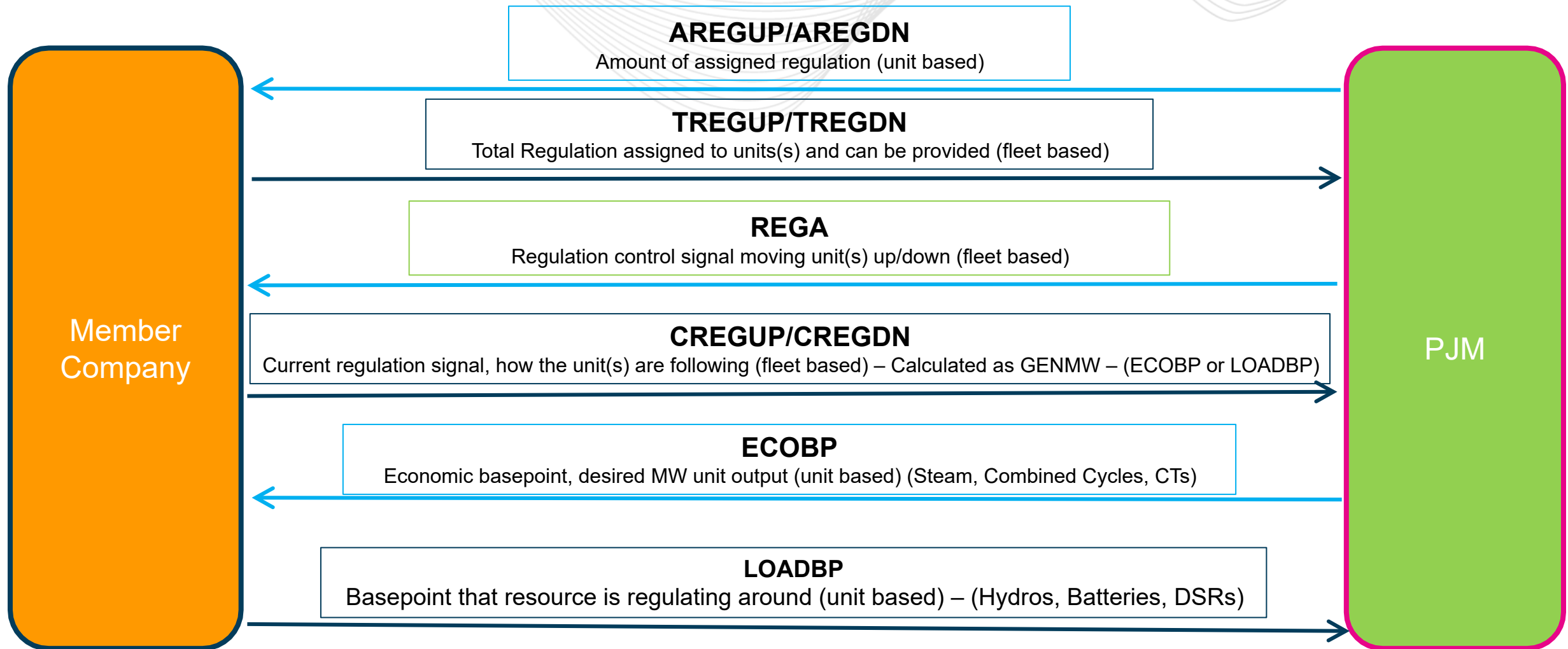
At 16:45

92 MW
88 MW
74 MW

- 4 MW
1 MW

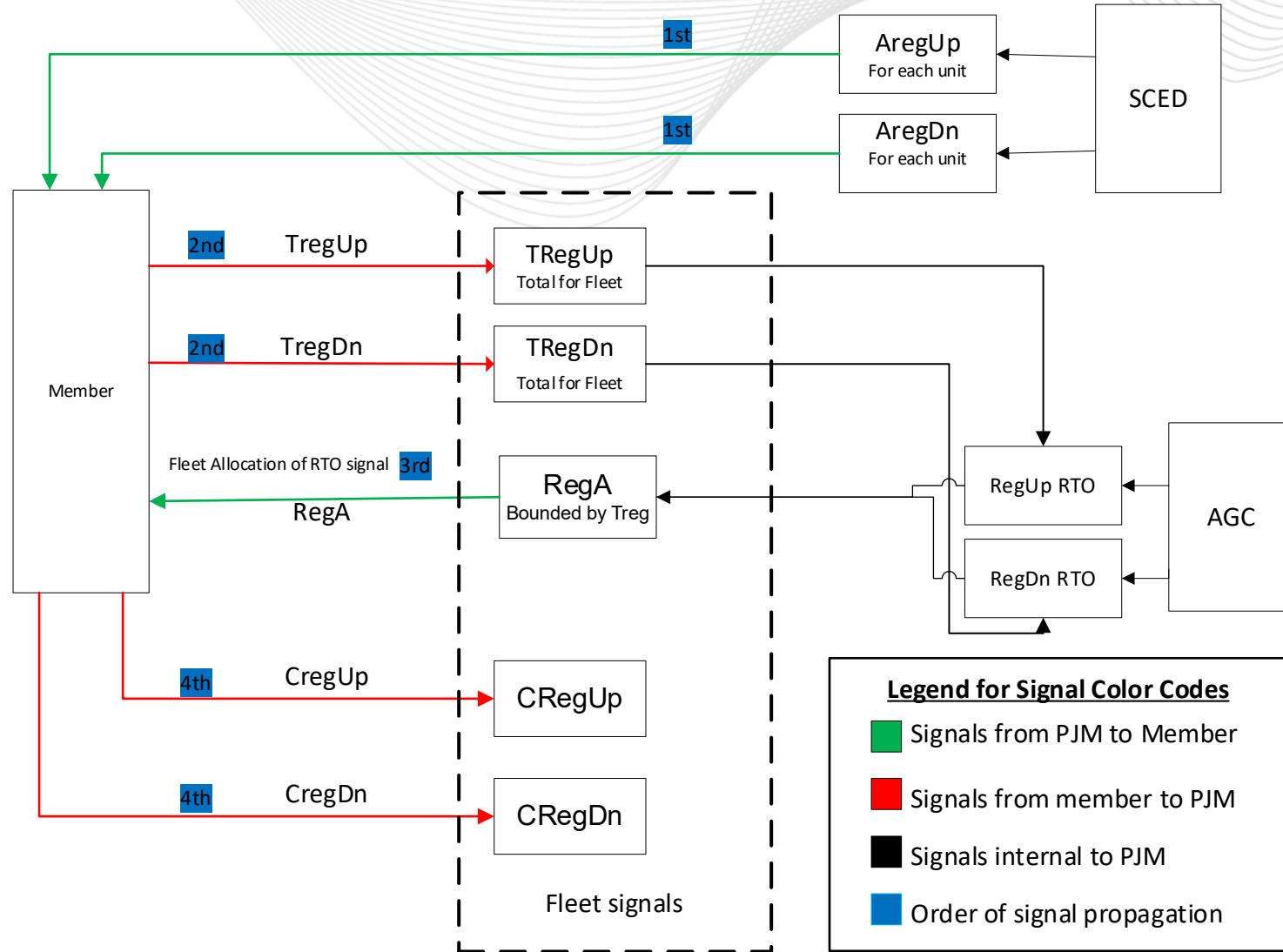
CREG = -3 MW

PJM_SWEET_COMED_GENA_CREGUP = 0 MW
PJM_SWEET_COMED_GENA_CREGDN = -3 MW



Disclaimer: While materials are current at the time of publishing, applicable requirements may change. PJM Governing Documents control.

Regulation Control Diagram



UNITS

AREGUP/AREGDN
Amount of assigned regulation (unit based)

ECOBP
Economic basepoint, desired MW unit output (unit based) Tag used for anything that isn't Hydro, Battery, DSR

LOADBP
Basepoint that resource is regulating around (unit based). Tag used for Hydros, Batteries, DSRs

1698 Total Units

411 Regulating units to be converted

FLEET

TREGUP/TREGDN
Total Available Regulation that can be provided (fleet based) for the assigned 30 minutes

REGA
Regulation control signal moving unit(s) up/down (fleet based)

CREGUP/CREGDN
Current regulation signal, how the unit(s) are following (fleet based) – Calculated as Unit Current Output (GENMW) – (ECOBP or LOADBP)

138 Total Fleets

All fleets will be converted

- Email the contact info provided
- “I would like to set up the following resources for the new Regulation Up / Down product”
- List of resource names

- The current Regulation product is splitting into an Up / Down product. **December 1 2026**
- Logic and ICCP/DNP configuration changes are required from members who wish to participate

Presenter:

Brian Sweet, Brian.Sweet@pjm.com
Dalton Hamilton,
Dalton.Hamilton@pjm.com

SME:

Jeff Hoffman, Jeff.Hoffman@pjm.com
CC: PJMTelemetrySupport@pjm.com

PJM AGC Transition to Regulation Up / Down

A green speech bubble containing a large black question mark, pointing towards the contact information.A blue speech bubble containing three horizontal white lines, representing a list or menu.

Member Hotline

(610) 666 – 8980

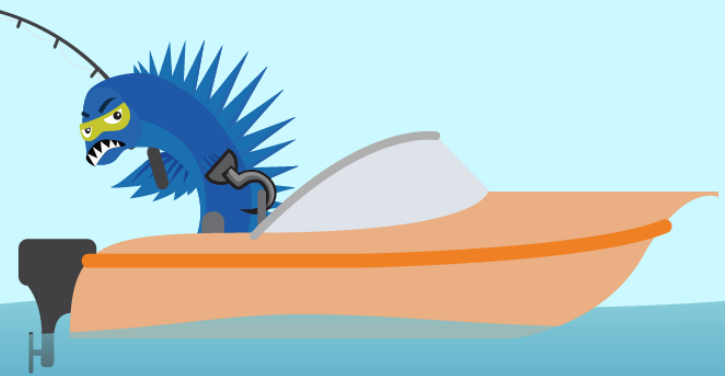
(866) 400 – 8980

custsvc@pjm.com

**PROTECT THE
POWER GRID**
**THINK BEFORE
YOU CLICK!**



**BE ALERT TO
MALICIOUS PHISHING
EMAILS**



Report suspicious email activity to PJM.
Call (610) 666-2244 or email it_ops_ctr_shift@pjm.com