Ogre

Anomaly Detection &
NTL Forecast AI solution

Boosting the energy transition

Ogre

ogre.ai

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.

Founded in 2021

Bucharest & London

First Financing Round 2022

24 FTEs

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

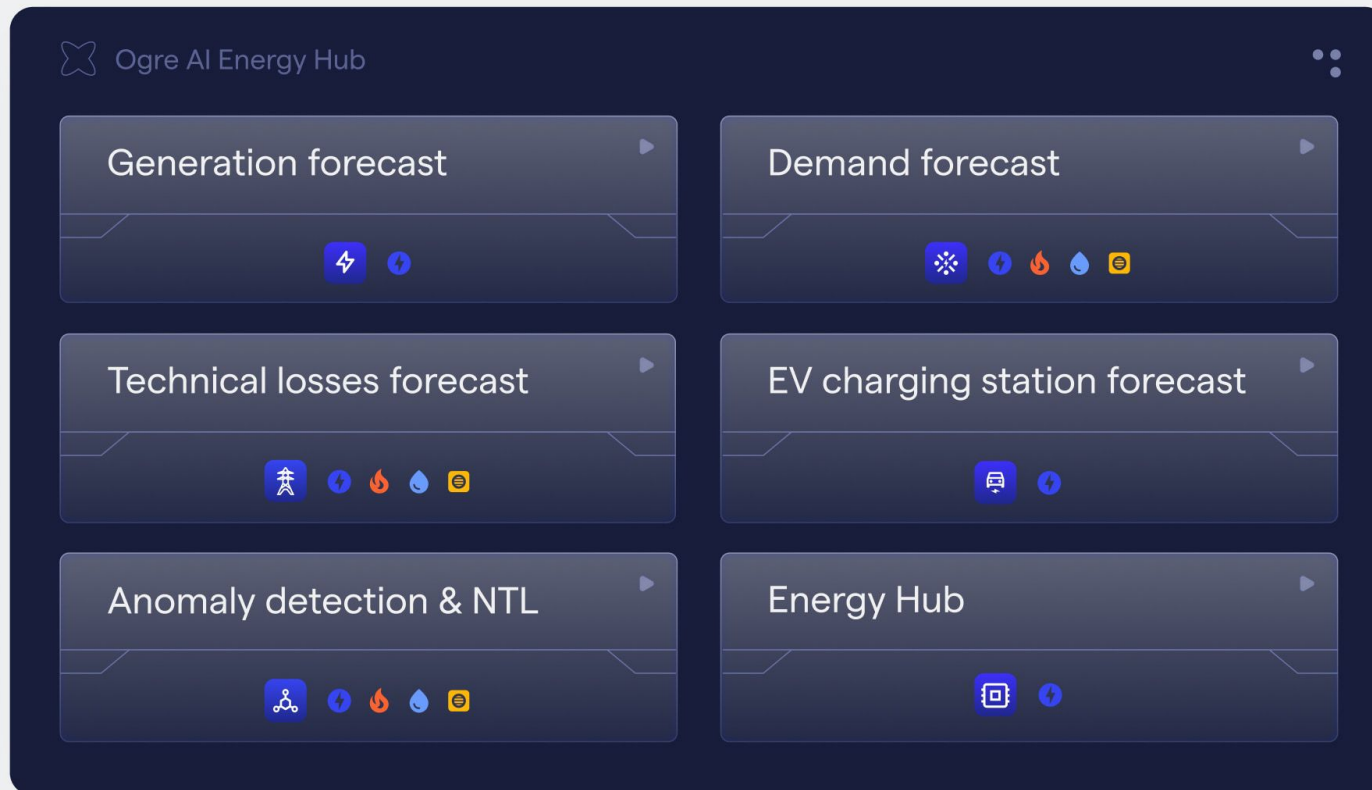Balancing market penalties

Forecast horizon challenges

RES adoption

Data Quality and Availability

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Our integrated platform offers a diverse range of AI modules, uniquely tailored for the needs of our valued partners
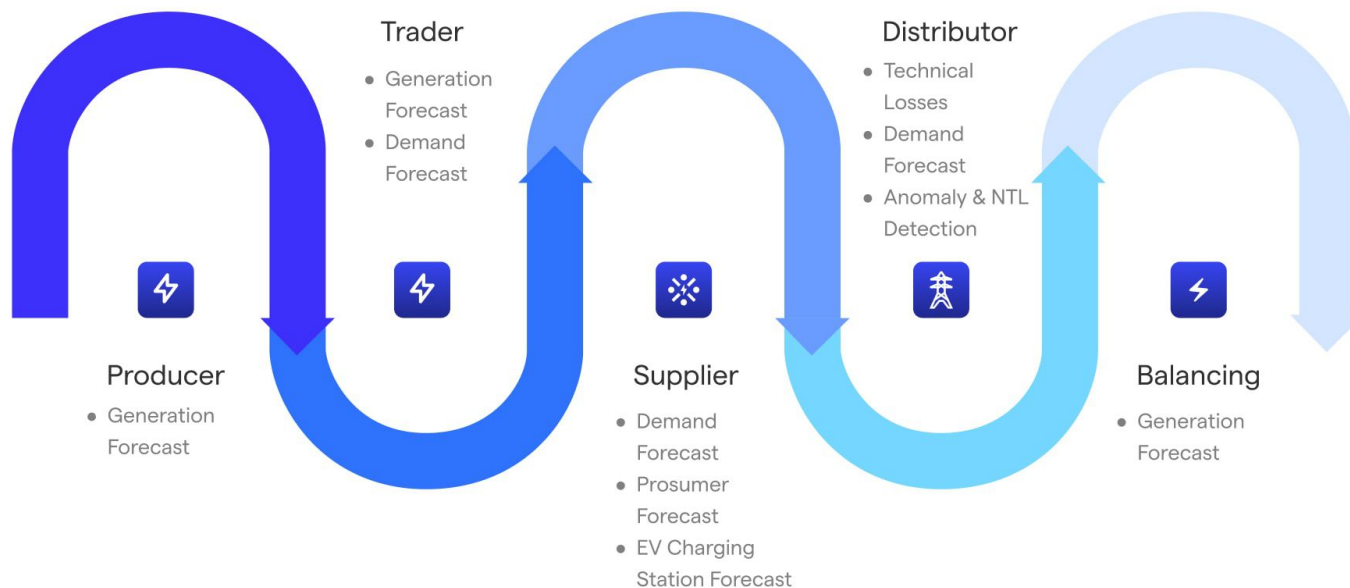
Our utilities industry and machine learning expertise can be leveraged to integrate complementary AI modules, seamlessly adapted to different domains or players and with a clear eye on scalability

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

Ogre AI Energy Hub

Generation forecast

Demand forecast

Technical losses forecast

EV charging station forecast

Anomaly detection & NTL

Energy Hub

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

Trader
- Generation Forecast
- Demand Forecast

Distributor
- Technical Losses
- Demand Forecast
- Anomaly & NTL Detection

Producer
- Generation Forecast

Supplier
- Demand Forecast
- Prosumer Forecast
- EV Charging Station Forecast

Balancing
- Generation Forecast

Anomaly Detection & NTL Forecast Module

This module uses AI to detect abnormal patterns within historical and real time consumption data to inform and deploy the workforce in an intelligent way

Our solution tackles non-technical losses head-on, reducing revenue leakage and boosting recovery rate, while also improving operational efficiency and enhancing customer satisfaction
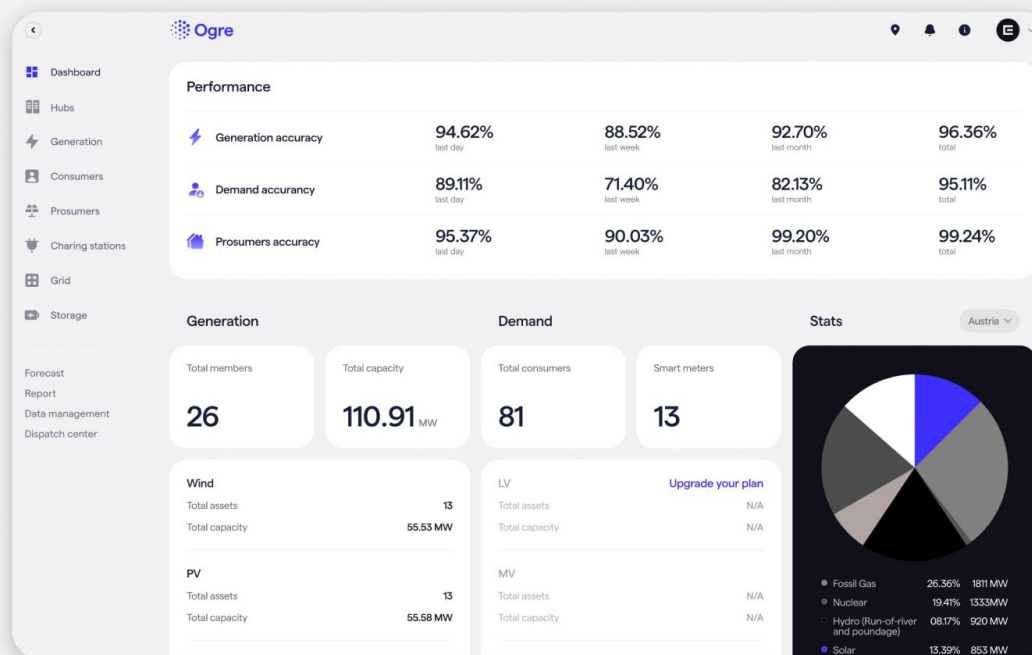
Anomaly Detection & NTL Forecast Module

Features

- Reporting
- Automatic detection of NTL events
- Weather, economic & social data integration
- Historical Data visualization
- Advanced AI algorithms
- Workforce development signals
- Role-based access control
- Notifications & Alerts
- Continuous Learning

Benefits

Boosted grid stability

Enable predictive maintenance strategies by identifying equipment showing signs of wear or malfunction.

Increased safety and security

Prevents situations that may pose safety risks, such as equipment overloads or failures leading to fires or other hazards.

Automated monitoring

Automates the monitoring of vast amounts of grid data, significantly reducing the manual effort required and allowing for real-time anomaly detection across the grid.

Early detection of faults

Operators can take preventive action, reducing downtime and maintaining a stable supply of electricity to consumers.

Existing NTL detection methodologies are vulnerable to non-malicious factors and require a large data sample size for detection analysis

Our approach aims to more efficiently account for the impact of anomalies and measurement noise in the detection pipeline, with an eye towards recurrent periodic patterns and diurnal/time of day effects.

The non-availability of labelled data can also be addressed in order to make the most out of scarcely available data points. This can be achieved by learning a non-classifier that is able to classify NTL points and by zooming into previous thefts and understanding the behavioral patterns that can lead to the construction of capable features.

A thorough data science activity is required in order to test the different AI models on the currently available data and to define the optimal solution for this project. Novel approaches such as change point detection will be used in order to understand significant sudden changes in time series (single or multivariate), at the level of underlying trend, for the raw data or its idiosyncratic component.

Statistical Profiling (no forecast)

Predictive Confidence Level (uses forecast)

Clustering & Unsupervised Learning (more advanced)

Change Point Detection (Novel)

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Anomaly Identification in Consumption Analysis, utilising specific and predictive analytic models on various data sources

Index of monthly consumption differences compared to the annual average

Index of monthly consumption differences compared to the same month of the previous year

Index of monthly consumption differences compared to the same month of the previous year

Index of deviations between actual monthly consumption and predicted monthly consumption

Index of significant disparities between estimated and actual consumption

Index of the frequency of anomalies in meter readings

Index of significant discrepancies between reported consumption and the customer's activity level

Index of unusual fluctuations in monthly consumption

Index of consumption that deviates from the usual energy usage pattern

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DELGAZ *grid*

Background

The distributor needed a solution to fully automate anomaly detection in the grid and to improve the consumption anomaly detection capabilities for the 54 SRMs along the whole distribution network.

Challenge

We were faced with incomplete non real-time data as well as a great variability in the patters. On top of that, the aging infrastructure had leaks and made it difficult to both identify anomalies as well as verifying the output of our solution.

Solution

We implemented our full blown tool for anomaly detection and used four main methodologies for detection including change point detection and clustering and unsupervised learning.

We also implemented our kanban workforce management module and automated alarms and checks for anomalies with high probabilities of occurrence.

Results

87%
Detection Accuracy

145%
Detection Boost

450% Faster Workforce deployment

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Business Model Overview - from Pilot stage to Yearly license

Test

Pilot program

Limited to 1-3 months

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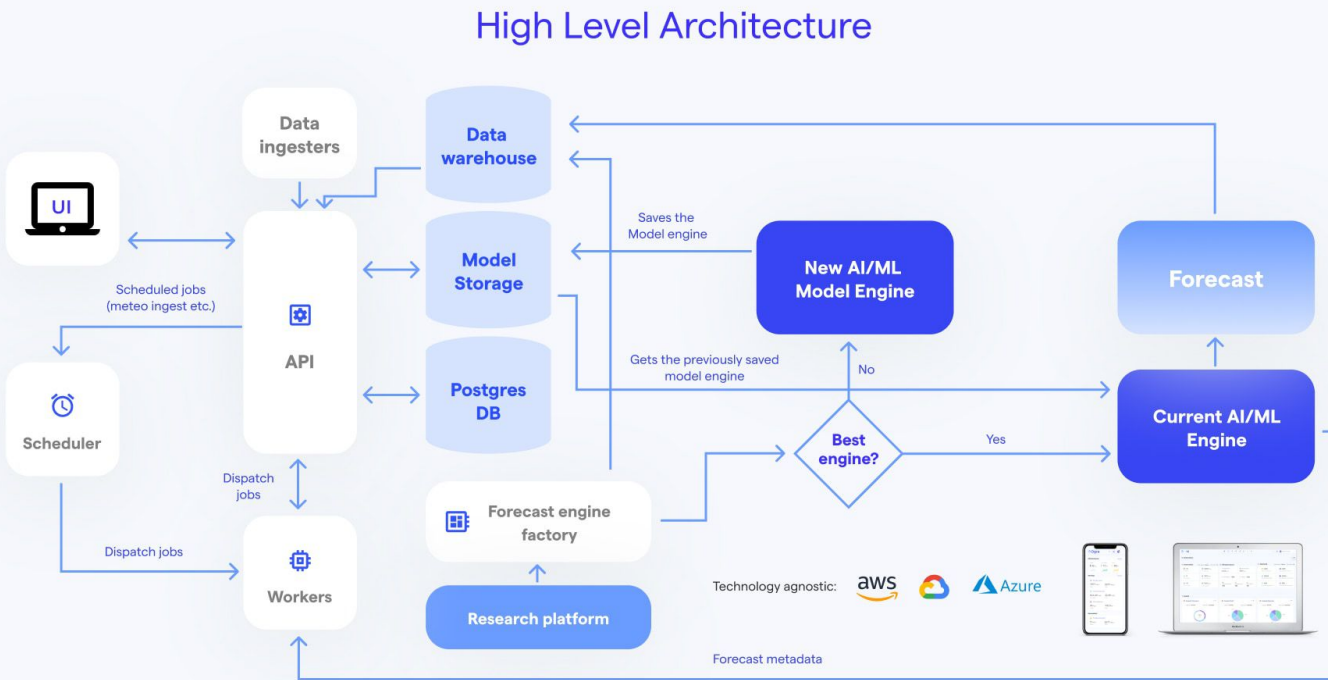## Yearly Subscription

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

Flexible pricing   Opex vs. Capex

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Ogre Platform keeps cost at a minimum while still delivering results and optimal performance of our systems and machine learning proprietary models

High Level Architecture

UI

Data ingesters

Data warehouse

Model Storage

Postgres DB

API

Scheduled jobs (meteo ingest etc.)

Scheduler

Dispatch jobs

Workers

Dispatch jobs

Forecast engine factory

Research platform

Saves the Model engine

New AI/ML Model Engine

Gets the previously saved model engine

Best engine?

No

Yes

Forecast

Current AI/ML Engine

Technology agnostic: aws | Google Cloud | Azure

Forecast metadata

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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 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.

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

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.

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.
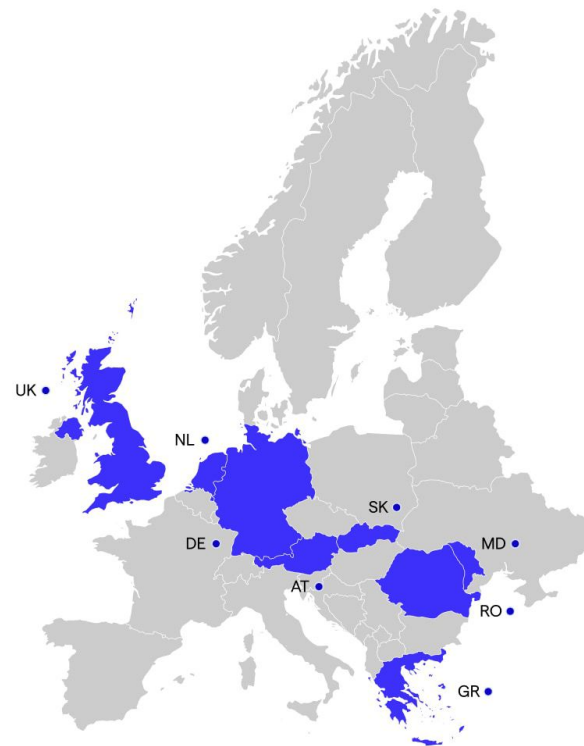
Forecast Transformations:

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

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We have a presence in several European markets

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

UK •

NL •

SK •

DE •

MD •

AT •

RO •

GR •

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We have all the relevant ISO certifications

ISO 45001 Occupational Health and Safety	ISO 27001 Information Security Management	ISO 14001 Environmental Management	ISO 9001 Quality Management	ISO 37001 Anti-Bribery Management Systems
ISO 45001	**ISO 27001**	**ISO 14001**	**ISO 9001**	**ISO 37001**
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

![Ogre logo]

The AI platform for energy management

ogre.ai

6 Gara Herastrau
Globalworth Square,
3rd floor, 020334, Bucharest, Romania
-
21 Ellis Street, Knightsbridge, London
SW1X 9AL, United Kingdom

office@ogre.ai
+40 (0)720 051 515