Demand/Load Forecasting

Microsoft Solutions Partner

Infrastructure (Azure)
Data & AI (Azure)
Digital & App Innovation (Azure)
Security
Biz Applications

Celebal Specialization and Strength

CELEBAL TECHNOLOGIES

Microsoft
AI Partner Of The Year 2023
Global

databricks
Partner Of The Year 2022 & 2023
Asia Pacific and Japan
2 YEARS IN A ROW

databricks
Migrations Partner Of The Year 2023
Asia Pacific and Japan

databricks Partner of the Year 2022 — Asia Pacific and Japan

databricks TOP CONSUMPTION PARTNER — Asia Pacific and Japan

databricks REGIONAL SYSTEM INTEGRATION PARTNER India — 2 YEARS IN A ROW

Microsoft Singapore Partner 2023

Microsoft MALAYSIA PARTNER AWARDS 2022 — Azure Data & AI Partner of the Year

Microsoft COUNTRY PARTNER OF THE YEAR India — 2 YEARS IN A ROW 2021 AND 2022

Partnerships

- Microsoft Solutions Partner
- databricks Elite Partner
- SAP Silver Partner
- Red Hat Ready Business Partner

Advanced Specialization

- AI & Machine Learning
- Analytics
- Infra and Database Migration
- Kubernetes
- Cloud Security
- Low Code No Code
- Intelligent Automation

INDIA | USA | CANADA | APJ | MIDDLE EAST | AUS

2800+	800+	500+
Employees	AI experienced professionals	AI Certifications

Industries We Serve

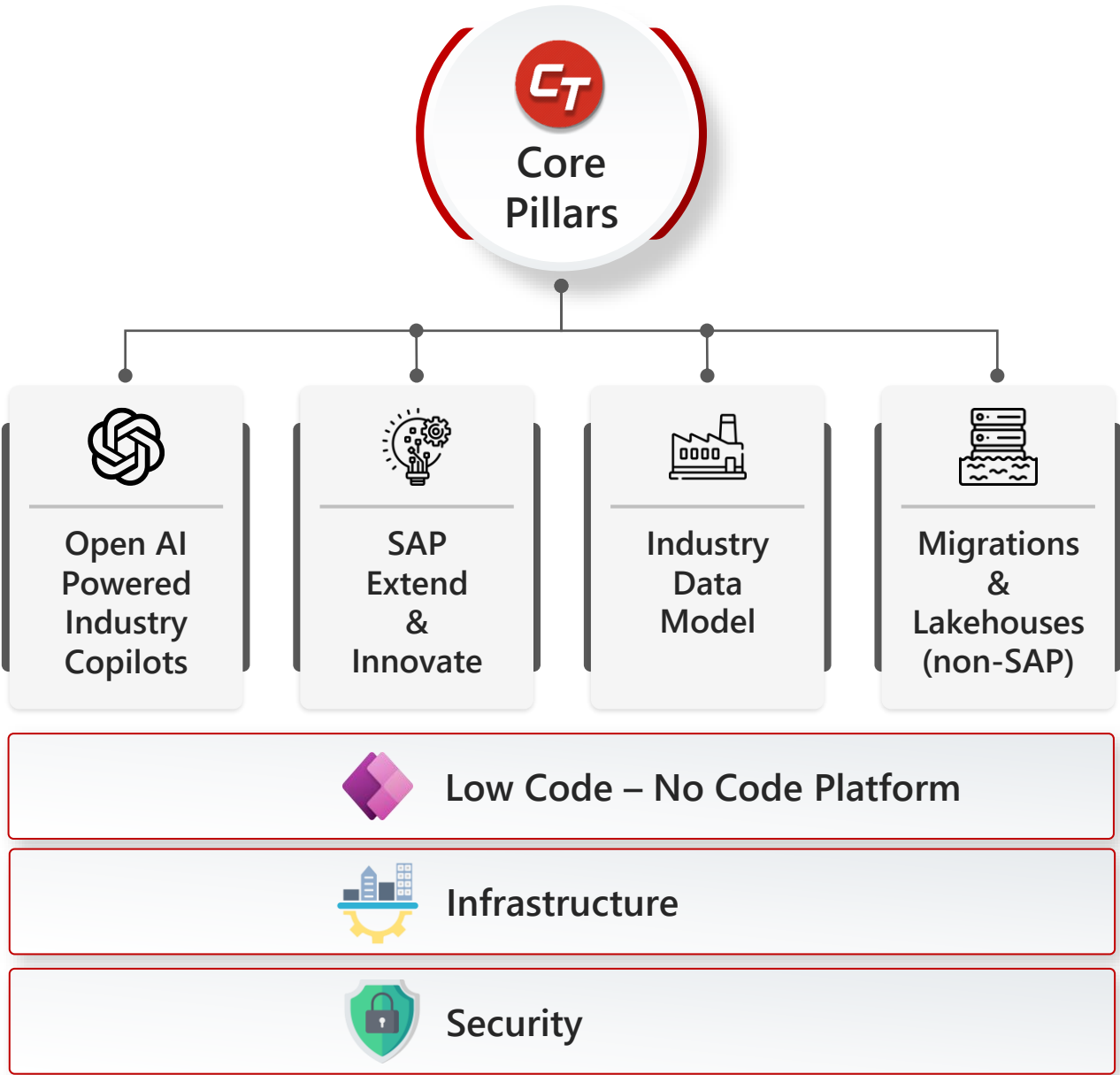| Manufacturing	Retail & CPG	Financial Services	Energy & Sustainability	Healthcare & Life Sciences	Media & Entertainment

Celebal Core Pillars

1. Brief Description of the Solution:

The Demand/Load Forecasting Solution sets a new benchmark in predictive precision, accurately estimating consumer electricity demand through the integrated power of Azure Machine Learning, Azure Kubernetes Service, Azure Storage Account, and Azure Function App. Energy stakeholders encounter major challenges in forecasting demand due to fluctuating load patterns and dynamic consumption behaviours. By intelligently analyzing historical consumption trends, environmental factors, and real-time demand shifts, our solution equips grid operators with critical insights to develop effective resource allocation strategies.

2. Business Problem It Solves:

Energy companies face significant challenges in forecasting and planning amidst volatile market conditions and evolving regulatory landscapes. Traditional forecasting methods often fall short in accuracy and fail to incorporate real-time data effectively. This leads to suboptimal resource allocation, increased operational costs, and missed opportunities for revenue optimization.

3. Value Add for Customer:

- **Precision Demand/Load Forecasting:** Utilizes advanced machine learning and data analytics to deliver highly accurate electricity consumption forecasts, enabling grid operators to plan with confidence.

- **Real-Time Demand Insights:** Continuously monitors live consumption patterns, providing immediate visibility into demand shifts for timely and efficient resource adjustments.

- **Intelligent Resource Planning:** Improves operational efficiency by aligning energy generation and distribution with projected demand, minimizing waste, and reducing costs.

- **Adaptive Demand Response:** Enhances demand response strategies by identifying optimal load-shifting opportunities, supporting grid stability, and reducing peak load pressure.

- **Reliable Grid Performance:** Predicts consumption variability in advance, helping prevent service disruptions and maintaining a consistent power supply under all operating conditions.
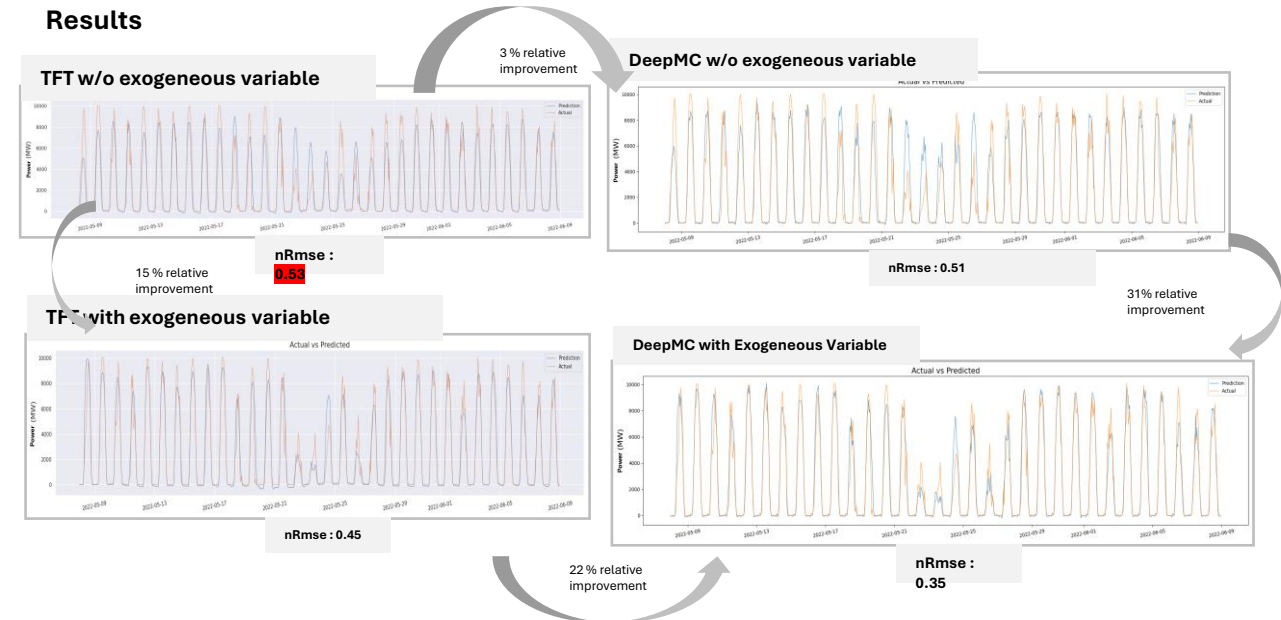
Dataset: Client
Location: Europe
Dataset Size : 20 Months
Maximum Demand : 350KW
Average Demand : 170KW

Power BI Dashboard

Results

TFT w/o exogeneous variable

nRmse : 0.53

3 % relative improvement

DeepMC w/o exogeneous variable

nRmse : 0.51

15 % relative improvement

TFT with exogeneous variable

nRmse : 0.45

31% relative improvement

DeepMC with Exogeneous Variable

nRmse : 0.35

22 % relative improvement

- **P&U framework** is the solution that fulfills all the power and utilities forecasting needs in the renewable energy domain.
- Reduces manual effort by automating the end-to-end data science lifecycle.
- The framework includes Microsoft's Deep MC algorithm, which decomposes localized weather data to understand the interaction between IoT sensor data and weather station forecasts.