SIEMENS

BEYOND CHANGE MANAGEMENT

WHAT IT REALLY TAKES TO SUCCEED WITH PREDICTIVE MAINTENANCE

Executive Summary

Predictive Maintenance (PdM) is one of the most compelling value propositions in modern industrial operations: move from reactive firefighting and calendar-driven schedules to condition-based, data-informed decisions that reduce unplanned downtime by 50%, increase productivity by 55%, and optimize maintenance spend.

Yet 60–85% of digital transformation programmes fail to deliver their intended value, not because the technology doesn't work, but because organizations underestimate or misunderstand what has to change for the technology to matter.

This white paper argues that PdM is bigger than a change management challenge. It is a fundamental shift in how maintenance organizations think, decide, and act. The organizations that succeed are not the ones that bolt on a change management programme after deployment; they are the ones that design change from the very beginning.

A company engaging with Siemens is buying the opportunity to change, not just technology. The organizational challenge is the same regardless of where on the technology stack the journey begins.

When organizations treat PdM as a technology test, they onboard a handful of assets, wait six months, and wonder why nothing happened. Nothing happened because nobody was asked to change anything.

Drawing on Siemens' delivery experience, this paper:

- Explains why PdM demands more than a traditional change management approach
- Introduces a practical framework for building PdM capability, with change designed in, not bolted on
- Addresses the critical gap most organizations miss knowing what to do with the information PdM provides
- Provides honest, experience-based guidance for every stage of the PdM journey

The intended audience is any senior leader, operational, digital, or financial, evaluating, implementing, or scaling a PdM programme.

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1. **The uncomfortable truth about PdM adoption**

The industrial world has never had better tools for predicting equipment failure. And yet, PdM initiatives consistently fail to deliver intended value. Not because the algorithms are wrong, but because:

- Maintenance teams continue calendar-based schedules regardless of system recommendations
- Alerts are acknowledged but not acted upon because nobody has defined what action looks like
- The system predicts degradation six months out and the team doesn't know what to do about it
- Leadership declares pilot success and moves on without building governance to sustain it
- Experienced engineers distrust model outputs they don't understand and quietly revert to intuition

These are not technological failures. They are organizational failures, entirely predictable and preventable when change is considered from the outset.

The central insight: PdM doesn't change what maintenance teams do. It changes how they decide. That is not a change management workstream. That is the project itself.

1.1 Why "Change Management" Is the Wrong Frame

Here is an uncomfortable truth from Siemens' delivery experience: whenever the words "change management" enter the conversation, it is usually because something has already gone wrong.

Siemens is not selling something so big and complex that it requires a long-term change management function. It is deploying a tool and enabling organizations to integrate it into their workflows. The organizations that succeed build consideration of change into the project from the beginning, through product design, project setup, and deliberate inclusion of the people most affected.

The goal is not to manage change. It is to design a project so well that formal change management is never needed.

2. **Why PdM is a particularly demanding shift**

2.1 It Challenges Expertise and Identity

Maintenance expertise is deeply personal. An experienced engineer who has kept a plant running for two decades carries knowledge not written down anywhere. PdM, introduced clumsily, can feel like a direct challenge: "We're replacing your judgment with an algorithm."

This is wrong and counterproductive. Organizations that succeed position PdM as an amplifier of human expertise, not a substitute. The engineer's knowledge becomes the training signal. Their feedback improves the model.

But here is the nuance: customers generally overestimate how complex PdM is, which makes them fearful. As vendors, we can underestimate how that feels, how scary, threatening, or worrying it can be. Our job is to be transparent about the volume of change expected and what it will or won't do to their roles.

2.2 It Requires Trust in Something Unfamiliar

Asking teams to change plans based on a model's output requires trust that doesn't arrive automatically.

Trust is built incrementally:

- Early wins that are visible and attributable
- Transparency about how the model works and its limitations
- A clear process for handling cases where the system is too sensitive or alerts aren't relevant
- Leadership that visibly endorses the new approach

When the system is too sensitive or in cases not relevant, the process for reviewing and learning from that case is itself a trust-building exercise.

2.3 It Disrupts Established Workflows and Incentives

PdM introduces real-time condition data suggesting different priorities into processes that have been stable for years. If a maintenance manager is measured on schedule adherence, they have little incentive to deviate based on a predictive alert.

Incentive alignment is an organizational challenge, not a technical one.

2.4 People Are Not Always Where You Expect Them to Be

In one deployment, Siemens' team had been trying to engage a key decision-maker for months. When they finally met him on site, he was coming off the production line in a full fire-retardant suit and heavy-duty gloves. He was never going to log into Senseye and review cases over coffee.

The realization: not everyone needs to use the platform directly. What was needed was a named individual to review cases and bring insights into existing daily stand-ups where the wider team was already present.

The lesson: Before deploying, examine how information actually flows through the organization. Design the information pathway accordingly, rather than assuming that everyone will interact with the platform in the same way.

The same applies to data collection. In many environments, the most valuable condition data comes from sensors fitted directly to machines in harsh locations, generating insights automatically, without requiring anyone to interact with them.

3. **The critical gap:** "what do we do with this information?"

This is the single biggest hurdle organizations face, and the one most often underestimated.

Senseye can raise a case predicting potential degradation weeks or months before failure. The technology works. But in organizations coming from a run-to-failure mindset, the answer to "what next?" is often nothing. Not because they don't care, but because they lack the infrastructure, workflows, and expertise to act.

3.1 The Investigation Gap

When Senseye raises a case, many teams struggle to translate a pattern on a screen into an action on the shop floor. If an operator said, 'that machine sounds wrong,' the same team would instinctively know how to investigate. But when that same anomaly is charted on a graph, it creates a dissonance. The signal is there, but the familiar context isn't.

This is not a technology gap. It is a capability gap.

Organizations need to ask:

- Do we have people who know how to investigate predictive alerts?
- Is there a named individual accountable for deciding what happens when a case suggests early-stage degradation, or does it fall between roles?
- Do we have diagnostic tools and expertise to validate what the model is telling us?
- If the prediction horizon is six months, do we have a process for scheduling that intervention?

If the answer to any of these is no, it's not a blocker; it's a planning input. Managed services or hypercare can bridge the gap while the organization builds the capability to own it.

This is where specialized diagnostic tools (such as those designed for drivetrain components), change the equation. They narrow the question from 'something might be wrong' to 'here is

what is likely developing, and here is the evidence.' That specificity is often the difference between a team that acts on an alert and one that ignores it.

3.2 The Three Barriers for PdM Beginners

For organizations starting from scratch, three barriers consistently emerge:

1. **Not knowing what to do with the information, or what to measure.** A case is raised. And then what? Without defined workflows, escalation paths, and decision authority, the insight dies on screen. Without workflows and decision authority, the insight dies on screen. And if success is defined only as 'downtime avoided,' teams miss the wider value including labour efficiency, spares optimization, reduced planned maintenance, none of which show up in a three-month PoC.
2. **Not knowing how to investigate and validate alerts.** The system says a bearing is degrading. The team doesn't have the expertise or equipment to confirm it. So, they wait and the value window closes. Pairing broad-scale predictive monitoring with asset-specific diagnostic tools can reduce this interpretation burden, but the organization still needs to define who acts and how
3. **Not trusting Senseye because they can't do the first two.** Trust is built through action. If a team cannot act on or validate alerts, confidence never develops. The alerts become noise.

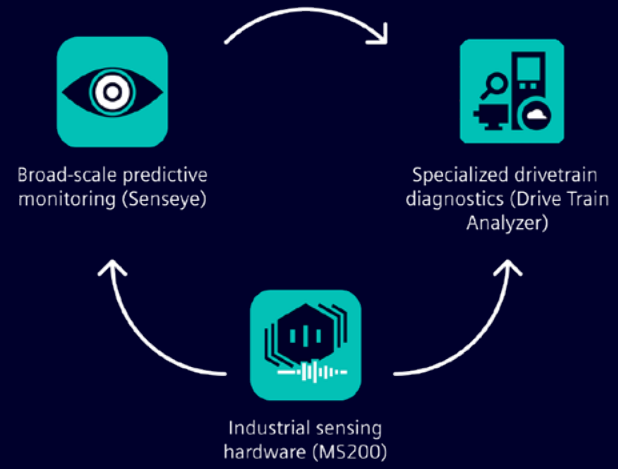
These barriers are interconnected and self-reinforcing. Addressing them requires building capability alongside the technology—not after it.

3.3 Siemens Enables; The Organization Transforms

This is a critical distinction: Connecting data to Senseye is not the same as doing Predictive Maintenance. PdM is an entire maintenance strategy, including toolsets, user roles, processes, and workflows, of which Senseye is one part. Expecting the platform alone to deliver the change is like expecting a fitness app alone to deliver a lifestyle transformation.

Siemens provides onboarding, training, and ongoing support. But the processes, the investigation capability, the decision authority, those are the organization's to build.

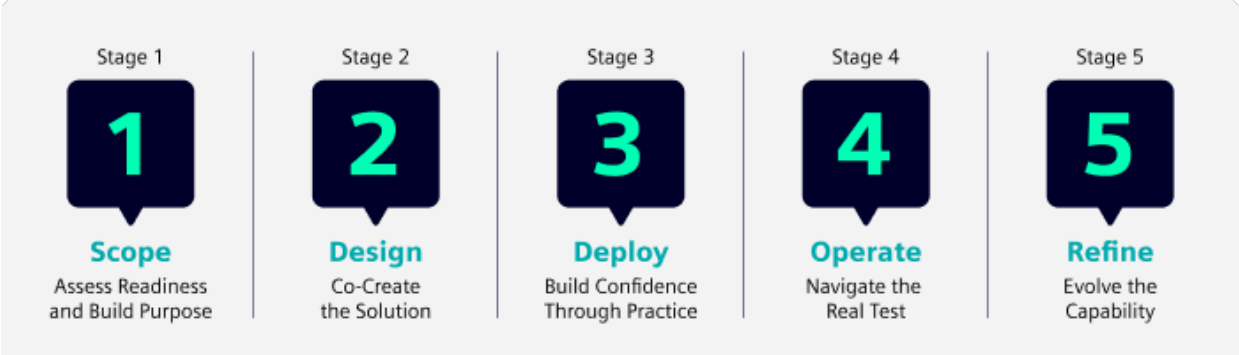
How the pieces fit together: Siemens' PdM portfolio spans three complementary capabilities:



Each addresses a different layer of the challenge this paper describes, and none replaces the need for the organizational capability around it.

4. **Building PdM capability:** a practical framework

Rather than a rigid methodology, this framework reflects the practical stages organizations move through. Change is not a parallel workstream; it is designed into each stage.



STAGE 1:

SCOPE — Assess Readiness and Build Purpose

Key assessment questions:

- What is the main requirement for PdM in your facility?
- What does your current maintenance strategy look like?
- Is budget allocated for PdM implementation?
- What machine information do you need that you currently lack?
- Do you have reliability engineering capability to investigate predictive alerts?

Build Purpose Before Features

Every successful deployment begins with structured conversations about why the organization is changing:

- What is unplanned downtime costing us?
- What happens to our customers when that line goes down?
- What are the safety risks of unplanned failures vs. scheduled interventions?
- How overstretched is the maintenance team and where is their time going?
- How much planned maintenance could be reduced or eliminated?

The shared narrative is critical. When the maintenance team, plant manager, and headquarters all understand the same drivers, that alignment is the single most powerful enabler of adoption.

Include the Right People Early

The single biggest predictor of success is grassroots support from maintenance professionals. Go further: find your biggest sceptics and draw them in, so they own the project rather than being owned by it.

Critical principle: unless you have groundswell support at the maintenance level, success is unlikely. That support must be established before the project kicks off.

Set Realistic Expectations

Be transparent about:

- **Timeline:** Initial deployment (6–12 months), site deployment (12 months), multi-site (18+ months)
- **Learning curve:** Early teething issues in data quality and ML accuracy are normal
- **Effort required:** This is transformation, not just tool installation
- **Role impact:** What PdM will and won't change about their day-to-day
- **KPIs:** Set targets that reflect the scale and timeframe of the deployment. Monitoring five machines for four months won't catch ten downtime events if those machines only experience one a year.

Outcome: Organizational buy-in, executive sponsorship, identified champions, a shared narrative, and a realistic assessment of capability to act on predictive insights.

STAGE 2:
DESIGN — Co-Create the Solution

Steps Involved:

- **Asset selection:** Prioritize assets with most significant production impact
- **Failure mode and data selection:** Determine main failure modes and data needed, recognizing that different asset types may benefit from different analytical approaches
- **PdM and operating context:** Define how PdM integrates into workflows
- **Data architecture:** Define IT/OT architecture, data flows, integration points, security

The data architecture decision also includes how condition data is captured in the first place. For many organizations, particularly those retrofitting PdM onto existing production lines, this means selecting sensing hardware that can be deployed without plant downtime, without access to existing networks, and without specialist installation.

Bring Users into Solution Design

The biggest mistake? IT or corporate teams dictating to maintenance professionals what they should do with PdM. Instead:

- **Validate against current practices:** Review existing schedules, work orders, tribal knowledge
- **Co-create workflows:** Design how alerts trigger action plans and feedback loops
- **Map the information pathway:** Identify who needs insights and how they currently receive them

Design the Response Before the Technology Goes Live

This is where the "what do we do with this information" gap must be addressed:

- Define how alerts will be acted upon
- Identify who has authority to change maintenance plans
- Establish investigation protocols: who goes to the machine, what do they look for?
- Design the escalation path for uncertain alerts
- Plan spares and scheduling strategy for long-horizon predictions

If the organization lacks reliability engineering capability, this is the stage to acknowledge and plan for it.

Define Roles and Ownership

- **Platform owner** (a named individual to review cases regularly)
- **Case reviewers** (daily alert triage)
- **Investigation leads** (validate alerts on the machine)
- **Maintenance planners** (translate insights to work orders)
- **Steering committee** (oversight and escalations)

Plan Training and Enablement

User Group	Training Focus
Maintainers	System navigation, alert interpretation, feedback mechanisms
Managers	Dashboard interpretation, ROI tracking, team coaching
IT/OT	Architecture, integrations, security, troubleshooting
Champions	Advanced features, change advocacy, peer support
Reliability / Investigation	Alert validation techniques, diagnostic protocols, root cause analysis

Outcome: Clear implementation plan, defined workflows, asset priorities, roles, investigation protocols, and training roadmap, all co-created with end users.

STAGE 3:

DEPLOY — Build Confidence Through Practice

Steps Involved:

- Support sensor installation and IoT connectivity
- Implement data pre-processing
- Configure the platform with operating context, asset hierarchy, and thresholds
- Integrate with CMMS data, OEM information; train end-users

Where new sensing is required, prioritize hardware that minimizes the deployment burden: wireless, ruggedized, minimal configuration. The faster condition data starts flowing, the faster teams build confidence through real case reviews.

Training That Reflects Reality

Training must be designed around how the organization actually works, not around an idealized schedule. Principles:

- Use real asset data. This dramatically improves retention and confidence
- Make training role-appropriate
- Focus on integration into decision-making, not just platform navigation
- Provide ongoing support: office hours, refresher sessions, access to Senseye's delivery team

Establish Daily Rituals

From day one, institute daily case review meetings:

- **Duration:** 15–20 minutes
- **Attendees:** Maintenance supervisor, PdM champion, key technicians, investigation lead
- **Agenda:** Review new alerts, discuss actions, flag issues

These are not just technical check-ins; they are behavioural reinforcement sessions that build the habit of consulting the system and acting on its outputs.

Address Human Concerns Directly

The fear of role replacement is real and legitimate. PdM makes experienced engineers more valuable, not less. It captures their knowledge and makes it scalable.

This reframing requires leadership to model new behaviours and create visible examples of engineers whose careers have been enhanced by PdM.

Manage Early Teething Issues

Expect data connectivity problems, false positives, and user confusion. Leadership should:

- Acknowledge issues transparently
- Fix data issues quickly
- Celebrate every prevented failure
- Maintain momentum through early frustrations

Outcome: System live, users trained, daily rituals established and early wins documented.

STAGE 4:
OPERATE — Navigate the Real Test

This is where the rubber meets the road. The organization faces the question it should have been preparing for since Stage 1: now what?

Close the Action Gap

Organizations that prepared well in Design will have:

- Investigation protocols being followed
- A named platform owner bringing insights into daily stand-ups
- Reliability engineering capability being exercised
- Escalation paths working in practice

- A feedback loop between investigation and findings

Organizations that did not prepare will find alerts accumulating without action, teams reverting to calendar-based schedules, and trust eroding, not because the technology failed, but because the organization wasn't ready.

Implement Structured Reviews

Daily reviews continue with increased sophistication: pattern analysis, intervention strategies, documented outcomes.

Periodic reviews (weekly/monthly): new failure modes, solution performance, best practices, ROI progress.

Steering committee (monthly/quarterly): executive updates, resource allocation, scaling strategy.

Build Feedback Loops

Feedback improves the model's accuracy and gives users ownership over the system's behaviour. When an engineer's feedback visibly improves a prediction, the relationship becomes collaborative rather than adversarial.

Outcome: PdM embedded in daily workflows, investigation capability maturing, measurable downtime reduction evident.

STAGE 5:
REFINE — Evolve the Capability

Treat PdM as a Capability, Not a Project

The most advanced Senseye customers treat PdM as a capability that continuously evolves, not a project with a completion date.

Early wins (Months 1–6): Downtime reduction, first prevented failures, initial ROI validation.

Medium-term gains (Months 6–18): Improved efficiency, better spares management, and growing reliability capability.

Long-term transformation (18+ months): Extended maintenance intervals, truly predictive culture, PdM insights influencing procurement, operations, and capital planning.

Learn to Celebrate Boring Success

When PdM works well, the headline is: nothing happened. A case was raised, somebody investigated; something was fixed quietly. That is where the real value lies, and organizations must learn to capture and communicate these quiet wins.

Enable Peer Learning and Plan for Scaling

Hearing from a colleague at another site who has navigated the same challenges is more persuasive than any vendor presentation. Senseye facilitates this through customer-to-customer sharing sessions.

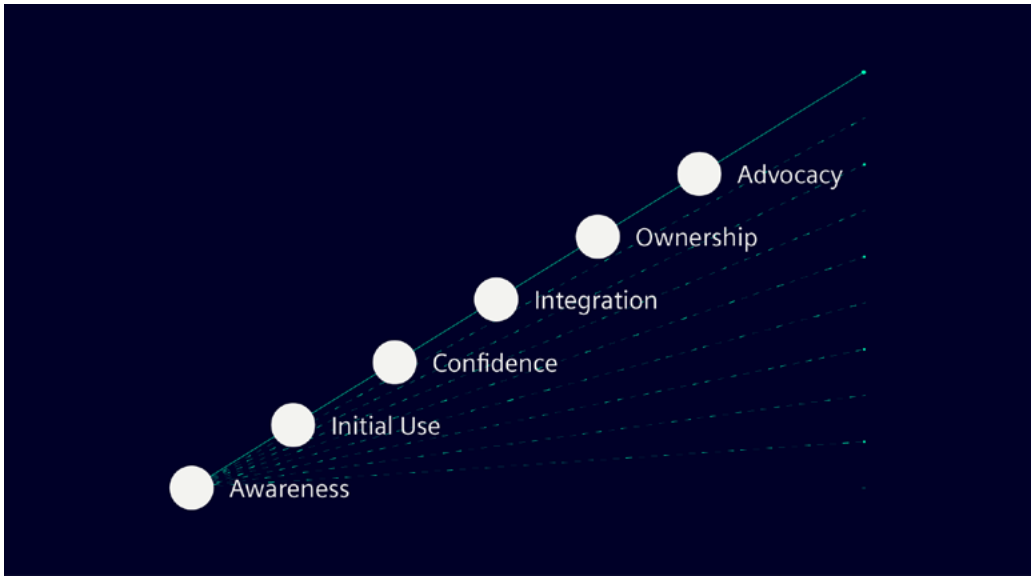
Scaling dimensions:

- **Asset expansion:** More machines at existing sites
- **Site expansion:** Additional facilities
- **Capability expansion:** Deepen analytics into asset-specific diagnostics for critical equipment, add sensing to previously unmonitored assets, or integrate PdM with energy and lifecycle planning. The toolset should grow with organizational maturity, not be deployed all at once
- **Organizational expansion:** Different business units or geographies

Outcome: Sustained ROI, clear scaling roadmap and an embedded continuous improvement culture.

5. **The maturity journey:** from awareness to ownership

Organizations move through six recognisable stages. Understanding them is essential because the interventions required at each are different.



Stage 1: Awareness

"We understand what PdM is and why it matters to us."

- Risk: PdM framed as a technology project rather than business transformation.

Stage 2: Initial Use

"We are using the system and responding to its outputs."

- Risk: Early perceived false positives erode trust. The "what do we do with this" gap becomes apparent.

Stage 3: Confidence

"We trust the system enough to change our plans based on its recommendations."
This is a critical inflection point.

- Risk: Confidence is fragile. A high-profile model error can set adoption back significantly.

Stage 4: Integration

"PdM is part of how we plan and operate."

- Risk: Integration becomes compliance rather than engagement.

Stage 5: Ownership

"We are proactively using PdM insights to drive better outcomes."

- Risk: Without continued investment, capability plateaus and decays.

Stage 6: Advocacy

"We want to roll this out elsewhere and we know how."

- Risk: Without a structured scaling framework, enthusiasm outpaces the organization's capacity to replicate what worked.

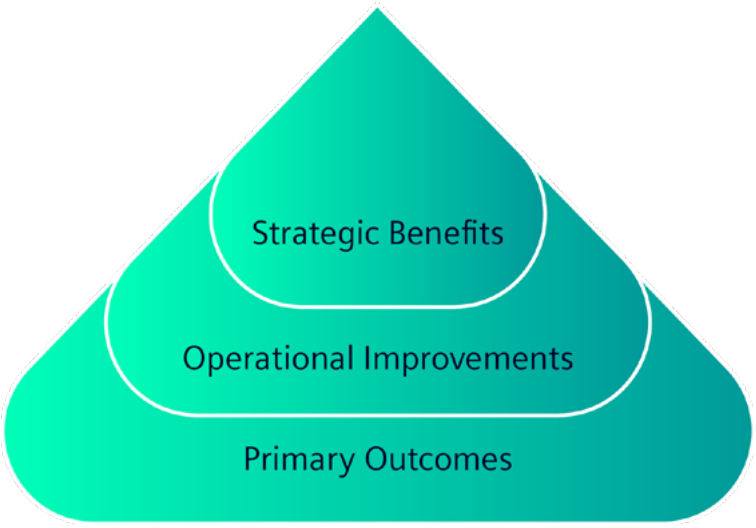
6. **Measuring success:** beyond traditional KPIs

Key Performance Indicators

Tier 1: Primary Outcomes
- Unplanned downtime reduction (target: 50%+)
- ROI achievement (payback typically 6–18 months)
- Maintenance cost reduction

Tier 2: Operational Improvements
- Maintenance accuracy (target: 85%+ improvement)
- Productivity gains (target: 55%+ increase)
- MTBF increase / MTTR decrease

Tier 3: Strategic Benefits
- Spares inventory reduction
- Maintenance lead time extension
- Safety incident reduction



Engagement Metrics

System Engagement: Alert interaction rates, feedback submission rates, feature adoption, case review attendance.

Organizational Health: Training completion, champion network growth, cross-functional collaboration, investigation capability development.

Resource Efficiency: Specialist-to-asset ratios (e.g., 1:50 → 1:1000), reactive vs. proactive time split, planner productivity.

Real-world example: One organization improved their specialist-to-asset ratio from 1:50 to 1:1000—a 20x efficiency gain.

7. Recommendations for organisations embarking on PdM

Based on Siemens' delivery experience:

1. **Don't test technology. Test your ability to change.** Design your pilot to test whether your organization can change how maintenance decisions are made, not whether the software works.
2. **Build the "what do we do about it" capability before you go live.** Define investigation protocols, escalation paths, and decision authority before the first alert is generated.
3. **Invest in the "why" before the "what."** Build a shared narrative connecting PdM to real operational pressures. Ensure the maintenance team, plant manager, and HQ all understand the same drivers.
4. **Include the people most affected from the very beginning.** Find your sceptics and draw them in so they own the project.
5. **Design the information pathway, not just the platform.** Not everyone needs to log in. Design how insights reach decision-makers through existing channels.
6. **Measure adoption, not just outcomes.** Alert response rates, investigation completion, and feedback volume are more actionable than outcome metrics in early stages.
7. **Celebrate the boring wins.** When PdM works, nothing happens. Learn to capture and communicate the failures quietly prevented.
8. **Treat PdM as a capability, not a project.** Build structures—customer success, ROI governance, continuous learning—that sustain and evolve the capability over time.

8. **Conclusion**

Predictive Maintenance is not a technology problem. The tools are mature, the data is available, and the analytics are sophisticated.

The organizations extracting the most value are doing so because they have changed more deliberately, more deeply, and more sustainably.

Siemens' role is to act as a catalyst, deploying a tool, and enabling organizations to integrate it into their workflows. But a catalyst does not do the work. It enables the work.

The engine of PdM transformation is always the organization itself: the maintenance engineer who trusts a prediction enough to change a plan, the reliability engineer who investigates and validates, the planner who incorporates a degradation trend, the manager who creates space for a new way of working, and the leader who holds the organization accountable.

Senseye can detect what is happening with your machines. But only your organization can decide what to do about it—and build the capability to act.

Technology creates possibilities. People create outcomes.

ABOUT SENSEYE PREDICTIVE MAINTENANCE

Senseye Predictive Maintenance is part of Siemens' integrated condition monitoring and predictive maintenance portfolio, combining AI-powered analytics at scale, specialised diagnostics for critical asset types, and purpose-built industrial sensing hardware.

By helping users identify where to focus maintenance resources, Senseye delivers:

- Up to 50% reduction in downtime
- Up to 55% increased productivity
- Up to 85% increase in maintenance accuracy

Existing customers include global multinational organizations in manufacturing, heavy industry (paper and metals), automotive, CPG (Consumer Packaged Goods), life sciences and many more industries.

For more information:

senseye-predictive-maintenance.digital@siemens.com

siemens.com/senseye-predictive-maintenance

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P.O. Box 31 80

91050 Erlangen, Germany

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