



Seasonal forecasts for the energy industry

Executive summary

- Winter weather has a significant impact on the energy sector.
- The Met Office received a mandate from UK Government to support the energy industry with tailored monthly and seasonal forecast briefings, initially during the winter of 2016/17 and subsequently during 2017/18 in response to user feedback.
- The service supported the industry with their decision-making, for example by helping to identify periods with an increased risk of energy shortages in the upcoming month and season.
- The climate service received excellent feedback from users, with 100% of respondents wanting to see the briefings repeated the following winter.

Winter weather has a significant impact on the supply of energy. For example stormy conditions can damage overhead electricity cables, cause flooding of sub stations, whilst also generating high wind power production. In contrast, cold snaps can rapidly increase gas and electricity demand, reduce wind power

production and put pressure on the supply side leading to wholesale energy price increases.

Winter weather and associated impacts are strongly correlated to the large-scale atmospheric circulation in the North Atlantic region. The Met Office seasonal forecasting system can skillfully predict this large scale circulation in winter¹, which enables skilful seasonal climate forecasts for the energy sector².

Before the winter of 2016/17 the Met Office received a mandate from the Department for Business, Energy and Industrial Strategy (BEIS) to support the energy industry with a service that enhanced the industry's resilience to the upcoming winter weather and its potential impacts.

The trial service consisted of a series of forecast briefings, updated monthly, from September 2016 to February 2017. During each briefing the forecast for the coming month and 3 month period was given. Each forecast contained information on the general weather situation, and the likely upcoming temperature, rainfall and wind speed conditions, highlighting potential impacts on the energy industry.

Users of this service included government organizations such as Ofgem, energy providers such as EON, EDF, energy traders including Flextricity, and code administrators such as ELEXON.

User feedback demonstrated the service supported the industry with their decision-making, for example by helping to identify periods with an increased risk of wind power supply constraints in the upcoming month and season and when alternative sources of energy may be required. For example the coldest periods in January, typically associated with low wind conditions, were correctly forecast in mid-December. The service also enabled the energy industry to anticipate future periods of volatile or high energy prices brought about by certain weather conditions, helping to forecast their energy system costs and inform trading decisions.

Their feedback has been very positive, with 100% of people wanting to see the briefings repeated in future years and over 90% finding the briefings to be useful or very useful.

Following the positive feedback, the forecast briefings were repeated over the winter of 2017/18. A series of cold snaps occurred at the end of February and early March, with significant snowfall and biting winds. The briefings successfully highlighted the increased risk of cold conditions at the end of February three weeks in advance, giving the industry advance warning of impactful weather.

“Many thanks for your interesting summary of likely weather patterns for the winter ahead. I am sure you know that preparing for winter weather is a key issue for electricity transmission and distribution companies and your seasonal outlook certainly provides a useful guide.”

David Whensley
Energy Networks Association

“The outlook was very helpful when considering the likelihood of power shortages during the winter of 2016/17. The forecasts lowered my assessment of the likelihood of shortages occurring.”

Stephen Doherty
SP Energy Networks

“The outlook helped anticipate and explain periods of weather induced high electricity prices.”

Emma Tribe
ELEXON

“The information was much appreciated in establishing our own internal outlook for our end-users”

Laurent Dubus
EDF

Users also highlighted additional information they would find useful, which will be used to inform future winter services. Requests included increasing the number of briefings, including more information on the nearer term (weekly and monthly forecasts), covering more metrics such as solar radiation and covering a larger European region.

¹Scaife et al 2014. Skillful long-range prediction of European and North American winters. *Geophysical Research Letters*. 41(7), <http://onlinelibrary.wiley.com/doi/10.1002/2014GL059637/abstract> ²Clark, R., Bett, P., Thornton, H. E., Scaife, A. A. (2017). Skillful seasonal predictions for the European energy industry. *Environmental Research Letters*, 12, 024002.