

# Plant-wide condition monitoring

Comprehensive monitoring of asset condition requires flexible connectivity, analytics, and visualization capabilities to enable world-class reliability strategies. Bently Nevada's data-driven solutions enable smarter decisions to avoid downtime while improving safety and asset life.



## Unexpected downtime has major cost consequences

The examples to the right highlight the cost of downtime for single-stream process operators, and the importance of condition monitoring across the full spectrum of asset criticality.

	Lost productivity (USD)
A large power plant off the grid for one week	\$13.9 million
A single-stream mineral process offline for one second	\$3,200
Restarting a cement kiln	\$75,000
Boiler restart at a 650 MW power plant	\$300,000
Cargo ship docked longer than scheduled, cost per hour	\$40,000
Overhead ladle crane in a steel plant, non-functional cost per hour	\$235,000



## 20%

lower internal operating expenses targeted by companies while increasing pressure on performance



## 50%

of workforce to retire in the next 5-10 years—knowledge and experience is not being transferred



## 3-5%

of lost production is due to unplanned events, costing 2-5x more than planned events



## THE BENEFITS OF CONDITION MONITORING



### Identify machine challenges

### Recognize root-cause failure mechanisms

- In progress
- At the earliest possible opportunity

### Identify damage

- As soon as it happens
- Well before functional failure



### Enhance planning

### Provide data to help answer

- What's wrong?
- Can I continue to run?
- What do we need to do about it and when?

## CONNECT, ANALYZE AND VISUALIZE



**System 1** is a comprehensive condition monitoring solution for assets across the entire spectrum of criticality. It enables condition monitoring from machine protection hardware, scanning systems, wireless and portable data collectors—and brings the data together into a single analysis platform while providing clarity and context through its powerful diagnostic HMI views.

It collects and analyzes plant-wide CM data, empowering operators to:

- Make more informed, proactive decisions on individual machine maintenance
- View a holistic health report of interconnected factory equipment
- Reduce downtime and improve overall plant ROI

## TOTAL ASSET COVERAGE IN ONE VIEW



**Your fleet:** well understood but data is in silos/fragmented



**Your knowledge:** built slowly and hard to transfer



**Your insights:** slow to deploy and hard to scale



**Your priorities:** Difficult to plan and execute without data

Data visibility with context and clarity is a game changer. System 1 simplifies data by bringing together multiple collection methods and systems, including:

- Online systems that collect data continuously
- Scanning systems, including wireless, that take data periodically
- Portable data collection for large numbers of less critical machines

## ONLINE, WIRELESS AND PORTABLE SOLUTIONS



### PORTABLE SOLUTIONS

- Human element—see, touch, smell
- Periodic measurements
- Economical for a large number of assets

### WIRELESS CM

- Simple to deploy
- Fast to expand
- Cost effective

### WIRED CM

- Highest point counts and sensors
- Fastest sampling rates
- Protection capable

Wireless capabilities are transforming plant-wide monitoring solutions.

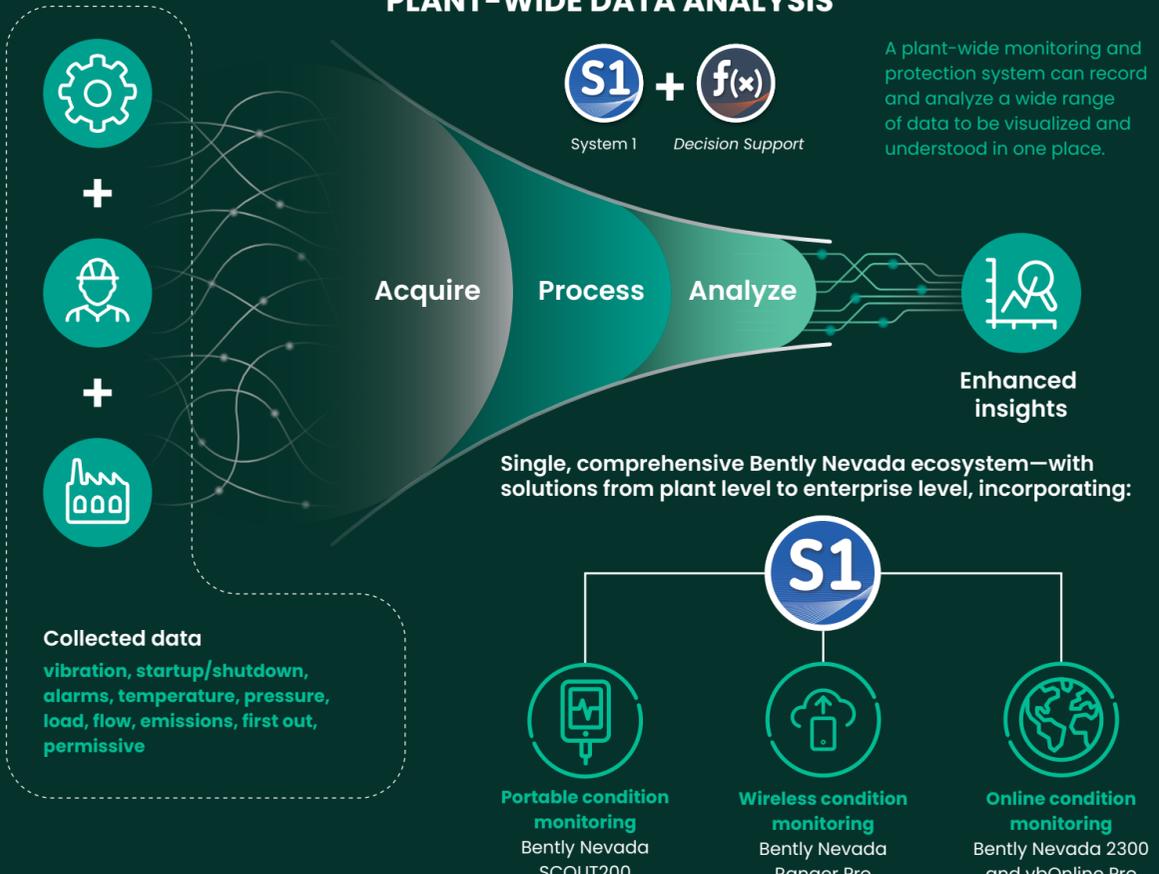
Sensors can be added to any asset to communicate over a wireless network back to the software program.

We use wHART protocol to keep assets online and monitored around the clock.

Wireless for: online, semi-continuous data, low-to-medium-risk assets, and flexible deployment

Portable for: handheld analyzers and collectors for periodic and route-based monitoring

## PLANT-WIDE DATA ANALYSIS



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