Filing Receipt

Received - 2021-08-02 09:49:03 AM
Control Number - 51812
ItemNumber - 230

Aspire Power Ventures, LP

August 2, 2021

Public Utility Commission of Texas
William B. Travis Building
1701 N. Congress Avenue
7th Floor
Austin, Texas 78701

Re: Project No. 51812, Issues Related to the State of Disaster for the February 2021 Winter Weather Event

Dear Commissioners:

On July 21, 2021, Aspire Power Ventures, LP ("Aspire") filed a letter supporting South Texas Electric Cooperative Inc.'s ("STEC's") recommendation that the Commission retain an independent third party consultant to provide a thorough external review of how the ERCOT market could be improved. While that independent consultant should conduct its own review and draw its own conclusions regarding ways to improve the market, all Texans should seek to assist in that process. With that imperative in mind, attached are three recent analyses performed by Aspire in order that they be shared with others who seek to improve the ERCOT market and its ability to serve consumers with reliable and reasonably priced power.

Aspire has identified several instances where generation has been "off" and not participating in the ERCOT market, leading ERCOT to rely on Reliability Unit Commitment ("RUC") to bring that same generation online. The purpose of the RUC process is to provide ERCOT with a mechanism that can ensure enough capacity is available for the grid to be operated reliably. In a perfect world, ERCOT would never have to use this tool. That is, in a perfect world, ERCOT would never have to exercise the command-and-control authority of committing generation. As a general rule, when ERCOT is required to commit generation for reliability purposes, the action represents a failure of the market, *i.e.*, a failure of either the market design or the way in which the market is being operated. While it is a valuable tool for maintaining reliability, RUC's use should be infrequent. A generating facility that is not on outage and is capable of running but which chooses not to participate – at whatever price in either the Day Ahead or Real Time Markets –is a significant cause for concern. Every time this occurs, somebody at the Commission, ERCOT, and/or the Independent Market Monitor ("IMM") should be asking why. This is not to say that there are not legitimate reasons why a generator may choose to withhold its power, but the question of why should, indeed must, be asked and promptly answered. Any market in which suppliers voluntarily and consistently choose to withhold production – *at any price* and absent a technical reason–is not a well-functioning market. The central question is why would a generator that is fully capable of running (and in most instances does run when committed by ERCOT) voluntarily choose to not participate? The worry for the market is that it is in the generator's commercial interests not to offer into the ERCOT system. That is, when a plant chooses not to participate in the ERCOT administered markets despite being fully capable of profitably running, they may be doing so for even more extraordinary profits from alternative sources. Since a generator does not get paid for electricity it does not produce, withholding power by not participating in the physical market necessarily means it will lose revenue, unless the effect of increasing the price – *in any market* - offsets the decrease in revenue from selling less electricity.

The markets administered by ERCOT are important components of the integrated commercial environment that consists of, among other things, the forward market, the futures market, and the physical spot market. It is only in the physical spot market that the actual, "real" price of electricity is determined. The futures market uses this price to clear its positions. Prices in both the forward market and the futures market prior to clearing are simply expectations of the real time spot price. Thus, the spot price is the single most important price and any action that affects either the expectation of this price or the actual price itself will necessarily affect revenues received by generators both from selling physical electricity, as well as from participating in either the forward or futures markets. It is not by accident that generators are pursuing the "gentailer" business model, *i.e.*, the vertical integration of generation and retailing, with such zeal. The higher the price of wholesale electricity, not only is it more expensive for retailers without generation to compete, but more importantly the higher the price of electricity to consumers.

The first of the attached analyses focuses on operational and bidding abnormalities that occurred in April, 2021. In particular, this analysis observes numerous instances where generators opted to be "off" even though, based on their implied heat rates, they would have profited from participating in the ERCOT Day-Ahead Market ("DAM") and Real-Time Market ("RTM"). In many instances, these "off" units were RUC'ed by ERCOT in April, driving up the cost of wholesale power incurred by Texas consumers. Disturbingly, ERCOT was forced to issue a conservation notice requesting that Texas consumers reduce their energy consumption due to worryingly low expected generation.

The second analysis includes June as well as the April experience addressed by the first analysis. The June experience strongly resembled that of April. Curiously, generators chose not to bid into the ERCOT market even though prices were high enough for profitable operation. The ERCOT wholesale model is premised on the competitive, free market expectation that all participants will seek to maximize profit within the ERCOT market itself. Our analyses suggest that this expectation is not always fulfilled. Especially in and around the periods where ERCOT called for conservation, many generating units, which would have profitably run under normal bidding practices, were RUC'ed and received even higher payments. As with the April example, this activity artificially increased the prices paid for power.

The third analysis focuses on the June RUC data, which puts the observations from the first two analyses in even more stark relief. Incredibly, more than half of the RUCs called by ERCOT in the past five years have occurred in the past three months (April-June). ERCOT's significantly more conservative procurement policies may explain some of this increase, but additional explanations seem likely. Based on the historic performance of generators, we estimate that approximately 65% of the RUC'ed units could have run profitably at ERCOT DAM clearing prices, but those units decided to remain in off status and ran only when RUC'ed.

The overuse of RUC creates unintended consequences. For example, RUC'ed units are not subject to the voluntary mitigation plans ("VMPs") that the Commission has approved to address market power concerns. As we look at needed market reforms, the interplay between RUC and VMPs should be part of the consideration. Additionally, holding generation out of the market in anticipation of being RUC'ed adversely affects the ability for retailers to hedge because it distorts futures prices. This price movement likely has contributed to higher margin rates, making it materially more difficult for small generators or market participants to properly hedge. For example, after the April and June distortions, on June 21, 2021 the margin rate for the June 2021 Intercontinental Exchange ("ICE") Futures contract jumped 545% from $14.45 to $93.17 per MWh; the rate for the July 2021 contract jumped 205% from $14.81 to $45.22 per MWh; and the rate for the August 2021 contract jumped 360% from 8.93 to 41.04 per MWh.

In the most significant change, on June 21, 2021, the margin rate for June 15, a day that had already settled in real-time, increased from $114/MWh to $558/MWh. The 16-hour average load over the peak was 60,234 MW that day. Assuming 50% of ERCOT is hedged, and hedge margins would be tied to ICE margin rates and ERCOT volatility, 481,872 MWh would have been hedged at $558/MWh, resulting in $268.9M in credit posting. Because both sides of the trade are required to post margin, this results in $537.9M in credit being posted by market participants for a single day of exposure.

This margin rate applies to all market participants hedging on ICE, long or short, so it affects REPs, generators, and speculators alike. This creates a chaotic, unaffordable environment for those seeking to mitigate their own risk. The Commission has found that hedged retail products are in the public interest as it has prohibited indexed pricing to the residential and small commercial markets. Wholesale market activities should not be shaped in a manner that unnecessarily impedes retailers from hedging portfolios to match with more fixed-price product offerings.

The impact of Winter Storm Uri illustrates the ripple effects of abnormally high energy prices in the ERCOT real-time energy market. While not of the degree of Uri's effects, the exponential increase in RUCs and the corresponding price hikes ultimately get charged to retailers who eventually must flow the higher costs through their rates. ERCOT will benefit from market improvements that dissuade overuse of RUC and that create significant signals for generators to bid into the DAM and RTM in a manner that reasonably recovers incremental costs. RUC is not intended for frequent use but for occasional reliability needs. We support the call for an independent consultant and encourage ERCOT to take all steps necessary for market reform.

I hope that our analyses can help you in the task of reforming the ERCOT market. It is a major undertaking from which we all will ultimately benefit. Thank you for your service to Texas.

Sincerely,

/s/ Adam Sinn

Adam Sinn

Cc: House State Affairs Committee
Senate Business & Commerce Committee
Governor Greg Abbott
Lieutenant Governor Dan Patrick
Speaker of the House Dade Phelan
Vincent McGonagle, Acting Director of the Division of Enforcement, CFTC

First Analysis

APRIL 2021 ERCOT BIDDING ANOMALIES

- Many planned plant outages (*i.e.*, maintenance, overhauls, etc.) are scheduled in April because of reduced weather-related demand.

- The planned outages reduce the amount of excess generation available on the ERCOT system and makes it more vulnerable to physical withholding.

- Commission Rules and PURA both prohibit withholding.

  - "Each market participant is expected to:… not engage in activities and transactions that create artificial congestion or artificial supply shortages, artificially inflate revenues or volumes, or manipulate the market or market prices in any way." Subst. R. 25.503(e)(3).

  - "For purposes of this section, 'market power abuses' include predatory pricing, withholding of production, precluding entry, and collusion." PURA § 39.157.

- ***Generation offers into ERCOT from April 10-14 showed unusual behaviors not linked to incremental pricing, which may suggest withholding.***

  - *It is not clear why it occurred, but the behavior was odd. A closer look is warranted. Allegations of any violations of PURA or Commission Rules is premature.*

  - *Especially in light of the events related to the February Storm, a <u>public</u> project to examine the April events offers a superior option.*

  - *A public project should include the IMM, the Commission, ERCOT Staff, and anyone else who wishes to participate.*

- Significant amounts of generation was available but offline during the week, even though the prices were high enough to support their operation.

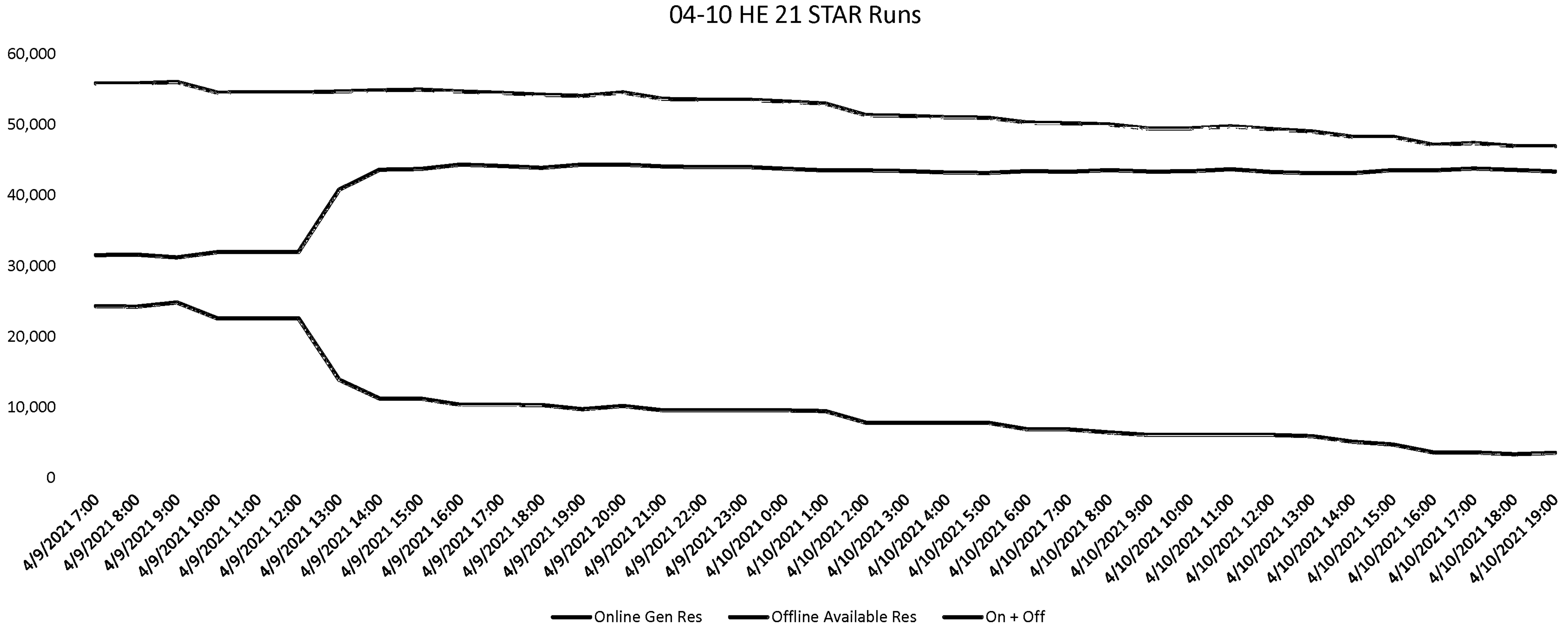
- The significant amount of offline generation led ERCOT to need to RUC units on numerous occasions.

- On April 11, the amount of offline generation caused ERCOT to need to use responsive reserves, which are more expensive than traditionally bid energy.

- RUC'ed units had heat rates low enough to sell into the market without being RUC'ed.

April 10-14 Capacity Analysis

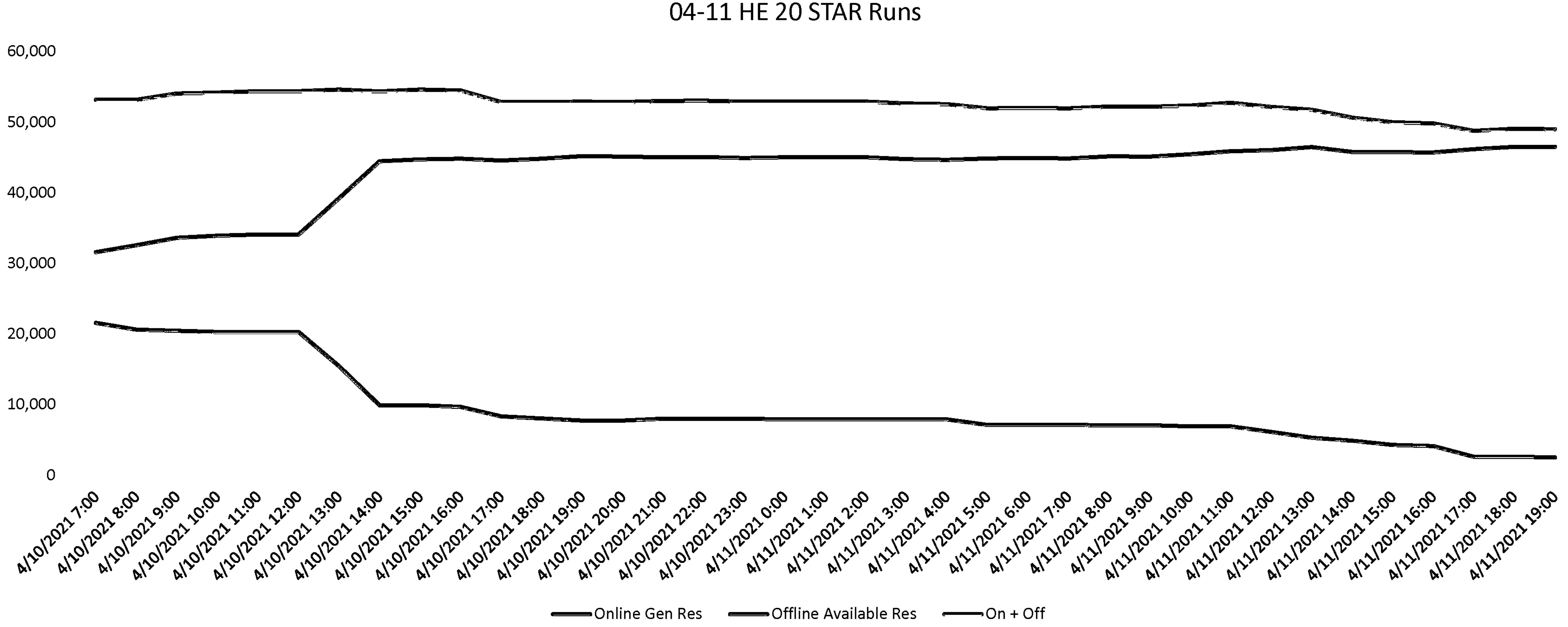
Saturday, April 10



- Weekend North Hub peak traded 40$ on Friday, April 09 on ICE
- ICE Henry Hub cash gas traded ~2.40 for Sat-Mon
- The 15:00 April 9 data showed 43,736 MW of Total Capacity Generation Resources and 11,244 of Offline Available MW
- Data Saturday morning showed similar online MW, even with forecasted load for April 10 HE 21 at 41,263 MW at 09:00

Run_Time	Online Gen Res	Offline Available Res	On + Off	On Change	Off Change	On + Off Change
4/9/2021 7:00	31,545	24,324	55,869			
4/9/2021 9:00	31,225	24,849	56,074	(320)	525	205
4/9/2021 15:00	43,736	11,244	54,980	12,511	(13,606)	(1,094)
4/10/2021 7:00	43,330	6,879	50,210	(406)	(4,365)	(4,770)
4/10/2021 9:00	43,363	6,078	49,441	33	(801)	(769)
4/10/2021 15:00	43,564	4,725	48,289	201	(1,353)	(1,152)

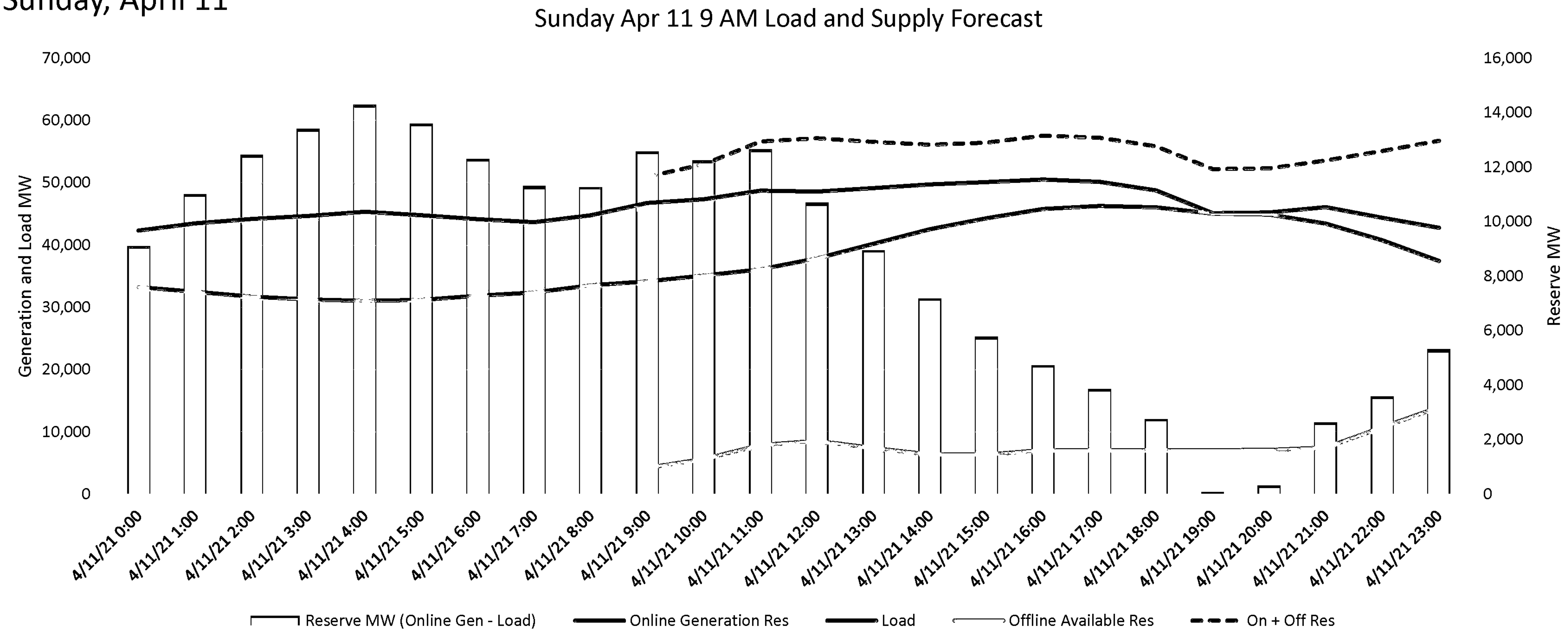
Sunday, April 11



- HB_NORTH Peak (HE 7-22) DA price cleared 39.50
- ICE Henry Hub cash gas traded ~2.40 for Sat-Mon
- ERCOT supply scarcity was evident Sunday morning, but meaningful MW were not added to the schedule until RUC's occurred

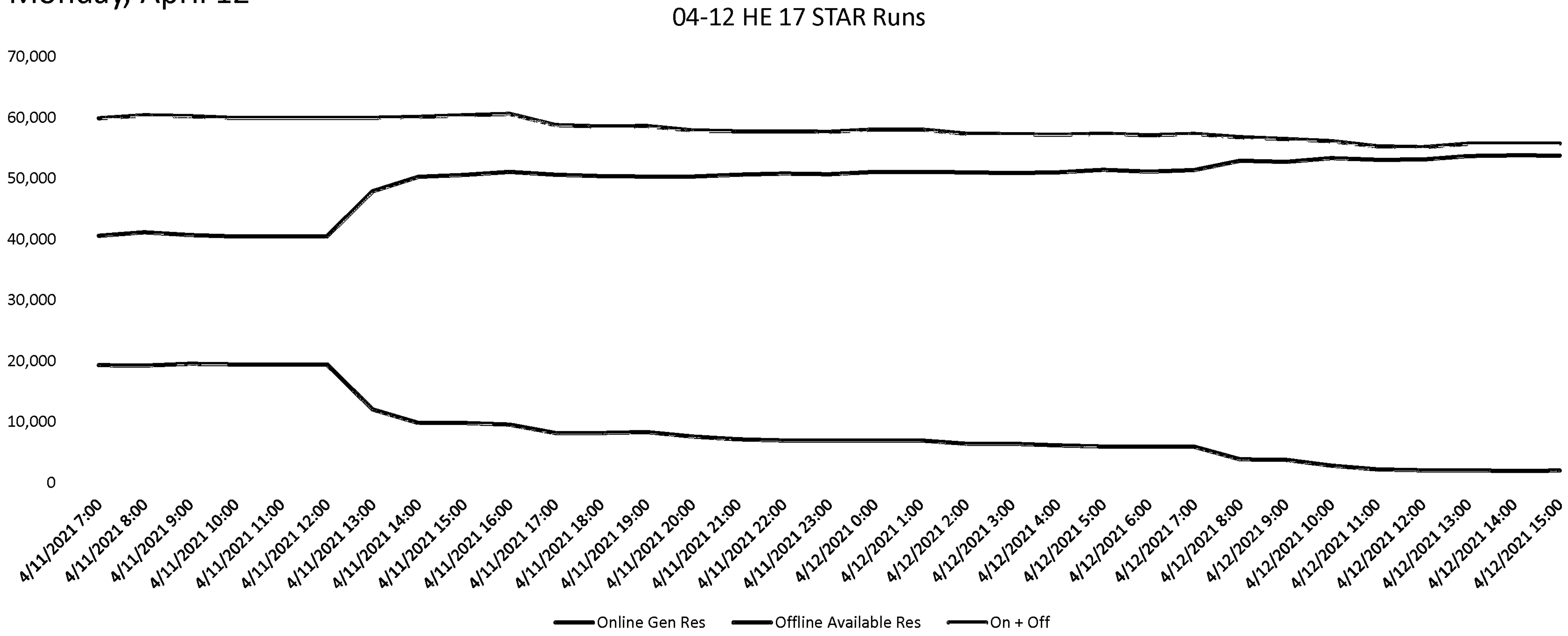
Run_Time	Online Gen Res	Offline Available Res	On + Off	On Change	Off Change	On + Off Change
4/10/2021 7:00	31,589	21,560	53,149			
4/10/2021 9:00	33,618	20,445	54,063	2,029	(1,115)	914
4/10/2021 15:00	44,712	9,882	54,594	11,094	(10,563)	531
4/11/2021 7:00	44,854	7,103	51,957	142	(2,779)	(2,637)
4/11/2021 9:00	45,117	7,072	52,189	263	(31)	232
4/11/2021 15:00	45,725	4,264	49,989	608	(2,808)	(2,201)

Sunday, April 11



- ERCOT supply shortage was evident at 9 am Sunday morning, but only an additional 608 MW were added to the Online Generation Resources COP for HE 20 by 3pm
- ERCOT showed over 7000 MW of offline available gen at 9am on 4/11 for HE 20, which would have supported the grid if turned online
- Responsive Reserve was deployed at 19:21
- Cap w/ Energy Offer Curves avail to Increase Gen Res Base Points in SCED bottomed out at 19:36 at -665 MW, which presented a threat to grid stability
- PRC bottomed out at 2519 MW at 19:32 ERCOT issued an advisory at 19:30 due to PRC being below 3000 MW
- PANDA_T1_CC1_1 was RUC'ed for capacity at 15:03 for HE 17-21
- SILASRAY_CC1_1 was RUC'ed for capacity at 20:03 for HE 22-24

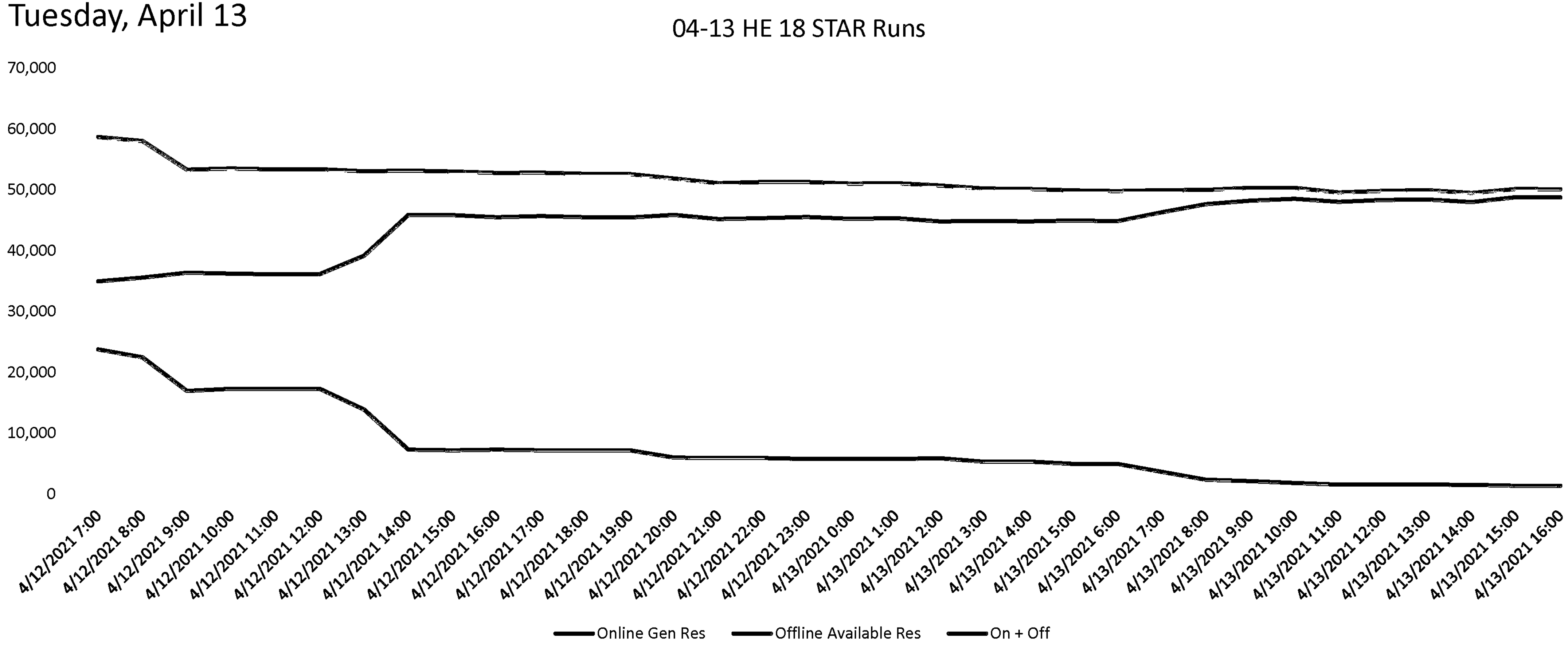
Monday, April 12



- HB_NORTH Peak (HE 7-22) DA price cleared 34.80
- ICE Henry Hub cash gas traded ~2.40 for Sat-Mon

Run_Time	Online Gen Res	Offline Available Res	On + Off	On Change	Off Change	On + Off Change
4/11/2021 7:00	40,620	19,323	59,943			
4/11/2021 9:00	40,709	19,559	60,267	89	235	324
4/11/2021 15:00	50,595	9,827	60,423	9,887	(9,731)	155
4/12/2021 7:00	51,411	5,933	57,344	816	(3,894)	(3,079)
4/12/2021 9:00	52,757	3,763	56,521	1,346	(2,170)	(824)
4/12/2021 15:00	53,788	2,008	55,796	1,031	(1,755)	(724)

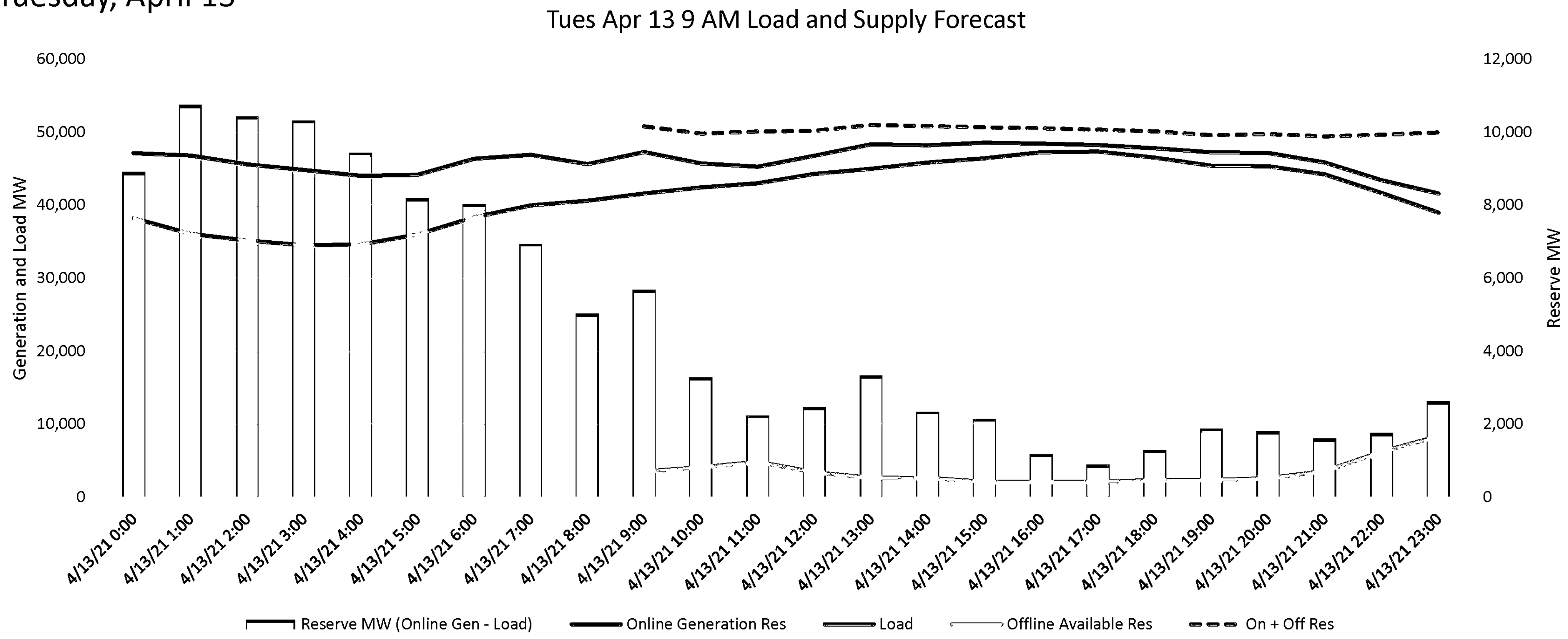
Tuesday, April 13



- 4/13 traded $40 on ICE on Monday morning as the short-term adequacy report showed plenty of MW in online and offline status
- HB_NORTH Peak (HE 7-22) DA price cleared 39.59
- From 07:00 on 4/12 to 07:00 on 4/13 almost 9000 MW of online + offline MW were removed from the operating plan
- ICE Henry Hub cash gas traded ~2.45 for Tues 4/13

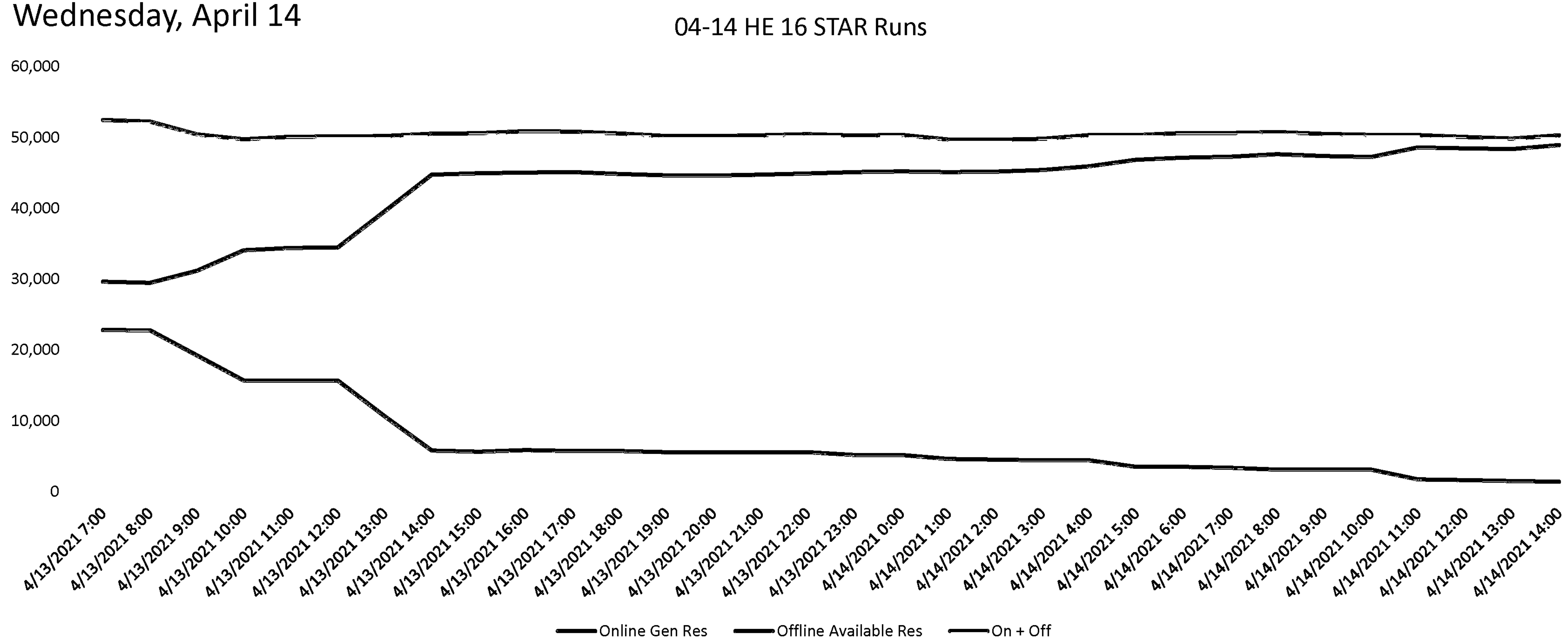
Run_Time	Online Gen Res	Offline Available Res	On + Off	On Change	Off Change	Off + On Change
4/12/2021 7:00	34,940	23,758	58,698			
4/12/2021 9:00	36,377	16,940	53,316	1,437	(6,818)	(5,381)
4/12/2021 15:00	45,846	7,179	53,025	9,470	(9,761)	(292)
4/13/2021 7:00	46,306	3,621	49,927	460	(3,558)	(3,098)
4/13/2021 9:00	48,224	2,096	50,319	1,917	(1,525)	392
4/13/2021 15:00	48,796	1,348	50,144	572	(748)	(175)

Tuesday, April 13



- On April 12 22:06, ERCOT issued the following operations message for April 13: Capacity Insufficiency: ERCOT is issuing an OCN for a projected reserve capacity shortage for hours ending 14:00 through 21:00. ERCOT is requesting all QSE's to update their COPs.
- ERCOT supply shortage was evident at 9 am Tuesday morning, and was addressed with multiple RUC's
- Cap w/ Energy Offer Curves avail to Increase Gen Res Base Points in SCED bottomed out at 19:02 at -304 MW, which presented a threat to grid stability
- PRC bottomed out at 2453 MW at 17:29. ERCOT issued a watch at 17:19 due to PRC being below 2500 MW
- Responsive Reserve was deployed at 15:59; Non-Spin Reserves were deployed at 16:16
- Lake Hubbard Unit 2A, Graham Unit 1, Trinidad Unit 6, Stryker Creek Unit 1A were RUC'ed throughout the day to provide power starting in the early afternoon
- RUCs occurred at 04:03, 06:03, 07:03 08:03, 09:03, 10:03, 18:03, and 20:03

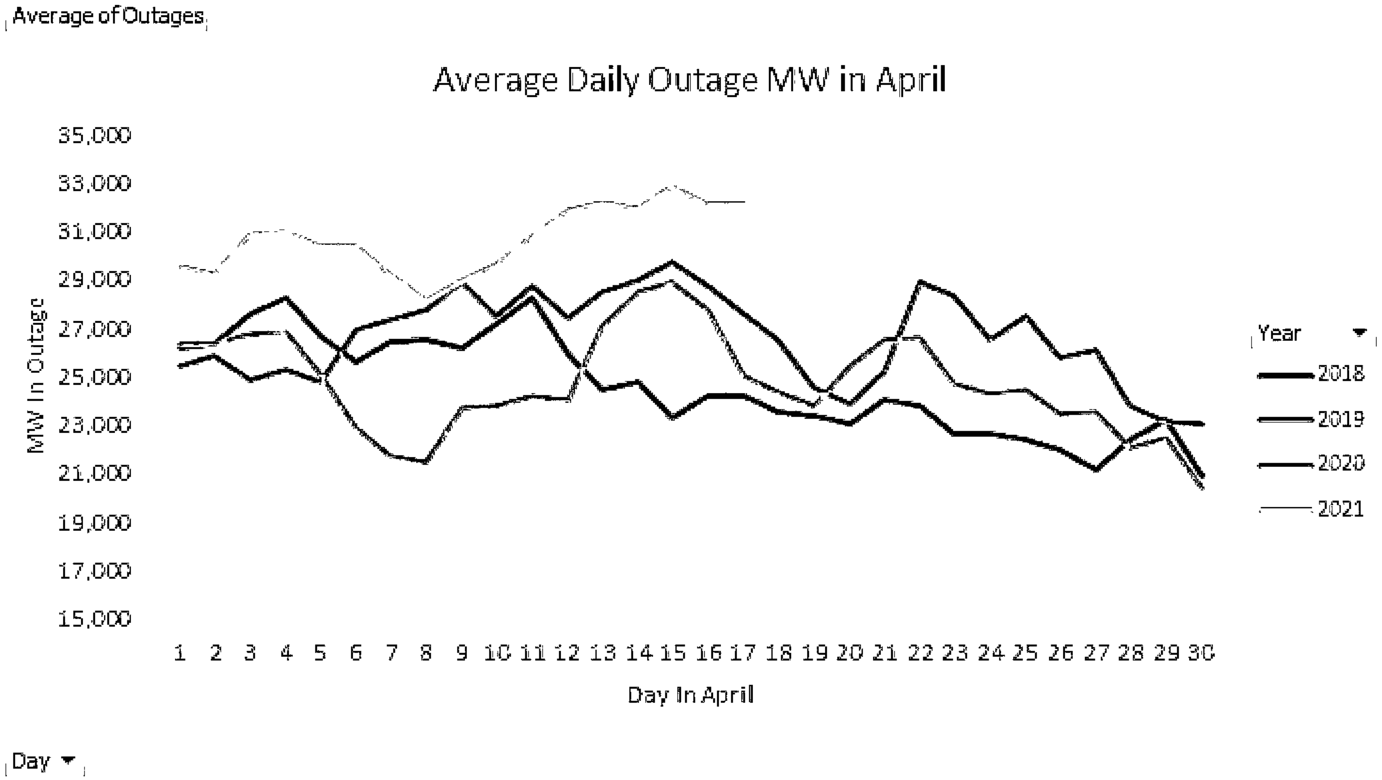
Wednesday, April 14



- HB_NORTH Peak (HE 7-22) DA price cleared 75.00
- ICE Henry Hub cash gas traded ~2.54 for Wed 4/14
- ERCOT Apr 13 22:06 op. message: Capacity Insufficiency: ERCOT is issuing an OCN for a projected reserve capacity shortage for hours ending 13:00 through 20:00. ERCOT is requesting all QSE's to update their COPs.
- Lake Hubbard Unit 2A, Trinidad Unit 6, Stryker Creek Unit 1A, Mountain Creek Unit 8 were RUC'ed throughout the day to provide power starting in the early afternoon
- RUCs occurred Apr 13 22:03; Apr 14 04:03, 07:03

Run_Time	Online Gen Res	Offline Available Res	On + Off	On Change	Off Change	On + Off Change
4/13/2021 7:00	29,657	22,814	52,471			
4/13/2021 9:00	31,205	19,241	50,446	1,548	(3,573)	(2,025)
4/13/2021 15:00	44,965	5,631	50,596	13,760	(13,610)	151
4/14/2021 7:00	47,284	3,359	50,643	2,318	(2,272)	46
4/14/2021 9:00	47,386	3,111	50,497	103	(248)	(145)
4/14/2021 15:00	48,924	1,301	50,225	1,538	(1,810)	(273)

April 2021 showed higher than usual historical outages

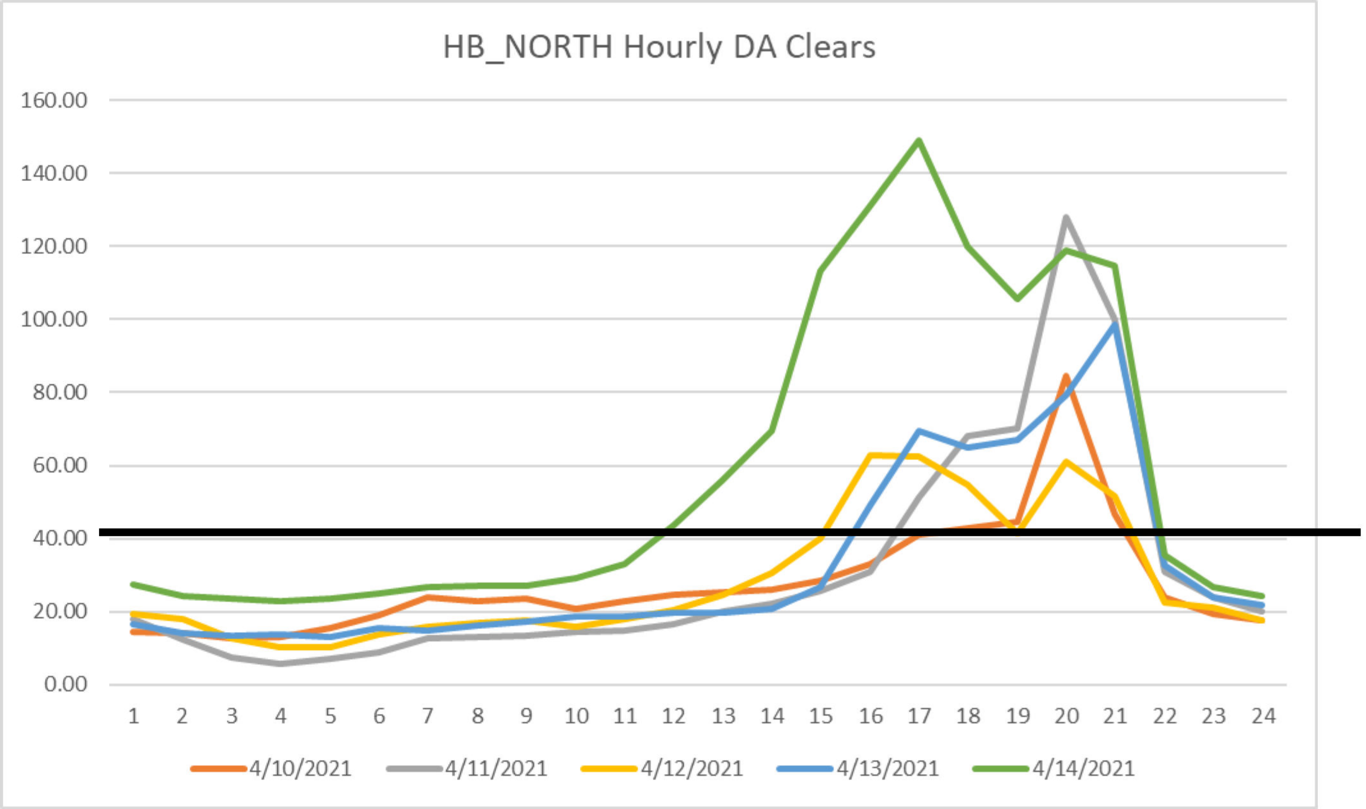


Costs For RUC Units

- SCED 60 day disclosure report provides insight into unit offer curves
- Use Monday, Sep 14 2020 as a case study
- Henry Hub cash gas traded ~2.18 on ICE for the three-day package (Sat-Mon)
- DA HB_NORTH peak cleared $24.26; RT HB_NORTH peak cleared $22.74
- Offer Prices For units (all in OFF status on 09/14/2020)
    - LHSES_UNIT2A offered 538 MW at $22.11
    - GRSES_UNIT1 offered 260 MW at $24.55
    - TRSES_UNIT6 offered 250 MW at $25.96
    - SCSES_UNIT1A offered 192 MW at $26.64
    - MCSES_UNIT8 offered 580 MW at $37.22
    - SILASRAY_CC1_1 offered 42 MW at $27.12
    - PANDA_T1_CC1_2 (a different combined cycle configuration from PANDA_T1_CC1_1) offered 630 MW at $16.75 (this unit was ON/ ONREG all day)

Costs For RUC Units

HB_NORTH Hourly DA Prices					
Hour Ending	4/10/2021	4/11/2021	4/12/2021	4/13/2021	4/14/2021
1	14.39	17.86	19.27	16.67	27.37
2	14.22	12.20	17.81	14.05	24.39
3	12.60	7.42	12.57	13.37	23.52
4	12.87	5.73	10.11	13.84	22.69
5	15.65	6.96	10.41	12.91	23.48
6	19.05	9.00	13.85	15.41	24.88
7	23.89	12.68	16.00	14.91	26.74
8	22.83	13.07	16.93	16.27	27.00
9	23.53	13.33	17.74	17.14	27.00
10	20.61	14.60	16.00	18.60	29.13
11	22.72	14.81	18.05	18.63	32.98
12	24.74	16.71	20.34	19.65	43.58
13	25.22	20.02	24.52	19.61	56.23
14	26.00	22.01	30.46	20.61	69.51
15	28.52	25.60	40.04	26.86	113.13
16	33.17	31.04	62.89	49.00	131.02
17	40.96	51.09	62.30	69.62	148.92
18	42.84	68.01	54.61	65.00	120.00
19	44.43	70.06	41.48	67.10	105.74
20	84.43	127.91	61.11	79.40	119.02
21	46.58	100.05	51.67	98.50	114.55
22	23.90	31.03	22.64	32.55	35.49
23	19.48	23.83	20.97	24.01	26.74
24	17.67	20.12	17.75	21.84	24.27



	Sep14 2020			Apr2021 RUCs	
Unit	HH ICE Cash Gas	Offer Price	Implied HR	HH ICE Cash Gas	Implied Cost
LHSES_UNIT2A	2.18	22.11	10.14	2.54	25.76
GRSES_UNIT1	2.18	24.55	11.26	2.54	28.60
TRSES_UNIT6	2.18	25.96	11.91	2.54	30.25
SCSES_UNIT1A	2.18	26.64	12.22	2.54	31.04
MCSES_UNIT8	2.18	37.22	17.07	2.54	43.37
SILASRAY_CC1_1	2.18	27.12	12.44	2.54	31.60

Highlighted hours above 40$, where most of these gas units that were RUC'ed are very economical to run

Data Summary

					MW During Peak Net Load Hour				9 am Bal-Day STAR for Peak Net Load Hour		
Date	HB_NORTH Peak RT	HB_NORTH Peak DA	Peak Net Load HE	Peak Net Load	Load	Wind	Solar	Outages	Online Generation Resources	Offline Available Resources	On + Off MW
4/10/2021	48.07	33.40	21	37,095	40,783	3,680	9	29,664	43,363	6,078	49,441
4/11/2021	216.64	39.50	20	39,317	45,275	5,174	784	31,882	45,117	7,072	52,189
4/12/2021	64.59	34.80	17	36,814	51,902	10,327	4,760	32,447	52,757	3,763	56,521
4/13/2021	491.75	39.59	18	42,124	48,870	5,061	1,684	32,238	48,224	2,096	50,319
4/14/2021	70.18	75.00	16	39,485	46,539	4,200	2,854	32,286	47,386	3,111	50,497

- Net Load is defined as Load minus Solar and Wind generation
- Useful to identify where greatest thermal generation needs exist

Second Analysis

ERCOT Market Outcomes for April 10-14

Ron McNamara, PhD

On Behalf of Aspire Commodities

Introduction

- Introductions
- Setting the stage:
  - Since the polar vortex in February there has (rightfully) been a lot of attention on specifically electricity in Texas. In particular, there has been a heightened focus on the electricity market (in both the design and operation), ERCOT (in both structure and conduct) and the PUCT (again, in both structure and conduct).
  - The April "shortage" event provided the fuel for another round of questioning.
  - Any electricity markets is a complex puzzle with a lot of pieces. As a result, it can be difficult, if not impossible, to develop an intuitive common-sense understanding of how they work including what is working well and what needs to be changed.
  - At its core the design of the ERCOT market, since implementing nodal pricing in 2010, is based on sound principles and is similar to all other electricity markets in the US, New Zealand, Singapore, Central America, and a number of other regions.
  - That being said, like all electricity markets, the design, operation and oversight of ERCOT have some unique and important features.
- Purpose/Intent:
  - For the past 10+ years we have been daily participants in the Texas electricity market. Our involvement covers the entire spectrum: the futures market (ICE), as well as the ERCOT-administered Day Ahead, Real Time, and Congestion Revenue Rights markets and the retail electricity market in Texas.
  - We are independent.
  - Based on our experience we strongly believe that for quite some time the Texas electricity market has been – and continues to be – manipulated during certain periods/intervals.

Prices in ERCOT – Stepp 1

- We begin with an explanation and discussion on "price" because any market is only as good as the price that it creates.
- The theoretical benchmark for evaluating a price is marginal cost. In theory, price equals marginal cost is perhaps the most important attribute of a competitive equilibrium from the perspective of welfare maximization.
- There are two types of prices in the ERCOT electricity market.
  - The **actual physical spot price** of electricity, and
  - The **price for either a forward or futures contract**:
    - Forward – private bilateral contract between parties, not regulated, traded OTC (if at all), private counterparty credit risk, customized terms and conditions.
      - Negotiated price between counterparties.
    - Futures (including the Day Ahead market administered by ERCOT) – exchange traded through an organized market, regulated, no (direct) counterparty risk, standardized.
      - Prior to clearing, price is determined by market forces.
      - The clearing price is the physical price created by/from ERCOT operations.
- Thus, *the forward price and the futures price prior to clearing are expectations* of the physical spot price created by ERCOT operations, while *the futures clearing price and the physical spot price are not only the same, they are the actual physical price of electricity.**
  - Forward prices and futures contract prices prior to clearing are expectations of the actual price of physical electricity.
  - Futures contract price at settlement and the physical spot price are actual prices for physical electricity.

(*Note: Both the forward and futures prices (prior to clearing) will reflect specific risks as well as the time-value-of money. Thus, while these prices are closely and strongly linked to the actual physical spot price, they should not be expected to be identical)

The Real Time Spot Price – Stepp 2

- Given the fundamental importance of the spot price it is helpful to understand the basics of how it is determined.
- Every 5 minutes ERCOT produces – via the Security Constrained Economic Dispatch (SCED) algorithm – a locational marginal price (LMP) for 15,090 electrical busses (or nodes) across Texas.
  - While this is a large computational problem, the underlying concept is fairly simple.
    - In essence, the SCED treats each node on the system as if it is a standalone market with its own unique supply and demand curves for electricity and holds everything else on the rest of the grid constant.
    - SCED determines/calculates what the **additional cost** to the system would be if the load at each specific node was incrementally higher (all other things equal), i.e., marginally higher.
      - In this way the SCED algorithm hypothetically replicates the optimal outcome of a perfectly competitive market.
      - This **additional cost is the locational marginal price for that specific node for that time interval.**
    - The SCED does this for each of the 15,090 electrical bus nodes - simultaneously!
  - These electrical bus LMPs are based on: (1) voluntary offers supplied by generators (and interruptible load), (2) the load forecast provided by ERCOT, (3) the topology of the actual grid, and (4) reliability requirements.
- The 15,090 electrical bus LMPs are reduced to 745 nodes that represent either a resource, a zone, or a hub.
  - A resource node is a specific location on the network, a zone is a contiguous geographical location, and a hub is an aggregation of nodes (not geographically contiguous).
  - There are four hubs in the ERCOT market – (not surprisingly) North, South, East and West.
  - As an example, the ERCOT North Hub consists of 84 separate nodes on the 345kV system in the Dallas-Ft Worth region.
  - The Hub price is simply the arithmetic average of the 84 individual nodes for a given time interval.
- With this as an introduction, we now look at publicly available information of market participant behavior for the period April 10th – 14th.

Summary of Prices, Generation Outages, and Net Load for April 10th - 14th

					MW During Peak Net Load Hour			
Date	HB_NORTH Peak RT	HB_NORTH Peak DA	Peak Net Load HE	Peak Net Load	Load	Wind	Solar	Outages
4/10/2021	48.07	33.40	21	37,095	40,783	3,680	9	29,664
4/11/2021	216.64	39.50	20	39,317	45,275	5,174	784	31,882
4/12/2021	64.59	34.80	17	36,814	51,902	10,327	4,760	32,447
4/13/2021	491.75	39.59	18	42,124	48,870	5,061	1,684	32,238
4/14/2021	70.18	75.00	16	39,485	46,539	4,200	2,854	32,286

Actual Real Time prices for the North Hub for the Peak Hours (Hours ending 0700 – 2200)

Actual Day Ahead prices for the North Hub for the Peak Hours (Hours ending 0700 – 2200)

Net load is the difference between actual load and intermittent resources (wind & solar). The higher the net load potentially the more thermal generation will be required to meet load.

Key question: Why was the Day Ahead market so far off for the first four days?

Detail For Day Ahead and Real Time Prices For April 10th-14th

	HB_NORTH Hourly DA Prices					HB_NORTH Hourly RT Prices				
Hour Ending	4/10/2021	4/11/2021	4/12/2021	4/13/2021	4/14/2021	4/10/2021	4/11/2021	4/12/2021	4/13/2021	4/14/2021
1	14.39	17.86	19.27	16.67	27.37	14.47	17.05	18.21	17.35	19.61
2	14.22	12.20	17.81	14.05	24.39	14.02	12.50	14.95	15.92	18.19
3	12.60	7.42	12.57	13.37	23.52	10.86	11.87	13.49	14.14	18.15
4	12.87	5.73	10.11	13.84	22.69	13.61	3.16	12.06	9.38	17.46
5	15.65	6.96	10.41	12.91	23.48	18.56	1.98	10.10	10.55	17.62
6	19.05	9.00	13.85	15.41	24.88	19.44	4.10	16.62	15.09	18.13
7	23.89	12.68	16.00	14.91	26.74	19.74	9.16	19.66	21.78	30.49
8	22.83	13.07	16.93	16.27	27.00	22.06	8.97	19.31	21.75	28.51
9	23.53	13.33	17.74	17.14	27.00	22.55	13.70	19.82	22.25	59.64
10	20.61	14.60	16.00	18.60	29.13	18.65	16.91	19.54	24.35	33.19
11	22.72	14.81	18.05	18.63	32.98	18.49	10.18	19.08	35.83	174.13
12	24.74	16.71	20.34	19.65	43.58	19.45	11.22	21.87	35.57	138.92
13	25.22	20.02	24.52	19.61	56.23	19.96	16.56	21.12	35.82	124.06
14	26.00	22.01	30.46	20.61	69.51	21.03	19.17	25.39	82.93	86.20
15	28.52	25.60	40.04	26.86	113.13	24.77	19.50	34.57	608.60	64.76
16	33.17	31.04	62.89	49.00	131.02	26.90	21.89	312.83	1,410.12	158.77
17	40.96	51.09	62.30	69.62	148.92	27.76	25.38	344.74	1,526.78	68.13
18	42.84	68.01	54.61	65.00	120.00	30.26	34.82	80.04	1,808.84	39.22
19	44.43	70.06	41.48	67.10	105.74	35.84	394.95	22.08	706.98	30.47
20	84.43	127.91	61.11	79.40	119.02	223.83	1,907.82	23.51	819.35	30.50
21	46.58	100.05	51.67	98.50	114.55	211.46	930.41	25.58	643.30	28.79
22	23.90	31.03	22.64	32.55	35.49	26.40	25.60	24.31	63.84	27.18
23	19.48	23.83	20.97	24.01	26.74	21.09	23.37	18.97	41.70	21.86
24	17.67	20.12	17.75	21.84	24.27	19.28	20.10	18.55	24.27	20.32
HE 7-22 Avg	33.40	39.50	34.80	39.59	75.00	48.07	216.64	64.59	491.75	70.18
Consecutive Hrs Above 40$	5	5	7	6	10	2	3	3	10	7
Higest Consecutive 3 Hr Avg	57.23	99.34	59.93	81.67	133.31	157.04	1,077.72	245.87	1,581.91	145.70

Day Ahead prices “missed” Real Time prices not because they significantly missed the timing of the peak net load or because they missed the fact that prices would be higher when net load was high. Rather the Day Ahead prices “missed” Real Time prices because of the magnitude of the price rise the occurred in the Real Time. So, the two key questions are (1) what happened between what was expected (Day Ahead) and what actually occurred (Real Time) and (2) why?

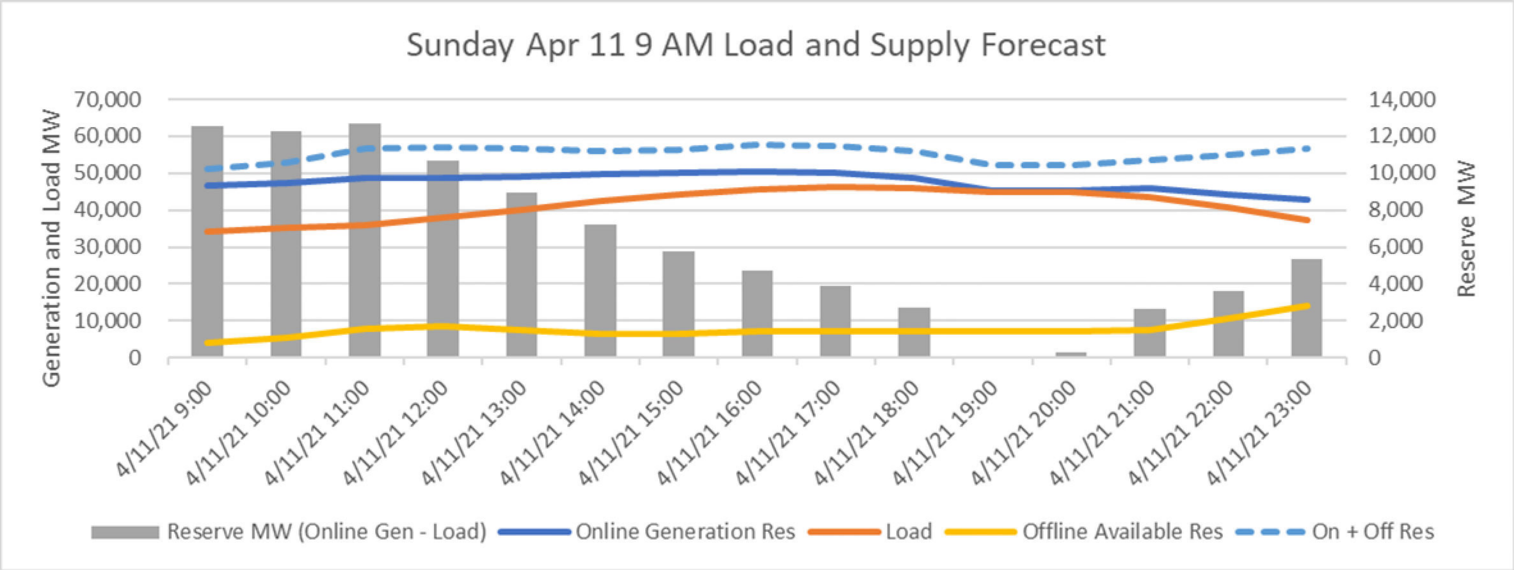
Generator Outages for Saturday, April 10th at 20:00

Sum of HSL	Telemetered Resource Status						
Decision Making Entity	OFF	OUT	Grand Total	SARA HSL MW	(OFF)/(SARA HSL MW)	(OUT)/ (SARA HSL MW)	(DME OFF)/ (Total OFF)
LUMINANT ENERGY COMPANY LLC (DME)	1,679	5,940	7,619	17,966	9%	33%	40%
NRG TEXAS POWER LLC (DME)	984	3,105	4,089	10,001	10%	31%	23%
EXELON GENERATION COMPANY LLC (DME)		1,892	1,892	3,548	0%	53%	0%
CPS ENERGY (DME)	479	972	1,451	5,799	8%	17%	11%
SHELL ENERGY NORTH AMERICA (US) LP (DME)		947	947	1,027	0%	92%	0%
BRAZOS ELECTRIC POWER COOPERATIVE INC (DME)		902	902	2,050	0%	44%	0%
KIOWA POWER PARTNERS LLC (DME)		858	858	1,285	0%	67%	0%
BARNEY DAVIS LLC (DME)		853	853	974	0%	88%	0%
EXGEN TEXAS POWER LLC (DME)	568	162	730	2,228	25%	7%	13%
TALEN ENERGY MARKETING LLC (DME)		650	650	827	0%	79%	0%
CITY OF AUSTIN DBA AUSTIN ENERGY (DME)	235	363	598	2,238	10%	16%	6%
CALPINE POWER MANAGEMENT LLC (DME)		484	484	6,741	0%	7%	0%
WATTBRIDGE ENERGY LLC (DME)		451	451	#N/A	#N/A	#N/A	0%
SAN MIGUEL ELECTRIC CO OP INC (DME)		391	391	391	0%	100%	0%
PANDA SHERMAN POWER LLC (DME)		350	350	743	0%	47%	0%
CITY OF GARLAND (DME)		296	296	421	0%	70%	0%
GOLDEN SPREAD ELECTRIC COOPERATIVE INC (DME)	187		187	753	25%	0%	4%
ECTOR COUNTY ENERGY CENTER LLC (DME)		167	167	307	0%	54%	0%
BRYAN TEXAS UTILITIES (DME)	19	104	123	223	9%	47%	0%
LOWER COLORADO RIVER AUTHORITY (DME)		106	106	3,025	0%	4%	0%

For the interval just prior to the interval when net load was at its peak for the day:

- Luminant Energy Company had (17,966MW – 7,619MW) = 10,347MW available for ERCOT to dispatch (57.6% of their total capacity) at any price.
- NRG Texas Power had (10,0001MW – 4,089MW) = 5,912MW available for ERCOT to dispatch (59.1% of their total capacity) at any price).
- Thus, out of a total capacity of 27,967MW only 16,259MW (58.1%) owned by the two largest generators in ERCOT, was available for ERCOT to dispatch – at any price – at the time when the market needed generation the most.
- **For this interval, when the market needed "supply" the most, the "suppliers", for whatever reason, withheld or withdrew their "supply". By definition, this is not what should happen in a well-functioning market.**
- (Note: the "SARA HSL" column refers to the "Seasonal Assessment of Resource Adequacy High Sustained Limit" for Generators, i.e., the total generation capacity of the company as defined by ERCOT (Spring 2021).

STAR and Load Forecast For Sunday, April 11



STAR Run_Time	Online Gen Res	Offline Available Res	On + Off	On Change	Off Change	On + Off Change
4/10/2021 7:00	31,589	21,560	53,149			
4/10/2021 9:00	33,618	20,445	54,063	2,029	(1,115)	914
4/10/2021 15:00	44,712	9,882	54,594	11,094	(10,563)	531
4/11/2021 7:00	44,854	7,103	51,957	142	(2,779)	(2,637)
4/11/2021 9:00	45,117	7,072	52,189	263	(31)	232
4/11/2021 15:00	45,725	4,264	49,989	608	(2,808)	(2,201)
4/11/2021 19:00	46,474	2,510	48,984	750	(1,754)	(1,005)

7,000 MW of offline available gen at 9am on 4/11 for HE 20, which would have supported the grid if turned online

- The load forecast and short-term adequacy report showed ERCOT could barely cover load with expected online generation for HE 20 and 21
- When factoring in ~3000 MW of ancillary services that also need to be provided by the online generation, ERCOT was forecasting a meaningful shortage at 9am for HE 20 and 21

In real-time, only about 2,500 MW remained offline – why are QSE so delayed in updating their COP status and setting units to ON or OUT for the peak when grid is forecasting a need for that generation

Generator Outages for Sunday, April 11th at 19:00

Sum of HSL	Telemetered Resource Status						
Decision Making Entity	OFF	OUT	Grand Total	SARA HSL MW	(OFF)/(SARA HSL MW)	(OUT)/ (SARA HSL MW)	(DME OFF)/ (Total OFF)
LUMINANT ENERGY COMPANY LLC (DME)	820	6,427	7,247	17,966	5%	36%	33%
NRG TEXAS POWER LLC (DME)		3,991	3,991	10,001	0%	40%	0%
EXELON GENERATION COMPANY LLC (DME)		2,287	2,287	3,548	0%	64%	0%
CPS ENERGY (DME)	479	1,163	1,642	5,799	8%	20%	19%
BRAZOS ELECTRIC POWER COOPERATIVE INC (DME)		902	902	2,050	0%	44%	0%
KIOWA POWER PARTNERS LLC (DME)		858	858	1,285	0%	67%	0%
BARNEY DAVIS LLC (DME)		852	852	974	0%	87%	0%
SHELL ENERGY NORTH AMERICA (US) LP (DME)		850	850	1,027	0%	83%	0%
EXGEN TEXAS POWER LLC (DME)	568	159	727	2,228	25%	7%	23%
TALEN ENERGY MARKETING LLC (DME)		650	650	827	0%	79%	0%
CALPINE POWER MANAGEMENT LLC (DME)		472	472	6,741	0%	7%	0%
WATTBRIDGE ENERGY LLC (DME)		451	451	#N/A	#N/A	#N/A	0%
CITY OF AUSTIN DBA AUSTIN ENERGY (DME)	56	363	419	2,238	3%	16%	2%
TEMPLE GENERATION I LLC (DME)	356		356	790	45%	0%	14%
PANDA SHERMAN POWER LLC (DME)		335	335	743	0%	45%	0%
CITY OF GARLAND (DME)		296	296	421	0%	70%	0%
GOLDEN SPREAD ELECTRIC COOPERATIVE INC (DME)	178		178	753	24%	0%	7%
ECTOR COUNTY ENERGY CENTER LLC (DME)		164	164	307	0%	53%	0%
COMPETITIVE POWER VENTURES INC (DME)		155	155	1,119	0%	14%	0%
LOWER COLORADO RIVER AUTHORITY (DME)		106	106	3,025	0%	4%	0%

Again, for the interval just prior to the interval when net load was at its peak for the day:

- Luminant Energy Company had (17,966MW – 7,247MW) = 10,719MW available for ERCOT to dispatch (59.7% of their total capacity) at any price.
- NRG Texas Power had (10,0001MW – 3,991MW) = 6,010MW available for ERCOT to dispatch (60% of their total capacity) at any price).
- Thus, out of a total capacity of 27,967MW owned by the two largest generators in ERCOT, only 16,729MW (59.8%) was available for ERCOT to dispatch – at any price – at the time when the market needed generation the most.
- **As before, for this interval, when the market needed "supply" the most, the "suppliers", for whatever reason, withheld or withdrew their "supply". By definition, this is not what should happen in a well-functioning market.**

Units Designated as "OFF" for Sunday, April 11th at 19:00

Unit	DME	HSL	Lowest > 0$ Offer with > 0 MW	MW at First >0$, >0 MW Offer	Most Expensive Offer	MW at MEO
MCSES_UNIT8	EXGEN TEXAS POWER LLC (DME)	568	34.56	100	44.57	580
PANDA_T1_CC1_1	TEMPLE GENERATION I LLC (DME)	356	45.98	193	65.77	356
TRSES_UNIT6	LUMINANT ENERGY COMPANY LLC (DME)	240	31.38	250	31.38	250
GRSES_UNIT1	LUMINANT ENERGY COMPANY LLC (DME)	239	23.52	46	28.59	260
BRAUNIG_VHB1	CPS ENERGY (DME)	217	27.22	50	30.21	220
BRAUNIG_VHB2	CPS ENERGY (DME)	216	28.84	50	32.05	240
AEEC_ELK_3	GOLDEN SPREAD ELECTRIC COOPERATIVE INC (DME)	178	19.20	85	31.76	196
LHSES_UNIT1	LUMINANT ENERGY COMPANY LLC (DME)	174	41.75	57	51.30	415
SCSES_UNIT1A	LUMINANT ENERGY COMPANY LLC (DME)	167	31.31	192	31.31	192

The table above provides the (1) High Sustained Limits for each plant, (2) the lowest offer with a positive amount of energy, (3) the minimum amount of energy associated with the lowest priced offer, (4) the most expensive offer and (5) the amount of energy associated with the most expensive offer. The list contains generators who are classified as so-called "small fish" as well as those classified, by default, as "big fish".

- Small fish are those generator companies with less than 5% of the total generating capacity in ERCOT. In a previous ruling the PUCT deemed that "Small Fish" do not have market power. This despite the fact, that the IMM has repeatedly determined that small fish do, in actual practice, have market power during specific intervals over the year.
- In the list above, ExGen Texas Power, Temple Generation, Golden Spread and CPS Energy are all "small fish".
- For this interval here was 2,355MW of generation that was designated as "Off-Line" in addition to the generation that was on outage. Of this, 1,535MW came from so-called small fish.
- The reduction in supply by 2,355MW necessarily confers market power to the remaining available generation.

The Day Ahead Market for Hours Ending 19:00-21:00 cleared with a price of $99.34, while the Real Time market for the same interval cleared at a price $1,077.72.

- **It would have been profitable for all of the units in the table to run at the clearing prices in both the Day Ahead and Real Time markets.**
- **The question that needs to asked and answered is: Why weren't these units running?**

In addition, the Panda Unit (Temple Generation, LLC) was committed by ERCOT through the Reliability Unit Commitment process on April 11th for that day, but the unit remained Off-line and did not run.

Generator Outages for Monday, April 12th at 16:00

Sum of HSL	Telemetered Resource Status						
Decision Making Entity	OFF	OUT	Grand Total	SARA HSL MW	(OFF)/(SARA HSL MW)	(OUT)/ (SARA HSL MW)	(DME OFF)/ (Total OFF)
LUMINANT ENERGY COMPANY LLC (DME)	1,343	6,321	7,664	17,966	7%	35%	56%
NRG TEXAS POWER LLC (DME)	58	3,390	3,448	10,001	1%	34%	2%
EXELON GENERATION COMPANY LLC (DME)		2,287	2,287	3,548	0%	64%	0%
CPS ENERGY (DME)	433	1,163	1,596	5,799	7%	20%	18%
BRAZOS ELECTRIC POWER COOPERATIVE INC (DME)		902	902	2,050	0%	44%	0%
KIOWA POWER PARTNERS LLC (DME)		858	858	1,285	0%	67%	0%
BARNEY DAVIS LLC (DME)		854	854	974	0%	88%	0%
SHELL ENERGY NORTH AMERICA (US) LP (DME)		850	850	1,027	0%	83%	0%
EXGEN TEXAS POWER LLC (DME)	568	156	724	2,228	25%	7%	24%
CALPINE POWER MANAGEMENT LLC (DME)		691	691	6,741	0%	10%	0%
TALEN ENERGY MARKETING LLC (DME)		650	650	827	0%	79%	0%
WATTBRIDGE ENERGY LLC (DME)		451	451	#N/A	#N/A	#N/A	0%
CITY OF AUSTIN DBA AUSTIN ENERGY (DME)		382	382	2,238	0%	17%	0%
TEMPLE GENERATION I LLC (DME)		351	351	790	0%	44%	0%
PANDA SHERMAN POWER LLC (DME)		344	344	743	0%	46%	0%
CITY OF GARLAND (DME)		296	296	421	0%	70%	0%
ECTOR COUNTY ENERGY CENTER LLC (DME)		164	164	307	0%	53%	0%
PHR HOLDINGS LLC (DME)		120	120	341	0%	35%	0%
LOWER COLORADO RIVER AUTHORITY (DME)		106	106	3,025	0%	4%	0%
BRYAN TEXAS UTILITIES (DME)		104	104	223	0%	47%	0%

Again, for the interval just prior to the interval when net load was at its peak for the day:

- Luminant Energy Company had (17,966MW – 7,644MW) = 10,322MW available for ERCOT to dispatch (57.5% of their total capacity) at any price.
- NRG Texas Power had (10,0001MW – 3,448MW) = 6,553MW available for ERCOT to dispatch (65% of their total capacity) at any price.
- Thus, out of a total capacity of 27,967MW owned by the two largest generators in ERCOT, only 16,875MW (60.3%) was available for ERCOT to dispatch – at any price – at the time when the market needed generation the most.
- **As before, for this interval, when the market needed “supply” the most, the “suppliers”, for whatever reason, withheld or withdrew their “supply”. By definition, this is not what should happen in a well-functioning market.**

Units Designated as "OFF" for Monday, April 12th at 19:00

Unit	DME	HSL	Lowest > 0$ Offer with > 0 MW	MW at First >0$, >0 MW Offer	Most Expensive Offer	MW at MEO
MCSES_UNIT8	EXGEN TEXAS POWER LLC (DME)	568	34.56	100	44.57	580
LHSES_UNIT2A	LUMINANT ENERGY COMPANY LLC (DME)	523	39.22	538	39.22	538
TRSES_UNIT6	LUMINANT ENERGY COMPANY LLC (DME)	240	31.38	250	31.38	250
GRSES_UNIT1	LUMINANT ENERGY COMPANY LLC (DME)	239	23.52	46	28.59	260
BRAUNIG_VHB1	CPS ENERGY (DME)	217	27.22	50	30.21	220
BRAUNIG_VHB2	CPS ENERGY (DME)	216	28.84	50	32.05	240
LHSES_UNIT1	LUMINANT ENERGY COMPANY LLC (DME)	174	41.75	57	51.30	415
SCSES_UNIT1A	LUMINANT ENERGY COMPANY LLC (DME)	167	31.31	192	31.31	192

For this interval there was 2,355MW of generation that was designated as "Off-Line" in addition to the generation that was on outage. Of this, 1,001MW came from so-called "small fish."

The Day Ahead Market for Hours Ending 16:00-18:00 cleared with a price of $59.93, while the Real Time market for the same interval cleared at a price $245.87.

- **It would have been profitable for all of the units in the table to run at the clearing prices in both the Day Ahead and Real Time markets.**
- **Same question as before: Why weren't these units running?**

Generator Outages for Tuesday, April 13th at 16:00

Sum of HSL	Telemetered								
Decision Making Entity	OFF	OUT	ONOPTOUT	Grand Total	SARA HSL MW	(OFF)/(SARA HSL MW)	(OUT)/ (SARA HSL MW)	(ONOPTOUT)/ (SARA HSL MW)	(DME OFF + ONOPTOUT)/ (Total OFF + ONOPTOUT)
LUMINANT ENERGY COMPANY LLC (DME)		6,424	1,343	7,767	17,966	0%	36%	7%	70%
NRG TEXAS POWER LLC (DME)		3,323		3,323	10,001	0%	33%	0%	0%
EXELON GENERATION COMPANY LLC (DME)		2,282		2,282	3,548	0%	64%	0%	0%
CPS ENERGY (DME)		1,610		1,610	5,799	0%	28%	0%	0%
BRAZOS ELECTRIC POWER COOPERATIVE INC (DME)		902		902	2,050	0%	44%	0%	0%
KIOWA POWER PARTNERS LLC (DME)		858		858	1,285	0%	67%	0%	0%
SHELL ENERGY NORTH AMERICA (US) LP (DME)		850		850	1,027	0%	83%	0%	0%
BARNEY DAVIS LLC (DME)		849		849	974	0%	87%	0%	0%
EXGEN TEXAS POWER LLC (DME)	568	158		726	2,228	25%	7%	0%	30%
CALPINE POWER MANAGEMENT LLC (DME)		704		704	6,741	0%	10%	0%	0%
TALEN ENERGY MARKETING LLC (DME)		650		650	827	0%	79%	0%	0%
WATTBRIDGE ENERGY LLC (DME)		451		451	#N/A	#N/A	#N/A	#N/A	0%
CITY OF AUSTIN DBA AUSTIN ENERGY (DME)		358		358	2,238	0%	16%	0%	0%
TEMPLE GENERATION I LLC (DME)		357		357	790	0%	45%	0%	0%
PANDA SHERMAN POWER LLC (DME)		350		350	743	0%	47%	0%	0%
CITY OF GARLAND (DME)		296		296	421	0%	70%	0%	0%
ECTOR COUNTY ENERGY CENTER LLC (DME)		164		164	307	0%	53%	0%	0%
LOWER COLORADO RIVER AUTHORITY (DME)		151		151	3,025	0%	5%	0%	0%
PHR HOLDINGS LLC (DME)		119		119	341	0%	35%	0%	0%
BRYAN TEXAS UTILITIES (DME)		104		104	223	0%	47%	0%	0%

Again, for the interval just prior to the interval when net load was at its peak for the day:

- Luminant Energy Company had (17,966MW – 7,767MW) = 10,199MW available for ERCOT to dispatch (56.8% of their total capacity) at any price.
- NRG Texas Power had (10,0001MW – 3,323MW) = 6,678MW available for ERCOT to dispatch (66.8% of their total capacity) at any price.
- Thus, out of a total capacity of 27,967MW owned by the two largest generators in ERCOT, only 16,877MW (60.3%) was available for ERCOT to dispatch – at any price – at the time when the market needed generation the most.
- **As before, for this interval, when the market needed "supply" the most, the "suppliers", for whatever reason, withheld or withdrew their "supply". By definition, this is not what should happen in a well-functioning market.**

Units Designated as "OFF" for Tuesday, April 13th at 19:00

Unit	DME	HSL	Lowest > 0$ Offer with > 0 MW	MW at First >0$, >0 MW Offer	Most Expensive Offer	MW at MEO	Status
MCSES_UNIT8	EXGEN TEXAS POWER LLC (DME)	568	34.61	100	44.62	580	OFF

Unit	DME	HSL	Lowest > 0$ Offer with > 0 MW	MW at First >0$, >0 MW Offer	Most Expensive Offer	MW at MEO	Status
LHSES_UNIT2A	LUMINANT ENERGY COMPANY LLC (DME)	523	40.09	538	40.09	538	ONOPTOUT
TRSES_UNIT6	LUMINANT ENERGY COMPANY LLC (DME)	240	32.40	250	32.40	250	ONOPTOUT
GRSES_UNIT1	LUMINANT ENERGY COMPANY LLC (DME)	239	24.29	46	29.52	260	ONOPTOUT
LHSES_UNIT1	LUMINANT ENERGY COMPANY LLC (DME)	174	42.68	57	52.44	415	ONOPTOUT
SCSES_UNIT1A	LUMINANT ENERGY COMPANY LLC (DME)	167	32.33	192	32.33	192	ONOPTOUT

For this interval there was 1,911MW of generation that was designated as "Off-Line" in addition to the generation that was on outage. Of this, 568MW came from so-called "small fish."

Luminant made up over 70% of the Off-Line capacity. However, all of these units/MWs were committed by ERCOT via the Reliability Unit Commitment process for April 13th. Luminant, however, chose to "opt out" of the RUC and paid other units to cover the commitment instructions they had received from ERCOT, i.e., they "opted out" of the RUC.

The Day Ahead Market for Hours Ending 19:00-21:00 cleared with a price of $81.67, while the Real Time market for the Hours Ending 16:00-18:00 cleared at a price $1,581.91.

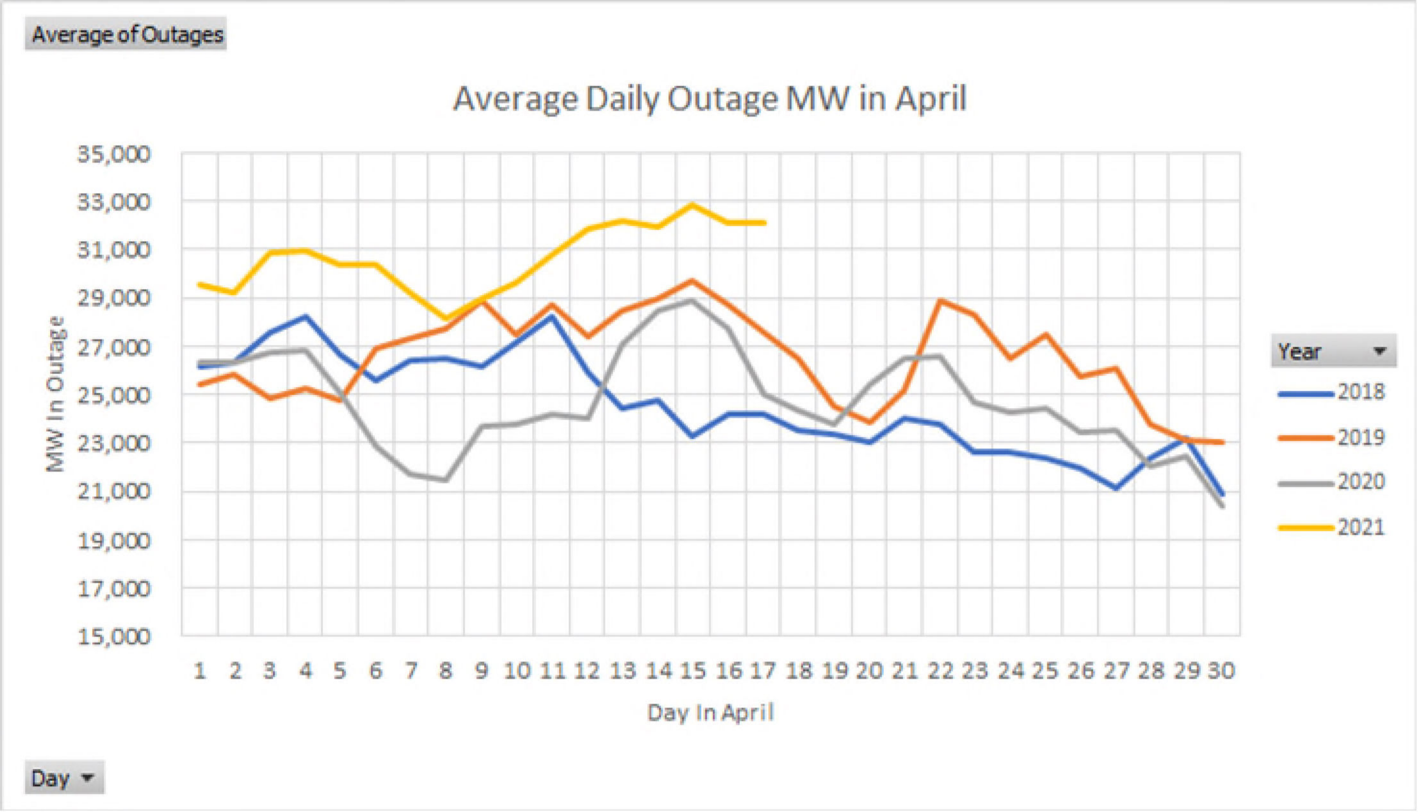
- **It would have been profitable for all of the units in the table to run at the clearing prices in both the Day Ahead and Real Time markets.**
- **Same question as before: Why weren't these units running?**

The previous day (April 12th), ERCOT had issued several operations messages indicating they anticipated difficult operating conditions due to a lack of generation capacity. In particular, ERCOT issued an "OCN" (Operating Condition Notice) for the Hours Ending 14:00-21:00. Nevertheless, the units in the table above did not turn on.

- **Again, why weren't these units running?**

We see the same behavior on April 14th as occurred on April 10th, 11th, 12th and 13th.

April 2021 Showed Higher Outages On A Year-Over-Year Basis



The average of outages for April 2021 was greater than the three previous years. Why?

Is it just a coincidence that this occurred in the same year when the two largest generators lost (by their own admission) more than $2 billion during the Polar Vortex event in February?

To understand – to monitor – the behavior of generators and "gentailers" in the ERCOT market, you must look beyond ERCOT. Other Market Monitors do this regularly (Monitoring Analytics in PJM).

Conclusions & Recommendations

Conclusions:

- This behavior by the generators from April 10-14th is not an outlier. We see this type of behavior frequently.
- The ERCOT market exhibits perverse outcomes – when it is economic to produce electricity, generators prefer to withhold their supply.
    - Why? Because it must be profitable for them to do so. Most likely so they can manipulate prices.

Recommendations:

1. The "so-called" small fish rule must be eliminated.
    - Either knowingly or not, uneconomic actions of the "small fish" generators confers market power to the "big fish" – who exploit it.
    - There is no economic or political justification for continuing the rule.
2. The process and manner in which the market is monitored must change. In particular, the behavior by the entire fleet of resources, rather than just individual units, controlled by an entity must be scrutinized for abuse of market power.
    - Units are not required to produce. However, when a unit is taken offline or is otherwise unavailable to produce for purposes of raising the price, the action should be severely punished.
3. The market must be monitored for joint – explicit and/or implicit – collusive behavior. Oftentimes a so-called small fish, knowing they will not be found guilty of market manipulation regardless of their offer, will offer their last MWs of supply at a very high price ("hockey-stick" bidding). This allows a non-small fish to raise their offer prices to very high levels as long as they stay below the level offered by the "small fish".
4. Monitoring of the market should extend to potential consequences arising in related markets.
    1. The result of price manipulation in the ERCOT-administered markets has caused credit requirements to rise significantly and dramatically for transactions on futures exchanges.
    2. This absolutely causes participants to no longer transact in the ERCOT forward and futures markets. Resulting in less liquidity, higher prices and less competition.

Thank You

Our perspective, experience and concerns are neither well understood or represented within the ERCOT and PUCT stakeholder community.

As such, we sincerely appreciate you time and patience in discussing these issues.

We have both professional and private reasons for wanting the Texas electricity market to be a well-functioning market.

Will share/supply any data, analysis, information that you need.

Thank you.

Third Analysis

<u>Upsurge in RUC Usage in 2021</u>

- By definition, RUC means that the generation bid into the ERCOT market could not fulfill a need on the System.
- Loads in 2021 have not been significantly larger than in the past five years.
  - Summer 2021 to date has been wet and relatively mild.
- Relative to the past several years, accounting for gas prices at Henry Hub, ERCOT Day-Ahead and Real-Time Energy Prices have been higher in 2021 despite the relatively mild weather since February.
  - Higher prices in the Day-Ahead and Real-Time Markets should encourage more generation deployment and should increase the ability for even less-efficient generators to recover costs.

- **<u>More than half of the hours of RUC procured by ERCOT in the past 5 years have occurred in the past 3 months.</u>**
  - The upsurge in "off" units that get RUC'ed does not sync with the higher Day-Ahead and Real-Time Energy Prices.
  - ERCOT's increased procurement of Ancillary Services does not explain the increased need to RUC.

- **<u>65% of the RUC'ed units could have run profitably based on Day-Ahead market clearing prices.</u>**
  - When the majority of off units could have made a profit by participating in the Day-Ahead Market, why are they not participating? **<u>Profits can and do come from sources other than the physical ERCOT market, i.e., financial trading, ICE, etc.</u>**

	Final Reason per ERCOT						
YEAR	RUC Hours-Capacity	RUC Hours-Constraint	RUC Hours-Evaluate Later	RUC Hours-Forced Outages	RUC Hours-Short Start	RUC Hours-Grand Total	Proportion of 5 Year RUC History
2017	71	455		24		550	16.3%
2018	108	496				604	17.9%
2019	14	171	10		46	241	7.2%
2020		221	13			234	7.0%
2021 (Apr.-July)	**1688**	**48**				**1736**	**51.6%**
Grand Total	*1881*	*1391*	*23*	*24*	*46*	*3365*	*100.0%*