



Reminder!

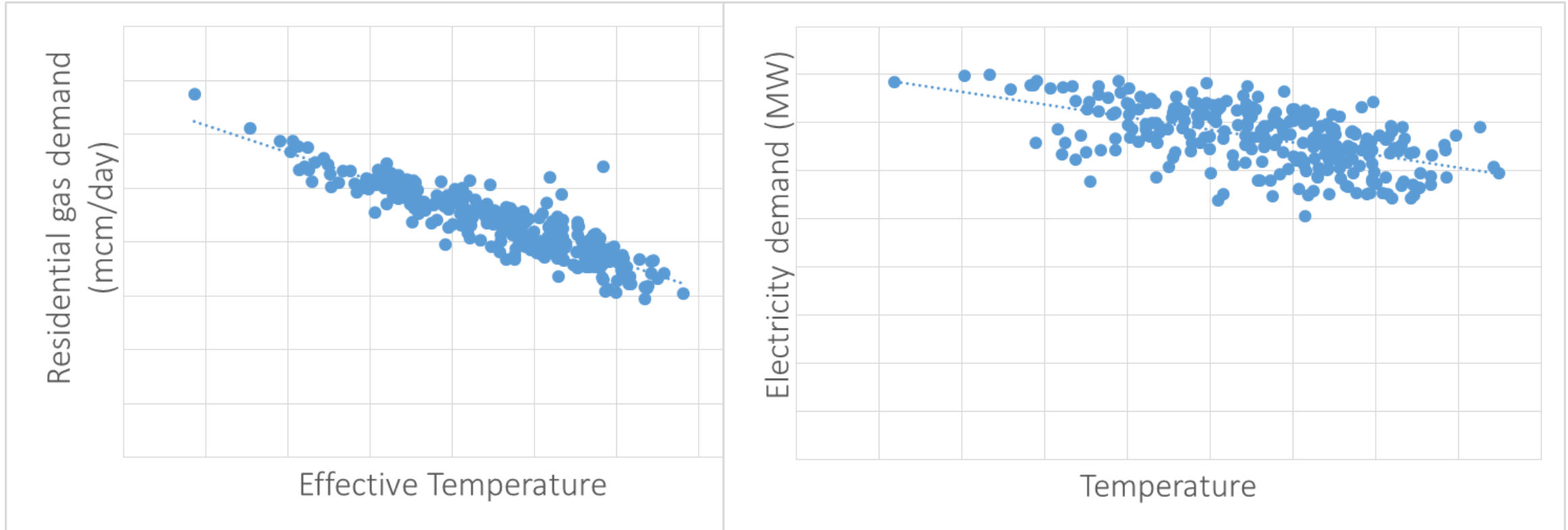
Meeting in 20 minutes at 14:45

Weather view on LNG cargo purchase

Click [here](#) to Snooze for 15 minutes

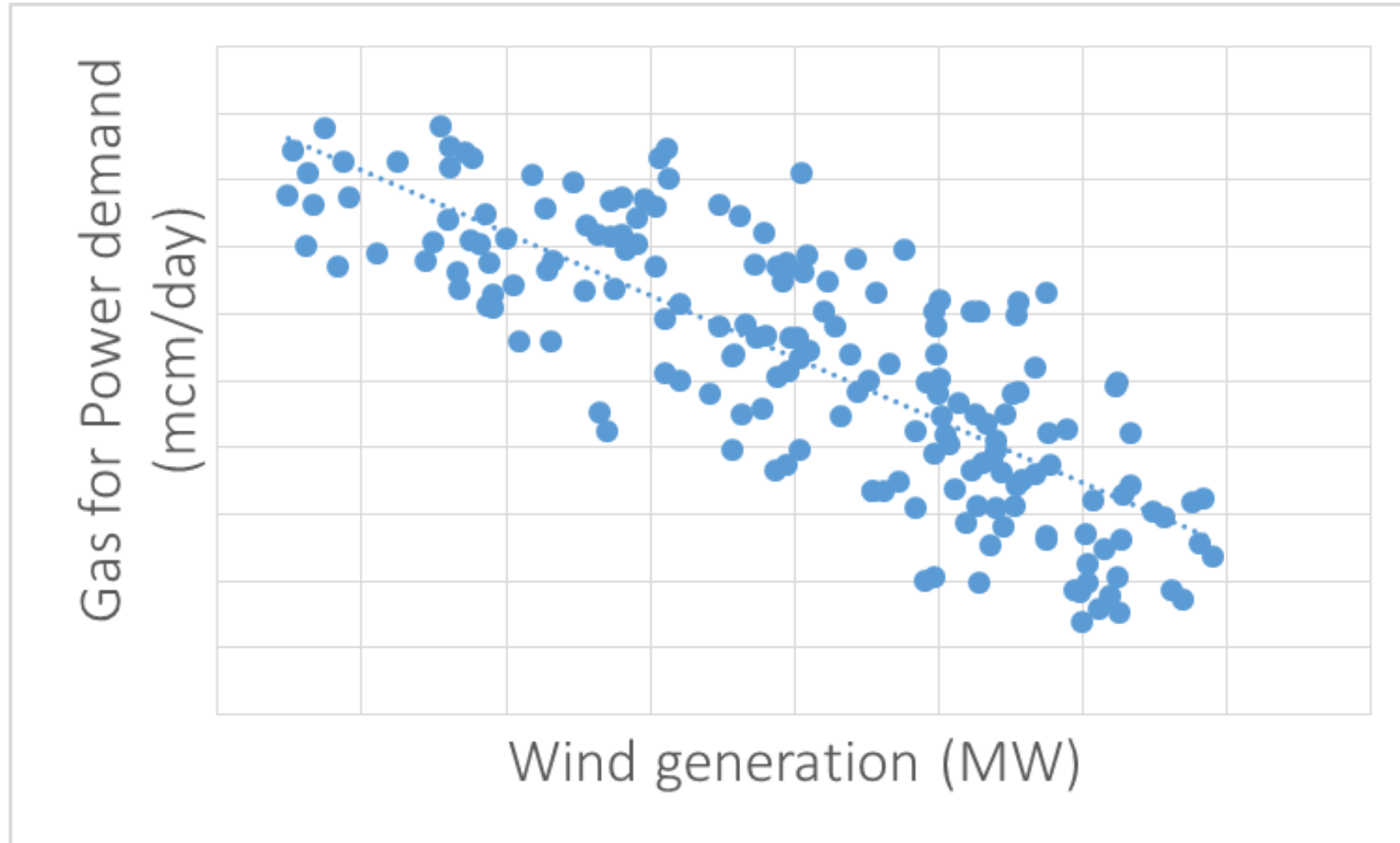


GB electricity and gas demand depends on temperature (DJF)



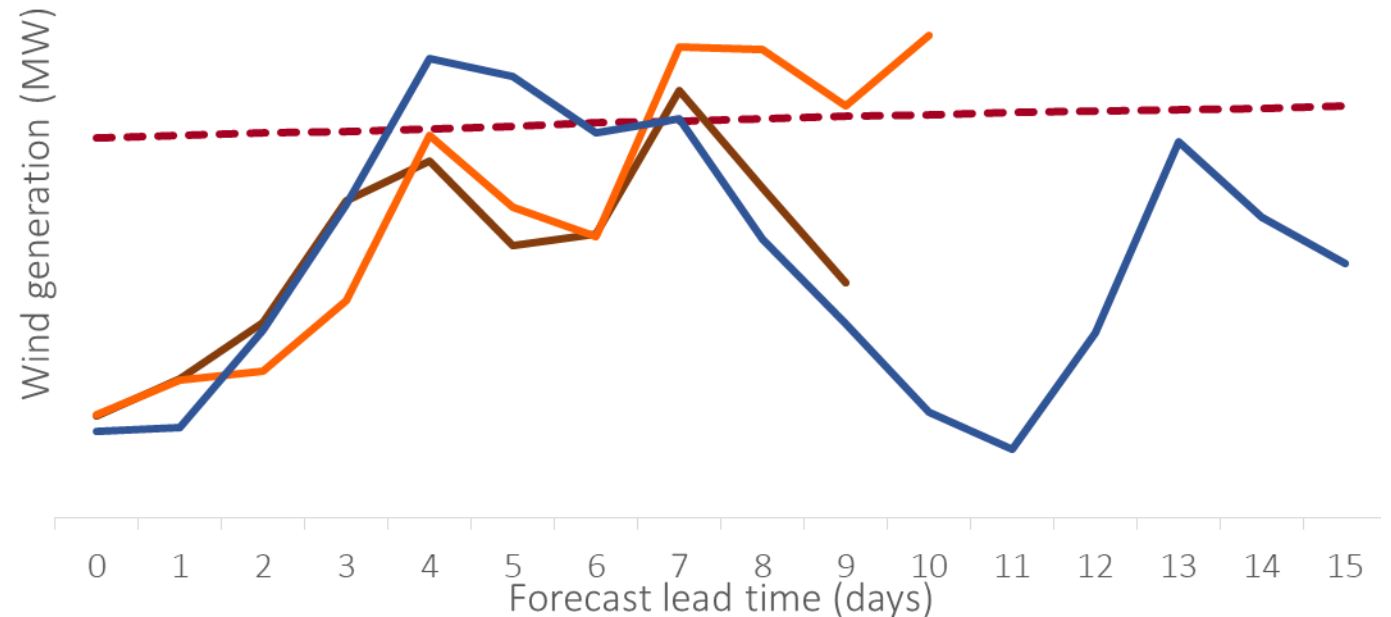
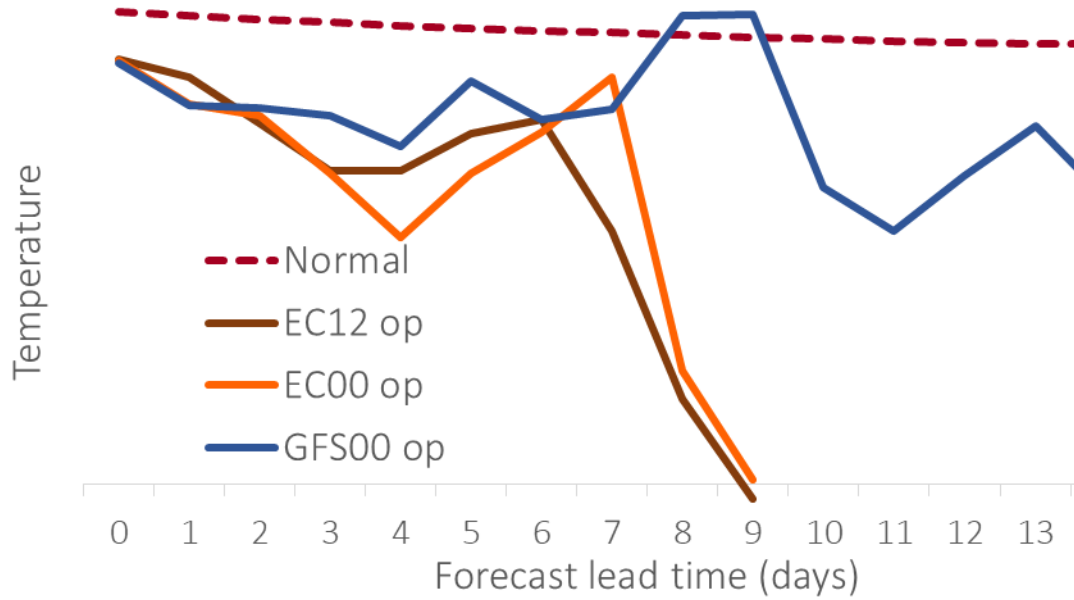


...and also on renewable output (DJF)





EC and GFS op forecasts



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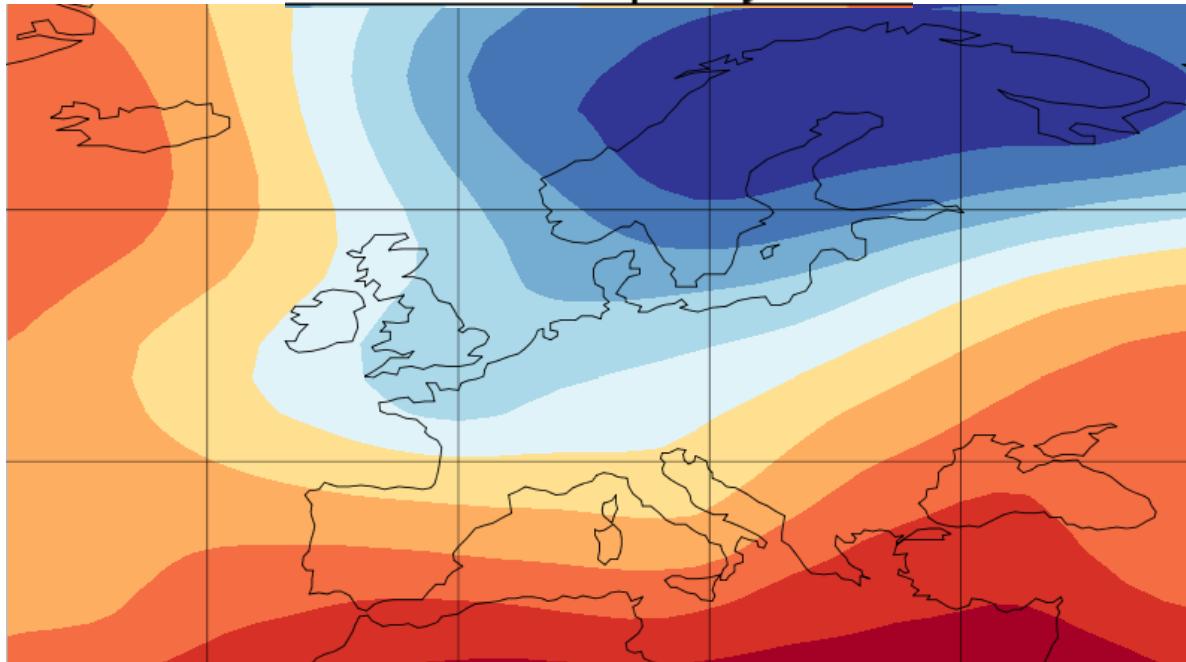
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Source: Lake Street, using data from ECMWF and NOAA

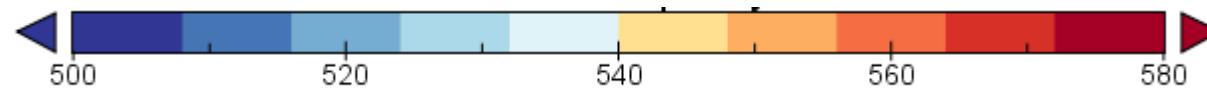
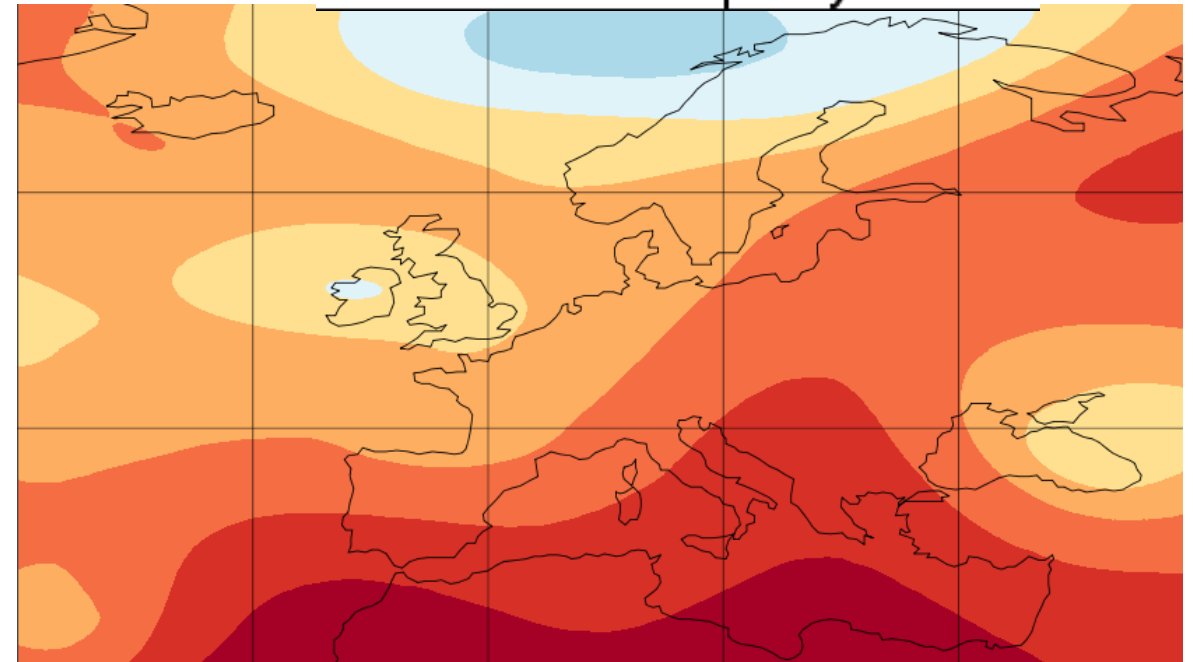


Day 9 synoptics

z500 EC00 op day 9



z500 GFS00 op day 9



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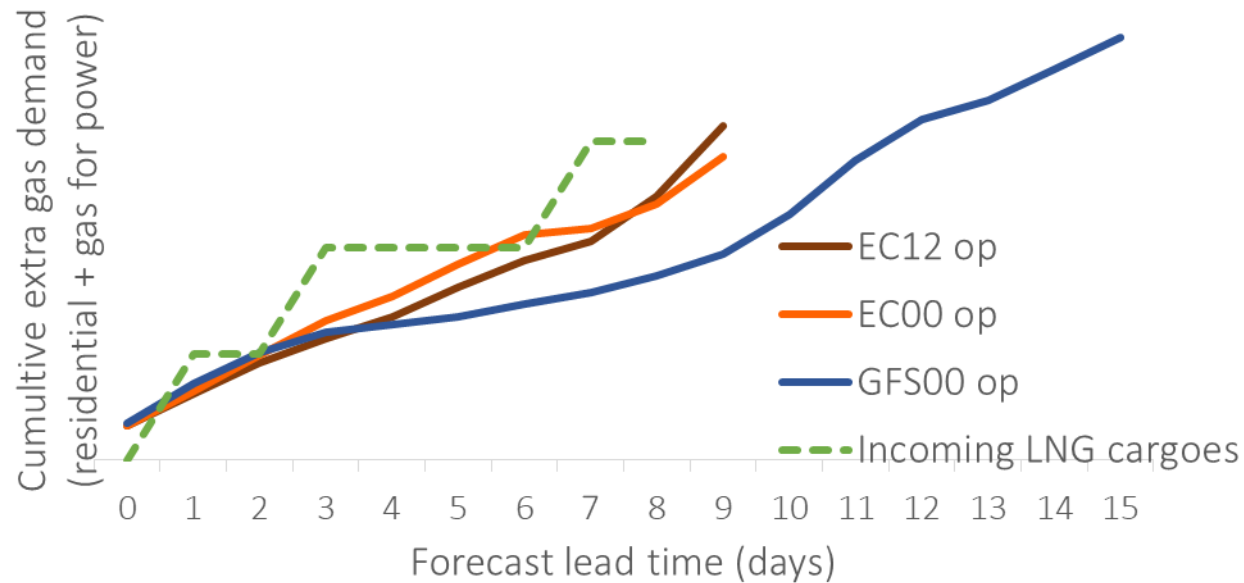
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Source: z500 plotted using GISS software from NOAA, using data from ECMWF and NOAA,



Forecast gas demand vs incoming LNG cargoes

Hypothetical scenario

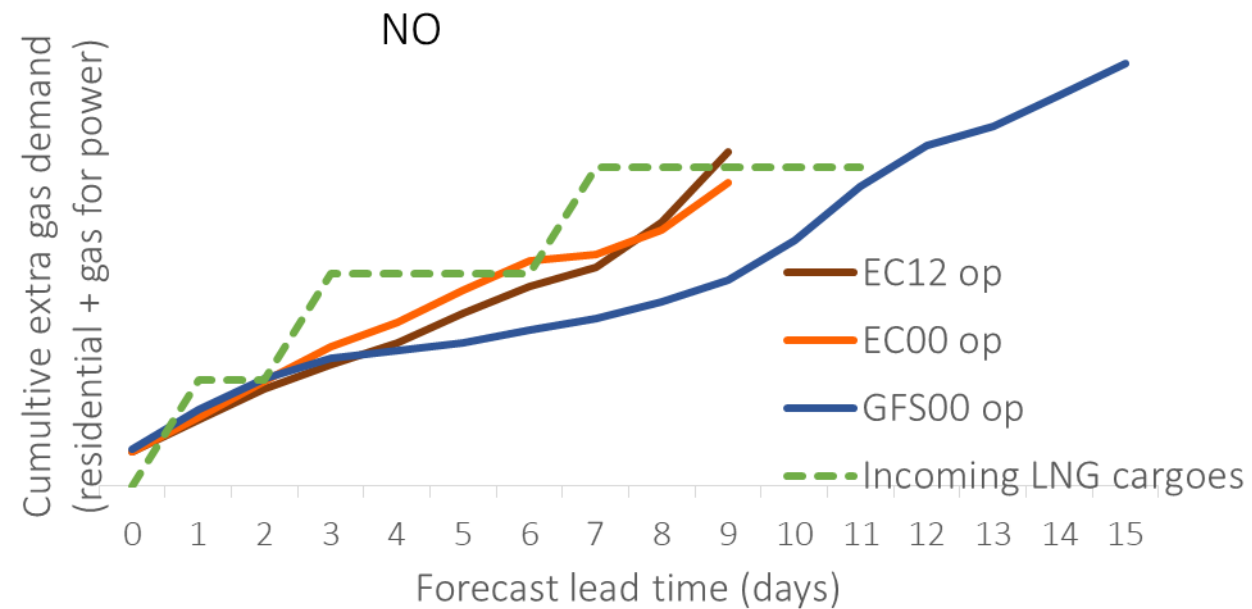
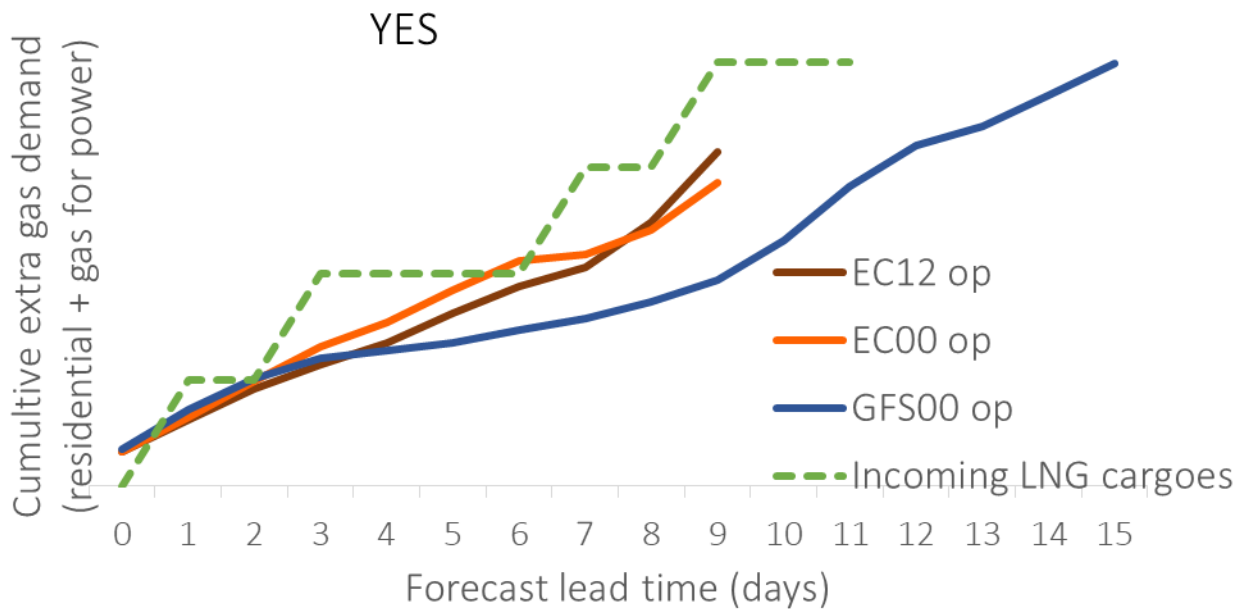


Poll: Based on the weather forecasts, do we purchase another LNG cargo to arrive on day 9?
Yes, No, or Abstain from making a decision



Forecast gas demand vs incoming LNG cargoes

Hypothetical scenario



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Lake Street
working with the weather

How ensemble forecasts enhance the energy sector

30 Years of Ensemble Forecasting and Symposium for Prof. Tim Palmer

Isla Finney



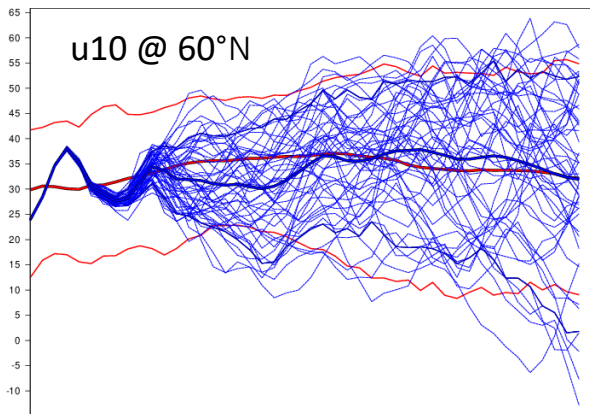
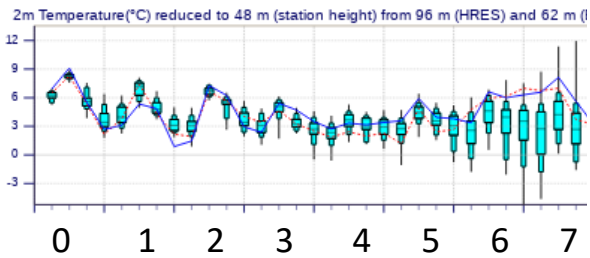
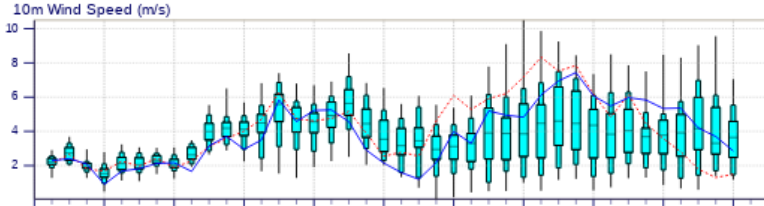
Ensemble information in energy sector: from exotic to essential

- Early 2000: focus on the op runs
- 2000-2005: gradual introduction of ensembles, mainly ensemble mean
- 2005-2010: ensemble mean use normal.
ensemble member use increases, mainly for probabilities
- 2010-now: probabilistic forecasts from ensemble members normal,
increasing use of ensemble member pattern information,
exploration of regimes in terms of energy supply/demand

My experience – obviously variations between countries and energy houses



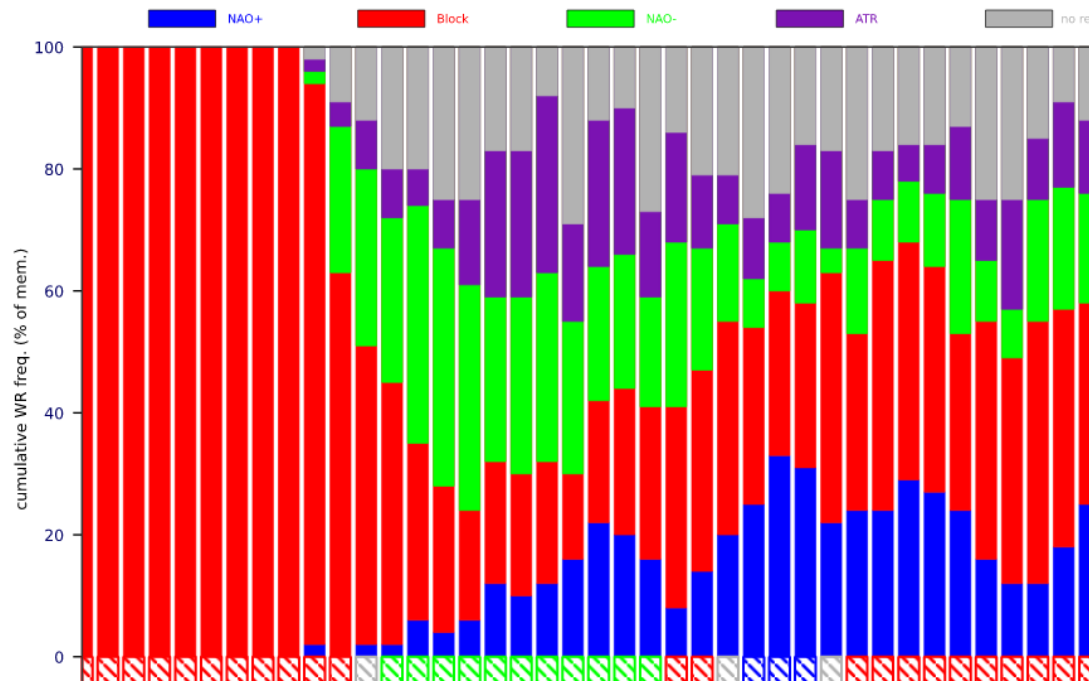
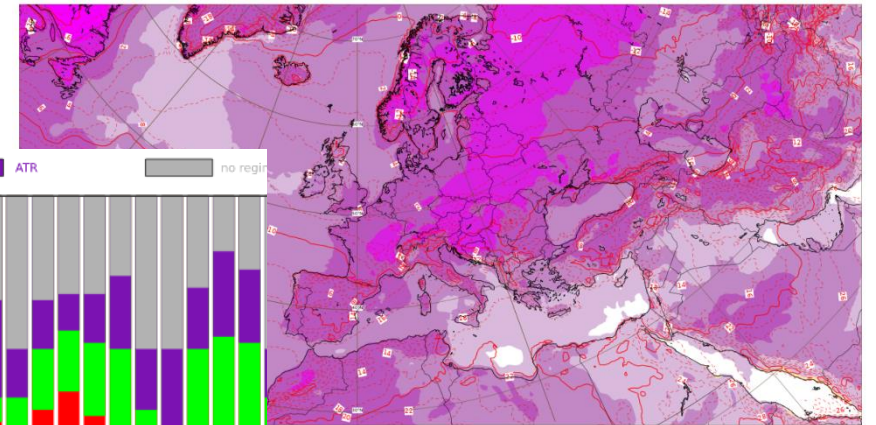
Ensemble charts regularly viewed by the energy sector



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Ensemble mean and spread: 2 m temperature

Base time: Wed 30 Nov 2022 00 UTC Valid time: Fri 09 Dec 2022 12 UTC (+228h) Area : Europe



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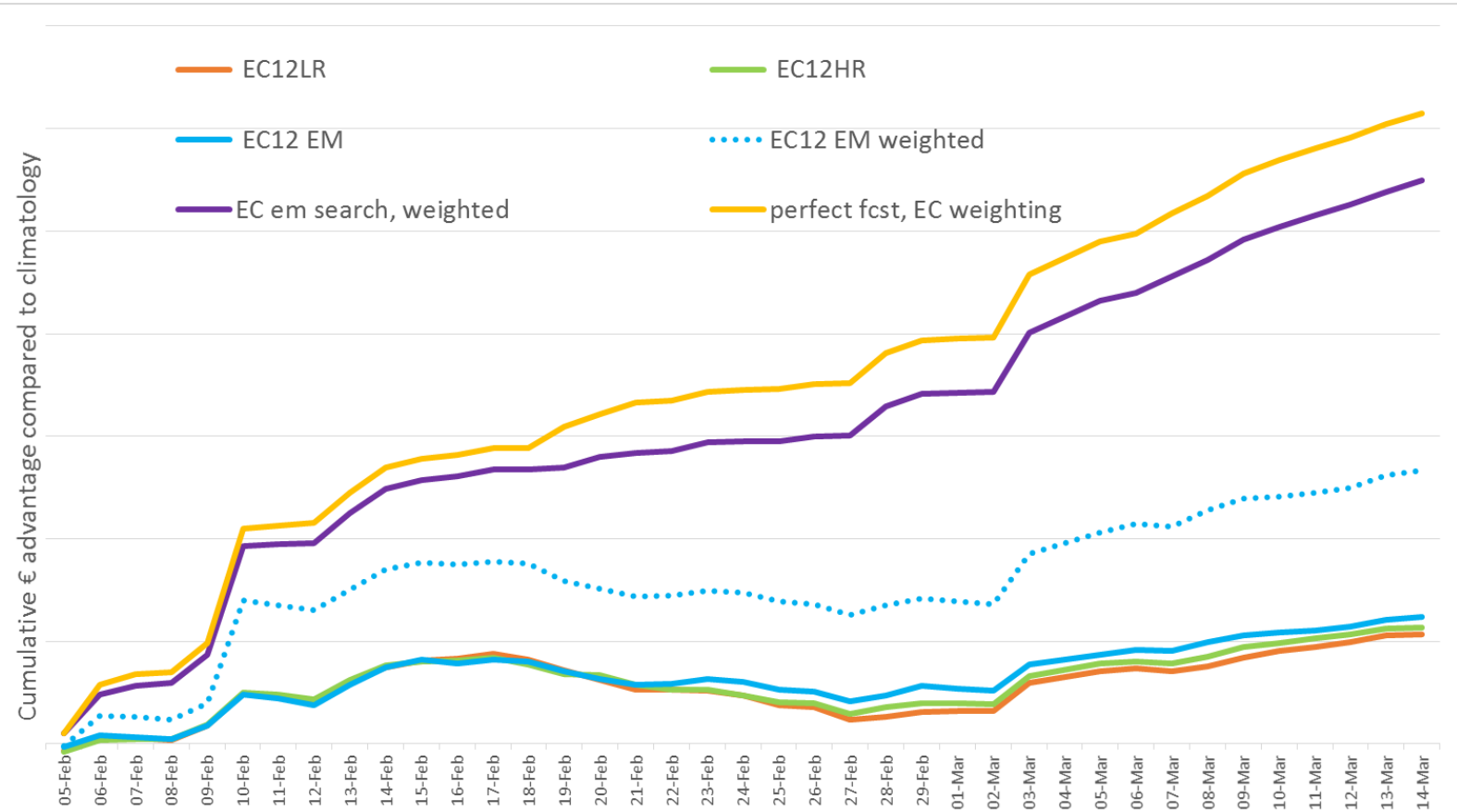
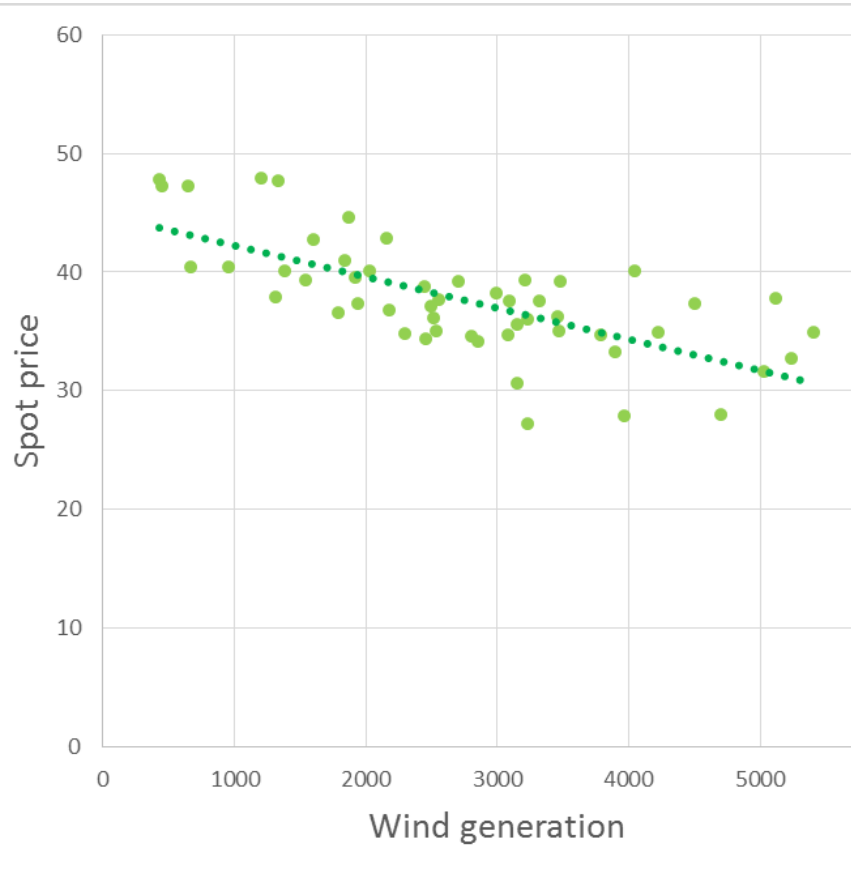
Source: ECMWF





Ensembles have value

96h forecast value for IT wind generation



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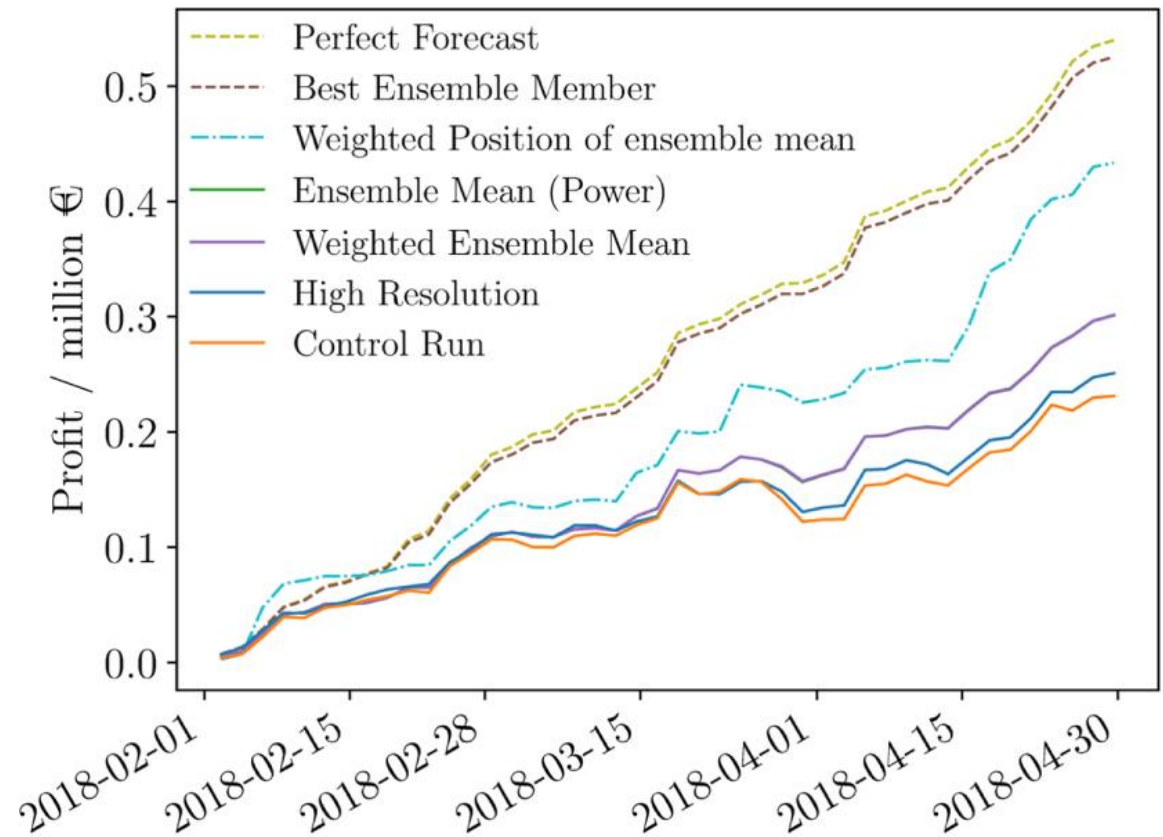
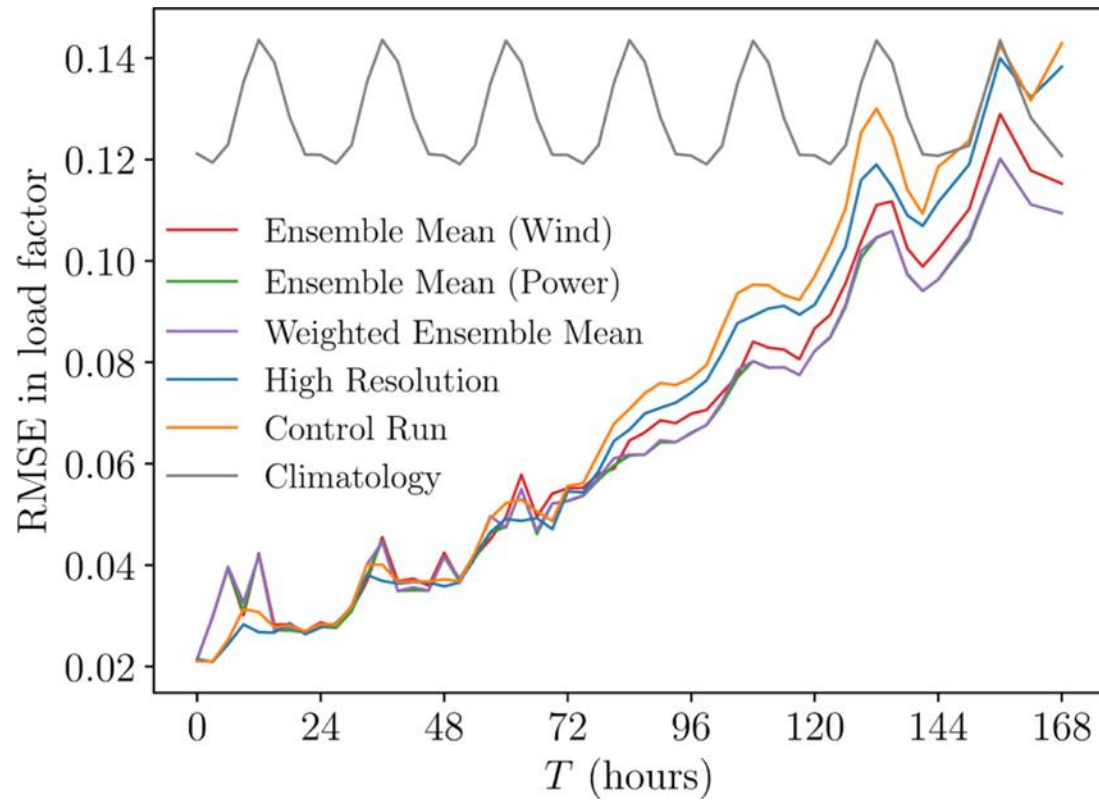
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Source: Lake Street, using data from ECMWF and GME



Ensembles have value

96h forecast value for DE wind generation



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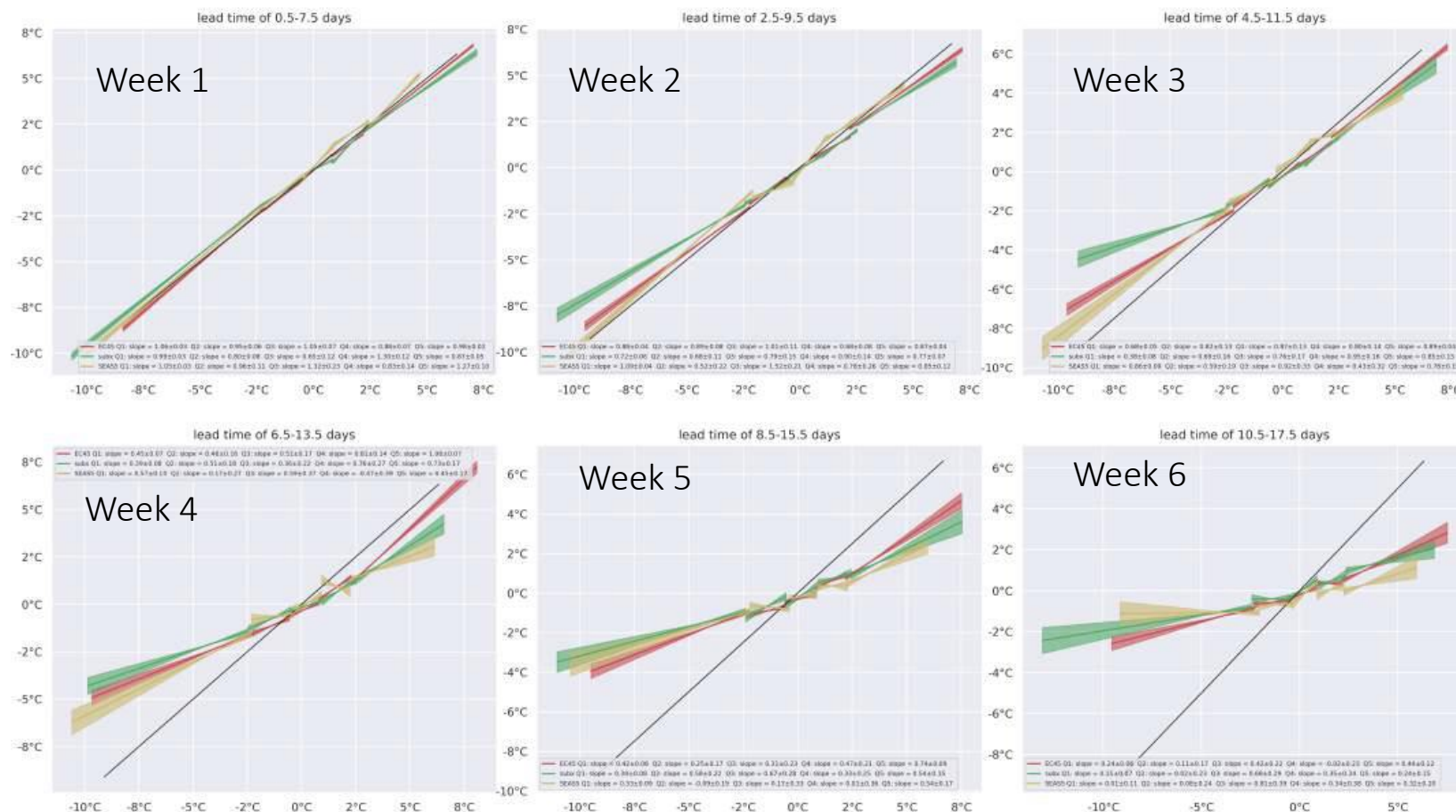
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Harder to extract value in sub-seasonal

Quintile dependent linear regression of forecast anomalies in DJF weekly mean French surface temperature against reanalysis temperature. Forecasts on the diagonal black line are characteristic of a perfect model

----- EC45
 ----- SubX
 ----- SEAS5



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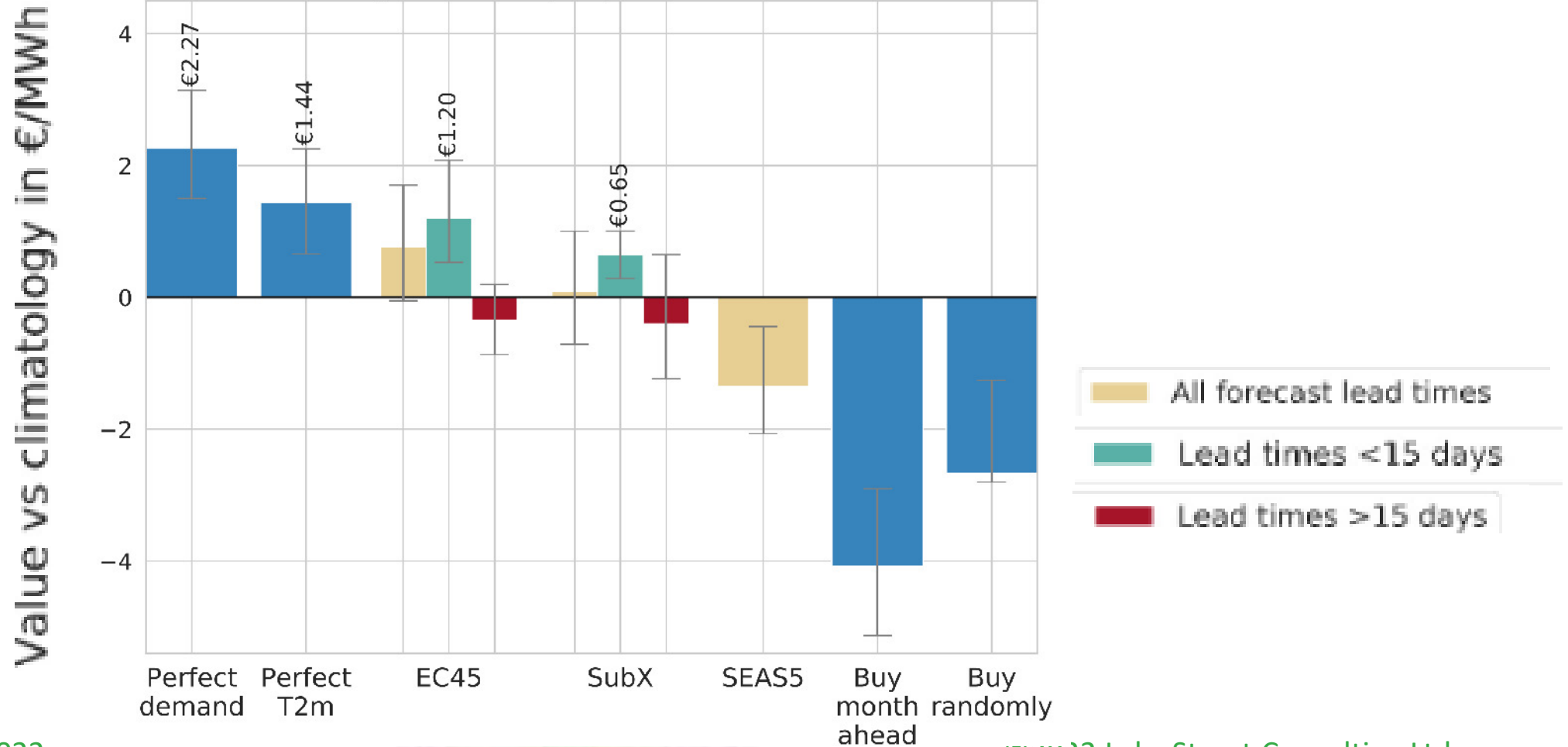
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Source: Lake Street, using data from ECMWF, Copernicus, NOAA. Work done by Josh Dorington whilst on a NERC funded internship



Harder to extract value in sub-seasonal

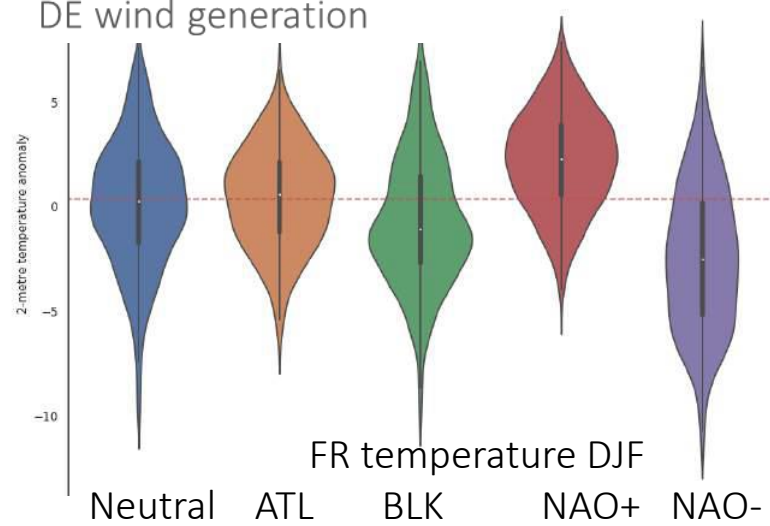
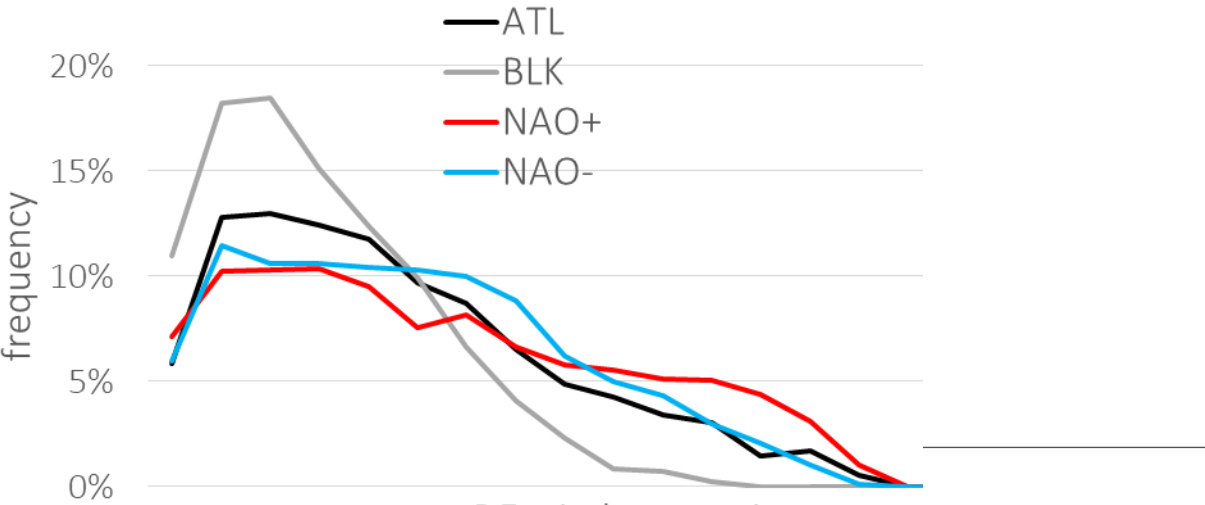
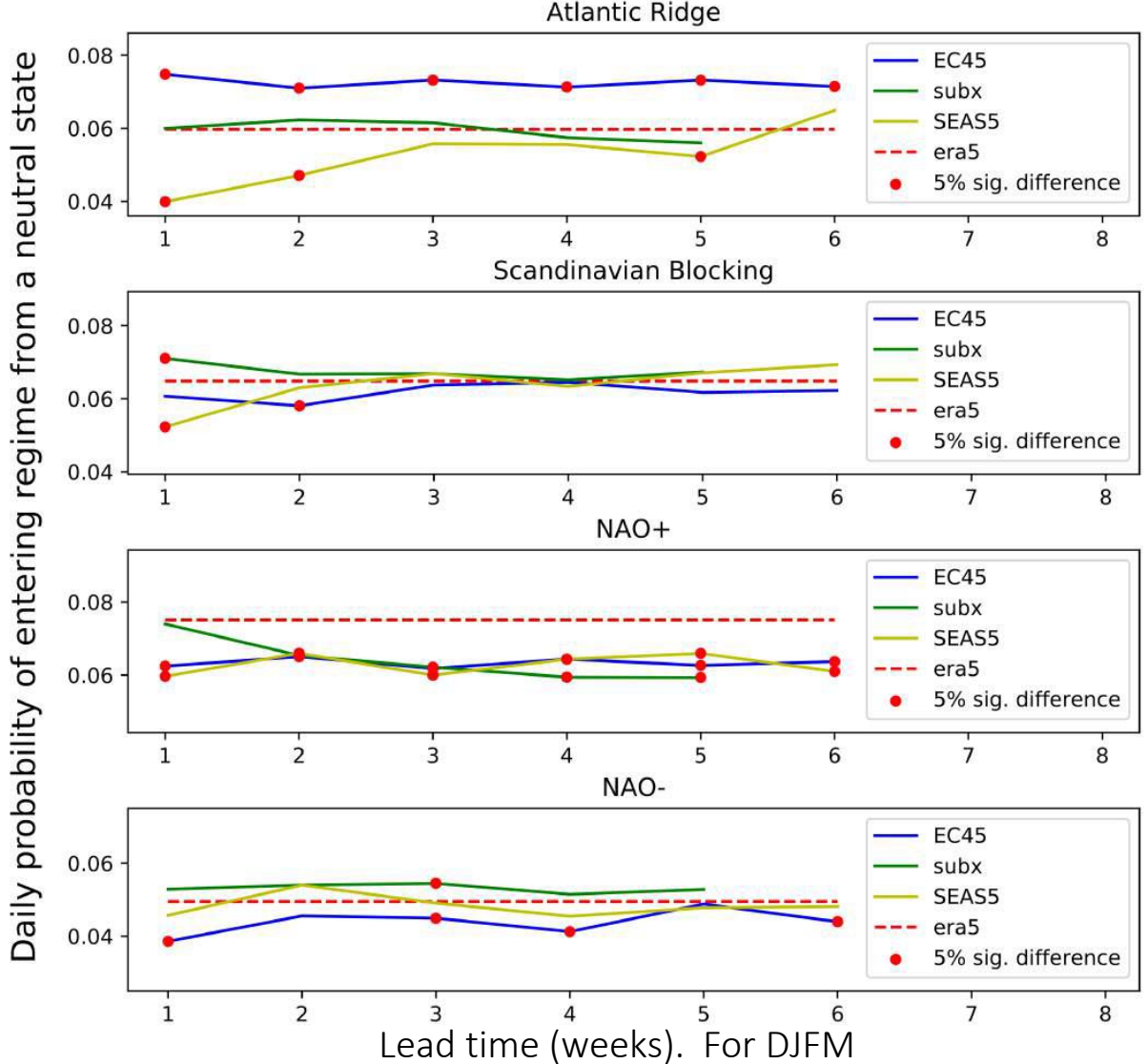
Month ahead vs day ahead trading strategy for FR power demand, DJF



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Some look to regimes



Weather regimes not always good as energy regimes!

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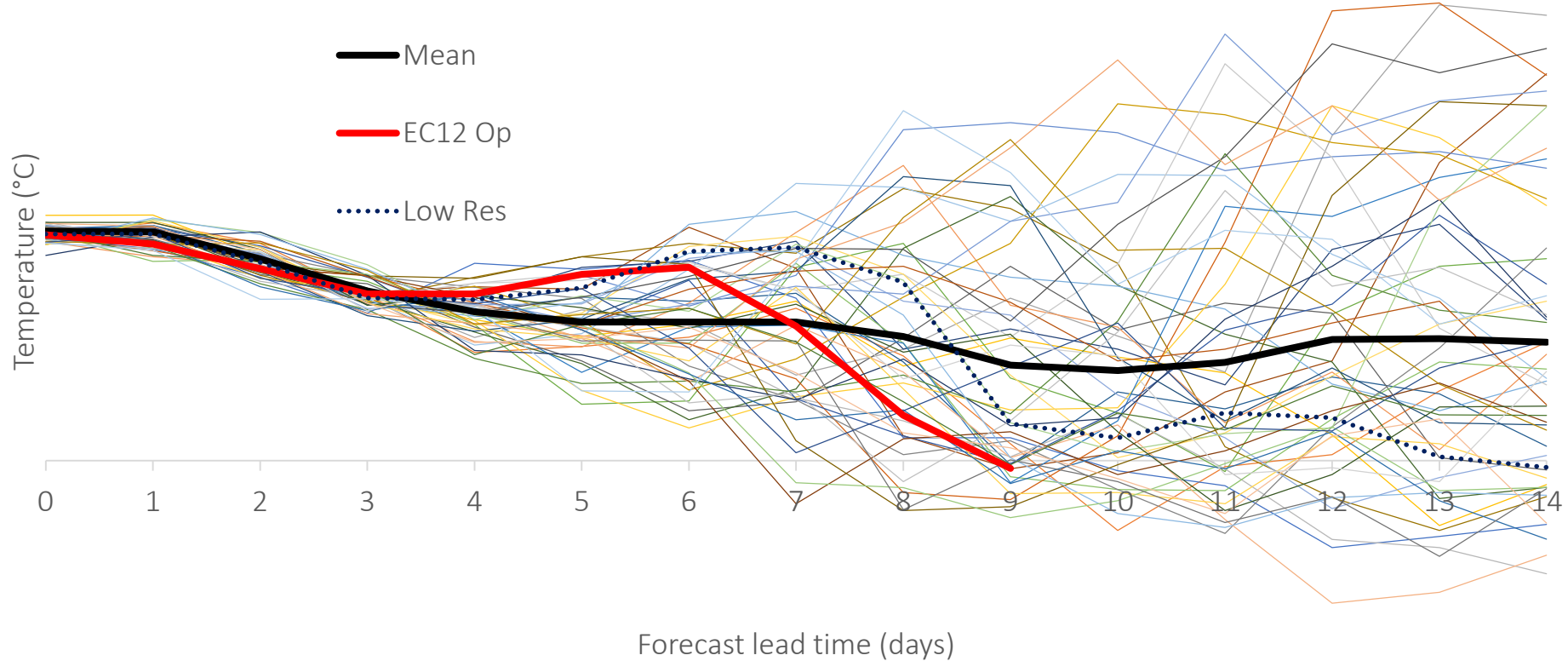


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Ensemble members

highlight uncertainties
and have temporal coherence



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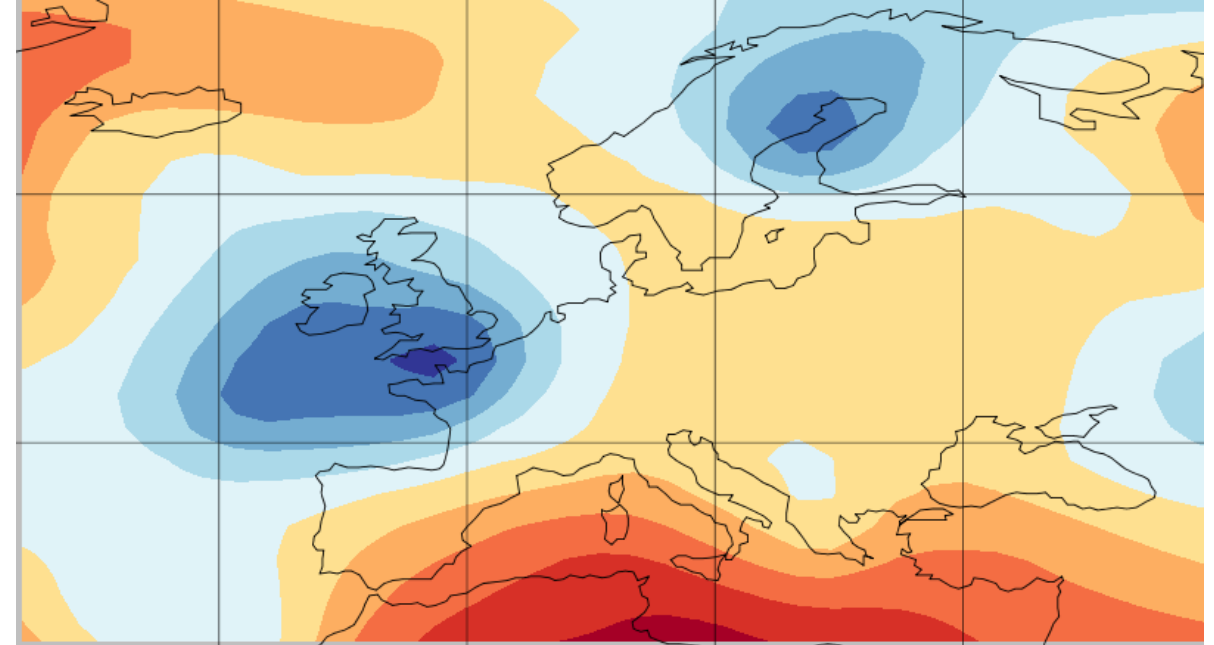
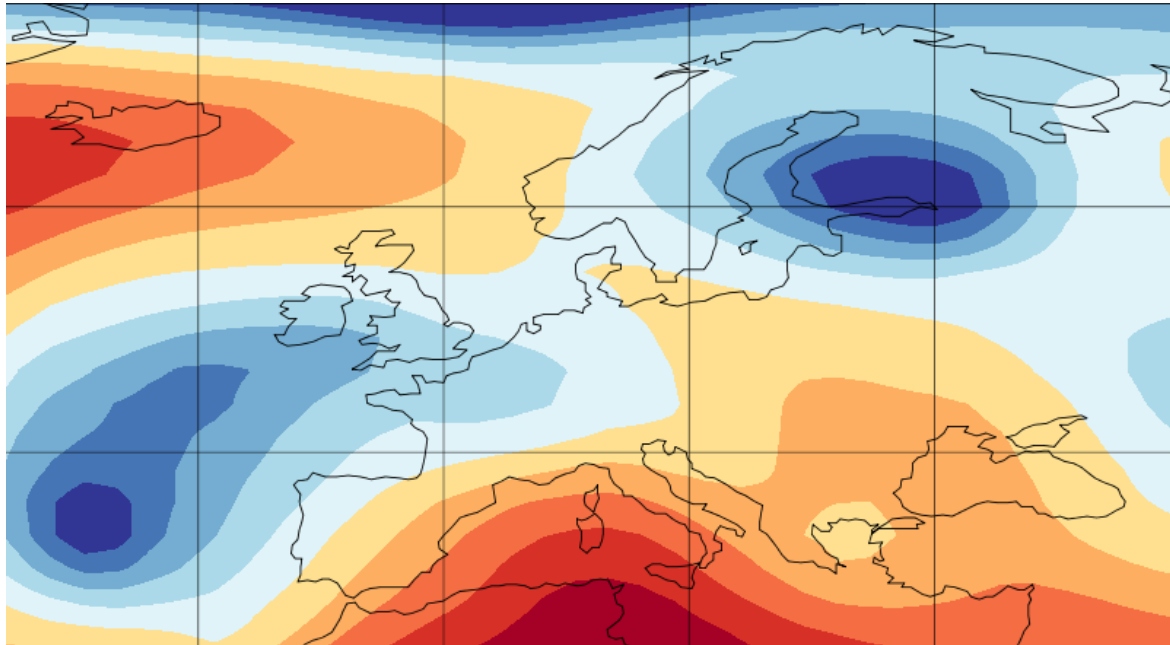
Source: Lake Street, using data from ECMWF



Ensemble members

have spatiral coherence

Day 5 z500



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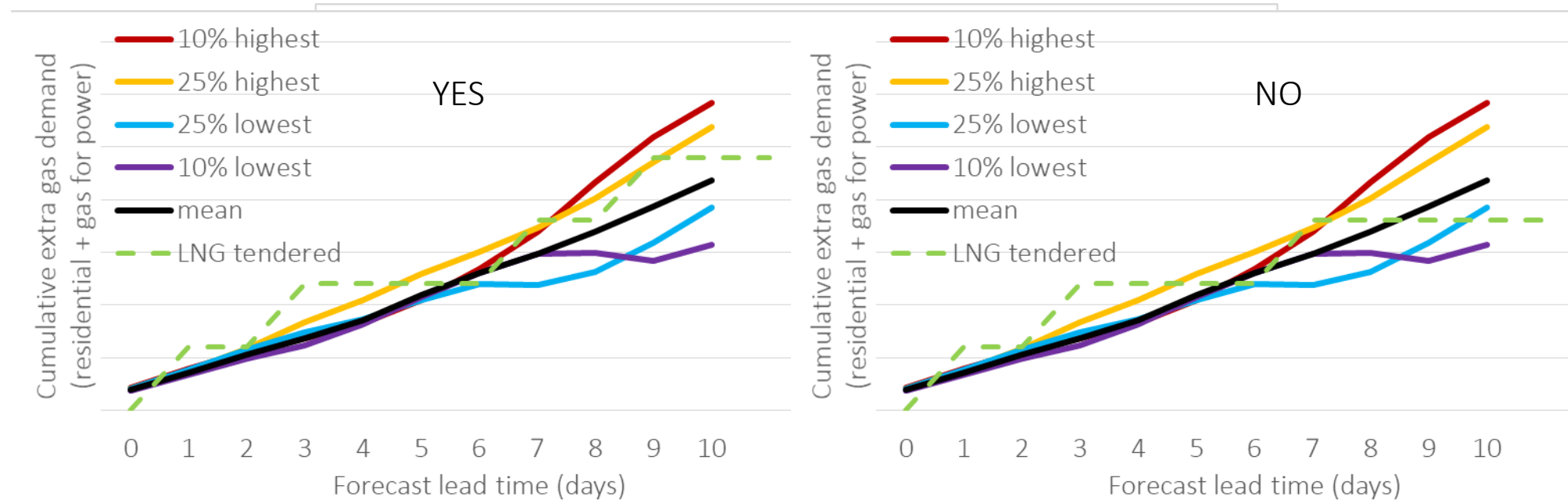
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Source: plotted using GISS software from NOAA using data from ECMWF



Forecast gas demand vs incoming LNG cargoes

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Summary

- Use of ensemble forecast information is now so commonplace in energy sector, many don't remember making decisions without it
- Ensemble mean has additional skill (over op runs) from day ~5
- Ensemble members have far more information
 - Highlight where uncertainty in the forecast is
and so a timeline as to when confidence will increase
 - Provide a means of estimating probabilities
 - Give insight into likely regimes, and so energy supply/demand balances
 - Are spatially and temporally coherent, which helps with interconnector flows and scheduling plant
- Model error uncertainty is not fully yet explored by ensembles
[stochastic perturbations a step in the right direction, but don't fully address]



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