

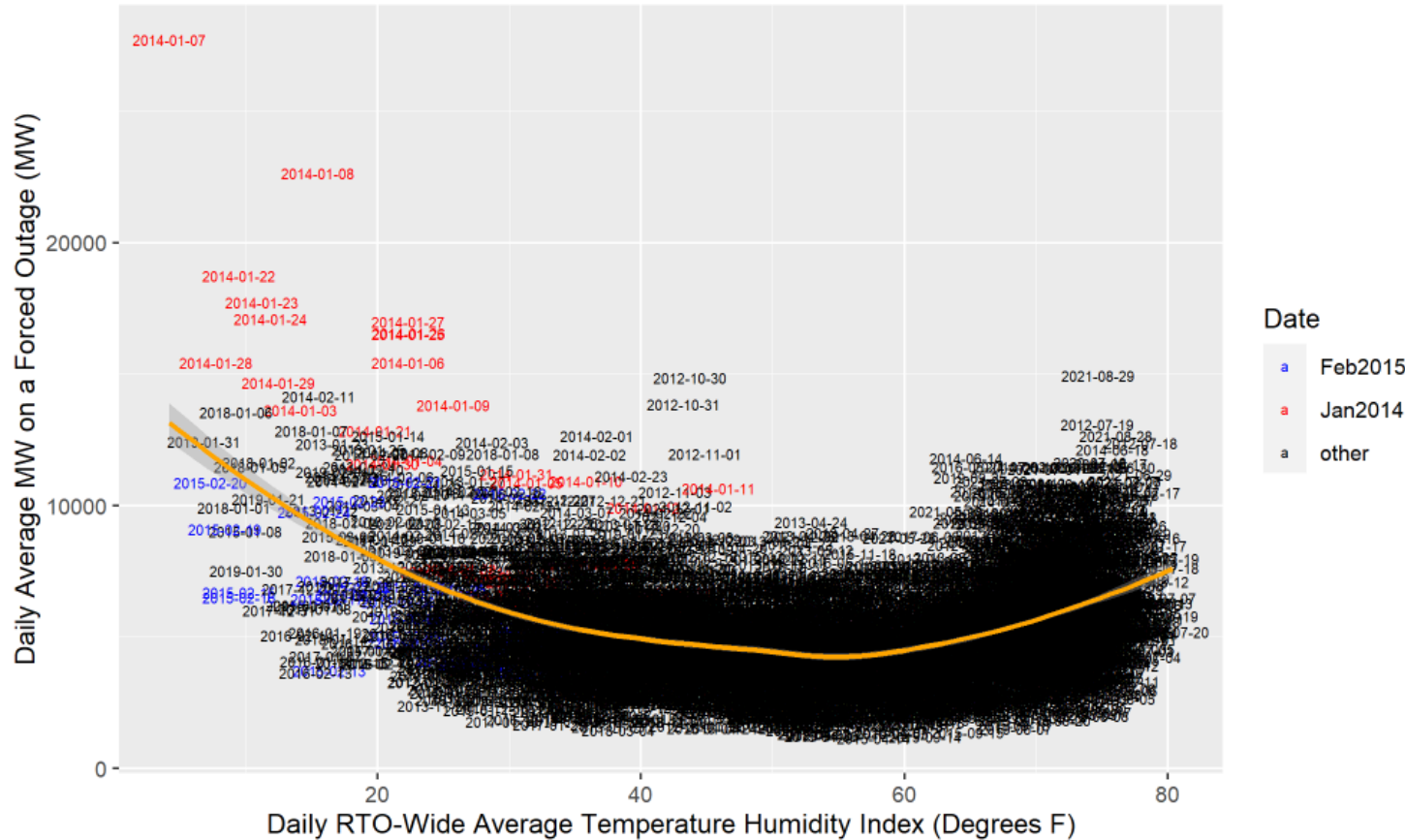


Responses to RASTF Data Analysis Requests submitted by AEE and Roy Shanker

Patricio Rocha Garrido
Resource Adequacy Planning
RASTF
September 22, 2022

- Thermal Weather-Dependent Forced Outages by Fuel Type
- Thermal Fuel-Related Forced Outages by Fuel Type
 - Specifically, fuel-related cause codes: 9130, 9131, 9134
 - 9130: Lack of fuel: Physical failures of fuel supply or delivery/transportation of fuel
 - 9131: Lack of fuel: Contract or Tariff allows for interruption
 - 9134: Fuel conservation

Analysis of GADS forced outages data in period 2012-2021 (excluding retired units)

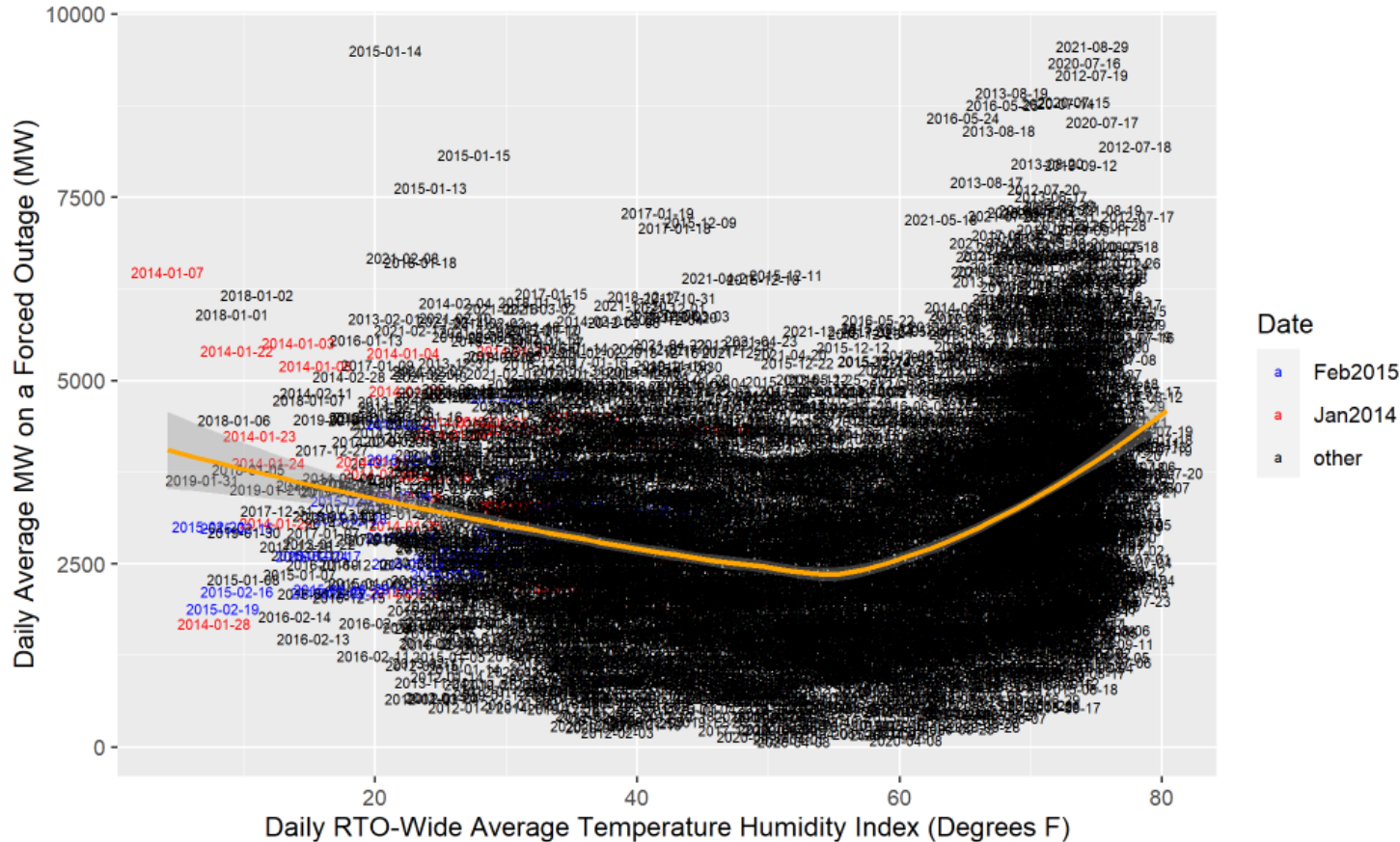


Historically, colder temperatures have caused a larger amount of forced outages.

If the January 2014 data points (in red) were to be excluded, there is a milder relationship between colder temperatures and a larger amount of forced outages.

Warmer temperatures also seem to cause a larger amount of forced outages (the graph has a bathtub shape)

Analysis of GADS forced outages data in period 2012-2021 (excluding retired units) – **Coal only**

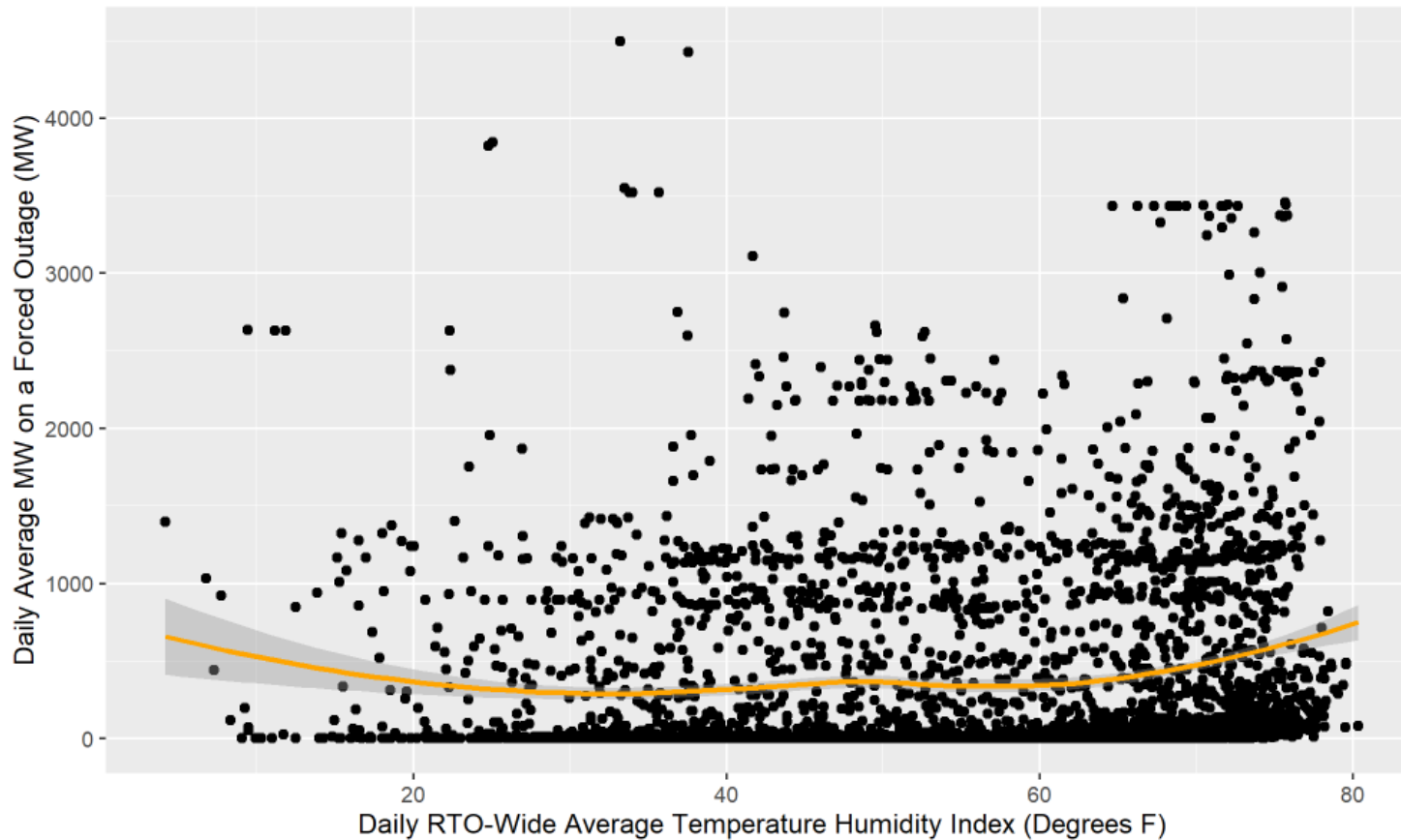


Historically, for existing coal units, there seems to be a relationship between warmer temperatures and a larger amount of forced outages. The same can be said for colder temperatures.

Cause codes prevalent on warmer temperature include:

- Feedwater pump
- Superheaters

Analysis of GADS forced outages data in period 2012-2021 (excluding retired units) – **Nuclear only**



Historically, for existing nuclear units, there seems to be a relationship between warmer temperatures and a larger amount of forced outages.

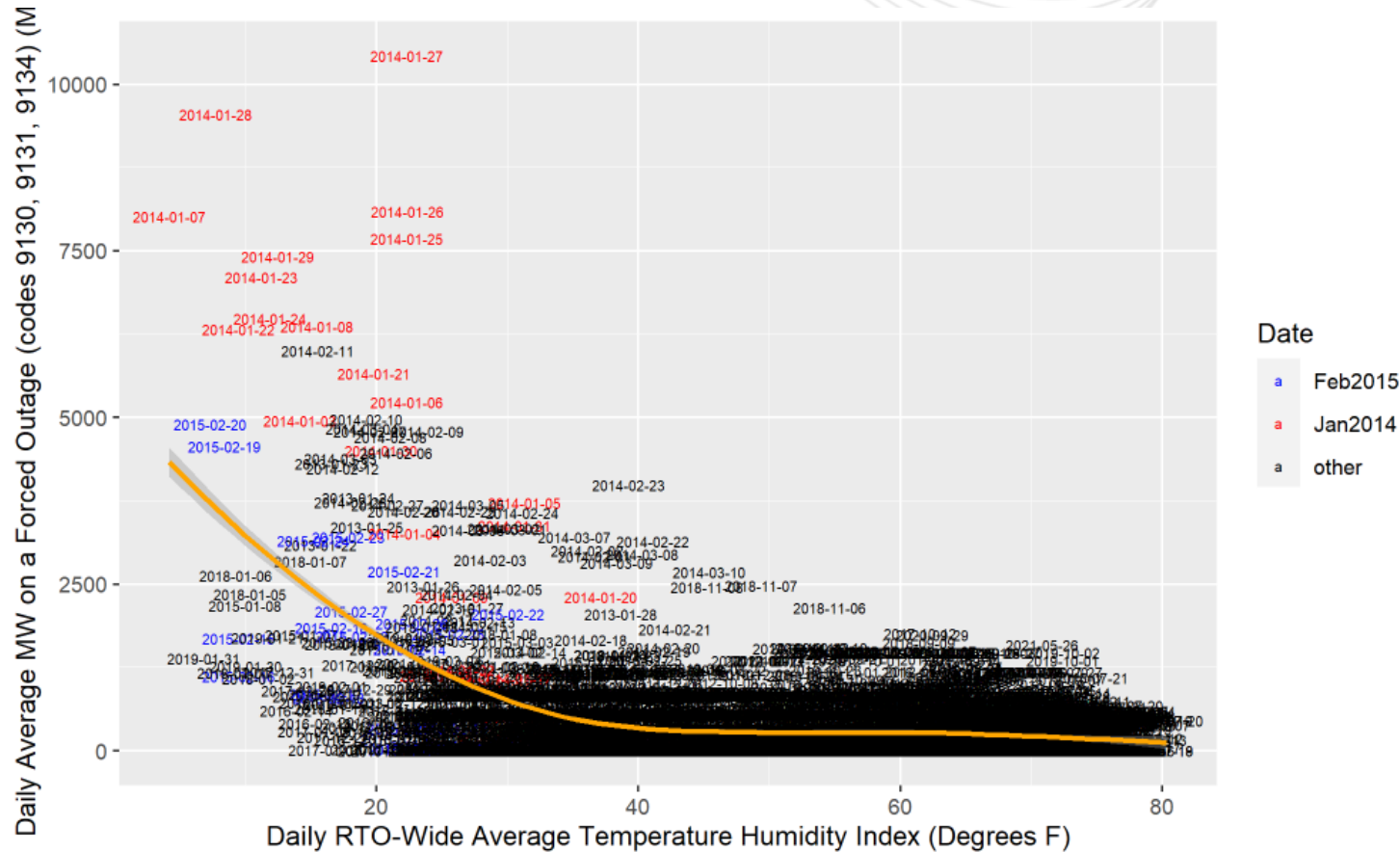
There are no cause codes that are prevalent when examining the forced outages of nuclear units on days with warmer temperatures.

Dates not provided because of data confidentiality issues.

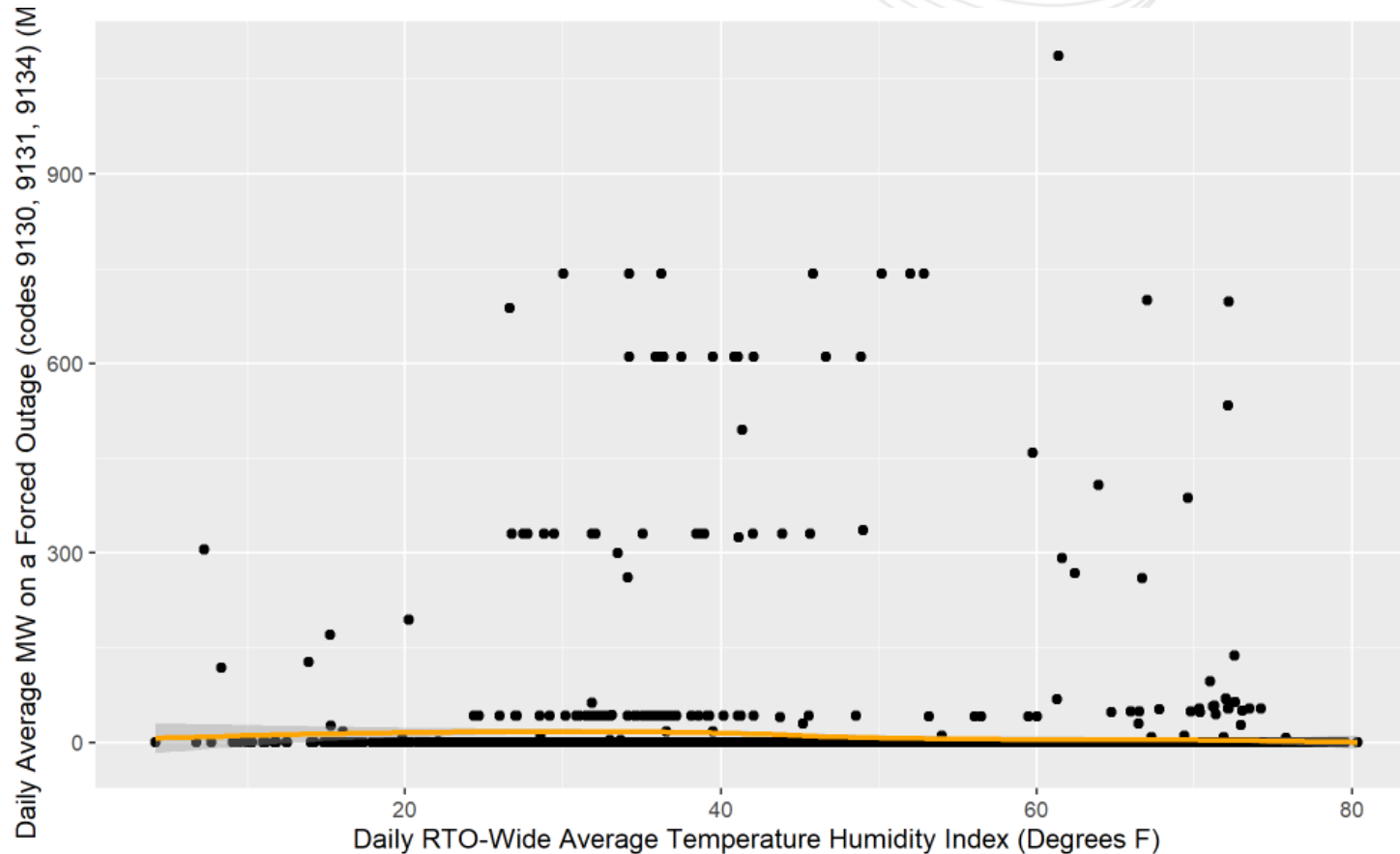


Fuel-Related Forced Outages

Analysis of GADS forced outages data in period 2012-2021 (excluding retired units)



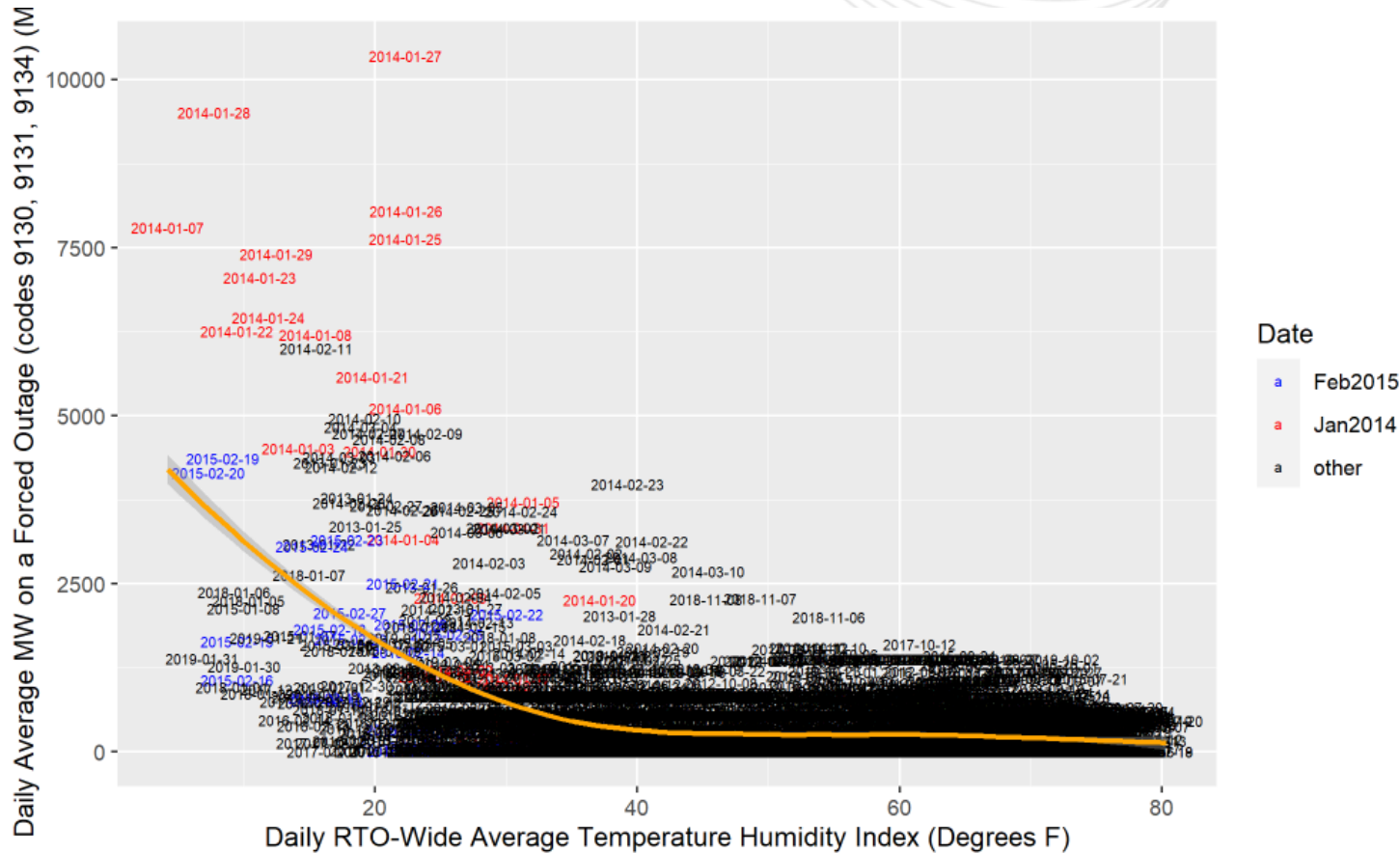
Analysis of GADS forced outages data in period 2012-2021 (excluding retired units) – **Coal only**



Largely, coal forced outages have not been historically associated with lack of fuel cause codes (9130, 9131 and 9134, specifically).

Dates not provided because of data confidentiality issues.

Analysis of GADS forced outages data in period 2012-2021 (excluding retired units) – **Natural Gas only**



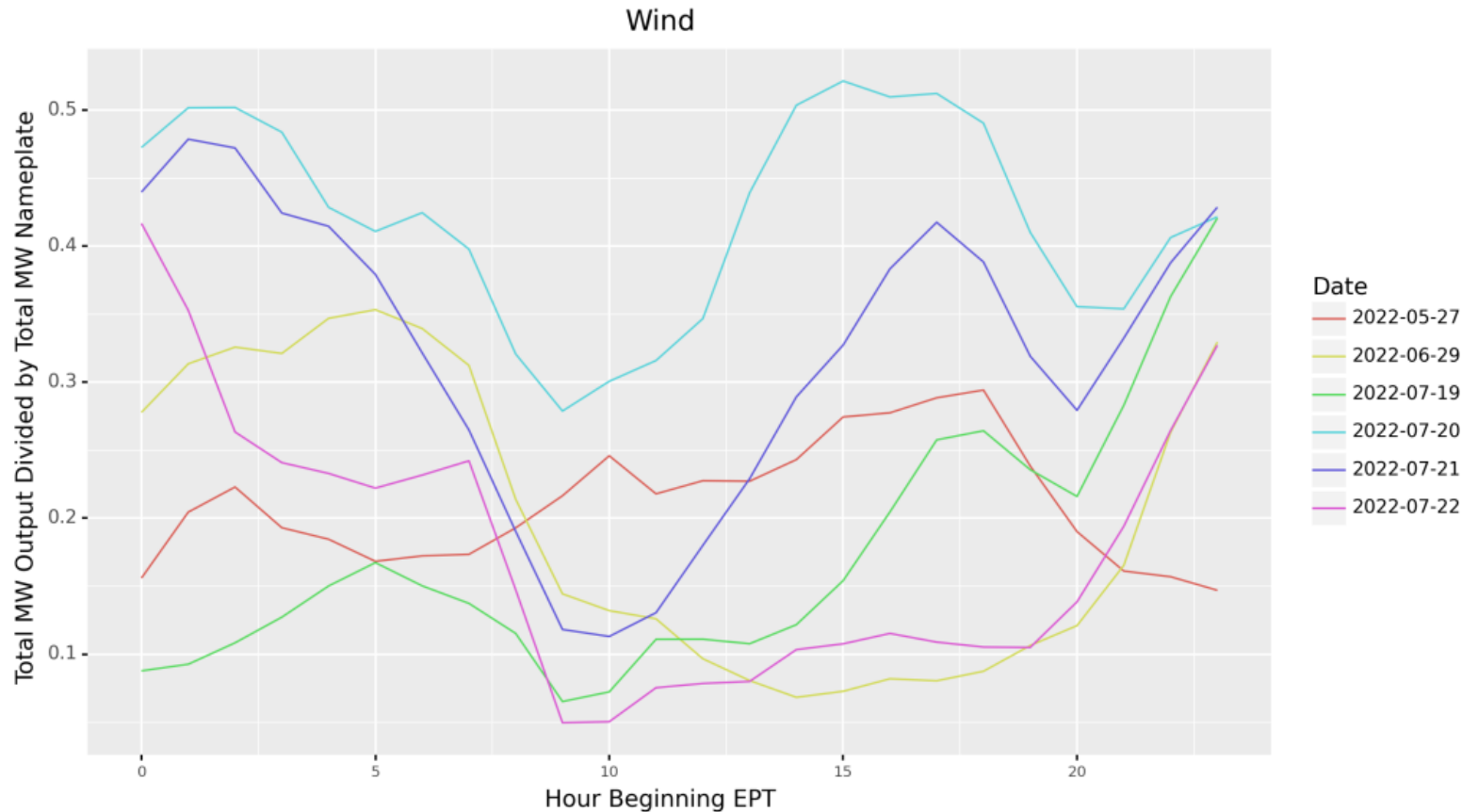
Historically, colder temperatures have caused a larger amount of natural gas forced outages with cause codes 9130, 9131, 9134, which are related to lack of fuel

Analysis of GADS forced outages data in period 2012-2021 (excluding retired units) – **Nuclear only**

Historically, nuclear forced outages are not associated with cause codes 9130, 9131, 9134, which are related to lack of fuel.

Graph not provided because of data confidentiality issues (not more than 3 generation owners in an outage)

- Resource Performance during recent May-June-July Hot Weather Alerts
 - May 27, 2022
 - June 29, 2022
 - July 19, 2022
 - July 20, 2022
 - July 21, 2022
 - July 22, 2022

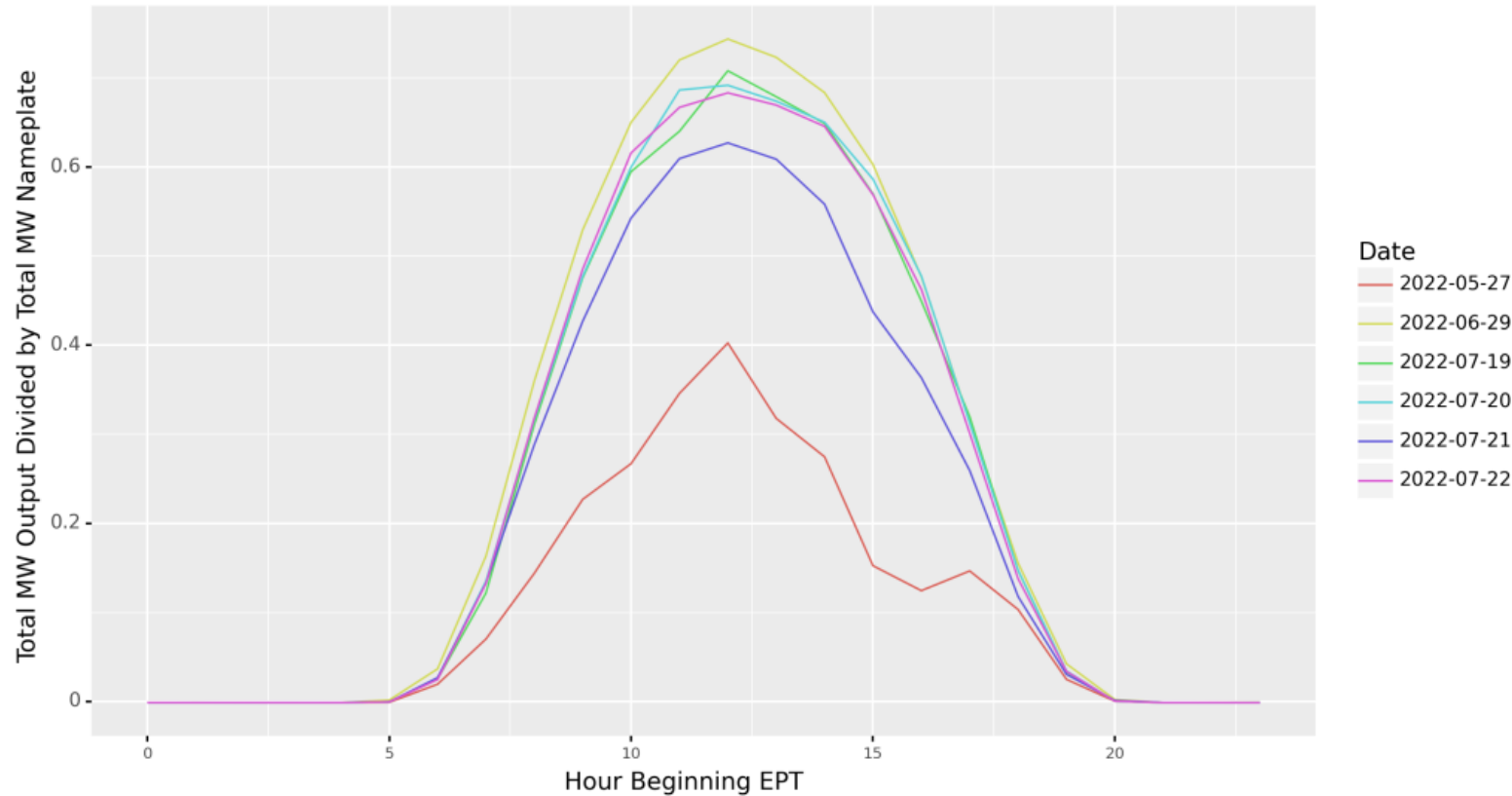


Comparing the days, high performance variability can be observed, especially during the afternoon period.



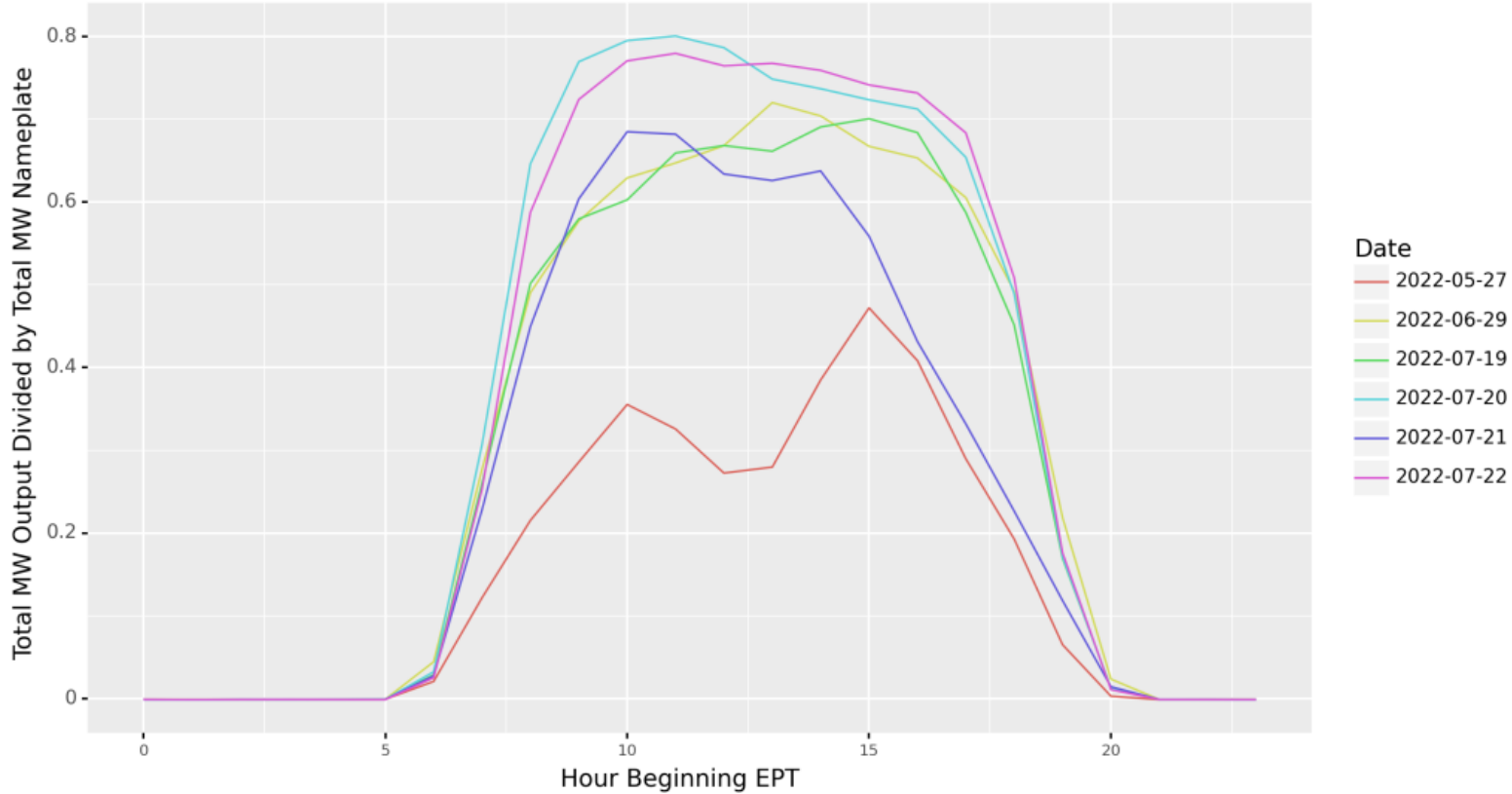
Solar Fixed Performance during May/June/July/Hot Weather Alerts

Solar Fixed

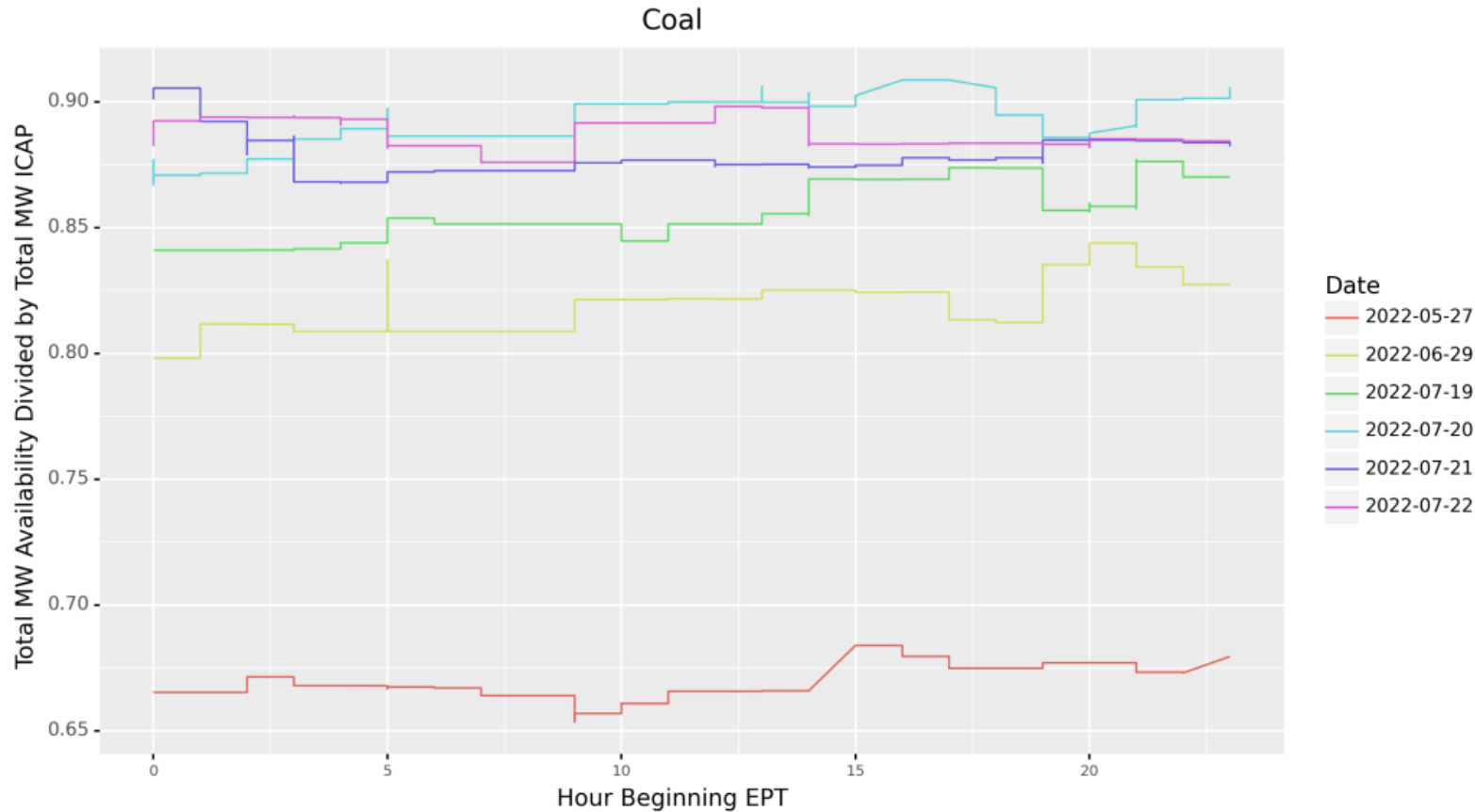


Performance was rather similar in all days except for 2022-05-27

Solar Tracking



Performance was somewhat similar in all days except for 2022-05-27



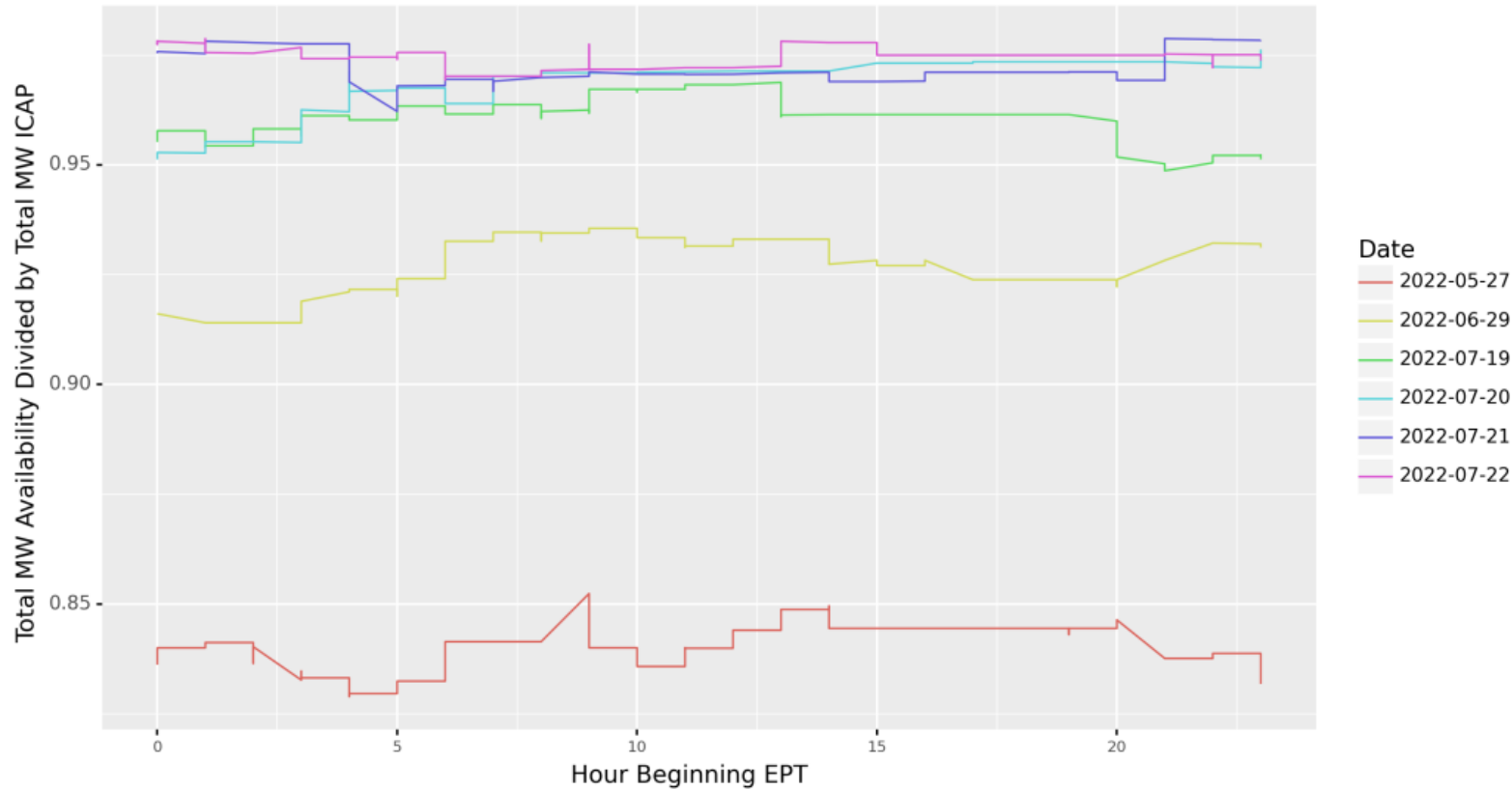
Availability was similar during the 4 July days. Lower availability was observed during the June and May events, especially the latter.

Intra-day variability in availability is low



Natural Gas Availability during May/June/July/Hot Weather Alerts

Natural Gas



Availability was similar during the 3 July days. Lower availability was observed during the June and May events, especially the latter.

Intra-day variability in availability is low



Nuclear Availability during May/June/July/Hot Weather Alerts

Availability was high and very similar during all days.

Graph not provided because of data confidentiality issues.

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Requests submitted by AEE and Roy
Shanker**



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