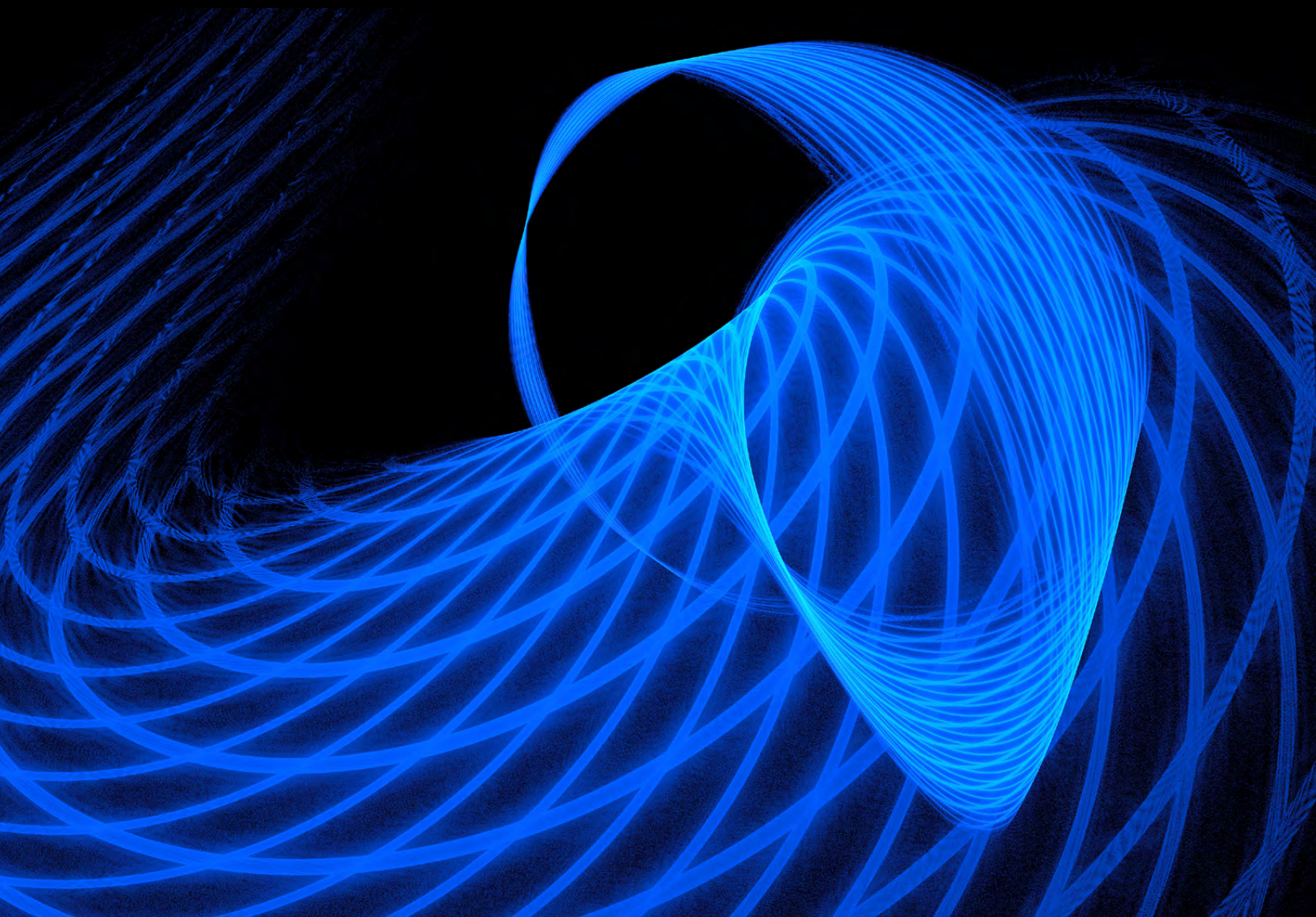
LTIMindtree

Case Study

Saving $6.5 Million per Year:
Distributed Energy Resources, Enhancing System Capabilities for a Global Utility Company



The Client

The client is a 135-year-old American utility giant, generating ~3,500 MW power for 900,000 customers across northern and central California. The client needed an overhaul of existing processes and systems to more accurately forecast load and distributed energy resource (DER) growth to meet customer timeline and capacity needs. Therefore, they needed to identify and execute transmission, distribution and substation priority projects that were critical path to meeting customer demands.

The need for upgrading the processes and internal systems

The client needed to develop new processes and improve existing processes and systems to plan load and Distributed Energy Resource (DER) growth more accurately to meet customer timeline and capacity needs. This would help with managing and optimizing grid and customer distributed energy resources for a reliable, accessible, and affordable system and help ensure advanced grid preparedness. These were the processes that needed an upgrade:

Customer load ramps and forecasts

Inaccurate and changing load ramps resulted in limited ability to validate customer demand and growth rate for large industrial loads. Accurate locational forecasts were critical for effective transmission and distribution system planning.

Electrification readiness

Electric infrastructure needed to be ready to support load growth driven by increasing customer demand for electricity including transportation electrification.

Distributed energy resource (DER) integration

The client faced a 450% increase in net metering customer requests over the last three years. Since 2023, workgroups involved did not have the information needed to forecast workload and system impacts.

Infrastructure readiness for load requests

As capacity demand for the client system increased, infrastructure needed to be developed in time to meet the needs of commercial, industrial, and residential customers. This required milestone and risk tracking for critical path capital project execution.

Data utilization for planning

The data required for load and resource planning was largely manual with inconsistent measurement and tracking processes that created gaps in the client's ability to accurately forecast load and resources for comprehensive system planning.

Challenges

- Difficulty meeting stringent timelines to complete overall project work to avoid operational, financial, and reputational risks for the client. The client could not create on-demand load forecasts that assist in prioritization of critical infrastructure projects.
- Source data from various systems was fragmented and loosely maintained.
- No proper process followed to store and maintain the data.
- Manually maintained spreadsheets needed to be replaced with Tableau reports.
- Unclear and frequently changing requirements from the client business team.
- Inaccuracies in loading and performing calculations on historical data that was poorly maintained manually.
- Most resources were shared in other ongoing projects leading to distribution of efforts.

LTIMindtree's solution

The LTIMindtree team collaboarated with the client to take the overall ownership for data modelling and project management work for digital transformation in the utilities sector. To update the internal systems and processes, the client required multiple tracks to identify, prioritize, and execute the overall scope of work. Six different tracks were identified:

Track 1: Measure and track qualified facility, community solar, net metering, products/ programs (DER volume)

Developed tools and consistent processes that provided data visibility to measure and track DER resource efforts.

Track 2: Measure and track EV load

Ensured all EV load needs (customer programs or other natural EV support outside of programs) were tracked and integrated into the planning process to ensure the client met commitments.

Track 3: Measure and track large load additions

Developed structure, accountability, and consistency for load forecasts including contractual mechanisms to ensure more accurate megawatt estimates. (Excluded customer engagement because of customer allocation capacity methodology).

Track 4: DER planning and forecast

Developed and implemented consistent, automated company-wide DER data reporting of forecast versus actuals.

Track 5: System modeling and project development

Modernized system planning tools to integrate forecast data efficiently and automate planning processes used to develop infrastructure projects to accommodate customer load growth and DERs.

Track 6: Update data hub to store all load data

Enhanced the data lake and architecture with new load data from various source systems (both internal and external) for consumption by forecasting, reporting, and planning models.

Our team co-ordinated with various source data systems (both internal and external) to understand and categorize the data that could be loaded into Snowflake. In order to to upgrade their systems and processes we:

- Identified all required data streams for accurate development of manually maintained data.
- Developed an objects pipeline for updating the data and entering Snowflake.

- Created complex views in Snowflake for UM2111 regulatory changes for Tableau dashboard development.
- Ensured data validation for EV and TE data by interacting with multiple sources of data.
- Fetched all the large load data and stored it in Snowflake. Also, created views to feed the data for new dashboards to replace existing manually maintained spreadsheets.
- Created views to feed data for DER forecast to actuals dashboard for EV and solar data.
- Loaded actual and forecast data from multiple source systems into Snowflake.
- Automated the DMV mapping process for unmatched vehicles and loaded the complete set of data for report generation.
- Created data pipelines and APIs for forecast data integration.

Overall program scope diagram

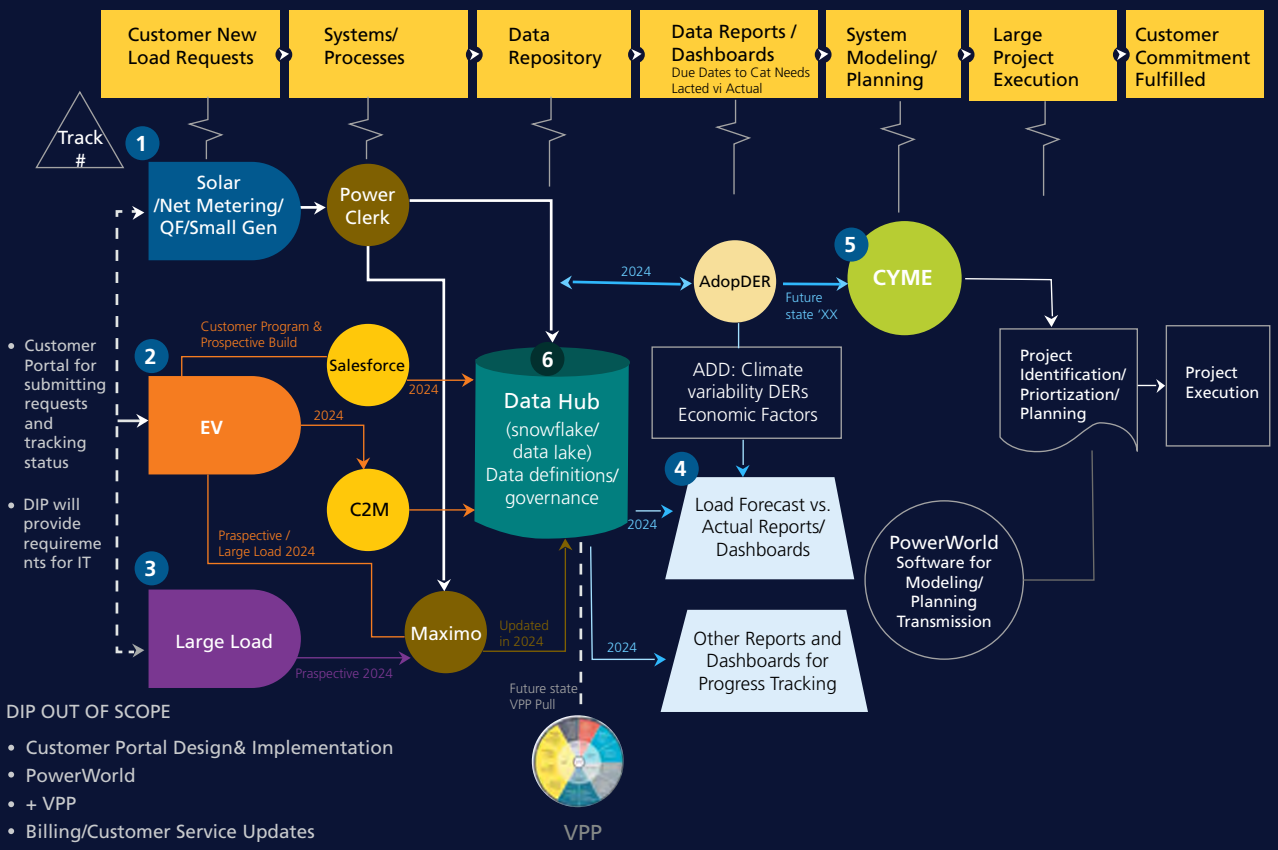


Figure 1: Infrastructure project scope diagram

Tech stack

Back-end technologies	AWS Lambda, DynamoDB, Matillion, Bit Bucket, S3, Glue
Front-end technologies	Python, Snowflake, HTML, CSS, Javascript, JQuery, Tableau Server
Database	SQL Server
Cloud resources	Web app, Azure SQL, Key vault, App insights, Azure Active Directory
DevOps	CI/CD pipelines, Azure DevOps

Benefits

LTIMindtree's digitalization solution for the client led to several operational benefits. We helped them upgrade from manual processes to automated and streamlined processes, boosting their efficiency.

~$6.5
million per year / Cost savings due to reduced costs and increased margins

40%
effort reduction / Through overall system upgrades and elimination of manual processes

$350,000
savings per year / As a result of reduced manual labor hours

Better analytics of load and DER data through interactive reporting compared to manually generated reports.

Enhanced, automated and scaled systems and processes for current and future growth for more accurate management of prospective load and design requests versus actual built. This ensured that requisite substation, line upgrades and new build requests were accurate with prioritization improvements.

Automated the calculated demand and allowance for ~1000 customers, including supporting data from embedded spreadsheets.

Updated customer process and communications for load requests estimates.

Conclusion

Our solution transformed the global energy company's data from manual, unorganized records to a streamlined, digitally maintained system. It replaced manual reports with interactive Tableau dashboards, providing real-time, in-depth analytics with minimal manual effort. This shift resulted in significant cost savings, improved processes, and faster, more accurate customer service. By adopting digital tools and cloud technology, the company can now make timely, data-driven decisions, improve operational resilience, and drive cost-saving innovations. Ultimately, our solution has positioned them ahead of competitors in a competitive and customer-driven market, demonstrating that digital transformation is essential for energy companies seeking sustainable success in a dynamic industry.

Looking to optimize grid and customer distributed energy resources with reliable, accessible, and affordable systems process management?

Reach out to us at eugene.comms@ltimindtree.com

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