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Tor Shield for Utilities Monitoring

- *IoT-based Operation Management, logs and reporting*
- *Energy Optimization*
- *Safety & Infra Monitoring*
- *Compliances and sustainability*
- *Uncover process inefficiencies*

About Us *Capabilities*

Tor Shield: End-to-end Utility Monitoring Solution

Remote Equipment Performance Monitoring and Energy Monitoring Solution

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Utilities Class

Active Energy
- Wind and Solar
- Grid Power and Transformer
- Battery Energy Storage Systems
- Backup Generators

Reactive
- APFC panel monitoring

Safety & Infra
- LT panel monitoring
- Busbar monitoring

Water
- Water Level
- Water flow & consumption
- STP, ETP

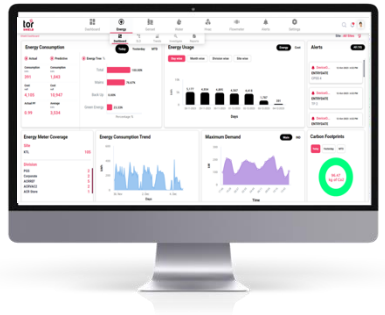
Air
- Compressed Air
- Gas Flow/ Consumption

Controllers, Meters, Sensors

- Controllers VFDs
- Temperature, Humidity, NONC contacts
- Flow Meters
- Bluetooth sensors
- Meters

Data Acquisition via Gateway

Visualization & Analytics



Web Application

- Real-time, accurate, granular information
- Dashboards & Reports
- Role-based user access
- Instant Alarms and Alerts

E2E Utility Monitoring Solution

Process Intelligence and Contextual, Deep, Real-Time, Non-Linear Analytics

- Unified bird's eye view
- Performance benchmarking
- Consumption cost reduction
- Specific utility consumption analysis
- Optimized manpower
- Improved equipment uptime
- Compliance simplified

Real-life case studies

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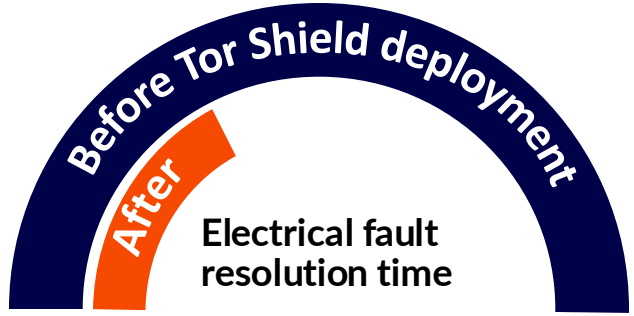
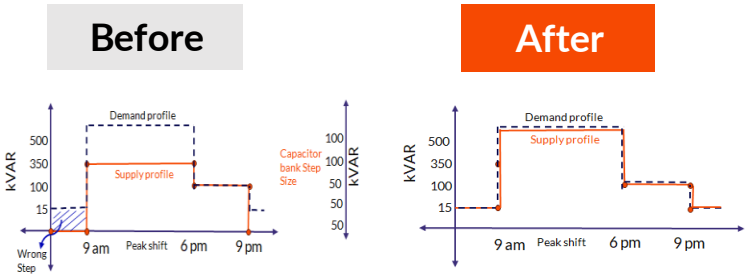
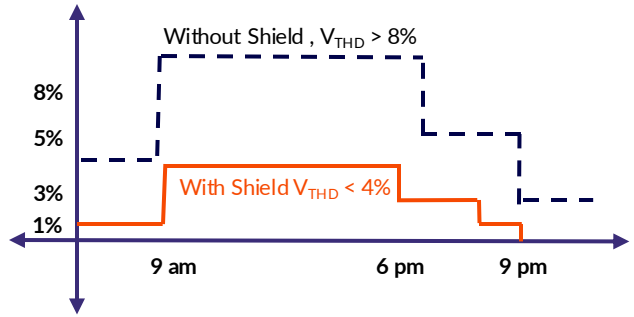
	Problems faced	Cause discovered	Solution and Impact
Leading auto parts maker ***(LT panel failures)***	▪ Multiple LT panel faults ▪ Limited visibility of panel operations	▪ Manual inspection **data was not accurate** ▪ **Without real-time data,** detecting issues promptly proved difficult ▪ Key safety **parameters were not tracked**	▪ Tor Shield: **Traditional panels to smart systems** ▪ Key electrical & **safety parameters were tracked** ▪ Faster **issue identification and resolution** ▪ Reduced **line downtime**
Manufacturing company ***(Power factor issues)***	▪ Increase in electric costs ▪ Power factor not maintained as per government regulations inspite of the APFC panel (350 kVAR capacitor bank)	▪ Requirement for 500 kVAR capacitance against 350 kVAR installed capacitor bank ▪ **Improper step size** of capacitor bank against demand ➔ **Lower Power Factor**	▪ 500 kVAR capacitor bank was installed ▪ **Capacitor bank step-size reconfigured** to cater to the initial demand of 15kVAR ▪ Power factor was maintained close to unity
Manufacturing company ***(APFC panel downtime)***	▪ Downtime of APFC panel ▪ Frequent failures of capacitor banks recorded.	▪ Temperature crossing 80^{O}C when certain drives were switched ON. ▪ V_{THD} was observed to be greater than 8%. ▪ The root cause pin-pointed to harmonic amplification	▪ APFC panel augmented ▪ Detuned filters installed ▪ The capacitor temperature did not exceed 50^{O}C. ▪ The V_{THD} was maintained under 4%.







Unified dashboard for multisite deployments

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Web application Segments & Deep-dive

1. *Active Energy*
2. *Reactive Energy*
3. *Transformer*
4. *Genset*
5. *Water, ETP, STP*
6. *Compressed Air & Gas*
7. *Panel*
8. *Busbar*

Click the arrow ➡ *to navigate to specific dashboards*

Active Energy
Monitoring and Analysis

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Web application Segments & Deep-dive

1. *Active Energy*
   - *Reactive Energy*
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   - *Busbar*

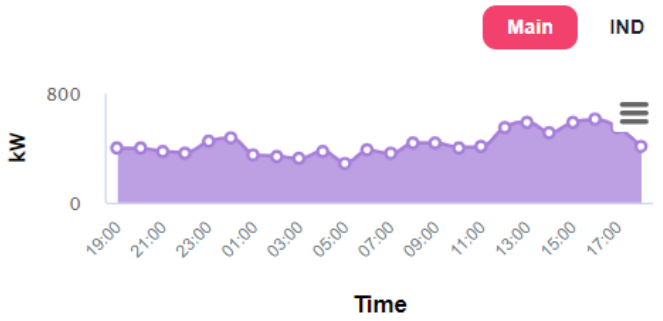
Benchmarking and Trend Analysis

- Compare the **actual power consumption with the rated power consumption** to identify abnormalities.
- Tracking **actual and adhering to internal benchmarks.**
- Perform **time series analysis** on critical parameters.
- Get alerts on **maximum demand** and **switch off non-critical loads.**

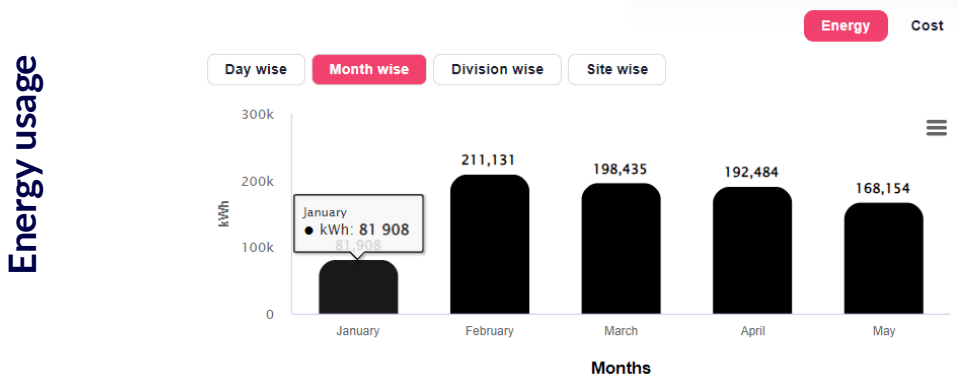
Data-driven decision making, leading to identifying areas where energy is being wasted and opportunities for improvement

12% reduction in electricity cost | 15 Months payback

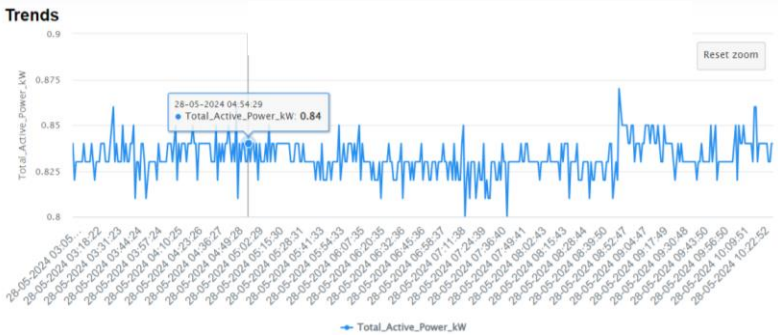
Maximum demand



Energy usage



Trends



Reactive Energy

APFC Panel Monitoring and Power Quality

Active Energy

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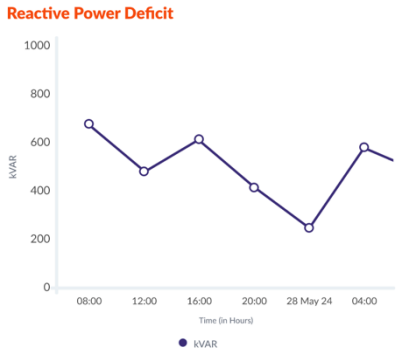
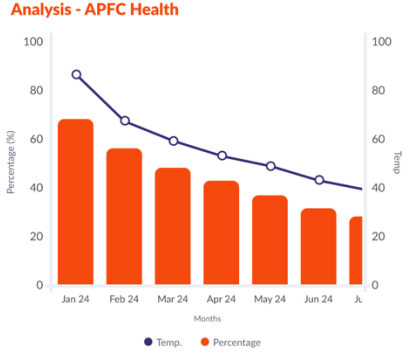
Demand and Supply Analysis

- Know whether the current **APFC panel can meet the required reactive power (kVAR) demand.**
- Track **reactive power demand pattern to match it with capacitor step sizes**.
- Get visibility of the actual capacity of the APFC panel, factoring in loss of capacitance due to aging.
- Prevent premature loss of capacitance through proactive temperature management.



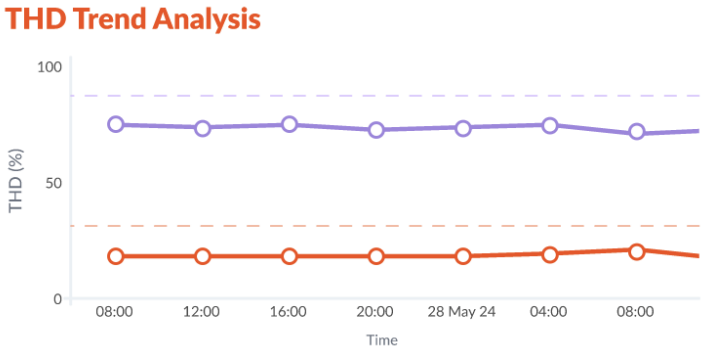


Ensuring APFC panel is always healthy and Power factor is maintained.

10% improvement in efficiency | 6 Months payback

Power Quality Analysis

- Perform granular **Total Harmonic Distortion [THD] analysis.**
  - **Time series analysis.**
  - **Spectrum analysis.**
  - **V_{THD}, I_{THD} analysis.**
- **Identify key loads contributing to the THD.**
- Identify **filter requirements**.
- Monitor **performance before and after filter installation.**



Transformer Monitoring

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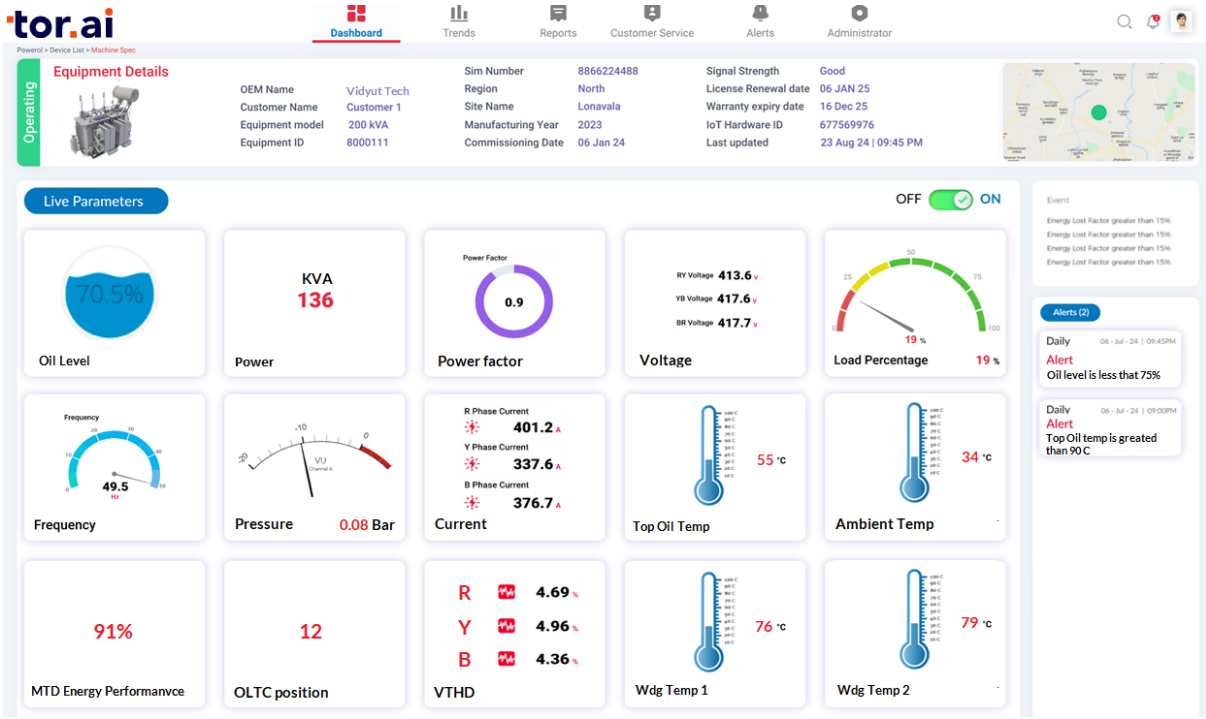
Remote Monitoring of Transformers

- Identify fluctuations in key parameters **to detect potential problems early**.
- Custom as well as pre-configured alerts in case of threshold breaches, tampering or theft.
- Granular reports of performance/health/productivity as well as deviations meant to guide the efficiency & and sustainability initiative



Genset Monitoring

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Monitor your backup power inclusive of Genset

- **Perform fuel consumption tracking of Genset.**
- Keep a **digital log** of energy consumption data from Genset.
- Keep **track of the loading** on the Genset.

Description	: **DGI 600 kVA**
Manufacturer	: **KOEL**
Genset Model	: **KOEL i Green**
Location of Origin	: **Khadki, Pune, MH**
Last Service date	: **28 Nov 2022**

Live Parameters

1739 Ltrs
Fuel Level

74 hrs 9 min
Total Run Hours

329.33 kWh
Energy

1
Power Factor

5.87 A	5.7 A	13.68 A
R phase	Y phase	B phase

R, Y, B Current

235.01 V	237.88 V	230.66 V
R phase	Y phase	B phase

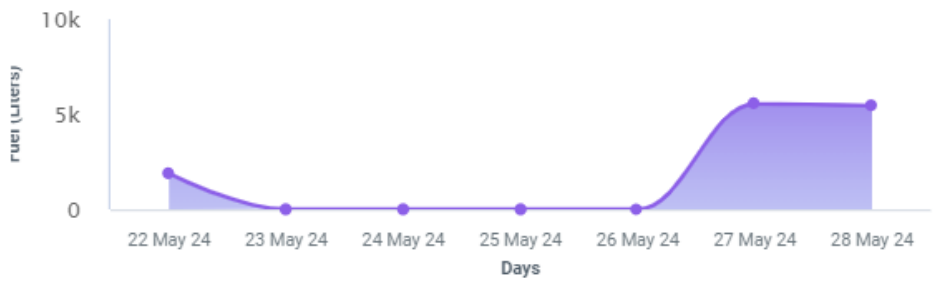
R, Y, B Voltage

5.91 kW	0 %
Power	Load

Power & Load (%)

V
Battery Voltage

Fuel Consumption



Ensure uptime and reduced idling. Reliable Genset operation during power failure.

95% reduction in idling | 6 Months payback

Water Consumption and Sustainability

Flow and Consumption tracking

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Water consumption and availability

Reporting for informed decision-making

- Section-wise and tank-wise water consumption reports
- Cost analysis reports

Comprehensive Insights

- Distribution analysis for optimizing flow and cost
- Leakage analysis for water conservation
- Consumption analysis for efficiency

Proactive Alerts

- Water level alerts for tanks
- Consumption trend deviations
- Tank empty and overflow alerts

Compliance reporting for sustainability, auto pump operation, SOP-driven approach and real-time alerts for water conservation

12% saving in water consumption | 10 Months payback

Air, Gas, Flow Meter
Bird eye view of entire plant

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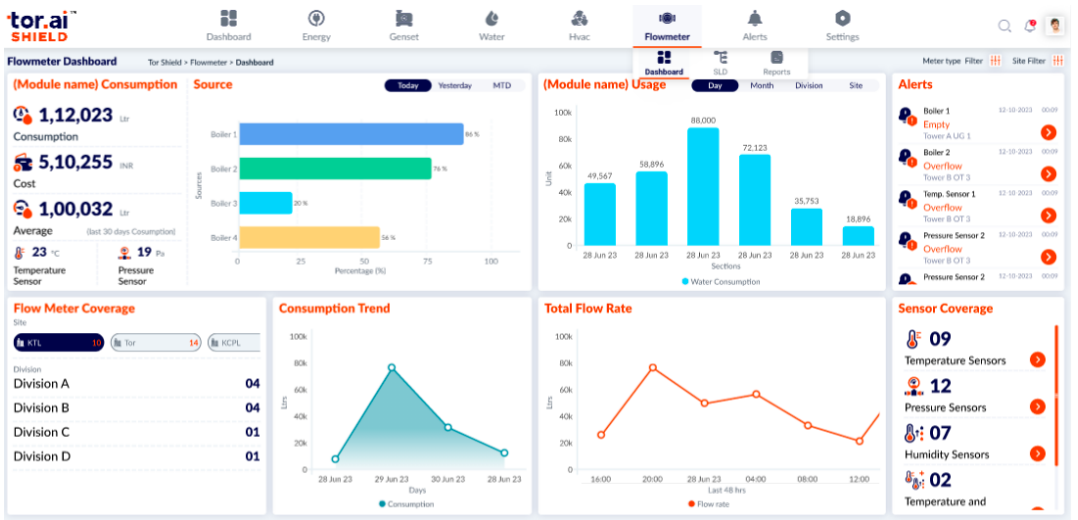
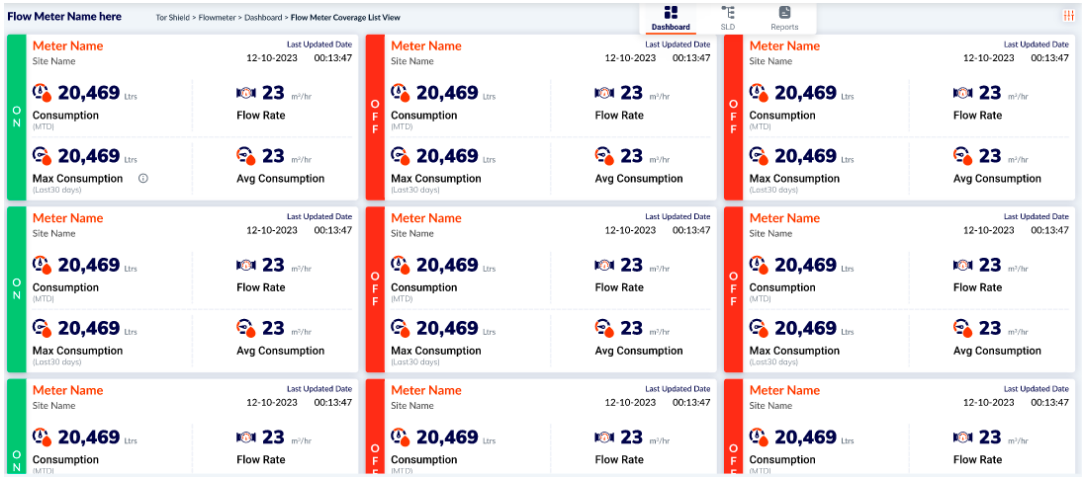
Gas/Air consumption and availability

Reporting
- Section-wise consumption reports
- Cost analysis reports

Insights
- Distribution analysis for optimizing flow and cost
- Leakage analysis for flow conservation
- Consumption analysis for efficiency

Alerts
- Consumption trend deviations





VFD coupled IoT solution for real-time pressure monitoring, demand-based compressor operation, auxiliary compressor cut off during night shift

9% saving in air consumption | 12 Months payback

LT Panel Monitoring

Bus Bar

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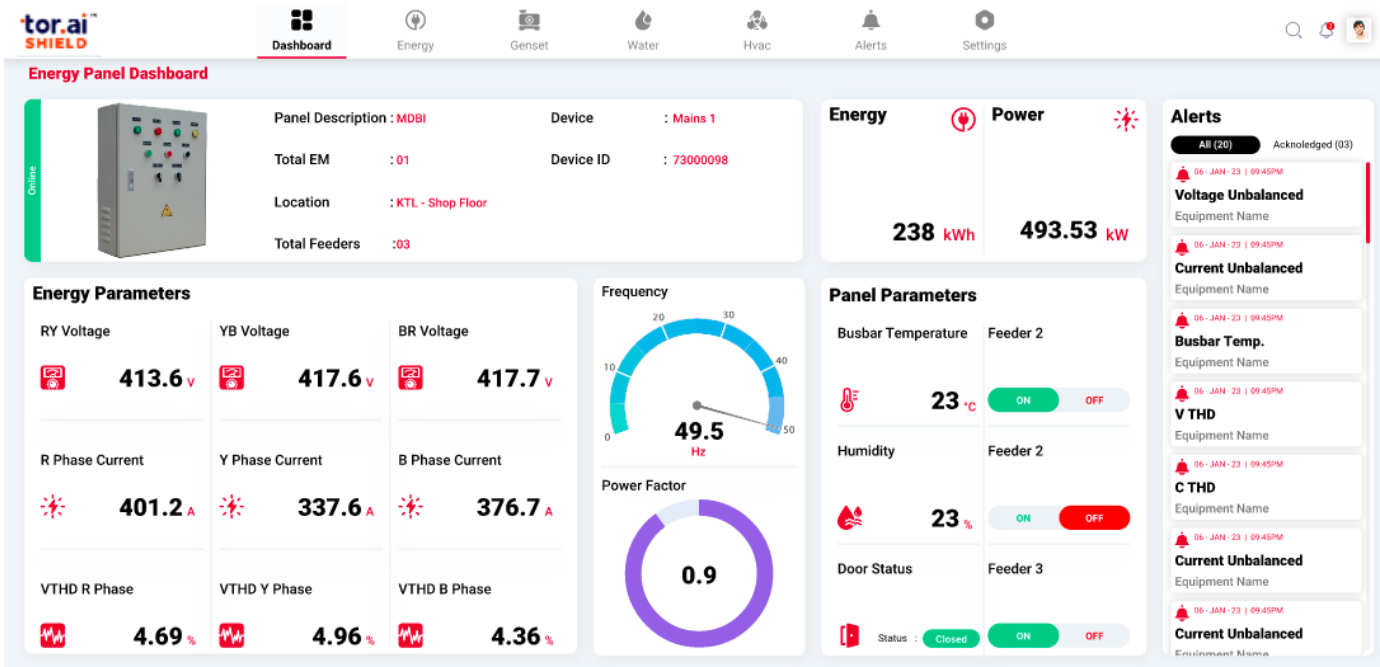
Remote Monitoring of LT panels

- Remotely monitor essential performance and safety-related parameters of LT panels.
  - Electrical parameters e.g. Current and voltage
  - Safety-related parameters e.g. Busbar temperature, Humidity & Panel door status
- Multi-site multi-panel hierarchy.
- Proactively prevent:
  - Severe causalities, e.g., short circuit or loose connections.
  - Rust and dust accumulation.



Effective manpower utilization, reliable operations and reduced breakdowns

95% reduction in unplanned downtime | 15 Months payback

Busbar Temperature and Humidity

LT Panel

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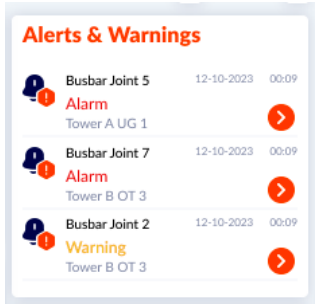
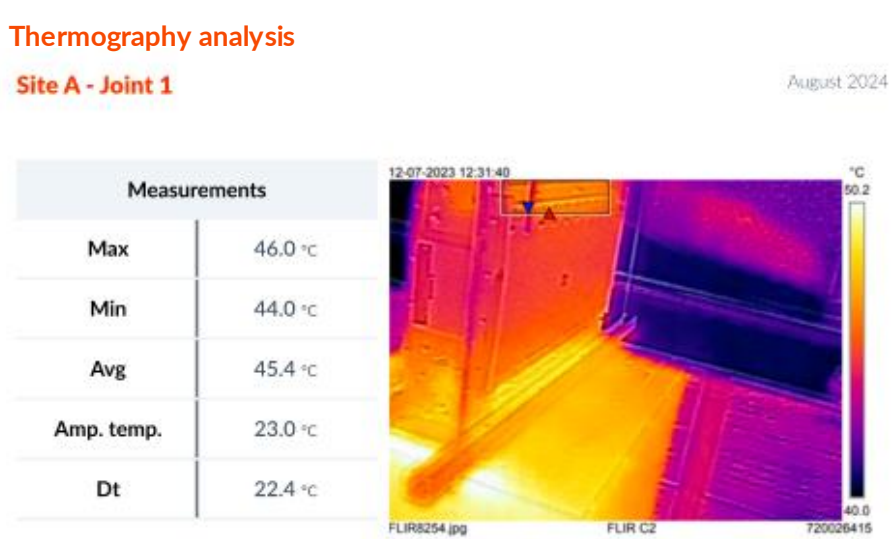
Proactive busbar monitoring

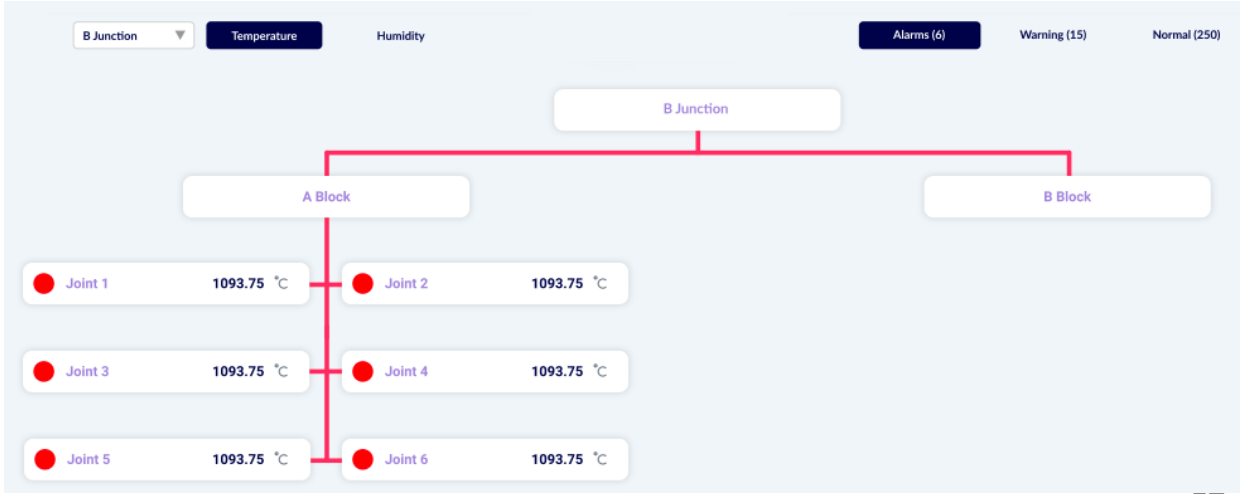
- Realtime busbar joint temperature and humidity monitoring.
- Monitor multiple sites in a single dashboard
- Drilldown view of every level with live parameters
- Color coding to identify abnormalities
- Alerts and Warnings
- Thermography analysis and predictive analysis

Insights for proactive maintenance resulting in no breakdowns, no SLA penalties, and manpower saving

95% reduction in unplanned downtime, no need to conduct thermographic analysis | 12 Months payback







Company Overview

About Us

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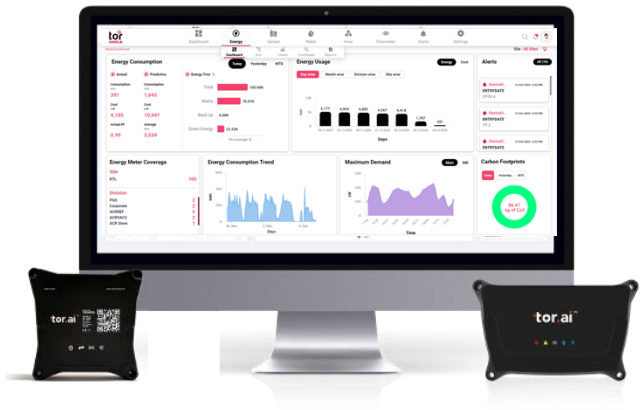
Full stack IoT Solutions

- Gateway
- Platform
- Application
- Analytics
- SIM management



Products

Tor Shield – EMS and other utilities – water, gas etc. monitoring solution

Tor Equip – For OEM segments such as Gensets, Chillers, Compressors, Transformers & Construction Equipment.

Tor Loco EV – For Electric Vehicle ecosystem such as 2Wheeler, 3Wheeler, 4Wheeler Buses & Battery OEMs

Credentials

250K+ Active Devices	3K+ Chillers
5K+ Compressors	60K+ Gensets
10K+ Meters	100+ Customers
10+ Patents	10+ Years of expertise

IATF 16949:2016 COMPANY · ISO 9001:2015 COMPANY · Information Security Management System ISO 27001 Certified

ISO International Organization for Standardization ISO 20001:2018

Key Customers

JSW · BKT GROWING TOGETHER · ClubMahindra · IKEA · CIE Automotive · Kirloskar Pneumatic · SCHMERSAL THE DNA OF SAFETY · Cummins · adani · KSB · AFCONS · TATA TATA PROJECTS

Capacities & Capabilities

In-house RnD & Product Development

- End-to-end hardware design, development, validation, pre-compliance testing, and third-party type test certification.
- Multi-protocol support: CANBUS, RS 485-MODBUS, Ethernet IP, SNMP, Modbus TCP

In-house Software Development

- Scalable, secure, flexible, state of the art IoT platform
- Embedded systems development
- Front-end web and mobile applications
- Python and OpenAI connectors

In-house Manufacturing

- ISO and IATF complaint in-house manufacturing.
- 300K gateways/ year capacity

Security & Privacy

- **ISO 27001 - certified security**
- Data ownership & confidentiality
- Cybersecurity
- Azure enterprise-grade security for cloud deployments
- **Integration capability** with CRM, ERP & PLM

Thank You

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