

# UK Met Office Customer Needs

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The UK Met. Office is clearly not a 'user' of weather however it has a large base of commercial customers which it works very closely with. Weather forecast information is currently provided from a few hours to a month ahead. There are however often requests for weather information beyond this. This abstract summarises the requests for seasonal weather forecasts for the UK and Europe and dialogue on the subject with Met. Office customers in the energy, insurance, retail and water industries.

Energy demand is highly sensitive to weather conditions and weather forecasts are crucial input to energy demand forecasts. All the players in the energy industry, transmission companies, generators, suppliers and traders, benefit from being able to anticipate the demand. Demand is sensitive to small changes in temperature above or below certain thresholds and also the strength of the wind. The illumination and the number of rainy days are also important, these are the so called 'misery' factors. Both electricity and gas demand is weather sensitive but the relationships differ as gas can be stored. The need for seasonal weather information is highest in the winter when demand is most affected by temperature variations. Advance warning of cold spells would be extremely useful. As well as using long-range forecasts for demand forecasting they would also be useful for resource planning i.e. in anticipating disruption to operations in bad spells of weather in winter. In hot summer weather UK electricity demand is increasingly affected by air conditioning usage. Likely occurrence of long hot periods of weather would therefore be beneficial to the industry.

## Summary - Energy Needs - Input to Demand Models

- Forecasts for winter, also summer
- Temperature, also wind (chill)
- Regional
- Site specific - urban conurbation

The insurance industry is interested in seasonal weather information which will help it anticipate the likely incidence of windstorms, droughts (leading to subsidence problems) and periods with temperatures below freezing (for bursts). For reinsurance purposes the forecasts would be required during the renewal season which is October through to December. (All reinsurance must be in place by the first of January.) Thus 3-month forecasts of winds and low temperatures would suffice, however longer forecasts of likely summer drought incidence would be necessary. For the insurance market the need is more continuous. Premiums may be adjusted with forecasts though in reality there are other factors, often of a much larger level of magnitude, which also have to be taken into account. (Like competition!) For insurance companies forecasts would also be useful on a practical level for balancing cash reserves - allowing companies to be better prepared for big pay outs. The weather derivatives market is also an important market for seasonal weather forecasts, this is covered by several other presentations so not included here. The insurance industry is very used to dealing with risk so from their point of view forecasts in terms of probabilities are very acceptable.

## Summary - Insurance Needs - Input to Risk Models

- Windstorms - index of storminess
- Subsidence - rainfall, 'soil moisture deficit'
- Low temperatures - periods below 0°C

The insurance industry is also interested in long-range weather predictions for other parts of the world, particularly relating to tropical cyclone activity. The UK Met. Office has been working closely with the TSUNAMI consortium, a consortium of insurance and reinsurance companies, since its formation in 1997. The Met. Office have been co-ordinating research at University College London and Reading University to develop long-range tropical cyclone predictions for the Atlantic, Japan and Australia. The research and output has been funded and driven by the insurance industry, a considerable amount of time at the beginning of the project was devoted to listening and understanding their needs. Tropical cyclone forecasts are required

in October for the following Atlantic hurricane season (July/August). The research combines statistical and dynamical techniques though operational forecasts at the moment are based on statistical methodologies.

In the retail and manufacturing sector sales of many products are very sensitive to the weather. The Met.Office provides detailed shorter term forecasts, a few days or weeks ahead, to a large number of food retailers. These forecasts help them anticipate and optimise sales of BBQ foods, salads etc. For the manufacture of the goods however the timescales involved in the manufacturing process are much longer, and often beyond what is currently available. Weather sensitive analyses may reveal high sensitivity of a product (e.g. ice cream, lager or soup) to various weather elements but a forecast of sales demand a month ahead is frequently not long enough to allow the manufacturing output to be adjusted to meet the expected demand.

The Met.Office has spent a considerable amount of time working with a white goods manufacturer recently. A demand for refrigerators and tumble dryers exists all year around. However for refrigerators there is a surge in demand when the weather becomes warmer at the start of the summer. The heat puts additional pressure on old appliances. There is also increased demand in the summer if it is long and hot. For tumble dryers demand normally decreases in the summer however demand can continue and even dramatically increase if June (then July and August) continue to be unsettled with higher than average rainfall. The company has faced difficult decisions in the past.

On the one hand they may have warehouses full of goods for which demand is very low, and a workforce for which there is no work. Do they lay the work force off and close the factory? A skilful seasonal forecast can help in this difficult decision making process. On the other hand they may have an empty warehouse, a factory working to full capacity and still be unable to meet demand. A skilful seasonal forecast may ensure they are never in this position.

#### Summary - Retailing and Manufacturing Needs

- Various weather parameter - temperature, rainfall, 'feel the weather' Used as input to sales analysis
- Throughout the year
- Regional basis

For the Water Industry seasonal weather forecasts would have benefits for managing water resources, anticipating overload of waste water and estimating the extent of any leakage problems. The different users in the industry require different data at various stages through the year.

#### Summary - Water Industry Needs

- Resources - Spring, summer and autumn; rainfall, temperature, sunshine and 'smd'; thresholds individual to companies
- Waste Water - Forecasts throughout year, particularly winter; rainfall and 'smd'
- Leakage - Winter; incidence of low temperatures

#### Summary of UKMO Customer Requirements for Seasonal Forecasts

- Need for skilful seasonal forecasts
  - temperature, rainfall, wind
  - regional (site specific energy)
  - breakdown of 'seasonal' period
- Probabilities acceptable
- Different thresholds, input to models (data not pictures)
- Confidence - verification essential