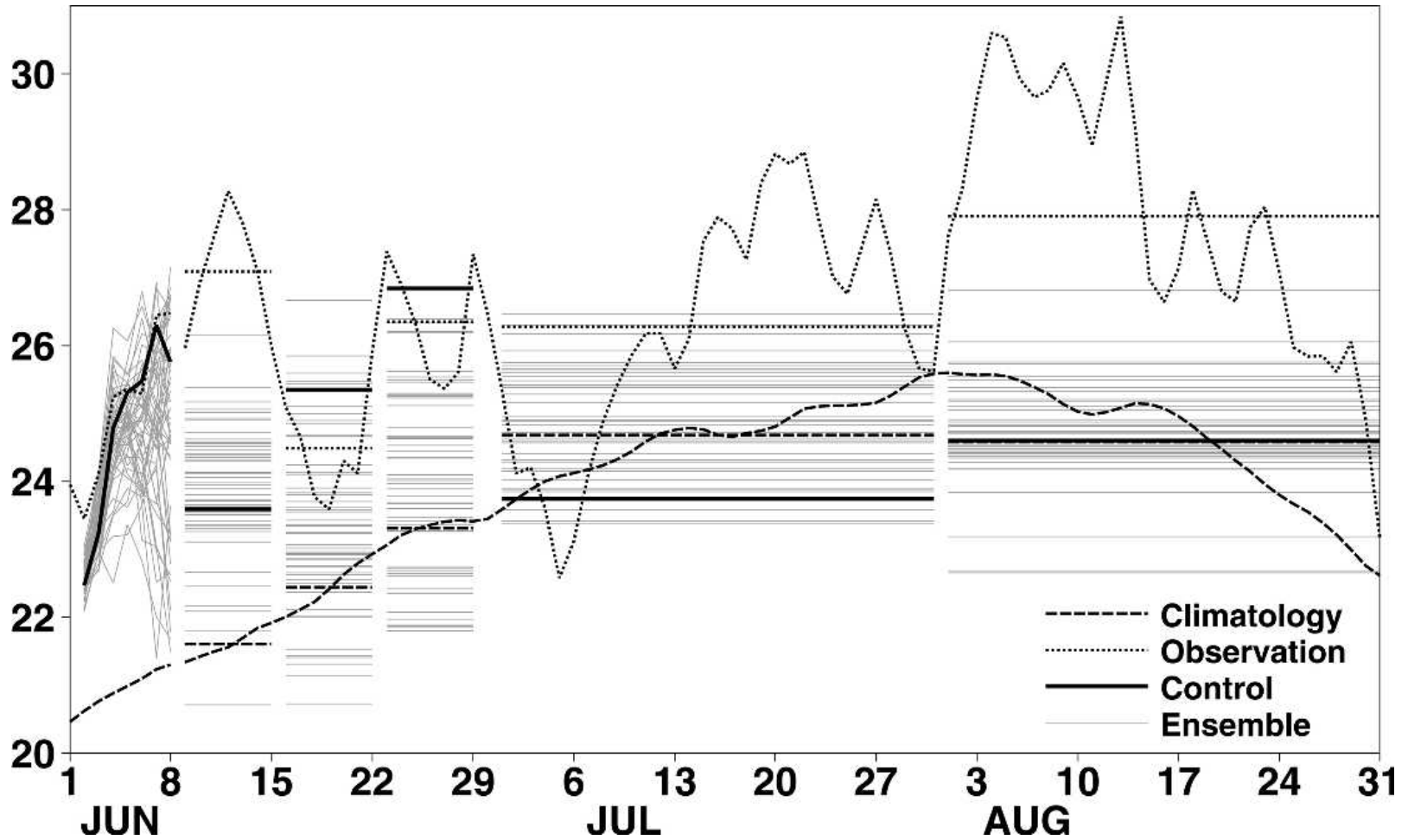








# Heat wave 2003. Prediction of temperature produced by ECMWF





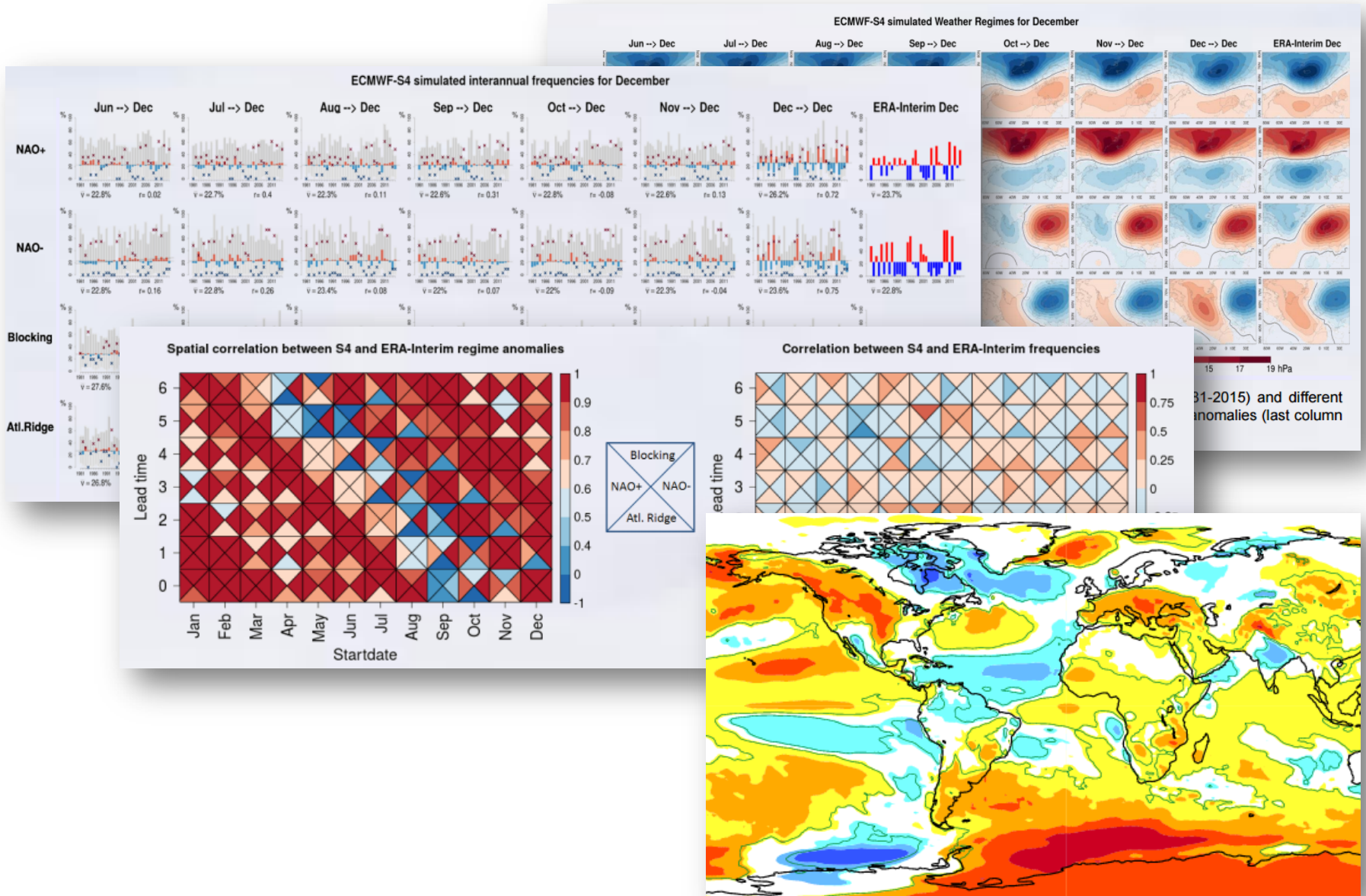


MIND THE GAP





# Climate data ≠ Climate knowledge





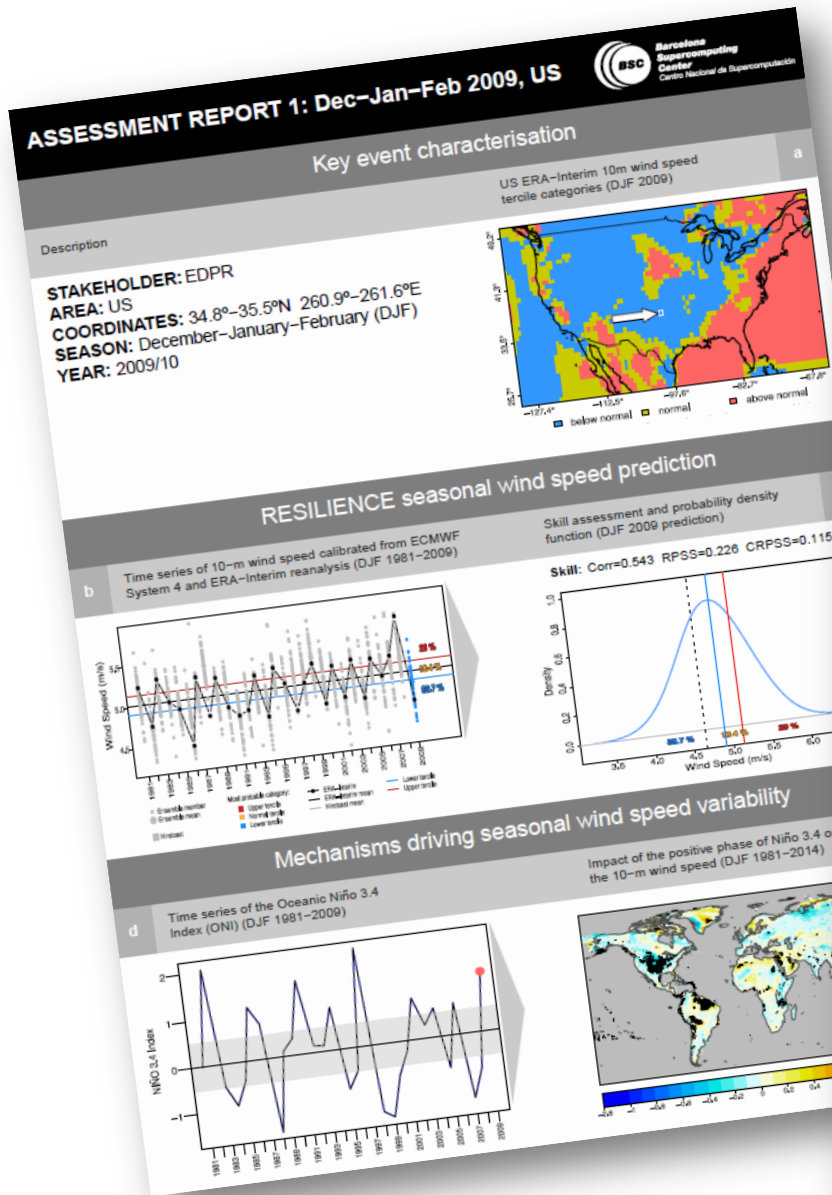


# CLIMATE SERVICES





# Explaining climate predictions



## Climate services factsheet 3

Seasonal wind prediction or more windy than need to be tailored to

How do we tailor se

Seasonal wind speed predictions

Prediction bias correction

Prediction quality assessment

Climate services for the wind energy sector

Applications

Mid-term energy system set up due to spe

Give available various data forecast correction (Dobla correct

The quality by the re-informative the clima

At the end, higher than to the obtain that they give stic predic support decis predictions' re

- Mid-term energy system set up due to spe
- Energy trading
- Estimation
- Meet the ba

## Climate services factsheet 7

### Use of climate information in the wind stakeholder chain

The high penetration of wind power in the electricity system provides many challenges mainly due to the unpredictability and variability of wind power generation. Therefore, having accurate forecasts of wind power is becoming increasingly important for many stakeholders in the wind energy sector.

#### Wind farm development



Figure 1: Stages of wind farm development, stakeholders involved at each stage and temporal horizons of climate information used

#### Prospecting

- Climate projections can be used for site selection according to the predicted wind conditions in a particular location in future decades.

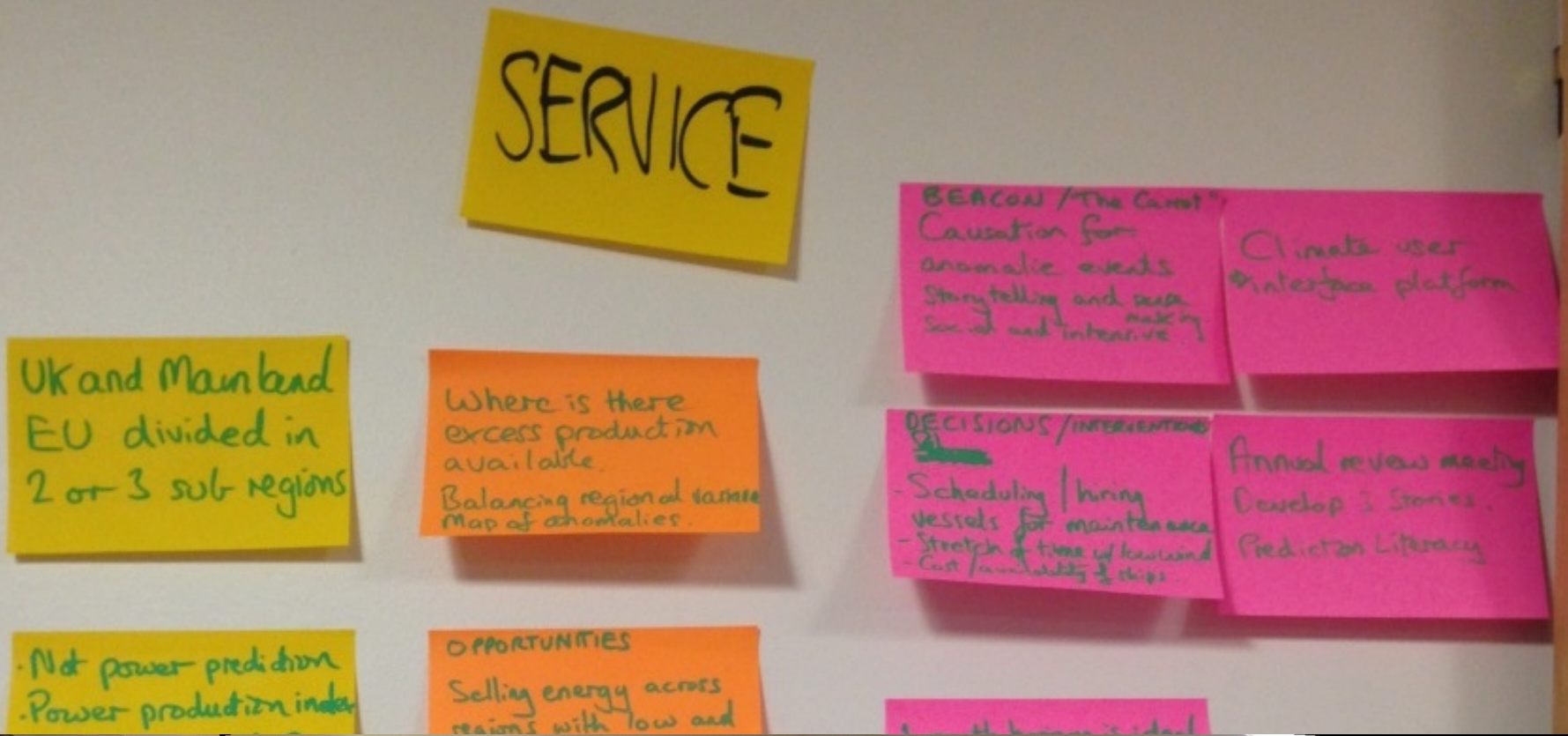
#### Pre-construction

- Climate predictions from years to decades can be relevant to understand and quantify the wind resource. For example, they can inform wind energy investors about the volatility of the resource in the future and how this risk can have an impact on the return on investment.

#### Post-construction

- Weather forecasts below 6h are useful to predict sudden events like ramps that can be managed by turbine and farm control.
- Weather forecasts from 6h to 2-3 days are used by transmission system operators for power system management (scheduling reserves, planning, congestion management). Wind farm operators use day-ahead & intraday forecasts for trading in the energy market.
- Weather forecasts from 2-3 days up to a week are used for operation & maintenance planning of wind farms, conventional power plants and transmission lines.
- Climate predictions from sub-seasons to seasons are particularly interesting to support offshore wind farm servicing logistics and onshore operation and energy generation.
- Climate predictions from seasons to decades are relevant to understand and quantify the wind resource, i.e. inform wind energy investors about the volatility of the resource in the future and how this risk can have an impact on the return on investment.

# Talking about climate predictions

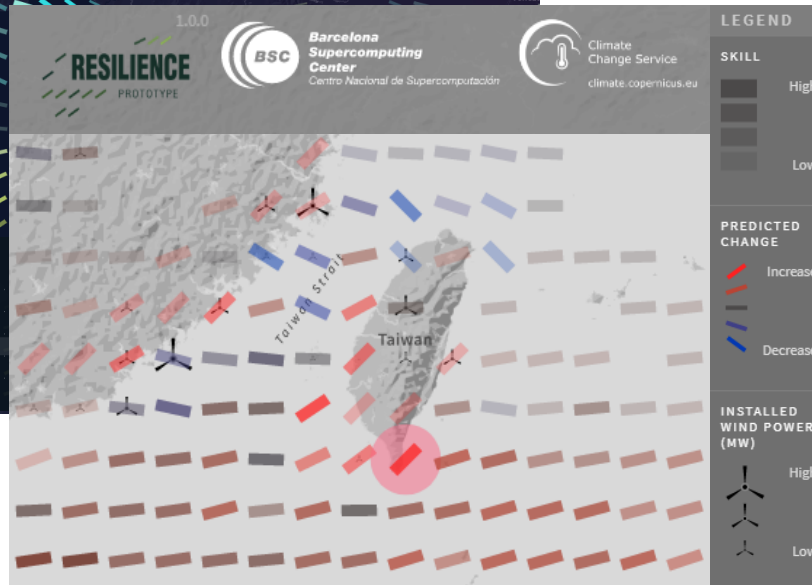




# Visualising climate predictions



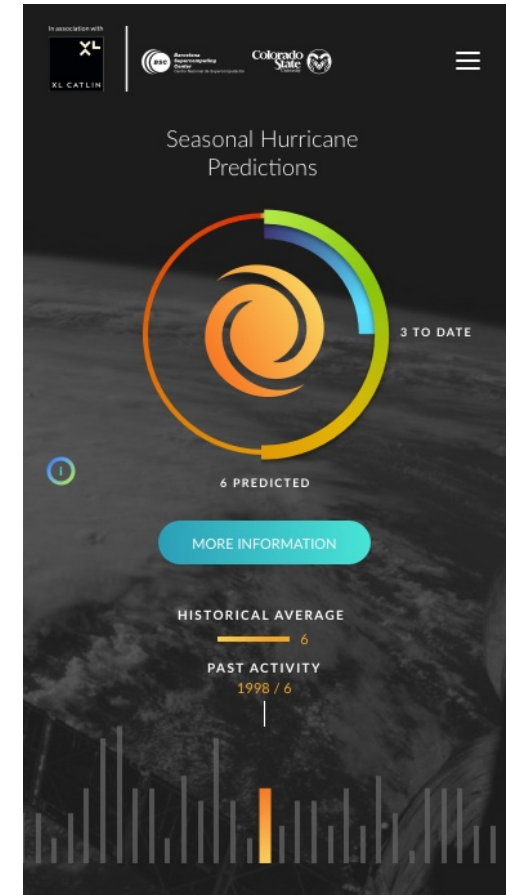
[www.project-ukko.net](http://www.project-ukko.net)



[www.bsc.es/ess/resilience](http://www.bsc.es/ess/resilience)



Weather roulette



[www.seasonalhurricanepredictions.org](http://www.seasonalhurricanepredictions.org)

**Lessons learnt...**



1

# Who is the real user?

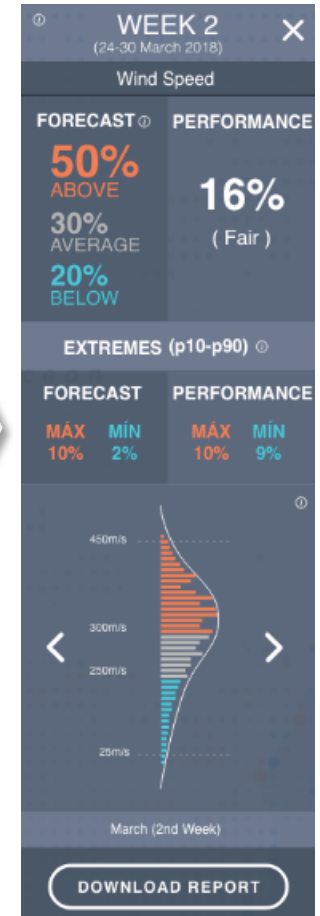
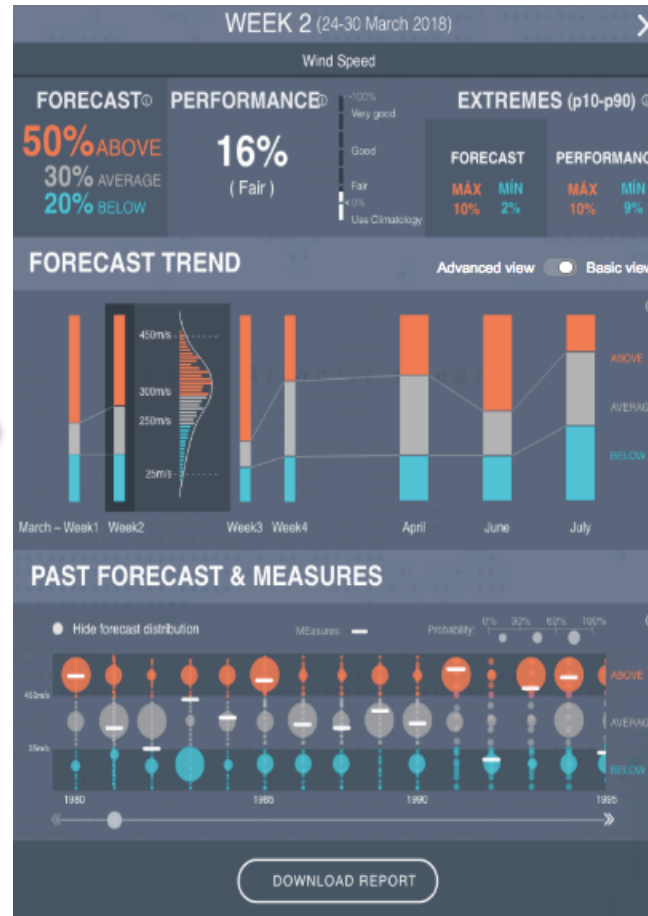
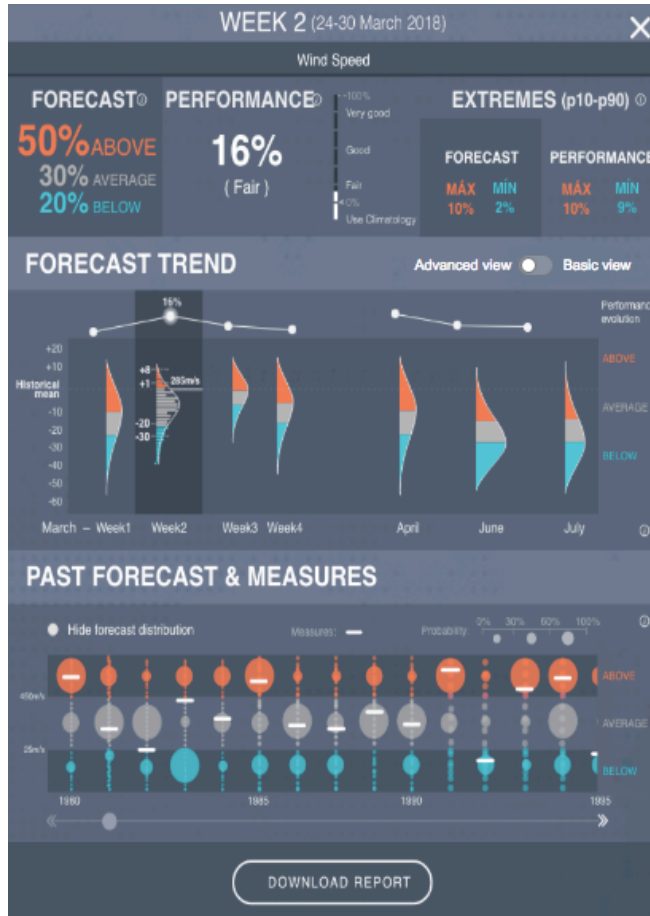


**CEO**



# 2

# Leave information behind





3

# Still... everybody wants raw data

The screenshot displays a web application interface for energy resilience forecasting. At the top, there are navigation tabs for 'ENERGY', 'HEALTH', and 'AGRICULTURE'. A search bar is present with the text 'Search by coordinates or text'. A 'Time selector' shows a timeline from 1 to 4, with 'Next 4 weeks' and 'Next 3 months' options. The main area features a map of the United States with a grid of colored dots representing data points. A sidebar on the left contains sections for 'VARIABLES', 'SETTINGS', and 'FILTERS'. A detailed forecast panel on the right shows 'WEEK 2 (24-30 March 2018)' with 'Wind Speed' data. It includes a forecast performance summary: 50% ABOVE, 30% AVERAGE, and 20% BELOW, with a 16% (Fair) performance score. Below this is an 'EXTREMES (p10-p90)' table and a probability distribution graph. Two circular callouts highlight 'DOWNLOAD PREDICTION' and 'DOWNLOAD REPORT' buttons.

**ENERGY RESILIENCE** HEALTH AGRICULTURE user

Check previous forecast 2000 Jan 04

Time selector: 1 2 3 4 | 1 2 3  
Next 4 weeks | Next 3 months

Prediction launched on 2000 Jan 04  
Next prediction update 2000 Dec 15

Powered by S2S4E (Simple Systems for Climate Energy)

**VARIABLES**

Select category  
Select variable

**SETTINGS**

Performance: 0% (slider from <0 to 100)

Probability threshold: Select probability threshold %

**FILTERS**

- Extremes probability
- Dark map
- Power plants

**HEALTH**

Close four  
Advance information

**LEGEND**

<b>Predicted Variability</b>	<b>Probability range</b>	<b>Extremes probability</b>	<b>Installed power (MW)</b>
● Above	● 50% to 100%	▲ Max (p90)	⚡ High
● Below	● 34% to 49%	▼ Min (p10)	⚡ Low

**WEEK 2 (24-30 March 2018)**

Wind Speed

FORECAST	PERFORMANCE
50% ABOVE 30% AVERAGE 20% BELOW	16% (Fair)

**EXTREMES (p10-p90)**

FORECAST	PERFORMANCE
MAX 10% MIN 2%	MAX 10% MIN 9%

450m/s  
300m/s  
250m/s  
200m/s

March (2nd Week)

**DOWNLOAD PREDICTION**

**DOWNLOAD REPORT**

# 4

# Data visualisation experts are key



[@iskiam](#)



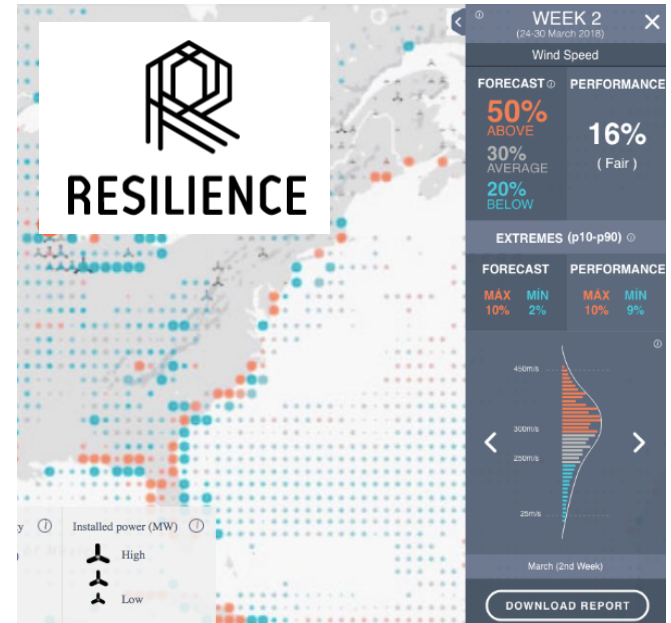
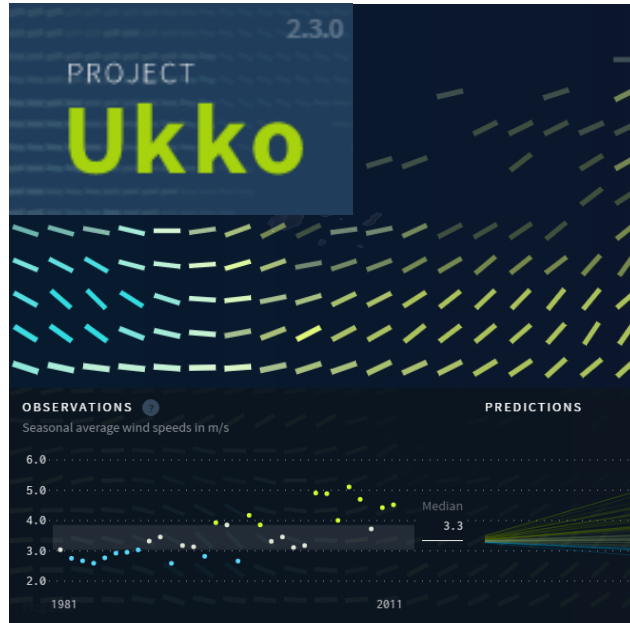
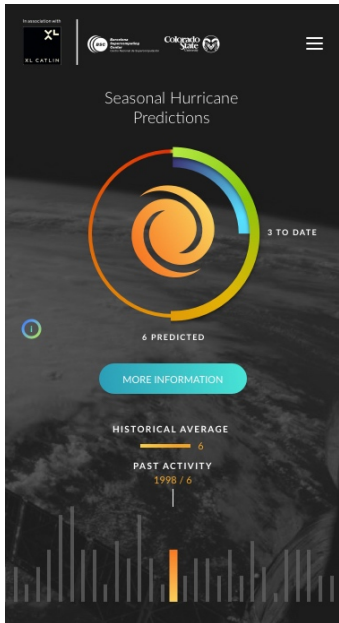
[@moritz\\_stefaner](#)



[@FuturEverything](#)



[@thefercook](#)





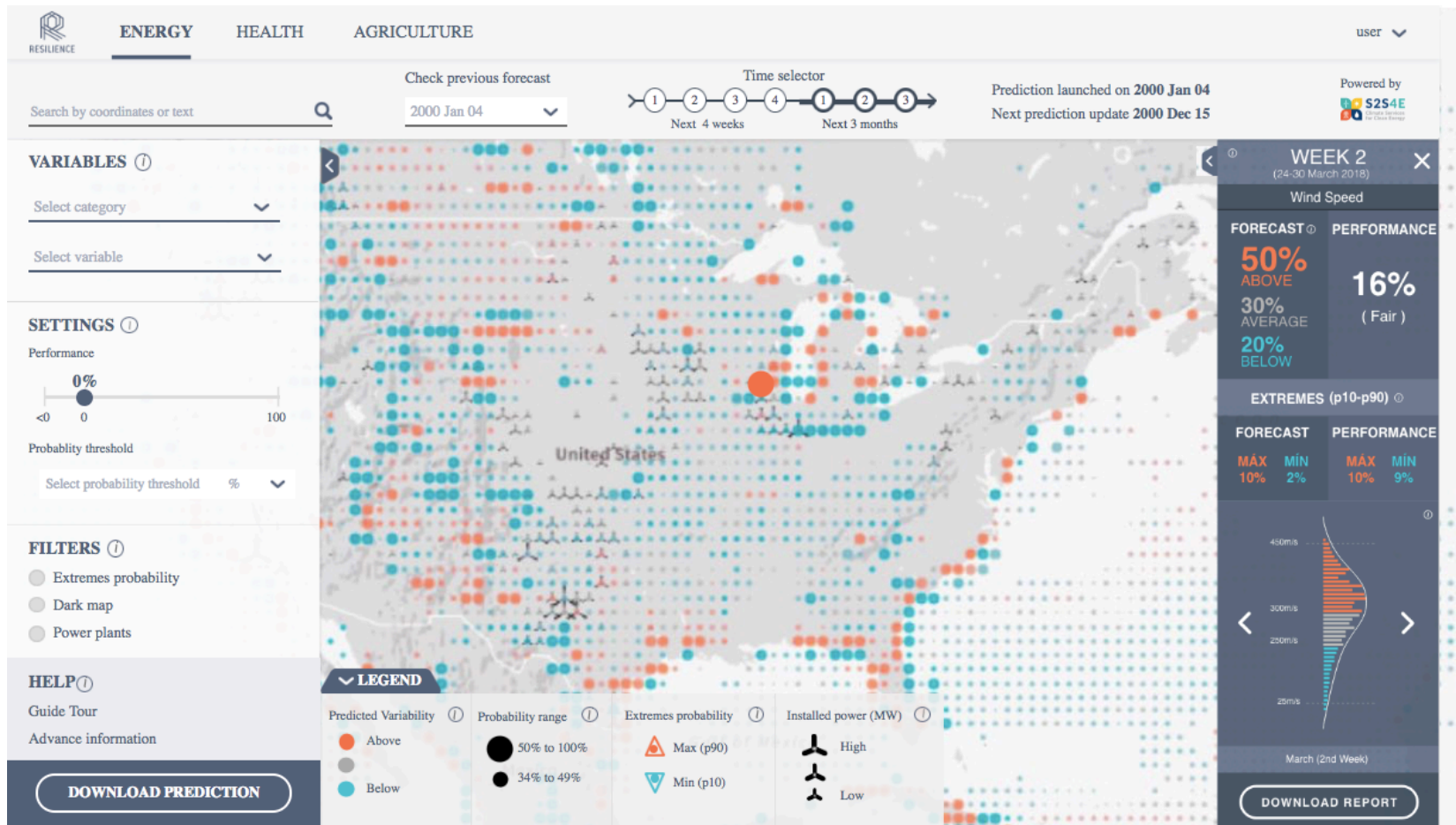
# 5

## ...and other profiles too



# 6

# Success criteria is TRUST





**The ideal near future  
for climate services...**

**Only by doing things different  
you can find different  
solutions**

