



# Using historical data for asset management decision making

Craig Knox, ISE Solution Engineering

October 10, 2017



# How is asset management different from work management?

## Process based work management – build and expand

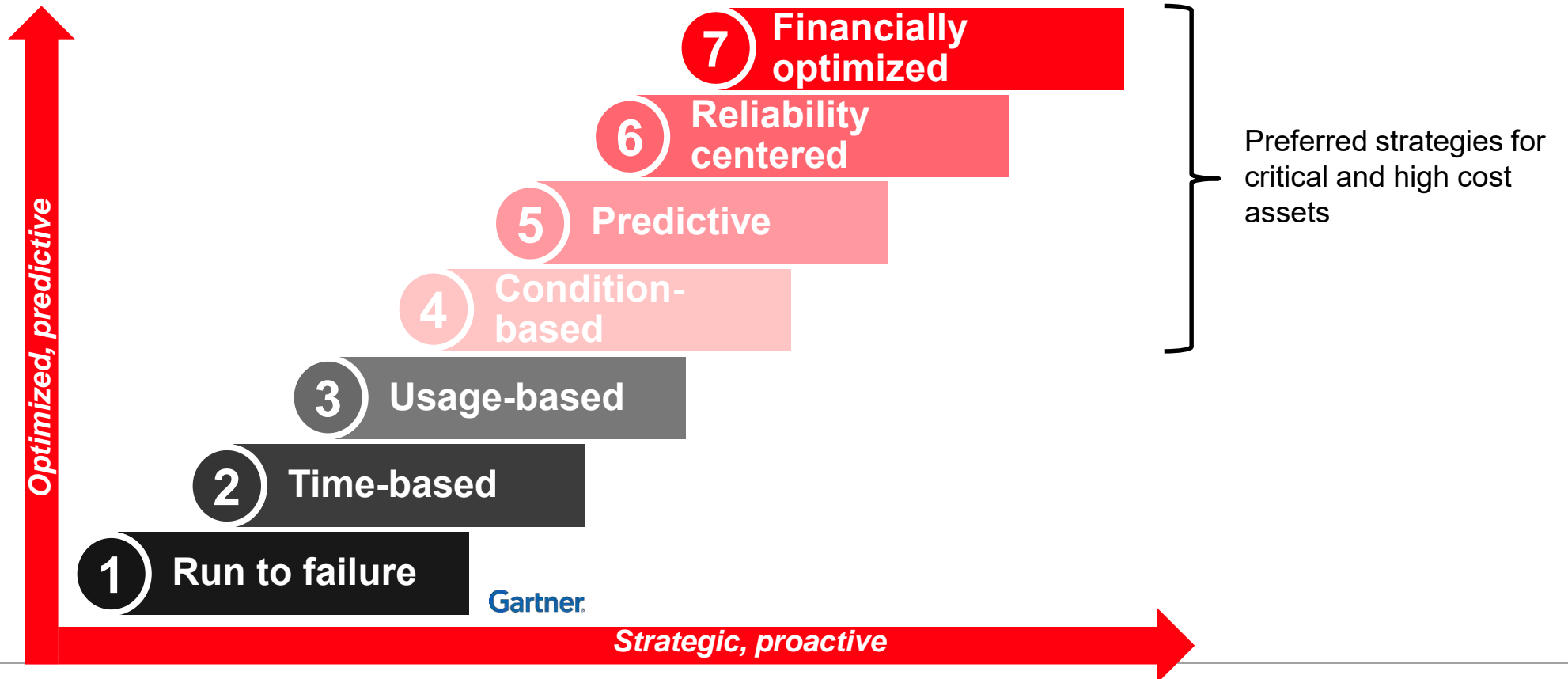
- Initiate work from multiple sources –
  - Customer information system or engineering design systems
  - Geographical information systems
- Sequential tasks required and optional tasks
- May include remote locations, crews and dispatching
- Workflows that include estimates for designs, approvals, permits, scheduling
- Work request and work orders for cost of labor and materials

## Asset management – maintain, replace and repair

- Maintenance and inspections
- Spare parts management
- Asset conditions
- Scheduled maintenance, checklist and safety procedures
- May include project teams for overhaul



# Asset maintenance strategies – what data do you need?



# Asset management based on ISO 55000/PAS 55

Best practices and questions to address

## PAS 55/ISO 55000

Holistic approach to asset management reinforces the following best practices:

- Alignment with the Business Plan
- Risk Evaluation and Mitigation
- Lifecycle Cost Management

- What are my assets? Where are they?
- What is the condition of my assets?
- What is the risk associated with the failure of my assets?
- Is the risk manageable?
- If not, what corrective action needs to be taken in:
  - The Short Term
  - The Long Term
- Of the above actions, which actions yield the best return?
- How to optimize actions/decisions with a “fleet” perspective noting budget, performance and other constraints?
- Is the process repeatable, auditable and justifiable?

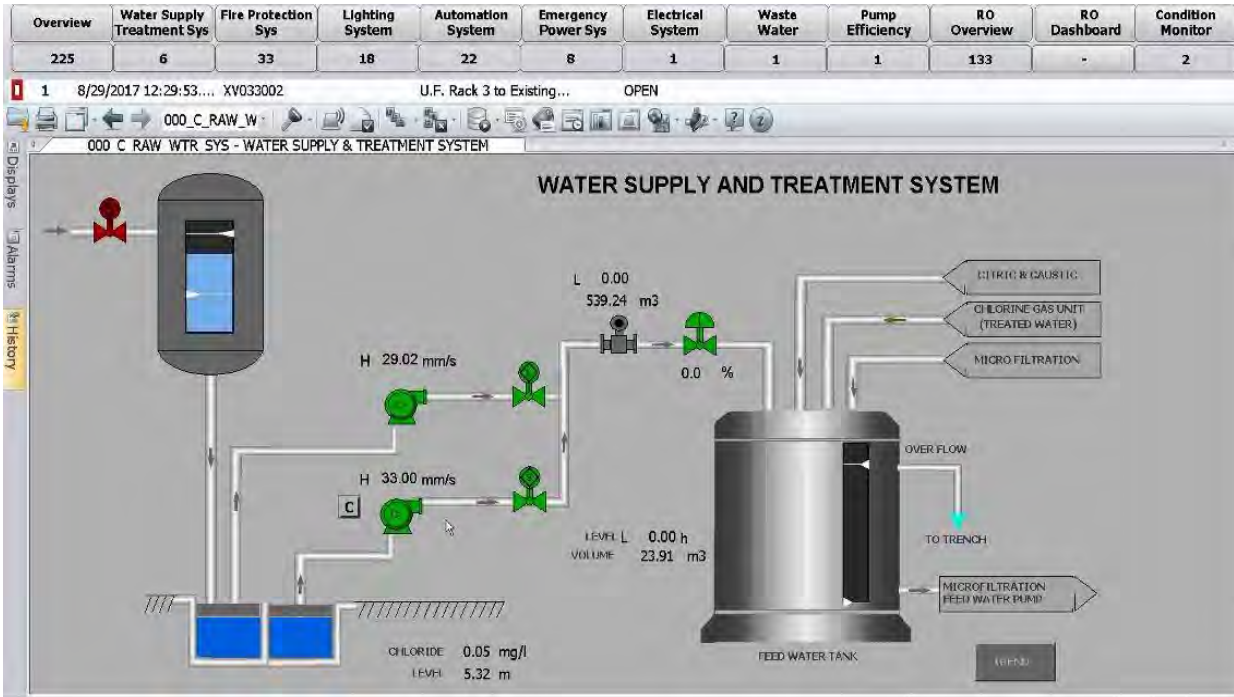
# — Operational reporting to prescriptive analytics

Operational Reporting	Dashboards	Business intelligence	Predictive analytics	Prescriptive analytics
<p data-bbox="359 568 647 696"><b>Reports to help manage the business</b></p> <ul data-bbox="359 711 647 882" style="list-style-type: none"><li>• Query and print hard copies</li><li>• Measure progress</li><li>• Manage work and resources</li></ul>	<p data-bbox="741 568 1029 654"><b>On-line access to data</b></p> <ul data-bbox="741 668 1029 911" style="list-style-type: none"><li>• Data grouped in star schemas</li><li>• Visually appealing screens</li><li>• Drill down capability for root cause analysis</li></ul>	<p data-bbox="1136 575 1424 768"><b>Data analysis with pre-packaged KPI's</b></p> <ul data-bbox="1136 811 1424 1225" style="list-style-type: none"><li>• KPI's established and data from operation automatically populates</li><li>• Real-time view of how the business is performing</li><li>• Intended to help people make better decisions vs. reactive</li></ul>	<p data-bbox="1513 575 1801 668"><b>Condition based analysis</b></p> <ul data-bbox="1513 682 1801 911" style="list-style-type: none"><li>• Alarms and alerts</li><li>• Intelligence built into monitoring and control</li><li>• Prevent siloed issues before critical</li></ul>	<p data-bbox="1890 575 2178 768"><b>Algorithms, machine learning, and beyond</b></p> <ul data-bbox="1890 782 2178 1053" style="list-style-type: none"><li>• 100's of parameters monitored and combined with historical data</li><li>• Financial, warehouse, labor and materials</li></ul>

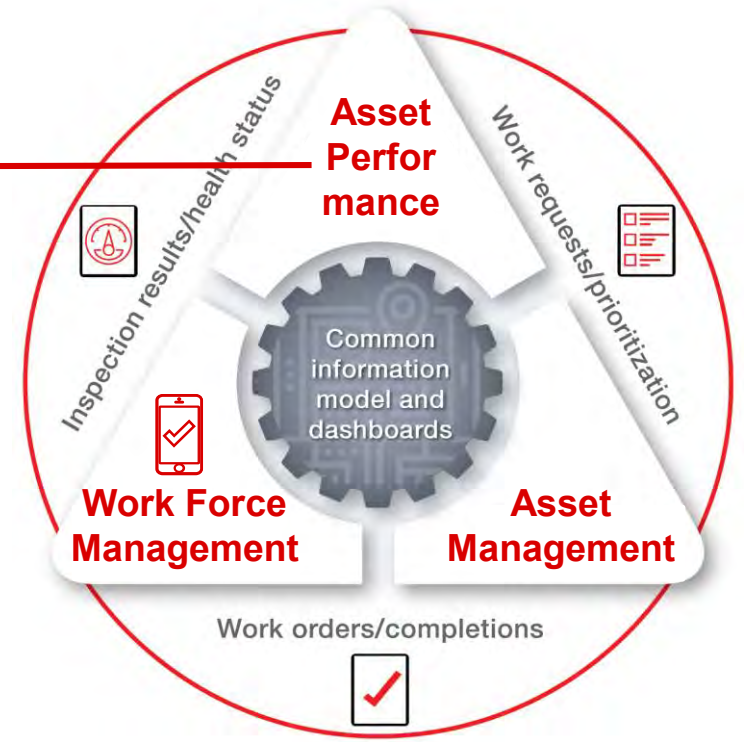


# Example Connected Asset Lifecycle Management

Solution for water/wastewater – monitoring and control with risk of failure example



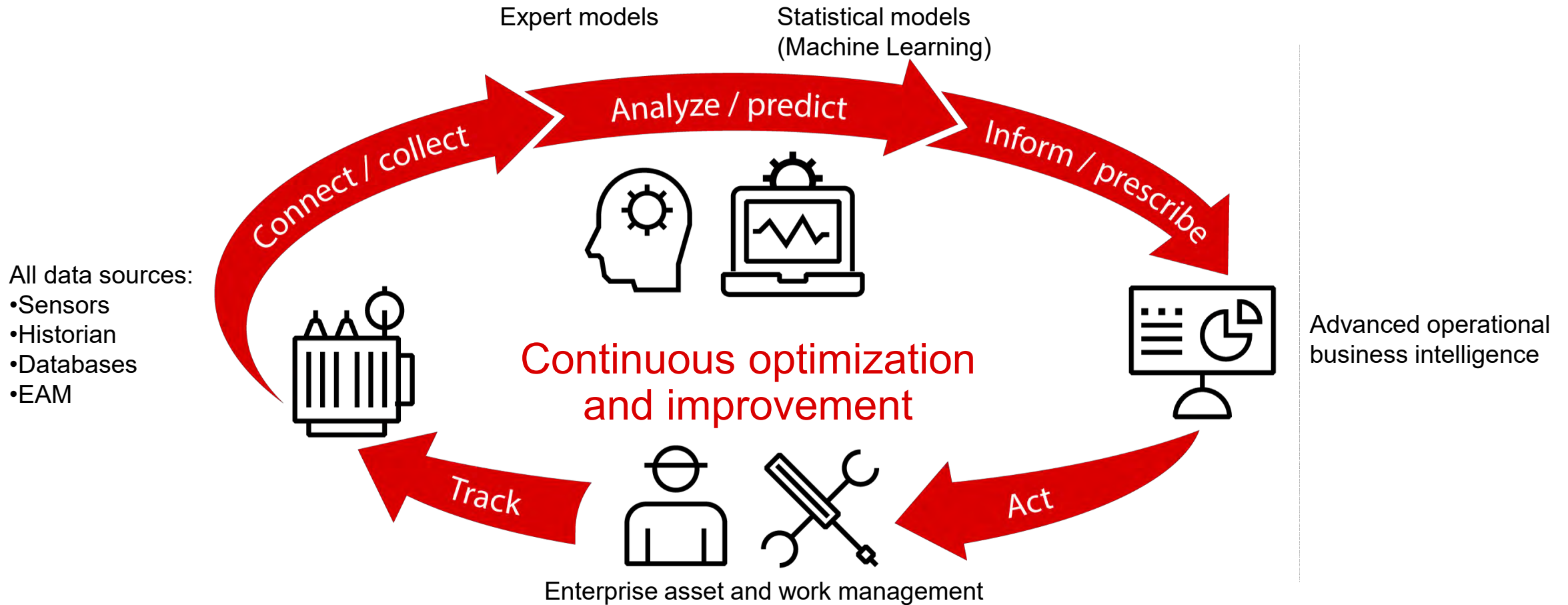
Historian



Integration with DCS System drives repair vs. replace decisions

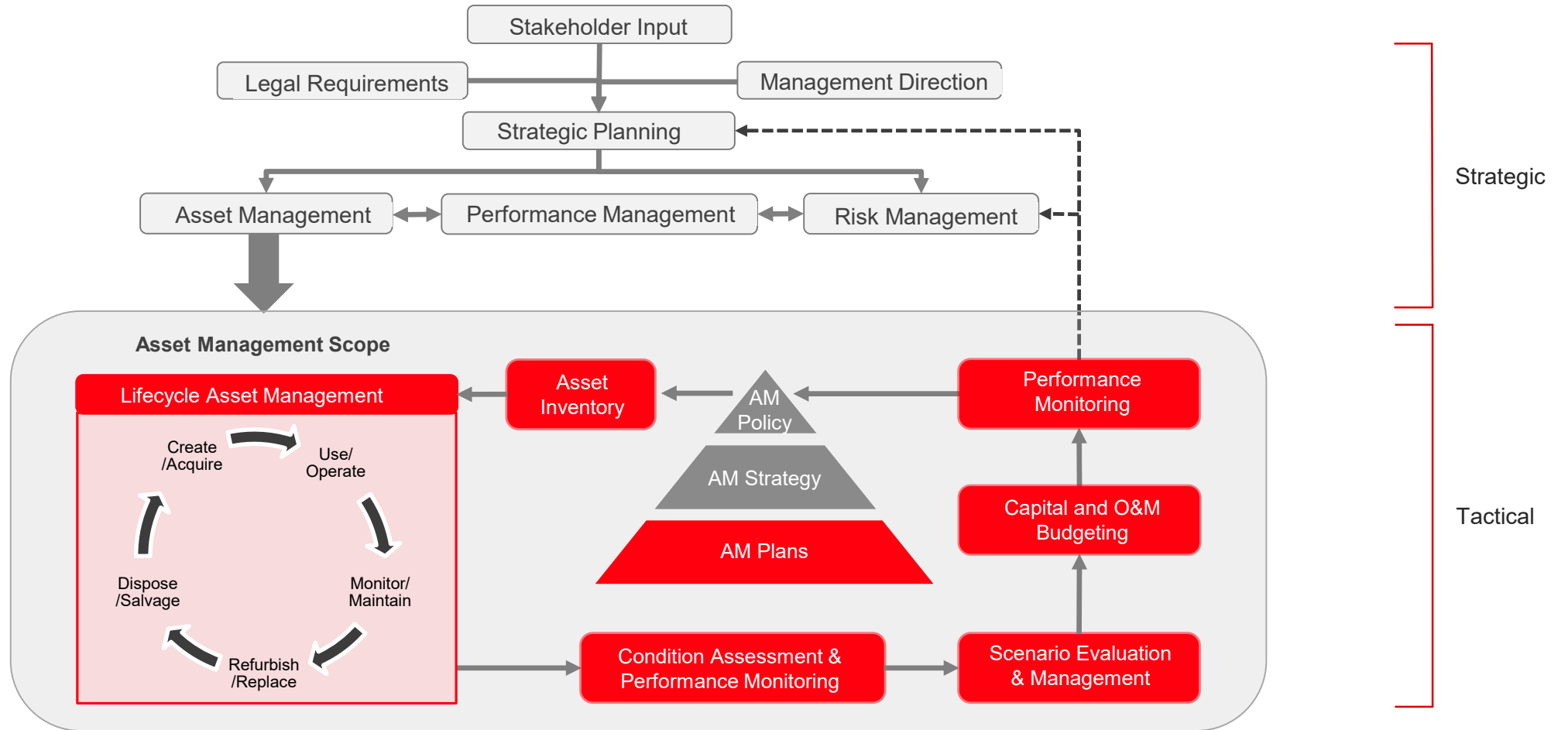
# Asset Performance – Historical data makes this work

A fleet-wide analytics platform to improve processes through risk-based optimization



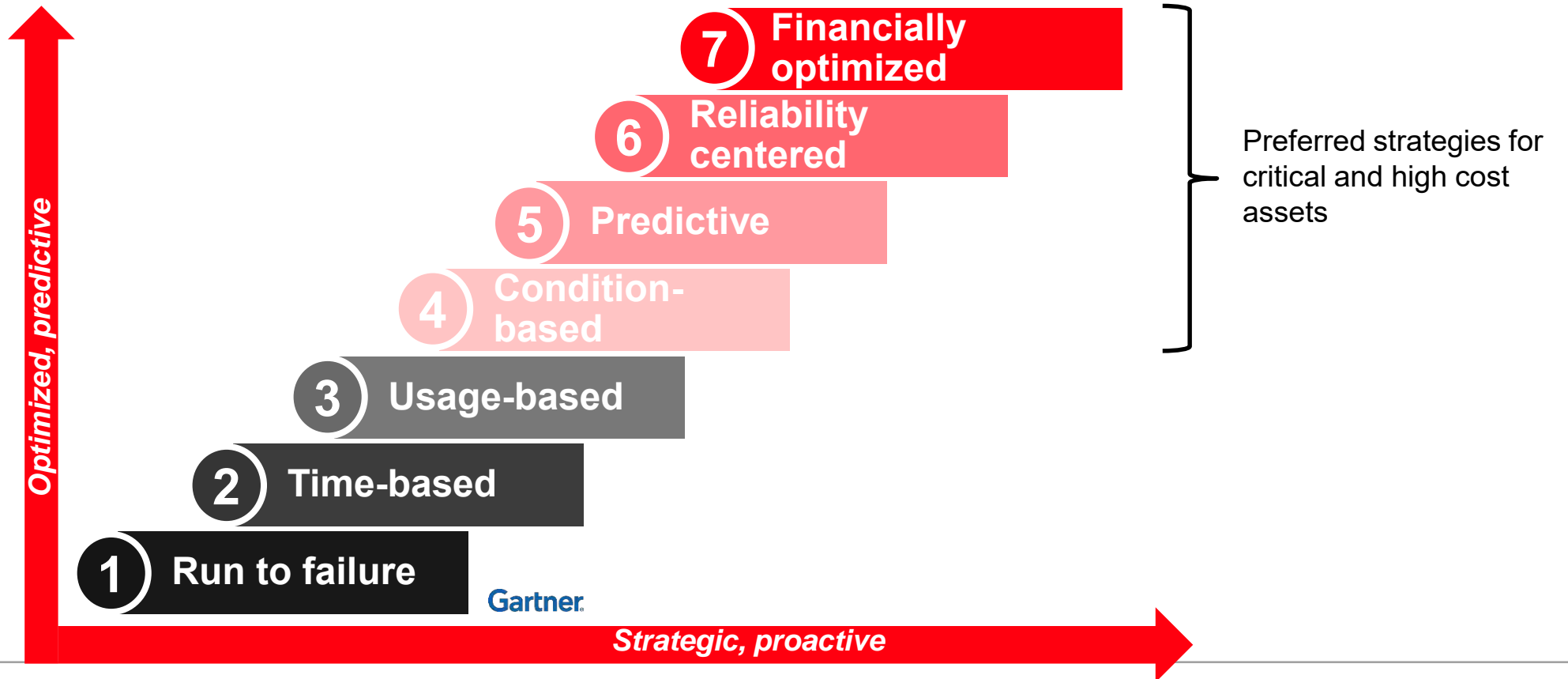
# Asset management – context within the organization

Line-of-sight Alignment



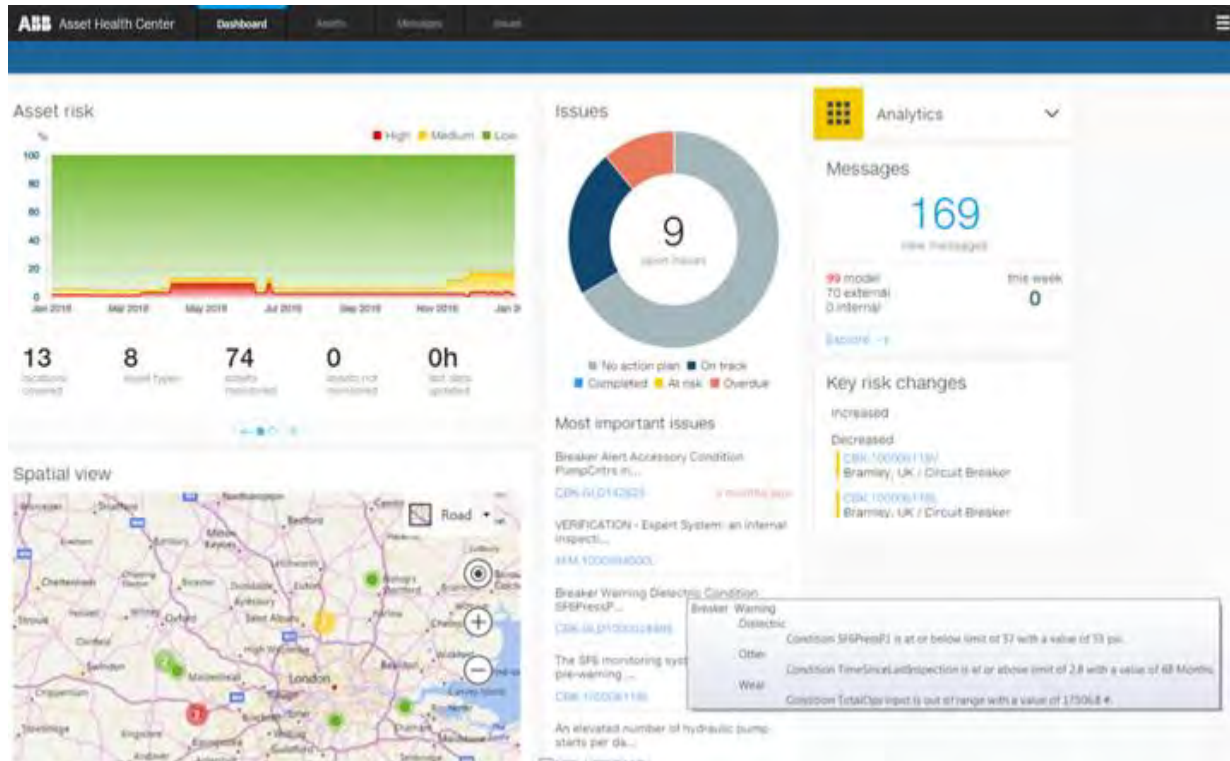


# Asset maintenance strategies



# Asset Performance Management (APM)

## Decision Support for Maintenance & Replacement



The assets list table displays 12 items, filtered by 'Wind Turbine'. The table includes columns for Asset ID, Description, Organization, Asset Voltage, Asset Age, Maintenance Priority, Replacement Priority, Importance, Condition, and Risk. The risk level is indicated by a color-coded dot (red for high, orange for medium, yellow for low, green for good).

Asset	Description	Organization	Asset Voltage	Asset Age	Maintenance Priority	Replacement Priority	Importance	Condition	Risk
WT.0015481	Accadia FG   Wind Turbine   WT.0015481	Onshore	0.6	1	57.6		50	43.1	High
WT.0025482	Accadia FG   Wind Turbine   WT.0025482	Onshore	0.6	1	57.6		50	43.1	High
WT.0125482	Accadia FG   Wind Turbine   WT.0125482	Onshore	0.6	1	57.6		50	43.1	High
WT.0035483	Accadia FG   Wind Turbine   WT.0035483	Onshore	0.6	1	47.5		45	39.5	Medium
WT.0045484	Accadia FG   Wind Turbine   WT.0045484	Onshore	0.6	1	31.3		45	26.0	Low
WT.0075487	Accadia FG   Wind Turbine   WT.0075487	Onshore	0.6	1	37.0		35	39.5	Low
WT.0115481	Accadia FG   Wind Turbine   WT.0115481	Onshore	0.6	1	34.7		50	26.0	Low
WT.0055485	Accadia FG   Wind Turbine   WT.0055485	Onshore	0.6	1	21.5		40	20.1	Good
WT.0085488	Accadia FG   Wind Turbine   WT.0085488	Onshore	0.6	1	24.3		35	26.0	Good

# Asset Investment Planning

## The path to financial optimization

For a given project, what is the best alternative?

For a given budget, what is the “optimal” set of projects to execute?

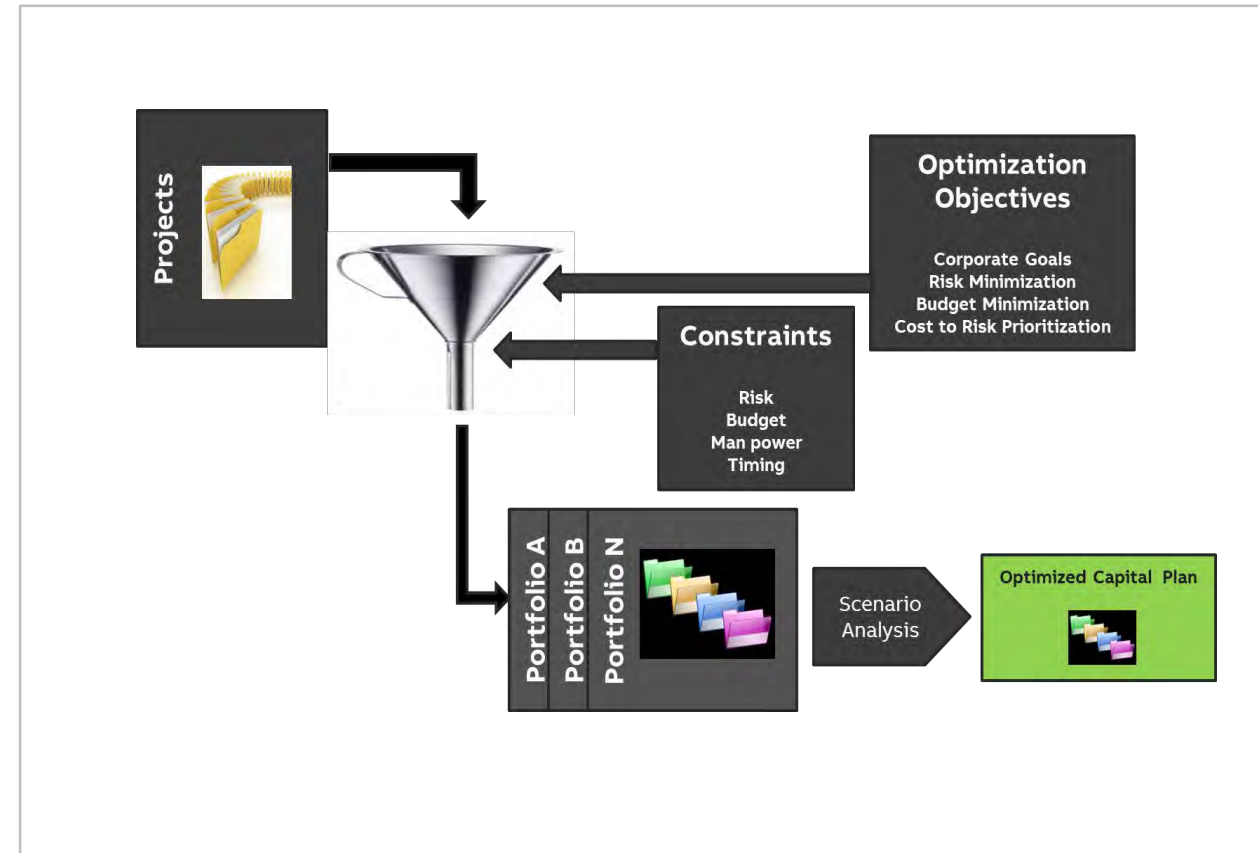
For a given level of (acceptable) risk, what is the minimum budget required?

How does a selected portfolio mitigate risk as a function of time?

What is the impact of budget reduction on risk exposure?

How does the level of risk exposure evolve in time, by risk category, for a given portfolio of Projects?

What is the “optimal” sequence of project execution within a given portfolio?



# Industry Challenges – Historical data helps address

**Funding for repair/replace aging infrastructure**

**1** Automated data process, condition of assets and cost of maintenance vs. repair

**Cost of technology and proven ROI**

**2** Reduce operating cost, provide deeper understanding of system performance, increase predictability of operations and maintenance needs and position infrastructure for long term health

**Sustainable water systems and regulations**

**3** Comprehensive asset management plan across all divisions based on ISO 55000

**Reducing risk and resiliency**

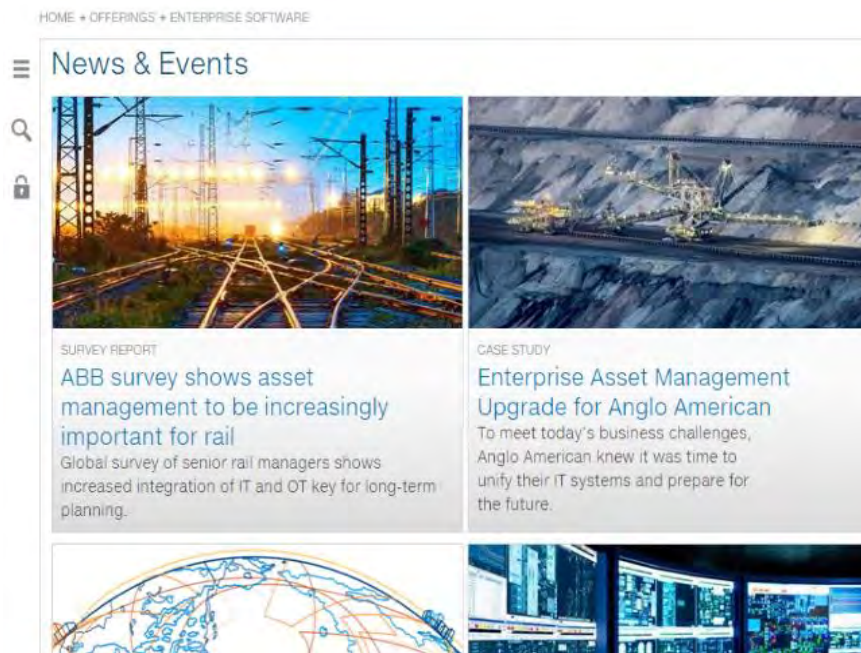
**4** Reliable energy efficient equipment with predictive analytics software

# Enterprise Software

On the web

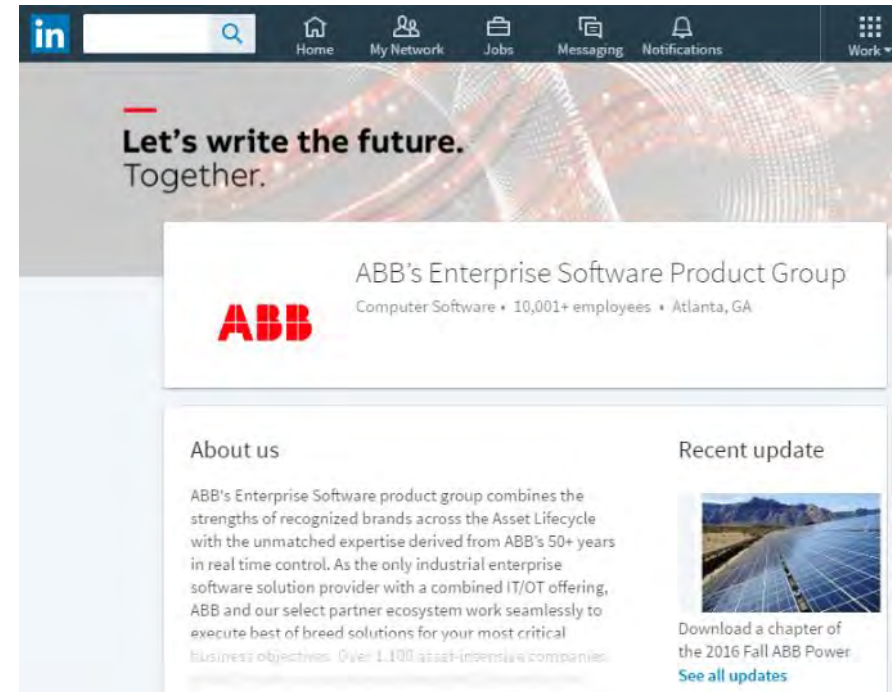
## Website

[new.abb.com/enterprise-software](http://new.abb.com/enterprise-software)



## LinkedIn showcase page

Search under “ABB’s Enterprise Software Group”







**AABB**