

31 May 2021

The Big Chill: *What happened in Texas?*

REKK Webinar: Power System Resilience

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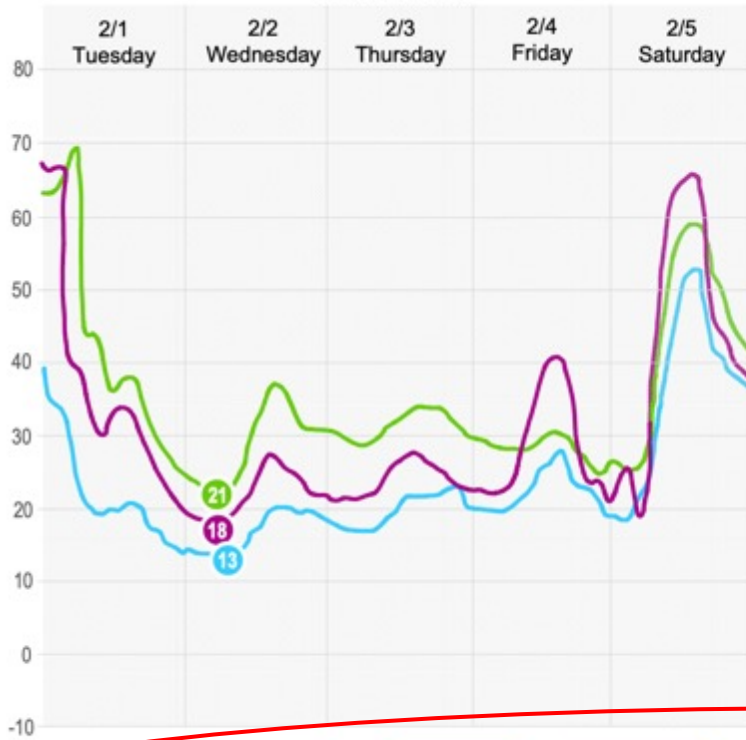
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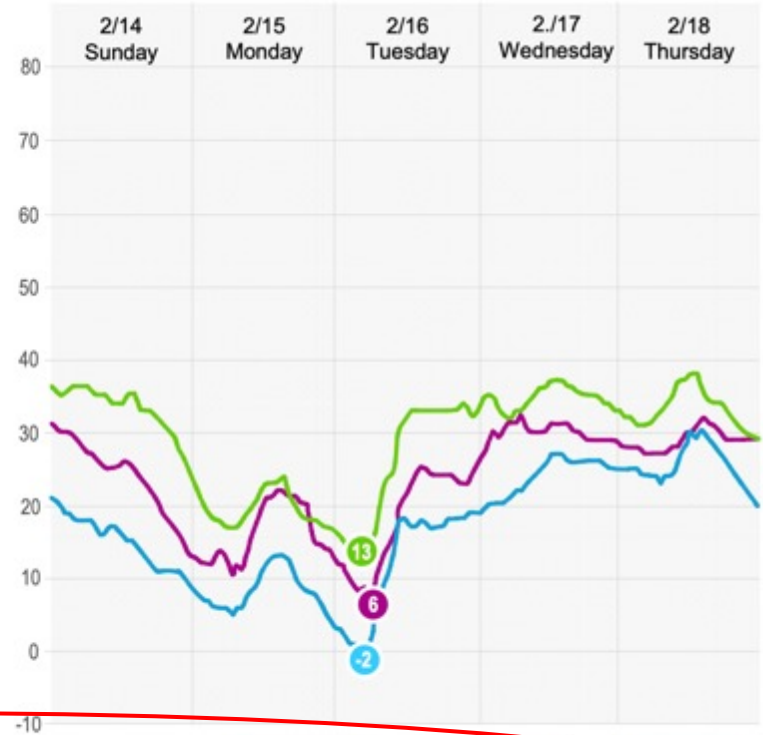


How extreme was the weather?

February 2011



February 2021



Consecutive Hours at or below freezing

City	DFW	Austin	Houston
Hours	101	69	34

Consecutive Hours at or below freezing

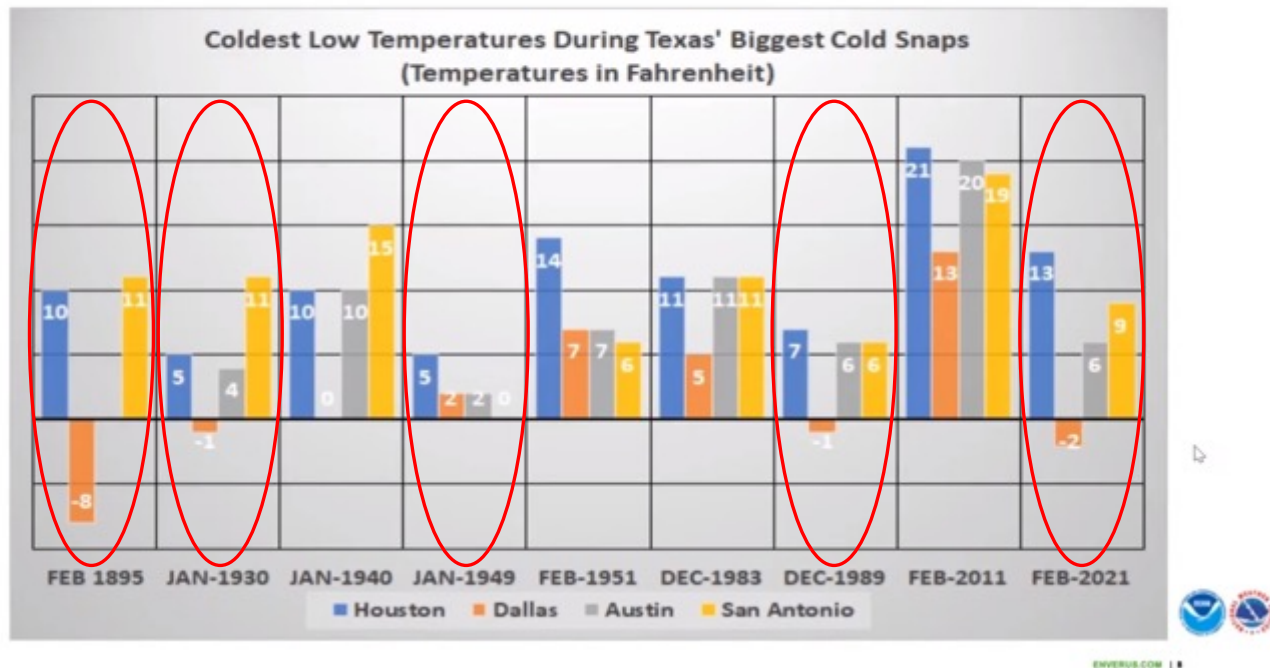
City	DFW	Austin	Houston
Hours	140	162	44

Source: ERCOT

How extreme was the weather?

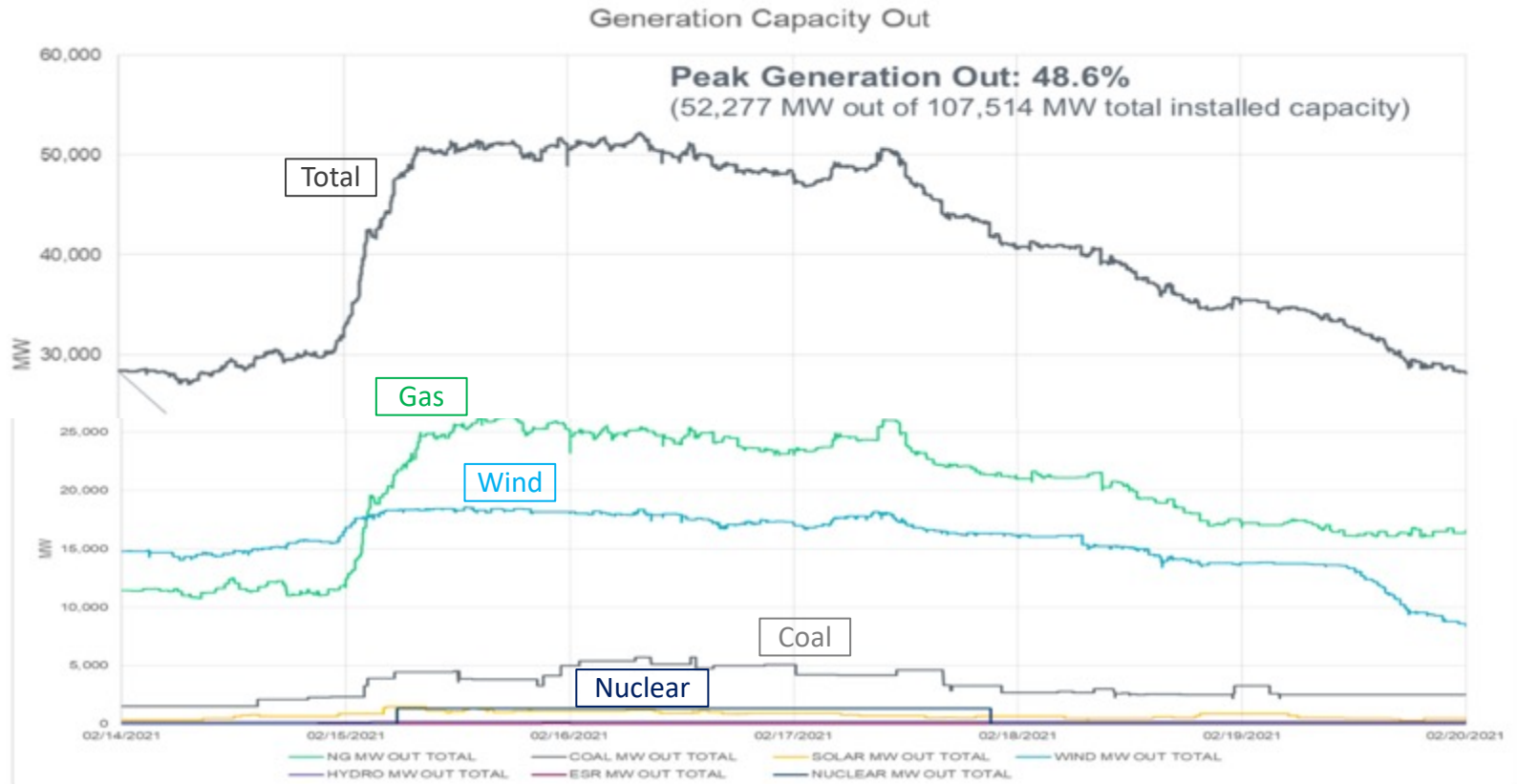
ERCOT Power Grid Outage: What Went Wrong?

ERCOT Based their 2020/21 Extreme Winter Peak on the 2011 Winter???



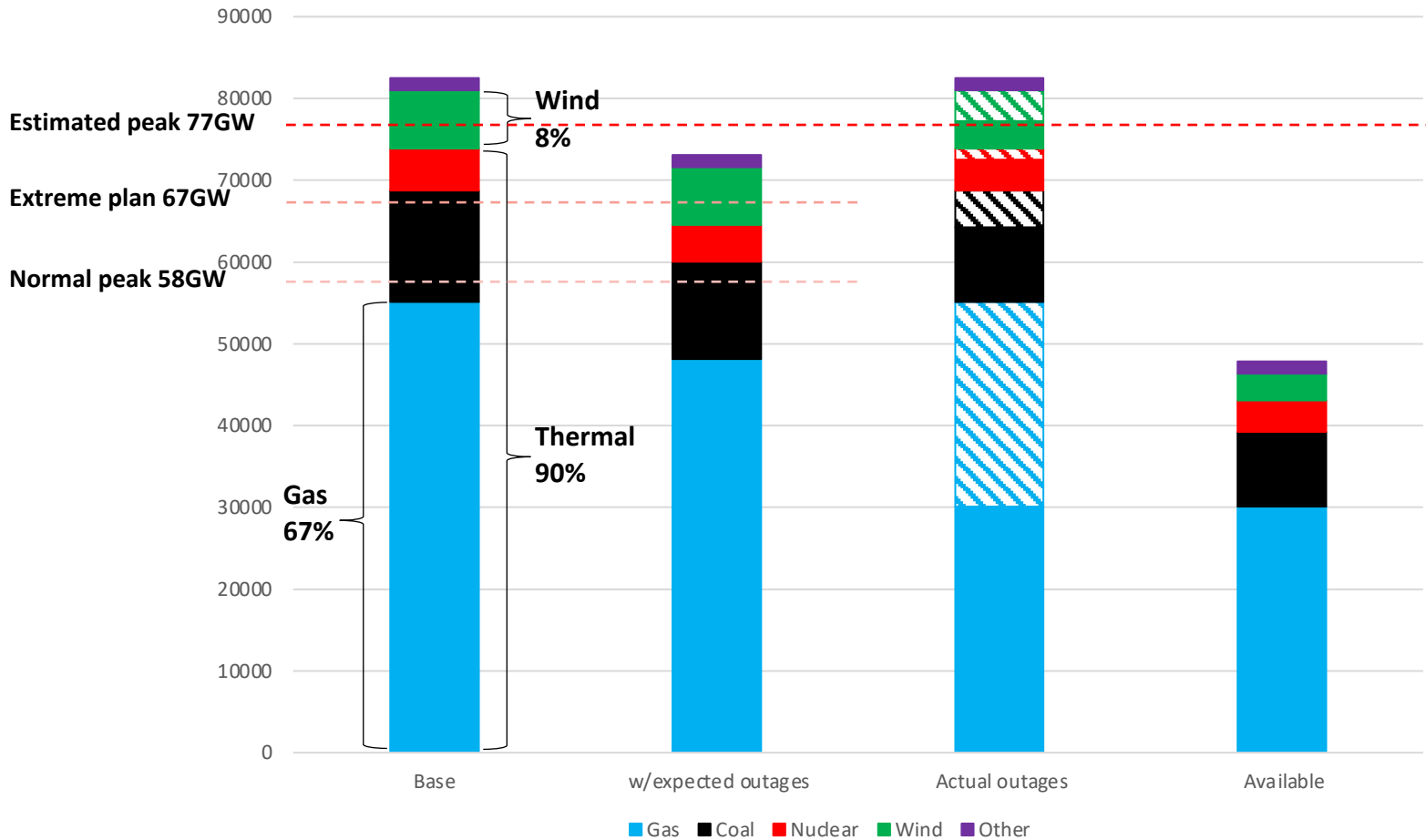
...not unprecedented, but statistically rare...but will it be less "rare" in the future??

Sequence of resource outages



Source: ERCOT

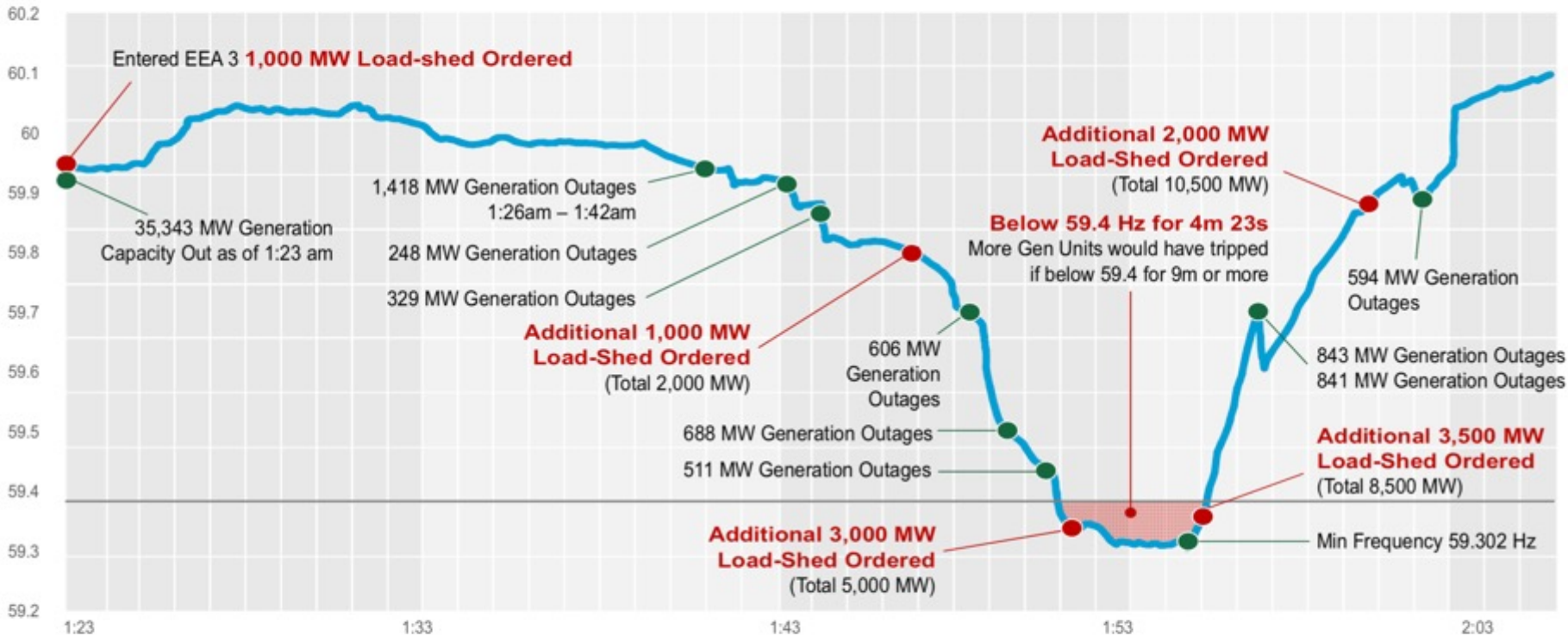
More important: What was the plan?



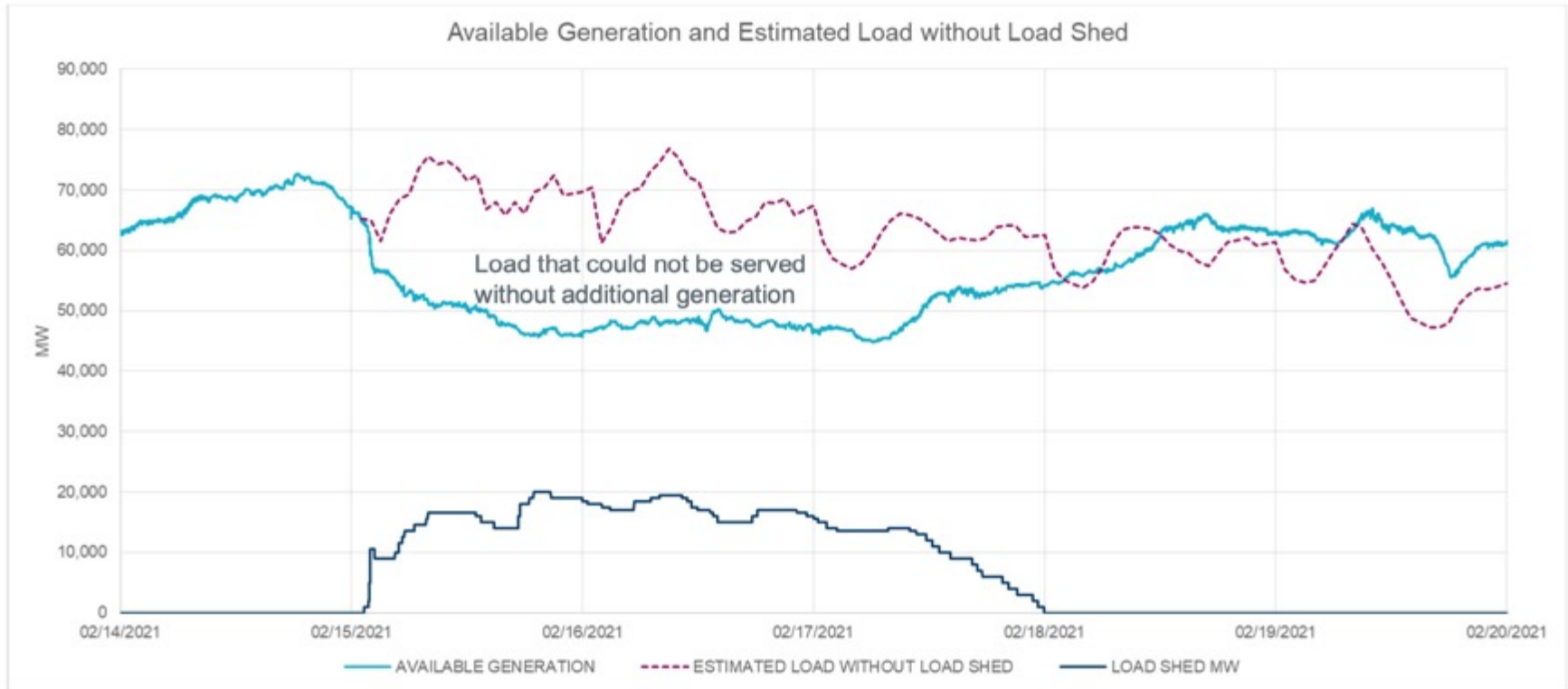
Sources: ERCOT SARA Report Nov 2020, RAP analysis of ERCOT data

It could have been much worse

Rapid Decrease in Generation Causes Frequency Drop



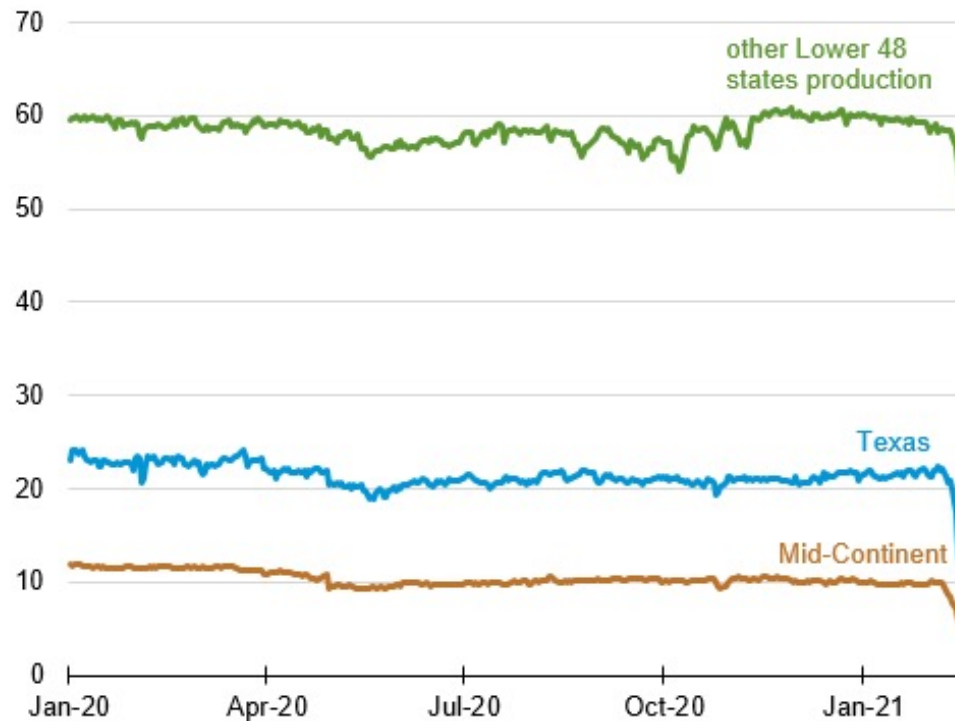
Loss of load



Source: ERCOT

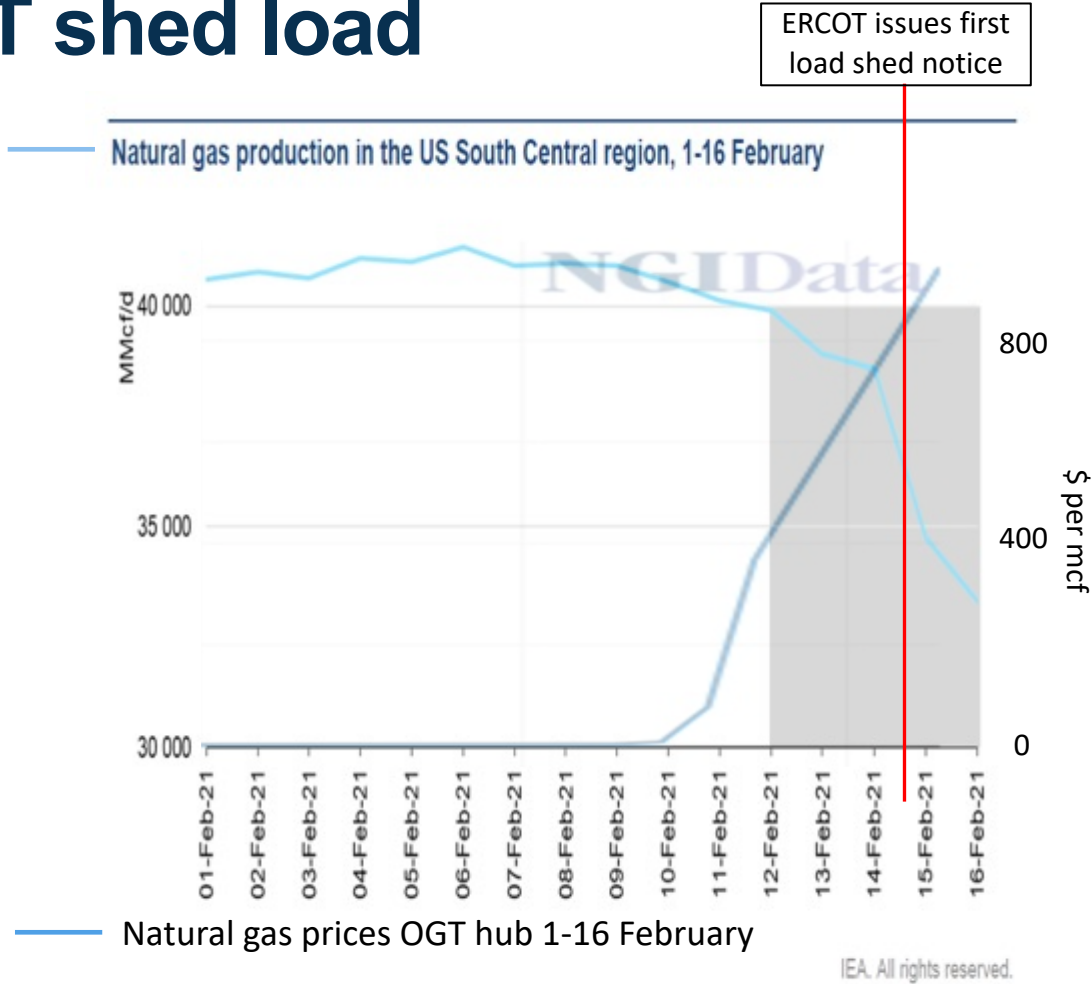
Natural gas production by region

Regional natural gas production (January 2020–February 2021)
billion cubic feet per day



Source: U.S. Energy Information Administration, based on data from IHS Markit.

Natural gas production and prices...before ERCOT shed load



Source: IEA analysis based on [Criterion Research](#).

Lots of opinions...mostly incorrect

Texas gov knew of natural gas shortages days before blackout, blamed wind anyway

Official's phone logs offer blow-by-blow account of the disaster as it unfolded.

TIM DE CHANT - 5/21/2021, 10:04 AM



Lots of opinions...mostly incorrect

- Some things that did *not* happen
 - This was not caused by reliance on wind...but it illustrated the remaining challenge of replacing the role of fossil-fueled generation in such circumstances.
 - There was no shortage of “firm” capacity...there was a shortage of cross-sectoral planning...and fossil gas!
 - Market design had nothing to do with this...all markets (including capacity markets) rely on prudent foresight that was lacking from the regulator on down.
 - ERCOT’s isolation was not a major factor...but more regional integration would still be very beneficial.

So where *did* it all go wrong?

- It was winter
- No parallel reliability regime + weak regulation in fossil gas industry = foreseeable gas supply failure (and possibly market manipulation)
- Critical gas infrastructure not identified (by gas industry) as critical electric loads (some even paid as ERS), compounding gas failure
- Like 2014 in PJM's capacity market, mechanisms to pay for reserves were compromised by undue reliance on vulnerable thermal generation
- Building boom + widespread electric resistance heat + rare (?) but predictable storm = foreseeable winter load bomb (that no one foresaw)
- Protected critical loads on large undifferentiated circuits = wide swathes of load were unavailable for rolling curtailments ("*sectionalization*")
- Poor building efficiency = low resilience to extended disruption
- Failed "summer" scarcity pricing circuit breaker = extreme pain, much of it unnecessary and pointless

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

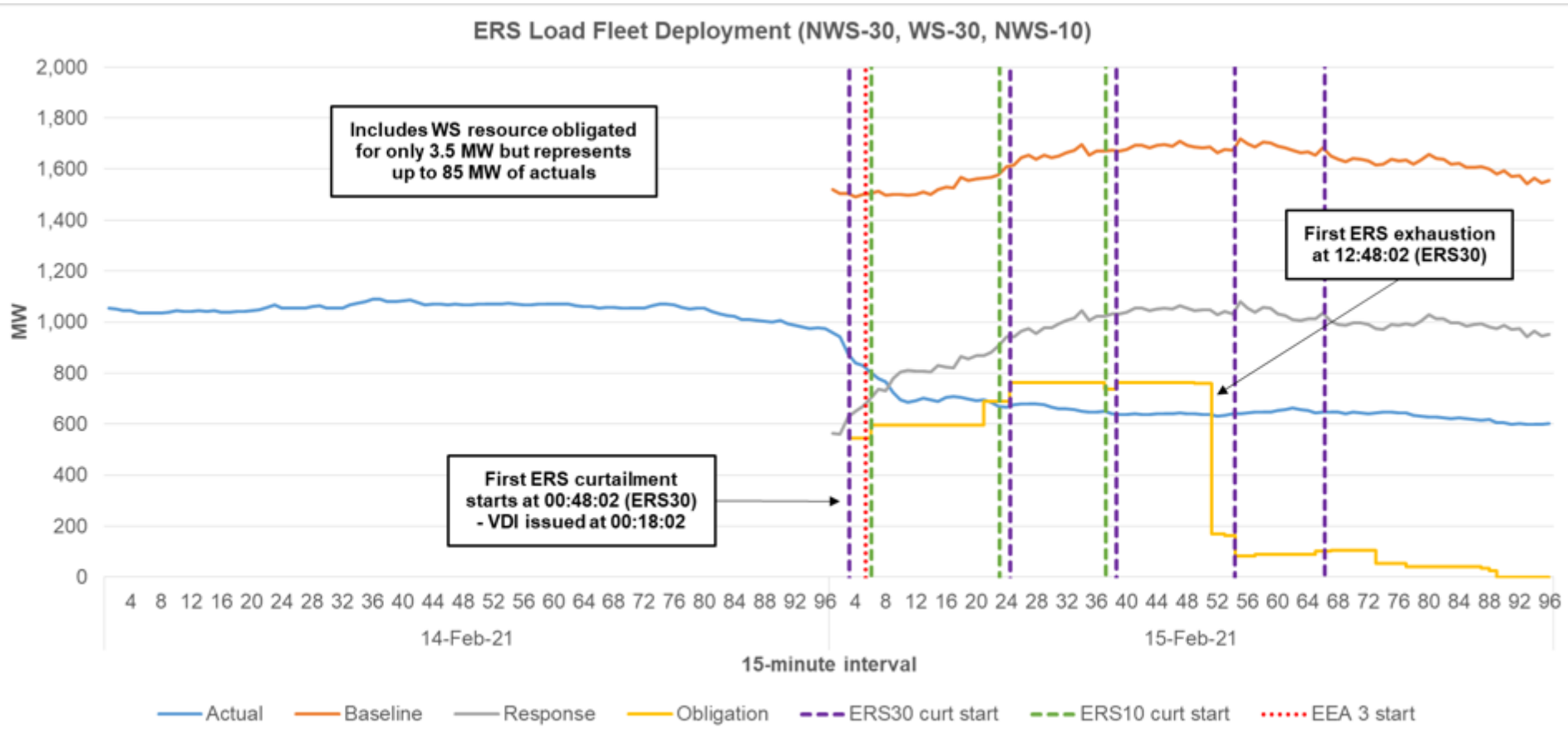


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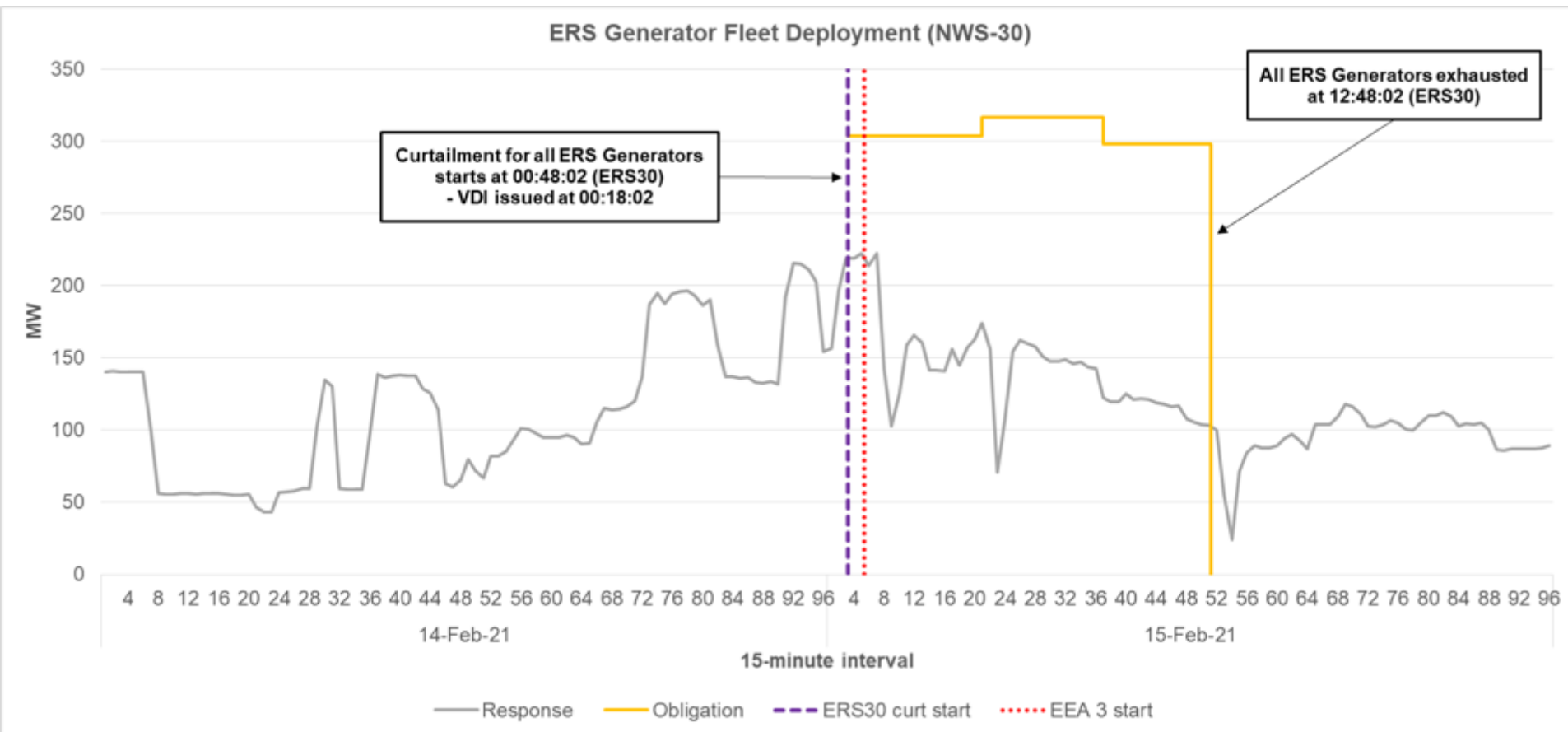
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Emergency Response Service (load)



Emergency Response Service (generation)



Non-controllable load resource performance

