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FCM Pay for Performance Evaluations

(Effective June 1, 2018)

Forward Capacity Market (FCM 101)



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This presentation uses Turning Point technology and some slides are intentionally hidden from the printed and posted version.



Objectives

- Purpose of pay for performance
- Discuss what is changing with pay for performance
- Describe a capacity scarcity condition
- Explain pay for performance calculations



Section Disclaimer



The following material is being provided by ISO New England (ISO) to enhance participant and stakeholder understanding of upcoming changes to the FCM Settlement process.

Participants and other stakeholders should not rely solely on this training for information but should consult the effective Transmission, Markets and Services Tariff (“Tariff”) and the relevant Market Manuals, Operating, and Planning Procedures (“Procedures”).

In case of a discrepancy between training provided by ISO and the Tariff or Procedures, the meaning of the Tariff and Procedures shall govern.

Summary of Changes to FCM Settlement

- Pay for performance implementation is scheduled to be effective June 1, 2018
- First FCM settlement to contain new calculations is June 2018 settlement, which will be in the *Hourly and Non-Hourly Services* Bill, issued on Monday, July 16, 2018
- All current shortage event evaluations, demand response performance evaluations, and external transaction penalty evaluations will be retired effective June 1, 2018
- Preliminary capacity performance score will be calculated and released to participants approximately 5-7 business days after each scarcity condition has ended

Summary of Changes to FCM Settlement, *continued*

- All resources types will receive identical treatment*
- Any excess or deficient collection of capacity performance payments will be allocated to resources with CSO MWs



One exception: Energy efficiency resources will only be evaluated during scarcity conditions that happen during applicable resource type performance hours; i.e., on-peak or seasonal peak hours

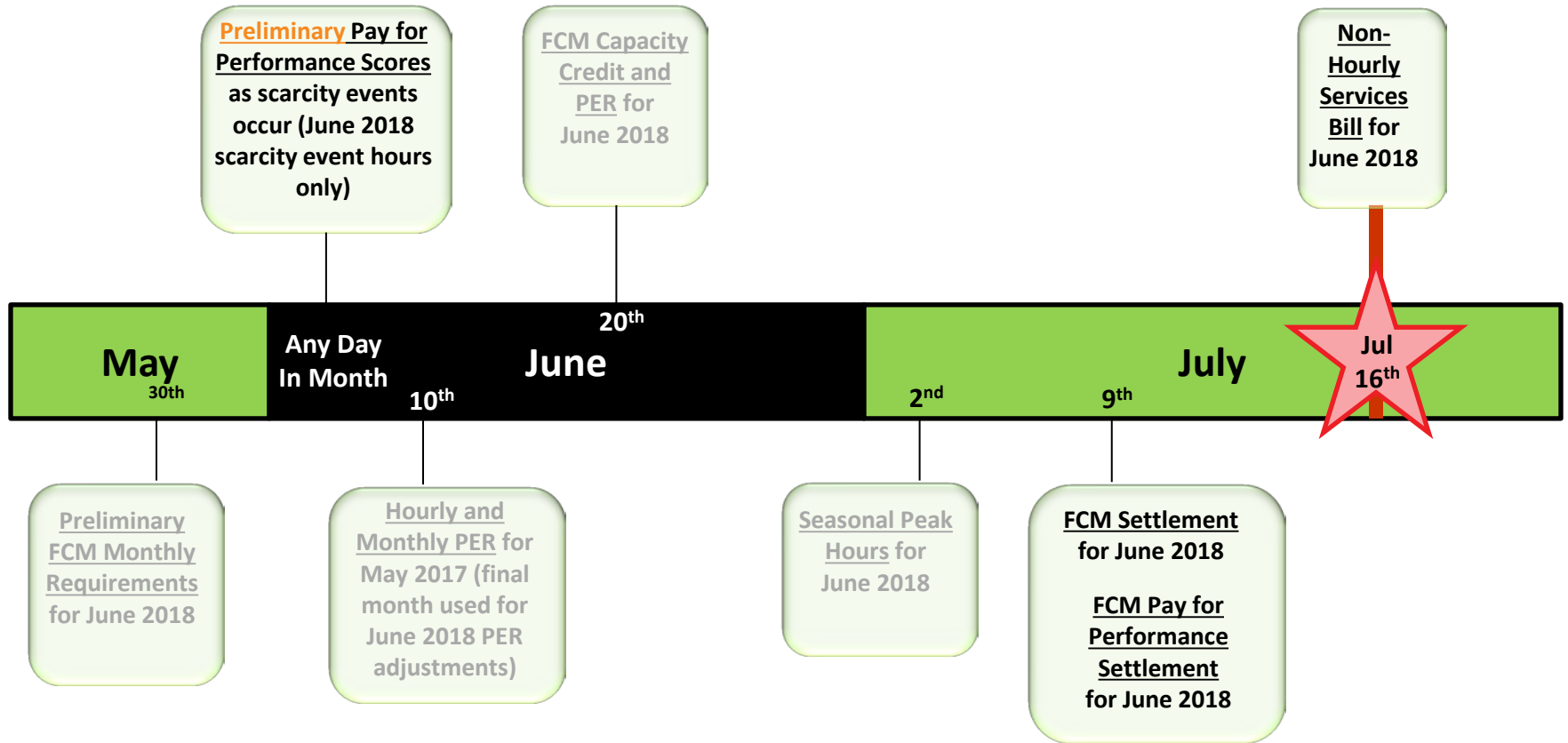
Purpose and Facts of FCM Pay for Performance

- Rewards good performers during capacity scarcity condition
- Penalizes poor performers during capacity scarcity condition
- There is a stop-loss mechanism for frequent bad performers
- Revenue neutral overall



No impact on Net Regional Clearing Price (NRCP)

Pay for Performance Processing Timeline: June 2018



What is a Capacity Scarcity Condition?

- Scarcity condition occurs when system is deficient; when both energy and reserve requirement are not satisfied
- More specifically, a scarcity condition is when reserve-constraint penalty factor (RCPF) is setting real-time reserve price and is included in nodal locational marginal price (LMP)
- During a scarcity condition every resource's performance score is calculated



Capacity Scarcity Condition

- Any five minute interval may be in a capacity scarcity condition
- Three types of conditions
 1. Local Thirty Minute Operating Reserve (TMOR) violation
 - Can only occur in a capacity zone shares its boundaries with a reserve zone
 - For Capacity Commitment Period (CCP) 9, it applies to capacity zones: Connecticut and NEMA-Boston.
 2. System-wide TMOR
 3. System-wide Ten Minute Non-Spinning Reserve (TMNSR)

How is Resource's Capacity Performance Score Calculated?

Score = Actual Capacity Provided (MW) – (Balancing Ratio (MW) x CSO(MW))

- **Actual capacity provided:** Equals sum of resource's output (energy MW) and reserve designation during scarcity condition
- **Balancing ratio:** Ratio representing required capacity and capacity supply obligation during scarcity condition

$$\text{Balancing Ratio} = \frac{\text{Load} + \text{Reserve Requirement}}{\sum \text{Capacity Supply Obligation}}$$

Actual Capacity Provided (ACP)

- Measure of performance during a capacity scarcity condition
- Calculation varies based on type of resource
- Generators, demand response resources, and external import transactions that are not associated with an FCM resource
 - These types of resources **do not** have CSO MWs
 - As a result, any capacity they provide during a capacity scarcity condition can only receive a payment

Actual Capacity Provided (ACP) – Calculations

- Generating Resource

= RT Reserve Designations + Energy Quantity – External Transaction sales

- If resource's output is limited by transmission system, energy quantity used in ACP is capped by desired dispatch point

- Import Resources

= Max (0, Net Energy Delivered)

- If lead market participant has more than one import resource impacted by same capacity scarcity condition, ACP is split between resources
 - If there is at least one FCM resource with a CSO, split based on pro-rata share of CSO
 - If there is an external transaction not associated to a resource, split based on pro-rata share of positive external transactions

Actual Capacity Provided – Calculations, *continued*

- Demand response resources
 - = **Max (0, ((RT Demand Reduction x T&D Loss Factor) + Net Supply))**
 - Energy market as part of price responsive demand (PRD)
 - Real-time demand reduction and net supply are still being discussed
- Active demand capacity resources (ADCR)
 - One or more demand response resources
 - Sum of ACP for associated demand response resources
- Passive demand capacity resource
 - Distributed generation
 - = **Max (0, ((RT Demand Reduction x T&D Loss Factor) + Net Supply))**
 - Load management
 - = **Max (0, ((RT Load Reduction x T&D Loss Factor) + Net Supply))**
 - Energy efficiency
 - Only counts in Peak Hours (Do not get paid or penalized)

Balancing Ratio

- Each capacity zone has a balancing ratio when impacted by a capacity scarcity condition at a five minute level
- When capacity scarcity condition is due to a local 30-minute operating reserves (TMOR) violation, the balancing ratio is based on values from capacity zone
- When capacity zone is impacted by both a local and system-wide violation, higher balancing ratio is used



Balancing Ratio, *continued*

- Usually ranges from 0 to 1
- Resource is expected to provide capacity equal to CSO times balancing ratio
- For example:
 - Resource's CSO is 50 MW
 - System's balancing ratio is 0.8
 - Resource's share is 40 MWs of capacity
 - If it provides more, it will receive an additional payment
 - If it is less, it will be penalized



50 CSO MW x 0.80 Balancing Ratio

Capacity Performance Score Calculation

$$\text{Performance Score} = \text{ACP} - (\text{Balancing Ratio} \times \text{CSO})$$

Resource	Capability	ACP MW	Balancing Ratio	CSO MW	Balancing Ratio * CSO MW	Performance Score (MW)
A	10.000	0.000	0.800	10.000	8.000	-8.000
B	10.000	5.000	0.800	5.000	4.000	1.000
C	10.000	5.000	0.800	0.000	0.000	5.000
D	10.000	5.000	0.800	3.125	2.500	2.500
E	10.000	0.000	0.800	3.750	3.000	-3.000

Capacity Performance Score Bilateral Contracts

- Resource with a positive capacity performance score in an interval may sell part or all of score to any resource impacted by same capacity scarcity condition
- Replaces supplemental availability bilateral contracts

Resource	Performance Score	Performance Score Bilateral Contract	Performance Score
B	1.000	-1.000	0.00
D	3.500	-2.500	1.00
E	-3.000	3.500	0.50

What is Performance Payment Rate?

Performance payment rate (PPR) is a fixed number by Market Rule, and is same for all resource types

FCA/CCP	Period	PPR (\$/MWh)
9, 10, 11	2018-19, 2019-20, 2020-21	\$2,000
12, 13, 14	2021-22, 2022-23, 2023-24	\$3,500
15 +	2024-25, +	\$5,455



5-min PPR Rate: $PPR \div 12$

5-min PPR Rate: $\$2,000 \div 12$

5-min PPR Rate: $\$166.67$

Preliminary Capacity Performance Dollar Calculation

Preliminary Capacity Performance Dollar = Performance Score x PPR

Resource	Performance Score	5-min PPR	Dollar
A	-8.000	\$ 166.67	- \$ 1,333.36
B	1.000	\$ 166.67	\$ 166.67
C	5.000	\$ 166.67	\$ 833.35
D	2.500	\$ 166.67	\$ 416.68
E	-3.000	\$ 166.67	- \$ 500.01

Credit	Charges
\$ 166.67	- \$ 1,333.36
\$ 833.35	- \$ 500.01
\$ 416.68	
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\$ 1,416.70	- \$ 1,833.37



Why Don't Performance Payments Net to Zero?

- During a deficiency there will be more under-performing resources than over-performing resources
- This means that absolute value of total charges will exceed value of total credits
- Any over-collection of funds are returned to all suppliers with a CSO (pro rata) at end of each month
- Unless a resource reaches its stop-loss amount

What is Stop-Loss?

- Stop-loss is a safety mechanism created to limit losses a resource may suffer during any given month or over entire commitment period
- By limiting losses it is possible that collection of funds from all remaining under-performers will not be enough to compensate all over-performers at fixed PPR rate
- The difference, if there is an under collection of funds, is charged to all suppliers with a CSO (pro rata) at end of each month

Stop-Loss

- Two stop-loss mechanisms for resources
 1. Monthly stop-loss
 - = *FCA Starting Price x Capacity Supply Obligation*
 - Resources with MRECO acquired prior to FCA #9 use capacity clearing price modified by Handy-Whitman instead of FCA starting price for MRECO obligation
 2. Annual stop-loss
 - = *Max CSO x [3 x (FCA Clearing Price – FCA Starting Price) – 12 x FCA Clearing Price] -1*
 - Max CSO is highest CSO value for resource in capacity commitment period up to settlement month
- When resources reach either stop-loss, penalties beyond stop-loss are considered to be “not charged”

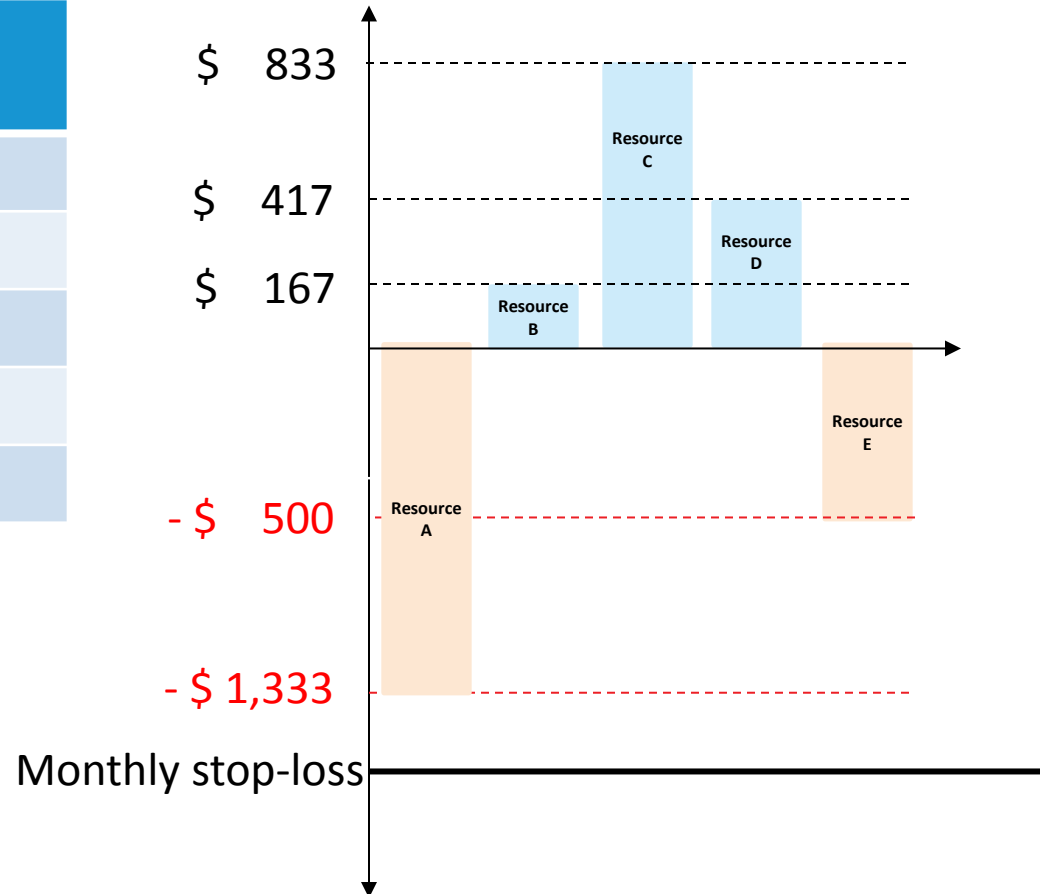
MRECO = multi-year rate existing capacity obligation

Stop-Loss Calculations

Case A: Over-Collected and No Resource Impacted by Stop-Loss

Resource	Preliminary Capacity Performance Dollar
A	- \$ 1,333.36
B	\$ 166.67
C	\$ 833.35
D	\$ 416.68
E	- \$ 500.01

Credit:	\$ 1,416.70
Charges:	- \$ 1,833.37
Balancing Fund:	\$ 416.67



Stop-Loss Calculations

Case A: Over-Collected and No Resource Impacted by Stop-Loss

Resource	Preliminary Capacity Performance Dollar	CSO	Reallocation	Capacity Performance Dollar
A	- \$ 1,333.36	10.000	\$ 190.48	- \$ 1,142.88
B	\$ 166.67	5.000	\$ 95.24	\$ 261.91
C	\$ 833.35	0.000	\$ 0.00	\$ 833.35
D	\$ 416.68	3.125	\$ 59.52	\$ 476.20
E	- \$ 500.01	3.750	\$ 71.43	- \$ 428.58
Total	- \$ 416.67	21.875	\$ 416.67	\$ 0.00

Resource A: Reallocation = (CSO / Total CSO) × Balancing Fund

Resource A: Reallocation = (10 / 21.875) × - (-\$ 416.67)

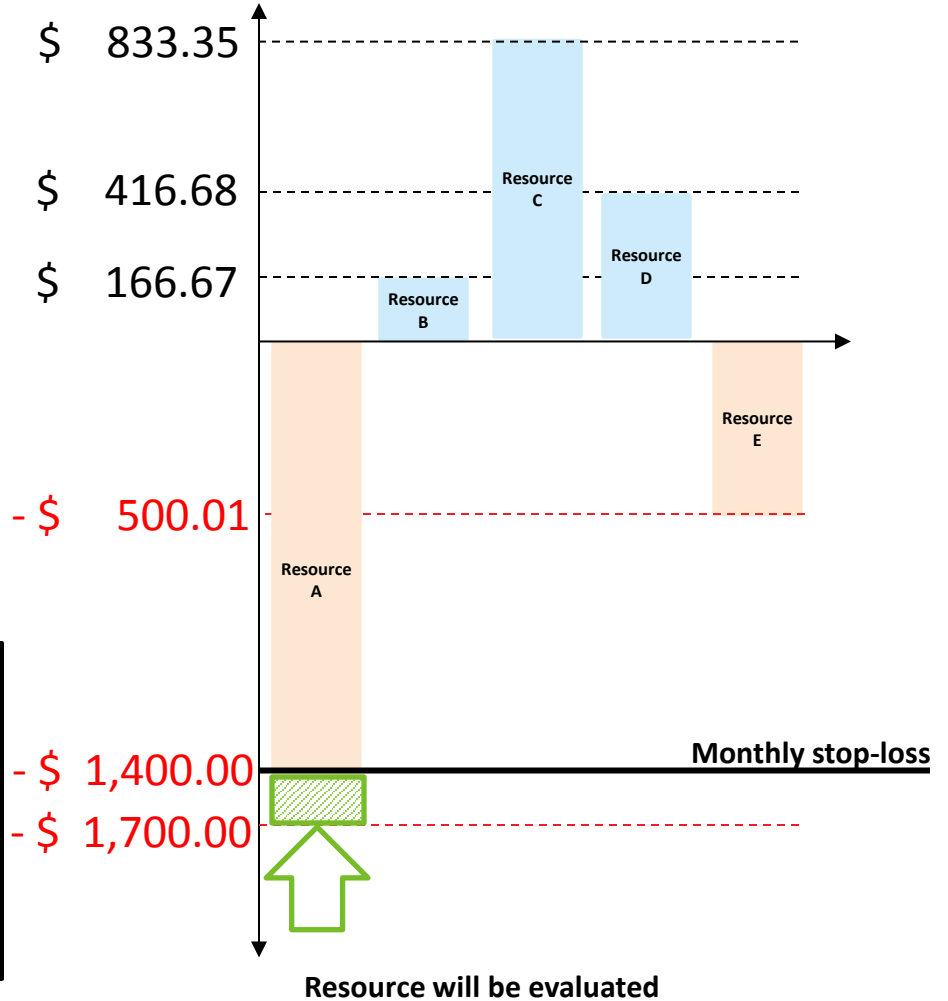
Resource A: Reallocation = \$ 190.48

Stop-Loss Calculations

Case B: Over-Collected and Resource Impacted by Stop-Loss

Resource	Preliminary Capacity Performance Dollar
A	- \$ 1,400.00
B	\$ 166.67
C	\$ 833.35
D	\$ 416.68
E	- \$ 500.01

Credit:	\$ 1,416.70
Charges:	- \$ 1,900.01
Amount not charged due to	
Stop-loss:	- \$ 300.00
Balancing Fund:	\$ 483.31



Stop-Loss Calculations

Case B: Over-Collected and Resource Impacted by Stop-Loss

Resource	Preliminary Capacity Performance Dollar	Stop-loss	CSO	Amount not charged due to Stop-loss	Reallocation #1	Reallocation #2	Capacity Performance Dollar
A	-\$ 1,400.00	Y	10.000	-\$300.00	-\$ 220.94	Excluded	-\$ 1,400.00
B	\$ 166.67	N	5.000	0.00	\$ 110.47	\$ 93.03	\$ 370.17
C	\$ 833.35	N	0.000	0.00	\$ 0.00	\$ 0.00	\$ 833.35
D	\$ 416.68	N	3.125	0.00	\$ 69.04	\$ 58.14	\$ 543.87
E	-\$ 500.01	N	3.750	0.00	\$ 82.0	\$ 69.97	-\$ 347.39
Total	-\$ 483.31		21.875	-\$300.00	\$ 262.37	\$ 220.94	\$ 0.00

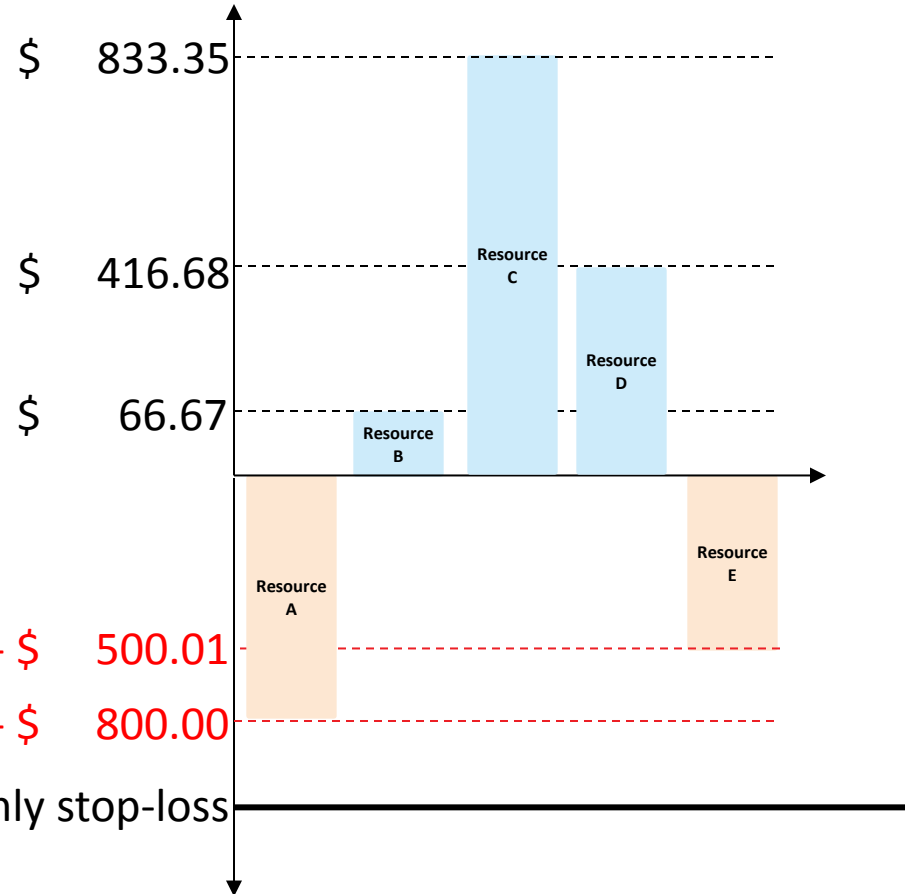
\$483.31

Resource A: Review = Reallocation does not take Resource A out of stop-loss
 Resource A: Review = Reallocate \$220.94

Stop-Loss Calculations

Case C: Under-Collected and No Resource Impacted by Stop-Loss

Resource	Preliminary Capacity Performance Dollar
A	- \$ 800.00
B	\$ 166.67
C	\$ 833.35
D	\$ 416.68
E	- \$ 500.01



Credit:	\$ 1,416.70
Charges:	- \$ 1,300.01
Balancing Fund:	\$ 116.69

Stop-Loss Calculations

Case C: Under-Collected and No Resource Impacted by Stop-Loss

Resource	Preliminary Capacity Performance Dollar	CSO	Reallocation	Capacity Performance Dollar
A	- \$ 800.00	10.000	- \$ 53.34	- \$ 853.34
B	\$ 166.67	5.000	- \$ 26.67	\$ 140.00
C	\$ 833.35	0.000	\$ 0.00	\$ 833.35
D	\$ 416.68	3.125	- \$ 16.67	\$ 400.01
E	- \$ 500.01	3.750	- \$ 20.00	- \$ 520.01
Total	\$ 116.69	21.875	- \$ 116.69	\$ 0.00

Resource A: Reallocation = $(\text{CSO} \div \text{Total CSO}) \times \text{Distribution Fund}$

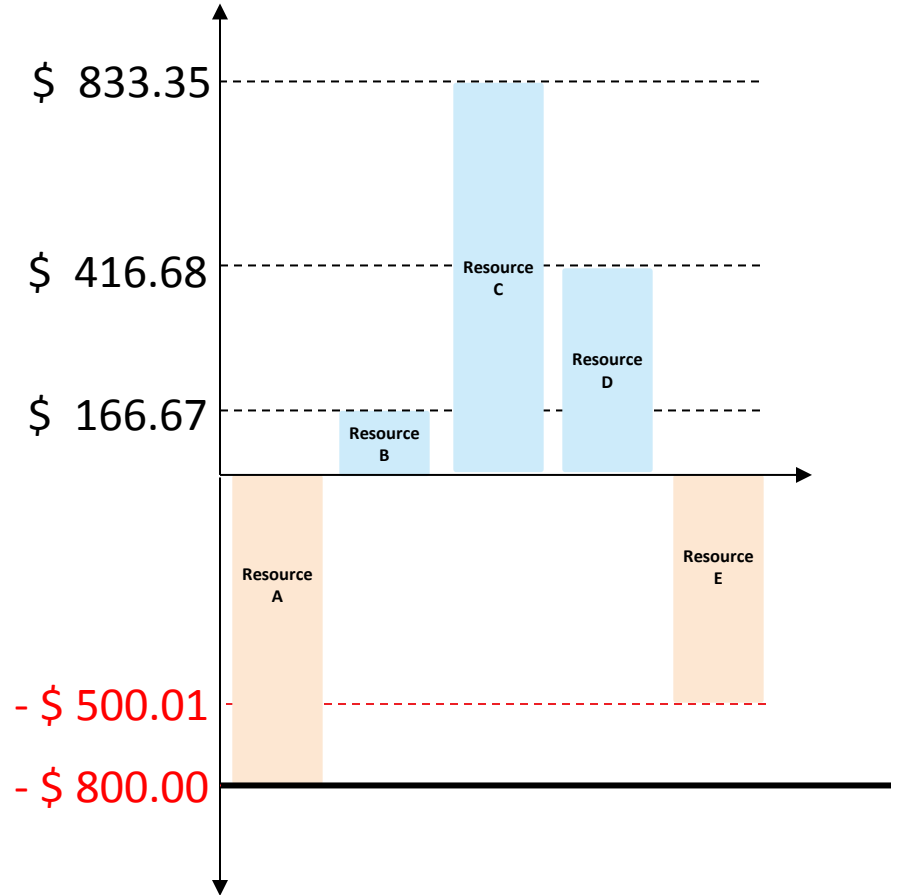
Resource A: Reallocation = $(10 \div 21.875) \times -\$ 116.69$

Resource A: Reallocation = $-\$ 53.34$

Stop-Loss Calculations

Case D: Under-Collected and Resource Impacted by Stop-Loss

Resource	Capacity Performance Dollar
A	- \$ 800.00
B	\$ 166.67
C	\$ 833.35
D	\$ 416.68
E	- \$ 500.01



Credit:	\$ 1,416.70
Charges:	- \$ 1,300.01
Amount not charged due to	
Stop-loss:	\$ 0.00
Balancing Fund:	\$ 116.69

Stop-Loss Calculations

Case D: Over-Collected and Resource Impacted by Stop-Loss

Resource	Preliminary Capacity Performance Dollar	Stop-loss	CSO	Reallocation #1	Stop-loss	Reallocation #2	Capacity Performance Dollar
A	- \$ 800.00	N	10.000	- \$ 53.34	Y	Excluded	- \$ 800.00
B	\$ 166.67	N	5.000	- \$ 26.67	N	- \$ 22.46	\$ 117.54
C	\$ 833.35	N	0.000	\$ 0.00	N	\$ 0.00	\$ 833.35
D	\$ 416.68	N	3.125	- \$ 16.67	N	- \$ 14.04	\$ 385.97
E	- \$ 500.01	N	3.750	- \$ 20.00	N	- \$ 16.85	- \$ 536.86
Total	\$ 116.69		21.875	- \$ 63.35		- \$ 53.34	\$ 0.00

- \$116.69

Summary

In the pay for performance section, you have learned:

- Purpose of pay for performance
- What is changing with pay for performance
- How a capacity scarcity condition occurs
- Calculations for pay for performance



Questions



Evaluations