

Vegam Condition Monitoring Solution



Digital Factories



Industrial IoT

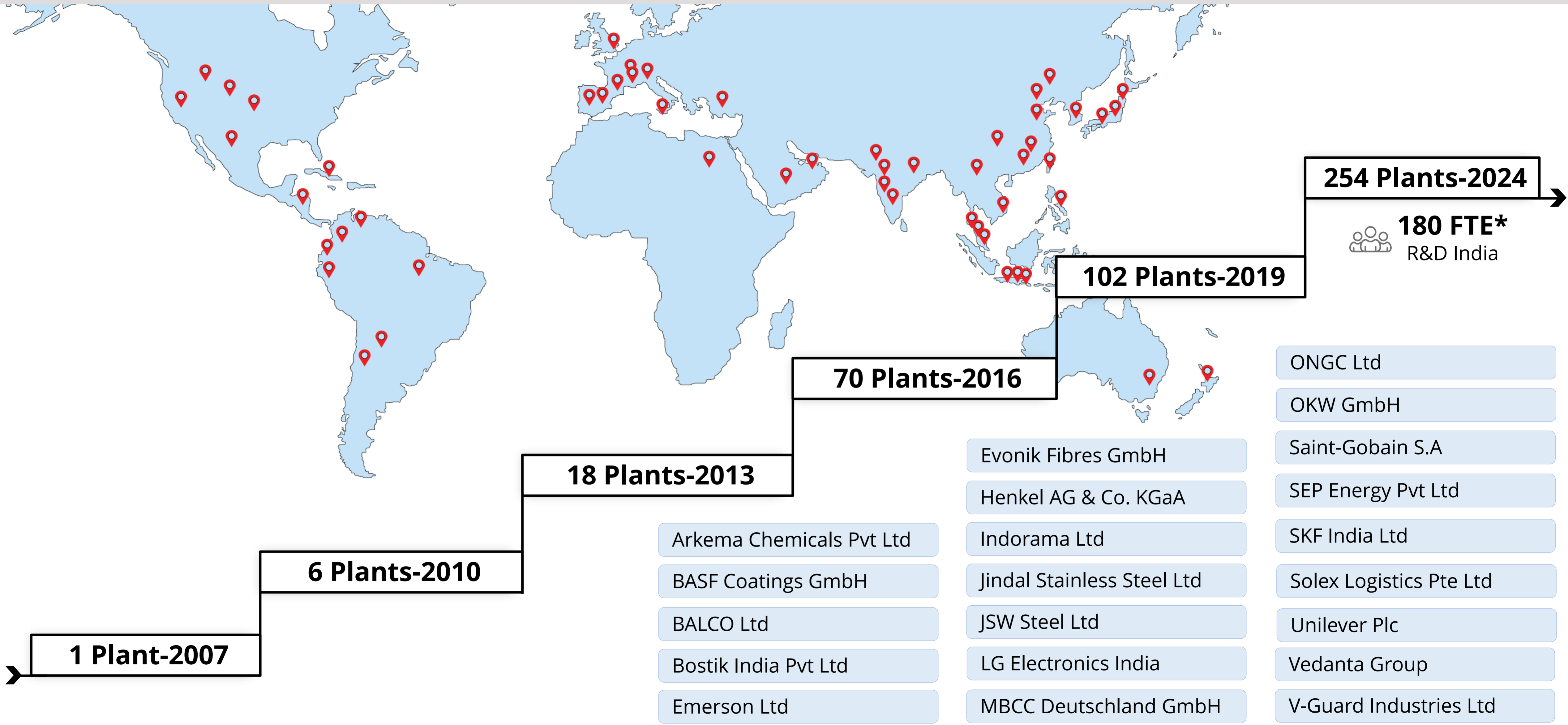


Robotics & Automation



Data Sciences AI/ML

Vegam Journey - Catalyzing Digital Transformation




ISO 27001: 2013, ISO 9001: 2015. "Jiritsuka" (Self Reliance) Model Line by Toyota

Vegam Condition Monitoring Solution




vSens Pro



3 Axis Wireless Vibration and Temperature Sensor

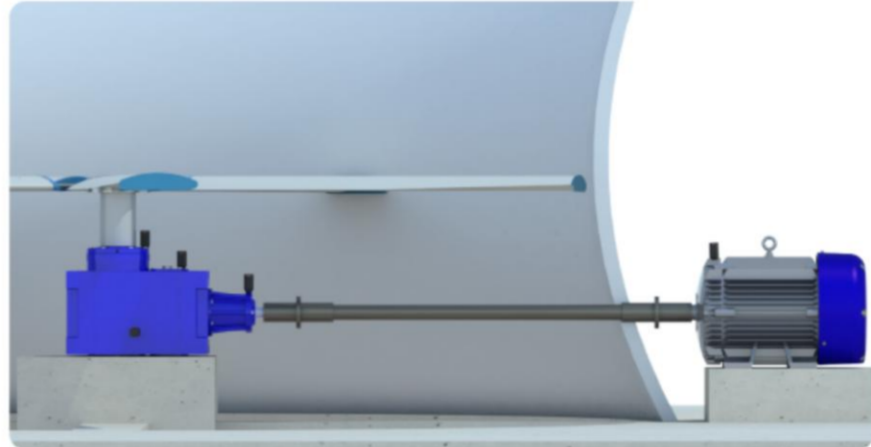
vGateway



Robust Industrial 4G Gateway

Vegam Admin Manufacture

Cooling Tower Unit 2 Fan 5



- Motor Imbalance ● ||||
- Shaft Misalignment ● ||||
- Input bearing ● ||||
- Gearbox Stage 1 ● ||||
- Intermediate Bearing ● ||||
- Gearbox Stage 2 ● ||||
- Output Bearing ● ||||
- Fan Blade ● ||||

AI Insight
1. 1x & its harmonic frequency in the vertical and axial directions indicating Bearing Clearance.
2. FFT spectrum presents 160hz & 292 hz, also its harmonic frequency in gearbox horizontal & axial direction, indicates gear mesh frequency

Expert Insight Check gear teeth condition & bearing clearance, find the defect and replace the same.

May 2024
1W 1M 3M 1Y

24
Alerts received

Machine hrs from the time of sensor installed






Machine Utilization

Notification	Faults
25-03-2024 04:48 PM	Bearing Looseness
25-03-2024 06:34 PM	Gear Mesh Stage-1



vSens Pro



-  **Compact Water and Dust Proof Sensor (IP68)**
-  **Wireless Long Range with High Battery Life**
-  **Continuous Velocity Data**
-  **Low Spectral Noise & Wide Frequency Range**
-  **Low RPM Applications**



vGateway



Robust Industrial Gateway with Secure Connectivity



Multiple protocol support - WiFi, Ethernet and LTE



Integrate with Vegam or third party cloud



AWS, Azure IoT Connector API



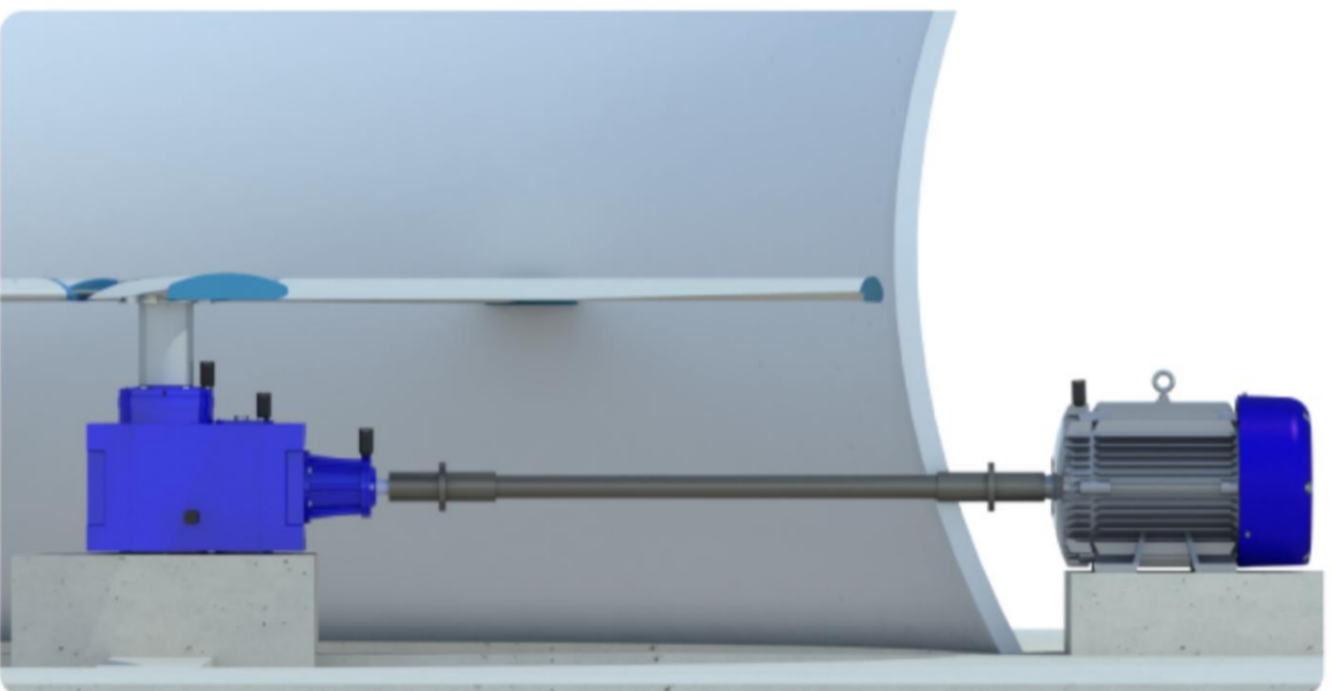
Edge Processing

Vegam Cloud Platform



Vegam Admin **Manufacture**

Cooling Tower Unit 2 Fan 5



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 Secure and Reliable Data Storage

 Integrate with any third-party platform

 Advanced ML Algorithms for Fault Detection

 Real Time Automated Alerts and Reports

 Vibration Analyst Expert Insights



- **Reports:**

- ✓ Daily reports with vibration levels of all monitoring points
- ✓ Weekly reports with short term and long-term vibration trends
- ✓ Clearly identify equipment showing deterioration
- ✓ Acts as input for scheduling effective maintenance

- **Alerts:**

- ✓ Warning alert triggered when vibration level crosses warning VRMS threshold
- ✓ Critical alert triggered when vibration level crosses critical VRMS threshold
- ✓ Email and SMS Alert
- ✓ Summary Alert Mail with details of equipment in critical condition can be triggered periodically

Hi,

VegamView monitored an alert at 09/08/2024 10:57:02.843 PM

Alert name : HC_1200MW_CH_AHP3-4_CompG_CompIP

Alert Description : HIGH CRITICAL - PLEASE CHECK EQUIPMENT : Vibration observed above the critical level of 10 mm/s in two or more axes in the AHP3-4_CompG_CompIP located at 1200MW_CH for last 5 minutes.

Alert Triggered Tag values :

Tag Name : CF0E80807A93/VelocityRMSX

Actual Value : 10.618593215942383

Tag Name : CF0E80807A93/VelocityRMSY

Actual Value : 9.430668830871582

Tag Name : CF0E80807A93/VelocityRMSZ

Actual Value : 11.868084907531738

Configured Alert Condition:

To view the configured alert condition, please visit the alerts configuration page and search for the alert name.

Regards,

VegamView Team.

Dear Team,

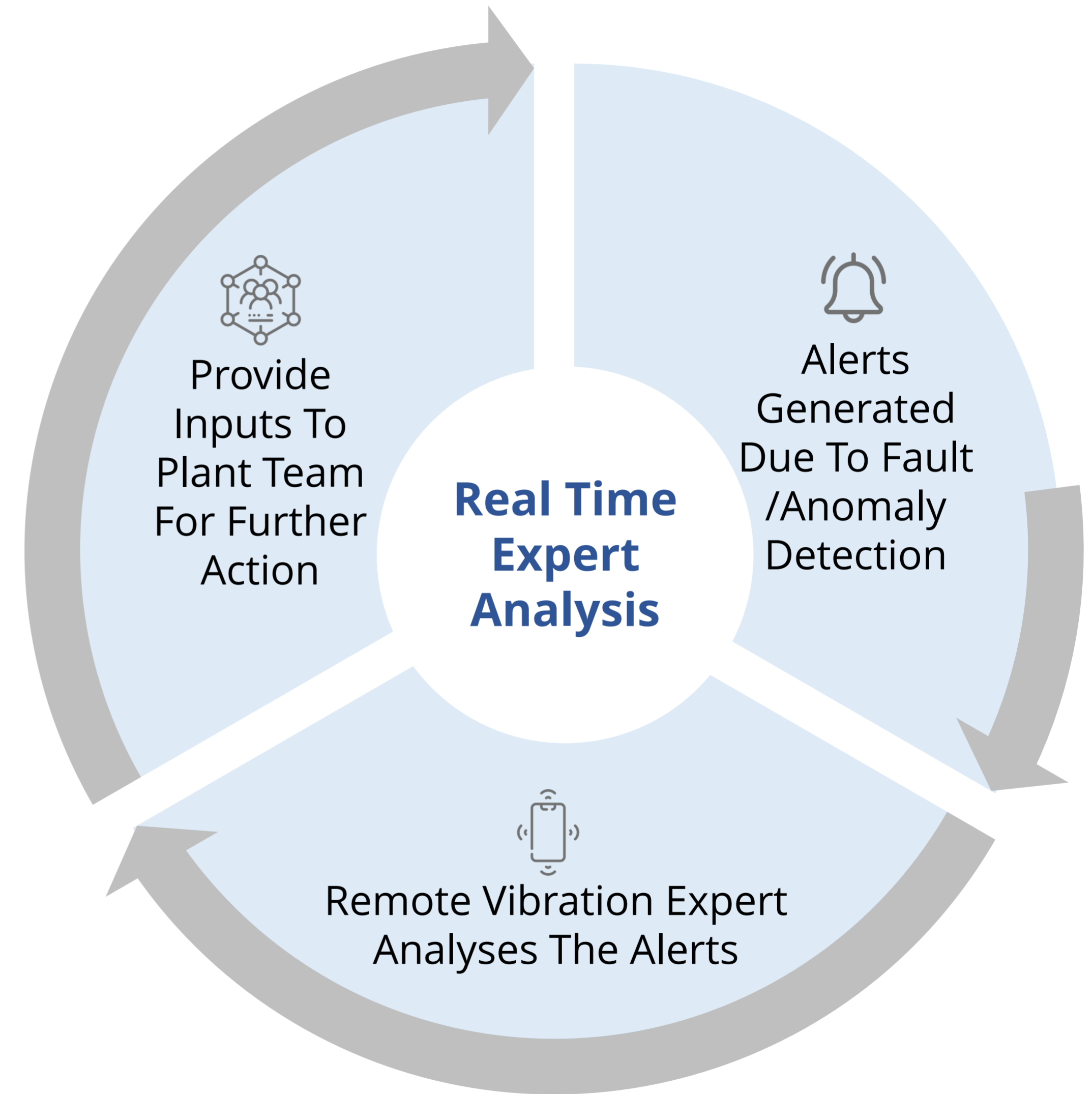
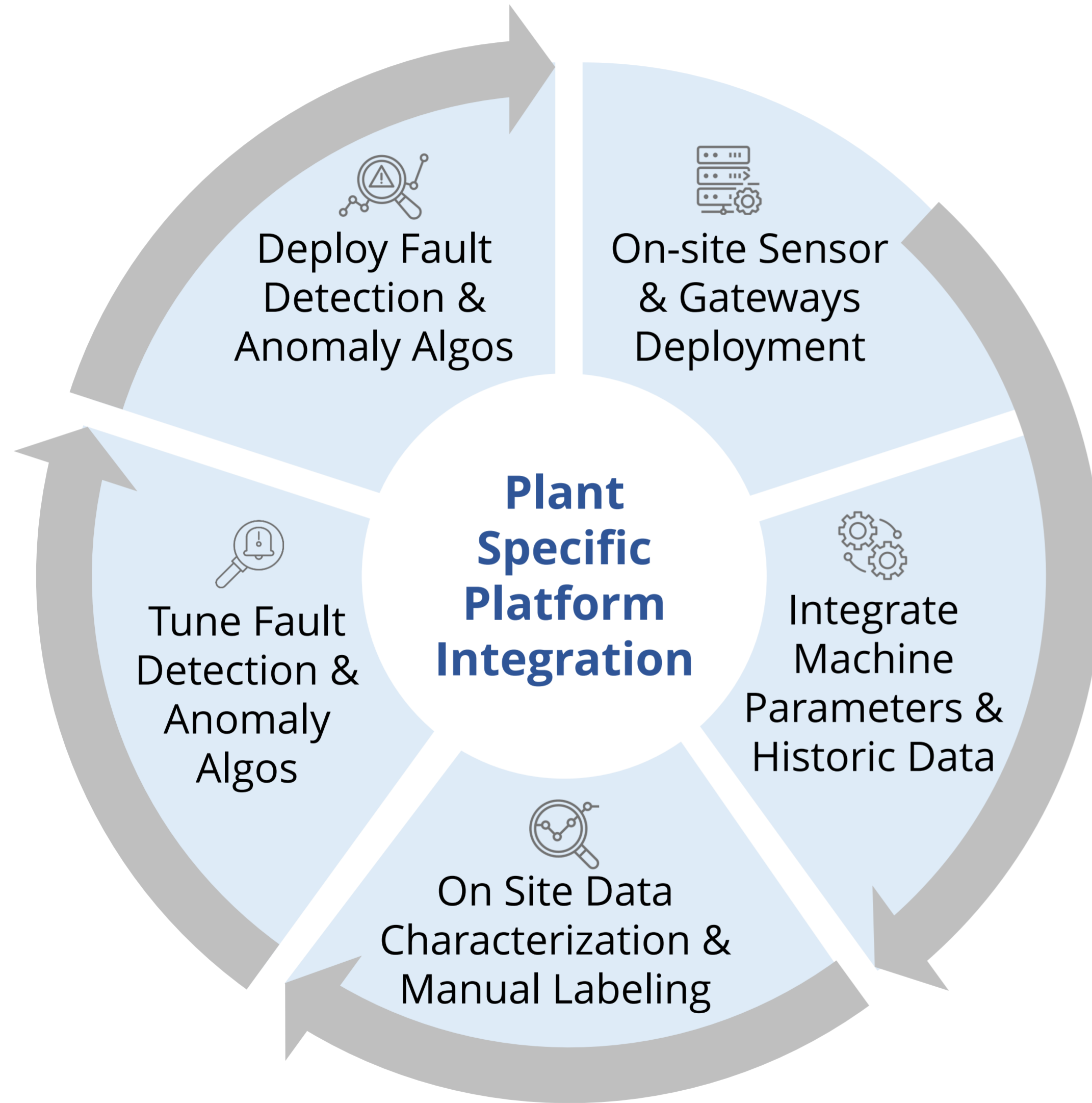
Please find below alert summary from VegamView

ALERT SUMMARY REPORT : 09/16/2024 23:58 to 09/17/2024 05:58

Equipment name	Location	Alert StartTime	Alert EndTime	Alert Duration (In Hours)	Alert Status	Alert Severity
1200MW_CH_AHP3-4_CompF	AHP Unit 3 & 4 - 1200 MW Compressor House	09/17/2024 12:21 AM	09/17/2024 01:16 AM	0.92	Not Active	Critical
1200MW_CT_U4_Fan5	Unit - 4 -1200 MW Cooling Tower Area	09/12/2024 03:21 PM		110.61	Active	Critical

Thanks!

Vegam Team.



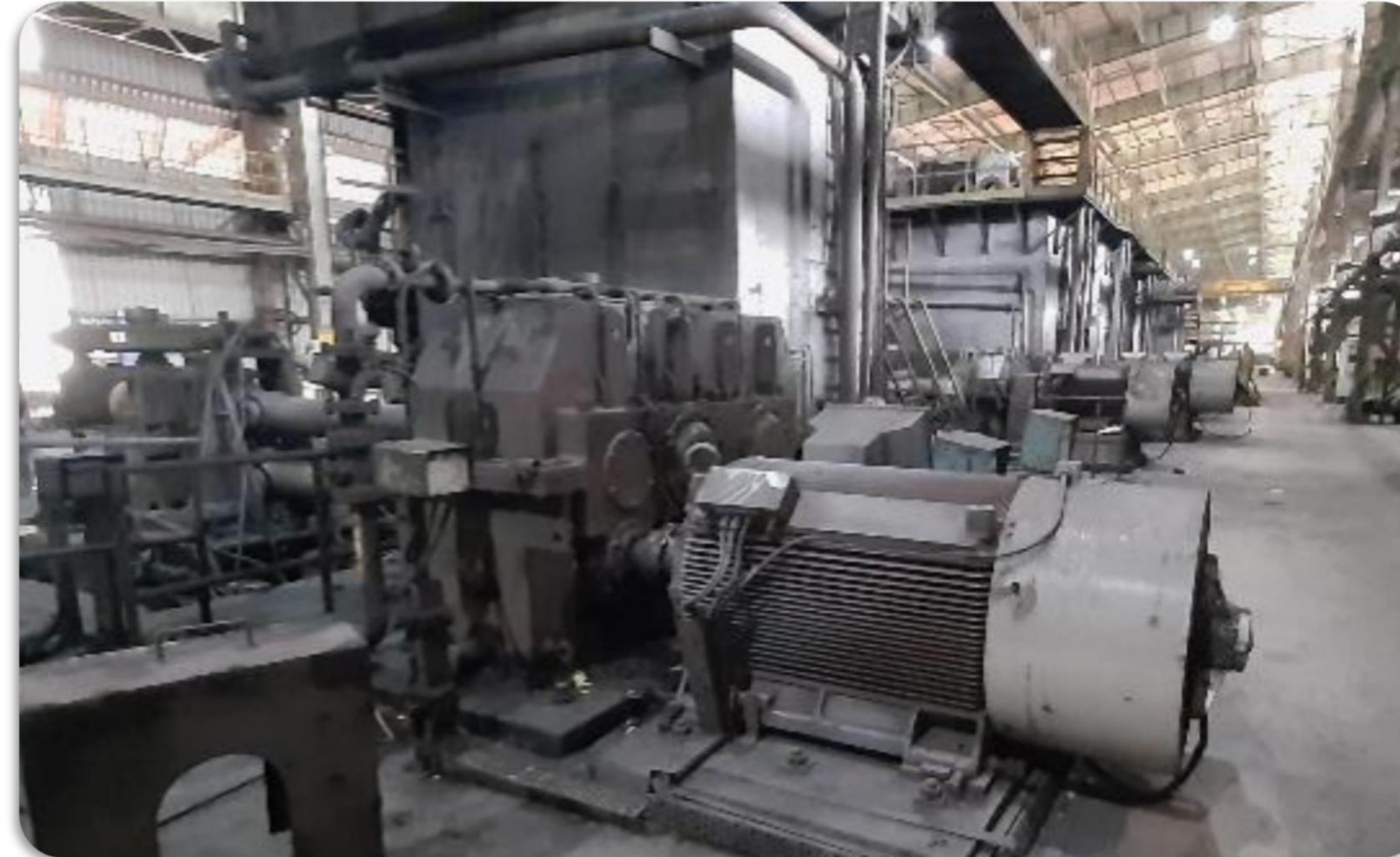


Case in point & Key Challenges

- India's largest Steel Plant, more than 12 MTPA capacity.
- Unplanned breakdowns of critical assets in Wire Rod Mill and Bar Rod Mill.
- Breakdowns result in loss of productivity, impact to production schedule and customer shipment
- 112 critical equipment identified in
- Operational challenges included high temperature, frequent water spillage and a demanding industrial environment with dust and fumes.
- Intermittent passing of wire rods created different load conditions on the machines creating process related challenges for data analysis.

300 Sensors on 112 Assests

vCMS



Value & Outcome

- Robust IP68 wireless sensors worked seamlessly in the harsh environments of Bar and Wire Rod Mills.
- Continuous velocity data and periodic spectrum data feeding into the advanced ML algorithms helped in accounting for process related changes
- Major gearbox breakdown avoided in the first 3 months, saving costs on bearing replacement and long unplanned downtime
- With early identification of issues, downtime was reduced by 40%
- Increased uptime a reduced maintenance costs resulted in \$550,000 revenue increase over the year.

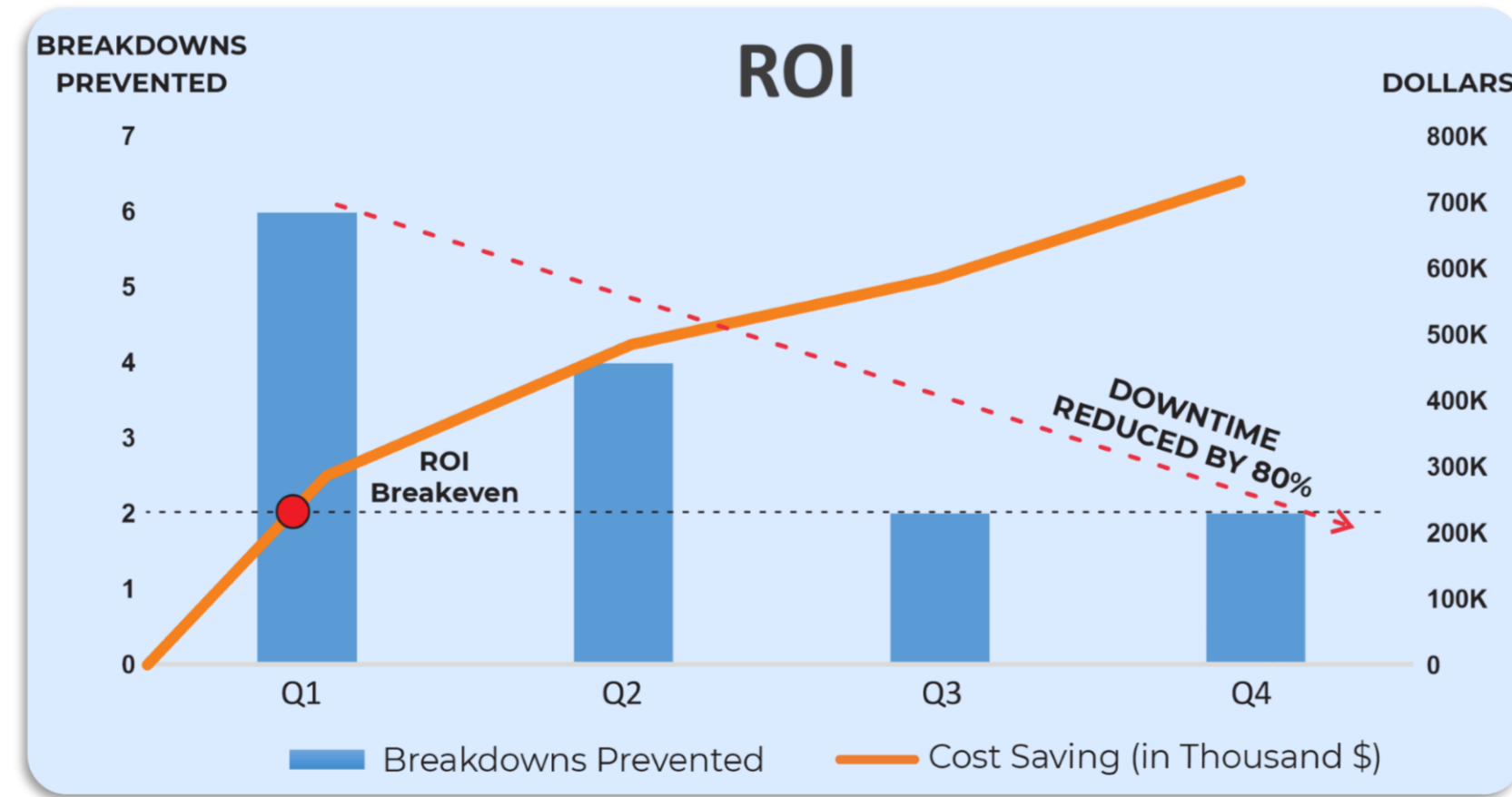
Overall Estimated Saving: \$550k



Case in point & Key Challenges

- One of India's largest Integrated Aluminum Plant.
- 62 Cooling Tower Fans spread across 6 units.
- Cooling tower located in remote locations pose challenges for continuous monitoring.
- Frequent breakdowns of gearbox, shaft and fan in cooling tower.
- Prolonged shutdown time after breakdown causes loss of productivity.
- Replacement of bearings in gear box incurs high maintenance cost.
- Safety concerns restrict the access of equipment inside cooling tower.

328 Sensors on 62 Assests



Value & Outcome

- Low spectral noise sensors captured low frequencies up to 0.8Hz associated with fan RPM and output bearing.
- Advanced machine learning algorithms analyzed vibration data (acceleration, velocity, and FFT spectrum) to generate critical alerts for multiple remote assets.
- Increased uptime and reduced maintenance costs resulted in \$700,000 revenue increase over the year.
- Achieved 120% ROI within first 3 months by preventing 6 fan breakdowns.
- Early detection of shaft misalignment and gearbox issues, preventing damage and part replacements.

Overall Estimated Saving: \$700k

“The agility and professionalism the **Vegam Team** has shown was tremendous.”

Vice President Operations & Supply Chain Asia, Adhesives

“Thanks **Vegam** Team for being such a good partner. I appreciate it a lot!”

VP Operations, IMEA, Fine Chemicals

“**Vegam SFS** helps us achieve performance at the highest granularity with just a click of a button.”

Head of Operations South East, European Chemicals Major

“**Vegam SFS** deployment offered great improvements in terms of productivity, labor efficiency, site safety and lean mind set.”

Manufacturing Operations Manager – Chemicals Factory, Melbourne

