



Overseas Industry Project

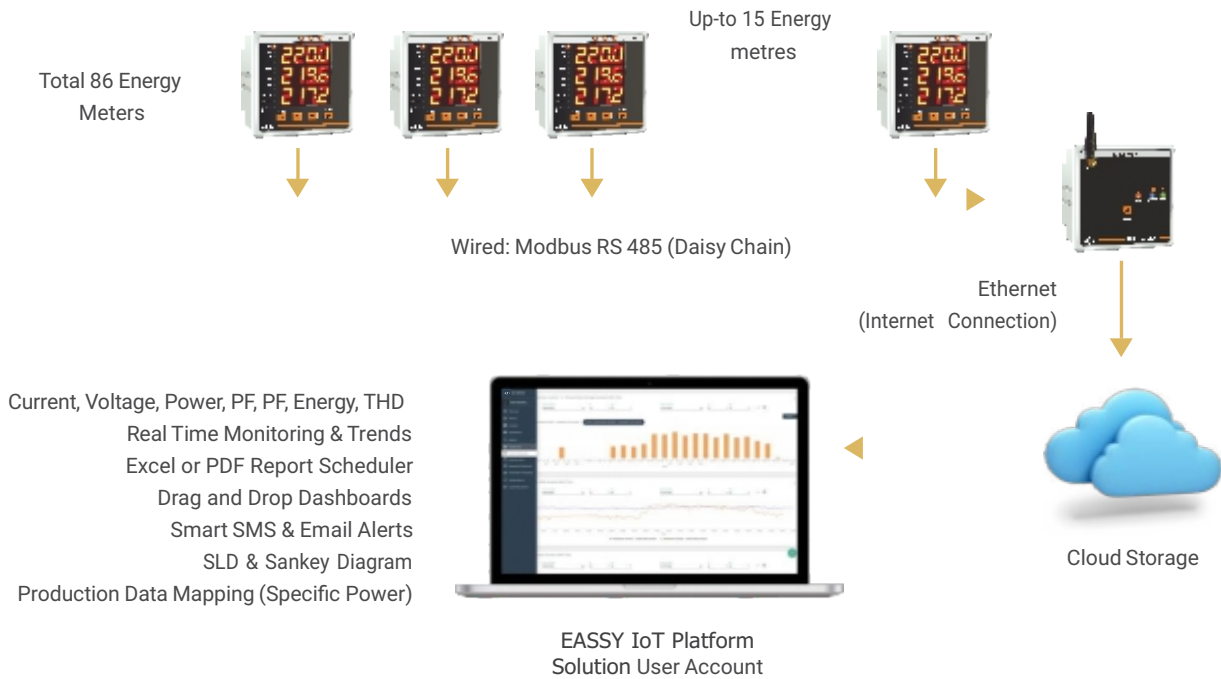
Smart Energy Management

Problem Statement

A One of International Company conceived as a private limited company in 12th July of the year 1982. Now stands on a gleaming pinnacle of success as an industry leader in Polyester Chips & as one of the top 5 players in the polyester Partially Oriented Yarns (POY) in India. The company has a BOPET film manufacturing plant in Bahrain. The unit was facing increasing operational costs due to machine inefficiency, improper utilization, electrical failures, equipment damages & unplanned downtimes. At the same time, it was difficult to locate such problems due to inability of existing methodologies (manual reading) to help them identify the root causes early and take proactive & data-driven steps. Also, they wanted to digitize their energy meter and start recoding the data digitally using a mature & scalable cloud platform. They hired Nippen Labs to provide a comprehensive & analytical energy management solution and cloud platform.

Solution Architecture

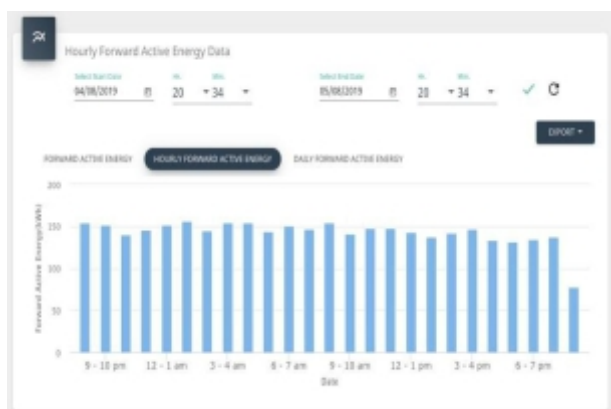
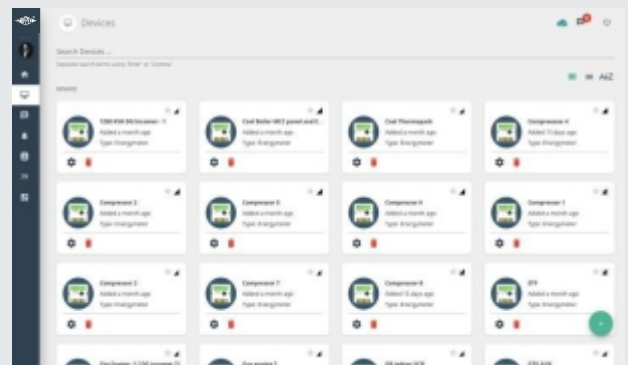
Company already had 86 multifunction energy meters installed across all the incoming and outgoing feeders of their factory. As a solution, multiple (up-to 15 meters looped in daisy chain) meters are connected to the Nippen's EASSY IoT device (Modbus RS-485 for energy meters data collection and Ethernet for data communication). The EASSY IoT Platform Solution device continuously stream the meter's data wirelessly to enable centralized energy data monitoring, analysis & reporting via Nippen's cloud based EASSY IoT Platform Solution.



Key Value Addition

360-Degree Visibility | Accurate & Continuous Data | No Manual Reading

Near real-time visibility of energy and electrical parameters of entire factory. Energy meters tagged with the incomers and connected loads (*Pic: Live energy meters*)

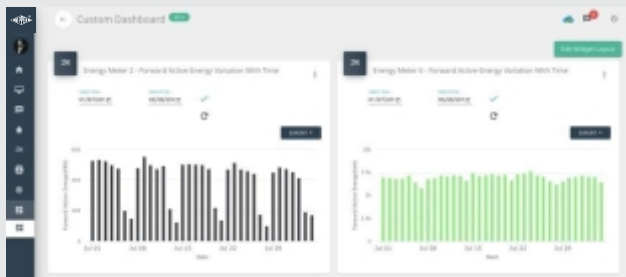


Asset kWh Consumption & Specific Power Analysis

The electrical team is now able view the daily/hourly trends of active energy, apparent energy & reactive energy for different loads and assets and cluster them in process lines. The assets were chillers, AHUs, compressors, Metalizers, Crane, Extruders, APFCs etc. The data was mapped with the production data to track and compare the specific power consumption of all the assets.

Incomer, Transformer & PF Analysis

EASSY IoT Platform Solution helps user to view all the incomers at a single glance. The user can monitor the data to monitor and analyse the critical parameters that impact the billing i.e., peak load, power factor, total unit consumption, harmonics & voltage. The user is also able to understand the loading of each transformer. From the data, they were able to track the performances of APFC panels as in some incomers the power factor was dropping frequently. (Pic PF and KVA trends)



Drag-and-Drop Dashboards

Using the drag and drop dashboards, the user can create multiple dashboards to view and compare the electrical data of similar processes. Smart tables to view the key real-time data of all the energy meters

It has feature to show visual alerts in-case a particular value (current, power, power factor) is out of desired ranges. (Pic: Kwh Trend comparison of two energy meters, Real-time tables with visual alerts)

Device	Current Voltage	Average Power Factor	Total Active Power	Total Reactive Power	Forward Active Energy	Forward Reactive Energy	
Energy Meter 1	429.2 V	228.8 A	0.9	182.1 kW	19.75 VAR	482,298.3 kWh	408,885.7 kWh
Energy Meter 2	426.5 V	3.6 A	1.0	2.1 kW	38.9 VAR	1,916.85 kWh	149,039.9 kWh
Energy Meter 3	421.7 V	1,788.8 A	1.0	1,335,786.3 W	256,278.8 VAR	32,121,248.8 kWh	27,480,718.8 kWh
Energy Meter 4	428.2 V	138.1 A	1.2	82.6 kW	18.8 VAR	1,096,291.4 kWh	911,322.3 kWh
Pump Station 1	418.4 V	124.1 A	1.1	83.2 kW	32.7 VAR	1,161,318.8 kWh	1,016,481.3 kWh

MIS Reports

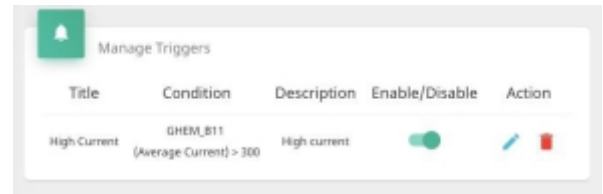
Tabular daily consumptions MIS reports are generated automatically & sent via email by EASSY IoT Platform Solution to concerned operators. (Pic: PDF report templates: Tabular previous day consumption, Load analysis reports)



The figure shows a detailed tabular report with multiple columns for various parameters such as date, time, device name, and consumption values. The table is organized into sections for different devices and time periods.

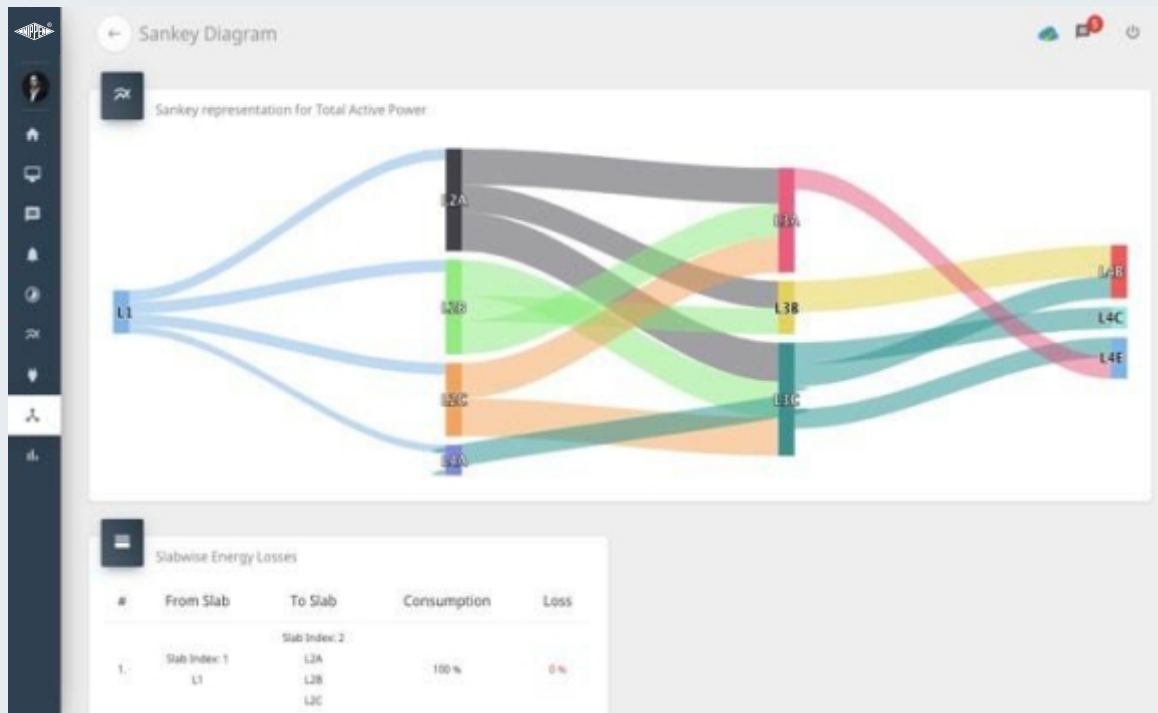
SMS Alerts for Proactive Maintenance

Condition based SMS alerts of over current, High THD, low power factor, high Max demand etc. helped the electrical team avoid proactively system failures. (Pic: High current alert configuration)



Sankey Diagrams for T&D Losses

Sankey diagram to provide the holistic view of energy distribution. It also tracked T&D losses to reduce the possibility of damage, downtime & heating. (Pic: Sankey Diagram)



SLD Diagram

The single line diagram of the entire network to visualize the electrical network right from power main supply to respective loads of the entire factory. (PIC: SLD diagram)



Power Quality Analysis

The operator can view the trends of current, voltage, power factor & harmonics for any selected period. This helped the operation to analyse the load performance over time and compare it with the rated benchmarks and also analyse the instances of over-voltage and under voltage. With the use of non-linear loads on the rise globally, isolation for poor quality distribution systems and mitigation of harmonics has become increasingly important. Harmonic Distortion can cause electrical equipment to overheat and malfunction, power factor correction capacitors to degenerate or fail, and circuit-breakers and relays to operate erratically. Therefore, it is important to gauge the total effect of these harmonics. (Pic: Voltage & Harmonics Analysis)

