

Microgrid Optimization

 **Microsoft**
Solutions Partner

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



Celebal Specialization and Strength



Partnerships



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+
Employees

800+
AI experienced
professionals

500+
AI Certifications



Industries We Serve



Manufacturing



Retail & CPG



Financial
Services



Energy &
Sustainability

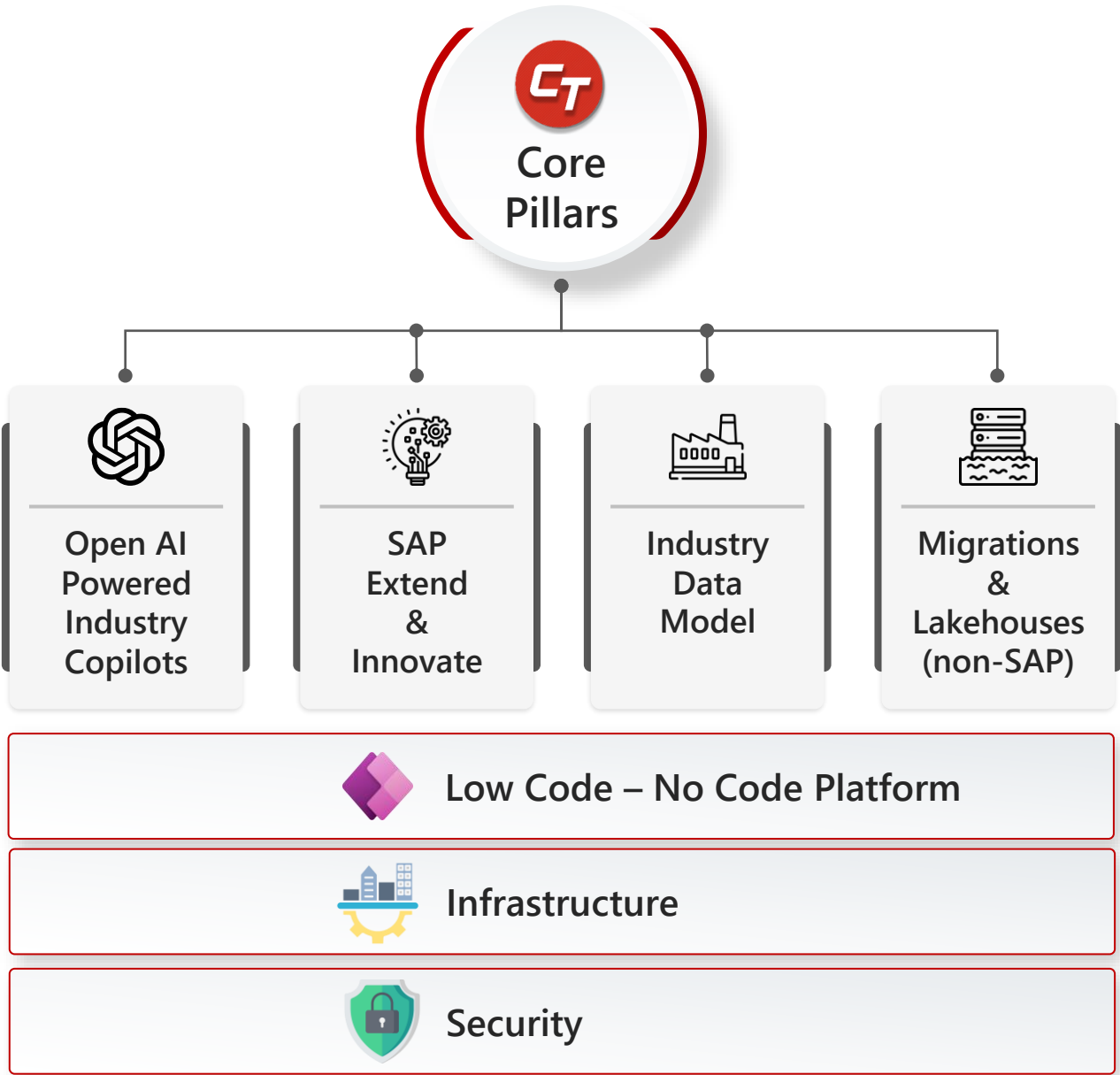


Healthcare &
Life Sciences



Media &
Entertainment

Celebal Core Pillars



1. Brief Description of the Solution:

Microgrid Optimization is an advanced analytics platform hosted on Azure, designed to maximize the efficiency, reliability, and cost-effectiveness of microgrid operations. It integrates real-time data analytics, predictive modeling, and control algorithms to optimize energy generation, storage, and consumption within microgrid systems. This empowers energy managers, utilities, and communities to achieve energy independence, resilience, and sustainability goals.

2. Business Problem It Solves:

Microgrid operators face challenges in balancing energy supply and demand, optimizing renewable energy integration, managing storage resources, and ensuring grid stability in dynamic operating conditions. Traditional methods often lack the sophistication and real-time capabilities required to optimize microgrid operations effectively. Microgrid Optimization addresses these challenges by providing automated tools to enhance operational efficiency and maximize the economic and environmental benefits of microgrid deployments.

3. Value Add for Customer:

- Optimized Energy Management:** The solution utilizes predictive analytics and control algorithms to optimize energy generation from renewable sources, manage energy storage systems, and balance supply and demand in real-time.
 - Enhanced Grid Resilience:** By incorporating weather forecasts and load predictions, Microgrid Optimization improves grid stability, minimizes downtime, and enhances resilience against disruptions.
 - Cost Savings and Sustainability:** Maximizing renewable energy utilization and reducing reliance on fossil fuels leads to significant cost savings on energy bills and supports environmental sustainability goals.
 - Scalability and Integration:** Built on Azure, the solution scales seamlessly to handle varying microgrid sizes and complexities. It integrates with existing infrastructure, IoT devices, and energy management systems, ensuring compatibility and facilitating rapid deployment.
- Microgrid Optimization on Azure Marketplace empowers organizations to harness the full potential of microgrid technology, optimize energy use, and achieve economic and environmental sustainability in today's energy landscape.

REVENUE MAXIMIZATION

We intend to maximize our profits by setting up schedules where we fulfill our consumer demand as well as sell energy to different markets at peak price periods. This is how we calculate revenue:

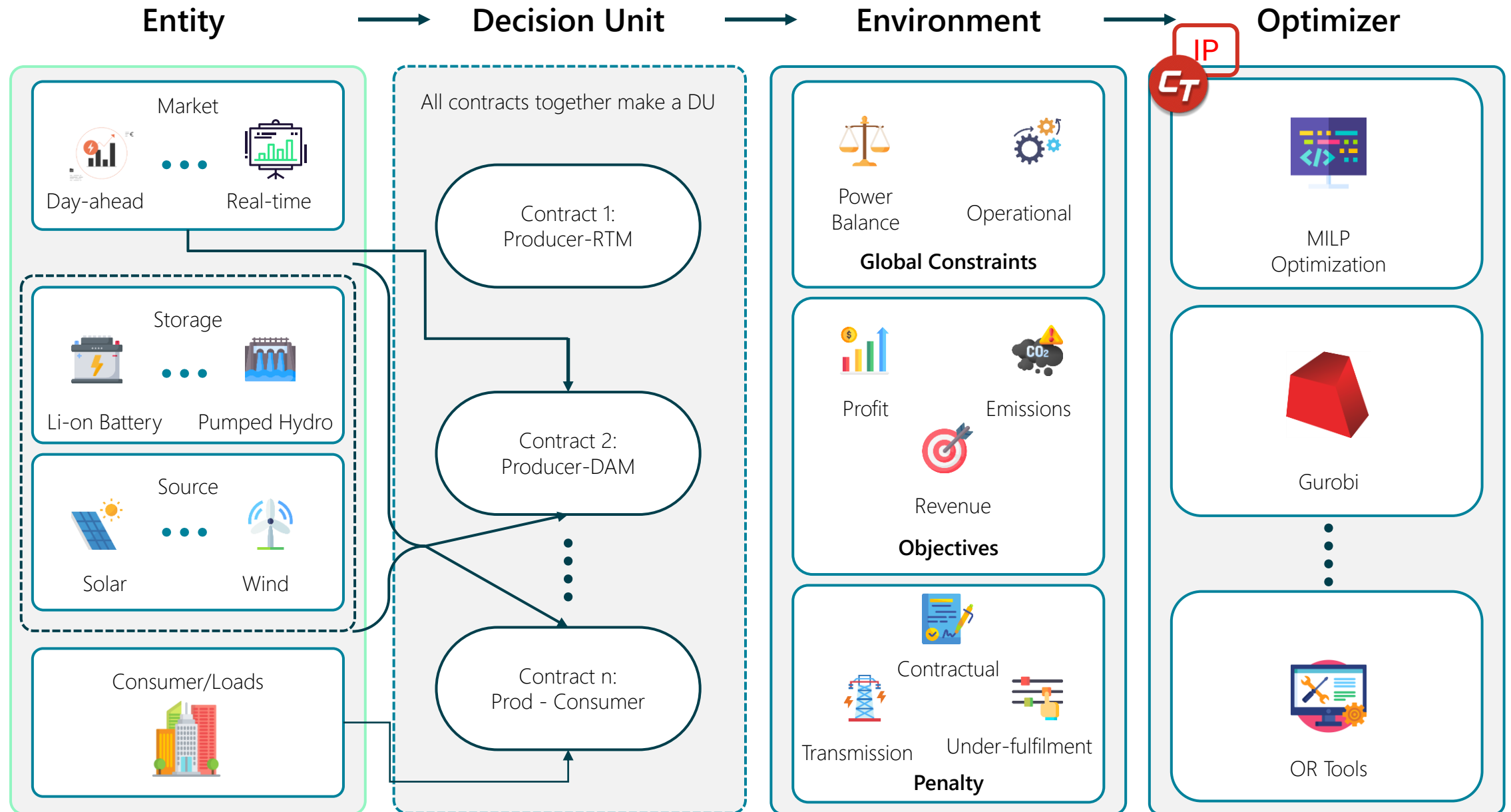
$$\text{REVENUE} = \$\text{Revenue from RTM} + \$\text{Revenue from DAM} + \$\text{Revenue from Consumer} - \$\text{Penalties(DSM/ Under fulfillment)}$$

POWER MATCHING

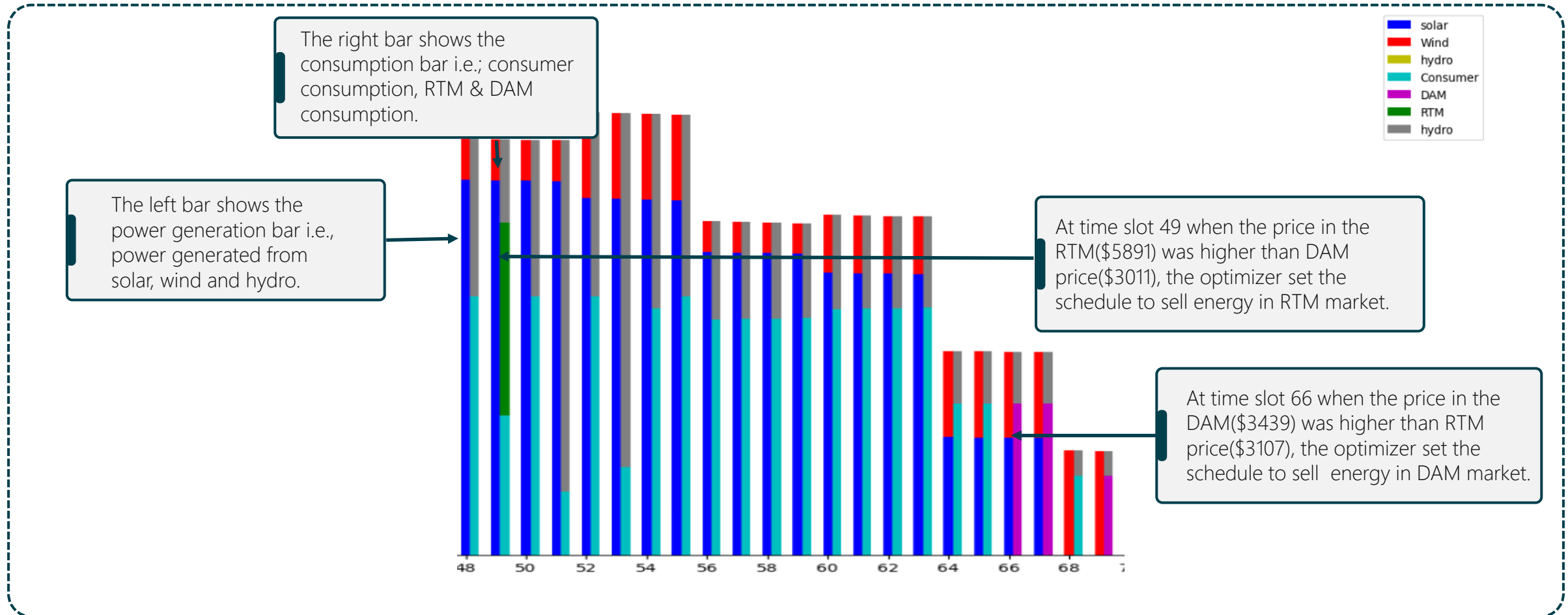
We focus on power distribution and power matching in such a way that none of the generated energy is lost.



Overall Flow



Providing 80% accuracy



- The forecasted values perform a key role in our optimization techniques. Our forecasting framework offers an accuracy of 80%.
- You can easily infer from the graph how power matching is done between entities i.e., amount of power generated is equal the amount being consumed; hence no energy is wasted.
- It can be also observed how we sell energy in different markets during peak price periods to maximize our revenue.



CELEBAL
TECHNOLOGIES

Thank You