Aggregated Distributed Energy Resource (ADER) Pilot Project

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Background

- In July ‘22, the PUCT directed ERCOT to begin development of a pilot to allow participation of ADERs in the ERCOT wholesale market.
  - As designed, ADERs consist of aggregations of many individual sites that can inject or withdraw power from the grid in response to an ERCOT instruction (i.e., not just load augmentation).
- The PUCT also established a task force comprising of various industry representatives to advise ERCOT and the PUCT on the development and administration of the pilot project.
- The PUCT expressed desire for October ‘22 Board approval of the Governing Document and we met that timeline with pilot administration initiating in November ‘22.

Background

- From the start, the pilot has contemplated multiple phases with each phase building on the previous.

- The intent of the phased approach was to allow for the pilot to commence as early as possible while minimizing changes to ERCOT and Distribution Service Provider (DSP) systems.

- While this has been somewhat limiting, this approach has allowed us to gain valuable information in each phase before making changes to ERCOT rules and systems for subsequent phases, which could require significant investment.

Pilot Objectives Include:

- Assessing operational benefits and challenges of ‘heterogeneous’ aggregations of resources which are net-generation or net-load;
- Understanding the ability and impact of ADERs providing Ancillary Services;
- Understanding distribution system impacts of ADERs as well as impacts to transmission system congestion management; and
- Identifying enhancements and study the need for and benefit of transitioning distribution-level aggregations to different levels of more granular dispatch and settlement and evaluate more complex use-cases and business models.

Key Features for Phase 1

- ADERs had to make use of the existing Aggregate Load Resource (ALR) participation model and many of the associated rules (data requirements, compliance metrics, etc.).
- All sites within an ADER had to be within a single Load Zone and DSP territory.
- Sites were reviewed to ensure that they were not already participating in other programs.
- ADERs were dispatched using zonal shift factors and were settled using zonal prices.
- ADERs were only allowed to provide Non-Spin.
- System-wide participation was limited to 80 MW of registered capacity for energy and 40 MW of Non-Spin.

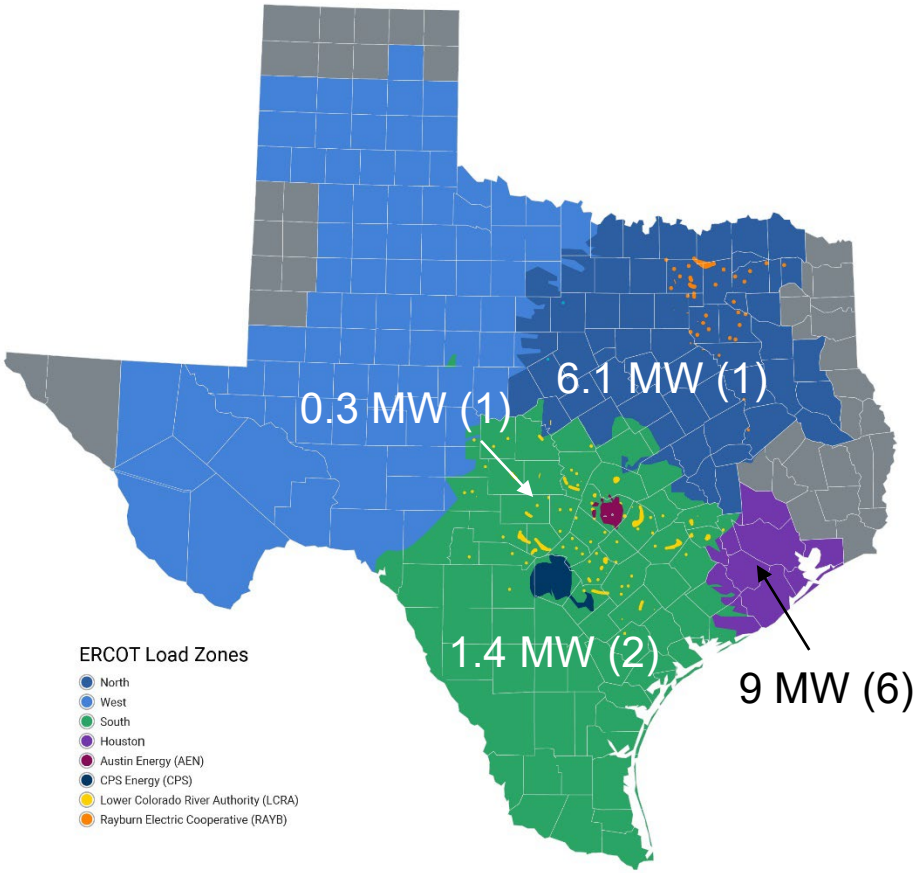
Changes for Phase 2

- Transition to Phase 2 of the pilot was approved in February ’24, and this is where we are today.

- Changes for Phase 2 were largely incremental and included:
  - Expanding ADER Ancillary Service participation to include the ERCOT Contingency Reserve Service (ECRS), also limited to 40 MW.
  - Improving telemetry validation processes and requirements
  - Identifying a need to review compliance metrics for ADERs
  - A continued commitment to evaluate alternative dispatch models and alternatives to dispatch using zonal shift factors

Pilot Participation as of May ‘24

- There are currently 2 ADERs participating in the wholesale electric market:
  - 13.1 MW for energy
  - 6 MW for Non-Spin
  - 6 MW for ECRS
  - Primary technology is batteries
- Energy and Non-Spin participation began in Aug. ’23, ECRS participation began in May ’24.
- 8 additional ADERs have ERCOT-accepted Details of the Aggregation forms in place:
  - ERCOT-wide energy: 3.7 MW
  - ERCOT-wide Non-Spin: 1.1 MW



Pilot Participation as of May ‘24

		LZ_AEN	LZ_CPS	LZ_HOUSTON	LZ_LCRA	LZ_NORTH	LZ_RAYBN	LZ_SOUTH	LZ_WEST	ERCOT-WIDE
Energy	**Limit (MW)**	2.8	5.3	20.3	3.1	28.7	1.2	10.3	8.2	80.0
	Approved (MW)	0.0	0.0	9.0	0.3	6.1	0.0	1.4	0.0	16.8
	Unused (MW)	2.8	5.3	11.3	2.8	22.6	1.2	8.9	8.2	63.2
	% Full	0%	0%	44%	10%	21%	0%	14%	0%	21%
Non-Spin	**Limit (MW)**	1.4	2.7	10.1	1.6	14.3	0.6	5.2	4.1	40.0
	Approved (MW)	0.0	0.0	3.7	0.0	3.0	0.0	0.4	0.0	7.1
	Unused (MW)	1.4	2.7	6.4	1.6	11.3	0.6	4.8	4.1	32.9
	% Full	0%	0%	37%	0%	21%	0%	8%	0%	18%
ECRS	**Limit (MW)**	1.4	2.7	10.1	1.6	14.3	0.6	5.2	4.1	40.0
	Approved (MW)	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	6.0
	Unused (MW)	1.4	2.7	7.1	1.6	11.3	0.6	5.2	4.1	34.0
	% Full	0%	0%	30%	0%	21%	0%	0%	0%	15%

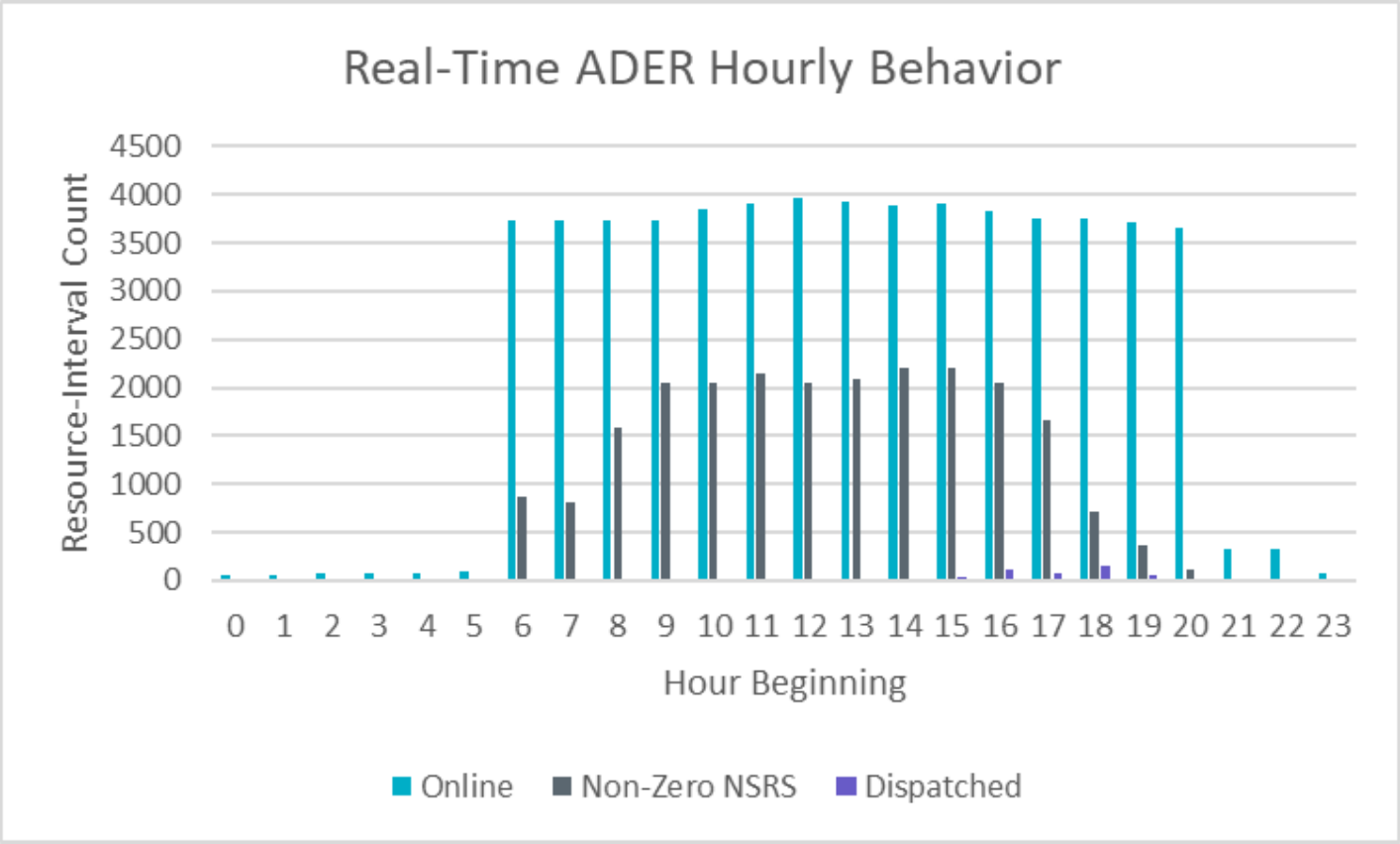
Phase 1 – General Participation Stats

- August ‘23 through January ’24:

Metric	Resource-Interval Count
SCED Intervals evaluated	94,500
SCED Intervals where the ADER was on-line	58,186
SCED Intervals with non-zero Non-Spin Responsibility	22,944
SCED Intervals with ADERs dispatched	514
SCED Intervals with ADERs deployed for Non-Spin	40

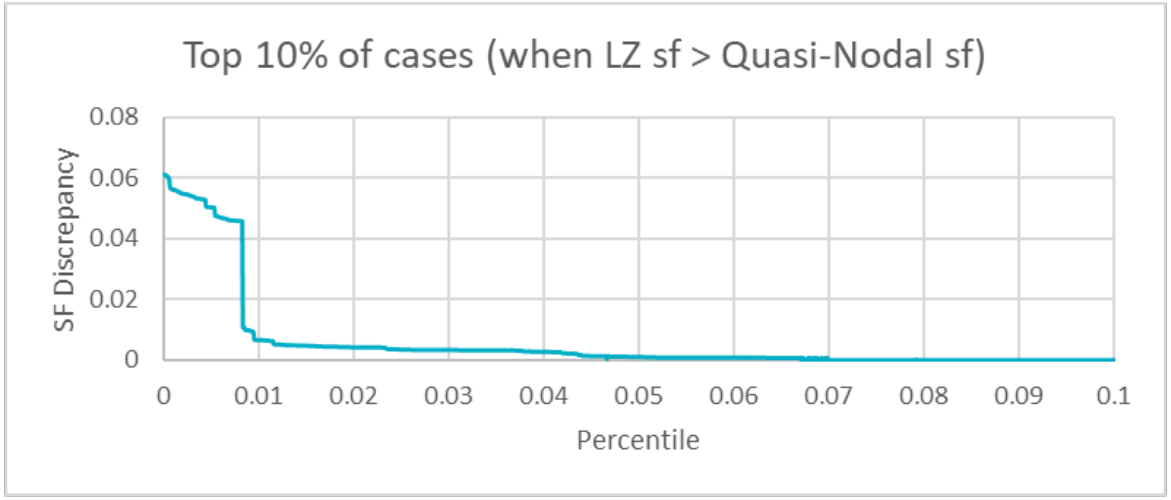
Phase 1 – Hours of Market Participation

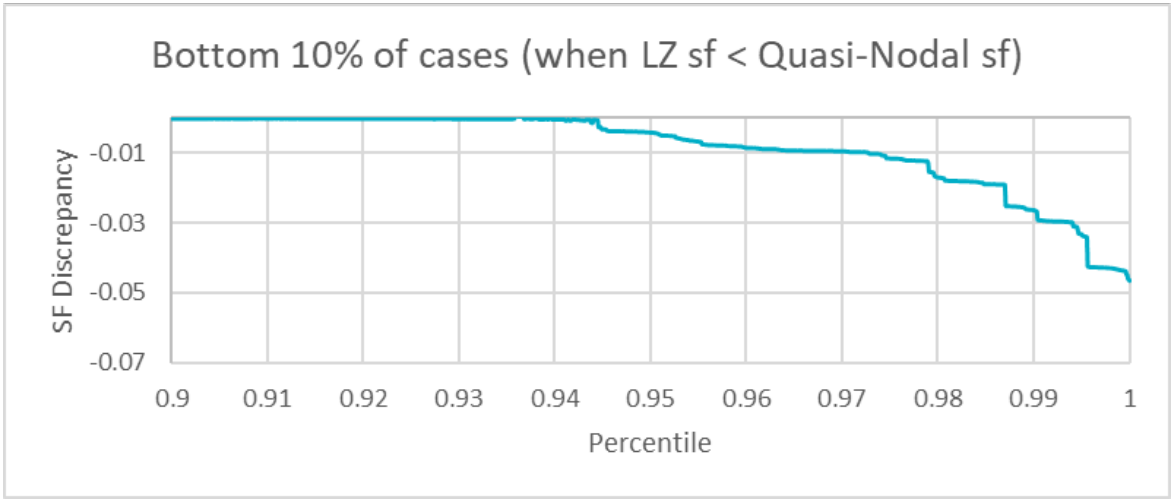
- August ‘23 through January ’24:



Phase 1 – Zonal vs. Quasi-Nodal Dispatch

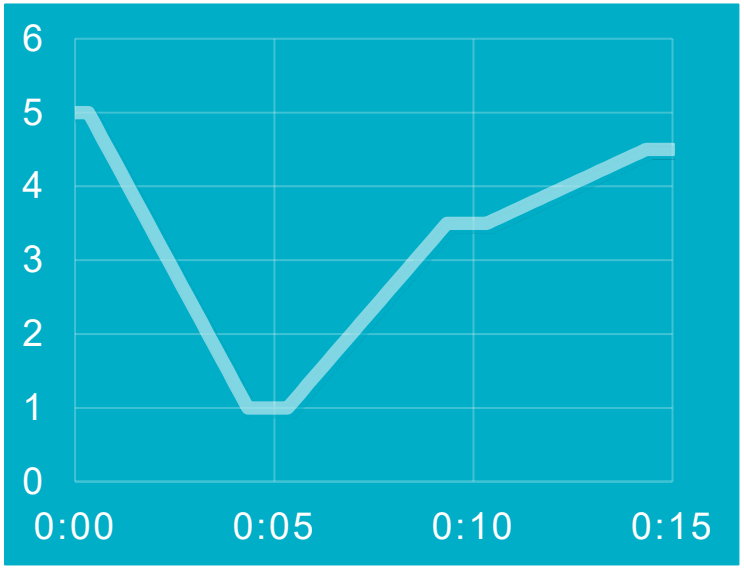
- August ‘23 through January ’24 (1 of the ADERs):





Major Challenges Being Raised by Interested Parties

- Ability to follow smooth, 5-minute dispatch.
- Duration requirements for the Ancillary Services allowed under the pilot.
  - Note: Batteries are the primary technology making up these aggregations thus far.



- Frequency of communication between devices, aggregator control systems, and ERCOT's systems.
- Lack of interoperability standards.
- Requirement that the entity representing the ADER also be the entity representing the customer.