# SMARTSIGNAL

Start every day with predictive analytics and zero surprises.

**GE VERNOVA**

# SMARTSIGNAL

A predictive analytics solution that empowers your reliability and maintenance engineers to detect and prevent equipment failures and maintenance needs – before they happen. With an expanding library of Digital Twin blueprints, including renewable assets, integrated with AI and ML analysis and proactive recommendations, SmartSignal helps decrease maintenance costs and increase efficiency and reliability across Operations and Maintenance (O&M).

**Predictive analytics**
Provide early detection of pending issues for hundreds of common industrial assets

**Diagnostic analytics and rules**
Indicate probable cause and suggest maintenance alternatives

**Time-to-action forecasting**
Estimates when an alarm limit will be reached, allowing optimal maintenance prioritization and scheduling

**Analysis, case management & more**
Provide a complete toolset for predictive maintenance
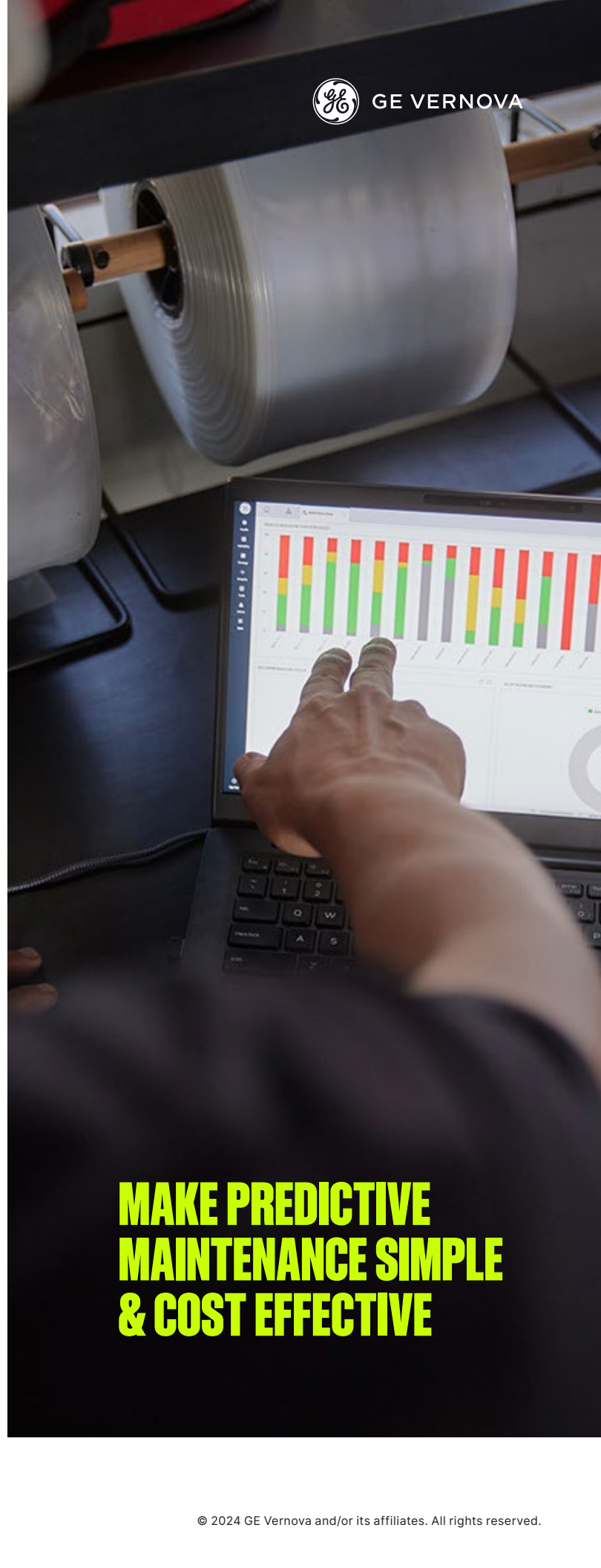
**Sensor health & coverage**
Monitors sensor status and current failure mode diagnostic coverage per asset to ensure continuous optimal results

**Rapid time to value**
Out-of-the-box Digital Twin blueprints are rapidly trained and deployed per asset

**Deployment & services options**
Available as on-prem software, cloud subscription, turnkey service, and an integrated component of GE Vernova APM software

# MAKE PREDICTIVE MAINTENANCE SIMPLE & COST EFFECTIVE

# POWER YOUR PREDICTIVE MAINTENANCE JOURNEY

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## Rely on our rapid and accurate Digital Twin blueprints

SmartSignal makes unique recommendations for every piece of equipment based on its own historical data and our Digital Twin analytics. SmartSignal is built on over 340 Digital Twins that cover rotating, fixed, electrical and mobile assets from across original manufacturers. We are continuously building new Blueprints with customers to support the energy transition with renewable assets covering wind and solar asset types. These blueprints are trained to create rapid and accurate predictive, diagnostic, and time-to-action models for each monitored asset.
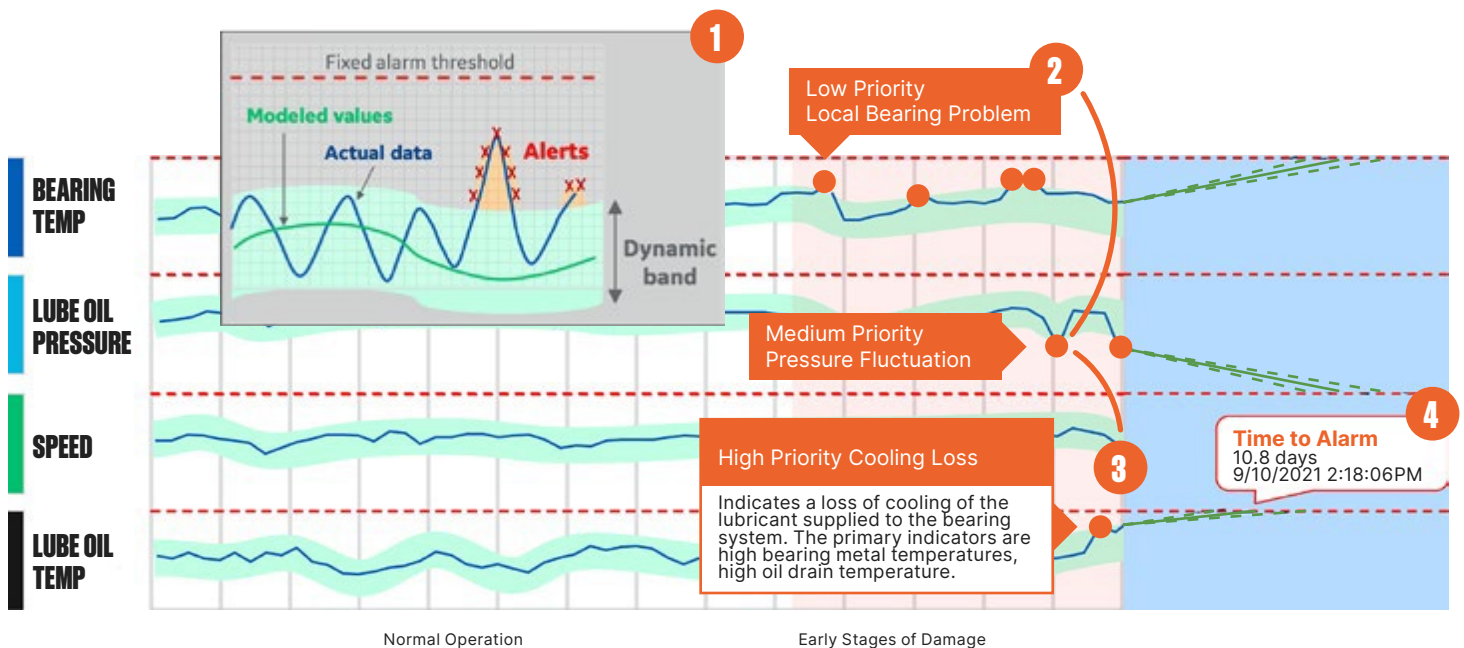
### Anomaly Detection

Anomaly detection models compare sensor readings to a particular machine's normal, predicted values for all relevant parameters, such as load, temperatures, pressures, vibration readings, and ambient conditions. SmartSignal detects and identifies events and abnormal behavior by the differences between real-time actual data and predicted, normal behavior—not by thresholds on actual values.

### Diagnostic Analysis

Anomaly notifications are compared with precursor signatures based upon pattern and persistence, using data from over 19,500 rotating, fixed, mobile and electrical assets. Notifications provide prioritized diagnostics with a localized, apparent cause for each developing problem and advisories, supported by charts of pattern differences, so users can track and diagnose the developing failures.

### Time-To-Action Forecasting

Using multiple analytics and desired time windows, engineers can forecast when the equipment will reach an alarm limit and require immediate remediation. With this intelligence, teams can prioritize and schedule corrective actions to avoid downtime at minimal cost. Time-to-action analysis can be applied independently any time to forecast future maintenance needs.



**1** Predictive analytics provide early warnings by comparing actual data to expected values within a dynamic band

**2** Detected anomalies generate prioritized alerts and diagnostic information

**3** Diagnostic analysis across readings indicates a correlation to bearing lube issue as possible cause

**4** Time-to-action forecasting provides timeframe requirements for remediation

# 350+ BLUEPRINTS AND GROWING

## Deployment options & APM integration

SmartSignal is available as an independent on-prem software product or a cloud-based subscription service. It is also available as an integrated pillar of GE Vernova's APM, combining powerful analytics within a comprehensive asset and O&M management solution. SmartSignal data and results can be a core component of APM health dashboards and reports, reliability management activities, strategic planning and other functions. Most reliability programs have major gaps, but GE Vernova's APM customers experience reliability up to 99.5%.
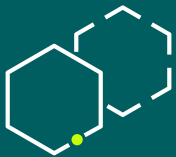
## Managed services for simplicity & success

GE Industrial Managed Services (IMS) offers a range of expert services to guide and facilitate your SmartSignal success. GE monitoring centers worldwide can provide 24×7 asset monitoring, issue triage and notification, remediation guidance, analytics management, and strategy consulting. IMS services are available with software purchase/subscription or as a turnkey outsourced offering – eliminating the need to own or manage software all together. GE IMS monitors thousands of assets around the globe and has saved our customers over $1.6 Billion USD over its history.

## Sensor health & failure mode coverage

To help ensure accurate detections, SmartSignal monitors incoming data to detect possible sensor malfunction. Per sensor configurable criteria track reading ranges and indicate any significant anomalies. Asset failure mode reports help assess risk by providing an accurate view of known failure modes coverage based on configured sensors for each individual asset.

## Specialized Digital Twin blueprints

Additional Digital Twin analytics packages are available for specialized systems or use cases:

**Cycle Watch for Combustion Turbines:** Monitors extensive startup performance parameters to identify emerging issues.

**Extended Vibration Monitoring:** Expands standard vibration monitoring to detect and diagnose journal bearing problems.

## Visualization, analysis & action

SmartSignal's rich visualization, analysis and case management tools coupled with analytics intelligence is your single source of truth for predictive maintenance and asset reliability management. Reliability and maintenance engineers can work together to investigate alerts, perform root cause analysis, determine immediate and long-term maintenance strategies, and track ultimate success.

## Accelerating the Energy Transition

SmartSignal is a key component of a predictive maintenance program that helps asset-intensive industries including power generation, renewables, oil & gas, manufacturing and mining increase efficiency which can reduce emissions as a byproduct. GE Vernova's APM software solutions including SmartSignal can accelerate the journey to decarbonization.

# WITH SMARTSIGNAL, START YOUR DAY WITH NO SURPRISES.

Understand what your asset performance analytics are telling you – and take the right actions before failures happen.

**Get started** ▶