
# CASE STUDY

How we helped IOCL's Raninagar, Bottling plant monitor utilities wirelessly

BridgeThings

FEBRUARY 2024

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# OVERVIEW

The IOCL bottling plant located in Raninagar faced challenges in efficiently monitoring and managing energy consumption, water usage, and lighting control within its premises. With a commitment to sustainability and operational efficiency, IOCL sought to implement a comprehensive solution to address these challenges.

## BACKGROUND

Like many industrial facilities, the IOCL bottling plant faced challenges in optimizing its energy usage, monitoring water consumption, and managing lighting systems effectively. Manual processes, outdated equipment, and the absence of modern monitoring systems hindered the plant's ability to operate efficiently and sustainably.

Recognizing the importance of sustainability and operational efficiency, IOCL sought to address these challenges by implementing a comprehensive solution that would enable real-time monitoring, data-driven decision-making, and optimized resource utilization.

# OUR INNOVATION


We have built all our hardware and software based on LoRaWAN technology. LoRaWAN is an globally accepted open source network which was developed by companies like Intel, Cisco etc. The Gateway when installed gives a wireless private network of about 1-1.5 km. All the assets within this range, can be push the data wirelessly to the Gateway.

# OUR COMPREHENSIVE SOLUTIONS

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# CHALLENGES

Despite having a highly innovative product, Wardiere Inc. struggled to reach their target audience. Their website had low traffic, and their conversion rate was not meeting their expectations.

**Inefficient Energy Monitoring**

Existing energy meters lacked communication capabilities, hindering real-time monitoring and data transmission.

**Lack of Water Consumption Tracking**

Absence of water meters made it difficult for IOCL to track and manage water consumption effectively

**Ineffective Lighting Control**

Manual control of lighting circuits led to inefficient energy usage, with no means to adjust lighting levels based on ambient light conditions.

**Suboptimal AC Operation**

ACs operating continuously without occupancy detection resulted in unnecessary energy consumption and higher operating costs.

## Resource Efficiency

## Target

Considering the myriad challenges faced by IOCL, the overarching expectation from this project is a substantial improvement in resource efficiency. Presently, IOCL operates within certain resource efficiency parameters, reflecting the existing state of operational practices. However, recognizing the need for optimization and enhancement, IOCL has set ambitious target values for resource efficiency. These targets encompass various aspects such as energy consumption, water usage, and overall operational efficiency. Through the implementation of innovative solutions and advanced technologies, IOCL aims to bridge the gap between current resource efficiency levels and the desired targets. This entails not only reducing waste and optimizing resource utilization but also fostering a culture of sustainability and continuous improvement. By striving to meet and exceed these targets, IOCL seeks to establish itself as a leader in efficient and sustainable operations within the petroleum industry, driving both environmental stewardship and economic viability.

# THEIR EXPECTATION


IOCL expects the project to enhance operational efficiency, sustainability, and cost savings. Through real-time monitoring and control, they anticipate streamlined operations, optimized resource usage, and reduced operational costs. Additionally, IOCL aims to align with environmental goals, achieving cost savings through energy efficiency and compliance with regulations. Leveraging data-driven insights, IOCL aims to drive continuous improvement and customer satisfaction, strengthening its market position.

# SOLUTIONS

We devised an integrated wireless utility management system for IOCL bottling plant, Raninagar, which included the setup of Gateway, energy, water management systems, lux based lighting control and AC controllers.

## LORAWAN GATEWAY

The solution involved the deployment of a LoRaWAN Gateway, strategically positioned at a central location and powered by a 230V AC UPS supply. This Gateway established a secure private wireless network with an extensive coverage of 1 kilometer. Once configured, the Gateway served as the communication hub, facilitating the transfer of data from various smart devices to the cloud platform.


## ENERGY MANAGEMENT SYSTEM

To monitor electrical energy consumption, traditional mechanical energy meters were replaced with advanced smart multi function meters. These meters come equipped with inbuilt telemetry capabilities utilizing RS485 telemetry for efficient data transmission. The energy data collected by these smart devices was seamlessly transmitted to the cloud via the LoRaWAN Gateway, enabling real-time monitoring and analysis

# WATER MANAGEMENT SYSTEM

Flow meters with RS485 port were seamlessly integrated with telemetries to enable wireless data transmission to the LoRaWAN Gateway. This facilitated real-time monitoring of water flow and consumption parameters, providing valuable insights into usage patterns and enabling proactive management strategies. The data collected by these smart devices was securely transmitted to the cloud platform, allowing for centralized monitoring and analysis. By implementing this water management system, gained the ability to accurately track water consumption, identify areas of inefficiency, and implement targeted measures to optimize water usage and reduce wastage, thereby contributing to both cost savings and environmental sustainability.

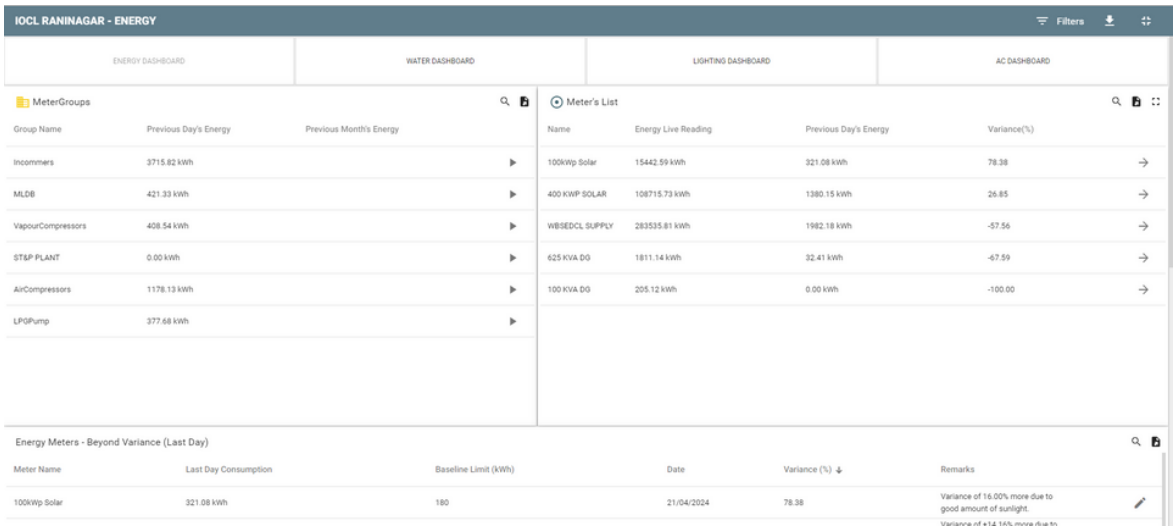
# AMBIENT LIGHT BASED CONTROL

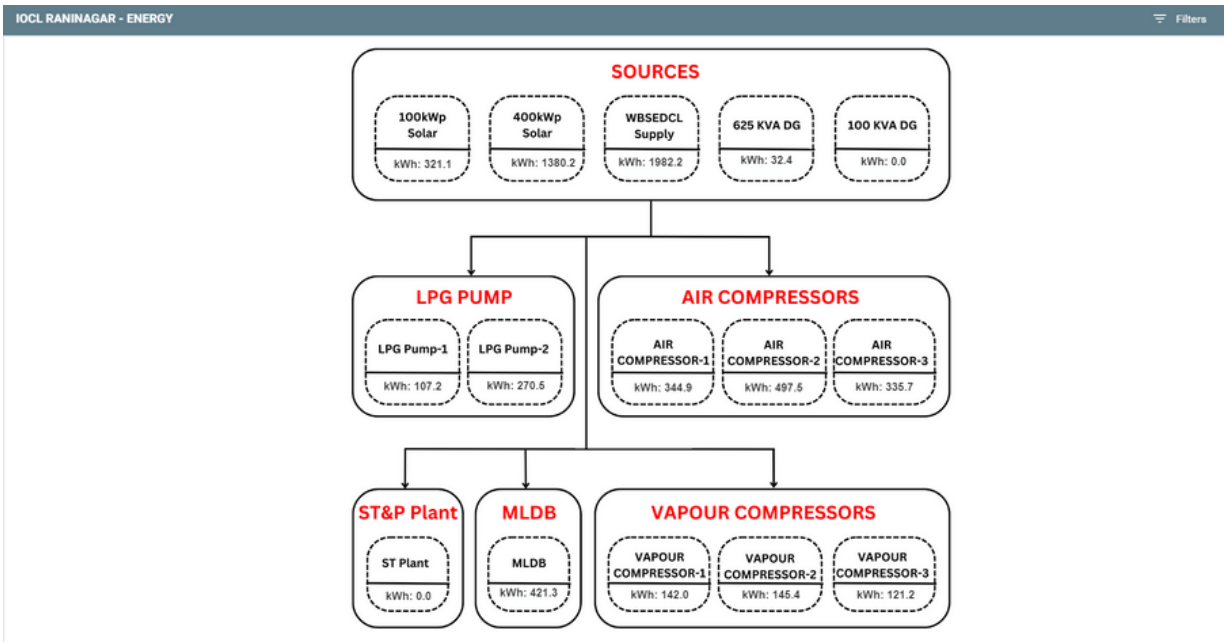
To maintain optimal lighting levels across the plant, ambient light sensors were installed at defined locations. These sensors continuously measured the lux levels in specific areas. Relay controllers, integrated into the Main Lighting Distribution Board (MLDB) through existing contactors, enabled dynamic control of lighting circuits. Users can define minimum and maximum lux levels on the dashboard, and if lux levels fall below the set threshold, the relay controller automatically activates the lights. Conversely, when sufficient lux levels are attained, the controller automatically turns off the lights.

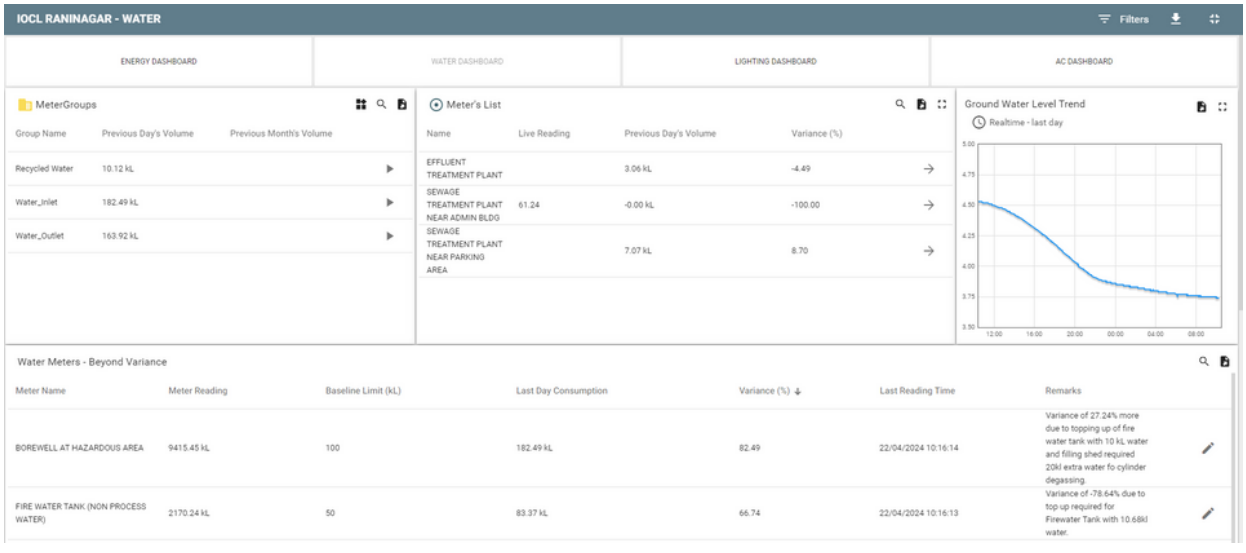
# SPLIT AC CONTROLLER

Phasellus id tristique libero. Orci varius natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Quisque dapibus rutrum mollis accumsan orci erat condimentum faucibus feugiat, torquent sem a dui donec habitant nunc congue lacinia, vitae quam magna venenatis est ante euismod vivamus. Inceptos nec metus luctus euismod erat neque vulputate vehicula male-suada, placerat nunc ligula facilisis praesent duis ornare leo arcu volutpat, interdum odio augue lectus laoreet vestibulum eget fermentum.

# DASHBOARD

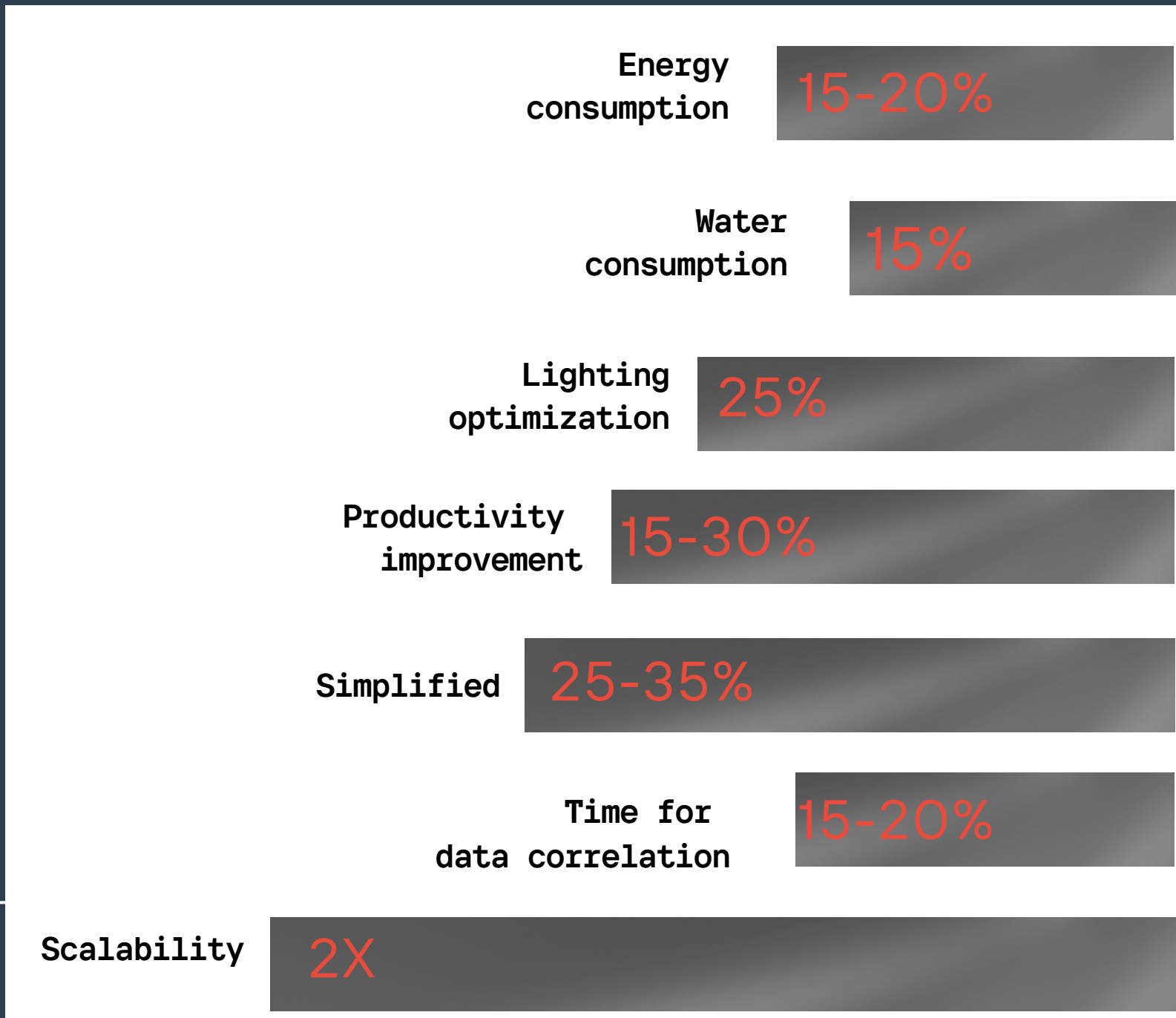

IOCL RANINAGAR - ENERGY
Filters
ENERGY DASHBOARD
WATER DASHBOARD
LIGHTING DASHBOARD
AC DASHBOARD
MeterGroups
Group Name
Previous Day's Energy
Previous Month's Energy
Incommers
3715.82 kWh
MLDB
421.33 kWh
VapourCompressors
408.54 kWh
ST&P PLANT
0.00 kWh
AirCompressors
1178.13 kWh
LPGPump
377.68 kWh
Meter's List
Name
Energy Live Reading
Previous Day's Energy
Variance(%)
100kWp Solar
15442.59 kWh
321.08 kWh
78.38
400 KWP SOLAR
108715.73 kWh
1380.15 kWh
26.85
WBSEDCL SUPPLY
283535.81 kWh
1982.18 kWh
-57.56
625 KVA DG
1811.14 kWh
32.41 kWh
-67.59
100 KVA DG
205.12 kWh
0.00 kWh
-100.00
Energy Meters - Beyond Variance (Last Day)
Meter Name
Last Day Consumption
Baseline Limit (kWh)
Date
Variance (%)
Remarks
100kWp Solar
321.08 kWh
180
21/04/2024
78.38
Variance of 16.00% more due to good amount of sunlight.


IOCL RANINAGAR - ENERGY
Filters
SOURCES
100kWp Solar
kWh: 321.1
400kWp Solar
kWh: 1380.2
WBSEDCL Supply
kWh: 1982.2
625 KVA DG
kWh: 32.4
100 KVA DG
kWh: 0.0
LPG PUMP
LPG Pump-1
kWh: 107.2
LPG Pump-2
kWh: 270.5
AIR COMPRESSORS
AIR COMPRESSOR-1
kWh: 344.9
AIR COMPRESSOR-2
kWh: 497.5
AIR COMPRESSOR-3
kWh: 335.7
ST&P Plant
ST Plant
kWh: 0.0
MLDB
MLDB
kWh: 421.3
VAPOUR COMPRESSORS
VAPOUR COMPRESSOR-1
kWh: 142.0
VAPOUR COMPRESSOR-2
kWh: 145.4
VAPOUR COMPRESSOR-3
kWh: 121.2


IOCL RANINAGAR - WATER
Filters
ENERGY DASHBOARD
WATER DASHBOARD
LIGHTING DASHBOARD
AC DASHBOARD
MeterGroups
Group Name
Previous Day's Volume
Previous Month's Volume
Recycled Water
10.12 kL
Water_Inlet
182.49 kL
Water_Outlet
163.92 kL
Meter's List
Name
Live Reading
Previous Day's Volume
Variance (%)
EFFLUENT TREATMENT PLANT
3.06 kL
-4.49
SEWAGE TREATMENT PLANT NEAR ADMIN BLDG
61.24
-0.00 kL
-100.00
SEWAGE TREATMENT PLANT NEAR PARKING AREA
7.07 kL
8.70
Ground Water Level Trend
Realtime - last day
Water Meters - Beyond Variance
Meter Name
Meter Reading
Baseline Limit (kL)
Last Day Consumption
Variance (%)
Last Reading Time
Remarks
BOREWELL AT HAZARDOUS AREA
9415.45 kL
100
182.49 kL
82.49
22/04/2024 10:16:14
Variance of 27.24% more due to topping up of fire water tank with 10 kL water and filling shed required 20kl extra water fo cylinder degassing.
FIRE WATER TANK (NON PROCESS WATER)
2170.24 kL
50
83.37 kL
66.74
22/04/2024 10:16:13
Variance of -78.64% due to top up required for Firewater Tank with 10.68kl water.

# RESULTS

Part of our wireless integration of utilities project, we successfully implemented energy, water, and lux monitoring systems. This integration not only led to significant reductions in consumption across the plant but also helped in reducing upfront capital cost by eliminating wires, reduced the commissioning time and improved efficiency. Overall, our efforts have resulted in tangible benefits for both the environment and their organization.



# CLIENT FEEDBACK

Our partnership with IOCL, underscores the power of a long range integrated wireless monitoring of utilities.

## TESTIMONIAL

We are thrilled with the results of this project. Thanks to the energy, water, and lux monitoring systems, our company has seen significant reductions in consumption and has greatly contributed to our sustainability goals and bottom line. This project has also helped us in getting the GreenCo certification for our BP. We highly recommend this innovative solution to other businesses looking to reduce their environmental impact and improve operational efficiency

**MANORANJAN DAS, MANAGER OF IOCL BP, RANINAGAR**

# THANK YOU!

**Inspired by IOCL's success story?**
**Get in touch with us to start your journey toward energy efficiency and sustainability.**

BridgeThings

## CONTACT

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