Overview of Demand Response in ERCOT

Kenan Ögelman
VP, Commercial Operations, ERCOT

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Various categories of Demand Response

Administered by ERCOT

- ✓ Load Resource Participation in ERCOT's Ancillary Services and Real-Time energy market
- ✓ Emergency Response Service (ERS)

Non-ERCOT Administered

- ✓ TDSP Load Management Programs
- ✓ 4-Coincident Peak (CP) Load Reduction
- ✓ Price-responsive Demand response
- ✓ Distributed Generation Price Response

Demand Response (administered by ERCOT)

Load Resource Participation in ERCOT's Ancillary Services and Real-Time energy market

- Controllable Load Resources (CLR) – Load Resources capable of following SCED base points
  - 6 CLRs ≈ 300 MW of registered capacity
  - Does not include Energy Storage (charging CLRs)
- Non-Controllable Load Resources – Blocky loads with both a 10-minute ramp capability for manual deployments and automatic deployment through Under Frequency Relay
  - 600+ Load Resources with ≈ 7,000 MW of registered capacity
  - General observation across Summer Peak
    - Willing Participation (Offers+Self Arranged) ≈ 3,100 MW
    - Actual Participation (Awards+Self Arranged) ≈ 1,380 MW
    - Available Quantity from Willing Participation ≈ 1,720 MW

Demand Response (administered by ERCOT)

Emergency Response Service (ERS)

- 4 ERS service types (Non-Weather Sensitive-10, Non-Weather Sensitive-30, Weather Sensitive-10, Weather Sensitive-30)
- Currently 3 four-month Standard Contract Terms (SCT) per year
  - December 2021, changing to 4 SCT's per year
- Procure 8 time periods per SCT
- $50 Million/yr spend limit
- ≈1000 MW and 24,000+ sites are typically participating
- Only procure Weather Sensitive types during peak time periods during Winter and Summer Standard Contract Terms

TDSP Load Management Programs

- Programs administered by the 4 Transmission and Distribution Service Providers (Oncor, CenterPoint, AEP, TNMP)
- Programs are available:
  - Weekdays only from June 1 through September 30
  - Between the hours of 1 p.m. to 7 p.m.
- Historically ≈ 250-350 MW available
- 2021 estimated at:
  - 303 MW Jun-Jul
  - 324 MW Aug-Sep
- Deployed through ERCOT instruction during Energy Emergency Alert Level 2

4-Coincident Peak (CP) Load Reduction

- The Four Coincident Peaks in ERCOT are the highest-Load 15-minute settlement intervals in each of the four summer months (June, July, August, September)

- Current estimated value of 1 MW 4CP load Reduction for a Transmission connected IDR customer on Oncor's system ~$38,000

4CP Days

Date	ESIIDs	NOIEs	HE 17 Reduce MW
8-Jun	3,711	20	1,880
13-Jul	3,429	19	2,765
13-Aug	3,691	20	2,416
1-Sep	5,200	20	2,803

NearCP Days

Date	ESIIDs	NOIEs	HE 17 Reduce MW
5-Jun	3,771	12	912
9-Jun	4,812	18	1,961
1-Jul	3,691	20	1,148
2-Jul	3,940	10	1,472
8-Jul	2,542	8	722
9-Jul	2,934	13	1,135
10-Jul	3,455	12	1,324
14-Jul	2,863	18	1,399
6-Aug	2,837	13	1,495
7-Aug	3,462	13	1,479
10-Aug	3,783	18	1,642
11-Aug	3,754	20	1,980
12-Aug	3,690	19	2,358
14-Aug	3,804	21	2,590
28-Aug	3,432	17	2,275

*The 4-CP days in the tables above are from 2020

REP/NOIE Demand Response + 4CP

- September 1, 2020 – Largest system wide DR response in 2020 - 2860 MW
- 4CP day with high prices in South Zone only
  - High price > $200
- Greatest contributor was 4CP response

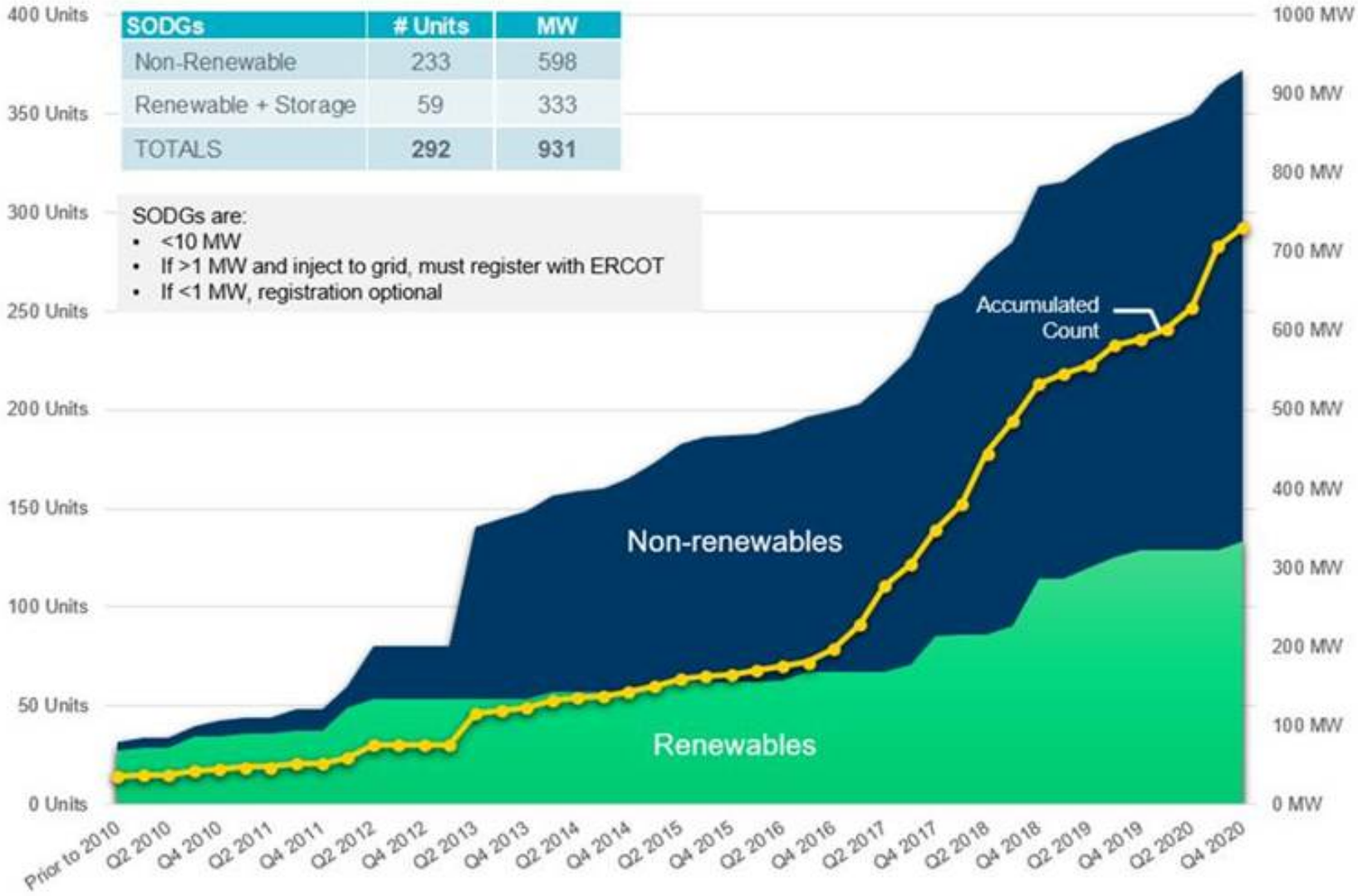
Day	Day Type	Total System DR	4CP Competitive	4CP NOIE	Indexed Real-Time (IRT)	Indexed Day-Ahead (IDA)	NOIE Price Response	Peak Rebate (PR)	Other Direct Load Control (OLC)	Category Total	Overlap
1-Sep-20	4CP, High Prices (South)	2,860	1,355	1,448	65	-	967	0	41	3,876	1,015

Observation: High price days rarely occur on 4CP days during years with greater reserve margin

Settlement-Only Distributed Generation in ERCOT 2010-2020

SODGs	# Units	MW
Non-Renewable	233	598
Renewable + Storage	59	333
TOTALS	**292**	**931**

SODGs are:
- <10 MW
- If >1 MW and inject to grid, must register with ERCOT
- If <1 MW, registration optional



FERC Order 2222

- This rule enables DERs to participate alongside traditional resources in the regional organized wholesale markets through aggregations, opening U.S. organized wholesale markets to new sources of energy and grid services.
- This rule also allows several sources of distributed electricity to aggregate in order to satisfy minimum size and performance requirements that each may not be able to meet individually.
- ERCOT has implemented rules pertaining to Distributed Generation separately from Demand Response
- ERCOT is closely monitoring development in other regions

Key Issues for Demand Response

- Price Responsive Demand Response misaligned with local reliability objective
  - Demand Response today responding to Zonal price versus Locational Marginal Price (LMP) signal
  - Demand Response can play more effective role in resolving local reliability issues
  - Misalignment may be exacerbated by sharp increases in localized loads (e.g., construction of large data mining facilities)
- 4-Coincident Peak (CP) Load Reduction
  - Historically, Peak Load hours and energy scarcity hours coincided
  - Scarcity hours in summer continue to shift from *Peak Load hours* to *Net-Peak Load hours,* which raises a question about the long-term efficacy of 4-CP Load Reduction
- Explore removal of 60% limit on Load Resources providing RRS
  - Requires NPRR
  - NPRR939 implementation needed to stagger NCLR Load Resource deployment
  - Minimum 1420 MW of RRS requirement will continue to remain

Recent Demand Response Developments

- Enable NCLRs to participate in Non-Spin
  - NPRR1093 Load Resource Participation in Non-Spinning Reserve has been submitted
- ERCOT Contingency Reserve Service (ECRS) implementation will enable more Load Resource participation
  - Current implementation schedule is post EMS Upgrade
- Implement NPRR939 to allow ERCOT to deploy Load Resources providing Responsive Reserve Service in multiple ~500 MW tranches
- Aggregated Load Resources
  - Recent interest from DR providers to aggregate residential or commercial loads like A/C or water heaters to provide Ancillary Services
  - Interest also includes adding rooftop PV & batteries
  - Most significant issues are around validation rules for performance and size of aggregation

Thank You!