



I&C Insights from the Limerick Safety Related Systems Upgrade Project

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- Senior Engineer
- Limerick Digital Modernization

Digital Modernization Project Scope

Replace logic and control of current safety systems with an integrated digital platform

- Plant Protection System (PPS)

Diversification of safety functions

- Diverse Protection System (DPS) – via Ovation DCS

Downgrade Redundant Reactivity Control System (RRCS) to a non-safety system and digitize logic

- Expansion of Ovation functions to include 10CFR50.62
- (Distributed Control System – DCS)

Automate various safety system operations

- Automated Operator Aids (AOAs) – via Ovation DCS

Revise Technical Specifications

- Implement Improved Tech Specs
- Rearrange/streamline to reflect PPS architecture

Plant Protection System

Diverse Protection Functions

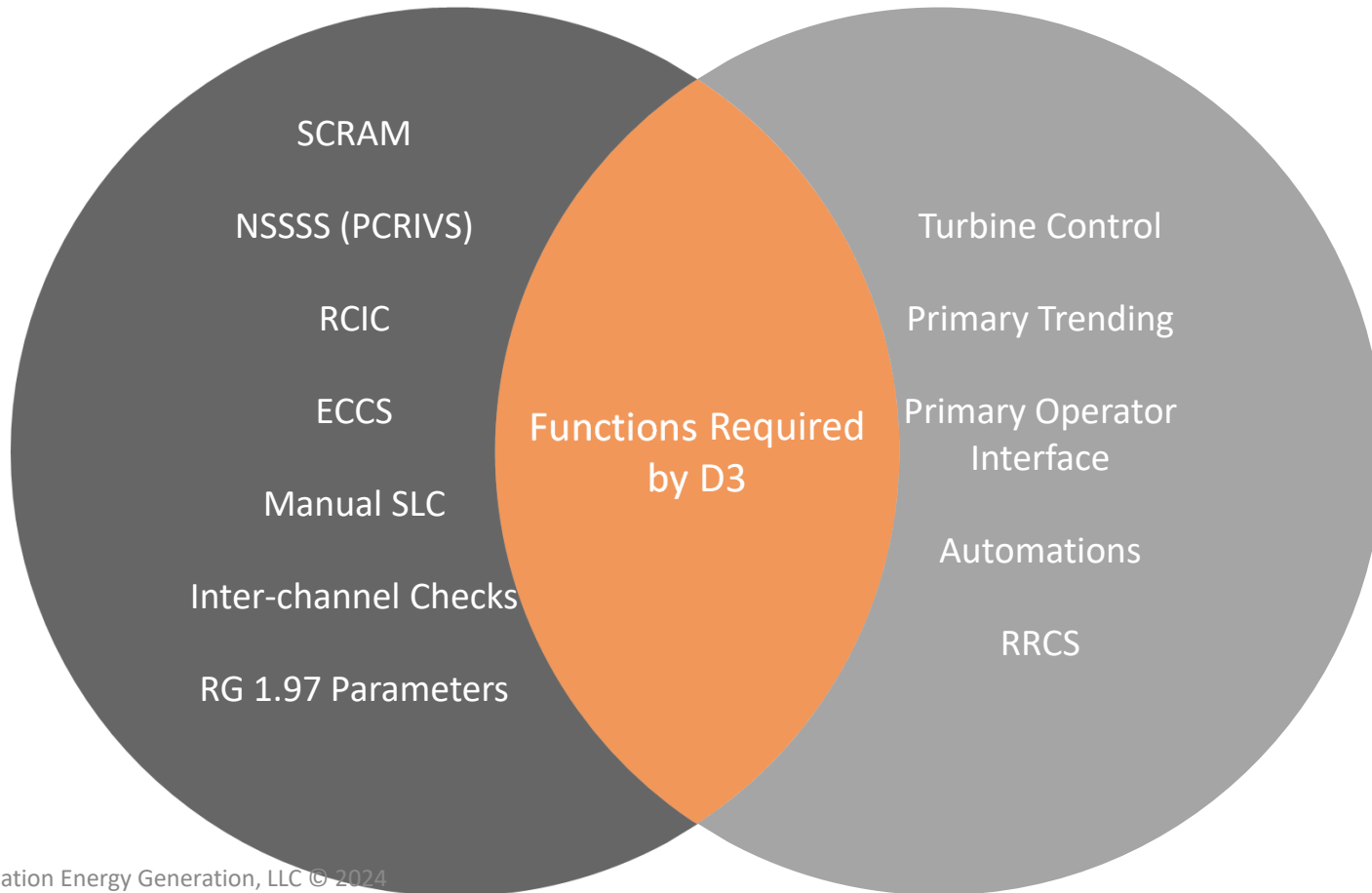
Distributed Control System

Credited Licensed Safety Functions

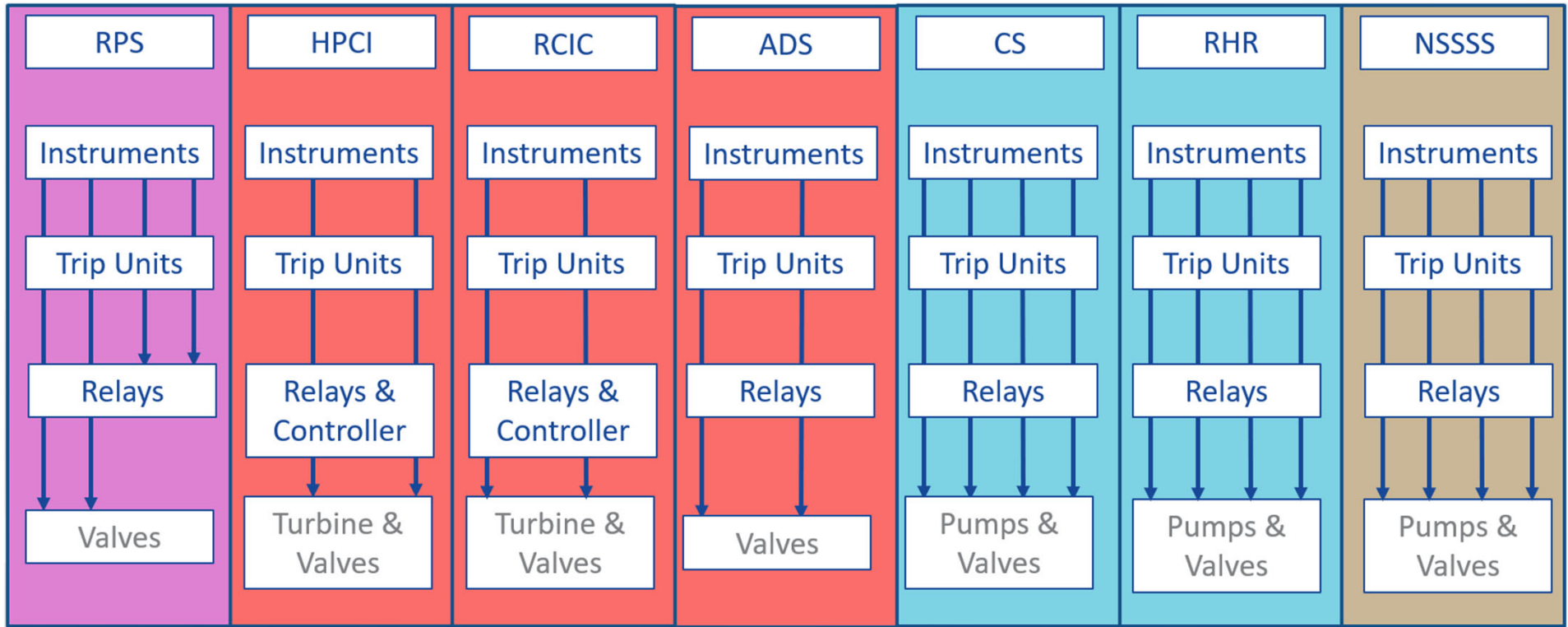
Diversity and Defense-in-Depth

Non-Safety Indication and Controls, Information Hub

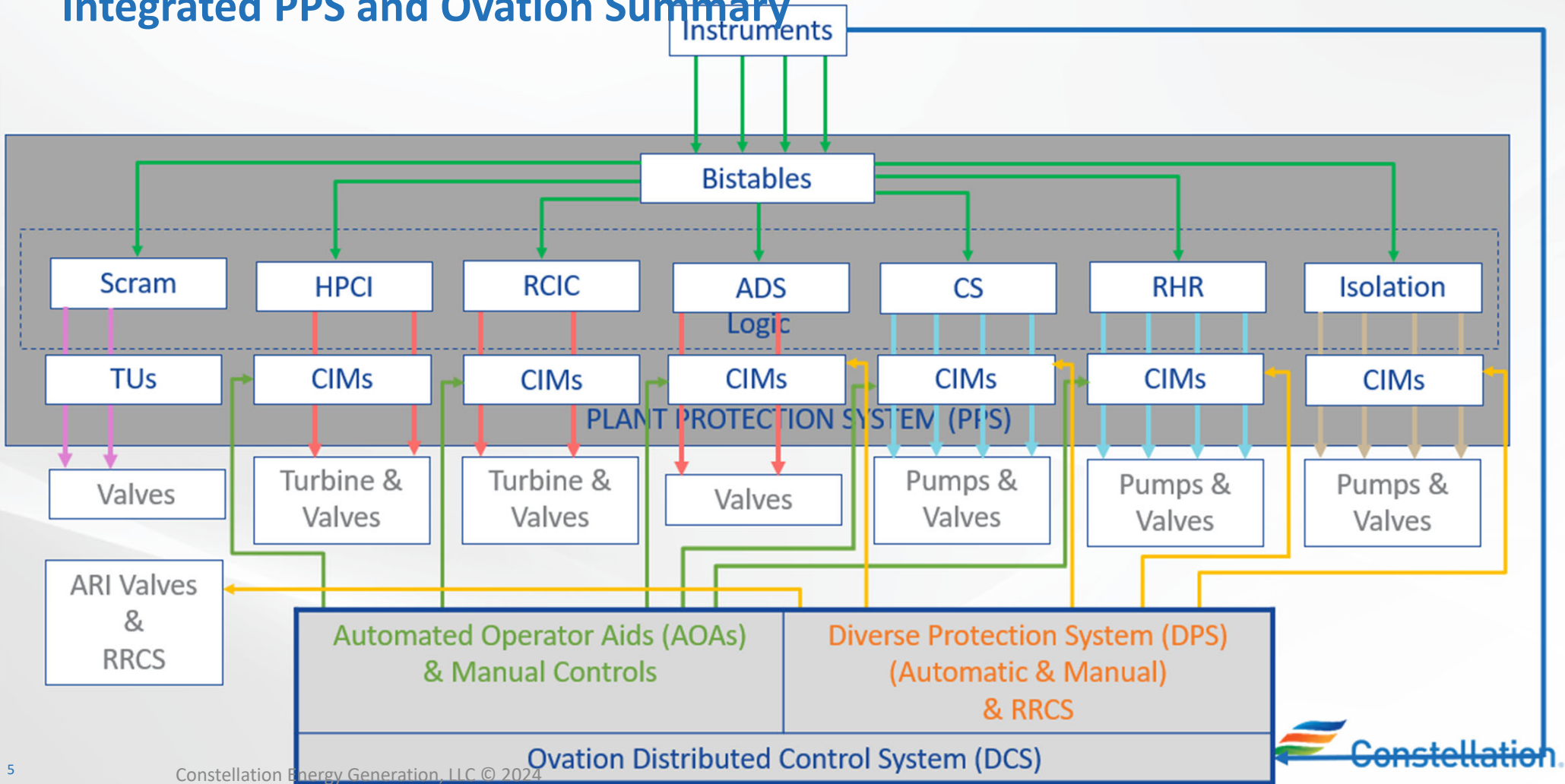
Two Diverse Systems with overlapping capability



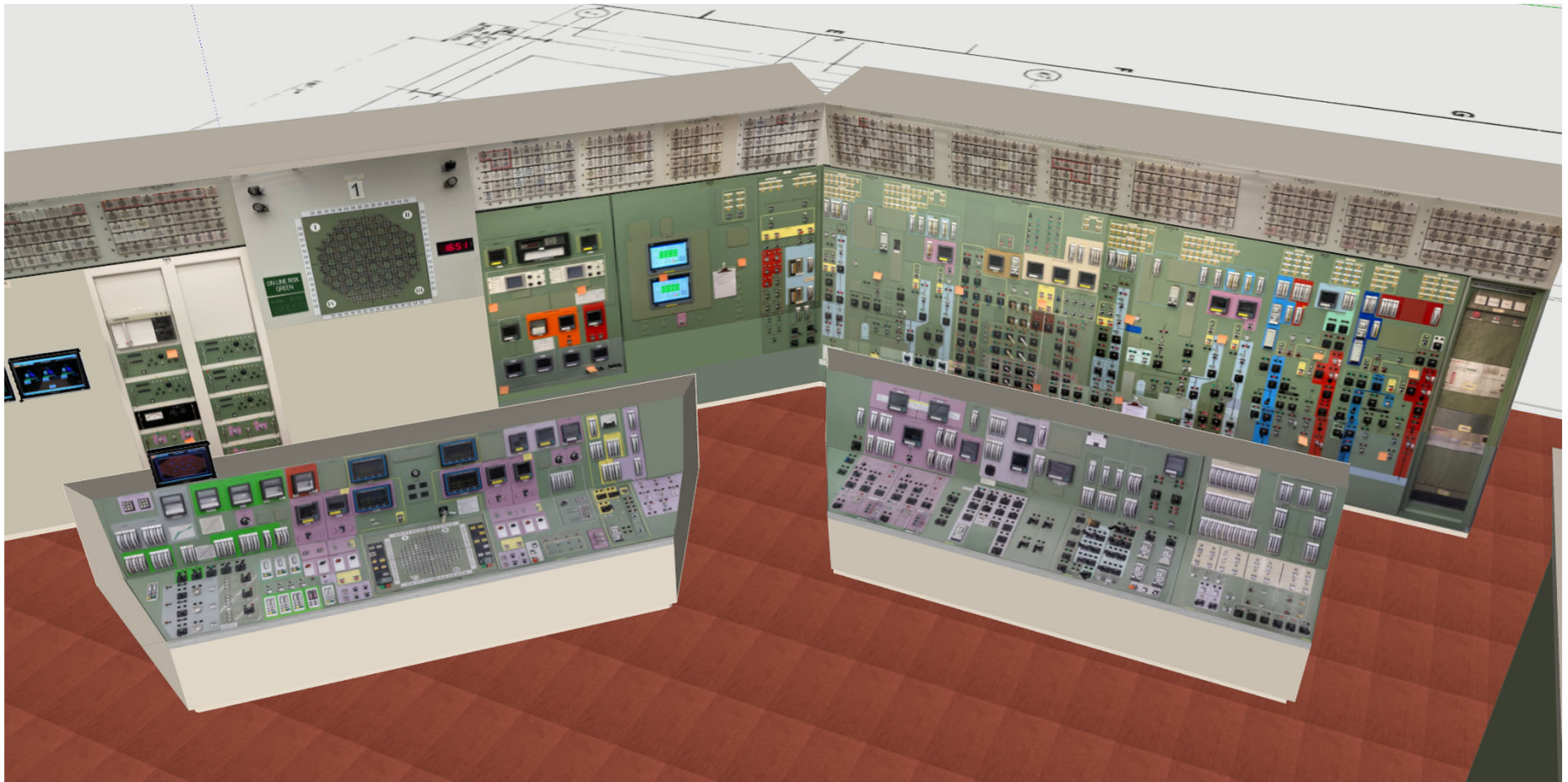
Integration from Current Plant to PPS



Integrated PPS and Ovation Summary



Digital Modernization Scope – Current MCR



Digital Modernization Scope – Post-DMP MCR



I&C Insights and Lessons Learned

Component Elimination

- Instruments
- Controls
- Relays

Component Interface

- Component Prioritization
- Incompatibilities

Information

- Information Flow
- Control Limitations

I&C Insights and Lessons Learned

Alternate Review Process

- Readiness of Procedures

Iterative Design

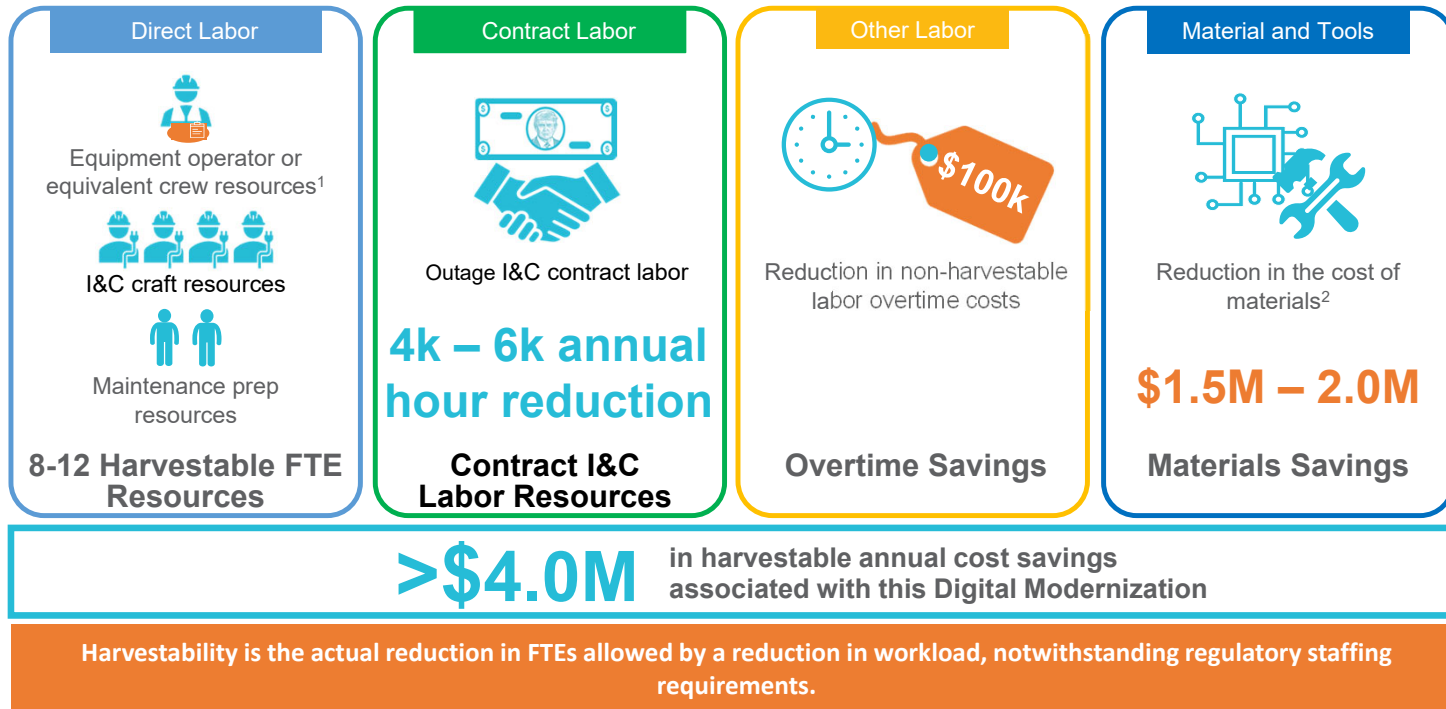
- Utility Readiness
- Vendor Readiness

First Of A Kind

- Key Deliverable Challenges
- Changes to Project Direction

Direct Annual Benefits*

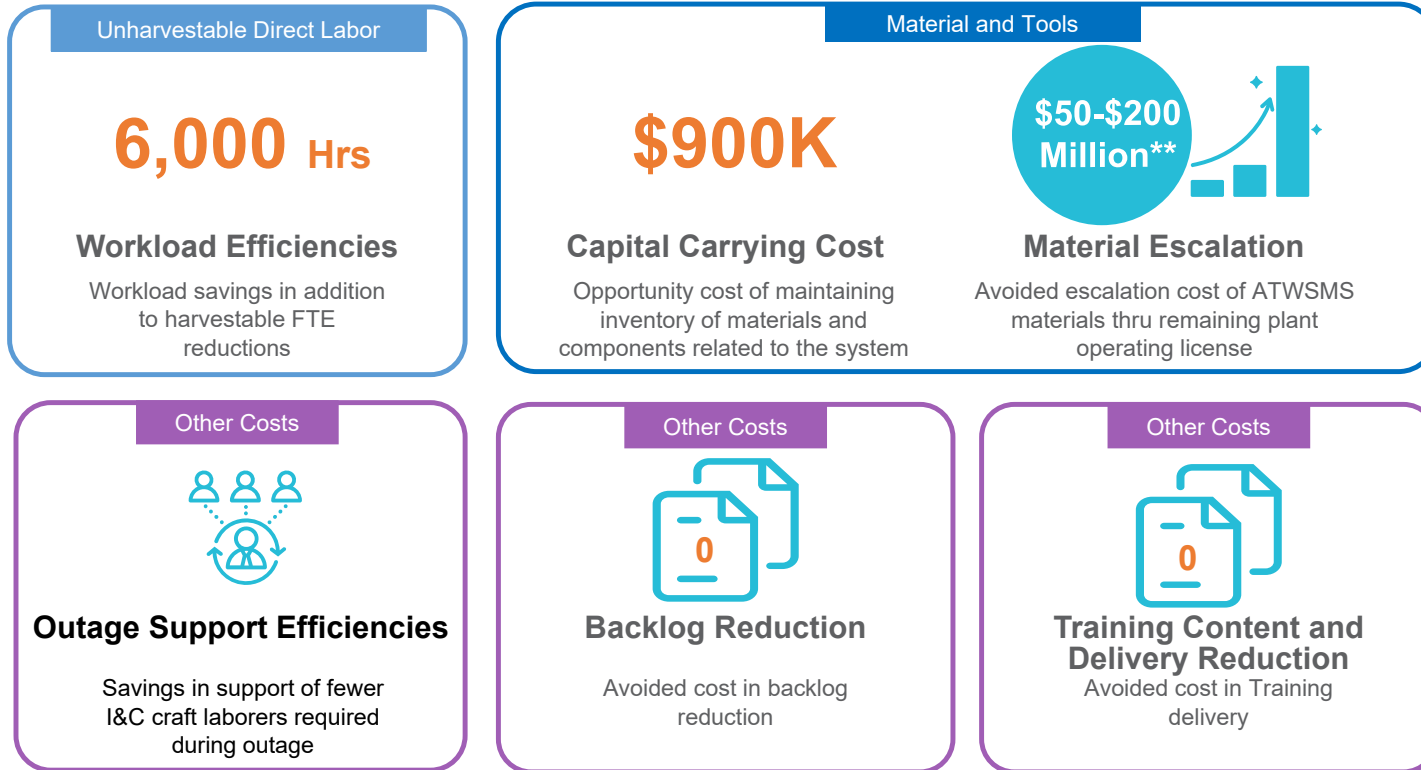
Digital modernization of the ATWSMS, RPS, ECCS, and N4S systems results in harvestable resources and annual cost savings:



**All figures presented herein are illustrative of scale of estimated project costs and benefits, and are not intended to present actual data utilized in the Owner's business case analysis.*

Other Benefits and Avoided Costs*

Digital modernization of the four safety-related systems results in resource efficiencies and avoided annual costs:



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Business Case Analysis Aggregate Results*

The financial metrics yielded by the BCA demonstrated a positive business case for the owner.



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***O&M costs inclusive of labor and materials*

****Based on a model term consistent with the operating license of the Station*

In Summary

Modification Scope

- Plant Protection System (PPS)
- Diverse Protection System
- Distributed Control System

I&C Insights

- Component Elimination and Interface
- Information and Control Flow
- Iterative Design and ARP
- FOAK challenges and impacts

BCA Overview

- Licensing overlap with HFE activities
- Benefits of Operations design input
- System split issues
- HSI development, prototyping, use of simulation



Questions