



# Technical Losses AI forecasting solution

Boosting the energy transition

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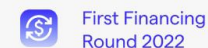
**Ogre is a technology company  
specialized in Forecasting and  
Energy Management**

## Mission

Revolutionize the energy sector with cutting-edge AI forecasting and energy management technology, providing comprehensive, integrated solutions that enhance efficiency, reliability, and sustainability across the entire energy value chain.

## Vision

To be the global leader in AI-powered energy solutions. We envision a future where our integrated solutions platform seamlessly connects all facets of the energy value chain, from generation and distribution to consumption, driving innovation, reducing environmental impact, and creating value for all stakeholders.



## Why Ogre



### Expert Team

Our team boasts exceptional industry and AI / ML expertise together with academic and professional resources, with professorship at Oxford University and gold medalists in both international mathematics and informatics Olympiads.



### Applied knowledge

We have vast expertise in both electricity and gas sectors, with applied knowledge across the whole value chain: generation, supply and transport and distribution. We work with very large utilities such as ENEL, Engie and E.ON.



### State of the Art Forecast Engine

Utilizing the forefront of AI innovation, our forecasting tool is ahead of the curve and produces a customized forecasting engine for every asset or every consumer of every supplier, sometimes producing millions of individual engines for a single client.



### Data Proficiency

We excel in integrating complex systems. We are not just data users but creators, boasting proprietary data sources including an in-house developed meteorological model that enriches our forecasting capabilities.



# Challenges Faced by Energy Operators

Real-Time Data Processing

EV adoption

Market Regulations

Energy Transition

Short term variability and ramp events

Balancing market penalties

Forecast horizon challenges

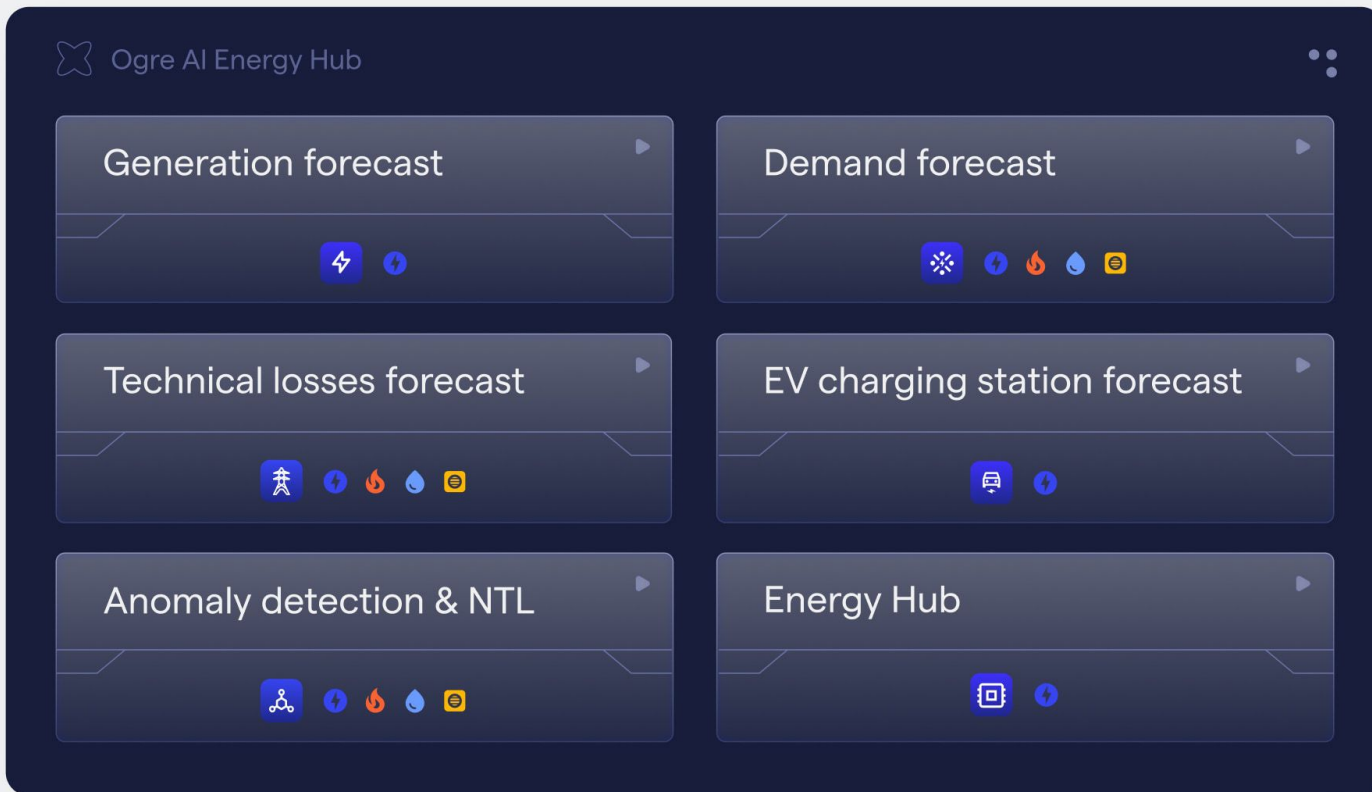
RES adoption

Data Quality and Availability

## Our integrated platform offers a diverse range of AI modules, uniquely tailored for the needs of our valued partners

Our utilities industry and machine learning expertise can be leveraged to integrate complementary AI modules, seamlessly adapted to different domains or players and with a clear eye on scalability

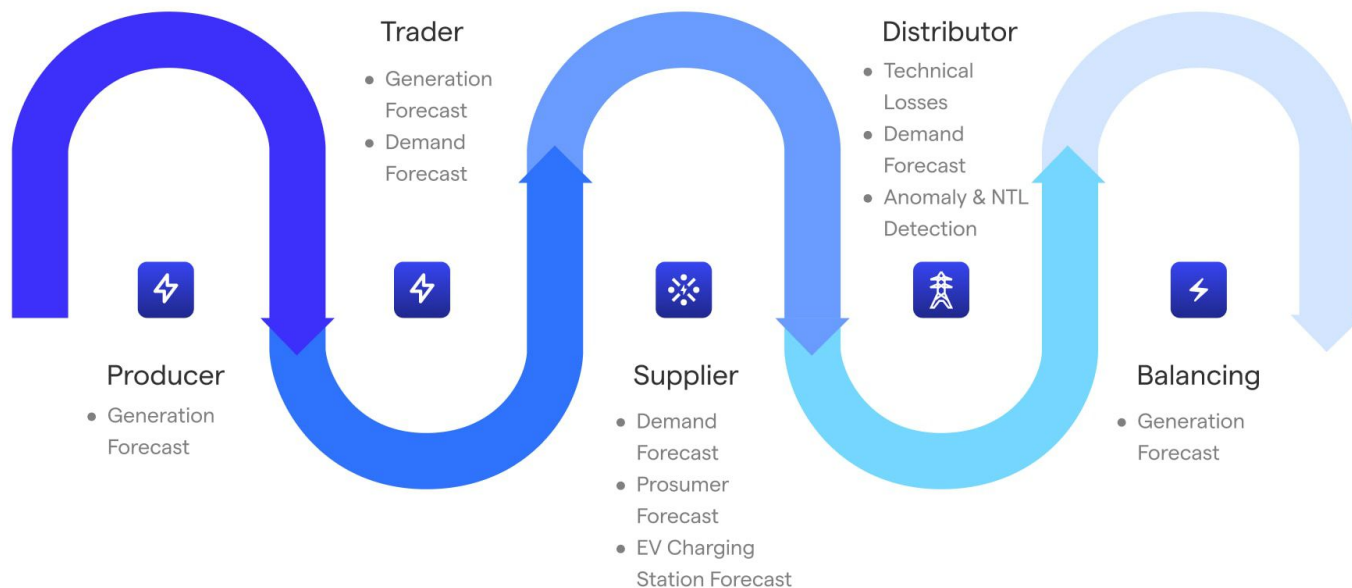
Every module is a product in itself, and we are already selling and integrating them for some of the world leading utilities.







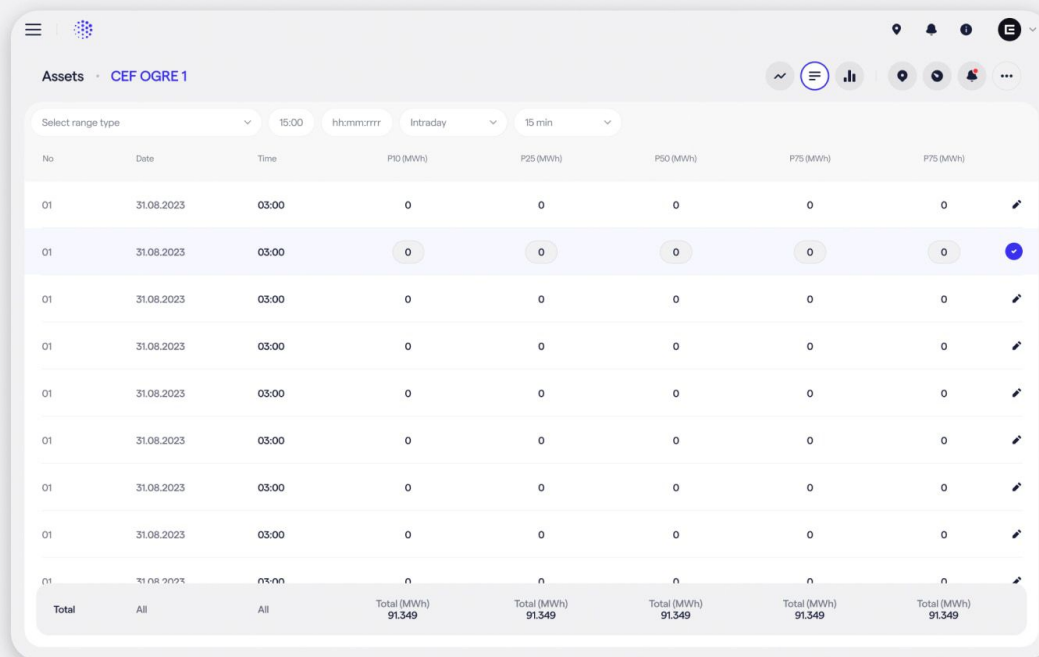
**Comprehensive Coverage:** spanning the entire Energy Value Chain from Generation to Consumption



# Technical Losses Forecast Module

This module forecasts technical losses with high precision, considering factors like load flow, network configuration, and equipment efficiency

This module is designed to accurately predict and analyze energy losses in the distribution and transmission network. It provides energy companies with actionable insights to reduce the associated balancing costs and improve overall energy management practices.



The screenshot displays the 'Assets' page for 'CEF OGRE 1'. The interface includes a top navigation bar with a menu icon, the asset name, and various utility icons. Below the navigation bar, there are filters for 'Select range type' (set to '15:00'), 'Intraday', and '15 min'. The main table lists forecasted losses for multiple time slots on 31.08.2023. The table has columns for 'No', 'Date', 'Time', and five loss categories: 'P10 (MWh)', 'P25 (MWh)', 'P50 (MWh)', 'P75 (MWh)', and 'P75 (MWh)'. Each row shows a value of '0' for all categories. A 'Total' row at the bottom shows a total of '91.349' for each category. The interface also includes a sidebar with a search icon and a top right corner with a user profile icon.

No	Date	Time	P10 (MWh)	P25 (MWh)	P50 (MWh)	P75 (MWh)	P75 (MWh)
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
01	31.08.2023	03:00	0	0	0	0	0
Total	All	All	Total (MWh) 91.349	Total (MWh) 91.349	Total (MWh) 91.349	Total (MWh) 91.349	Total (MWh) 91.349



## Technical Losses Forecast Module



### Features

- Accurate forecasting
- Historical consumption data visualization
- Weather integration
- Advanced Machine Learning Algorithms
- Forecast accuracy metrics
- Personalized reporting
- Role-based access control
- Notifications & Alerts
- Continuous Learning

### Benefits

#### Improved financial performance

Less energy needs to be purchased or generated to meet customer demand, directly reducing the cost of energy procurement.

#### Improved Grid Reliability

Reducing technical losses contributes to the overall reliability of the power supply.

#### Boosted quality of service

Contributes to the overall reliability of the power supply and helps mitigate scenarios that lead to significant losses.

#### RES integration support

Enable DSOs and TSOs to better predict and manage losses, facilitating the integration of renewables into the grid.



## Background

The client was in urgent need of a forecasting solution to reduce losses from operating the service in its 3 local DSOs. High price volatility as well as high balancing costs affected the business greatly.

## Challenge

Historical data problems due to the Covid pandemic and war in Ukraine made it difficult to reach the project KPIs.

## Solution

The three DSOs received our demand forecast and technical losses forecast solutions, together with a customized reporting platform built in Tableau.

## Results

**36%** Forecast error reduction

**3-7%** MAPE 15 mins

**1-2%** MAPE monthly

## Testimonial

"As CEO of a very large DSO, I can attest that the AI application we implemented for reducing technical losses has revolutionized our operations.

Our efficiency has skyrocketed, and we are now leading the way in sustainable energy management."



**Monica Hodor**  
CEO E-Distribuție



## Background

Transelectrica wanted to improve its forecasting capabilities for demand and technical losses in order to decrease balancing costs and energy waste. The company was facing great financial losses and risk due to the challenges in energy balancing, increased number of prosumers and a much greater adoption of renewables.

## Challenge

Limited data automation and availability for data analytics readiness as well as high operational complexity during shifting regulations. We had to implement a comprehensive data science and management activity in order to have the building blocks for our cutting-edge tech.

## Solution

The TSO implemented our demand and technical losses forecast solutions, together with a highly customized reporting tool. The solution greatly improved forecasting accuracy and helped the operator in both reducing operational costs as well as balancing related penalty costs.

## Results

**25%** Forecast error reduction

**4-7%** MAPE 15 mins

**1-2%** MAPE monthly



## Business Model Overview - from Pilot stage to Yearly license

Test

### Pilot program

Limited to 1-3 months



Ogre solution

### Yearly Subscription

- Unlimited usage
- One time payment for integration
- Monthly / Yearly / Multi-Year Payments

Flexible pricing

Opex vs. Capex



# High Level Architecture

The diagram illustrates the High Level Architecture of the Forecast Engine. It shows the flow of data and the interaction between various components.

**Components and Data Flow:**

- Data Ingesters** feed data into the **Data warehouse**.
- The **Data warehouse** is connected to **Model Storage** and **Postgres DB**.
- Model Storage** and **Postgres DB** are connected to the **API**.
- The **API** is connected to the **UI** and the **Scheduler**.
- The **Scheduler** sends **Scheduled jobs (meteo ingest etc.)** to the **API**.
- The **API** sends **Dispatch jobs** to the **Workers**.
- The **Workers** are connected to the **Forecast engine factory**.
- The **Forecast engine factory** is connected to the **Research platform**.
- The **Research platform** sends **Forecast metadata** to the **Forecast engine factory**.
- The **Forecast engine factory** sends data to the **Best engine?** decision diamond.
- The **Best engine?** diamond sends data to the **Current AI/ML Engine** (Yes) or the **New AI/ML Model Engine** (No).
- The **New AI/ML Model Engine** sends data to **Model Storage** ( Saves the Model engine ) and **Postgres DB** ( Gets the previously saved model engine ).
- The **Current AI/ML Engine** sends data to the **Forecast** component.
- The **Forecast** component sends data to the **Data warehouse**.

**Technology agnostic:** aws, gcp, Azure

**Forecast metadata**



Ogre Forecasting Engine is an assembly of individual smaller pieces, that can have various roles in the Forecasting Process

## Data Set calibrators:



- Some data sets need specific calibration to incorporate client specific information.
- E.g calibrating the meteorological data for a specific geography terrain or equipment properties.

## Data processing:



- Data is processed in a format compatible with forecasting algorithms.
- This includes removing atypical or erroneous data, and/or performing other cleaning and processing operations. Automated processing is essential.

## Data set ingestors:



- To make accurate forecasts, Ogre forecast engine needs relevant and comprehensive historical data.
- This data can be collected from several sources, such as databases, smart meters or consumption monitoring devices.

## Model Aggregators:



- Given a set of sub-engines compute an ensemble forecast by various methodologies, ranging from simple model stacking to more complex aggregation neuronal networks.

## Forecast Algorithms:



- The core of the Ogre forecast engine
- Used to generate forecasts and predictions based on historical data.
- Various types: linear regression algorithms, machine learning algorithms or time series algorithms

## Forecast Transformations:



- Smoothing, regularizations and other transformations of the forecasting time-series to respect given constraints that are imposed by client specifications and technical knowledge.

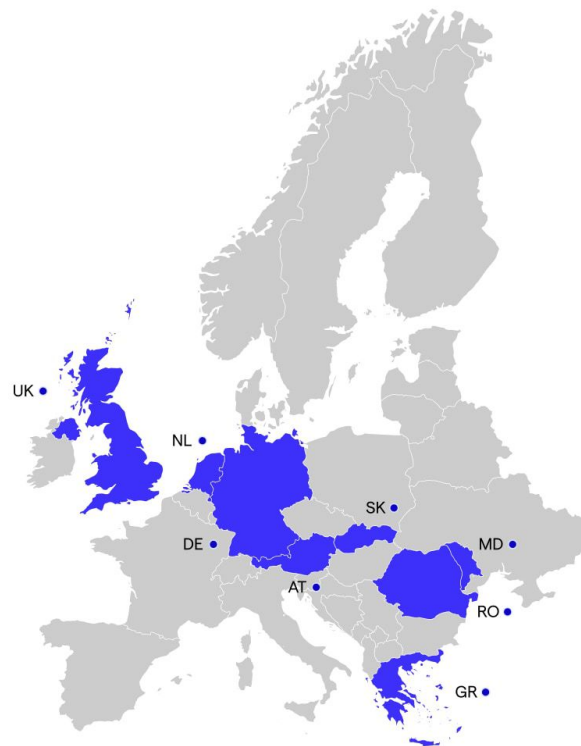






We have a presence in several European markets

Providing accurate forecasting for energy companies in the UK, Netherlands, Germany, Austria, Greece, Romania, Slovakia, Moldova



We have all the relevant ISO certifications



Certificate S-MC  
nr. 2906, SR EN  
ISO 45001:2018



Certificate SI-MC  
nr. 1103, SR EN ISO  
27001:2018



Certificate M-MC  
nr. 3517, SR EN ISO  
14001:2015



Certificate C-MC  
nr. 3286, SR EN ISO  
9001:2015



Certificate  
SR EN  
ISO 37001:2016





# The AI platform for energy management



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