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MEMORANDUM

FROM: Jason M. Ryan, ADER Task Force Chair
Arushi Sharma Frank, ADER Task Force Vice-Chair

RE: Project No. 53911, *Aggregate Distributed Energy Resource (ADER) ERCOT Pilot Project*

DATE: August 29, 2022

On August 26, 2022, the ADER Task Force held a workshop regarding Aggregated Load Resources (ALR) and Energy Storage Resource (ESR).

The following attached material was presented:

- ERCOT, Overview of Requirements for Aggregated Distributed Energy Resource (ADER) Participation in Phase 1 of the ADER Pilot Project
- P-Watt Advisers, Aggregate Distributed Energy Resources (ADERS): Participation model discussion and characteristics shared with ALRs and ESRs

Any questions regarding the ERCOT presentation may be directed to Dave Maggio at David.Maggio@ERCOT.com. Any questions regarding the P-Watt Advisers presentation may be directed to Paul Wattles at pwattles@gmail.com.

A recording of the workshop is available at: <https://youtu.be/h9YqIIIaY04>.



Overview of Requirements for Aggregated
Distributed Energy Resource (ADER)
Participation in Phase 1 of the ADER Pilot
Project

Texas PUC ADER Task Force Workshop
August 26, 2022

ALR Requirements vs ADER Requirements

- For phase 1 of the pilot, ADERs will leverage the existing ALR participation model as much as possible.
- The design and implementation of ALRs was for aggregations and sites within the aggregation that were demand response only (e.g. loads that will reduce consumption) not intended for aggregations and sites within the aggregation that export.
 - ADER pilot will expand the ALR concept to allow sites within the aggregation to export as long as the aggregation is always a net load to the grid
 - To meet this requirement if the population includes sites that export, ERCOT is considering either allowing the QSE for the ADER to:
 - (a) include other loads to always make the aggregation a net consumption, or
 - (b) apply an off-set to the COP and telemetry submittal.
 - This is still under review.
- Similar to the ALR, the population of sites for the ADER must be provided to ERCOT (excel spreadsheet provided by ERCOT)
 - The QSE may add or subtract Premises from an ADER at any time. The QSE shall update appropriate telemetry values when a change is made to the population,
 - QSEs shall report to ERCOT its ADER population changes on a monthly basis via excel spreadsheet.

ALR Requirements vs ADER Requirements

- Telemetry per ADER to be provided by QSE to ERCOT
 - As required by section 6.5.5.2 (5) Operational Data Requirements and the Nodal ICCP Communications Handbook
 - Either premise-level or device-level telemetry will be allowed during the pilot.
 - Which one the QSE decides to provide will be up to them but ultimately the telemetry must pass some level of validation.
 - Telemetry for an ADER cannot use a combination of premise and device-level
 - Validating device-level telemetry will be explored during phase 1. Subsequent phases will depend on the results of the analysis.
 - Device-level telemetry validation rules (step 1) as defined for ALRs, will not be a requirement for ADERs.
 - Net Power Consumption (NPC) to be validated using the aggregate of the premise-level 15-minute interval meter data
 - For period being evaluated 90% of the 15-minute aggregate NPC values must be within 10% of the resource-level interval meter data
 - Scheduled Power Consumption (SPC) should closely match the NPC in the absence of SCED basepoint instruction
 - SPC+2 will not be required

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ALR Requirements vs ADER Requirements



- Unlike ALRs, ERCOT will not attempt to baseline the ADER for purposes of evaluating its predictability. This evaluation is used for ALRs so that the baseline can be used as an additional audit process for performance evaluation.
- Upon meeting all application, registration and technical requirements as an ADER the QSE and ADER must be SCED qualified and if providing Non-Spin must also pass Non-Spin qualification test


ALR Requirements vs ADER Requirements

- Once the aggregation has met the requirements of an ADER, the resource will be treated as a Controllable Load Resource in ERCOT systems
 - QSE must register the CLR
 - Performance in accordance with 8.1.1.4.1(4) Regulation Service and Generation Resource/Controllable Load Resource Energy Deployment Performance (CLREDP)
 - CLREDP is a performance metric comparing the resource's Average Telemetered Power Consumption (NPC) for every 5-minute clock period to its Average Base Point instruction
 - For the pilot, ADERs will not be required to provide Primary Frequency Response
- 15-minute Interval data (ESI ID data or the equivalent in NOIE territory) required for all sites in the aggregation
- For those sites with export capability the meters must include DG profile so that the export channel is provided to ERCOT
- Unlike ALRs, Statistical Sampling as an alternative to interval metering at each site will not be allowed during the pilot project
- Other requirements for ADERs TBD

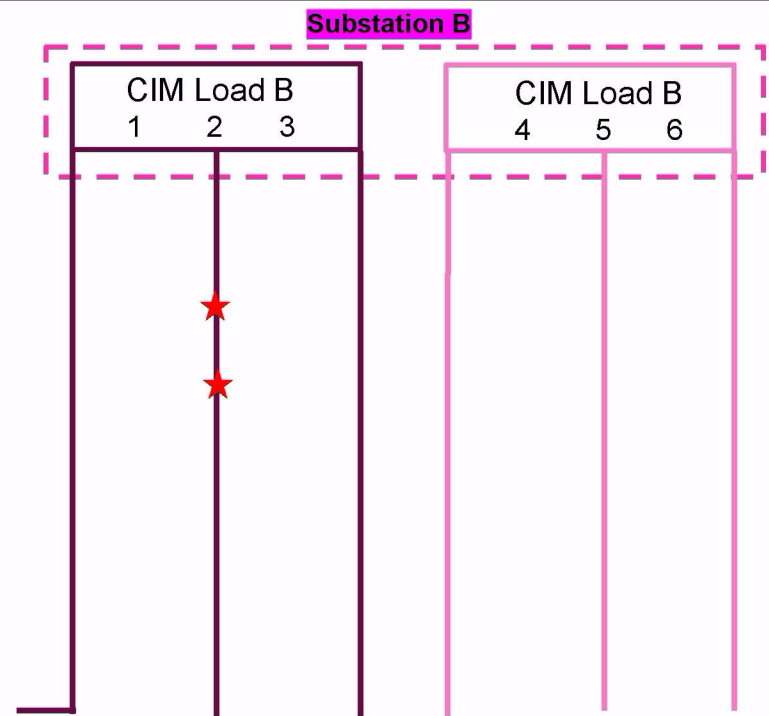
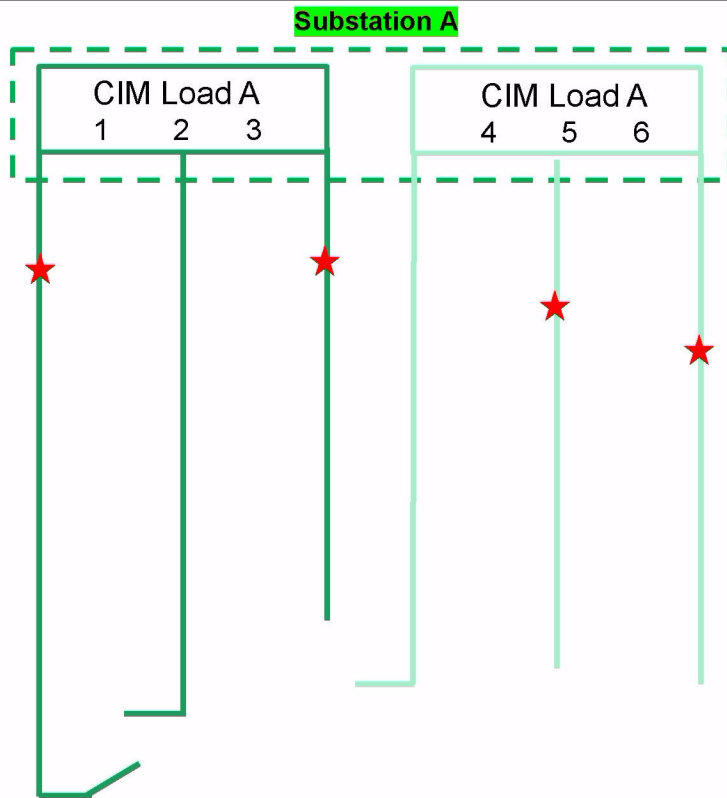
Background and Terminology

1. **ALR:** “Aggregate Load Resource” -- as defined in current protocols:
 - a) All individual sites of the ALR are always net load and the ALR is always a load.
 - b) Examples: Sites with thermostat control, pool pump control, EV charging control (EV never injects), on-site back-up power that reduces the load (but never makes the individual site net gen) or on-site back-up power that allows the previse to isolate from the grid.
 - c) An individual metered site that is always net load is shown with a ★.

2. **ADER:** (phase 1): “Aggregate Distribution Energy Resource” -- (per phase 1 of the pilot):
 - a) Option 1: Clumping Approach: Some individual sites can be net gen. “Strategic Clumping” is required to mix net load sites with net gen sites --- so that the ADER is always seen as a net load. Examples include individual sites with batteries mixed with individual sites that are always net load. If duration limited, more information is needed.
 - b) Option 2: Clumping not required but an “OFFSET” is used in the submittals for the ADER. The OFFSET ensures the ADER is always seen as a net load. The Base Point that is sent is a “consumption” value for the ADER, but the sum of the individual sites can be net gen (but is seen as less load by ERCOT). Example An aggregation of individual sites with batteries. If duration limited, more information is needed.
 - c) An individual metered site that could be net gen or net load is shown with a . An individual metered site that is load to offset injections at other sites within the ADER is shown with a .

3. **AIWR:** “Aggregate Injection Withdrawal Resource” -- (Future State):
 - a) Individual sites of an AIWR can be net load or net injection (batteries). or sites that only inject or only withdraw. (No clumping or OFFSET needed.)
 - b) All types of devices can be included in an AIWR. The AIWR has an MPC and an HSL. It is a “single model” similar to a battery but could be a mix of devices.
 - c) An individual metered site that is part of an AIWR could be a site with a combination of load control, a battery and/or generation. (The symbol used for an individual site that is part of an AIWR ).

ALR (As Described Currently in Protocols)



∞

★ An individual metered site that is always net load.

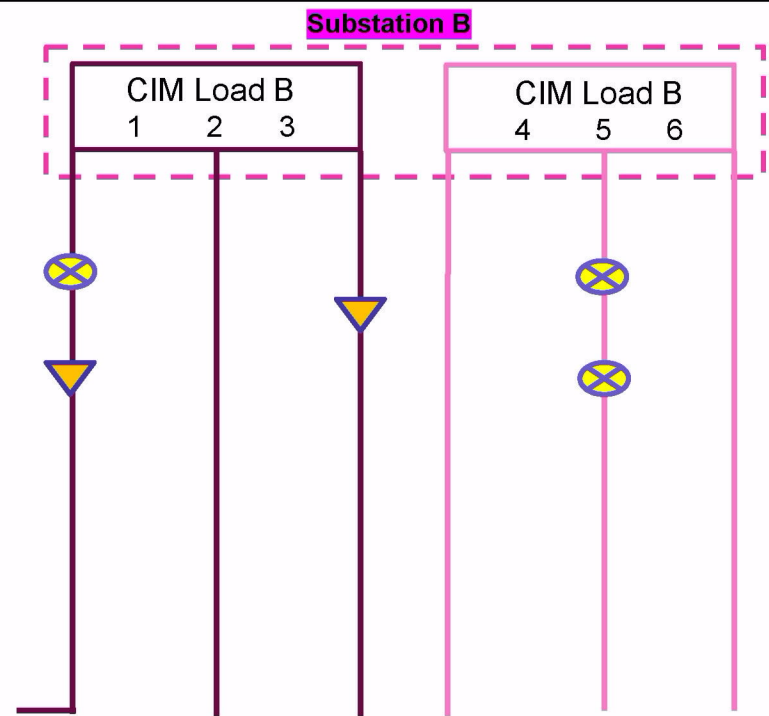
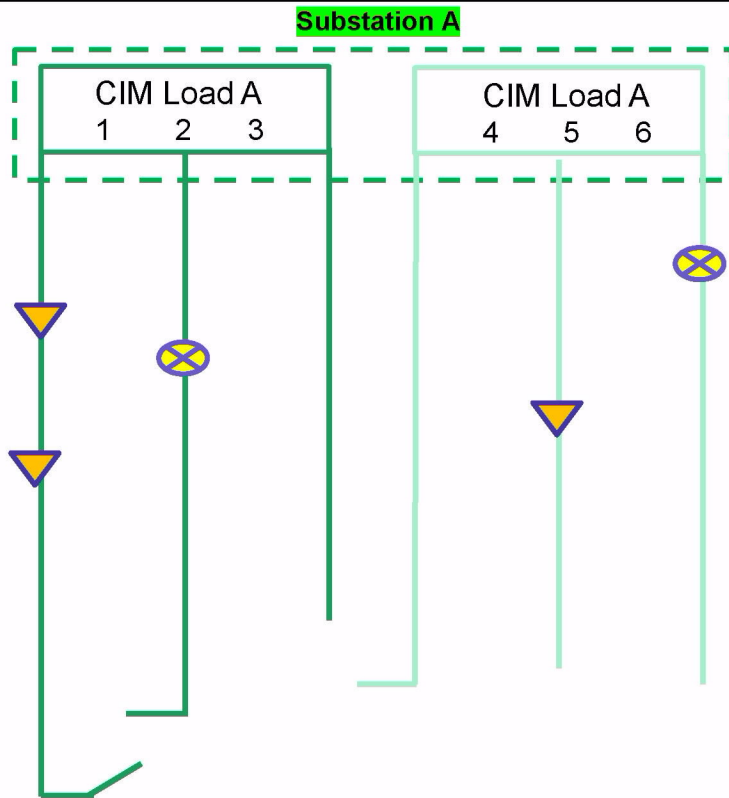
ALR Example Table

Site #	CIM Load	Feeder	Device Range		Current Load	MPC	LPC
			mpc	hsl			
1	A - 123	1	3	0	10	10	7
2	A - 123	3	5	0	10	10	5
3	A - 456	5	2	0	10	10	8
4	A - 456	6	3	0	10	10	7
5	B - 123	2	3	0	10	10	7
6	B - 123	2	4	0	10	10	6
Total			20	0	60	60	40

						MPC	LPC	Range
ALR						60	40	20

ADER

“Aggregate Distribution Energy Resource (phase 1) and OPTION 1 = Clumping



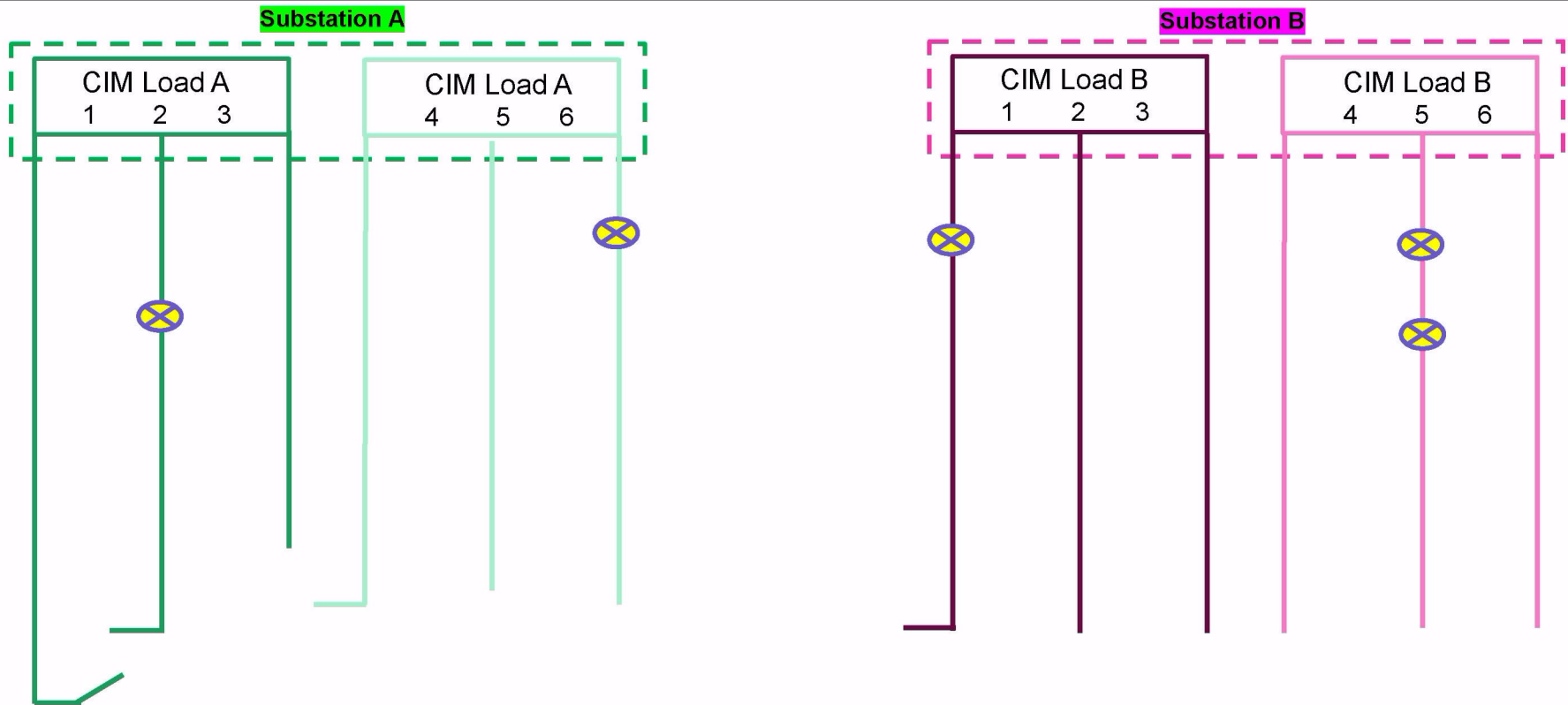
The “ballast” always keeps the ADER a net load. Base Points are always consume “X” kW. There could be individual sites that are net gen.




An individual metered site that could be net gen or net load.
An individual metered site that is that is load to offset injections at other sites within the ADER.

ADER

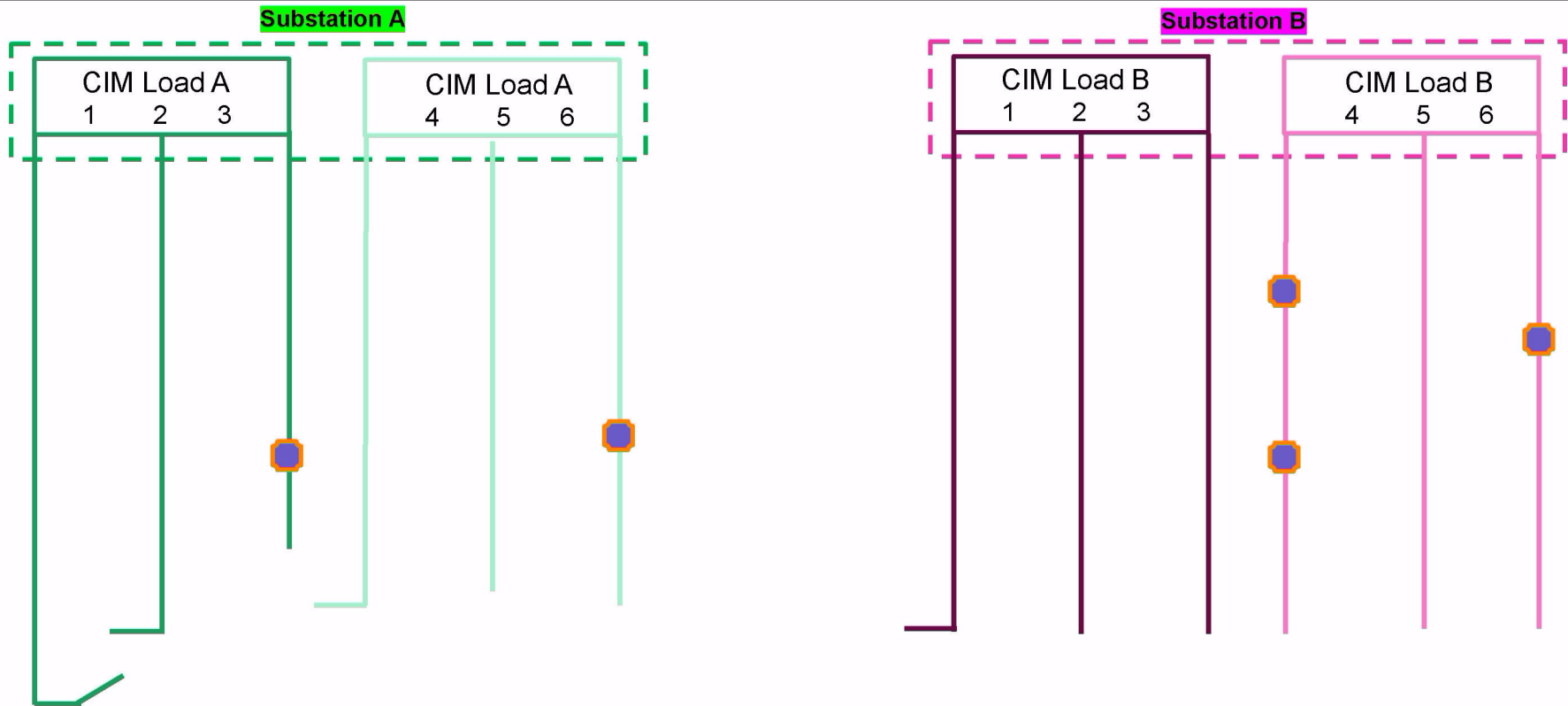
“Aggregate Distribution Energy Resource (phase 1) and OPTION 2 = OFFSET




The “OFFSET” incorporated in the submittal of the MPC and LPC of the ADER ----- will always keeps the ALR seen as a net load to SCED. Base Points are always consume “X” kW for the ALR but for some intervals the “consumption” is achieved with the sum of the individual sites of the ADER being net gen.

 An individual metered site that could be net gen or net load.

AIWR “Aggregate Injection Withdrawal Resource (Future State)”



The AIWR is seen as an Aggregate Resource that can withdraw and/or inject. The Base Point sent to the “single model” is based on the offer to sell and the bid to buy and can be a Base Point to consume or a Base Point to inject. There is no clumping or OFFSET required.

 An individual metered site that is part of an AIWR. It could be a site with a combination of load control, a battery and/or generation.

Aggregate Distributed Energy Resources (ADERs)

Participation model discussion
Characteristics shared with ALRs and ESRs

ADER Pilot Workshop
Friday, August 26, 2022

Paul Wattles
Principal, P-Watt Advisers

Topics

1. ALR Parallels

- a. Aggregation membership constraints (LSE/QSE, LZ, TDSP)
- b. CLR parallels (PFR/SCED)
- c. Changes to ADER population management

2. ESR Parallels

- a. SCED qualification and participation: Bids/Offers

3. Telemetry

- a. 2-second ICCP
- b. Premise level
- c. Device-level

ALR Parallels

- Aggregations are constrained by:
 - Represented by same LSE and QSE
 - Must be located in same Load Zone
 - Assumption is that this applies to NOIE Load Zones as well as competitive choice areas
 - Must be located in same TDSP service territory
 - This is an additional constraint; does not apply to ALRs
 - Assumption is that ADERs must be qualified for SCED and Primary Frequency Response, similar to CLRs
 - Pilot should be willing to contemplate whether this should apply to all ADERs
 - Changes to ADER population to be managed same as those for ALRs
 - QSE updates telemetry in real time to reflect ADER composition
 - QSE sends monthly updates to ERCOT

ESR Parallels

- A fundamental difference between ADERs and ALRs is that an ADER can go positive to the grid at the aggregation level
 - ALRs must always be a Load
- ADERs in this way (will eventually) resemble Energy Storage Resources (ESRs)
- ESRs participate in SCED as follows:
 - Submit Real-Time Market Bids to Buy (up to specified price) for withdrawals
 - Submit Real-Time Market Offers to sell for energy injections (when ADER is net-positive at the aggregate level)

Telemetry

- As is required for all Resources, QSEs representing ADERs must provide ERCOT with 2-second telemetry using ICCP protocol
 - Data points TBD, but will likely mimim those for CLR_s and ESR_s, as listed in Nodal Protocols 6.5.5.2
- This is not arguable....it's part of grid ops

Telemetry

- The question is whether the telemetry that is used by ERCOT as the primary source for performance evaluation should reflect:
 - Premise-level data, or
 - Device-level data
- ERCOT's Aggregate Load Resource rules specifically allow device-level telemetry to fill this role
- In an ADER, it's going to be the devices that are the workhorses
 - Example: batteries providing the response to SCED Base Point instructions
- The rest of the 'load' in the ADER is not going to be responding to ERCOT instructions

Telemetry

- What happens if premise-level data is the primary source for performance monitoring?
- An ADER may (in fact may likely) be composed in large part of premises (homeowners, small businesses) who have:
 - Behind-the-meter storage
 - Solar panels
 - Possibly, EV charging
- All of the above will be 'noise' when evaluating premise-level data
- Even if the 'devices' are responding perfectly, the response can get lost in the noise

Telemetry

- Device-level telemetry should be the primary data source for performance evaluation
 - The devices are the workhorses
- QSEs could provide premise-level telemetry data as a secondary source for performance monitoring
 - If something seems out of whack – if premise-level data indicates that the service was not being provided – further investigation may be needed

Telemetry

A final note:

- If a QSE prefers being evaluated on premise-level telemetry --- no problem!
 - This is also part of existing ALR rules at ERCOT