Advanced machine learning to transform utilities & system operators.

Lower Costs, Higher Reliability—All in Real Time.

Mohak Mangal, Stanford GSB
Dhruv Suri, Stanford Doerr School of Sustainability

Meet the team

Mohak Mangal

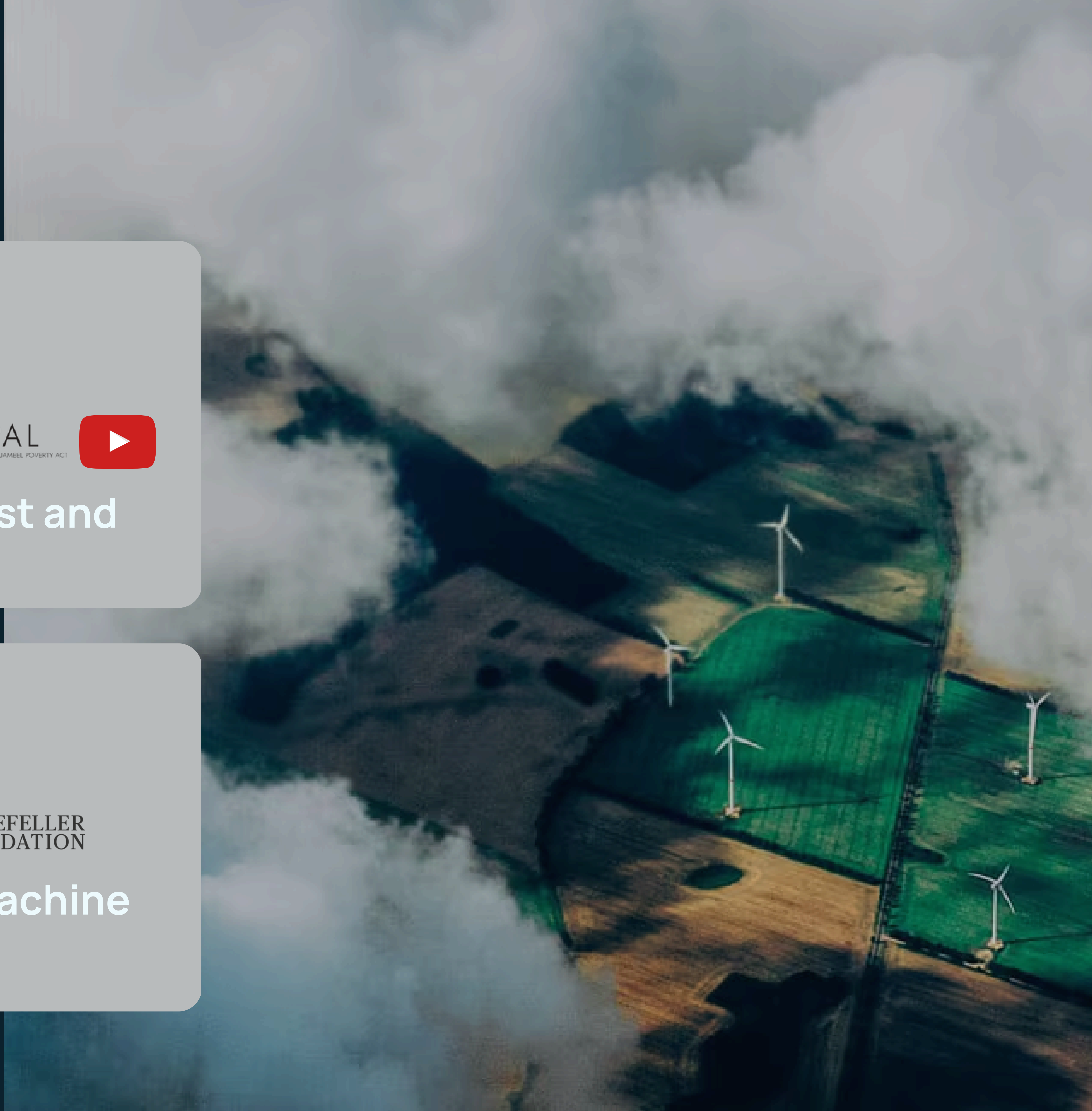
MA , MBA

Experienced Economist and Statistician

Dhruv Suri

PhD Candidate

Power Systems and Machine Learning Engineer



Our Expert Advisors

Ines Azevedo

Professor, Stanford University

Leads a $20 million DoE-funded consortium for energy reliability

Adam Brandt

Professor, Stanford University

Optimization pioneer, coupled-gas and electricity systems planning

Lincoln Bleveans

Sustainability Utilities & Infrastructure

Ex-utility executive; 30+ years experience in the energy sector

Utilities and system operators lose billions due to outdated forecasting and procurement methods

“We live and die by our ability to plan for the future … If we get it wrong, the cost implications for customers and for our business are huge.”

Senior executive of one of the largest utilities in India
(Rs. 15,000 cr+ annual revenue)

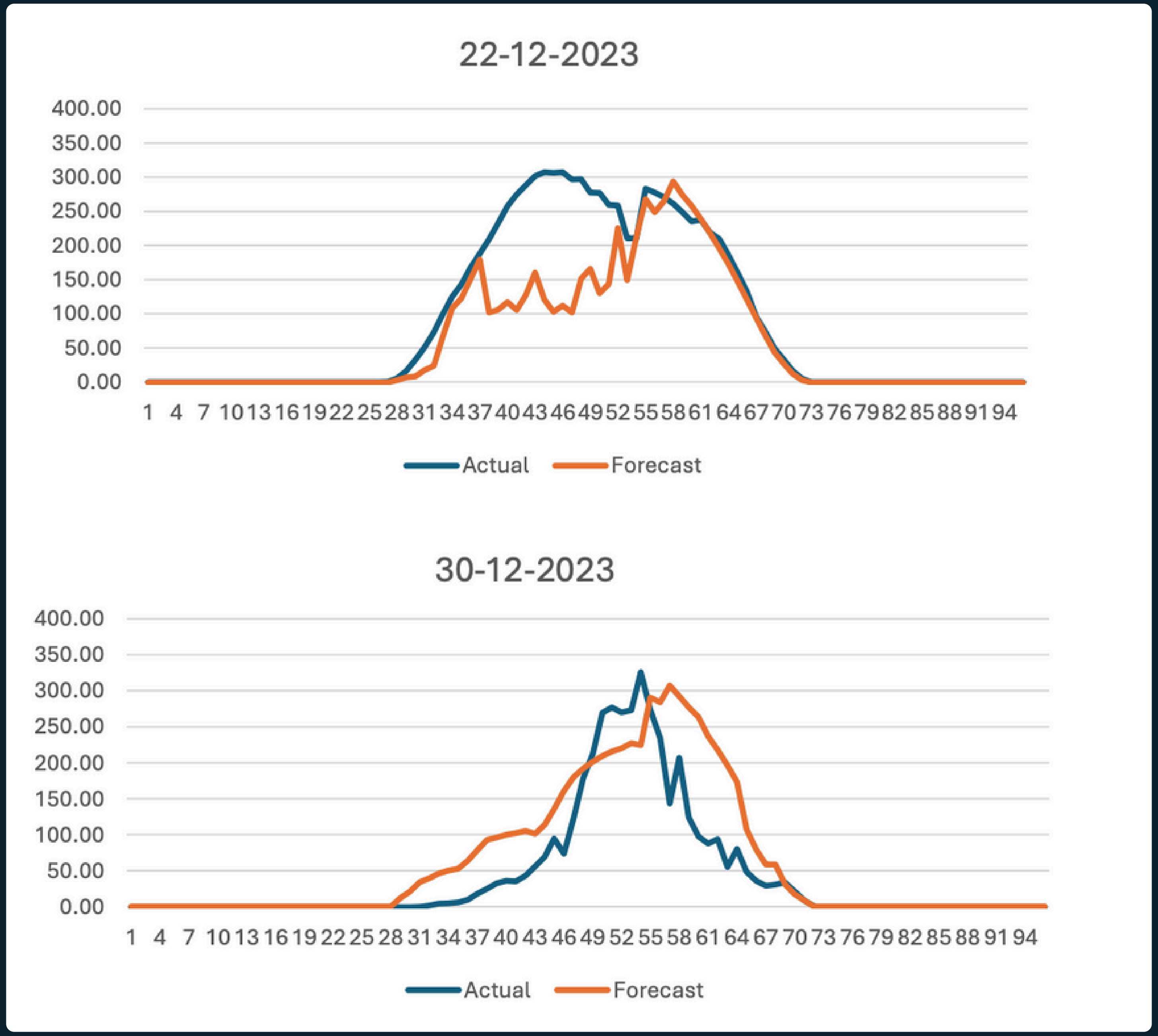
These costs have an economy-wide impact affecting businesses and consumers

Source: PRS

We spoke to executives of 40+ utilities and system operators to understand their pain points

Current forecasting stack relies on deterministic models that don’t reflect grid fluctuations

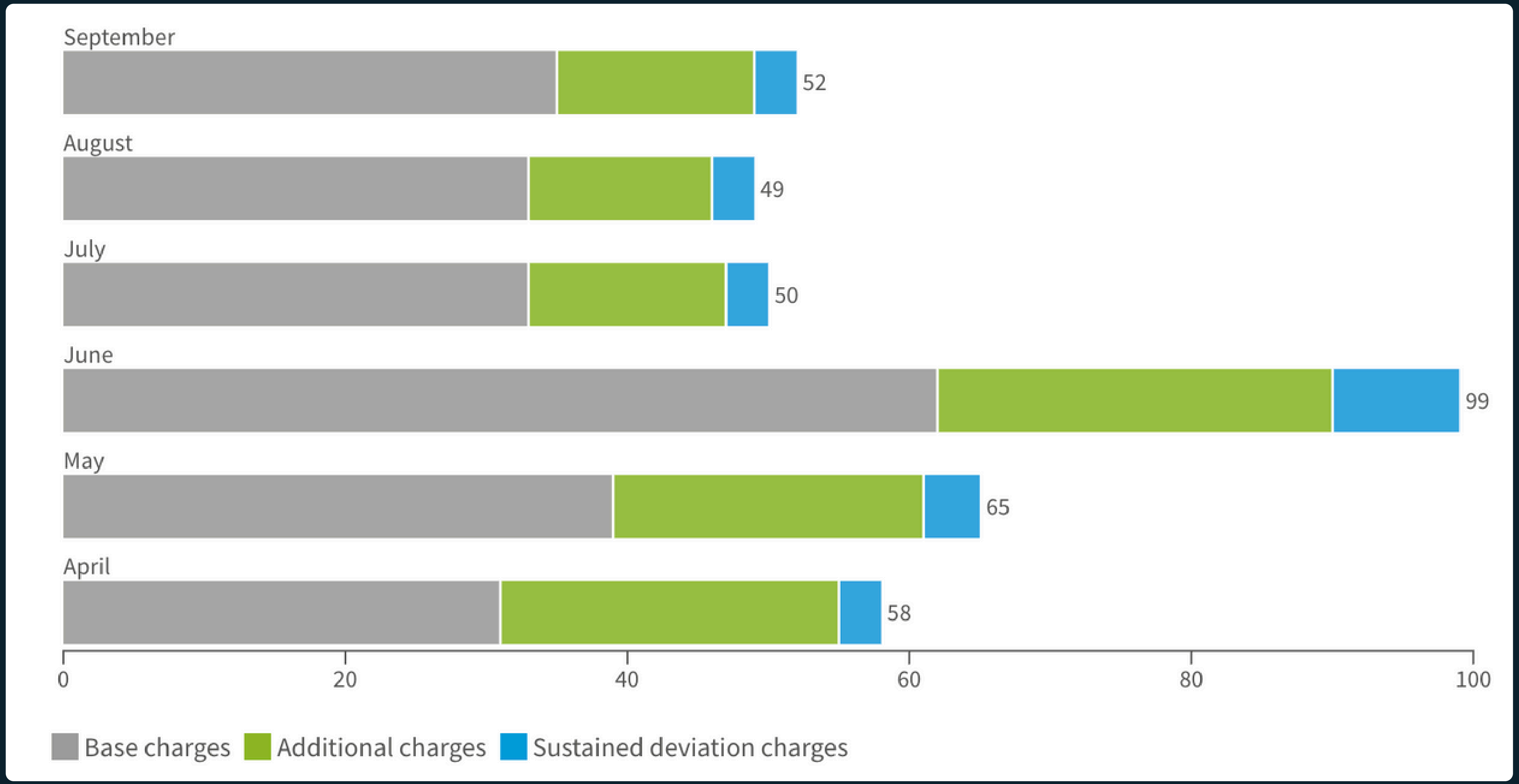
In November-December 2023, a 320 MW solar park in Bikaner **produced far lower than its typical output** in one day due to a sudden foggy and cloudy day.



Source: SPDA

This leads to frequent over-purchasing or under-purchasing of power, increasing losses

UP incurred INR 374 crores as DSM penalties during H1 FY23.

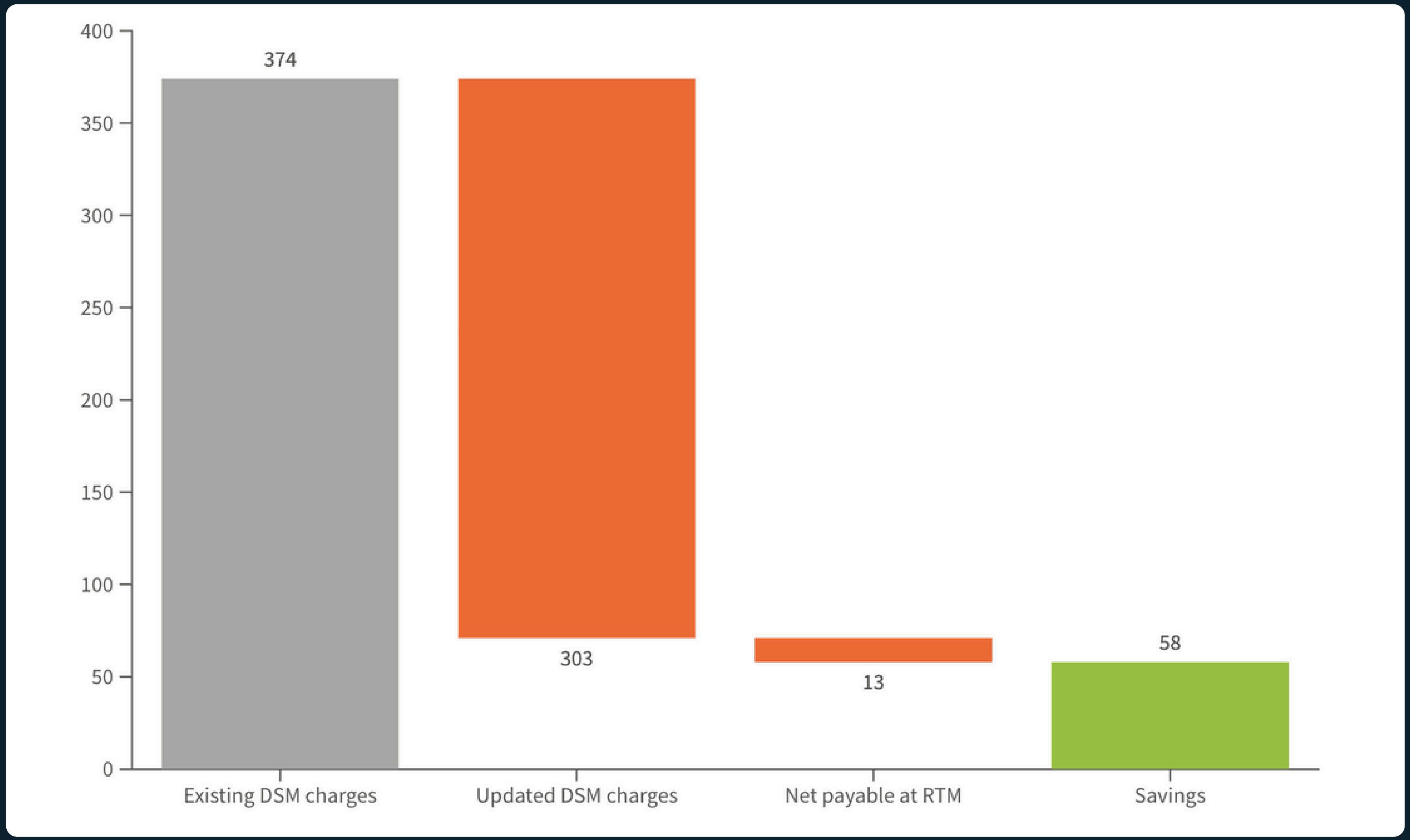


Source: CEEW

This leads to frequent over-purchasing or under-purchasing of power, increasing losses

UP incurred INR 374 crores as DSM penalties during H1 FY23.

By increasing its forecast accuracy to 95%, UP could have saved ~Rs. 60 crores.



Source: CEEW

Several states are facing challenges due to inaccurate forecasting

Andhra Pradesh: ‘High demand, low availability leading to load-shedding’

There is a shortage of 50 million units of power, says official

Published - April 09, 2022 09:35 pm IST - VIJAYAWADA

STAFF REPORTER

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Delhi Penalizes Three DISCOMs for Defaulting on Renewable Purchase Obligations

The commission asks distribution companies to pay the penalty within a month

October 10, 2019 / Anjana Parikh / Other, Renewable Energy,

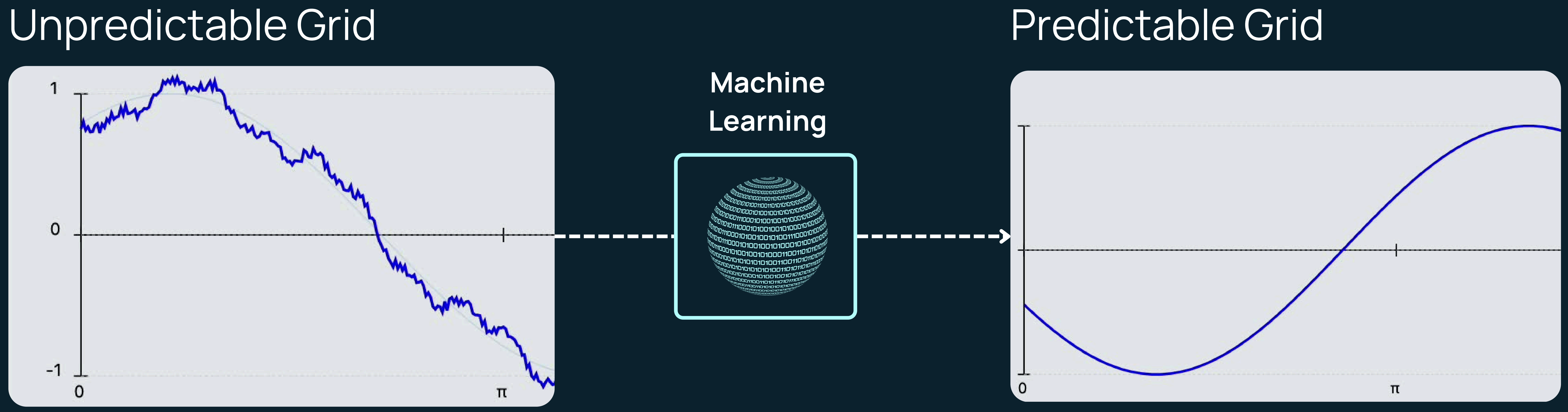
Telangana government rejects proposal to hike power tariff of consumers

By Srinivasa Rao Apparasu , Hyderabad

Jan 30, 2025 08:06 AM IST

The Telangana government is unlikely to increase the power tariff for consumers in the state for the upcoming financial year 2025-26

We cut the losses by enabling real-time optimization that keeps costs down and reliability up



We are working with the best utilities and system operators

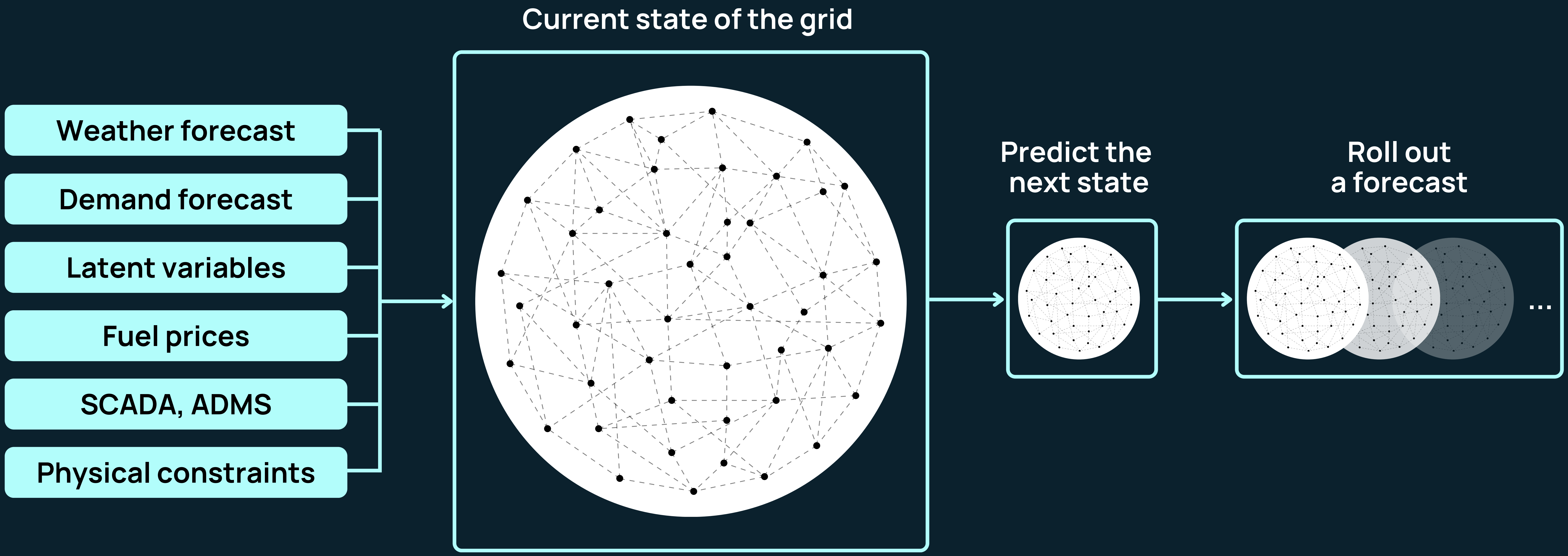
ENEXIS
Congestion Analysis

Load and Renewable Forecasting
CESC LIMITED

TATA POWER
Load and Renewable Forecasting

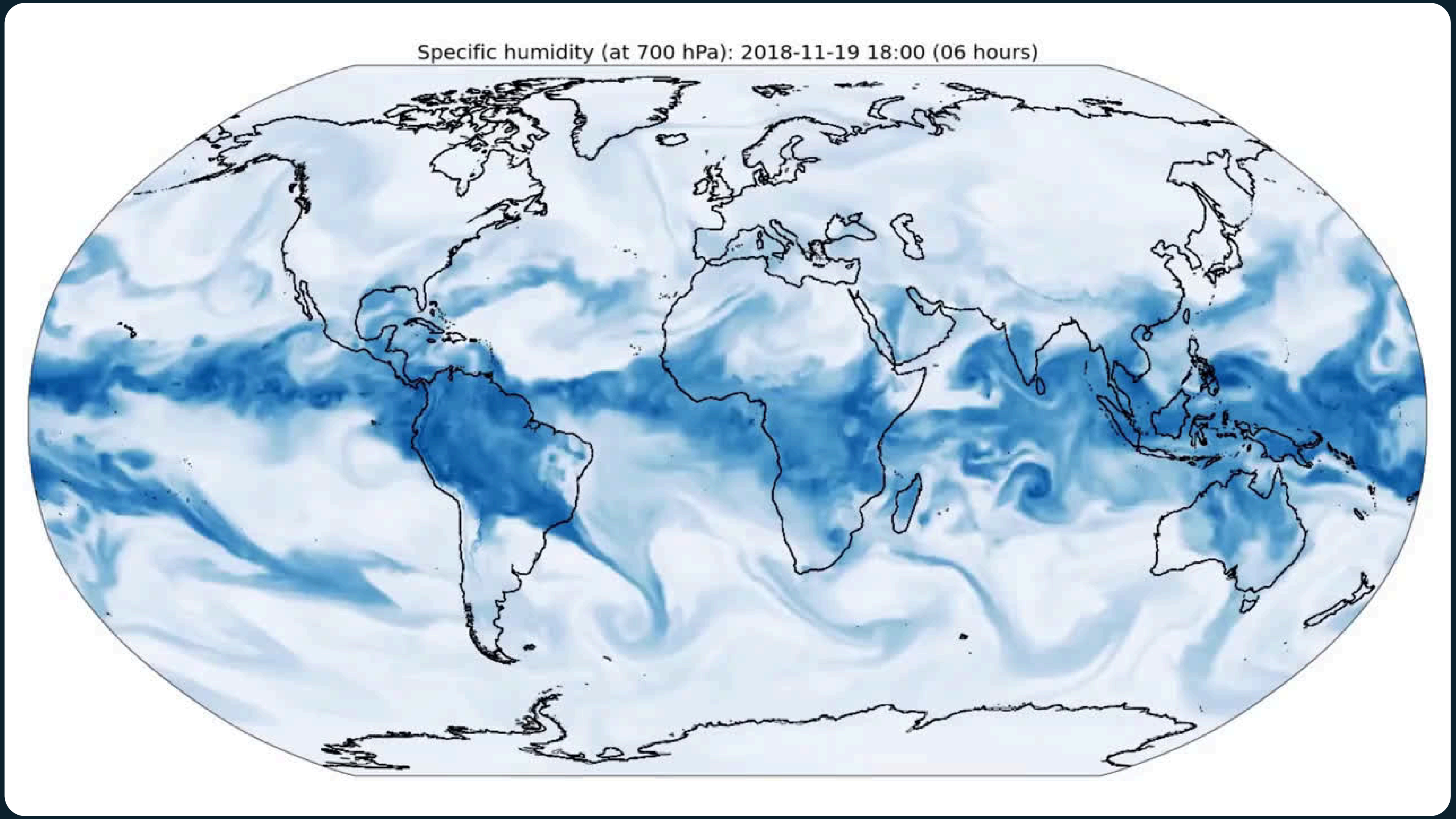
xm
Load and Renewable Forecasting

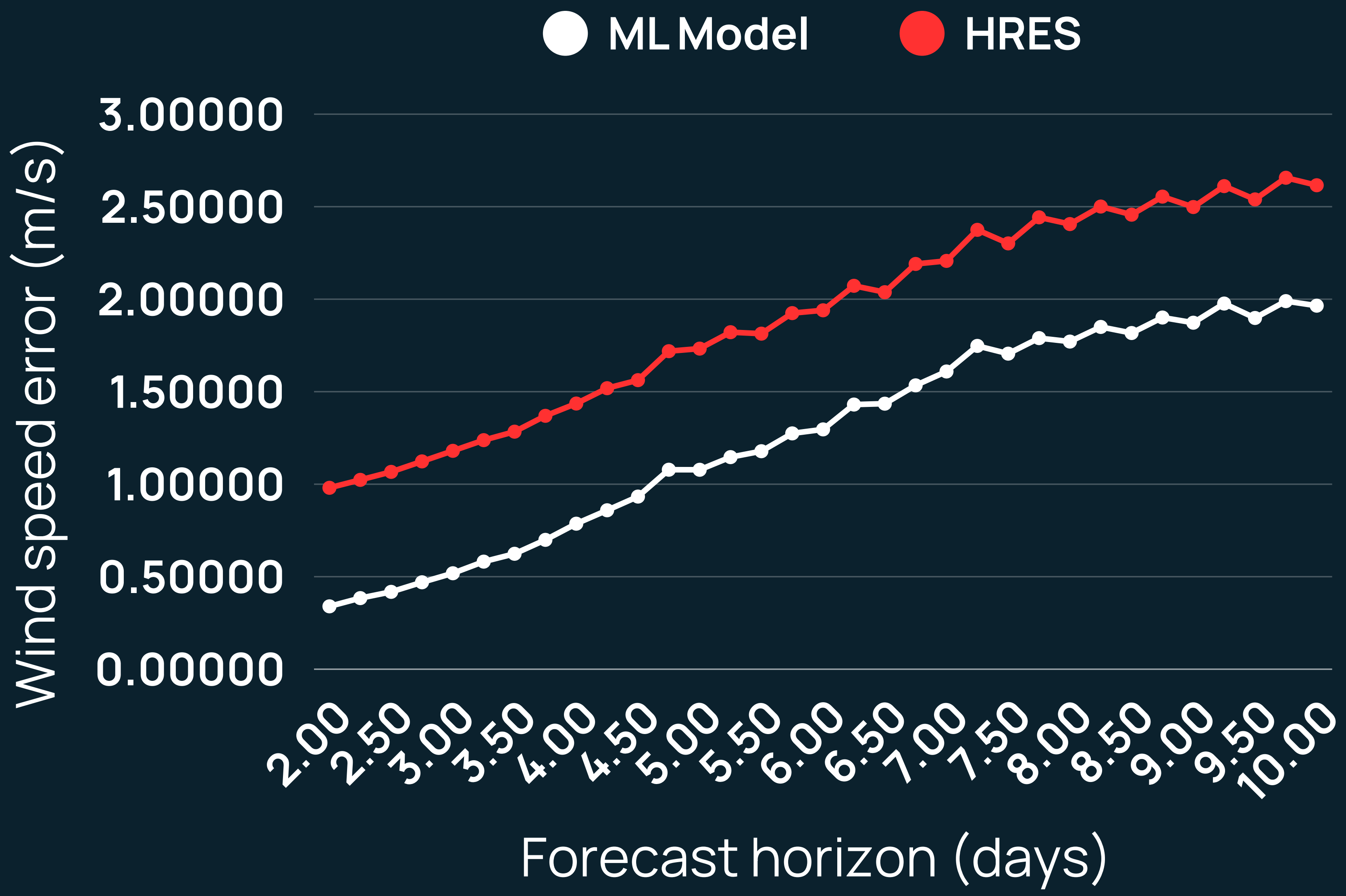
We combine deep learning with utility data to give you the most accurate forecasts



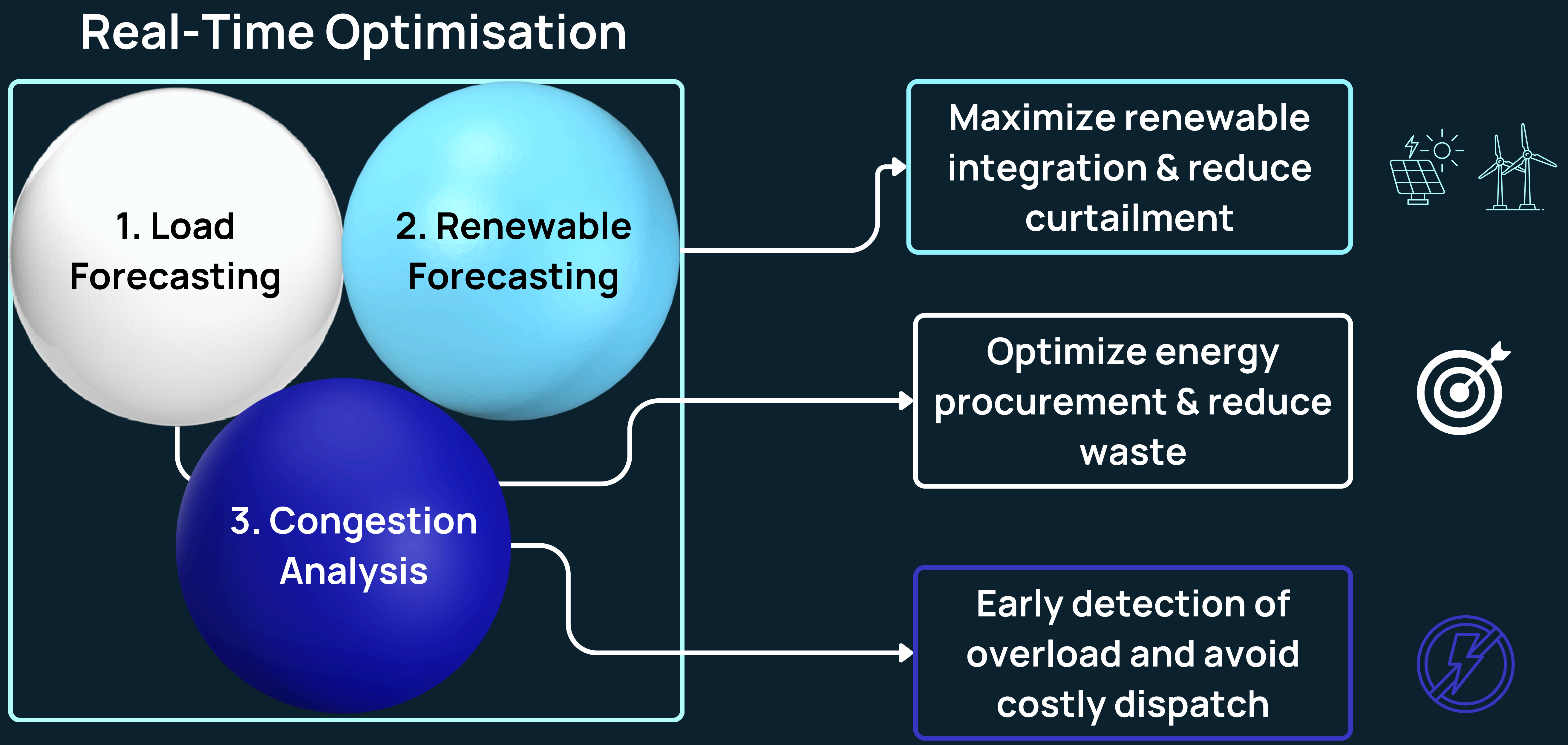
Our ML models beat the State of the Art

In a partnership with Chile's system operator, we built a machine-learning weather prediction model in 90 days that outperformed ECMWF HRES predictions.



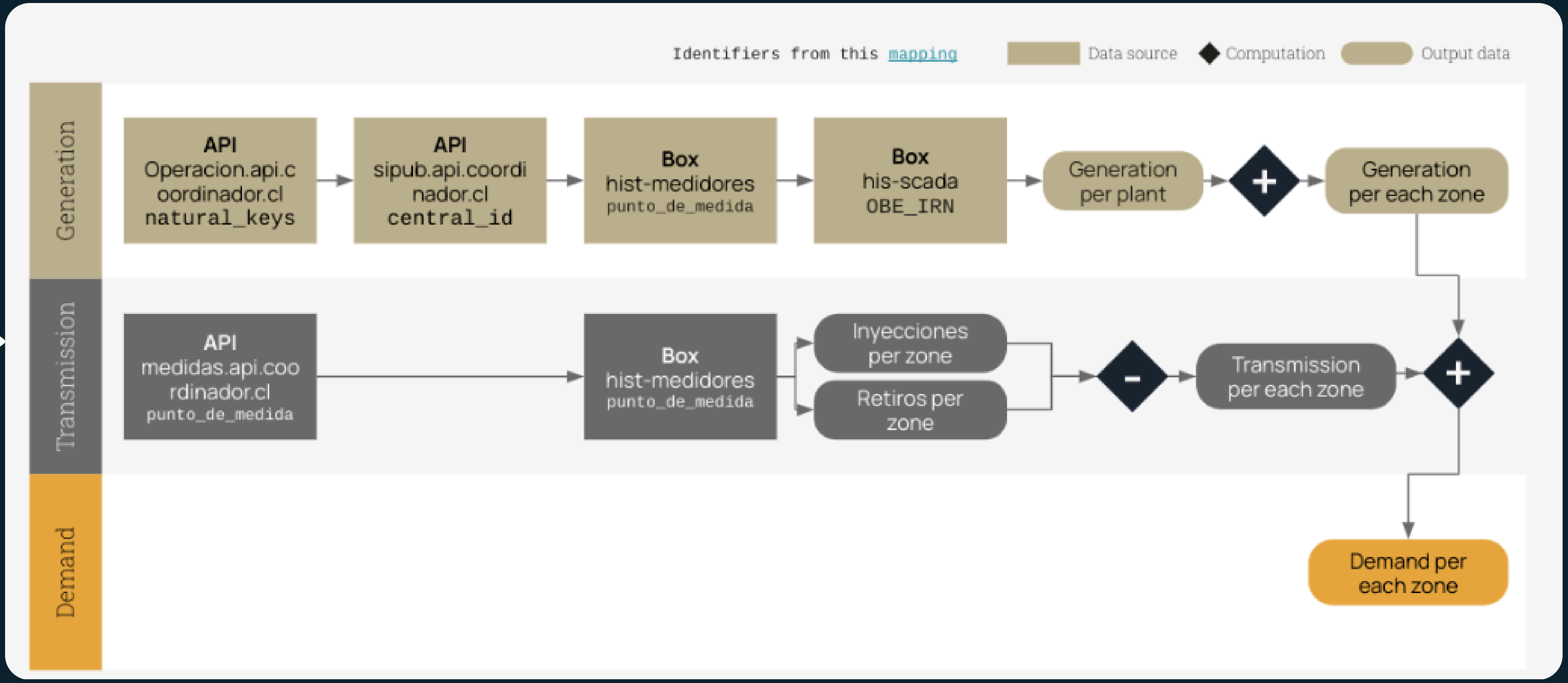


We are laser-focused on three core use cases



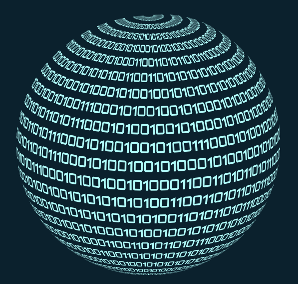
We ensure seamless integration with your existing systems

For the Chilean system operator, we designed the system architecture to ensure seamless integration.

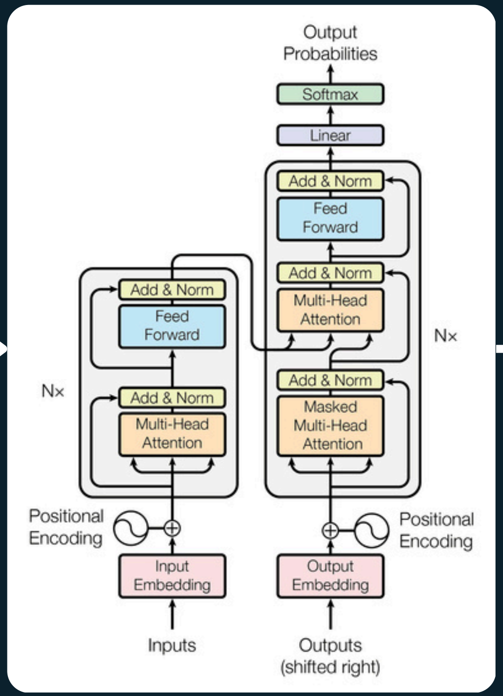


Our AI engine uses two key approaches

AI Engine



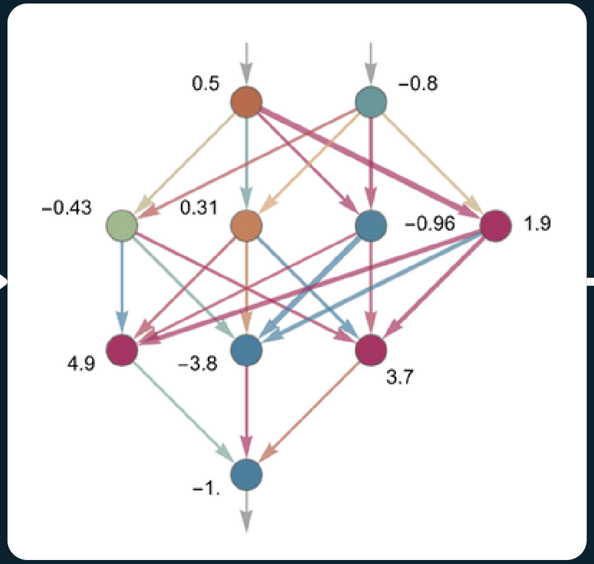
1. Transformers



Analyze large, complex time-series data (like loads, weather patterns, market signals)

Cut your forecast errors significantly, saving you money.

2. Graph Neural Networks (GNNs)



Capture how physical grid nodes and lines connect, revealing congestion risks and interdependencies.

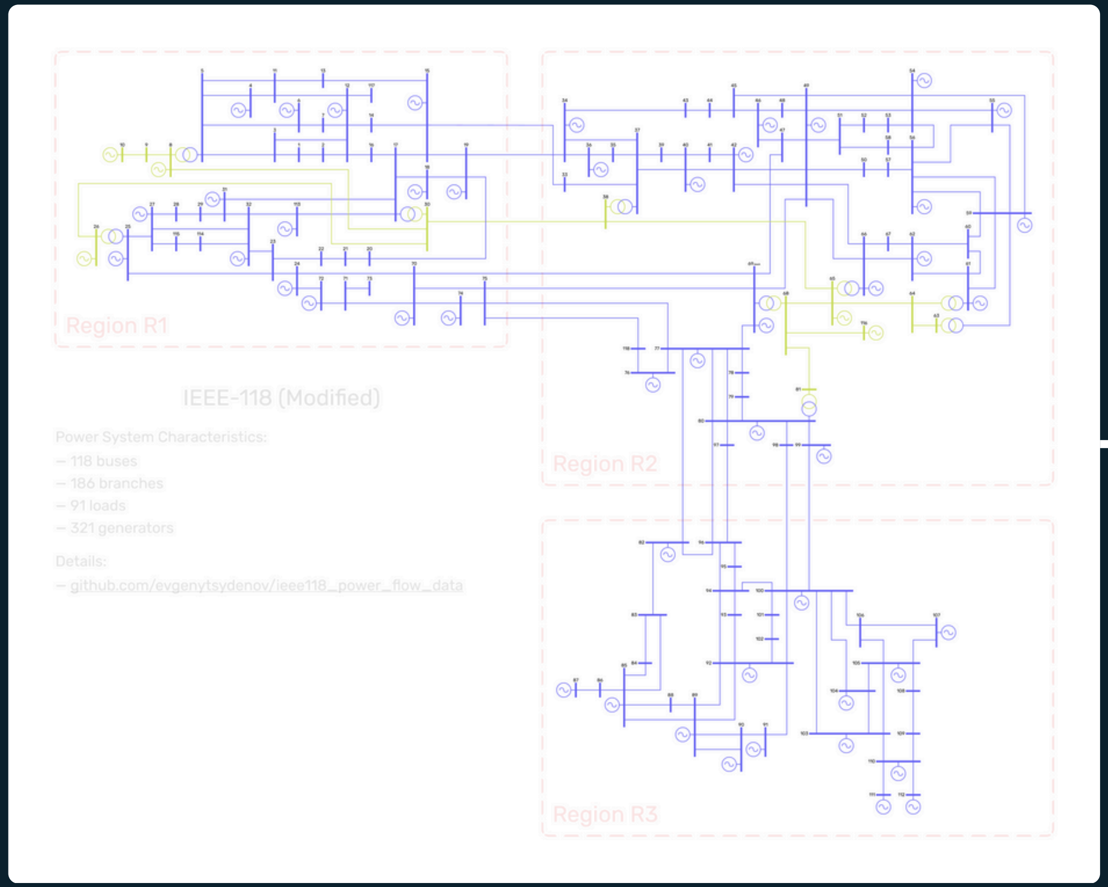
Reduce the risk of overload and blackouts, protecting revenue and reliability

Using transformer models like in Chat-GPT, we analyze time-series data to deliver highly accurate forecasts

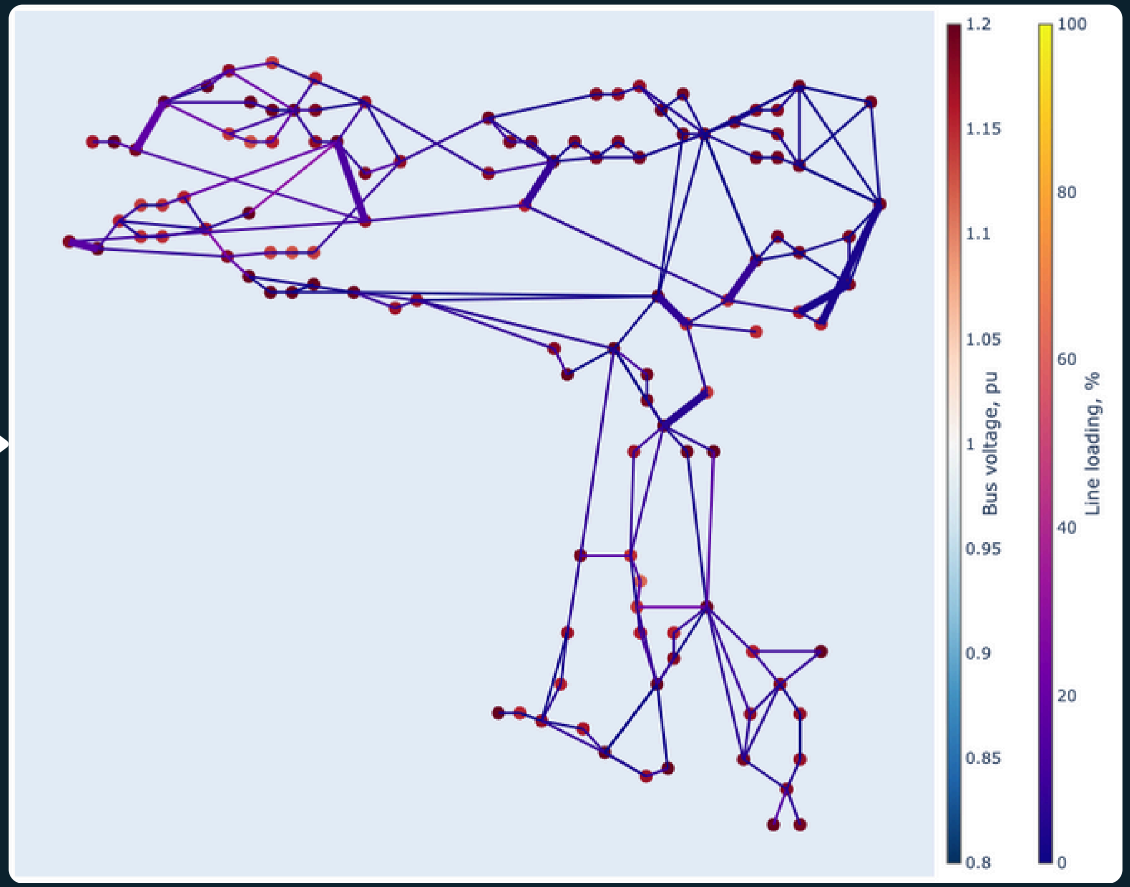
	Input	Processing	Output
Chat-GPT	Correct the grammar of this sentence ***The cat sat upon the dog***		The corrected sentence is: ***The cat sat on the dog***
Our Engine	Predict the grid and weather		Accurate grid-state and weather forecasts from seconds to years

Our GNN architecture gives operators a real-time map of congestion risks and optimal dispatch decisions

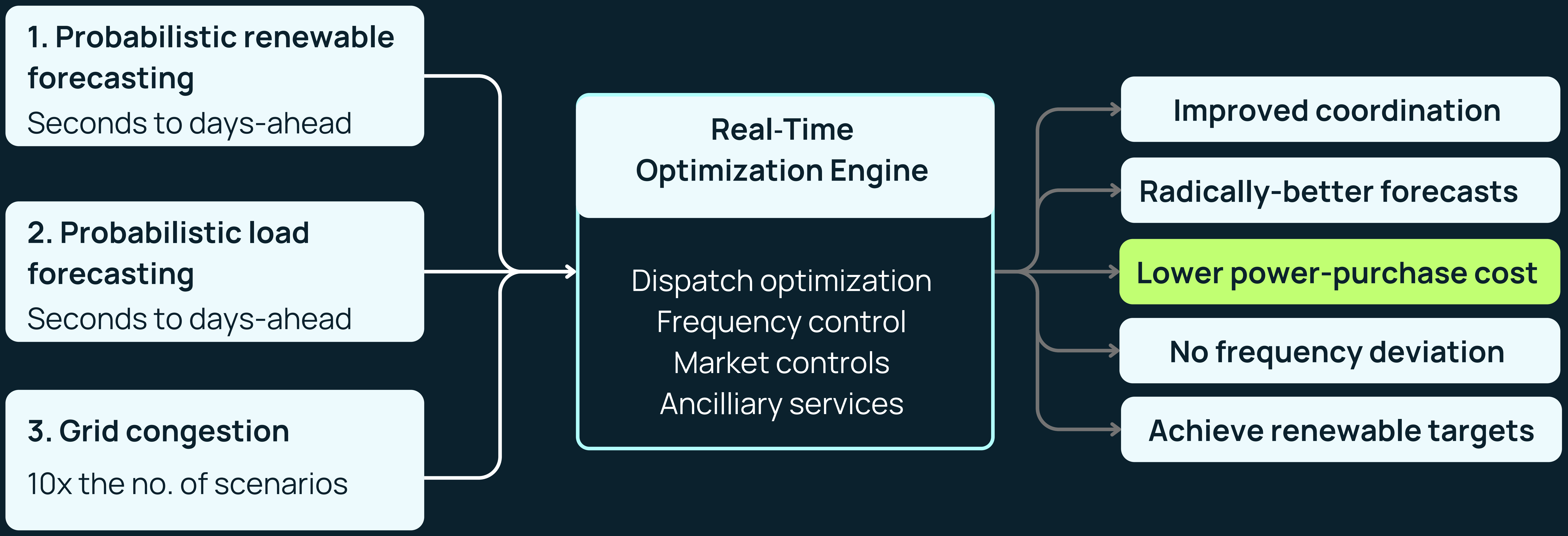
We model the grid as a graph:
Nodes = substations & transformers
Edges = power lines



Our engine learns from real-time SCADA data and historical records to predict overload risks 24 hours ahead.



Our real-time optimisation engine reduces your power procurement costs



You can read our detailed technical paper for more details

Matrix: AI-Powered Grid Operations for Electric Utilities

Dhruv Suri[1] and Mohak Mangal[2]
[1]Department of Energy Science & Engineering, Stanford University, [2]Graduate School of Business, Stanford University

The power grid is undergoing an unprecedented transformation driven by decentralization, renewable energy integration, and increasing system uncertainty. Traditional deterministic grid management approaches struggle to handle the stochastic nature of modern power systems, leading to forecasting errors, congestion mismanagement, and operational inefficiencies. To address these challenges, we present an AI-powered grid operations platform that leverages probabilistic forecasting, reinforcement learning-based congestion management, and agentic AI for autonomous decision-making.

Our framework enables real-time grid orchestration by integrating multi-source data from SCADA, AMI, PMUs, and high-resolution weather models, allowing for sub-second decision-making and adaptive grid control. The system is designed as a modular, scalable solution, enabling utilities to deploy AI-driven optimization at any level—from localized feeders to entire transmission networks. This approach enhances grid reliability, reduces operational costs, and maximizes renewable energy utilization by shifting from reactive, rule-based operations to predictive, self-learning AI systems. Success is measured through forecast accuracy improvements, uncertainty reduction, and economic efficiency gains over existing legacy models. This platform represents a transformational shift in grid operations, moving beyond static contingency planning toward a real-time, self-optimizing, and resilient power system.

Contents

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Interested in a collaboration? Get in touch.

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