Dispatchable Reliability Reserve Service (DRRS)

Workshop V Presentation

June 26, 2025

Agenda

- High-Level Recommendation
- DRRS Design Evolution
- Statutory Requirements
- Potential DRRS Design Concepts and Recommendation Rationale
- Overview of Release Factor Concept
- Real-Time Procurement Discussion
- Day-in-the-Life Examples
- Examples of Off-Line Resource awarded Off-Line DRRS in DAM
- Next Steps

ERCOT Recommends Adopting the “Release Factor” Design Concept

- We believe strongly that the DRRS design option selected must:
  - Meet the conditions in the statutory language of PURA § 39.159(d)-(e)
  - Align with the guidance from the Public Utility Commission of Texas to develop DDRS as an Ancillary Service to meet an operational uncertainty mandate *but* with flexibility in the design to more explicitly support resource adequacy should such a policy decision be made in the future.
- Alternative proposals have been advanced that address these two conditions to varying degrees.
- To fully address these conditions and to support an implementation timeframe by avoiding undue complexity, **we recommend the adoption of the “Release Factor” design concept** first presented in November 2024 and subsequently refined through our further internal design discussions.

DRRS Design Evolution

Through 2024 and 2025, ERCOT and stakeholders have been developing the concept of DRRS as an Ancillary Service.

- NPRR1235 was the original vehicle for specifying how the attributes specified in PURA § 39.159(d) and other design elements will be incorporated in the Protocols.
- Some stakeholders have put forward design changes to NPRR1235 that explicitly seek to achieve a reliability standard, while there is opposition from others. Both ERCOT and the IMM have expressed concerns about the approach, based on price formation as well as the general intent of DRRS as an operational uncertainty tool.
- Nov. 2024 SAWG: ERCOT presented two design concepts for DRRS that achieve operational mandate and retain future flexibility to include resource adequacy.
- Dec. 2024 Open Meeting: PUCT encouraged DRRS design to **address operational forecast uncertainty while preserving optionality to directly support resource adequacy in the future**.
- Jan. 2025 SAWG: Additional conceptual designs from IMM and Hunt Energy Network were presented.
- Feb. 2025 DRRS Workshop IV: Considered procurement and deployment of DRRS with a focus on real-time issues and considerations, regardless of the design concept adopted, to ensure adherence to statutory requirements.

DRRS Statutory Requirements

The impetus for developing DRRS comes from Public Utility Regulatory Act (PURA) § 39.159(d)-(e):

(d) The commission shall require the independent organization certified under Section 39.151 for the ERCOT power region to develop and implement an ancillary services program to procure dispatchable reliability reserve services on a day-ahead and real-time basis to account for market uncertainty. Under the required program, the independent organization shall:

1) determine the quantity of services necessary based on historical variations in generation availability for each season based on a targeted reliability standard or goal, including intermittency of non-dispatchable generation facilities and forced outage rates, for dispatchable generation facilities;

2) develop criteria for resource participation that require a resource to:

   A. be capable of running for at least four hours at the resource's high sustained limit;

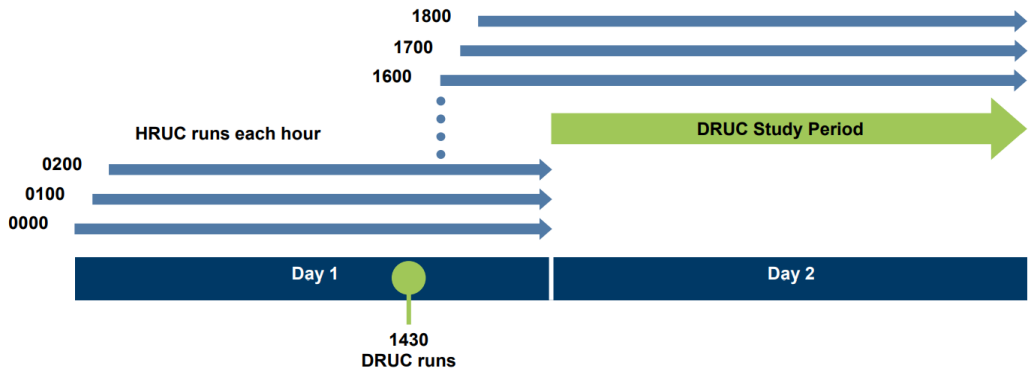
   B. be online and dispatchable not more than two hours after being called on for deployment; and

   C. have the dispatchable flexibility to address inter-hour operational challenges; and

3) reduce the amount of reliability unit commitment by the amount of dispatchable reliability reserve services procured under this section.

RUC and PURA § 39.159(d)

- Reliability Unit Commitment (RUC)
  - Ensures that enough Resource capacity is committed to reliably serve the forecasted Load on the ERCOT System and meet Ancillary Service capability needs over a multi-hour time horizon.
  - For any given Operating Hour, RUC processes start both for Day-Ahead RUC (DRUC) and for each Hourly RUC (HRUC), which runs ~60 minutes before the Operating Hour.
- To satisfy the statutory RUC-reduction requirement, Operators must understand how DRRS is being provided no later than when the commitment decisions of other OFF Resources are evaluated by RUC.
  - That is, the Operator can choose to forgo the RUC because they know DRRS is available and can solve the same forecasted conditions.
  - Therefore, the deployment of DRRS, particularly Off-Line DRRS, needs to be done through the RUC process that is run before a given Operating Hour.



ERCOT Considered Numerous Potential DRRS Design Concepts

- ERCOT has been evaluating the two design concepts for compliance with statutory requirements and PUCT guidance:
  - Concept 1: Multiple Pass
  - Concept 2: Release Factor
- Based on stakeholder feedback, ERCOT also evaluated a concept implemented at ISO New England:
  - As part of its Day-Ahead Ancillary Service Initiative (DASI), ISO New England introduced the DA Energy Imbalance Reserve (EIR), which is procured in hours when the forecasted energy requirement exceeds the cleared physical energy supply.
  - EIR is solely a Day-Ahead product and does not have a corresponding Real-Time product. Further, the "call-option" structure is a financial settlement and not an operational tool.
  - **ERCOT determined that this design concept does not meet statutory requirements for DRRS and will not be pursued further:**
    - EIR requires determining the physical load cleared in DAM, which is an issue for the ERCOT DAM market design due to the presence of virtuals (PTPs and DAM energy-only bids/offers)
    - Settlement Point Locational Marginal Price (LMP) for a physical resource is different than the Settlement Point LMP for a virtual
    - EIR is not an operational reserve that the ERCOT Operator can deploy
    - Cannot ensure that the PURA requirement to reduce RUC is met

Do DRRS design concepts satisfy PURA 39.159(d) requirements?

DRRS design concept	Meets PUCT guidance to maintain optionality	Procure on day-ahead basis (d)	Procure on real-time basis (d)	Account for market uncertainty (d)	Reliability standard/goal (d)(1)	Reduce RUC (d)(3)
Multiple Pass	Yes*	Yes	Yes	Yes	Yes	Yes
Release Factor	Yes	Yes	Yes	Yes	Yes**	Yes
ISO New England's DASI	No	Yes	No	Yes	No	Unknown

* Functions as either an operational tool or a resource adequacy tool but not both simultaneously

** Can be achieved through the choice of the release factor and the DRRS quantity procured

ERCOT Recommendation Rationale

Multiple Pass

- Meets all DRRS requirements
- Increases complexity with the need to create an additional DAM pass and a 4-hour-ahead procurement process
- Two-pass DAM approach could result in misalignment between prices and incentives due to differences between the passes
- Ability to meet PUCT guidance on design flexibility depends on a binary choice: use for operations or resource adequacy

Release Factor

- Meets all DRRS requirements
- Leverages existing concepts from other Ancillary Services (AS) to avoid undue complexity
- Maintains optionality to meet uncertainty and/or resource adequacy goals consistent with PUCT guidance

Recommendation: ERCOT proposes moving forward with the **Release Factor** concept.

Release Factor Concept

- Key attribute is that awarded capacity is shared between DRRS and energy and other AS using a “Release Factor” between 0 and 1. The release factor can be adjusted based on season, time of day, etc.
  - Similar to the ramp-sharing concept in RT-SCED between energy and regulation.
  - A Release Factor of 0 means no DRRS-awarded capacity can overlap with energy and other AS awards, whereas a value of 1 indicates that all DRRS-awarded capacity can overlap with energy and other AS awards.
  - Thus, a Release Factor of 0, accompanied by a DRRS quantity in the Ancillary Service Plan reflective of the amount of expected forecast uncertainty, would be the approach taken if *only* meeting an operational uncertainty mandate.
- Co-optimization of energy and ancillary services ensures that the LMPs for energy and AS Market Clearing Prices for Capacity (MCPCs), including DRRS, will account for opportunity costs.
- In Real-Time under stressed system conditions, the non-overlapping DRRS-awarded capacity from On-Line Resources can be converted to energy. Priority of which AS will go short will depend on the price points on the DRRS demand curve vs. the demand curves for the other AS.

DRRS System-Level and Resource-Level Constraints (DAM & Real-Time)

- DRRS System level constraints

$$\sum_{r,h} DRRS\ MW\ Award_{r,h} = Cleared\ MW\ DRRS\ Demand\ Curve_h \rightarrow Shadow\ Price = DRRS\ MCPC$$

- DRRS Resource level constraints:
  - On-Line Resource that is DRRS-Eligible and has submitted DRRS Offer. For example, for a Generation Resource (r), in hour (h):

$$Energy\ MW\ award_{r,h} + RegUpMW\ award_{r,h} + RRS\ MW\ award_{r,h} + ECRS\ MW\ award_{r,h} + NSPIN\ MW\ award_{r,h} + (1 - RF)\ DRRS\ MW\ award_{r,h} \leq HSL_{r,h}$$

  - Off-Line Resource that is DRRS-Eligible and has submitted DRRS Offer. For example, for a Generation Resource (r), in hour (h):

$$DRRS\ MWaward_{r,h} \leq HSL_{r,h}$$

Key Features of Release Factor Concept

Resource Eligibility	Day-Ahead Market (DAM)	Reliability Unit Commitment (RUC)	Real-Time Market

• On-Line and Off-Line Resources that are:
  • Dispatchable by SCED
  • If Off-Line, capable of starting within 2 hours
  • Able to sustain their HSL for at least 4 hours
	• Procured in DAM like any other AS
	• Participation is voluntary
	• QSEs may offer energy, other AS and DRRS
	• To be awarded DRRS, the Resource **must offer** DRRS
	• Once awarded DRRS, an Off-Line Resource will update its Current Operating Plan (COP) status to “DRRS” for the target Operating Hour
	• DRRS awarded in DAM will be paid the DAM MCPC
	• For Off-Line Resources, DRRS awards preclude any other AS award
		• RUC is the mechanism by which Off-Line DRRS is deployed. RUC does not procure DRRS like it does for other AS
		• Off-Line Resources with “DRRS” COP status will be given preference ahead of other Off-Line Resources. This is based on forecasted system conditions at the time RUC is executing
		• An Off-Line Resource carrying DRRS may choose to self-commit (show as ‘ON’ in COP)
		• If an Off-Line Resource awarded DRRS is deployed through RUC, it is not made whole to its startup and minimum energy costs
			• Reprocured in Real-Time like any other AS
			• The Real-Time market will have the same DRRS constraints as the DAM
			• For a DRRS-qualified Generation Resource that is telemetering a status of DRRS (Off-Line), there is an eligibility check to verify that this resource either had a status of DRRS or ON in their COP for both the DRUC and all the HRUCs for a given Operating Hour
			• To be awarded DRRS, the Resource **must offer** DRRS
			• AS imbalance concept under RTC for existing AS can also be applied to DRRS

Real-Time Procurement Discussion

- DRRS Ancillary Service Demand Curve (ASDC) for Real-Time SCED same as DAM
- Co-optimization will need to account for State of Charge (SOC) constraints

Real-Time DRRS awards can be given to:

On-Line DRRS-eligible Generation Resources and Energy Storage Resources (maximum injection capability)

Includes any Off-Line DRRS Resource that was deployed via RUC, which would then be ON in Real-Time

+

Off-Line DRRS*

*Resources that are **Off-Line in Real-Time with a telemetered status of DRRS** which also had previously submitted and maintained a **COP status of either 'DRRS' or 'ON'** for both DRUC and each run of HRUC for a given Operating Hour

COP Resource Status:
- **"DRRS"** = Off-Line Resources with a DRRS award in the DAM and/or incremental Resources
- **"ON"** = Includes On-Line Resources with a DRRS award in the DAM

Real-Time Procurement Discussion

- DRUC/HRUC COP validation for Off-Line DRRS Resources is required:
  - Ensures Off-Line Resources that received a DRRS award in DAM reflected and maintained this in their COP (i.e., the Resource was always available to RUC if needed)
  - Inclusion of ‘ON’ in this validation is necessary for a case where a Resource changed their status to ON (i.e., intending to self-commit for a future hour) but subsequently changed their status back to DRRS for that hour (accounted for in the next HRUC)
- Without this validation check, a Resource with an Off-Line DRRS award could strategically avoid a deployment in RUC via their COP Resource Status

Other Aspects for Consideration

- Consider the tracking of DAM DRRS awards (On-Line and Off-Line) at a QSE portfolio level and include DRRS trades after DAM to make the product more fungible.
  - Consider treatment of trades for On-Line and Off-Line Resources.
- Create a mechanism for Off-Line DRRS-eligible Resources that were not awarded in DAM, but which had submitted and maintained a COP status of either ‘DRRS’ or ‘ON’ for DRUC and each subsequent run of HRUC for a given Operating Hour to participate in the Real-Time Market for DRRS.
  - Pathway to increase liquidity of DRRS product in Real-Time.

Day-in-the-Life Examples: System-Level Setup

- We will look at the system-level setup for a particular hour, e.g., Hour Ending (HE) 17
- Consider system-wide total DRRS requirement is 10,000 MW
- Assume Release Factor (RF) is 0.8 (i.e., 80%)
- From the system-wide total DRRS requirement the amount required to serve Operational Uncertainty is = (1 – RF)*10,000 = (1 – 0.8)*10,000 = 2,000 MW
- Thus, amount required to address Resource Adequacy = 10,000 MW – 2,000 MW = 8,000 MW
- DRRS can be cleared from both On-Line and Off-Line Resources.
  - The total DRRS awards to both On-Line and Off-Line Resources should sum to the system-wide total DRRS requirement.
  - For Off-Line Resources the DRRS awards are mutually exclusive to any Off-Line ECRS awards and/or Off-Line Non-Spin awards.

Values of Release Factor and DRRS Quantity are for illustrative purpose only and demonstrate the flexibility to address both operational forecast uncertainty and resource adequacy.

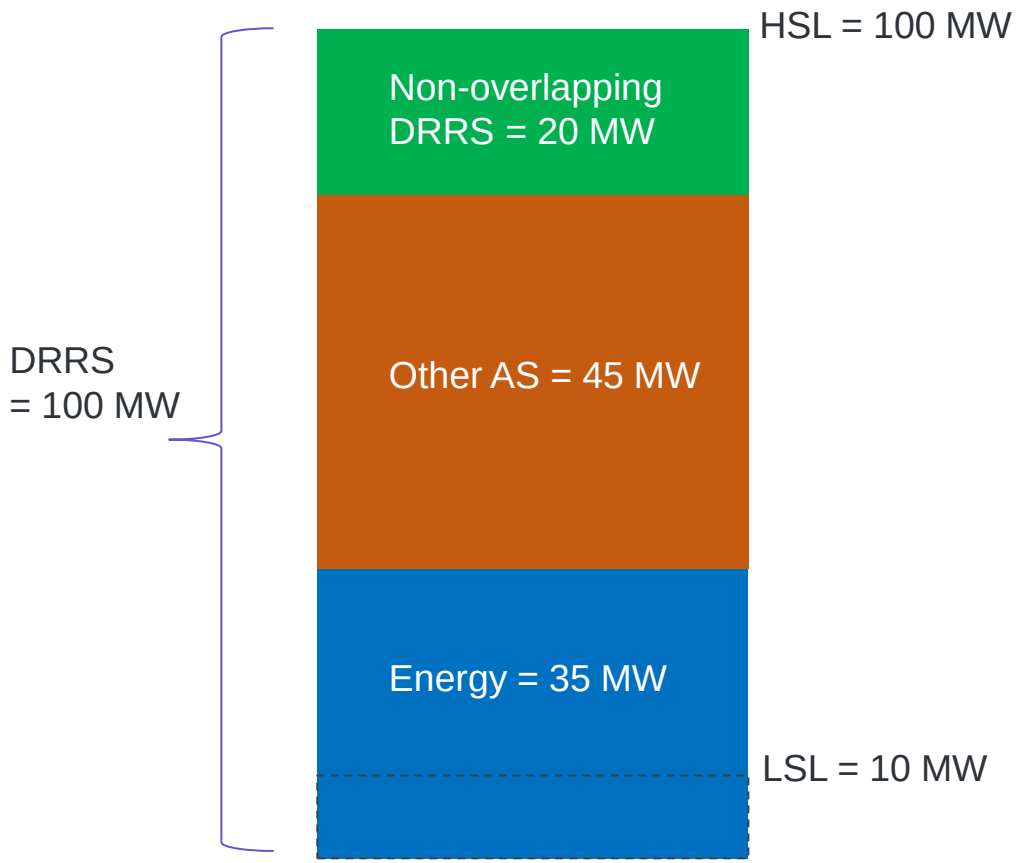
Day-in-the-Life Examples

- Next, we will consider two examples for a DRRS-qualified Generation Resource for a given hour (HE 17)

- **Example 1**: Generation Resource is considered On-Line in DAM (either through self-commitment or DAM-commitment) and On-Line in RT
  - Scenario 1: Real-Time system conditions same as or close to those in DAM
  - Scenario 2: Real-Time system conditions tighter than those in DAM
- **Example 2**: Generation Resource is Off-Line in DAM
  - Scenario 1: In Real-Time the Resource is On-Line, either through DRRS deployment by RUC or self-commitment
  - Scenario 2: In Real-Time the Resource is Off-Line, and maintains RT DRRS eligibility through COP status of ‘DRRS’ or ‘ON’ in DRUC and all subsequent HRUCs for study period covering the given hour (HE 17)

Example 1: On-Line Generation Resource in DAM

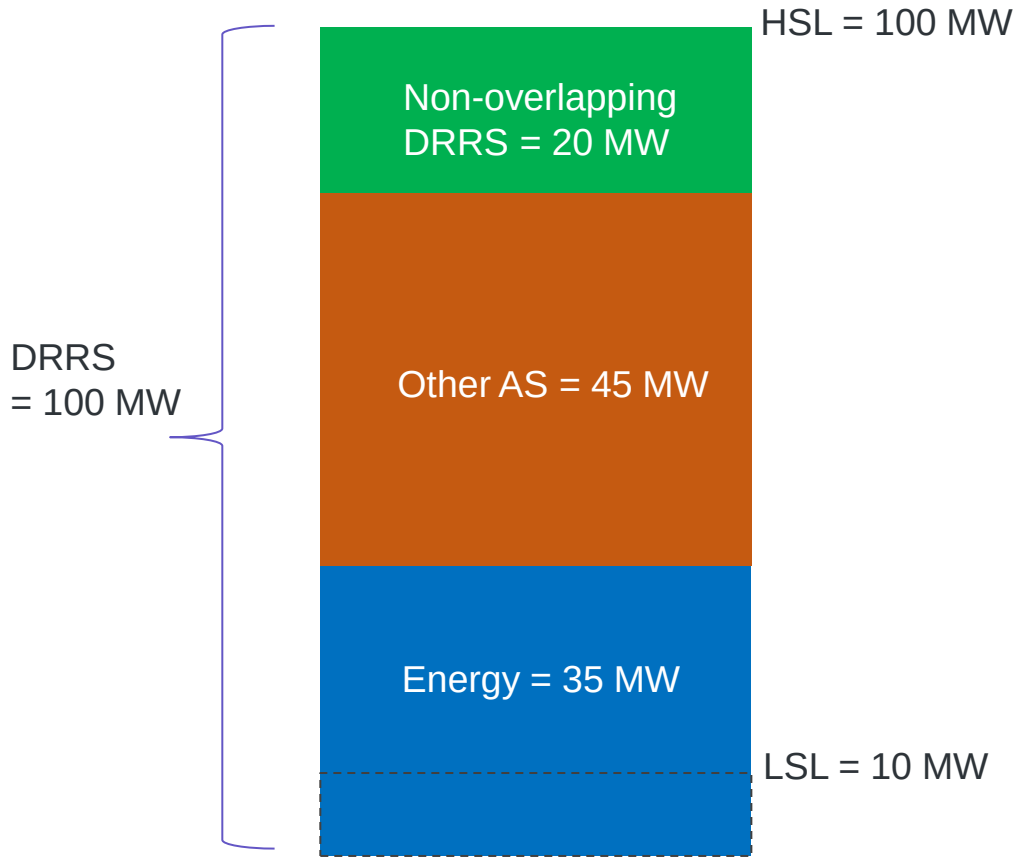
- Consider a DRRS qualified Generation Resource with HSL = 100 MW and LSL = 10 MW
- Release Factor = 0.8 (80%)
- Assume it submits DRRS offer for full 100 MW of its HSL for HE 17
- Its DAM awards for this hour could be:
  - Energy = 35 MW
  - Other AS (RegUp+RRS+ECRS+Non-Spin) = 45 MW
  - DRRS = 100 MW
  - Non-overlapping DRRS = (1-Release Factor) * DRRS Capacity = (1-0.8)*100 = 20 MW
  - This 20 MW behaves as an operational reserve as it does not overlap with other awards.
- For HE 17 the DAM DRRS Settlement = (-1) * DAM DRRS Award * DAM DRRS MCPC
  - No change to DAM Settlement of other products



Example 1: On-Line Generation Resource in RT

Scenario 1: Assume Real-Time conditions same as or close to those in DAM

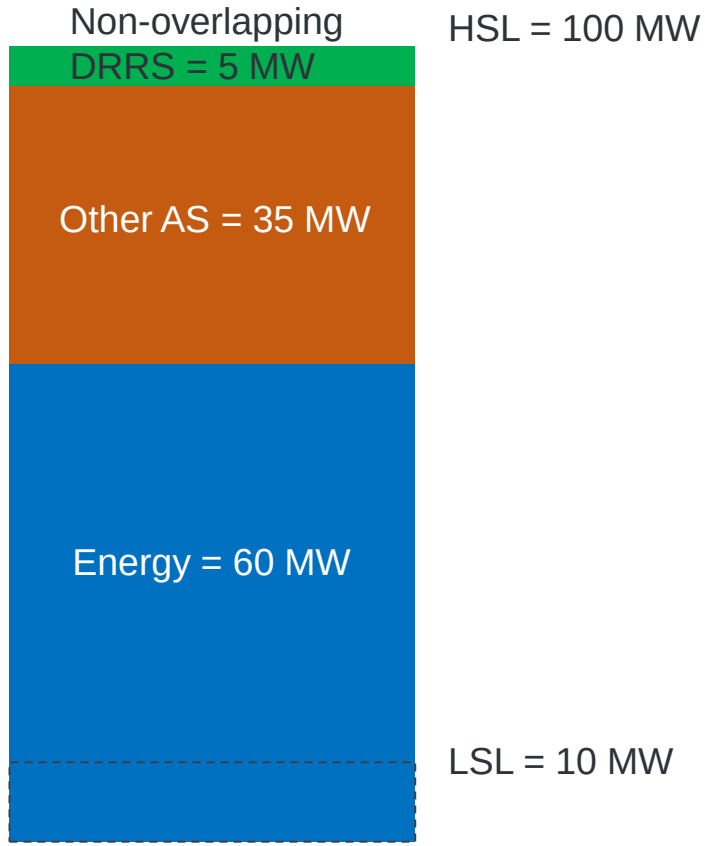
- If this Resource is On-Line in RT, the same DRRS procurement constraints and DRRS demand curve applies as in DAM, but to RT system conditions.
- Release Factor = 0.8 (80%)
- Resource HSL = 100 MW, LSL = 10 MW. For HE 17 the RT awards could be:
  - Energy = 35 MW
  - Other AS (RegUp+RRS+ECRS+Non-Spin) = 45 MW
  - DRRS = 100 MW
  - Non-overlapping DRRS = (1-Release Factor) * DRRS Capacity = (1-0.8)*100 = 20 MW
  - This 20 MW behaves as an operational reserve as it does not overlap with other awards.
- For HE 17 the RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC
  - No change to RT Imbalance Settlement of other products.



Example 1: On-Line Generation Resource in RT

Scenario 2: Assume Real-Time system conditions tighter than those in DAM

- Assume we go short on AS, starting with DRRS (assuming DRRS demand curve has a lower price than Non-Spin demand curve)
- Resource HSL = 100 MW, LSL = 10 MW. The RT awards could be:
  - Energy = 60 MW (increase from DAM award by 25 MW)
  - Other AS (RegUp+RRS+ECRS+Non-Spin) = 35 MW (decrease from DAM award by 10 MW)
  - DRRS = 25 MW
  - Non-overlapping DRRS = (1-Release Factor) * DRRS Capacity = (1-0.8)*25 = 5 MW
  - This 5 MW behaves as an operational reserve as it does not overlap with other awards.
- For HE 17 the RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC
  - No change to RT Imbalance Settlement of other products



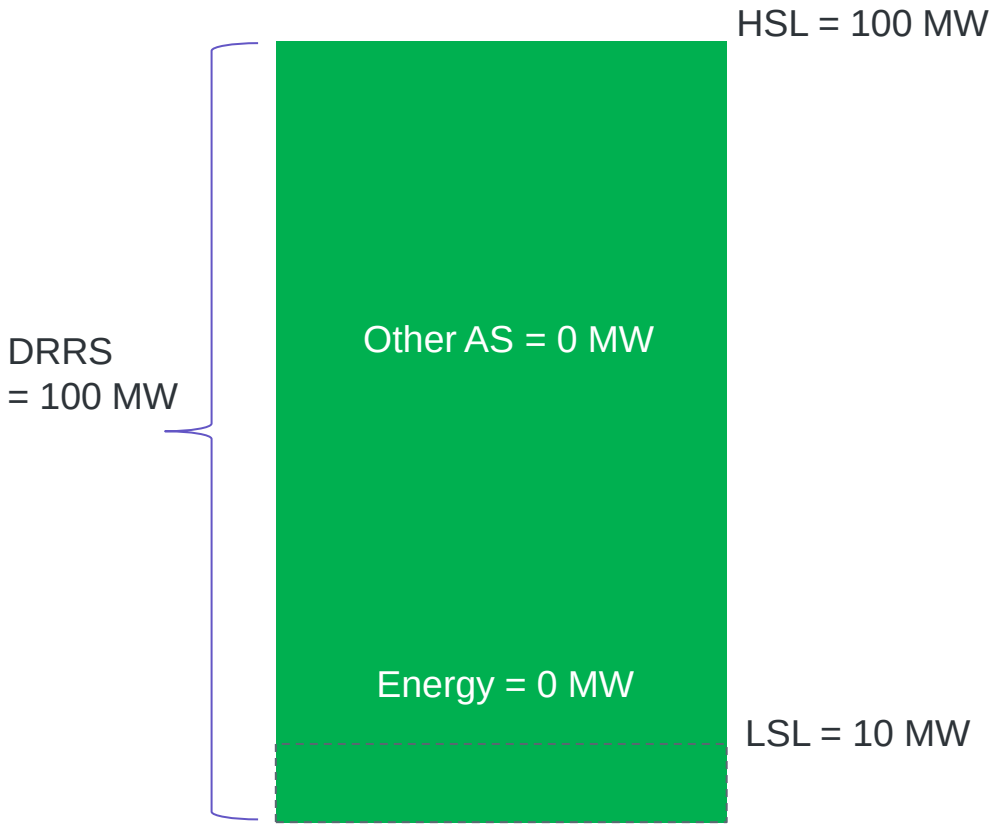
Example 1: Settlement

- Scenario 1: Real-Time conditions same as or close to those in DAM
  - Assume DAM DRRS MCPC = $5, RT DRRS MCPC = $5
  - For HE 17, DAM DRRS Settlement = (-1) * DAM DRRS Award * DAM DRRS MCPC = (-1) * 100 * 5 = - $500 {*payment*}
  - For HE 17, RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC = (-1) * (100 - 100) * 5 = $0

- Scenario 2: Real-Time system conditions tighter than those in DAM
  - Assume DAM DRRS MCPC = $5, RT DRRS MCPC = $10
  - For HE 17, DAM DRRS Settlement = (-1) * DAM DRRS Award * DAM DRRS MCPC = (-1) * 100 * 5 = - $500 {*payment*}
  - For HE 17, RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC = (-1) * (25 - 100) * 10 = $750 {*charge*}
  - It is expected that the imbalance settlement from the other products will be sufficient to cover the net charge from DRRS of $250

Example 2: Off-Line Generation Resource in DAM

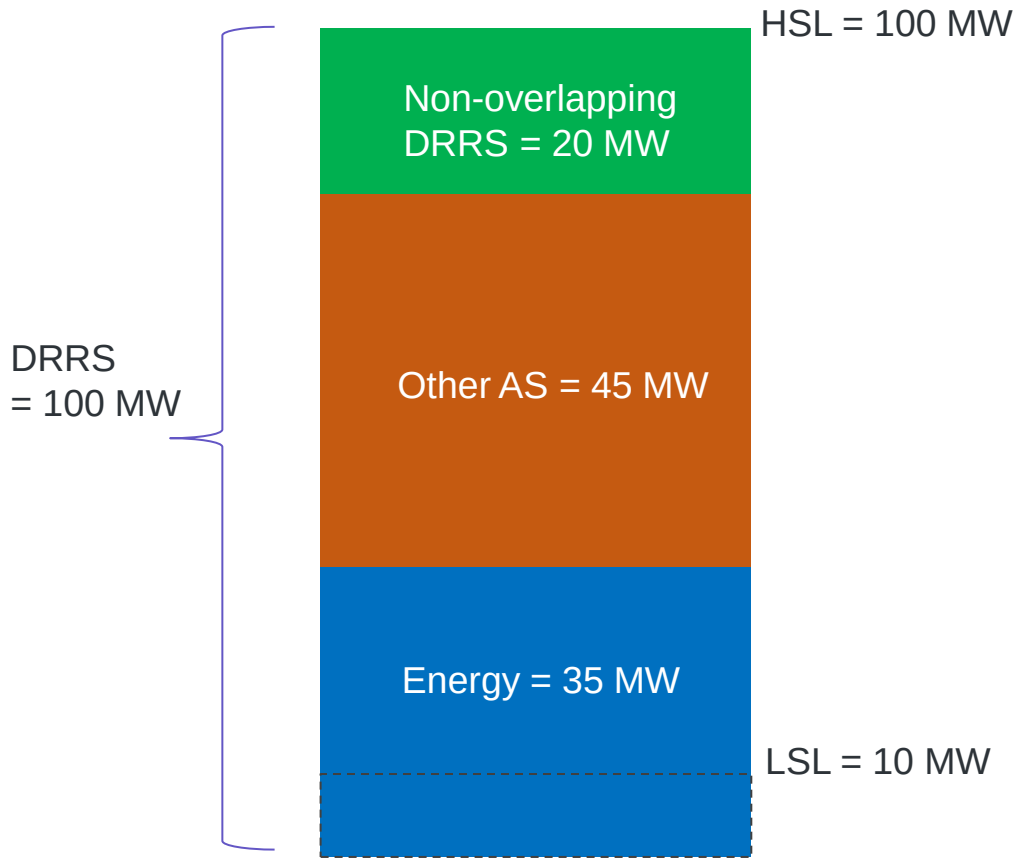
- Consider a DRRS-qualified Generation Resource with HSL = 100 MW and LSL = 10 MW
- Release Factor does not come into play since the Resource is Off-Line
- Assume it submits DRRS offer for full 100 MW of its HSL for HE 17. In HE 17 its DAM awards could be
  - Energy = 0 MW
  - Other AS (RegUp+RRS+ECRS+Non-Spin) = 0 MW
  - DRRS = 100 MW
  - Since this Resource is Off-Line it cannot get awards for any other product.
- In order for Resource to maintain RT DRRS eligibility, the Resource needs to update its COP status to 'DRRS' for DRUC and all subsequent HRUCs for study period covering HE17
  - Resource could have COP status of 'ON' (i.e., self commit) but not OFF or OUT
- For HE 17 the DAM DRRS Settlement = (-1) * DAM DRRS Award * DAM DRRS MCPC
  - No change to DAM Settlement of other products



Example 2: On-Line Generation Resource in RT

Scenario 1: Assume Real-Time conditions same as or close to those in DAM

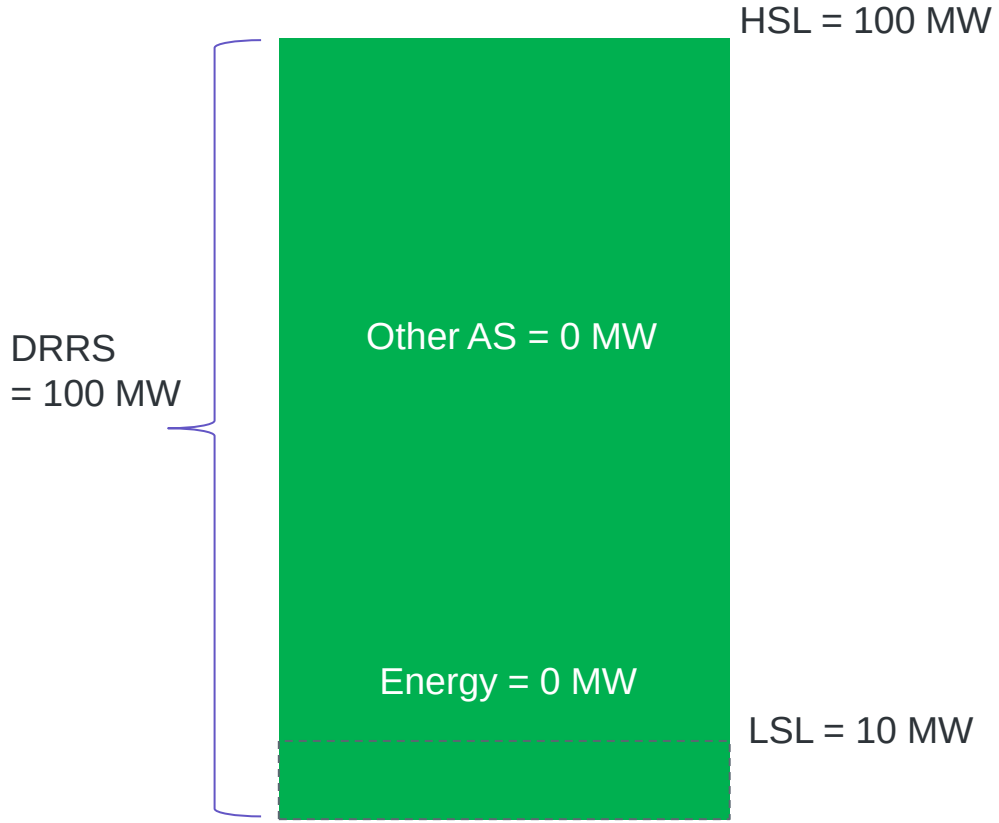
- DRRS-qualified Resource was Off-Line in DAM.
- In RT assume it is On-Line, either through DRRS deployment by RUC or self-commitment. Same DRRS procurement constraints and DRRS demand curve applies as in DAM, but to RT system conditions.
- Release Factor = 0.8 (80%)
- Resource HSL = 100 MW, LSL = 10 MW. For HE 17 the RT awards could be:
  - Energy = 35 MW
  - Other AS (RegUp+RRS+ECRS+Non-Spin) = 45 MW
  - DRRS = 100 MW
  - Non-overlapping DRRS = (1-Release Factor) * DRRS Capacity = (1-0.8)*100 = 20 MW
  - This 20 MW behaves as an operational reserve as it does not overlap with other awards.
- For HE 17 the RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC
  - No change to RT Imbalance Settlement of other products.



Example 2: Off-Line Generation Resource in RT

Scenario 2: Assume Real-Time conditions same as or close to those in DAM

- DRRS-qualified Resource was Off-Line in DAM.
- In RT assume it is Off-Line. ERCOT processes (DRUC and HRUC) did not deploy DRRS from this Resource. It maintained RT DRRS eligibility through telemetering COP status of 'DRRS' or 'ON' in DRUC and all subsequent HRUCs for study period covering HE 17.
- Release Factor does not come into play since the Resource is Off-Line
- Assume it submits DRRS offer for full 100 MW of its HSL for HE 17. In HE 17 its RT awards could be:
  - Energy = 0 MW
  - Other AS (RegUp+RRS+ECRS+Non-Spin) = 0 MW
  - DRRS = 100 MW
  - Since this Resource is Off-Line it cannot get awards for any other product.
- For HE 17 the RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC
  - No change to RT Imbalance Settlement of other products.



Example 2: Settlement

- Scenario 1
  - Assume DAM DRRS MCPC = $5, RT DRRS MCPC = $5
  - For HE 17, DAM DRRS Settlement = (-1) * DAM DRRS Award * DAM DRRS MCPC = (-1) * 100 * 5 = - $500 {*payment*}
  - For HE 17, RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC = (-1) * (100 - 100) * 5 = $0

- Scenario 2
  - Assume DAM DRRS MCPC = $5, RT DRRS MCPC = $5
  - For HE 17, DAM DRRS Settlement = (-1) * DAM DRRS Award * DAM DRRS MCPC = (-1) * 100 * 5 = - $500 {*payment*}
  - For HE 17, RT DRRS Imbalance Settlement = (-1) * (RT DRRS Award – DAM DRRS Award) * RT DRRS MCPC = (-1) * (100 - 100) * 5 = $0

Example 3: Off-Line DRRS Not Deployed via RUC

HRUC	HE	Resource COP Status	RUC Status	Notes
05:15	17	DRRS	OFF	
06:15	17	DRRS	OFF	
07:15	17	DRRS	OFF	
08:15	17	DRRS	OFF	
09:15	17	DRRS	OFF	
10:15	17	DRRS	OFF	
11:15	17	DRRS	OFF	
12:15	17	DRRS	OFF	
13:15	17	DRRS	OFF	
14:15	17	DRRS	OFF	
15:15	17	DRRS	OFF	
16:16	17	DRRS	OFF	

- Resource awarded DRRS in the DAM
- Capacity available for RUC
- No deployment
- Real-Time Telemetered Status: DRRS
- Available for Real-Time Off-Line DRRS award

Example 4: Off-Line DRRS and Deployed via RUC

HRUC	HE	Resource COP Status	RUC Status	Notes
05:15	17	DRRS	OFF	
06:15	17	DRRS	OFF	
07:15	17	DRRS	OFF	
08:15	17	**DRRS**	**ON**	Resource Committed by RUC
09:15	17	ON	ON	
10:15	17	ON	ON	
11:15	17	ON	ON	
12:15	17	ON	ON	
13:15	17	ON	ON	
14:15	17	ON	ON	
15:15	17	ON	ON	
16:16	17	ON	ON	

- Resource awarded DRRS in the DAM
- Capacity available for RUC
- Deployed via RUC
- Real-Time Telemetered Status: ON
- Available for Real-Time On-Line DRRS award

Example 5: Off-Line DRRS from Day-Ahead to Real-Time

HRUC	HE	Resource COP Status	RUC Status	Notes
05:15	17	DRRS	OFF	
06:15	17	DRRS	OFF	
07:15	17	**ON**	**ON**	Resource changes status to ON indicating plan to self-commit for that HOUR
08:15	17	**ON**	**ON**	
09:15	17	**DRRS**	**OFF**	No longer plans to self-commit and reflects change in status to DRRS
10:15	17	DRRS	OFF	
11:15	17	DRRS	OFF	
12:15	17	DRRS	OFF	
13:15	17	DRRS	OFF	
14:15	17	DRRS	OFF	
15:15	17	DRRS	OFF	
16:16	17	DRRS	OFF	

- Resource awarded DRRS in the DAM
- Capacity available/accounted for by RUC
- No deployment
- Real-Time Telemetered Status: DRRS
- Available for Real-Time Off-Line DRRS award

Example 6: Off-Line DRRS that Self-Commits

HRUC	HE	Resource COP Status	RUC Status	Notes
05:15	17	DRRS	OFF	
06:15	17	DRRS	OFF	
07:15	17	**ON**	**ON**	Resource changes status to ON indicating plan to self-commit for that Hour
08:15	17	ON	ON	
09:15	17	ON	ON	
10:15	17	ON	ON	
11:15	17	ON	ON	
12:15	17	ON	ON	
13:15	17	ON	ON	
14:15	17	ON	ON	
15:15	17	ON	ON	
16:16	17	ON	ON	

- Resource awarded DRRS in the DAM
- Decides to self-commit for HE 17
- Real-Time Telemetered Status: ON
- Available for Real-Time On-Line DRRS award

Next Steps

- Today is the last workshop to discuss various DRRS design concepts.
- We invite stakeholder feedback on concepts discussed today so that we can move forward with selecting a design.
- Please provide feedback by July 18, 2025 to ryan.king@ercot.com
  - Out of the concepts presented today, which do you feel best meets PURA statutory language?
  - Which of the proposed concepts best meets the PUCT guidance?
- Late-Fall to End-of-Year: ERCOT to prepare draft Protocols language to incorporate the selected design and file an NPRR.
  - Depending on the scale of the changes, the NPRR may be a modification of NPRR1235 or NPR1235 may be withdrawn and superseded by a new NPRR.

Appendix

ISO New England's Day-Ahead Ancillary Services Initiative (DASI)

- Introduced the co-optimization of energy with ancillary services in the Day-Ahead Market. Previously ancillary services were procured out of market.
  - Introduced three DA Flexible Response Services procured from fast-ramping and fast-start resources, namely DA 10 min spinning reserve (TMSR), DA 10 min non-spinning reserve (TMNSR), and DA 30 min operating reserve (TMOR).
- The fourth product is the "DA Energy Imbalance Reserve" (EIR), which is procured in each hour when the forecasted energy requirement exceeds the cleared physical energy supply.
- Settlement of DA Ancillary Services is done using a "call-option" structure, where Resources receive a credit for reserve capacity, followed by a potential close-out charge for non-performance.
- Suppliers will make DAM AS offers knowing the strike price. The strike price is the expected LMP plus a $10 adder. A Gaussian Mixture Model is used to forecast the systemwide hourly RT LMP for the next day. The adder is included to reduce costs to consumers.

ISO New England's Day-Ahead Ancillary Services Initiative (DASI)

- ISO New England has a reliability unit commitment process called the Reserve Adequacy Analysis (RAA). Even before DASI implementation it was rarely used to commit Resources. Post-DASI no major change is expected to RAA usage.
- Nothing about real-time operations changes based on implementation of DASI.
  - Decisions in RT are based on RT offers and availability.
  - EIR awards do not impact the operational preference for a unit.
- No change to the Real-Time reserve market, which pays only opportunity costs. Hence, there are no bids/offers for reserves for RT reserves.
  - Additionally, RT reserve prices in most hours are zero.

ISO New England's Day-Ahead Ancillary Services Initiative (DASI)

- Benefits
  - Accounts for uncertainty by considering DA load forecast in the procurement of the Energy Imbalance Reserve product.
- Drawbacks
  - EIR is only a Day-Ahead product and does not have a corresponding Real-Time product. Thus, it does not satisfy the statutory requirements for DRRS.
  - The 'call-option' settlement is a financial mechanism and not an operational tool.
  - ISO New England has quite low congestion (typically less than 1% of energy costs). Thus, the difference between Close-out Costs (which are based on system RT LMP) and RT Energy (which is based on nodal prices), tends to be low. Developing an accurate strike price forecasting model in ERCOT could be challenging, particularly since congestion in ERCOT is much higher.

Key Features of Multiple Pass Concept

- DAM comprised of two passes:
  - “DAM DRRS Procurement Pass”: A simplified DAM without network constraints that considers load forecast by zone, resulting in binding DRRS AS awards to Off-Line resources and MCPCs.
  - “DAM DRRS Release Pass”: Mostly classic DAM, but without consideration of DRRS (respects DRRS awards to Off-Line resources from first pass – and not make these Off-Line Resources available to this pass of DAM).
- Real-Time DRRS procurement process: Will run 4 hours ahead of the target Operating Hour and procure DRRS from <= 2 hours lead-time Off-Line resources, based on an updated forecast.
  - Similar to the “DAM DRRS Procurement Pass” but only for the target operating hour.
- Real-Time
  - Real-Time SCED runs as normal and resources awarded DRRS are not withheld but can be economically dispatched and/or awarded other Ancillary Service (AS).

Benefits and Drawbacks of Multiple Pass Concept

Benefits

- Meets the statutory requirements in PURA § 39.159
- Does not preclude incorporating resource adequacy goals in a future market design change.
- No price distortions or other unintended consequences associated with withholding DRRS MW (ensures that non-dispatchable resources do not receive the price benefits).
- The Real-Time procurement process incorporates updated forecast information (i.e., targets operational uncertainty) thus can reduce the need for some RUCs.

Drawbacks

- New procurement processes in DAM and before RUC, which increases complexity.
- The two-pass DAM approach could result in misalignment between prices and incentives due to differences between the passes.
- This approach functions best as either an operational tool or a resource adequacy tool but not both simultaneously.