# A Risk and Economics-informed Evaluation of Work Management Automation Technologies

Outline

- Introduction/Motivation/Problem
- TERA process
- Mapping processes (time, cost, functional reqs)
- Identifying technologies
- Performing TERA on technologies
  - Performance, time reductions, cost reductions
- Technology risks
- Adoption strategy
- Next steps
- Conclusion

Issue and Solution
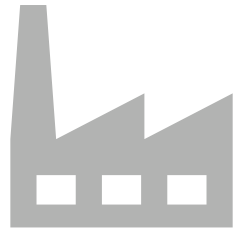
Issue:

We've modernized plant infrastructure, but haven't modernized how we manage the data or leveraged it to reduce O&M costs
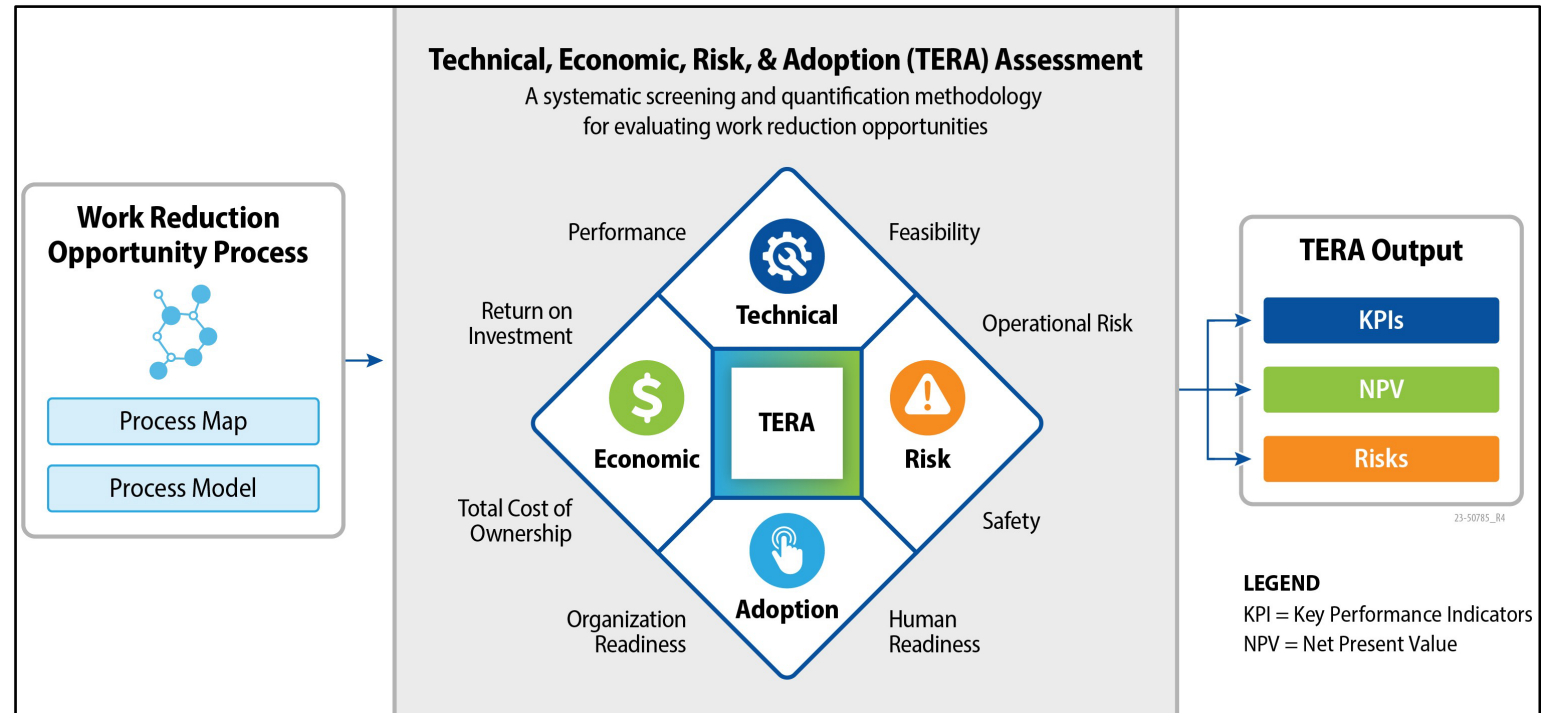
Solution:

Evaluate the integration of new and existing digital technologies, enhancing operation efficiency and reducing costs

LWRS LIGHT WATER REACTOR SUSTAINABILITY

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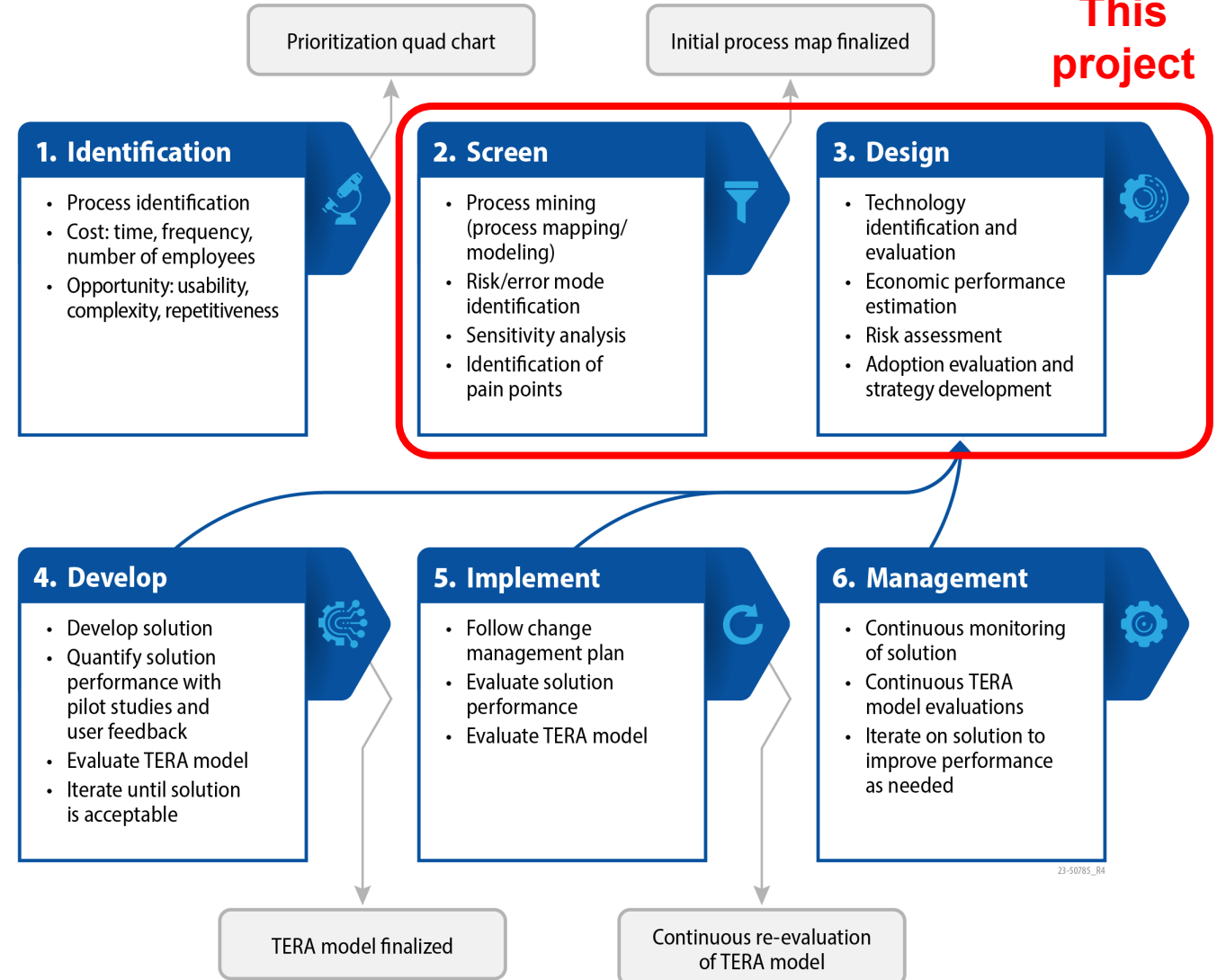# Technical, Economic, Risk, and Adoption Assessment (TERA)

- A quantitative method to systematically **identify, evaluate, and prioritize modernization investments** in nuclear power plants to reduce inefficiencies and operational costs.

- TERA provides a structured evaluation methodology of new technologies that:

  - **Maximizes ROI** by focusing on high-potential projects.

  - **Enables risk-informed decision making** and ensures smoother implementation of innovative solutions.

  - **Streamlines decision-making** processes for modernization efforts, leading to faster innovation cycles

  - **Enhances operational efficiency** by identifying and mitigating potential risks early

Work Reduction Opportunity Process

Process Map

Process Model

Technical, Economic, Risk, & Adoption (TERA) Assessment

A systematic screening and quantification methodology for evaluating work reduction opportunities

Performance — Feasibility
Return on Investment — Operational Risk
Technical
Economic — TERA — Risk
Total Cost of Ownership — Safety
Organization Readiness — Human Readiness
Adoption

TERA Output

- KPIs
- NPV
- Risks

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LEGEND
KPI = Key Performance Indicators
NPV = Net Present Value

TERA Process

Focus of this project:

1. Map current process through stakeholder engagement

2. Turn process map into quantitative model

3. Evaluate potential technologies for feasibility and performance

4. Alter process model with new technology

5. Evaluate new process for change in costs or benefits

6. Create development and implementation strategy

This project

Prioritization quad chart

Initial process map finalized

1. Identification
- Process identification
- Cost: time, frequency, number of employees
- Opportunity: usability, complexity, repetitiveness

2. Screen
- Process mining (process mapping/ modeling)
- Risk/error mode identification
- Sensitivity analysis
- Identification of pain points

3. Design
- Technology identification and evaluation
- Economic performance estimation
- Risk assessment
- Adoption evaluation and strategy development

4. Develop
- Develop solution
- Quantify solution performance with pilot studies and user feedback
- Evaluate TERA model
- Iterate until solution is acceptable

5. Implement
- Follow change management plan
- Evaluate solution performance
- Evaluate TERA model

6. Management
- Continuous monitoring of solution
- Continuous TERA model evaluations
- Iterate on solution to improve performance as needed

TERA model finalized

Continuous re-evaluation of TERA model

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Work Week Management Solutions
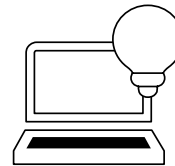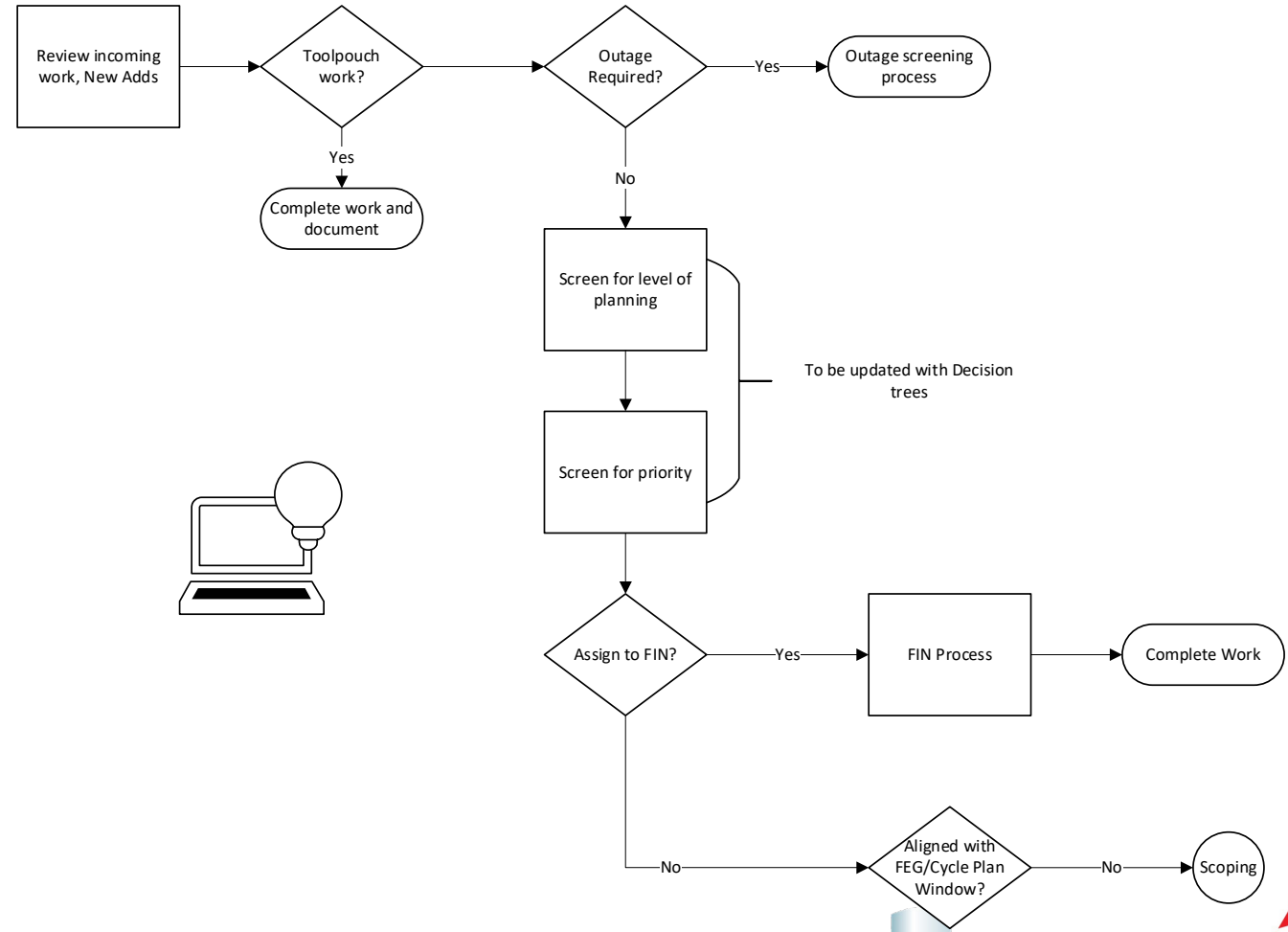

WRO 1.1 Meeting Package Automation

- Information retrieval, Visualization
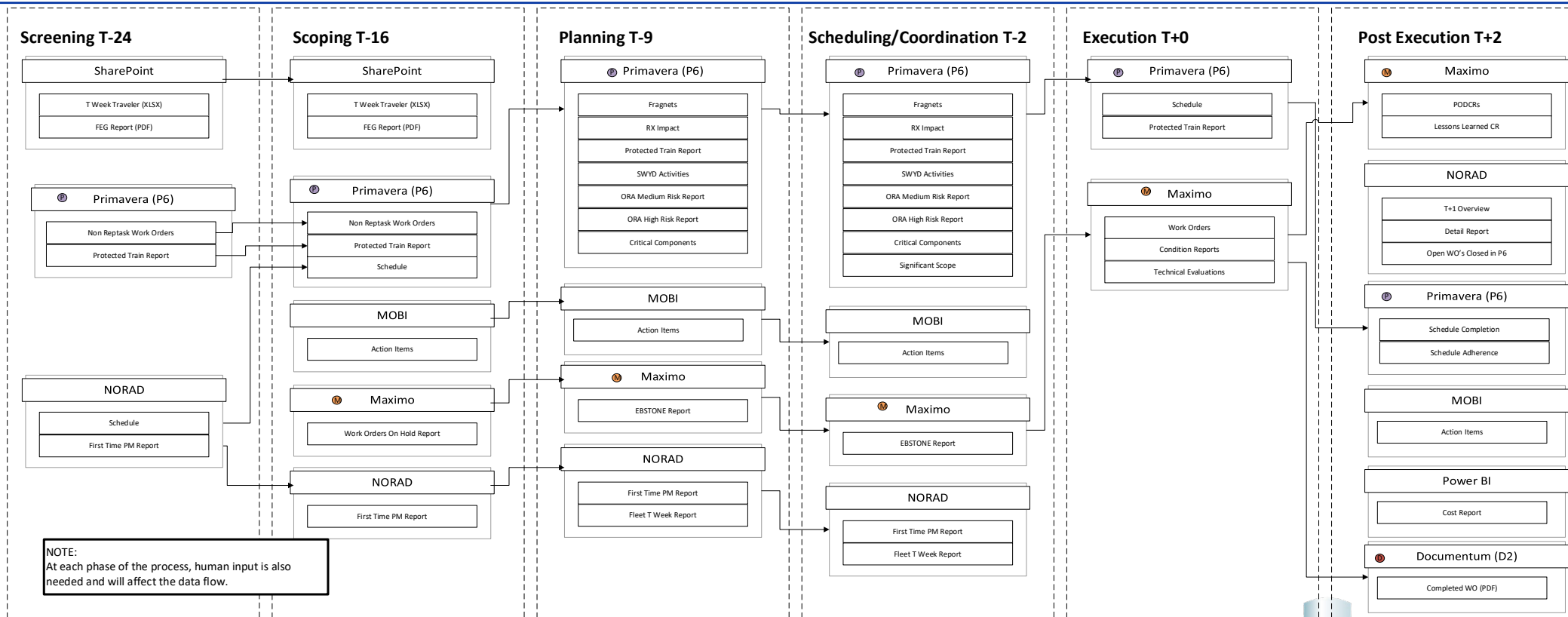
Work Week Management Solutions
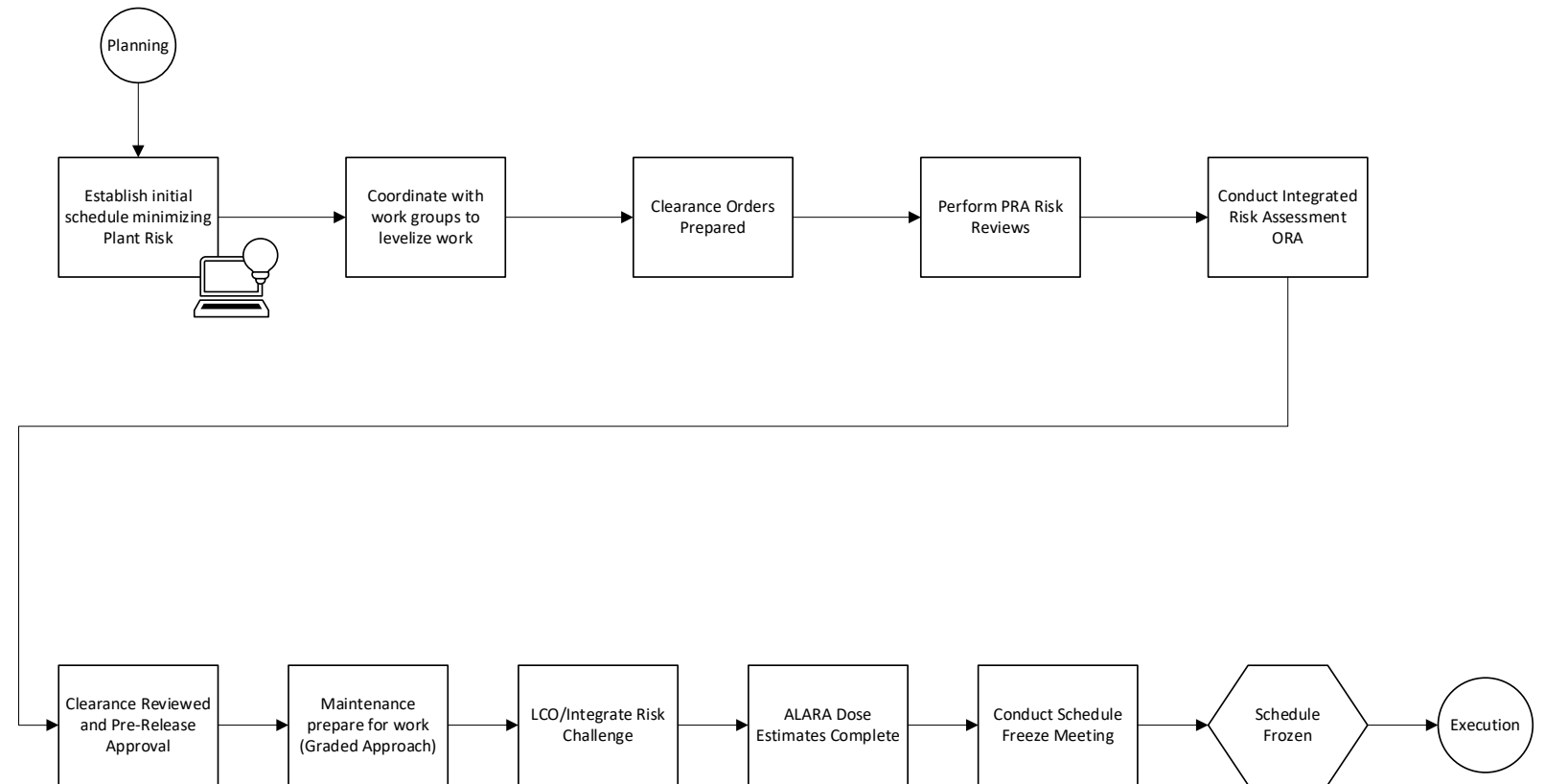
WRO 1.2 Screening AI Assistant

- New Adds Screening
- Risk Assessment

Review incoming work, New Adds

Toolpouch work?

Yes → Complete work and document

Outage Required?

Yes → Outage screening process

No ↓

Screen for level of planning

To be updated with Decision trees

Screen for priority

Assign to FIN?

Yes → FIN Process → Complete Work

No ↓

Aligned with FEG/Cycle Plan Window?

No → Scoping

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Work Week Management Solutions

WRO 1.3 Planning Optimization

- Schedule Bundling
- Conflict Detection

Functional Requirements

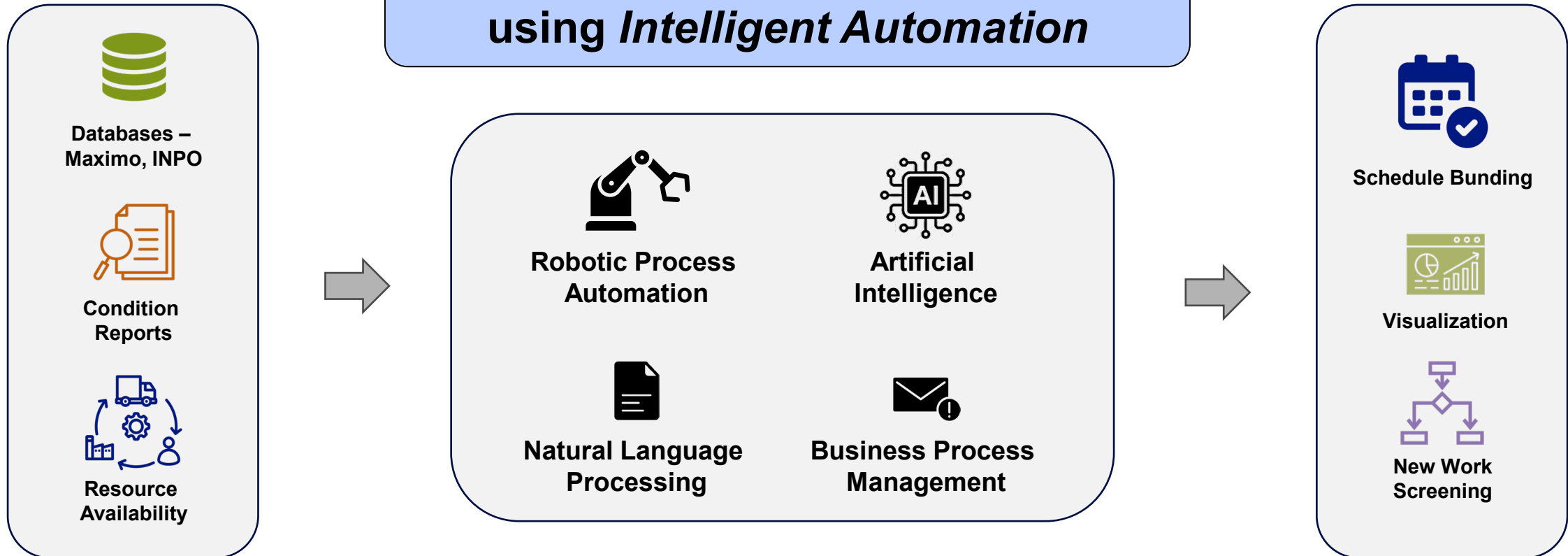| Step	Work Description	Functional Requirement
2.1	Work is screened in.	N/A
2.2	The scheduler identifies the affected system.	The scheduling tool shall identify the affected system by reading the location ID and system fields in the screening report or Maximo.
2.3	The scheduler looks at the cycle plan and identifies any upcoming outages scheduled for the affected system.	The scheduling tool shall access the cycle plan. The scheduling tool shall identify upcoming system outages that correlate with the affected system.
2.4	Record any upcoming system outages for affected system.	N/A
2.5	Based on identified responsible group and similar work orders, the scheduler will determine the approximate hours needed from each work group.	The scheduling tool shall access historical work orders for similar tasks. The scheduling tool shall estimate hours needed from each work group based on average hours used in historical work orders for similar tasks.
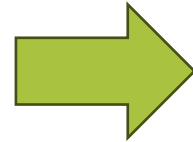
Required Functionality

1. **Generate and Distribute Reports**
2. **Identify and Categorize Items**
3. **Review and Update Records**
4. **Classify and Assess Items**
5. **Identify Similar Records and Responsible Entities**
6. **Review and Manage Workflow**
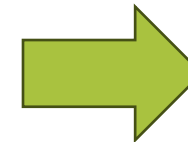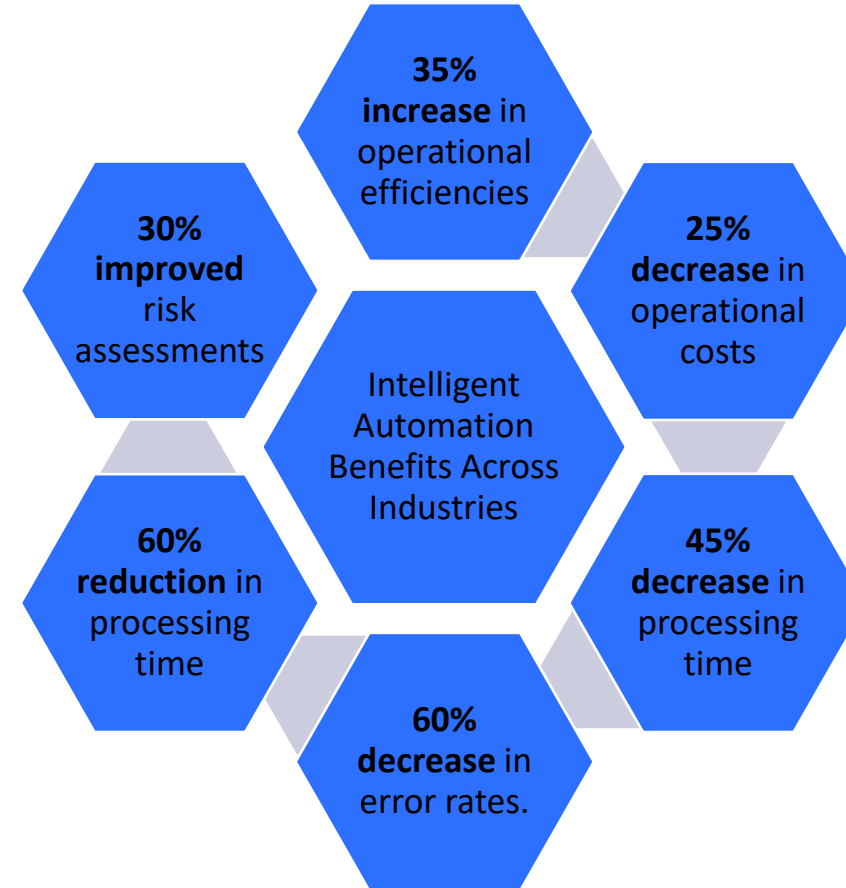
Solution Identification and Evaluation

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Solution Concept – Work Week Management

Workflow Automation & Tracking using *Intelligent Automation*

Databases – Maximo, INPO

Condition Reports

Resource Availability

Robotic Process Automation

Artificial Intelligence

Natural Language Processing

Business Process Management

Schedule Bunding

Visualization

New Work Screening

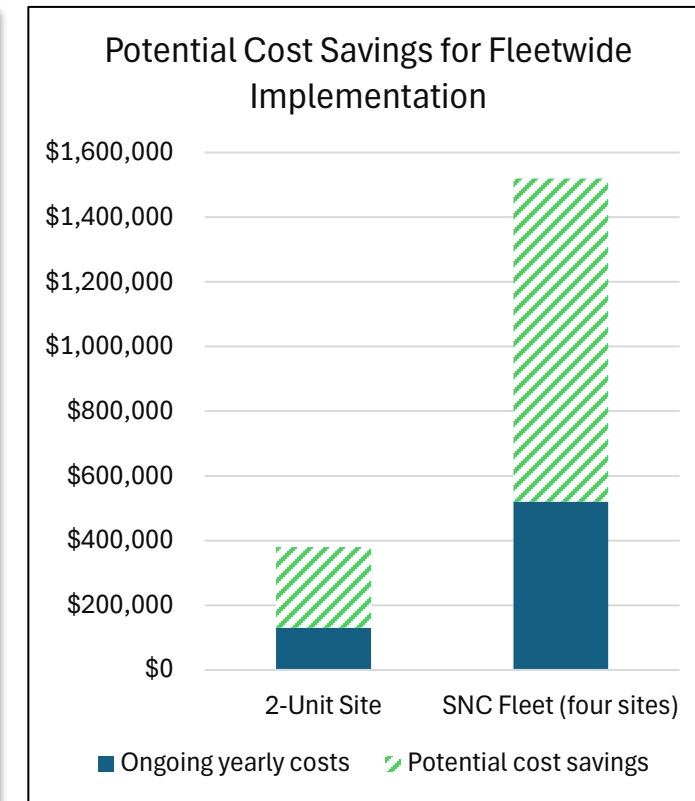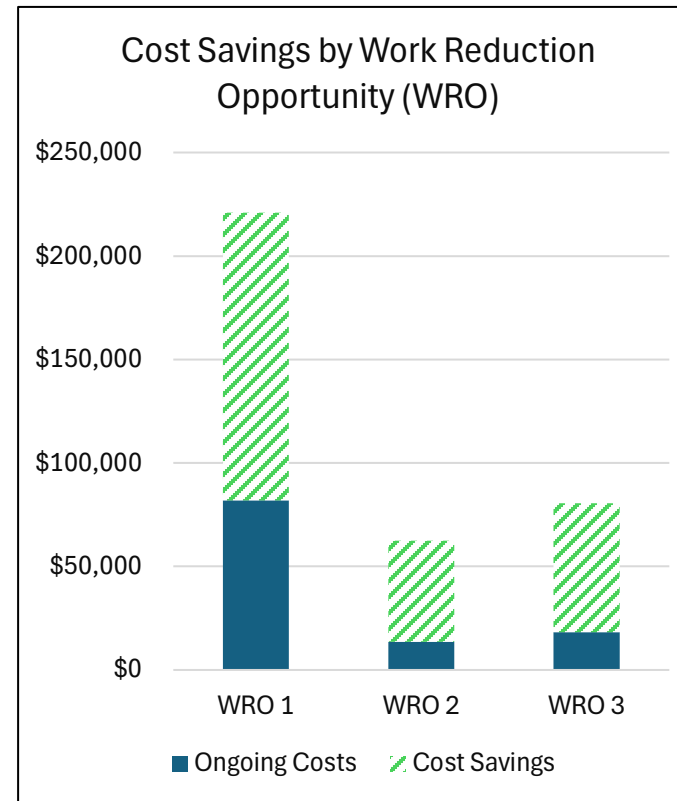# Intelligent Automation for Work Week Management

Intelligent automation leverages AI and traditional process automation technologies to streamline processes

- **Reduces operational costs** by automating repetitive tasks and optimizing workflows.

- **Improves accuracy and consistency**, minimizing human error and increasing productivity.

- **Enables data-driven decision-making** through real-time insights and predictive analytics.

35% increase in operational efficiencies

30% improved risk assessments

25% decrease in operational costs

Intelligent Automation Benefits Across Industries

60% reduction in processing time

45% decrease in processing time

60% decrease in error rates.

Economic Benefits for each WRO

- **Estimated potential savings possible** by automating work management practices for a two-unit site and then extrapolated across the SNC fleet by using:
  - robotic process automation,
  - artificial intelligence,
  - machine learning technologies.

- **Key outcomes of the analysis include:**
  - Cost estimation of the current processes using plant personnel estimates
  - Cost savings estimations using projected work reductions provided by automated
  - Cost savings could exceed **$1M per year** if implemented across entire fleet

Cost Savings by Work Reduction Opportunity (WRO)

Legend: Ongoing Costs, Cost Savings

Potential Cost Savings for Fleetwide Implementation

Legend: Ongoing yearly costs, Potential cost savings

Adoption Strategies for Intelligent Automation

An adoption strategy is beneficial because it ensures a smooth transition and maximizes the effectiveness of new technologies or processes within an organization.

- Boosts user acceptance and engagement.

- Minimizes operational disruptions.

- Accelerates return on investment.

- Reduces resistance to change.

- Reduces overall risks.

Obtain cultural adoption support by leadership

Identify ideal processes for automation

Let business operations lead RPA

Bring IT on board early

Send the right message to staff

Build a robust infrastructure

Conclusion

- Next steps
  - Solution development and verification
  - Deployment and solution management

- Project Team
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