Supercharging asset longevity

Predictive maintenance with IoT sensors and AI integration

Deloitte.

A current challenge

With over 400,000 domestically owned federal facilities averaging 47 years old [1], the **estimated deferred maintenance and repair (DM&R) exceeds $1T** and **compounds at 7% annually [2]**. Businesses also face **capacity loss** and **increased operational costs** due to challenges such as a tough US labor market, shrinking maintenance windows, and siloed data sources.

What is Predictive Maintenance (PdM)?

PdM **monitors and diagnoses systems and equipment**, **predicting failures before they occur** and providing asset owners with **transparency into their assets' current state**.

Expected Benefits & Impacts of PdM

Predictive Maintenance Benefits [3]

- **10 times** return on investment
- **20-25%** increase in production
- **30-40%** overall savings opportunities
- **35-45%** reduction in downtime
- **70-75%** elimination of breakdowns
- **25-30%** reduction in maintenance costs

Potential long-term impacts of PdM

Risk Management Enhancement:
- Generates risk scores based on failure likelihood
- Assists resource prioritization
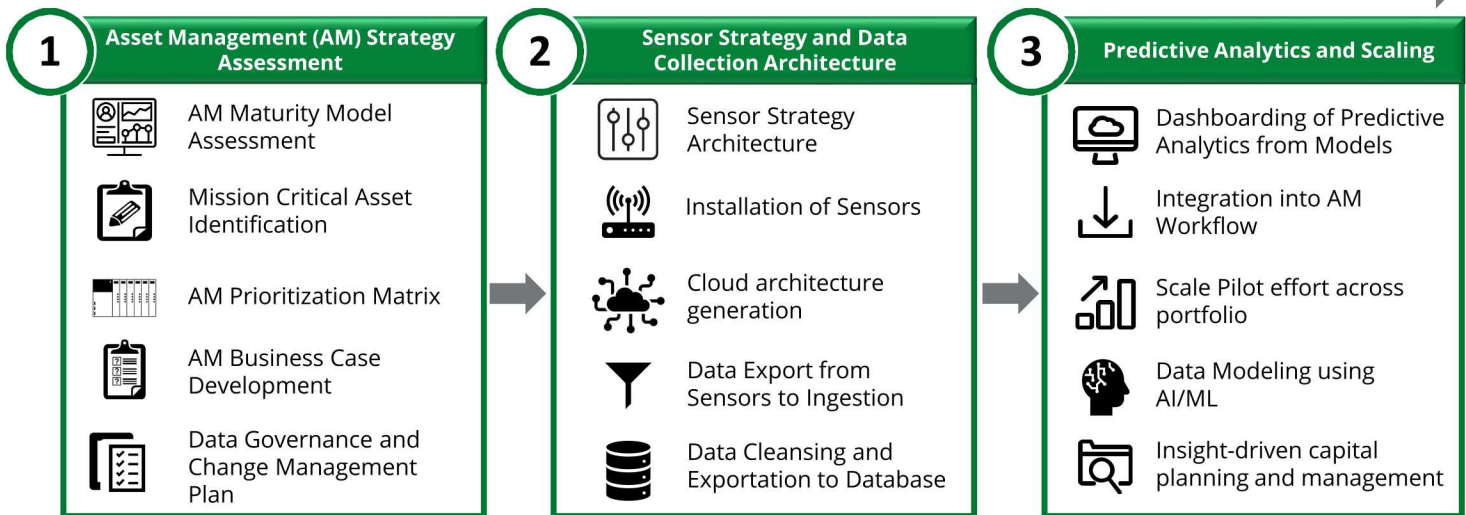
Budget and Funding Optimization:
- Reduces unexpected costs
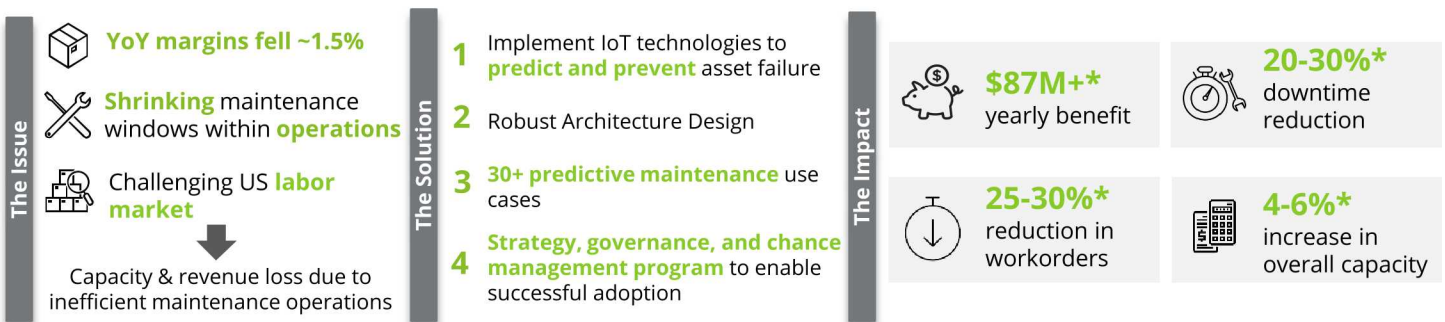- Drives savings through optimized resource allocation

In-depth Asset Understanding:
- Offers continuous monitoring and analysis
- Informs effective long-term asset management

Predictive Maintenance Execution Cycle

1 Asset Management (AM) Strategy Assessment

- AM Maturity Model Assessment
- Mission Critical Asset Identification
- AM Prioritization Matrix
- AM Business Case Development
- Data Governance and Change Management Plan

2 Sensor Strategy and Data Collection Architecture

- Sensor Strategy Architecture
- Installation of Sensors
- Cloud architecture generation
- Data Export from Sensors to Ingestion
- Data Cleansing and Exportation to Database

3 Predictive Analytics and Scaling

- Dashboarding of Predictive Analytics from Models
- Integration into AM Workflow
- Scale Pilot effort across portfolio
- Data Modeling using AI/ML
- Insight-driven capital planning and management

Our Experience | Conveyance Equipment PdM Case Study

The Issue

- **YoY margins fell ~1.5%**
- **Shrinking** maintenance windows within **operations**
- Challenging US **labor market**

Capacity & revenue loss due to inefficient maintenance operations

The Solution

1 Implement IoT technologies to **predict and prevent** asset failure

2 Robust Architecture Design

3 **30+ predictive maintenance** use cases

4 **Strategy, governance, and chance management program** to enable successful adoption

The Impact

- **$87M+*** yearly benefit
- **20-30%*** downtime reduction
- **25-30%*** reduction in workorders
- **4-6%*** increase in overall capacity

Contact us

Interested in learning more? Deloitte's Infrastructure & Financial Advisory team is ready to help today!

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1. Issuance of an Addendum to the National Strategy for the Efficient Use of Real Property
2. "Why Aren't the Wrenches Turning on Preventative Maintenance?", Gridium
3. P. N. N. L. f. t. F. E. M. Program, "Operations & Maintenance Best Practices - A Guide to Achieving Operational Efficiency," U.S. Department of Energy, 2010.
4. *Estimated Figures