Markets and Reliability in the Texas and California Electricity Systems

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What is a blackout?

Name	Area Effected	Predictable?	Example	Frequency
Distribution problem	Local	Not Very (probabilities only)	My House	1.5-2 per year
Cascading Transmission problems	Many States	No	2003 US East Coast Blackout	?10 -20 years?
Supply Shortage	Parts of Cities	Yes	California in August	*1 in 10 years (goal)*

Special Category: Wildfire Prevention Blackouts

Figure 3: PSPS Scope Changes as Weather Forecasts Change

Each color indicates the geographic location of a different Time-Place for this PSPS event

Scope at 10/12/20 1534 PDT

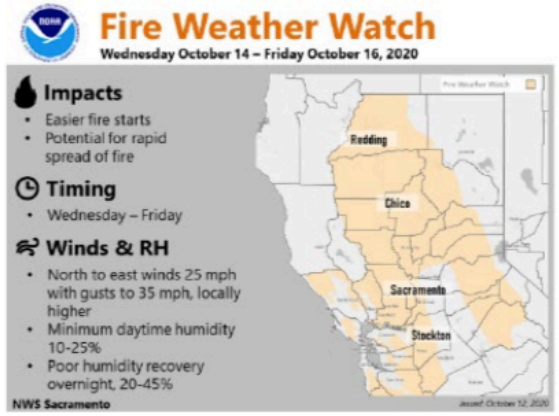
Forecasted Event Data

Fire Weather Timing

- Start: 10/14 2000
- End: 10/16 1000

~49,000 Customers

95 Distribution Circuits
2 Transmission Circuits



Scope at 10/13/20 1402 PDT

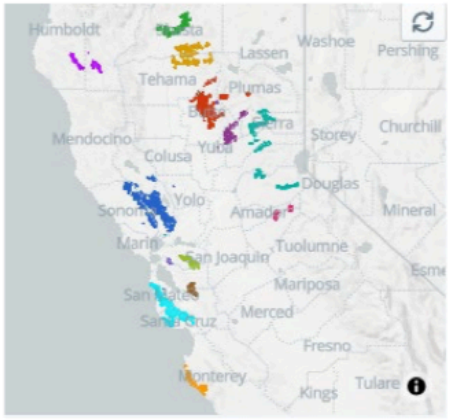
Forecasted Event Data

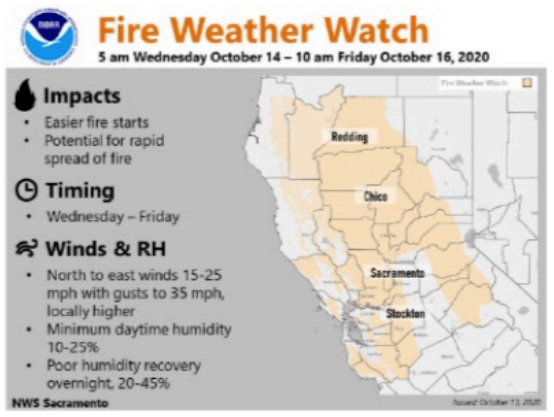
Fire Weather Timing

- Start: 10/14 2000
- End: 10/16 1000

~54,000 Customers

104 Distribution Circuits
10 Transmission Circuits

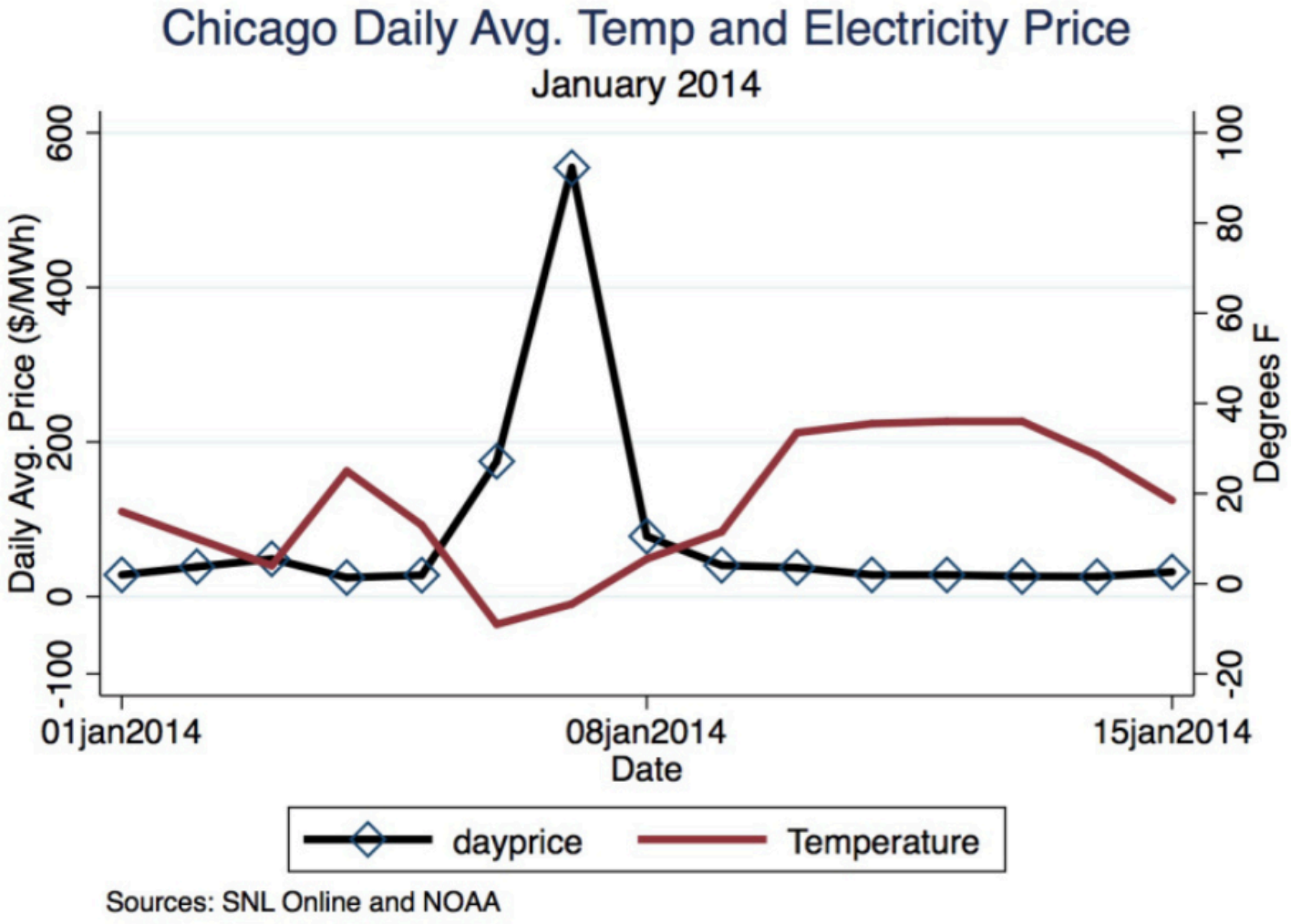




Blackouts in Context

- 2020 CA Wildfire prevention (PSPS)
  - 30,000 - 350,00 customers lose power for 24-72 hours.
  - Seven large PSPS events in PG&E territory Sept-December.
- August 2020 CA heatwave
  - About 500,000 customers lose power for 15-150 ***minutes***.
  - Outages rotated to achieve 1000 MW load reduction
- February 2021 Texas winter storm
  - About 4.5 million customers lose power for 24-72 hours
- 2003 East coast blackout
  - 55 ***Million*** people lose power for 8 - 72 hours
  - But not during terrible weather

Reliability Does Pay:
But does it pay enough?



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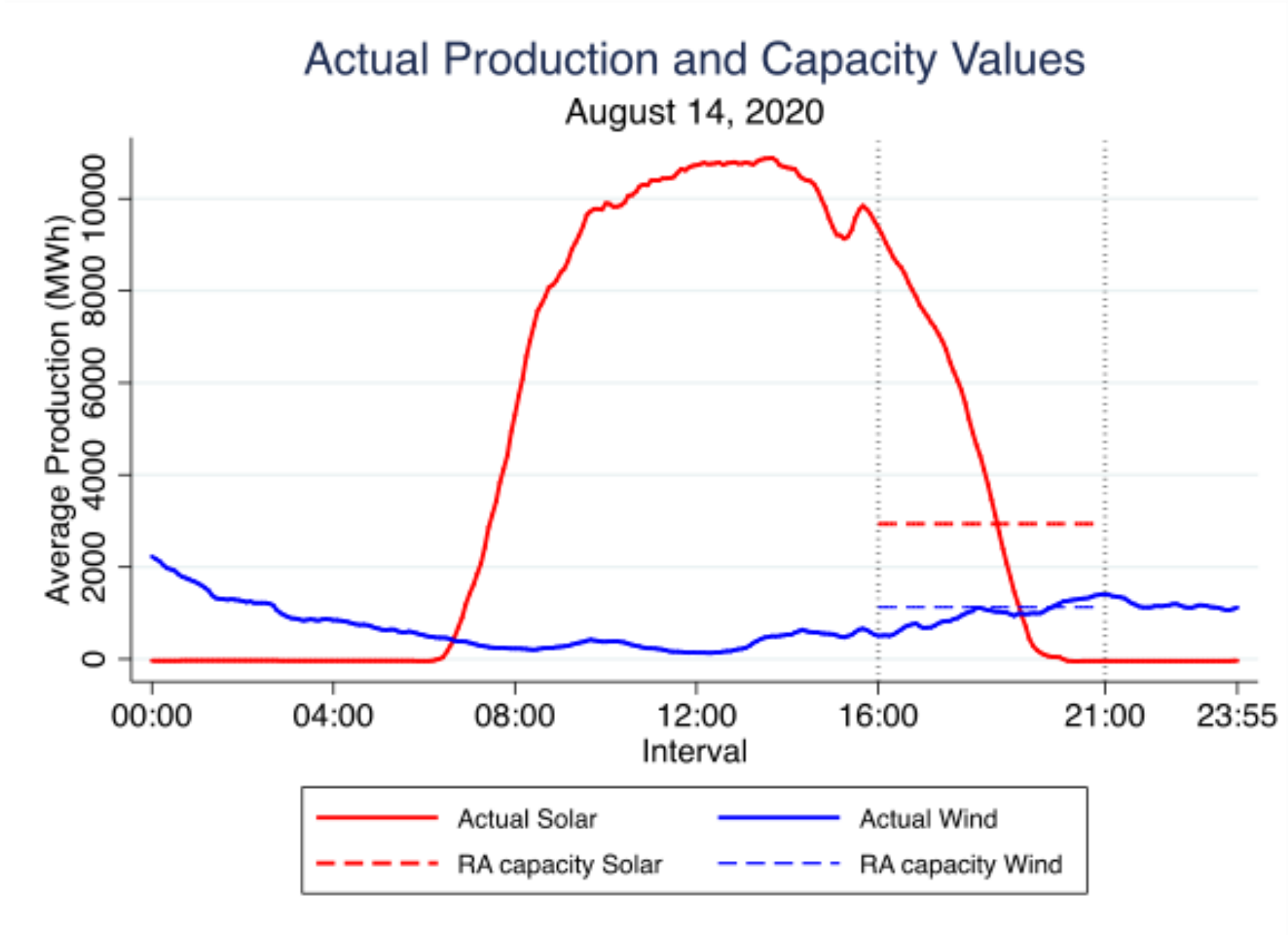
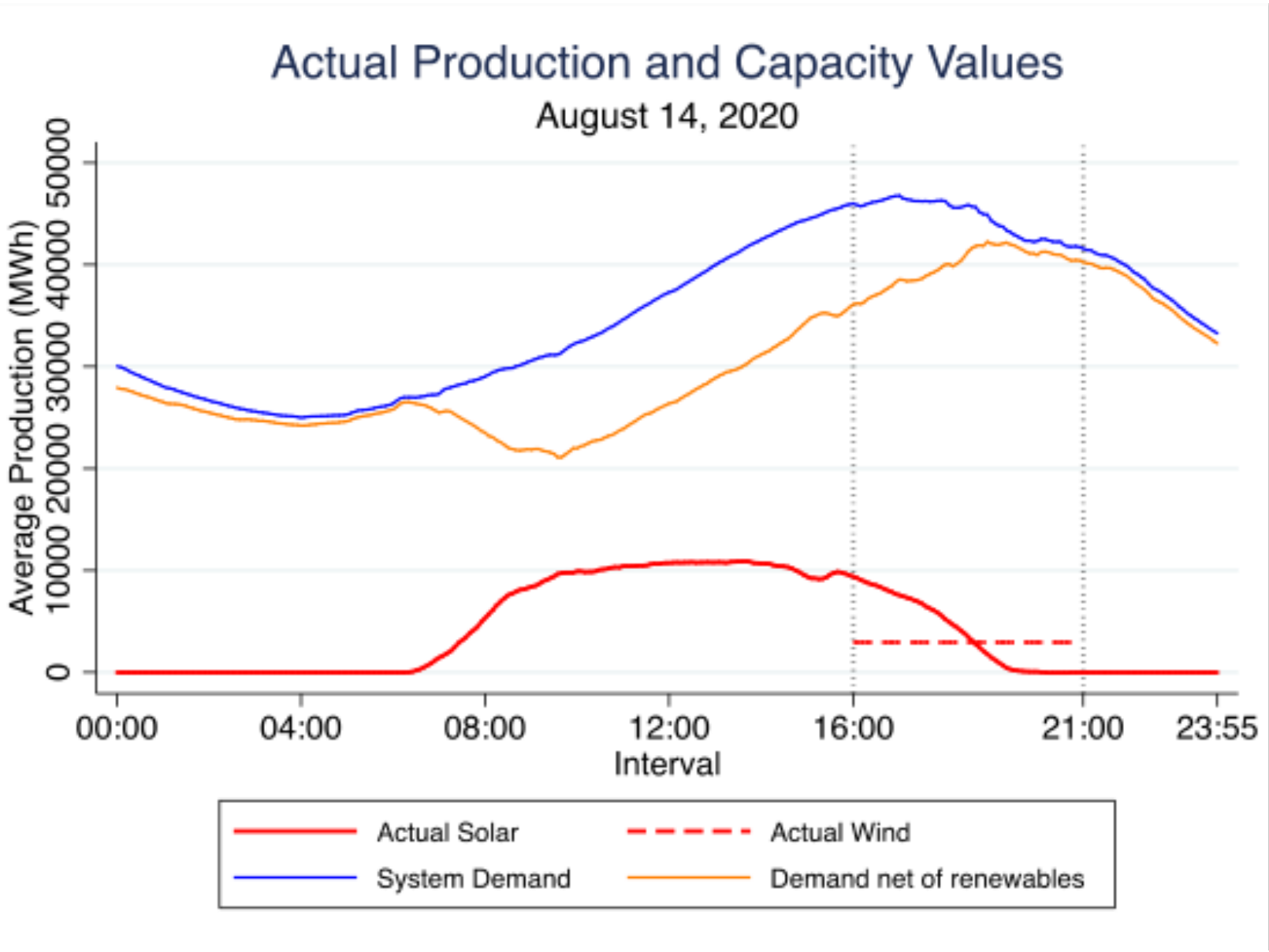
Reliability and Markets

- Can markets provide sufficient reward for reliable power supply?
- Would a capacity market have prevented the Texas events?
  - I don't think so; Planning margins were met
- NYISO or PJM style capacity market would have provided arguably *weaker* performance incentives

Multiple Steps to Reliable Electricity Supply

- Capacity Markets focus on capacity planning
- Most put insufficient weight on the other steps to reliable supply
- Strong performance incentives are needed to ensure *capacity* translates to *energy*
- *But no market has bigger incentives than Texas*


Actual Production and Capacity Values
August 14, 2020
Average Production (MWh)
0
2000
4000
6000
8000
10000
00:00
04:00
08:00
12:00
16:00
21:00
23:55
Interval
Actual Solar
Actual Wind
RA capacity Solar
RA capacity Wind



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Factors Influencing the California Reliability Outlook

- Politics of "scoring" resources & needs
  - What demand forecast should be used?
  - How much credit should different sources get?
- Return of retail competition in the form of community choice aggregation
  - Gaps in RA rules no longer papered over by regulatory procurement
    - No penalties for being short on the "day of"
- Tighter capacity in rest of the west
  - CAISO rules limit prices to below those seen in AZ during August 2020
    - Integration with other markets cuts both ways in a supply shortage situation

Capacity Sales and Performance Incentives

- Markets like CA have relatively weak penalties for capacity non-performance
- Some markets, like ISO-NE charge upwards of $5000/MWh for non-performance of capacity during any period where there is a constraint relaxation
- But Texas market has the largest penalty of them all, $9000/MWh lost opportunity
  - Would that pay for deicing turbine blades?

Thank You!

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