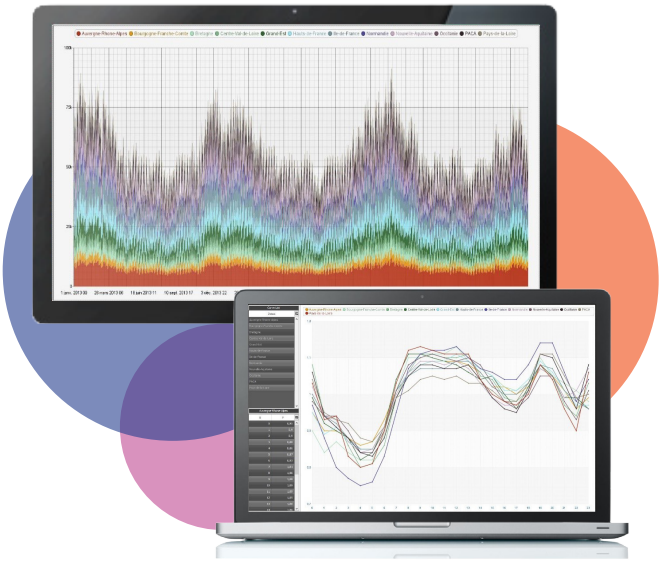
Artelys Crystal Forecast

Energy Demand analysis and forecasting

Risk assessment and strategic decision making is requiring more and more **quantitative insight on Energy demand evolution** for any temporal horizon. Various interaction between factors such as **temperature and calendar effects** and increasing structural complexity particularly with the development of new Energy use makes it challenging to obtain robust demand forecast.



Artelys Crystal Forecast offers both strategic and operational decision makers a **reliable and customized tool** to better anticipate risks, through a global process combining data analysis, calibration and forecasting. It learns from your data to optimize parameters and adjust the forecast to your specific **activity growth** both **economic** and in terms of **client's portfolio**, plus it can materialize **future evolution of sectorial and Energy use proportion** in energy demand.

Your solution for Energy Demand analysis and forecasting

Key features

- **Energy demand forecasts** at all time horizon with statistically optimized parameters particularly for heat & air conditioning gradient, calendar effects and interactions
- Customized **hypothesis of structural evolution** based on your expertise and strategic projection
- Integration of an **expert model** based on International demand evolution studies that is optimized on your demand specificities and that you can update at any time
- Statistical modeling with **R software**, the most popular statistical software, to provide with the latest and most robust algorithms of both calibration and forecast
- Visualization tools with **built-in indicators**: Hourly demand for each zone, daily/weekly profiles, statistical aggregation (median, decile, etc...), Two-dimensional visualization and regression
- **Key indicators** such as structural growth, corrected annual demand, Seasonality and climatic effects

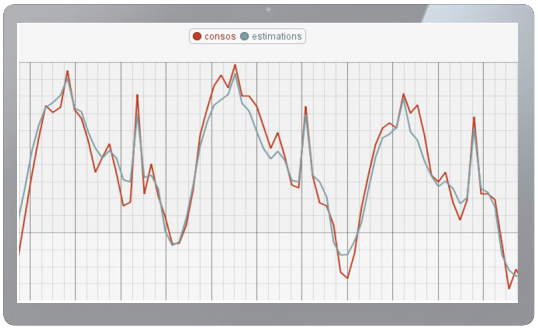
Application

- Daily gas consumption short term forecasts in a Metropolitan area
- National hourly electric consumption long term forecast with activity transfer from industry to tertiary
- Multi-regional hourly heat consumption

Artelys | OPTIMIZATION SOLUTIONS

A proven efficiency on Energy demand forecasting

- Model based and tested on regional, national and transnational energy demand studies
- Consideration of all expert reported effects on energy demand: Temperature both for heating and air conditioning, calendar effects and potentially wind or irradiation effects
- Adapt itself to your very last historical demand data



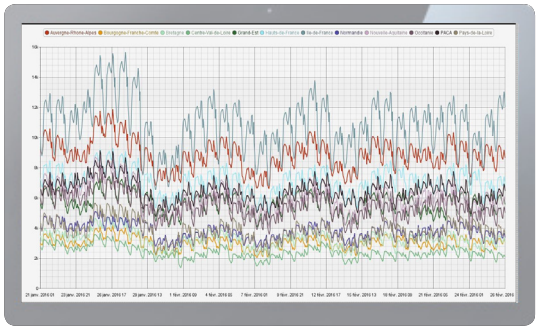
Test case 0	Test case 01	Test case 02	Test case 03	Test case 04
January 2016	51,62 M	46,73 M	47,73 M	50,04 M
February 2016	44,26 M	43,01 M	44,80 M	50,61 M
March 2016	46,02 M	46,12 M	46,85 M	46,39 M
April 2016	40,85 M	36,20 M	41,66 M	40,38 M
May 2016	35,24 M	35,85 M	34,68 M	36,78 M
June 2016	33,41 M	33,17 M	33,72 M	33,66 M
July 2016	34,03 M	33,76 M	33,58 M	33,61 M
August 2016	33,80 M	34,19 M	33,89 M	34,05 M
September 2016	33,78 M	35,26 M	35,77 M	34,16 M
October 2016	39,36 M	40,92 M	40,91 M	36,18 M
November 2016	43,84 M	46,39 M	44,86 M	46,58 M
December 2016	47,08 M	52,21 M	53,13 M	54,09 M

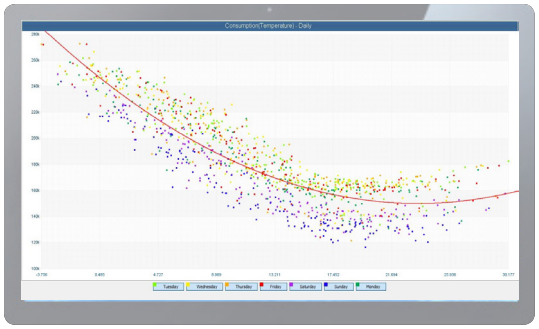
An easy to use tool for dashboard and reporting content

- Customizable graphical and table views to improve reporting of past or future evolution of Energy demand
- Easy export to insert directly in your presentation

Forecasting at every temporal horizon

- Ergonomics adapted for short/middle/long term horizons
- Spatial/temporal and multidimensional (Energy Use, Sector) aggregation
- Adapted exports to Artelys Crystal applications or your own planning or reporting tool



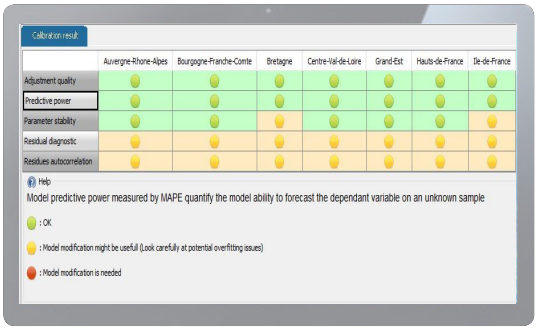


A tool to enlighten underlying components of your demand

- Entirely configurable aggregation and zoom options to have a perfect insight of your historical demand
- Screen configurations to quantify, rank and visualize interaction between main effects
- Implementation of graphics reported of particular interest by TSO, DSO or producers (Daily profile, structural growth, corrected annual demand, Seasonality, temperature effect and threshold)

A full range of statistical indicators to validate the forecasts accuracy

- Summary table of global quality of the fitted parameters and confidence in the future forecasts
- Adaptive help messages to escort you in updates of the model
- Self-awareness of models statistical quality with powerful indicators: statistical indicators (MAPE, RMSE), Prediction power and error evaluation and diagnosis



Adaptive solutions

Artelys consultants can help you take advantage of Artelys Crystal Forecast's flexibility for complex studies. Artelys may help you in conducting alternative energy forecast studies (production, prices and more).

Independency and efficiency

Artelys Crystal Forecast is developed by an independent optimization and statistics software editor.