# LOADFOR™

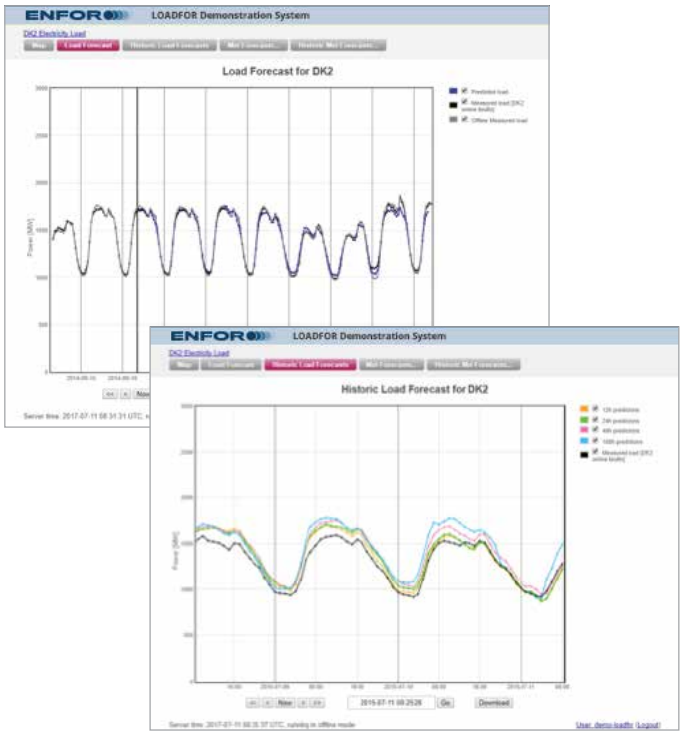
## Electricity Load Forcasting

LoadFor™ is a software solution for forecasting of electricity load (demand). The solution is a self-learning and self-calibrating system. It is based on machine learning and uses weather forecasts and historical demand data to automatically produce very accurate electricity load forecasts.

## Why do you need LOADFOR™

An accurate electricity load forecast enables efficient planning and operation of both production and distribution as well as trading of electricity. Accurate load forecasts are essential for transmission and distribution system operators to operate the power grid efficiently and reliably. Efficiently in order to reduce cost of standby capacity and reliably to avoid blackouts.

Electricity traders and retailers need accurate load forecasts to predict power prices, purchase sufficient electricity for their customers and avoid imbalance fees and penalties. LoadFor™ automatically forecasts electricity load and requires minimal effort from the client.




## Key benefits:

- Automatically and accurately forecasts electricity load in a geographical area and/or for a portfolio of electricity consumers
- Increases security of supply for electricity customers
- Easy and inexpensive to install, maintain and operate
- Reliable, stable and high availability with a proven operational track record
- Low maintenance with minimal interference and interaction required from the client
- Highly flexible. Can be configured to various power grids and customer portfolios

LoadFor™ is an industry leading solution which requires minimal effort from the client and yet yields superior forecast accuracy when compared to competing technologies.

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# How does LOADFOR™ work

LoadFor™ is a self-learning system based on machine learning. On the basis of historical electricity load, historical meteorological data and meteorological forecasts, the system is not only able to predict the electricity load, but can also automatically and continuously calibrate and improve its predictions as it is fed with more data. In addition, online power measurements can be used as input (if available) to increase forecast accuracy.

Based on input data, LoadFor™ automatically identifies and takes the systematic behavior of electricity consumers into account. This means that LoadFor™ continuously adapts to the actual situation by continuously monitoring the consumption and adapts to changes, such as:

- Changes in consumer behavior
- Changes in the number of consumers
- Changes in the meteorological models
- Changes in the physical characteristics of the power grid

The self-learning mechanism has the benefit, that LoadFor™ will identify the impact of any changes by itself and quickly adapt.

Electricity load forecasting can be complicated by the fact that the dynamics of buildings in some geographic regions affect the cooling or heating demand on an hourly basis. LoadFor™ system automatically applies an optimal smoothing effect which solves this issue, such that the physical properties of the underlying energy system are modelled correctly and the forecast shows the appropriate response to changes in temperature or sun irradiation.

Optionally, LoadFor™ can be deployed in combination with MetFor™ (ENFOR™ service for locally optimized weather forecast) to obtain a more accurate local weather forecast, which will result in superior electricity load forecast accuracy.

LoadFor™ is provided as an integrated service from the ENFOR™ platform which contains a data collection and validation module. The data collection and validation module collects the necessary data, ensures that the necessary data is available and contains a toolbox for automatic detection and correction of missing and/or erroneous measurements. The ENFOR™ platform also provides LoadFor™ with data integration modules through either FTP, SFTP or web-services such that LoadFor™ can be seamlessly integrated with various data sources.

LoadFor™ can be installed locally on customer systems or hosted by ENFOR™ as a service. It is also possible to get a customized support and maintenance agreement from ENFOR™ or one of the partner companies.

# Key features:

- Self-learning and self-calibrating algorithms for accurate forecasting of electricity load
- Scenario generation
- Uncertainty bands based on quantile forecasts
- Integrates seamlessly with locally optimized weather forecasts from MetFor™
- Web-interface available for configuration and monitoring of system
- Data integration interfaces based on FTP, SFTP or web-services supporting numerous formats and file types (CSV, XML, SOAP, JSON etc.)
- Runs on common server platforms (Windows, Linux)

# About ENFOR

**ENFOR provides forecasting and optimization solutions for the energy sector. Utilities, energy traders, transmission and distribution system operators use ENFOR solutions for forecasting of wind power, solar power, hydro power, electricity and heat demand as well as optimization of district heating systems. Based in Denmark, and established in 2006 as a spin-off from the Technical University of Denmark, the company has a solid operational track record and successfully serve customers all over the world.**


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*"The future is an unknown, but a somewhat predictable unknown. To look to the future we must first look back upon the past."*

- Albert Einstein