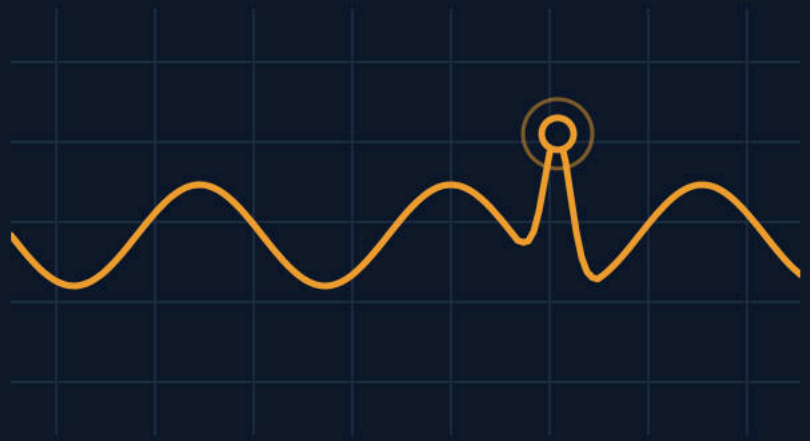
Krionix™
CONNECTING THE DOTS OF TOMORROW.

PADMASHAKTI IOT TECHNOLOGIES PVT LTD

Krionix THMS

Transformer Health Monitoring System for BESCOM distribution transformers



Solution overview · October 2026 · Padmashakti IoT Technologies Pvt. Ltd.

THE PROBLEM

BESCOM loses more than 35,000 distribution transformers a year

4,95,592
distribution transformers in service (Feb 2024)

35,987+
failures in each of the last three reported years (up to 38,288)

34,820
failures in 2023–24, up to Feb 2024 (about 7% of the fleet)

₹75 crore
average yearly repair cost, as stated by BESCOM

Nearly **93% of transformer failures occur in rural areas**, according to BESCOM.

Source: BESCOM, Distribution Transformer Details (page updated 24 May 2024) · Krionix THMS · 2

WHY THEY FAIL

Warning signs appear before the failure

Overloading
Load grows beyond the transformer's rating, especially in peak seasons.

Unauthorised load
New connections are added without the transformer being upgraded.

Ageing
Insulation and oil lose strength over the years of service.

Phase unbalance
One phase carries more load and runs hotter than the others.

Low voltage
Loads draw more current for the same power, adding heat.

Oil loss and leakage
Less oil means weaker cooling and insulation.

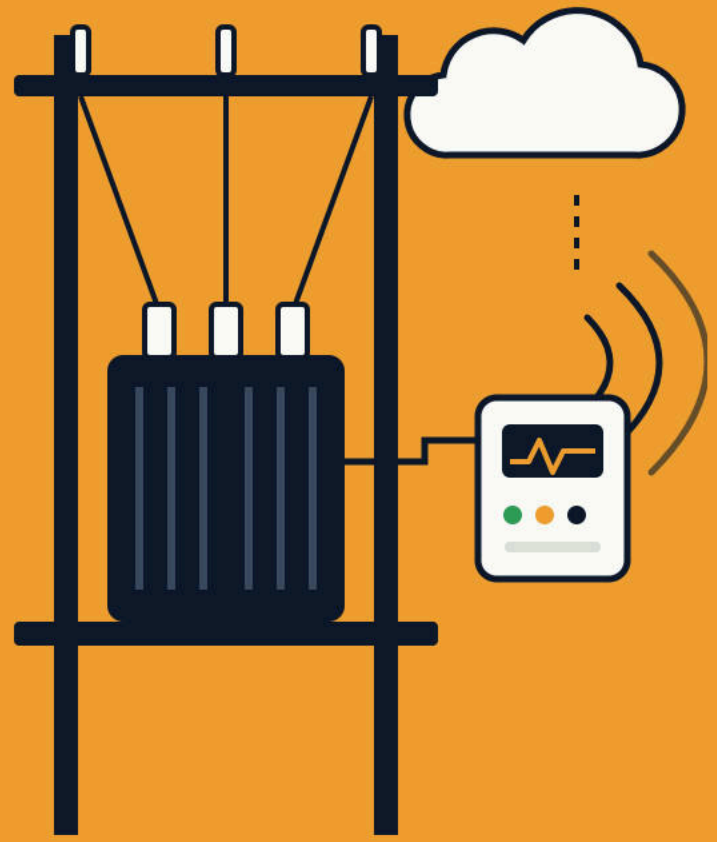
BESCOM names overloading, unauthorised connections, ageing and manufacturing defects as the main causes. Most of these show up in current, voltage or temperature readings before the transformer fails.

Source for main causes: BESCOM, Distribution Transformer Details · Krionix THMS · 3

THE SOLUTION

Know each transformer’s condition before it fails

Krionix THMS continuously monitors the electrical and physical health of every connected distribution transformer, and notifies BESCOM engineers when readings move outside safe limits.



HOW IT WORKS

From transformer to engineer's phone

1

Sensors

CTs, voltage, oil temperature, oil level, vibration

2

Edge unit

Controller, isolated RS485 energy meter, weatherproof enclosure

3

4G link

Built-in SIM, no BESCOM network needed

4

Cloud

Secure cloud platform; rules, analytics, history

5

People

Command centre dashboard and field mobile app

Live dashboard for every monitored transformer

Timely alerts to the responsible engineers

Health and loading reports for planning

WHAT IT MEASURES

Electrical and physical health, together

Electrical

- Phase voltages V1–V3 and line voltages V12, V23, V31
- Phase currents I1–I3 and phase unbalance
- kW, kVA and kVAr per phase; demand load
- Energy: kWh and kVArh
- Power factor and frequency
- Harmonics

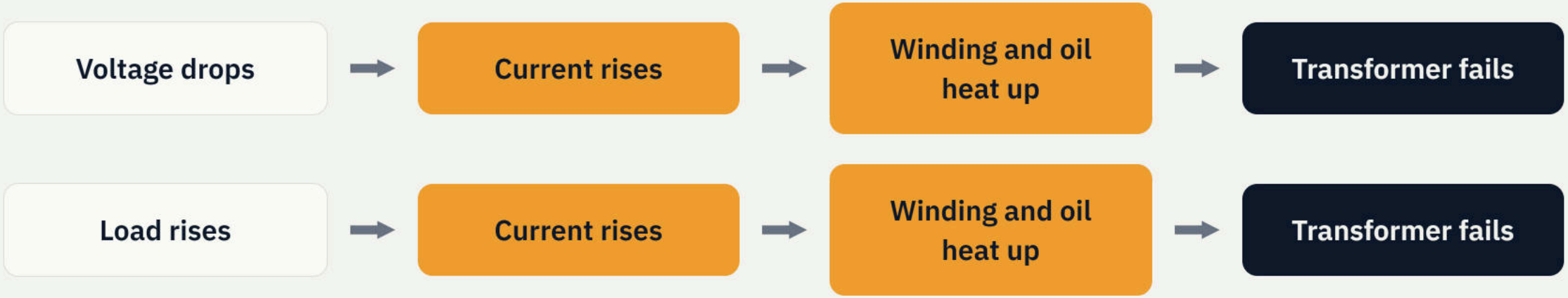
Physical

- Oil temperature
- Ambient temperature and humidity
- Vibration
- Oil level
- Transformer body cavity pressure
- Winding temperature and tap position

The parameters included depend on the transformer rating and the package selected.

EARLY WARNING

THMS sees the chain before the failure



Alerts are raised at the highlighted stages, when current, unbalance or temperature crosses its set limit, leaving time to reduce load, rebalance phases or top up oil.

WHAT BESCOM GAINS

Fewer failures, faster fixes

Fewer failures
Overload, oil loss and overheating are caught early.

Lower repair spend
Each avoided failure saves about ₹23,400 in repair cost.*

Shorter outages
Fault and unit-offline alerts point crews straight to the transformer.

Targeted maintenance
Maintenance goes where the readings show a need.

Planning data
Actual loading per transformer to plan upgrades and rebalancing.

Unusual load signals
Sudden load or unbalance changes can indicate unauthorised connections.

* BESCOM states it spends about ₹75 crore a year repairing about 32,000 failed transformers. ₹75 crore ÷ 32,000 = ₹23,437, rounded to ₹23,400 per repair. Repair cost only; outage losses and replacement transformers are not included.

AN ILLUSTRATION ON BESCOM'S FIGURES

For every 5,000 transformers monitored, cutting the failure rate by one percentage point avoids 50 failures and about ₹11.7 lakh in repairs a year.

5,000

transformers in the example group

~350

failures a year at a 7% failure rate

~₹82 lakh

repair cost a year at ₹23,400 per repair

7% = 34,820 ÷ 4,95,592 (BESCOM, 2023–24 up to Feb 2024), the lowest recent rate · Repair cost only · 9

WHERE IT GOES

Three packages, matched to transformer size

Rating	Typical location	What is monitored
25–100 kVA	Rural and agricultural feeders, where most failures happen	Full electrical set, oil temperature, ambient, vibration
150–315 kVA	Urban and town distribution	Everything above, plus oil level and transformer body cavity pressure
400–1250 kVA	Commercial, industrial and critical loads	Everything above, plus harmonics, winding temperature and tap position

PRICING

One-time hardware, small monthly subscription

25–100 kVA

₹10,000

one-time, per transformer

+ ₹250 / month

150–315 kVA

₹15,000

one-time, per transformer

+ ₹250 / month

400–1250 kVA

₹32,000

one-time, per transformer

+ ₹350 / month

Subscription covers 4G data SIM, cloud hosting, dashboard and mobile app, alerts, reports and software updates. Installation and commissioning charges are additional and will be quoted separately.

OPERATING MODEL

One command centre for about 5,000 transformers

The team

- Control-room engineer monitoring the live dashboard
- Division supervisors assigning and tracking work
- Field technicians working through the mobile app

How an alert is handled

1. Alert appears on dashboard and phone
2. Supervisor assigns a technician
3. Technician attends and updates the app
4. Closed and logged for monthly reports

Run by BESCOM staff, or as a **managed service** by Krionix (quoted separately).

PROPOSED PILOT

Start small: 10–20 transformers, 90 days

Scope

- 10–20 transformers across all three sizes
- Include ones with a recent failure history
- One or two sub-divisions chosen by BESCOM

Timeline

- Weeks 1–2: survey and install
- Weeks 3–12: live monitoring
- Week 13: results review with BESCOM

We measure

- Alerts raised and acted on
- Faults caught before failure
- Data uptime
- Field response time

Pilot terms: special commercial terms will be offered for the pilot, to be finalised through mutual discussion.

ROADMAP

From pilot to full fleet

Stage 1

Pilot

10–20 transformers, 90 days, results reviewed with BESCOM

Stage 2

Sub-division

Hundreds of transformers, starting with failure-prone feeders

Stage 3

Taluk

About 5,000 transformers with a command centre

Stage 4

Circle-wide

Scale across BESCOM, with data shared to its existing systems

WHAT KRIONIX DELIVERS

One team, end to end

Device and platform

THMS units, cloud platform, dashboard and mobile app

Installation

Site survey, installation and commissioning

Support and reporting

Alert set-up, technical support and periodic health reports

Next step: agree pilot sites and start installation.

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