IMPACT OF DIGITIZATION ON GRID EFFICIENCY, RESILIENCY AND NET ZERO TRANSITION

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NET ZERO TRANSITION

Incremental emissions reductions are no longer enough in the race to decarbonize our economy. Getting to net zero requires transformative change in the ways we produce and distribute energy, move people and goods, and build our communities.

Identified are four different transition pathways

- TRANSFORMATION
- RECONFIGURATION
- TECHNOLOGICAL SUBSTITUTION
- DE- ALIGNMENT & RE-ALIGNMENT

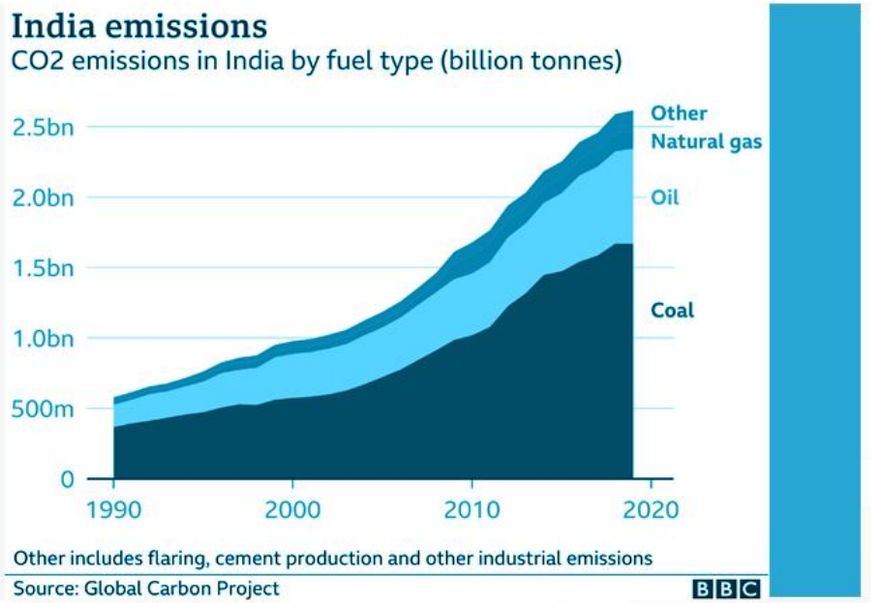
THE TOP SEVEN EMITTERS (CHINA, THE UNITED STATES OF AMERICA, INDIA, THE EUROPEAN UNION, INDONESIA, THE RUSSIAN FEDERATION, BRAZIL) ACCOUNTED FOR ABOUT HALF OF GLOBAL GREENHOUSE GAS EMISSIONS IN 2020.

TRANSITION TO NET ZERO

“FROM FUEL BASED TO ALL THING ELECTRIC”

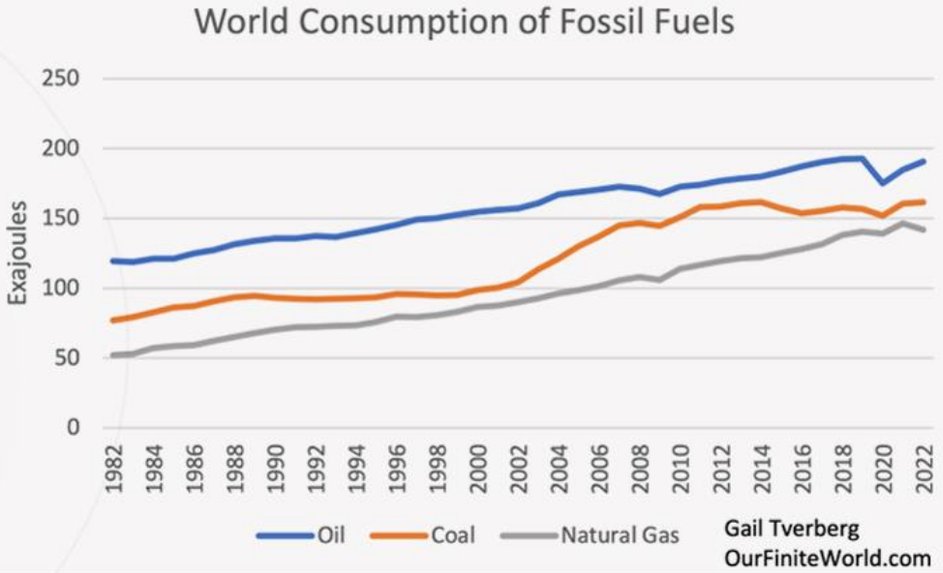
THE CARBON CONUNDRUM

India's demand for electricity continually surges. However, this growing demand comes at a cost. In 2019, India's energy-related CO2 emissions exceeded a staggering 2.4 billion metric tons, comprising one-third of the nation's greenhouse gas (GHG) output and half of its fuel-related CO2 emissions.



GLOBALLY, ELECTRICITY GENERATION CONTRIBUTES 42.5% OF CO2 EMISSIONS, WITH COAL-FIRED POWER PLANTS CONTRIBUTING A SUBSTANTIAL 73% TO THIS TOTAL. ADDRESSING THIS CHALLENGE IS CRUCIAL FOR A GREENER FUTURE.

THE HARSH REALITIES



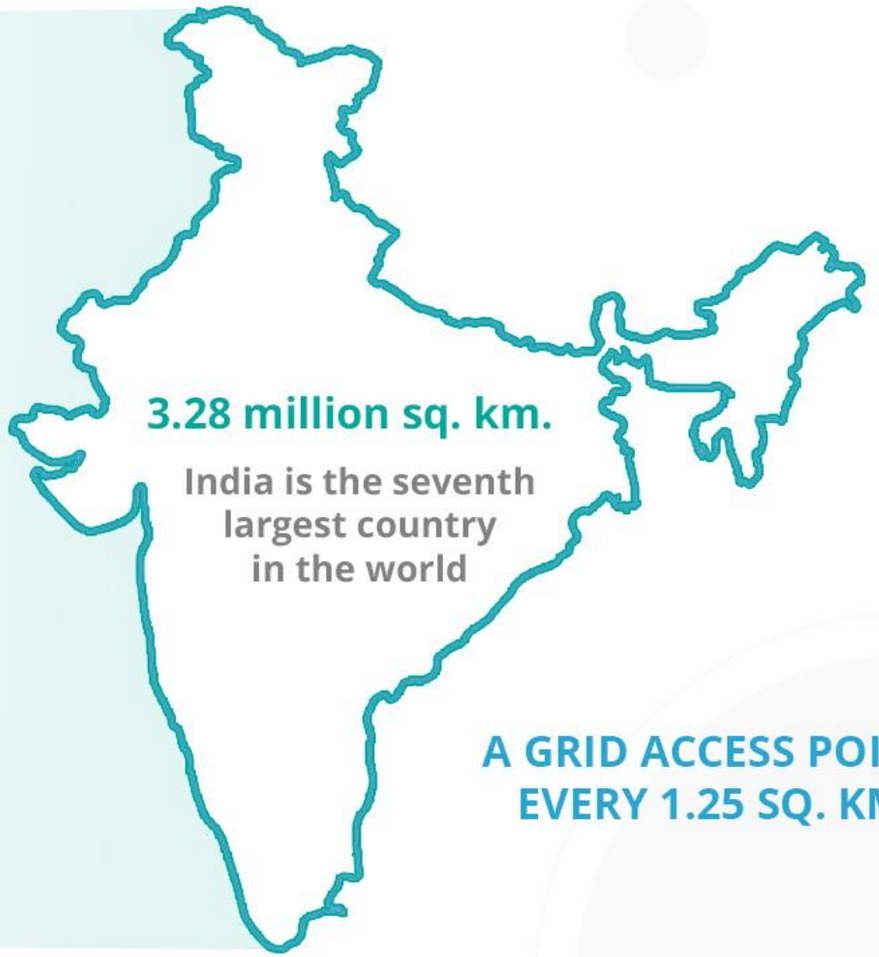
Incentivizing to clean alternatives like electric cars, renewable energy, and biofuels is an admirable goal. However, achieving this transition requires more than just embracing these technologies. We must also make significant reductions in our energy consumption and material use.

RENEWABLE ENERGY SOURCES ONLY SATISFY ABOUT 14% OF THE WORLD'S ENERGY NEEDS. WE'RE NOT REPLACING FOSSIL FUELS WITH RENEWABLES; WE'RE MERELY ADDING THEM ON TOP.

INDIA'S POWER GRID IS **NOT** SMART

THE GRID IS VULNERABLE, INEFFICIENT, FAULT-PRONE AND UNABLE TO...

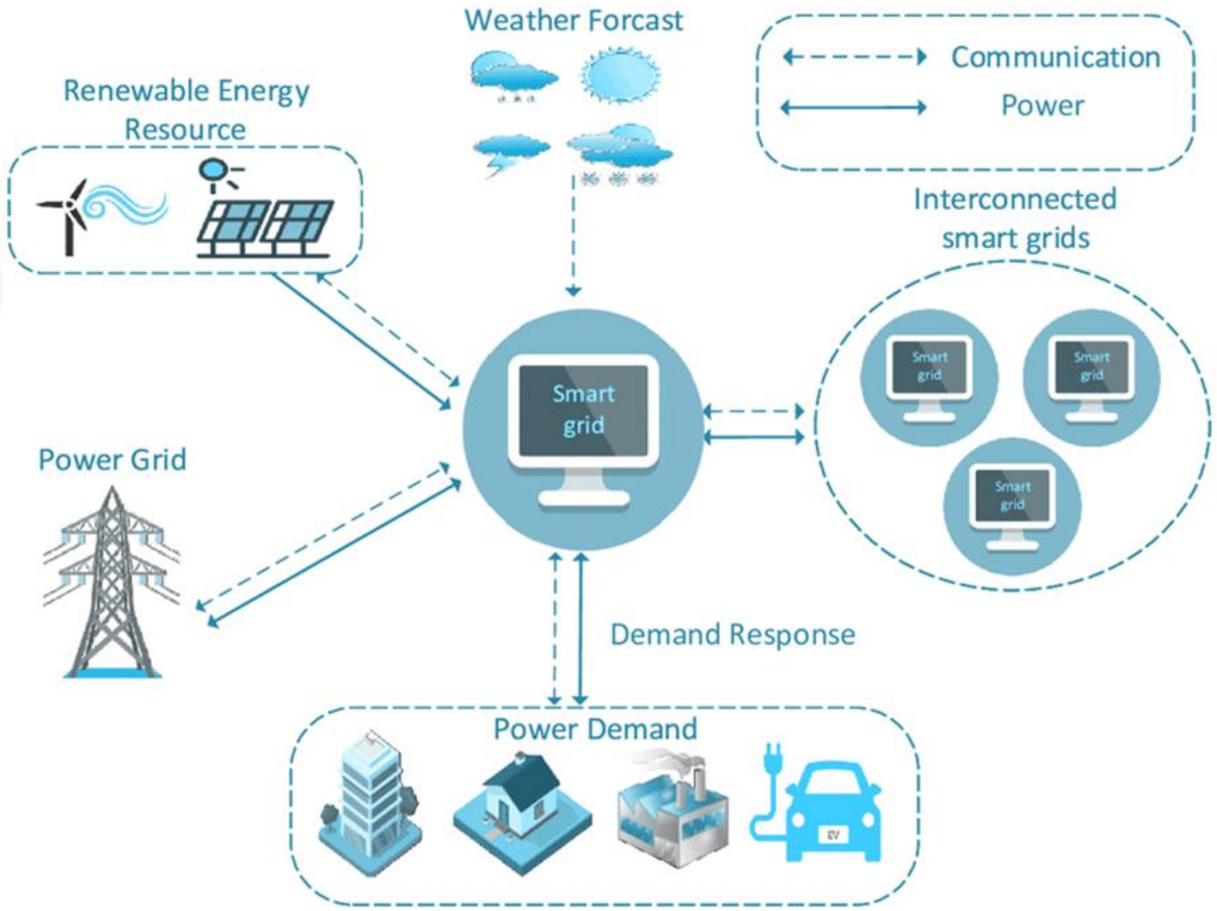
- FORECAST BREAKDOWNS
- ISOLATE FAULTS & HEAL ITSELF
- MANAGE DEMAND EFFICIENTLY
- ENSURE CONSISTENT, HIGH QUALITY POWER

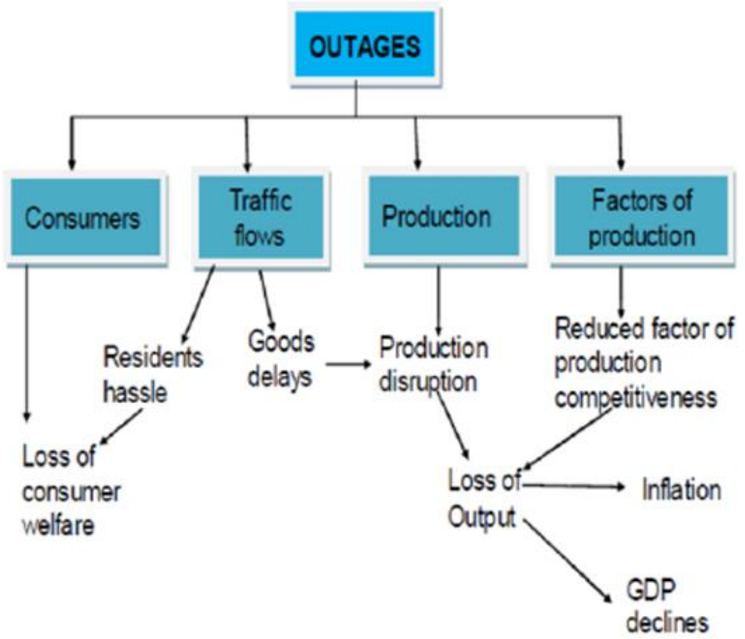


A GRID ACCESS POINT EVERY 1.25 SQ. KM

Data Source: Secondary Research, White Papers, Ministry of Power

A RELIABLE GRIDSMART - A BASIC ESSENTIAL TOWARDS NET ZERO

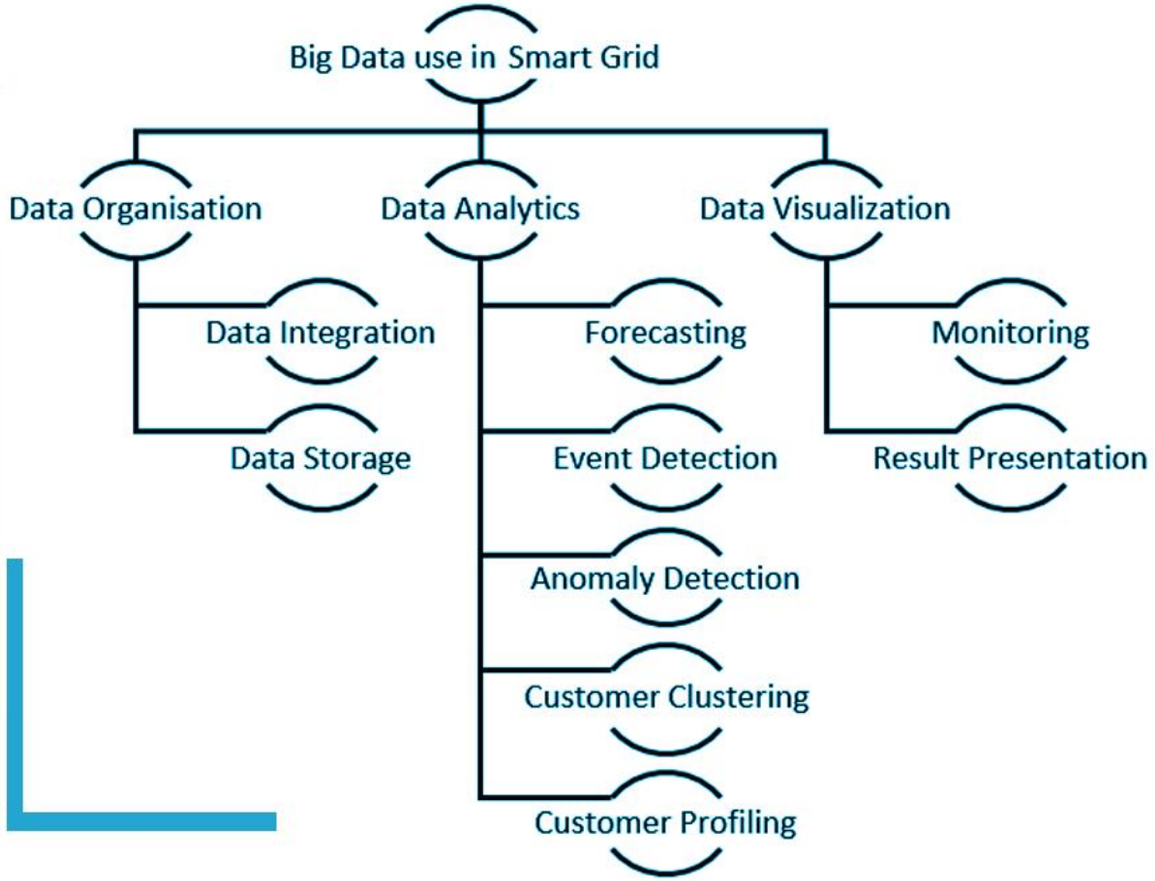




As more and more things move to electric, a grid failure, triggered by a technical glitch lurking within the transmission and distribution infrastructure can cause a domino effect.

GRID DIGITALIZATION - STRUCTURE AND PROCESS

GRID DIGITALIZATION COMPRISES OF : DATA CAPTURE -> ANALYTICS & CORRELATION -> IDENTIFICATION OF BOTTLENECKS & GRID ANOMALY --> BRINGS IN PREDICTIVENESS IN THE GRID --> ENABLES GRID HEALING TRIGGERS



DESCRIPTIVE ANALYTICS	DIAGNOSTIC ANALYTICS	PREDICTIVE ANALYTICS	PRESCRIPTIVE ANALYTICS
WHAT HAPPENED?	WHY DID IT HAPPEN?	WHAT WILL HAPPEN?	HOW CAN WE MAKE IT HAPPEN?
HINDSIGHT	INSIGHT	FORESIGHT	→
STATISTICS	ANALYTICS	MACHINE LEARNING	ARTIFICIAL INTELLIGENCE

SMART GRID ANALYTICS ARE SYSTEMATIC COMPUTATIONAL ANALYSES OF THE DATA PRODUCED IN THE GRIDS. WITH THESE ANALYTICS, ONE CAN GET A MORE PRECISE INTERPRETATION, COMMUNICATION, AND IDENTIFICATION OF DATA TRENDS OR MEANINGFUL PATTERNS FROM THE DATA THAT COMES IN.

FULL LV AUTOMATION PROJECT

Utility Case Study

PROJECT SCOPE

Digitization and Remote Platform Integration of LT Distribution Transformer, ACBs, Protection Relay and RMU

Number of Sites: >100

AI-IoT MAKING GRIDS SMART AND PREDICTIVE

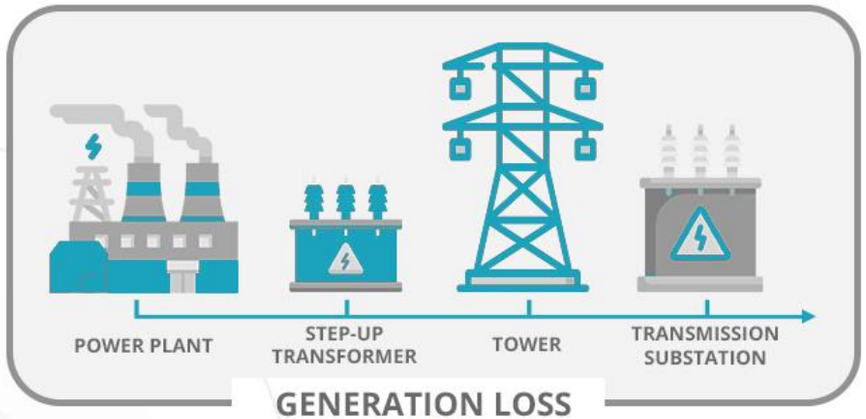
Auto Detection

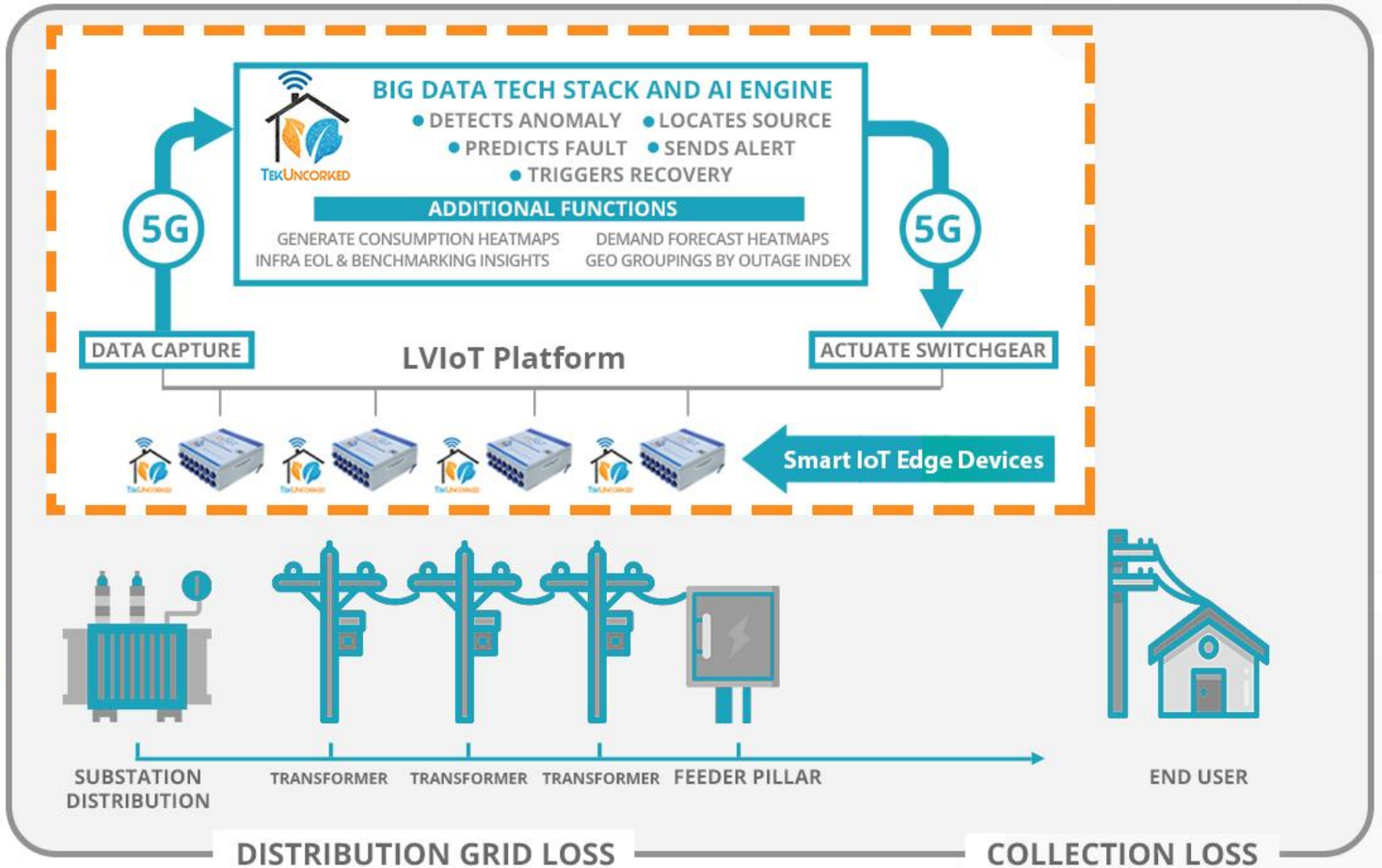
Auto Healing

Auto Maintenance

TekUncorked's LVIoT stack comprises **Smart Edge IoT Devices, Big Data Software and AI Engines**.
LVIoT makes existing distribution grids smart, predictable and remotely accessible for fixing grid losses.

LVIoT PLATFORM FOR LT GRID DIGITIZATION



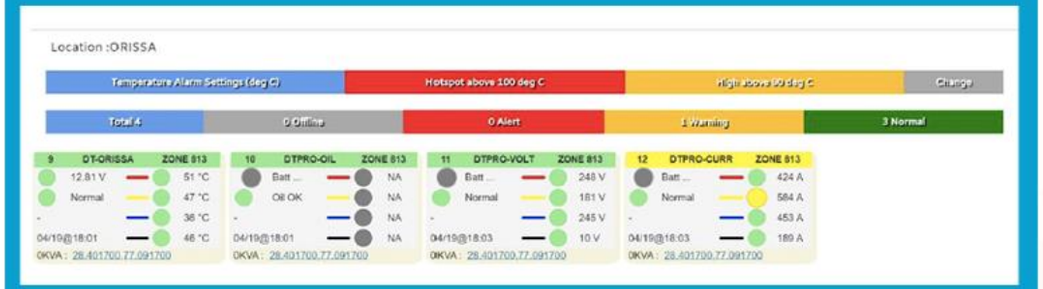


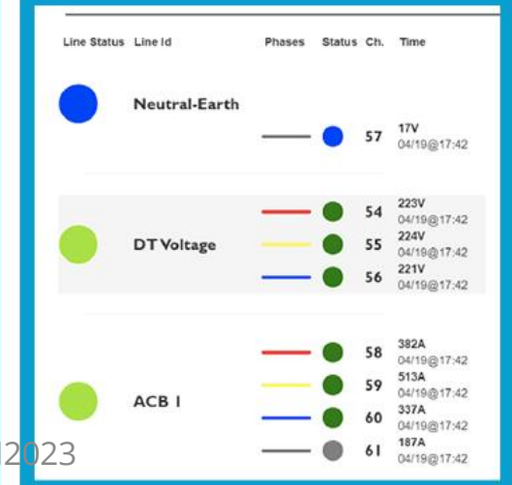
LVIoT AI STACK - INSTALLATIONS

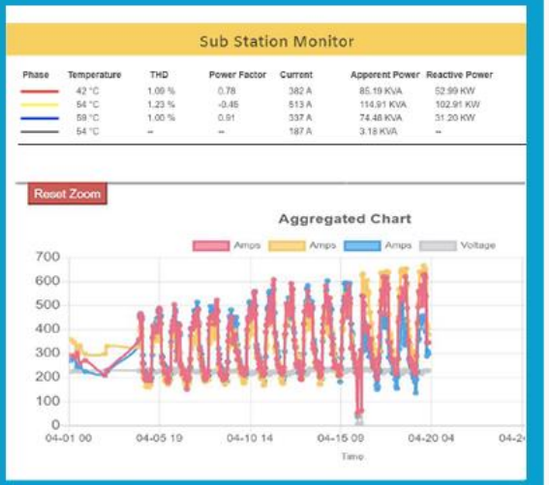
LOCATION	LVIOT EDGE DEVICE	PARAMETERS MONITORED	REASON FOR CHOOSING THE DEVICE
[redacted]	LVIOT-SS	DT BUSHING TEMP, INCOMER AND ACB MONITORING	DEMONSTRATES SOLUTION CAPABILITY TO DO LT SUB- STATION MONITORING
[redacted]	LVIOT DT PRO	BUSHING TEMP, OIL LEVEL AND OIL TEMP, LOAD CURRENT & LOAD VOLTAGE	DT MONITORING

INSTALLATION LOCATIONS

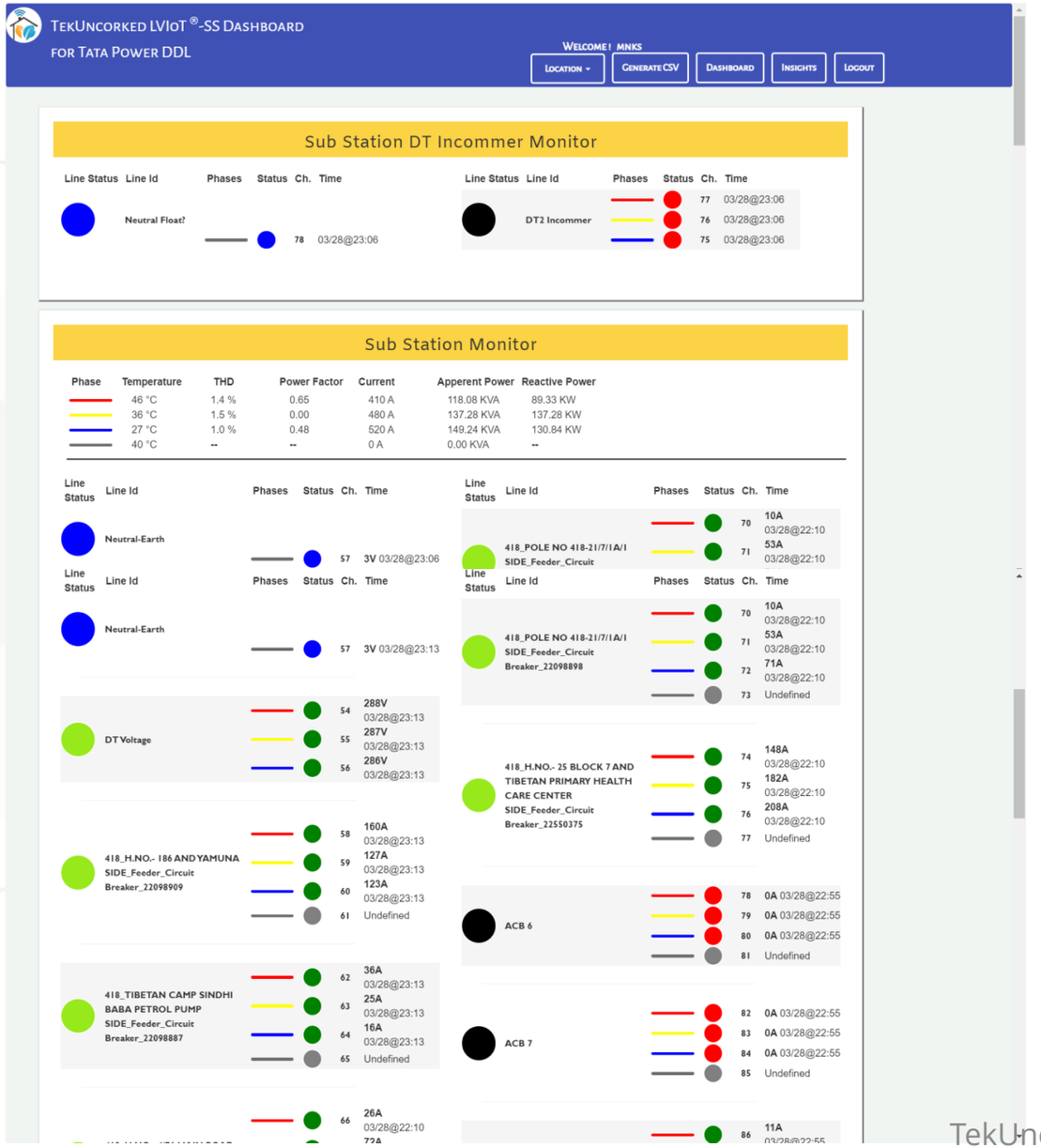
MONITORING SCREENSHOTS







Sub-station Detailed View – Current Status



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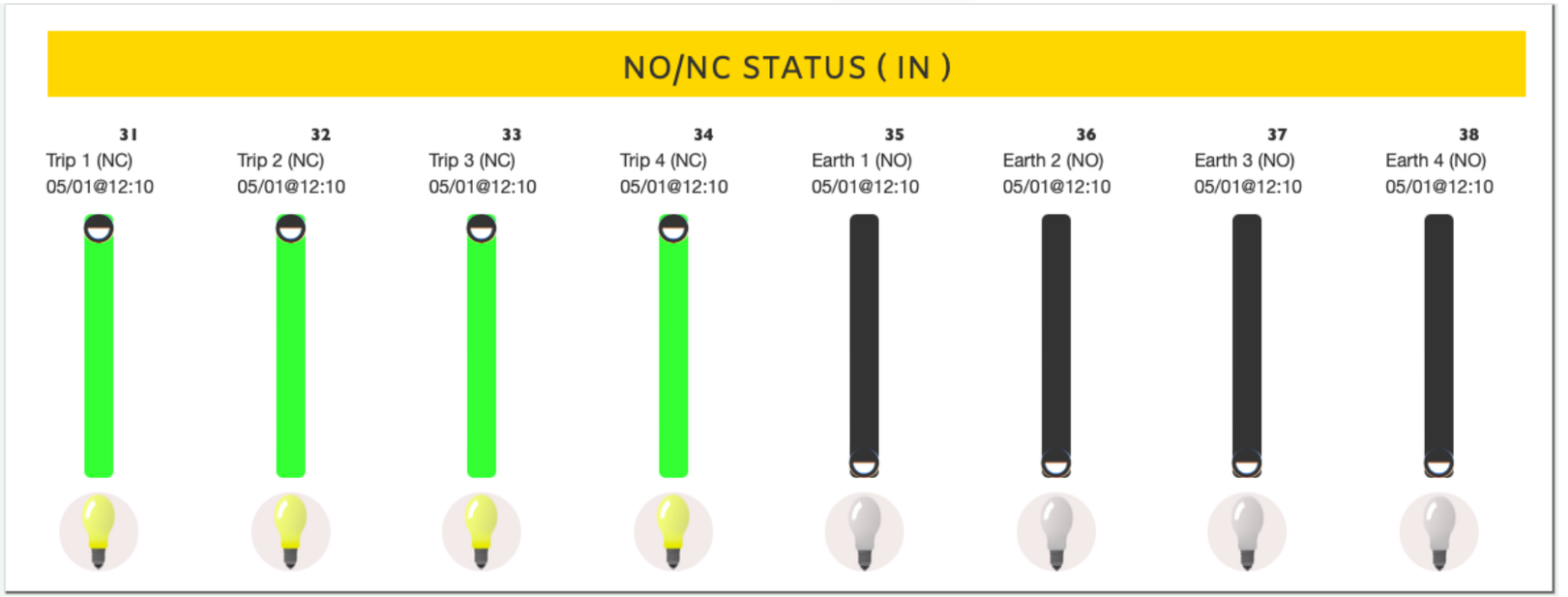
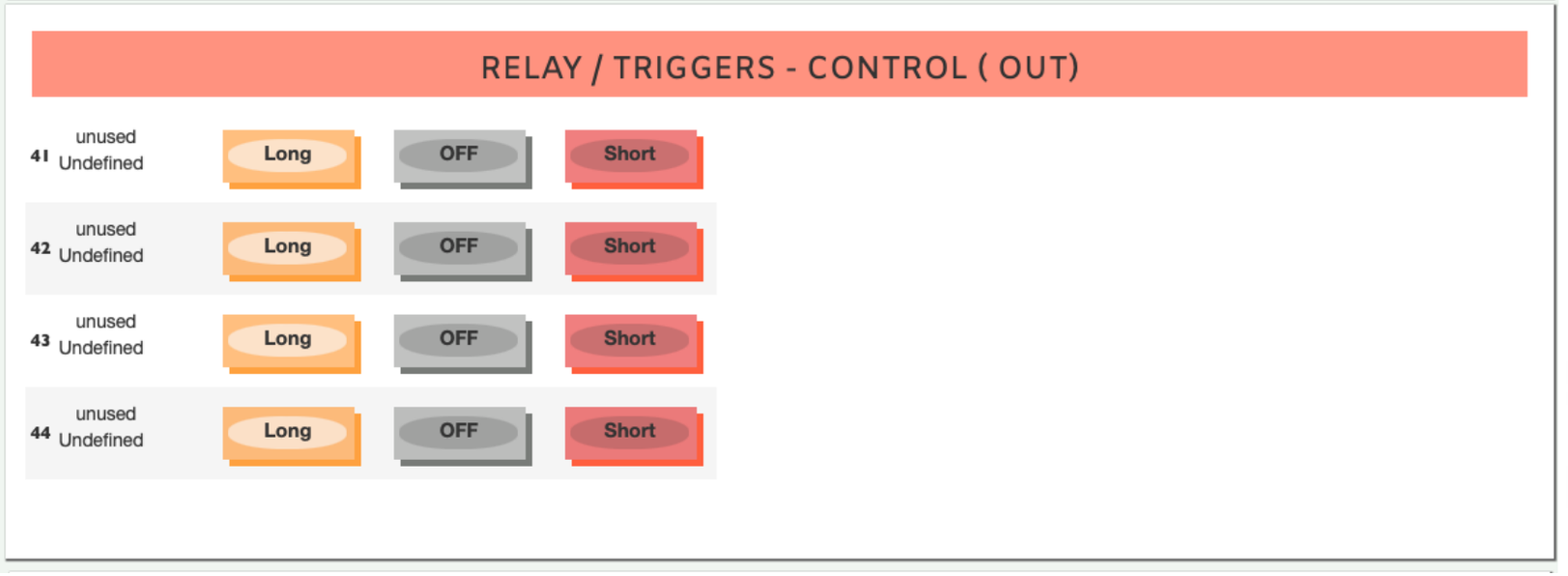
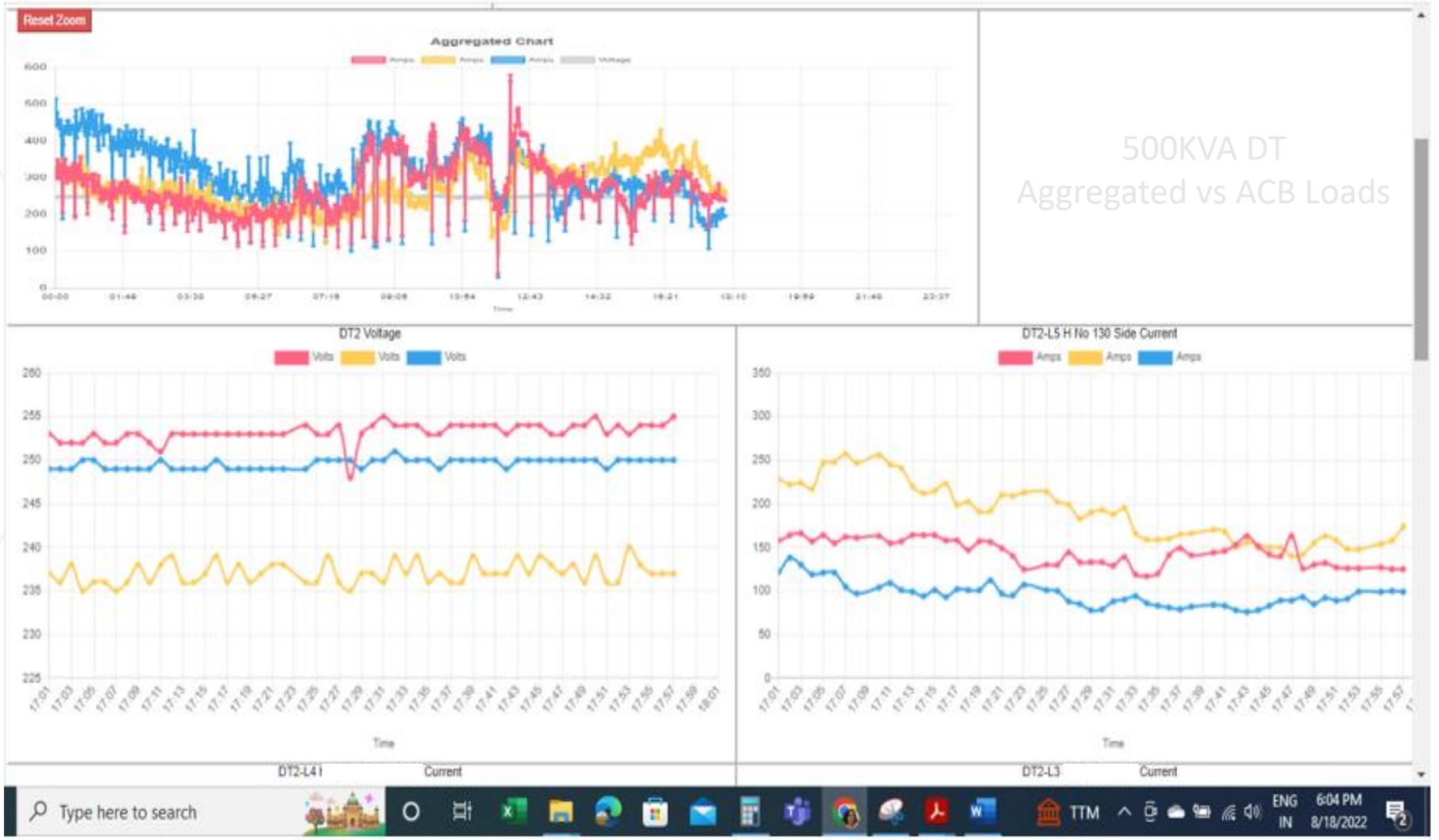
Remote Monitoring & Automation of RMU





Enhanced Visibility on Aggregated and Feeder Level Loads & Imbalances



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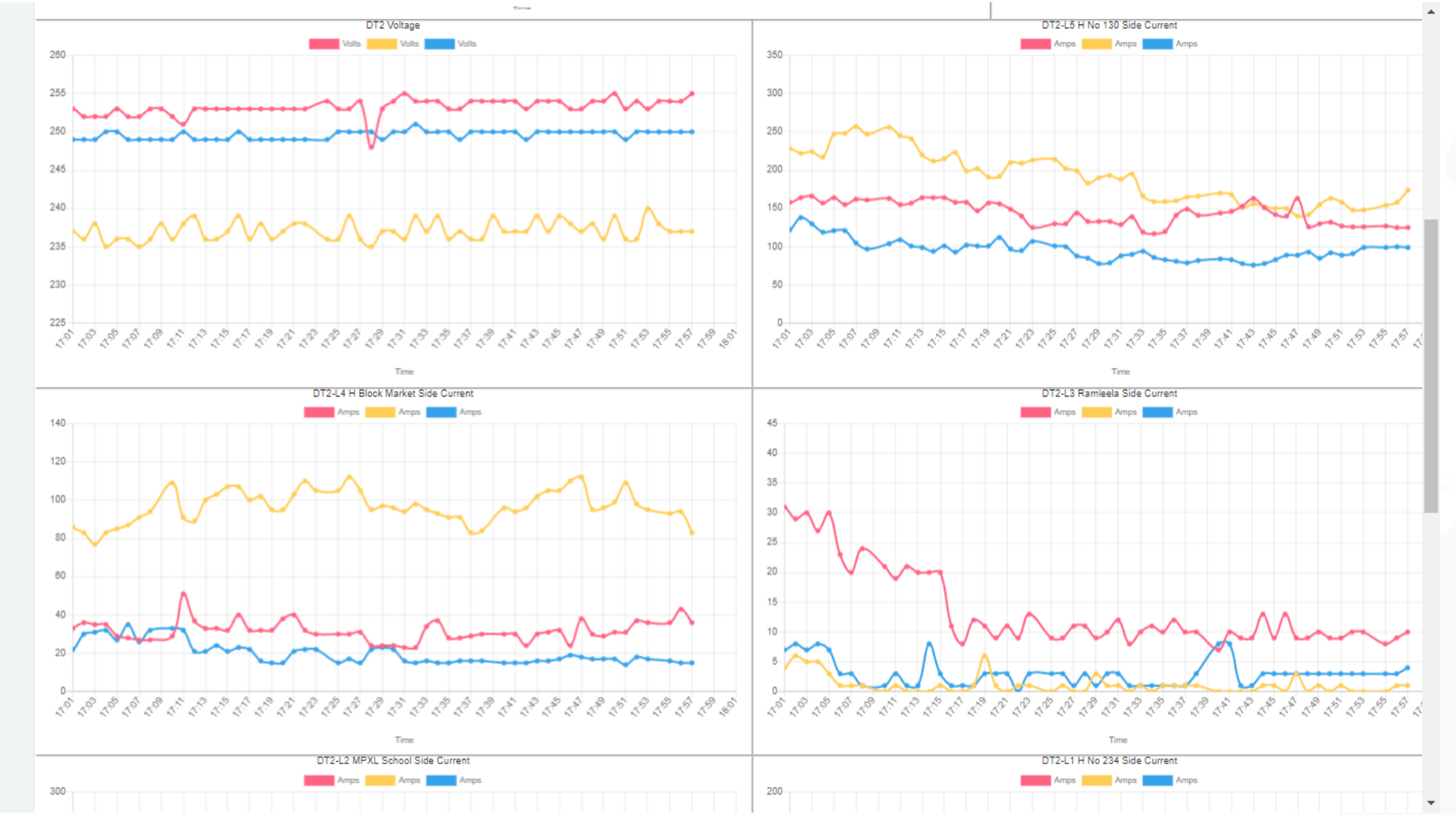
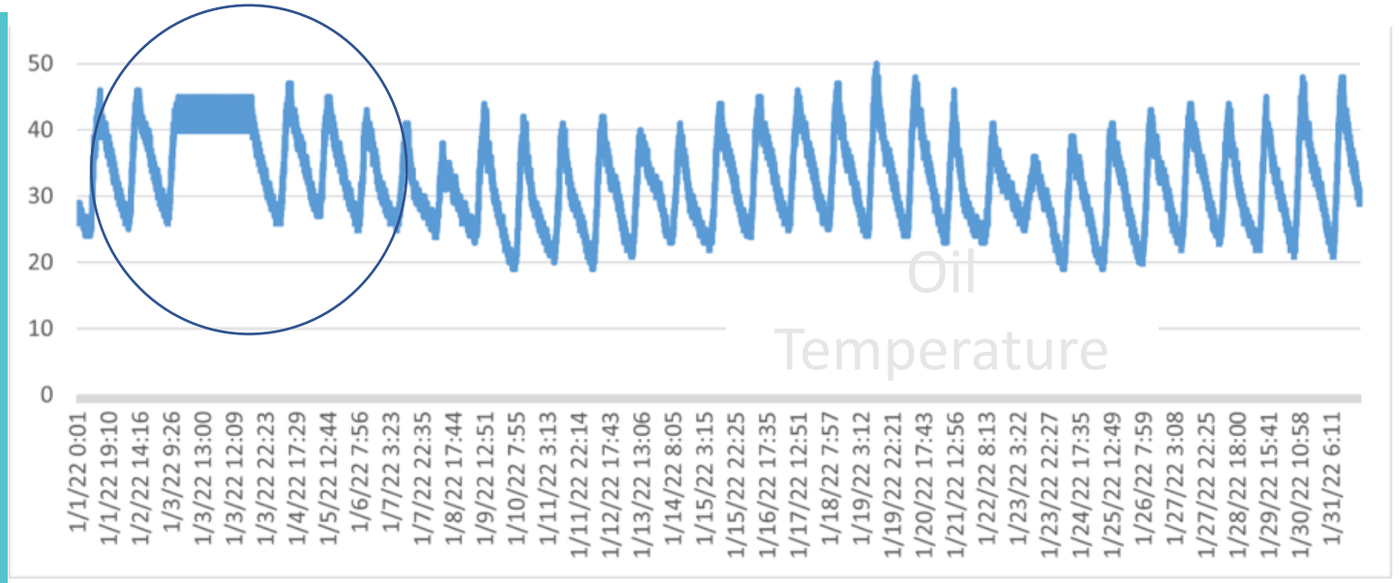
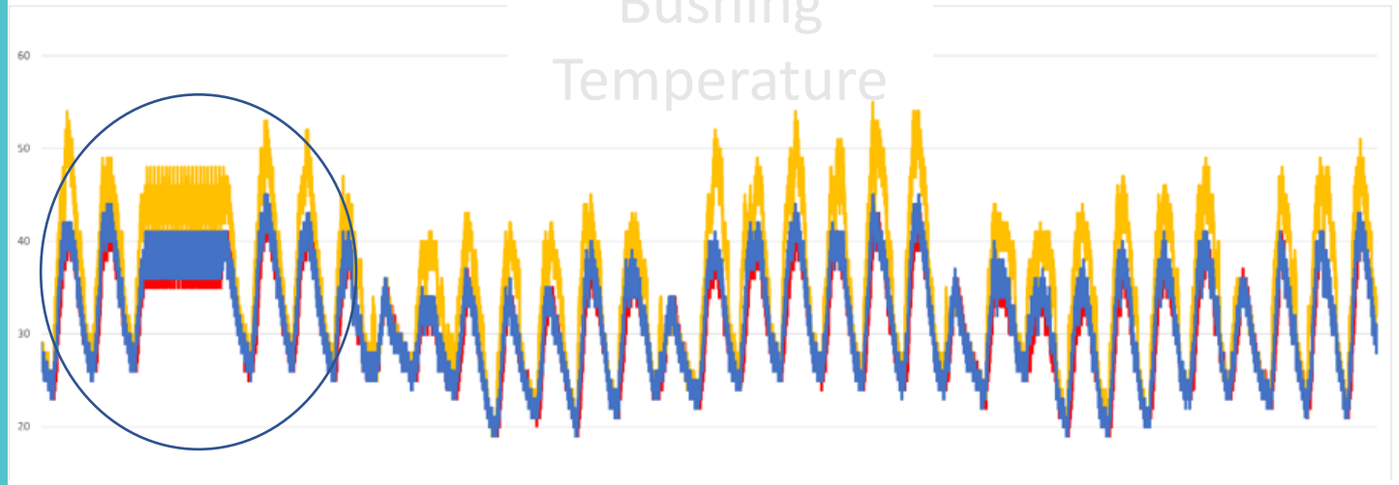


REAL-TIME VISIBILITY ON GRID EQUIPMENT HEALTH





Actionable Alerts

Actionable Alerts enabled as per specification and need.

Notification on recovery of fault condition

BENEFITS TO UTILITY

LVIoT Edge & Cloud AI - Breakdown alerts, fault localisation and forecasts

Effective Management of Grid Assets
Real Time Actionable Alerts
Theft Localisation & Pilferage prevention.
Predictive LV Grid Maintenance
Eliminate Outage & Power Leakage

Asset Life Cycle Planning
Asset Failure Prediction
Track Asset Degradation
Asset EOL Forecasting

Insights for Future Investments
Forecasting future demand based on Asset usage data
Benchmarking of Assets
Design of Optimised & sustainable distribution grids of future

LVIoT Platform at scale in India can lead to reduction of GHG Emissions to the tune of 15 GT CO2e/Hour

Reliable outage-free electricity for all

Google for Startups · Microsoft Partner · Cambridge Cleantech · Qualcomm Ventures · New Energy Nexus · Third Derivative · hartron · NASSCOM Center of Excellence-IoT & AI (A MeitY Initiative with Govt. of Karnataka, Haryana, Gujarat & AP)

Thank you.