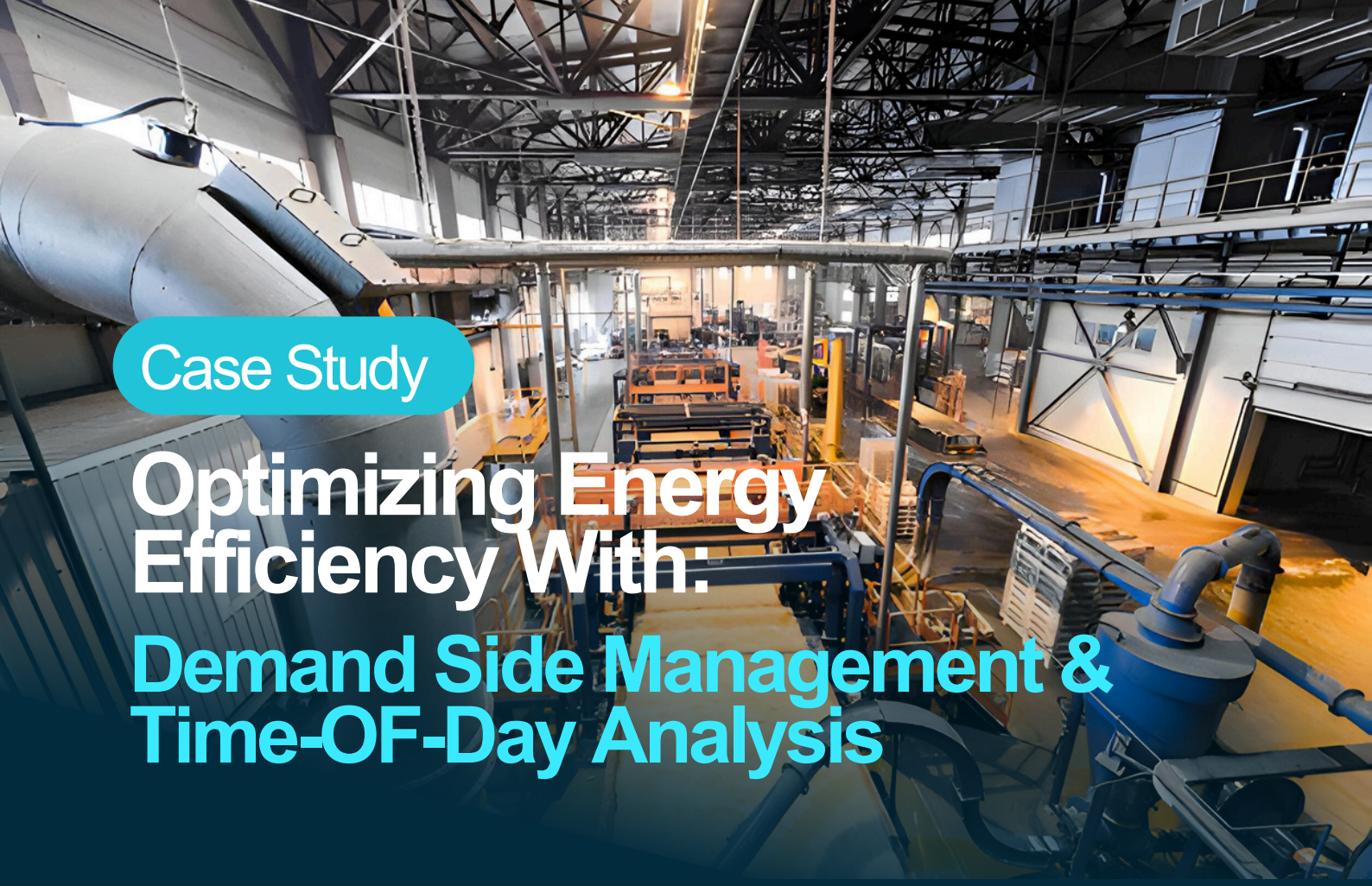


Case Study

# Optimizing Energy Efficiency With:

# Demand Side Management & Time-OF-Day Analysis

## Company Profile

The client is a renowned manufacturer of electrical components, including transformer cores and transformer laminations, based in Pune. The manufacturing unit is equipped with 9 furnaces and heavy machinery used in the production of electrical components. Along with the production facilities, the unit also accommodates the primary office building. The facility operates with an annual electricity energy expenditure of approximately **~ $4,05,590 USD**.

## Case Summary

The client sought to optimize their energy consumption and reduce operational costs associated with electricity tariffs. Given the complex energy requirements of the manufacturing process—especially the operation furnaces and other heavy machinery—the company recognized the need for a more efficient energy management solution. Previously, the client lacked a comprehensive energy monitoring system, which led to inefficiencies in energy consumption and higher electricity costs.

To address this, we offered an advanced Smart Energy Management system, incorporating Demand Side Management (DSM) and Time of Day (TOD) analysis techniques. These features were integrated into the client's operations to better manage their energy consumption and identify potential cost-saving opportunities.

## Business Challenges

Prior to implementation the client faced significant operational challenges impacting energy efficiency and cost effectiveness including:

- **Lack of Energy Monitoring:** The facility did not have any energy monitoring system in place, relying on manual readings taken periodically. This led to inefficiencies in identifying consumption patterns and high-energy cost areas.
- **High Energy Costs:** With a large number of energy-intensive operations, particularly furnaces and heavy machinery, the facility had substantial electricity expenditure.
- **No Time-of-Day Optimization:** Energy consumption during peak hours contributed significantly to higher tariff rates. Without a proper system in place to shift energy demand, the business continued to pay higher rates during these times.
- **Manual Data Reporting:** Data was manually recorded, which not only delayed insights into energy consumption but also limited the ability to respond in real-time to energy inefficiencies.

## Our Solution

We implemented an advanced Smart Energy Management platform tailored to the client's specific needs. Key features of the solution included:

- **Real-Time Energy Consumption Dashboard:** A comprehensive, real-time dashboard was installed, enabling the client to visualize energy consumption across various units of operation. This allowed the team to identify energy usage patterns and pinpoint inefficiencies.
- **Automated & Customized Reports/Alerts:** Automated reporting was set up to provide the client with detailed insights into energy consumption trends, along with customized alerts for unusual or excessive energy usage.
- **Single Line Diagram & TOD Analytics:** A single-line diagram was created to map out the entire energy system. Additionally, TOD analytics were implemented, allowing the client to track energy consumption according to varying tariff rates at different times of the day. This feature enabled the client to optimize energy use by shifting demand from peak hours to off-peak hours, where tariffs were more favorable.
- **Demand Side Management (DSM):** The system also integrated Demand Side Management techniques, which helped the client manage and reduce their peak energy demand by adjusting production schedules and shifting energy use to lower-cost periods.

## Key Business Impact

Energy Savings Potential: Shifting production to off-peak hours resulted in a **~26% savings** based on tariff differences.

Optimized Production Scheduling: TOD analytics enabled alignment of energy-intensive processes with off-peak hours.

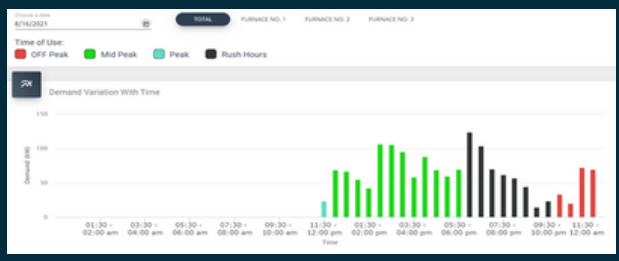
Increased Operational Efficiency: Real-time monitoring and automated reports improved energy tracking and efficiency by **~5 to 10%**.

**~80%** Improvement in asset inspection accuracy and inspection coverage, reducing manual intervention.

Increased Asset Longevity: Managing peak demand reduced stress on electrical systems, extending equipment lifespan.

Better Financial Planning: Automated reports provided accurate energy cost forecasts for better resource allocation.

**Before: Production in Peak hours**




**After: Production shifted to off Peak hours**


## Success Recap

The implementation of our solution proved to be a game-changer for the client. By integrating real-time energy monitoring, customized reporting, TOD analytics, the client was able to shift in production scheduling from peak to off-peak hours led to a potential savings on tariff costs, optimizing energy consumption directly impacting the bottom line.

In addition to the financial savings, the client gained improved operational control, enhanced sustainability, and a more efficient energy usage model.

The success of this project underscores the power of advanced energy management solutions in helping high-energy consumers, such as manufacturers, optimize their operations and realize significant cost savings.