



Day-Ahead Market Energy Settlement





2026_11 DAM Energy Settlement

Greetings
and
Introductions

- Attendance
- Questions
- Presentation materials
- Recording for future purposes



PROTOCOL DISCLAIMER

This presentation provides a general overview of the Texas Nodal Market and is not intended to be a substitute for the ERCOT Protocols, as amended from time to time. If any conflict exists between this presentation and the ERCOT Protocols, the ERCOT Protocols shall control in all respects.

For more information, please visit:

http://www.ercot.com/mktrules/nprotocols/

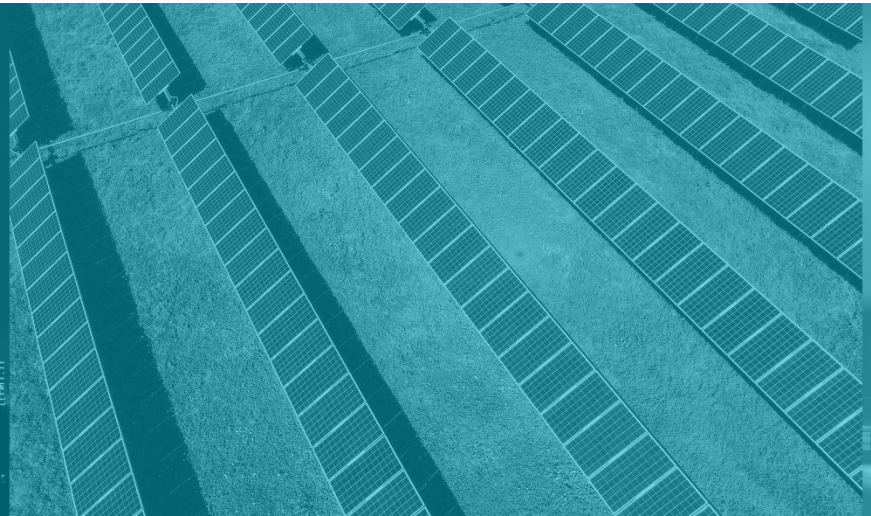
Topics in this course include:

1. Energy Bids
2. Energy Offers
3. DAM PTP Obligation Bids
4. Make-Whole Payments
5. Make-Whole Charges





Introduction




Concept



Math



Protocols



Example

Settlement Equation

Which Markets and Which Participants?

CRR Auction

DAM

Real-Time

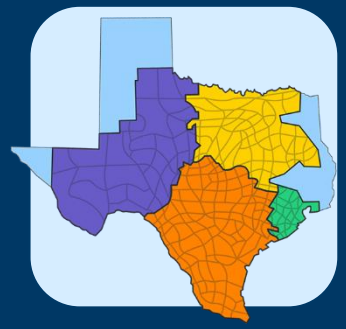




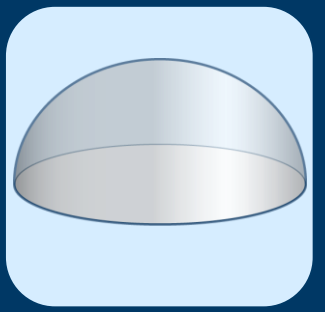
Resource Node (RN)



Load Zone (LZ)



Hub (HB)



Sign (+/-) matters for Charge Types & Bill Determinants!

Positive (+) Amount = QSE Charge

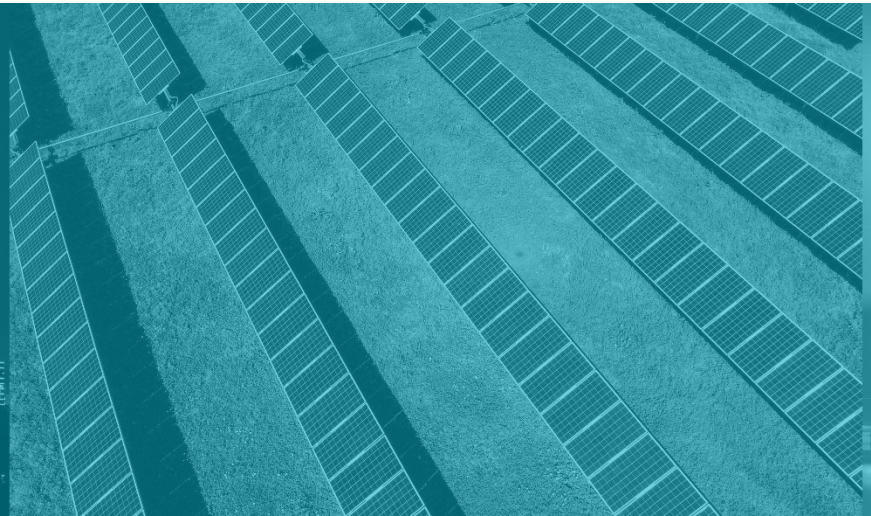


Negative (-) Amount = QSE Payment



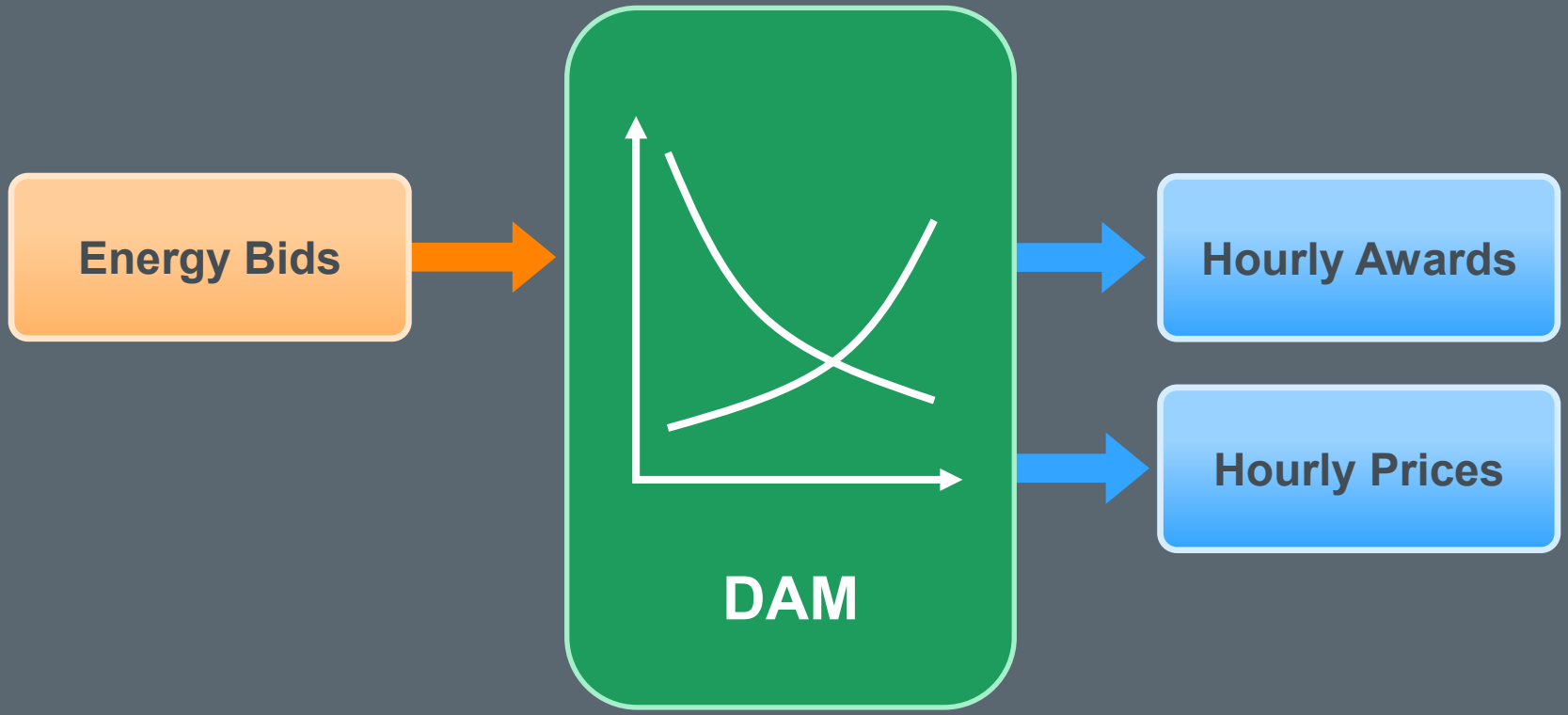


Energy Bids


Energy Bid: Concept





Awarded Energy Bid at Load Zone 1 for a given hour

- DAM Awarded Energy Bid Quantity = 68MW
- DAM Settlement Point Price (SPP) at LZ1 = $40/MWh



Awarded Energy Bid = DAM SPP * Quantity

Awarded Energy Bid = $40/MWh * 68MW

$2,720 for the hour at LZ1

DAEPAMT = Day-Ahead Energy Purchase Amount

$$DAEPAMT_{q,p} = DASPP_{p} * DAEP_{q,p}$$



DASPP	Day-Ahead Settlement Point Price
DAEP	Day-Ahead Energy Purchase
q, p	QSE, Settlement Point

Settle Awarded Energy Bid at Hub 1 for Hour 14

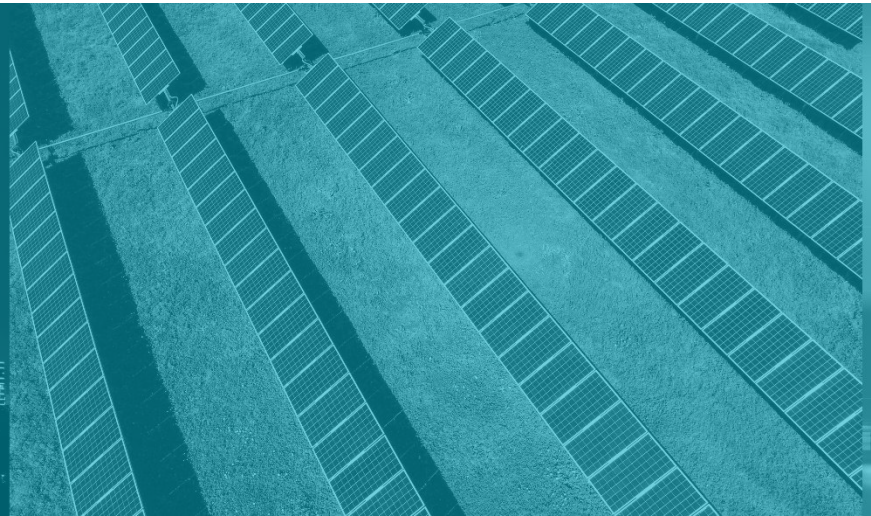
- DAM Awarded Energy Bid Quantity = 75MW
- DAM SPP at HB1 = $35/MWh







Energy Offers


Energy Offer: Concept



Energy-Only Offers

Three-Part Supply Offers

DAM

Hourly Awards

Hourly Prices

Awarded Energy Offer at Resource Node 1 for a given hour

- DAM Awarded Energy Bid Quantity = 100MW
- DAM SPP at RN1 = $30/MWh



Awarded Energy Offer = (-1) * **DAM SPP** * **Quantity**

Awarded Energy Offer = (-1) * **$30/MWh** * **100MW**

-$3,000 for the hour at RN1

DAESAMT = Day-Ahead Energy Sale Amount

$$DAESAMT_{q,p} = (-1) * DASPP_{p} * DAES_{q,p}$$



DASPP	Day-Ahead Settlement Point Price
DAES	Day-Ahead Energy Sale
q, p	QSE, Settlement Point

Example 2: Energy Offer

Settle Awarded Energy-Only Offer at Hub 1 for Hour 13 & 14

- DAM Awarded Energy-Only Offer Quantity both hours = 135MW
- DAM SPP at HB1 for Hour 13 = $35/MWh
- DAM SPP at HB1 for Hour 14 = $38/MWh



DAEPAMTQSETOT = Day-Ahead Energy Purchase Amount QSE Total

$$DAEPAMTQSETOT_q = \sum_p DAEPAMT_{q,p}$$

DAESAMTQSETOT = Day-Ahead Energy Sale Amount QSE Total

$$DAESAMTQSETOT_q = \sum_p DAESAMT_{q,p}$$

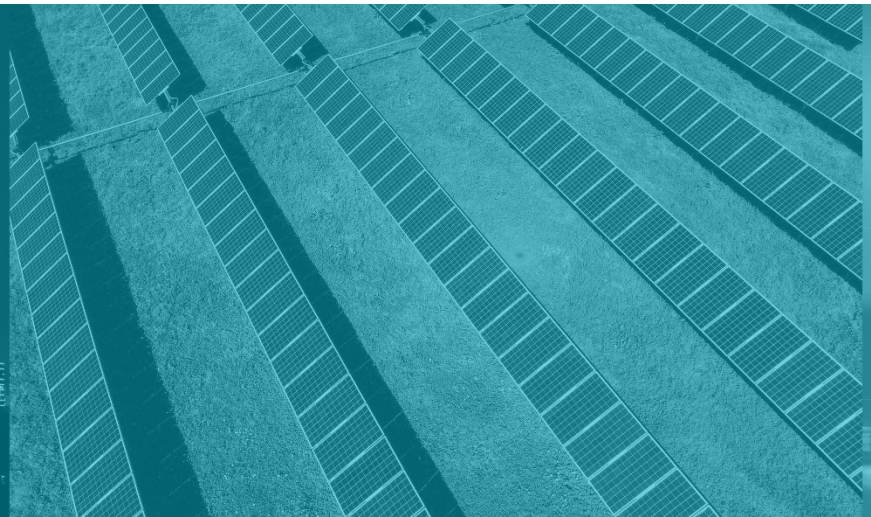


q, p	QSE, Settlement Point





DAM PTP Obligation Bids


DAM PTP Obligation Bid: Concept



PTP Obligation Bids

DAM

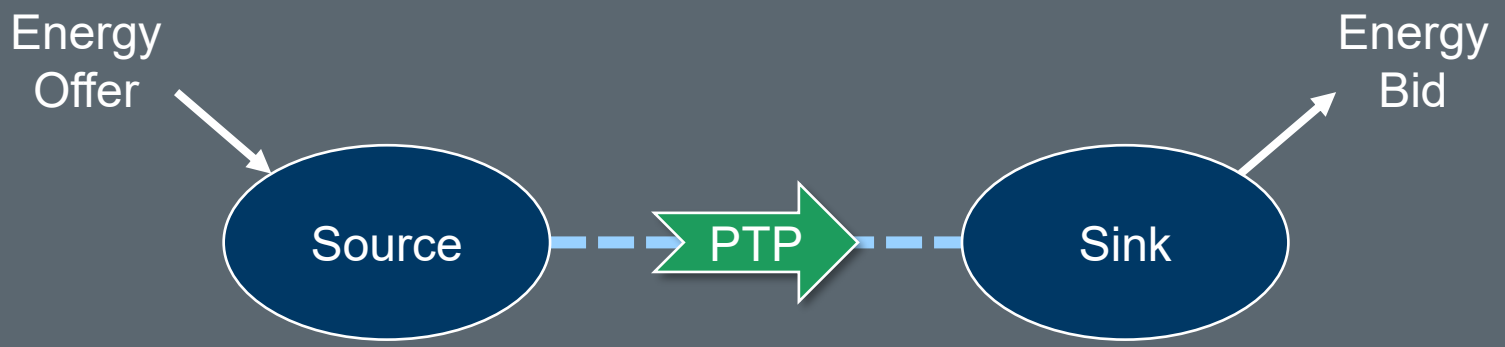
Hourly Awards

Hourly Prices

Like a coupled Offer and Bid



Purchase Price = Sink – Source





Awarded PTP Obligation Bid for a given hour

- PTP Obligation Bid Path: Resource Node 1 (Source) / Load Zone 1 (Sink)
- DAM Awarded PTP Obligation Bid Quantity = 50MW
- DAM SPPs at RN1 = $14/MWh & at LZ1 = $18/MWh



Awarded PTP = Price * Quantity

Awarded PTP = (Sink Price – Source Price) * Quantity

Awarded PTP = ($18/MWh – $14/MWh) * 50MW

Awarded PTP = $4/MWh * 50MW

$200 for the hour (RN1 to LZ1)

DARTOBLAMT = Day-Ahead Real-Time Obligation Amount

$$DARTOBLAMT_{q,(j,k)} = DAOBLPR_{(j,k)} * RTOBL_{q,(j,k)}$$

Where: $DAOBLPR_{(j,k)} = DASPP_k - DASPP_j$

DAOBLPR	Day-Ahead Obligation Price
DASPP	Day-Ahead Settlement Point Price
RTOBL	Real-Time Obligation
q, j & k	QSE, Source & Sink Settlement Point



Example 3: DAM PTP Obligation Bid

Settle Awarded PTP Obligation Bid for Hour 12

- PTP Obligation Bid Path: Hub 3 (Source) / Load Zone 3 (Sink)
- DAM Awarded PTP Obligation Bid Quantity = 75MW
- DAM SPPs at HB3 = $27/MWh & at LZ3 = $62/MWh





Make-Whole Payments



Make-Whole Payment: Concept



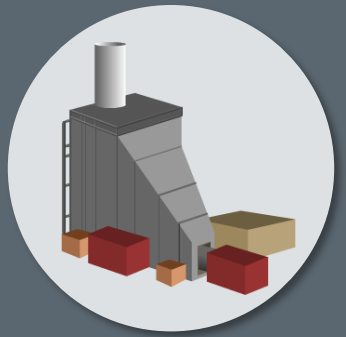
Three-Part Supply Offers

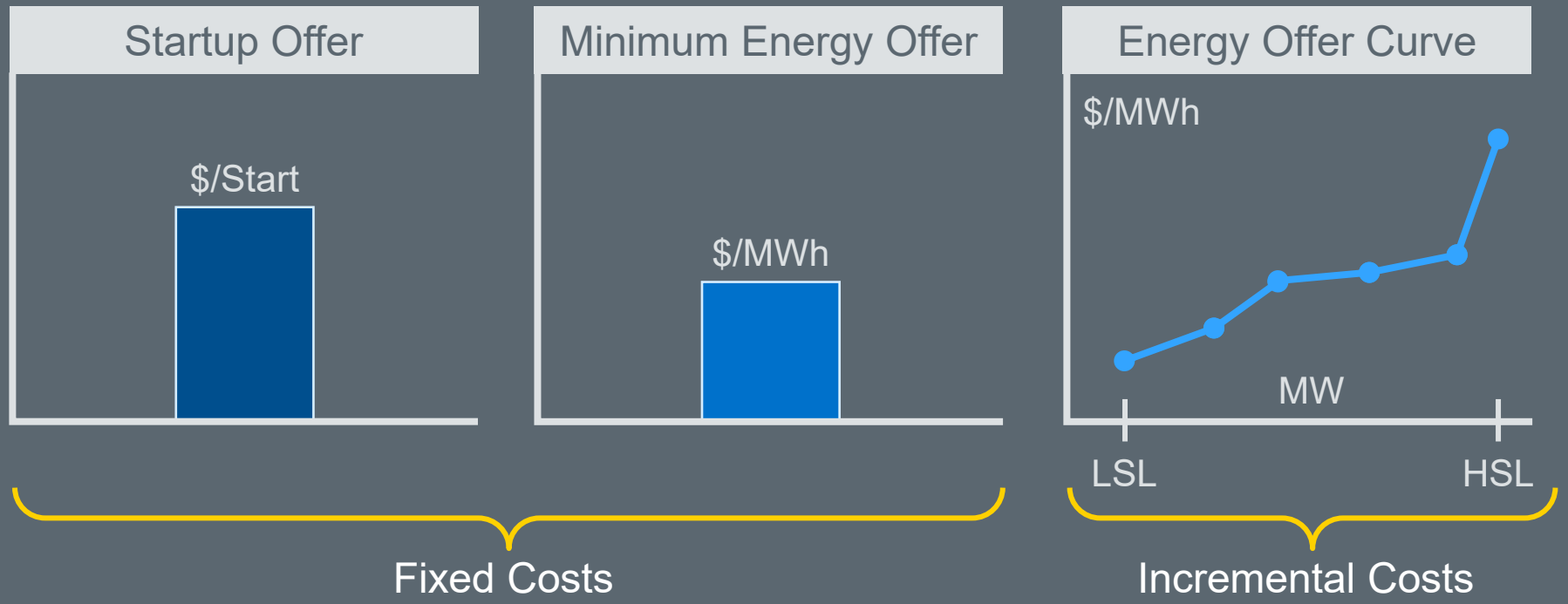
DAM

Hourly Awards for Resource

Hourly Prices

Why is Day-Ahead Make-Whole necessary?



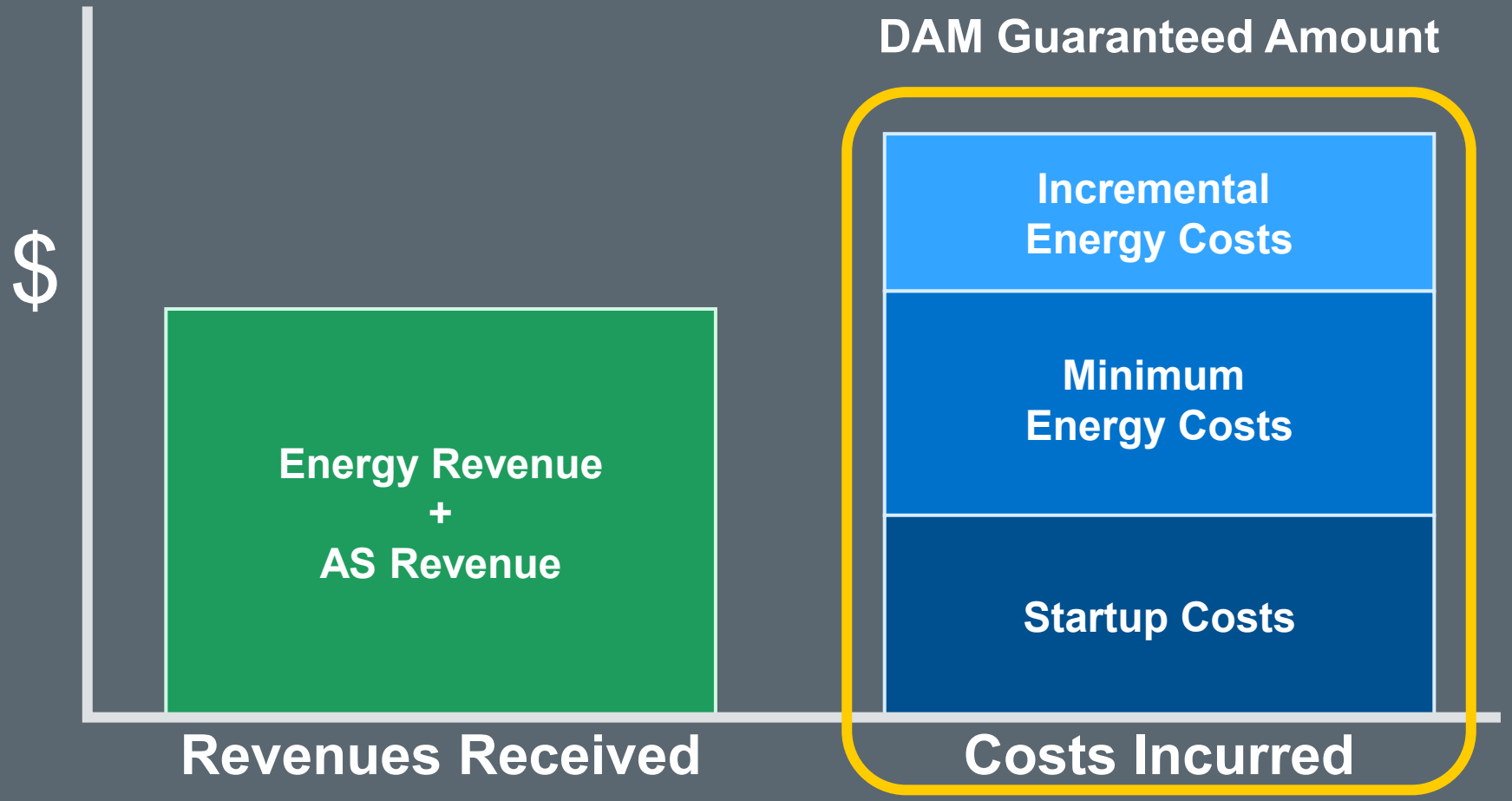


LSL – Low Sustained Limit

HSL – High Sustained Limit

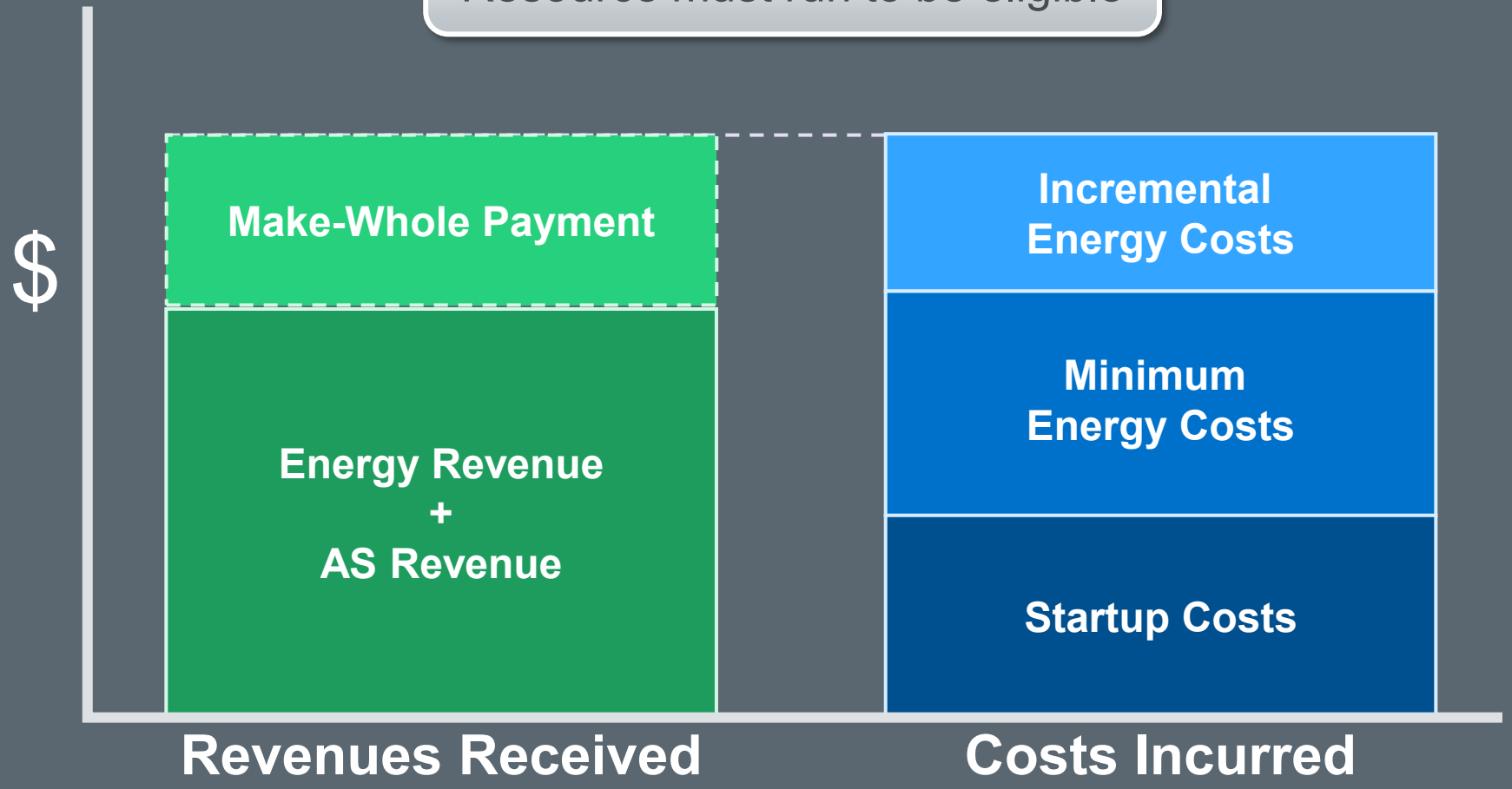
LMPs are determined from incremental costs


QSE

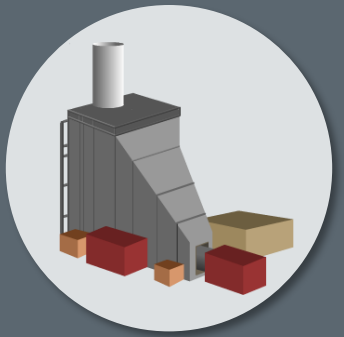

DAM Guaranteed Amount
$
Energy Revenue
+
AS Revenue
Incremental
Energy Costs
Minimum
Energy Costs
Startup Costs
Revenues Received
Costs Incurred



Resource must run to be eligible



Costs from Generation Resource



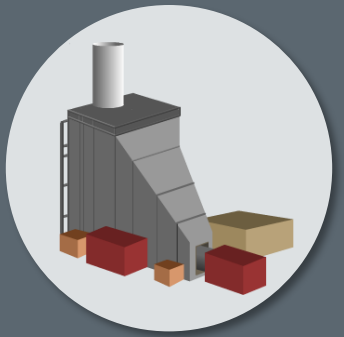


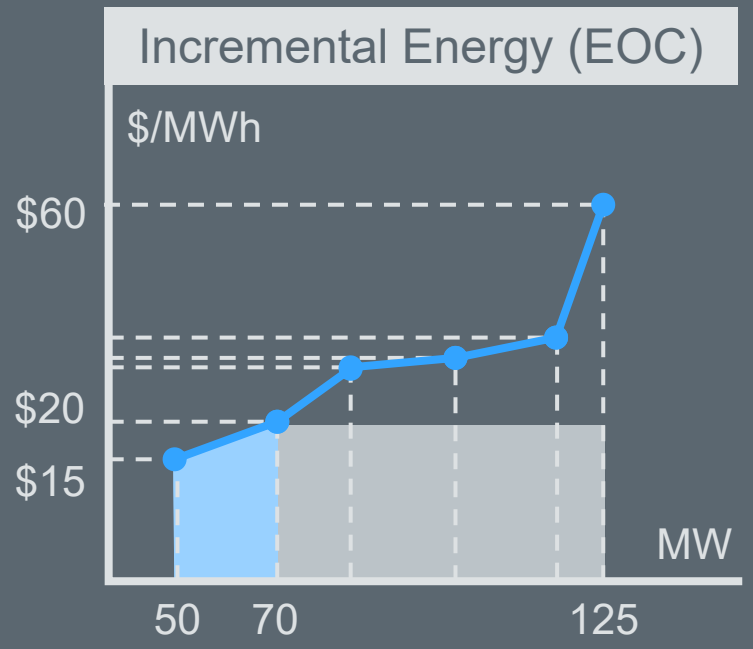
LSL – Low Sustained Limit

HSL – High Sustained Limit

Average Incremental Energy Cost (AIEC):

- Average Price between two price/quantity pairs
- Limited by the Energy Offer Curve Cost Cap





Assume:
PQ1 = $15/MWh & 50MW
PQ2 = $20/MWh & 70MW
PQ6 = $60/MWh & 125MW
EOC Cost Cap = $20

1st AIEC = $17.50/MWh

All other AIEC segments = $20.00/MWh

Guaranteed Amount (GA) for a given DAM-committed Resource



- Resource Award = 55MW (per hour for 10 hours), LSL = 45MW
- Startup = $3,000 (Capped at $3,500)
- Minimum Energy = $15/MWh (Capped at $10/MWh)
- Energy Offer Curve (LSL to HSL) = $20/MWh (Capped at $12/MWh)

GA = Startup Cost + (Minimum Energy Cost * LSL * Hours) +
(Incremental Energy Cost * (Award – LSL) * Hours)

GA = $3,000 + ($10/MWh * 45MW * 10) + ($12/MWh * (55MW – 45MW) * 10)

Guaranteed Amount = $3,000 + $4,500 + (12MWh * 10MW * 10)

Guaranteed Amount = $3,000 + $4,500 + $1,200

$8,700 for the DAM-committed Resource

Make-Whole Payment for a given hour

- Resource Award = 55MW (per hour for 10 hours), 550MW total
- DAM Guaranteed Amount = $8,700
- Day-Ahead Energy Revenue = -$5,000
- Day-Ahead AS Revenue = -$700



Make-Whole Payment = (-1) * Max(0, **Guaranteed Amount** + **Energy Revenue** + **AS Revenue**) * (**Award for Hour** / **Total Award**)

Make-Whole Payment = (-1) * Max(0, **$8,700** + **-$5,000** + **-$700**) * (**55MW** / **550MW**)

Make-Whole Payment = (-1) * Max(0, **$3,000**) * **0.1**

$300 for the hour

Make-Whole Payment for a given hour

- Resource Award = 55MW (per hour for 10 hours), 550MW total
- DAM Guaranteed Amount = $8,700
- Day-Ahead Energy Revenue = -$9,000
- Day-Ahead AS Revenue = -$700



Make-Whole Payment = (-1) * Max(0, **Guaranteed Amount** + **Energy Revenue** + **AS Revenue**) * (**Award for Hour** / **Total Award**)

Make-Whole Payment = (-1) * Max(0, **$8,700** + **-$9,000** + **-$700**) * (**55MW** / **550MW**)

Make-Whole Payment = (-1) * Max(0, **-$1,000**) * **0.1**

$0 for the hour

DAMWAMT = Day-Ahead Make-Whole Payment Amount

$$DAMWAMT_{q,p,r,h} = (-1) * Max(0, DAMGCOST_{q,p,r} + \sum_h DAEREV_{q,p,r,h} + \sum_h DAASREV_{q,r,h}) * DAESR_{q,p,r,h} / (\sum_h DAESR_{q,p,r,h})$$

DAMGCOST	Day-Ahead Market Guaranteed Amount (Cost)
DAEREV	Day-Ahead Energy Revenue
DAASREV	Day-Ahead Ancillary Service Revenue
DAESR	Day-Ahead Energy Sale from Resource
q, p	QSE, Resource Node Settlement Point
r, h	DAM-committed Generation Resource, Hour



DAMGCOST = Day-Ahead Market Guaranteed Amount (Cost)

$$DAMGCOST_{q,p,r} = Min(DASUO_{q,p,r}, DASUCAP_{q,p,r}) + \sum_h(Min(DAMEO_{q,p,r,h}, DAMECAP_{q,p,r,h}) * DALSL_{q,p,r,h}) + \sum_h(DAAIEC_{q,p,r,h} * (DAESR_{q,p,r,h} - DALSL_{q,p,r,h}))$$

DASU(O/CAP)	Day-Ahead Startup (Offer/Cap)
DAME(O/CAP)	Day-Ahead Minimum-Energy (Offer/Cap)
DAAIEC	Day-Ahead Average Incremental Energy Cost
DALSL	Day-Ahead Low Sustained Limit
DAESR	Day-Ahead Energy Sale from Resource
q, p	QSE, Resource Node Settlement Point
r, h	DAM-committed Generation Resource, Hour



Settle the Make-Whole Payment for Hour 20

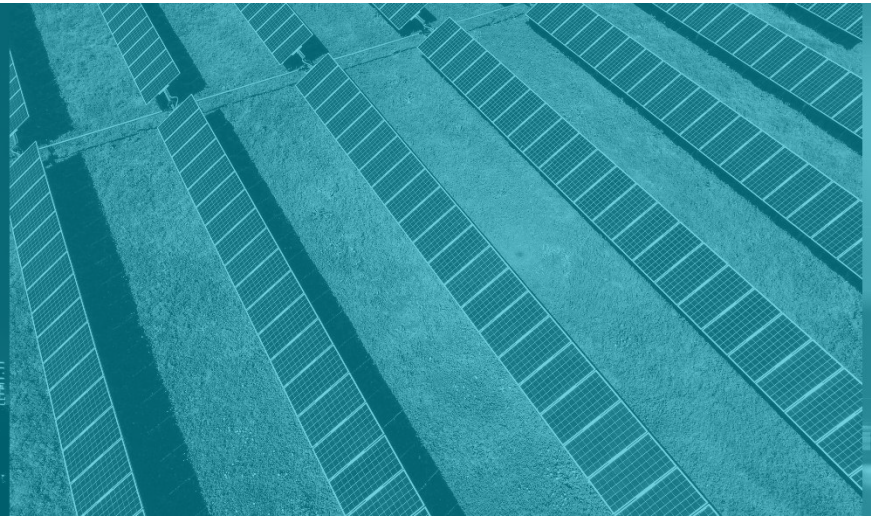


- Resource Award for Hours 18 to 21 = 100MW per hour
- DAM Guaranteed Amount = $10,000
- Day-Ahead Energy Revenue = -$7,600
- Day-Ahead Ancillary Service Revenue = -$400



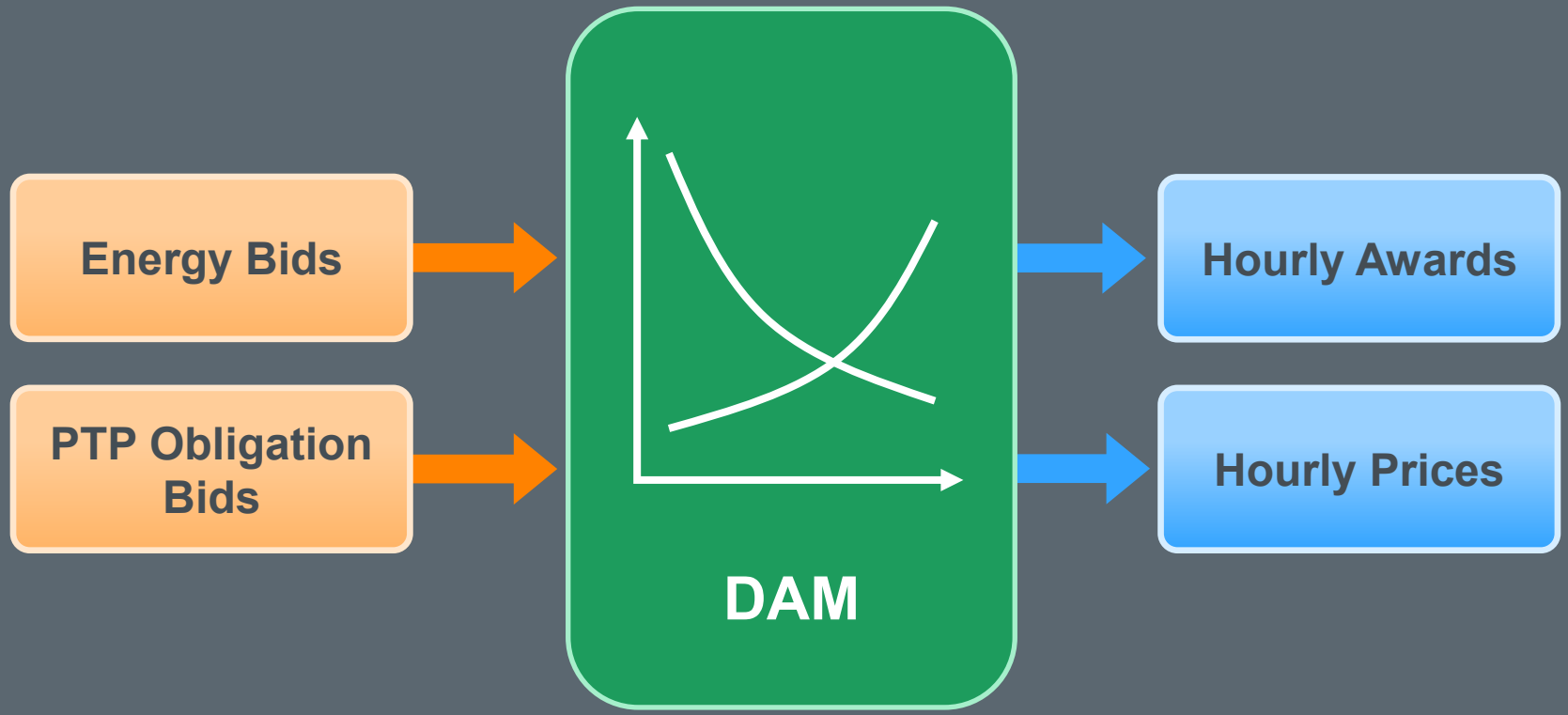


Make-Whole Charges


QSEs pay their share of Make-Whole Payments…





Based on Awarded Bids for the hour

Make-Whole Charge for a given hour

- Make-Whole Payment Total = -$60,000
- Day-Ahead QSE Energy (Awarded Bids) = 50MW
- Day-Ahead Total Energy (Awarded Bids) = 50,000MW



Make-Whole Charge = (-1) * **Make-Whole Payment Total** * (**Day-Ahead QSE Energy** / **Day-Ahead Total Energy**)

Make-Whole Charge = (-1) * **-$60,000** * (**50MW** / **50,000MW**)

Make-Whole Charge = **$60,000** * **0.001**

$60 for the hour

LADAMWAMT = (Load-Allocated) Day-Ahead Make-Whole Charge Amount

$$LADAMWAMT_q = (-1) * DAMWAMTTOT * DAERS_q$$

Where: $DAERS_q = DAE_q / DAETOT$

DAMWAMTTOT	Day-Ahead Make-Whole Payment (Amount) Total
DAERS	Day-Ahead Energy Purchase Ratio Share
DAE	Day-Ahead Energy
DAETOT	Day-Ahead Energy Total
q	QSE



Example 5: Make-Whole Charge

Settle the Make-Whole Charge for Hour 20

- Make-Whole Payment Total = -$30,000
- Day-Ahead Energy Purchase Ratio Share = 0.015



Topics in this course included:

1. Energy Bids
2. Energy Offers
3. DAM PTP Obligation Bids
4. Make-Whole Payments
5. Make-Whole Charges

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