



EMERSON EXCHANGE 2025

ACCELERATING INNOVATION



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INNOVATION

Sustaining Value of Advanced Control Best Practices from Nutrien's 5 Year Journey

Christopher Thivierge | Nutrien

Devin Marshman | Spartan Controls

May 2025

Who are we?



Emerson Impact Partner



Matthew Gillespie
P.Eng. M.B.A.
Manager POT



Chris Thivierge
P.Eng.
Sr. Process Control
Engineer



Jordan Himmelsbach
P.Eng.
Process Control
Engineer



Devin Marshman
P.Eng.
Solutions Consultant



Ryan Brown
P.Eng.
APC Team Manager

Nutrien's Purpose

- *At Nutrien, our purpose is Feeding the Future. As a leading provider of crop inputs and services, Nutrien plays a critical role in feeding the future by helping growers to increase food production in a sustainable manner. We're moving the agriculture industry and the world forward – today and for generations to come.*



What Nutrien provides?

Retail

- More than 2000 locations globally.

Phosphate

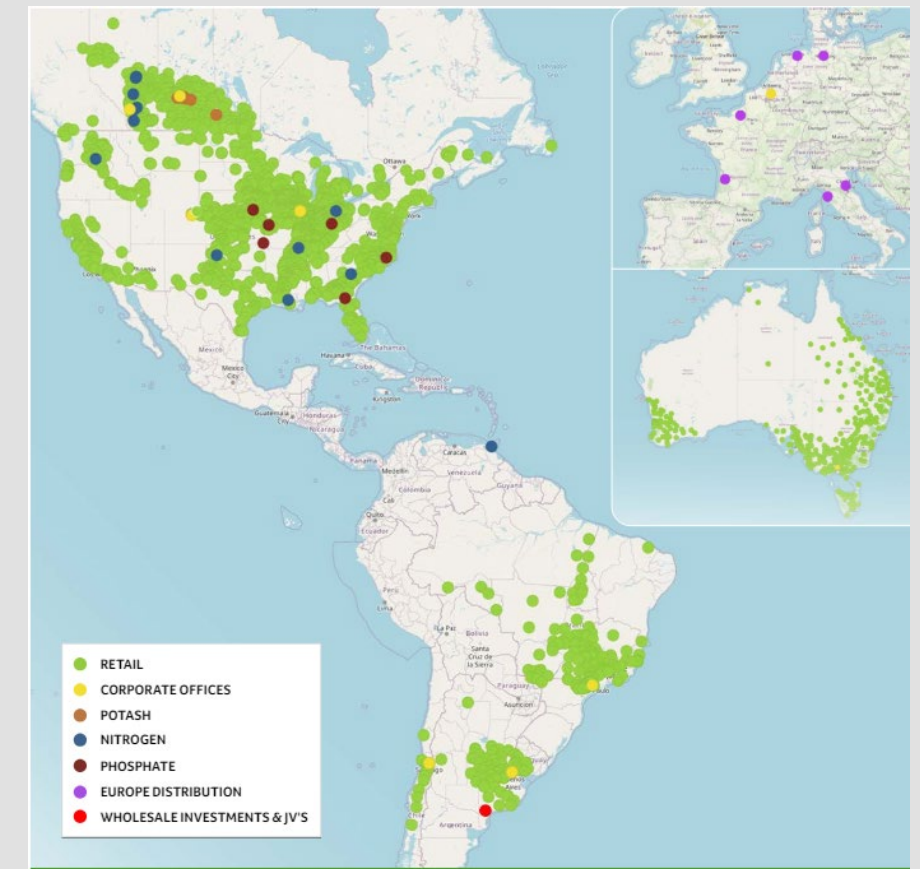
- 2% in Global capacity (1.7M Tonnes)

Nitrogen

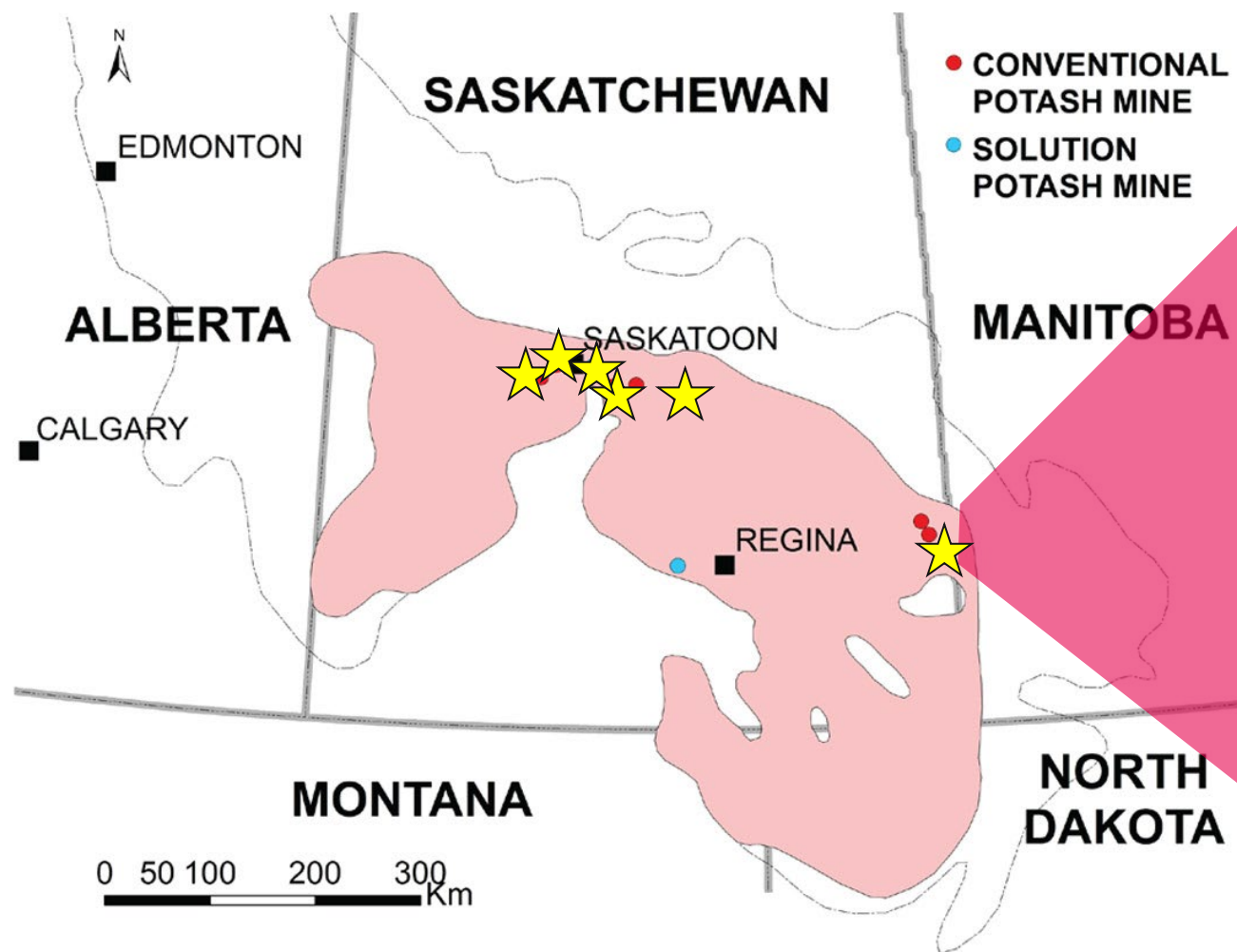
- 3% in global capacity (7.1M Tonnes Gross)

Potash

- Single largest producer of Potash on the global market
- We have a 20 million tons nameplate capacity



Potash Mining and Milling



Importance of Potash on the Global Market



Why does Nutrien care about APC solutions



Increase Efficiency

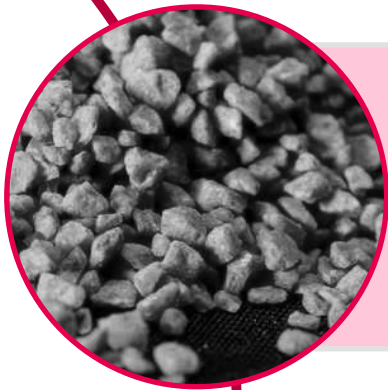
- Product Quality
- Recovery
- Waste Reduction



Improved Operator Performance

- Remove Monotonous Tasks
- Enable Consistent Process Flow
- Reduced Downstream Upsets

Why does Nutrien care about APC solutions



Increase Efficiency

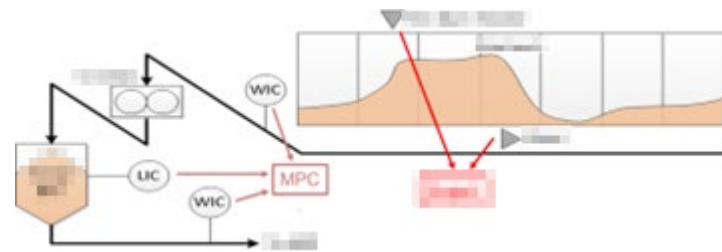
- Product Quality
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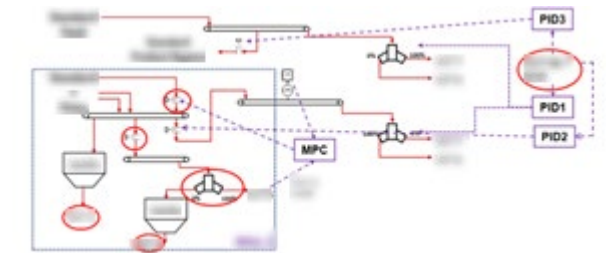
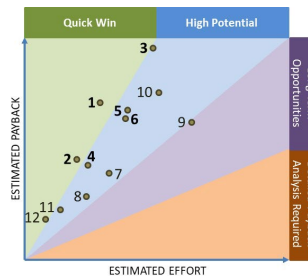
Improved Operator Performance

- Remove Monotonous Tasks
- Enable Consistent Process Flow
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History of Nutrien APC



Cory site
-75% mill feed loss events
+ 1% increased throughput



Rocanville site
+ 5% compaction utilization

2013

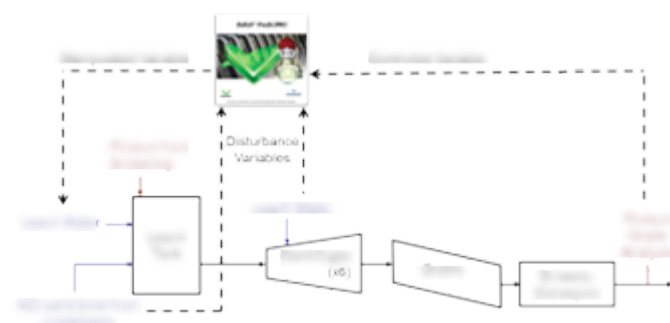
2014

2015

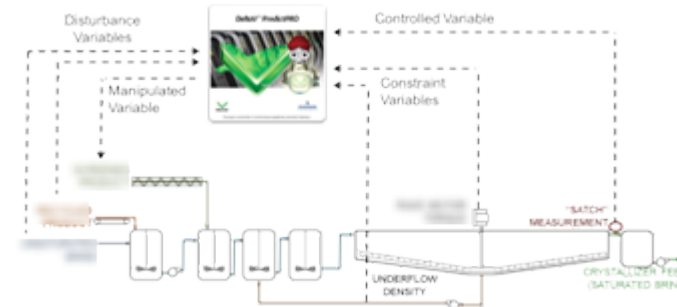
2016

2017

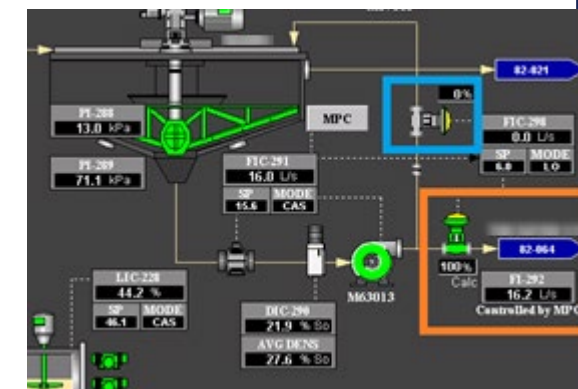
2018



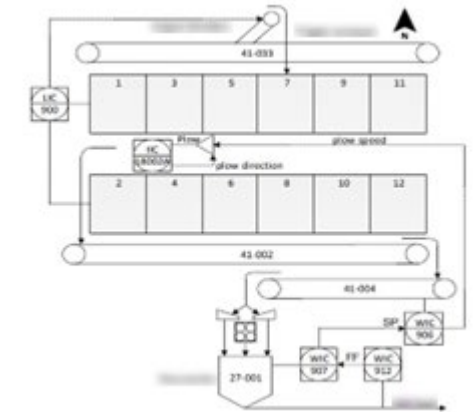
Allan site
+ 0.25% increased production



Allan site
+ 0.25% increased production



Lanigan site
+ +0.12% increased production



Lanigan site
+ 0.25% per year

History of Nutrien APC

Increased Focus towards APC Solutions

Objective by the end of 2020

- Deliver on ~20-30 'high value' initiatives across all sites (mill + UG)
- Alignment from sites on key processes to identify and prioritize APC initiatives
- Internal capabilities developed at sites to sustain ongoing value and competencies at center to manage and optimize scaled roll-out
- Mechanism in place to track against key metrics

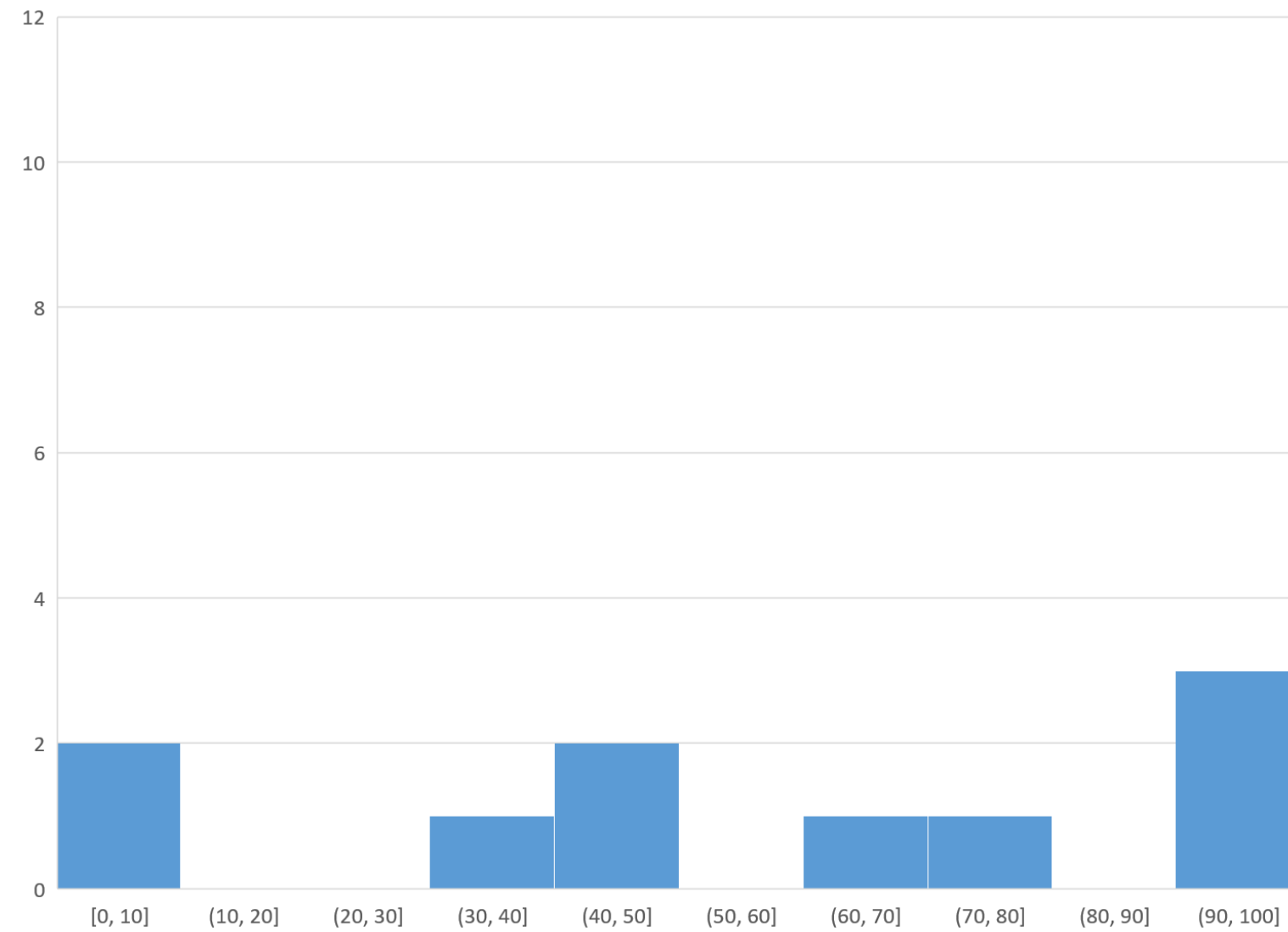
2019 2020 2021 2022 2023 2024 2025



+4 high priority applications

SITE	APPLICATION	WEEKLY AVAILABILITY (%)	EFFECTIVE USE OF AVAILABILITY (%)
ALLAN		99.9	1.4
		97.6	97.2
		96.3	99.9
		94.3	96.8
CORY	Tripper APC:	65.8	Tripper APC: 0.0
	Plow APC:	65.8	Plow APC: 100.0
	Mill Feed Balance:	65.8	Mill Feed Balance: 100.0
LANIGAN		93.3	91.1
PATIENCE LAKE		95.0	96.4
ROCANVILLE		63.1	70.2
		97.3	0.0
	CCT-4:	95.8	CCT-4: 0.0
	CCT-5:	91.5	CCT-5: 0.0
	CCT-6:	98.0	CCT-6: 0.0
	CCT-7:	96.0	CCT-7: 0.0
	Mill 2 Balancing:	94.4	Mill 2 Balancing: 100.0
Site Balancing:	88.7	Site Balancing: 83.9	

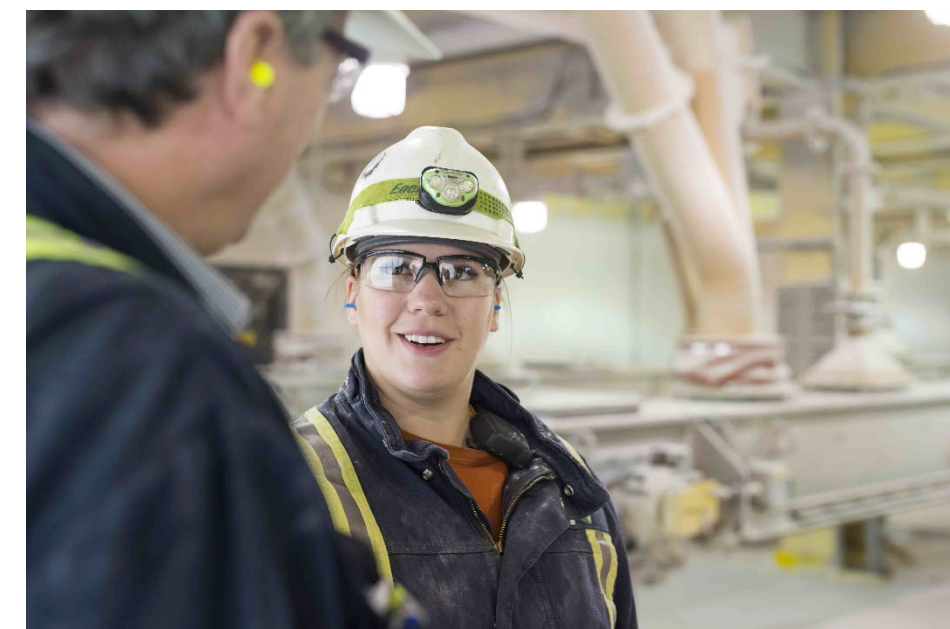
Distribution of Utilization - 2020



30% Highly Utilized

Lessons Learned - Foundational Considerations

APC Solution Success



Lessons Learned - Foundational Considerations

APC Solution Success

Champions

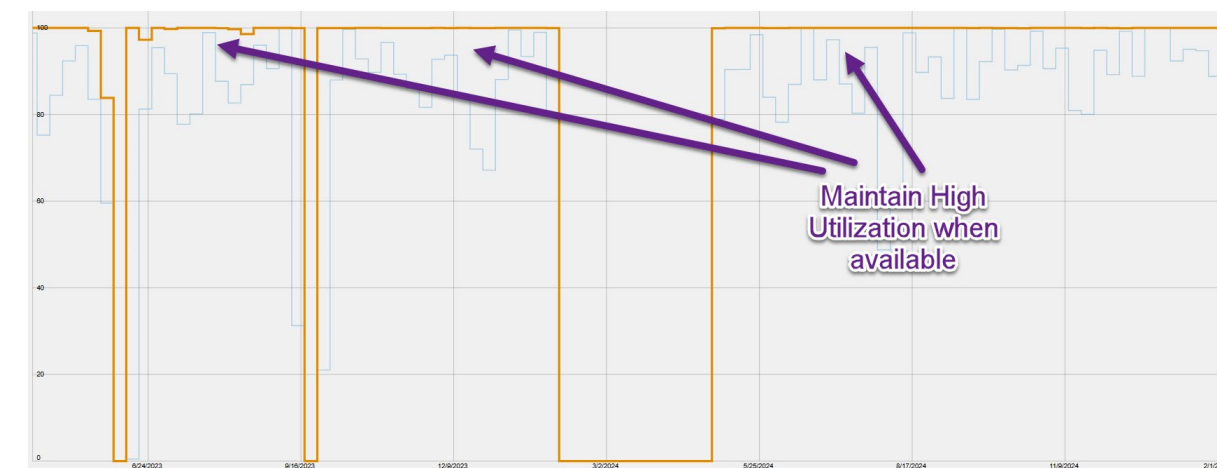
APC Solution KPIs

Consistent Control System

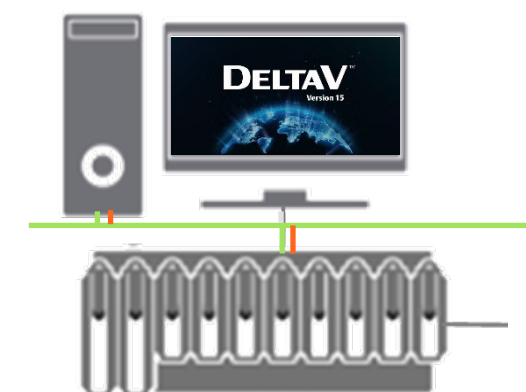
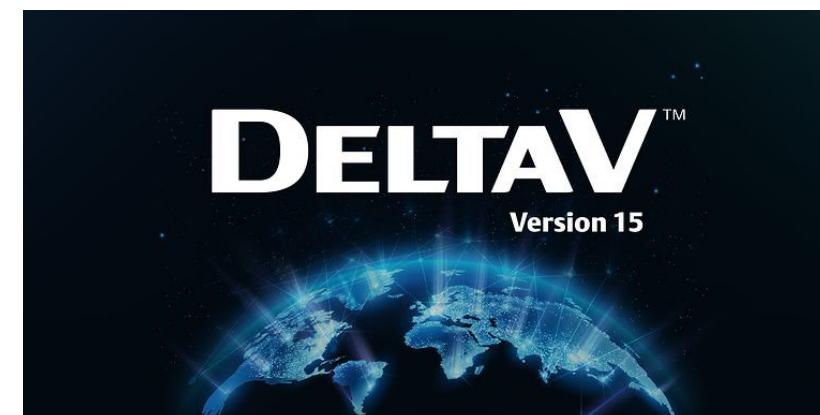
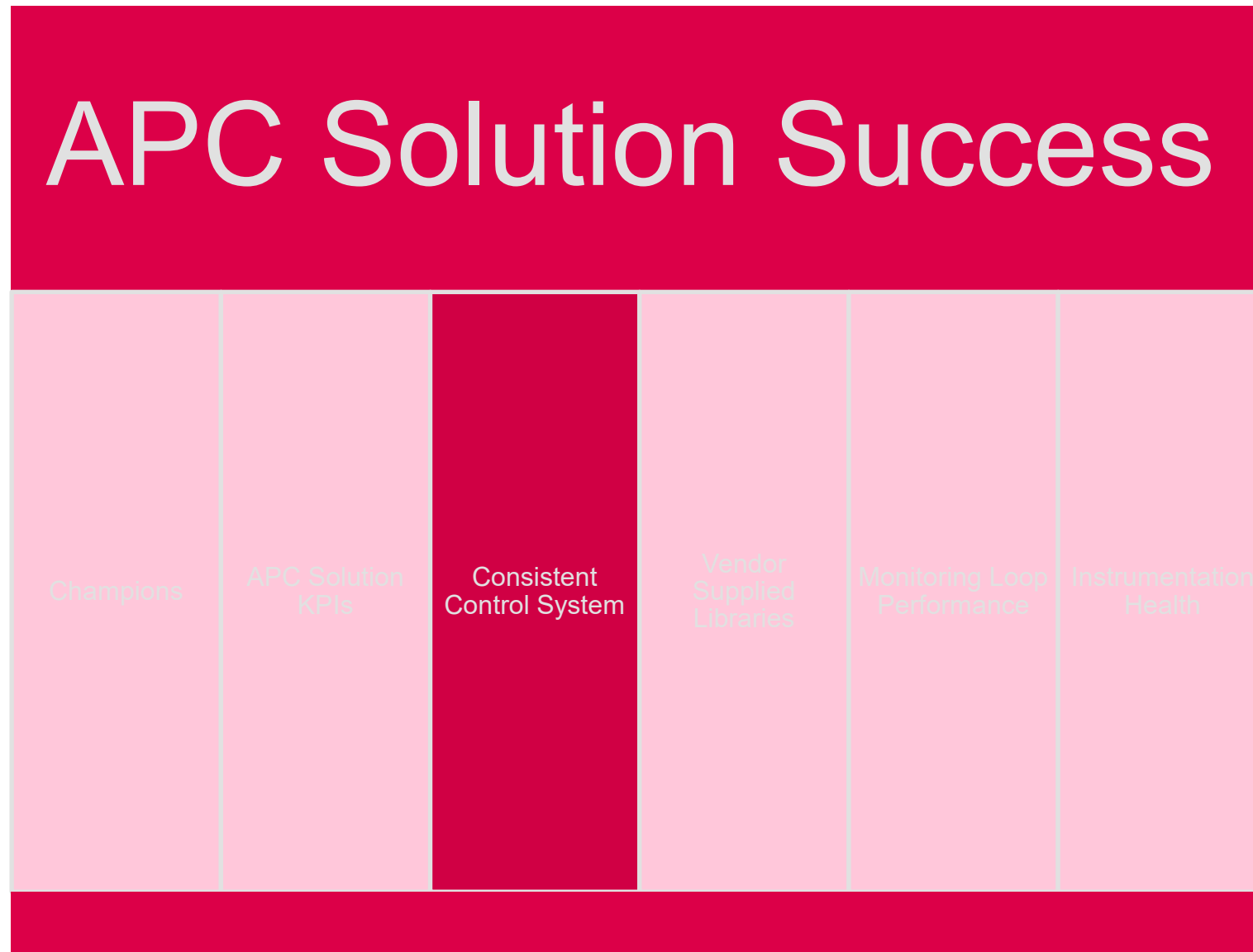
Vendor Supplied Libraries

Monitoring Loop Performance

Instrumentation Health

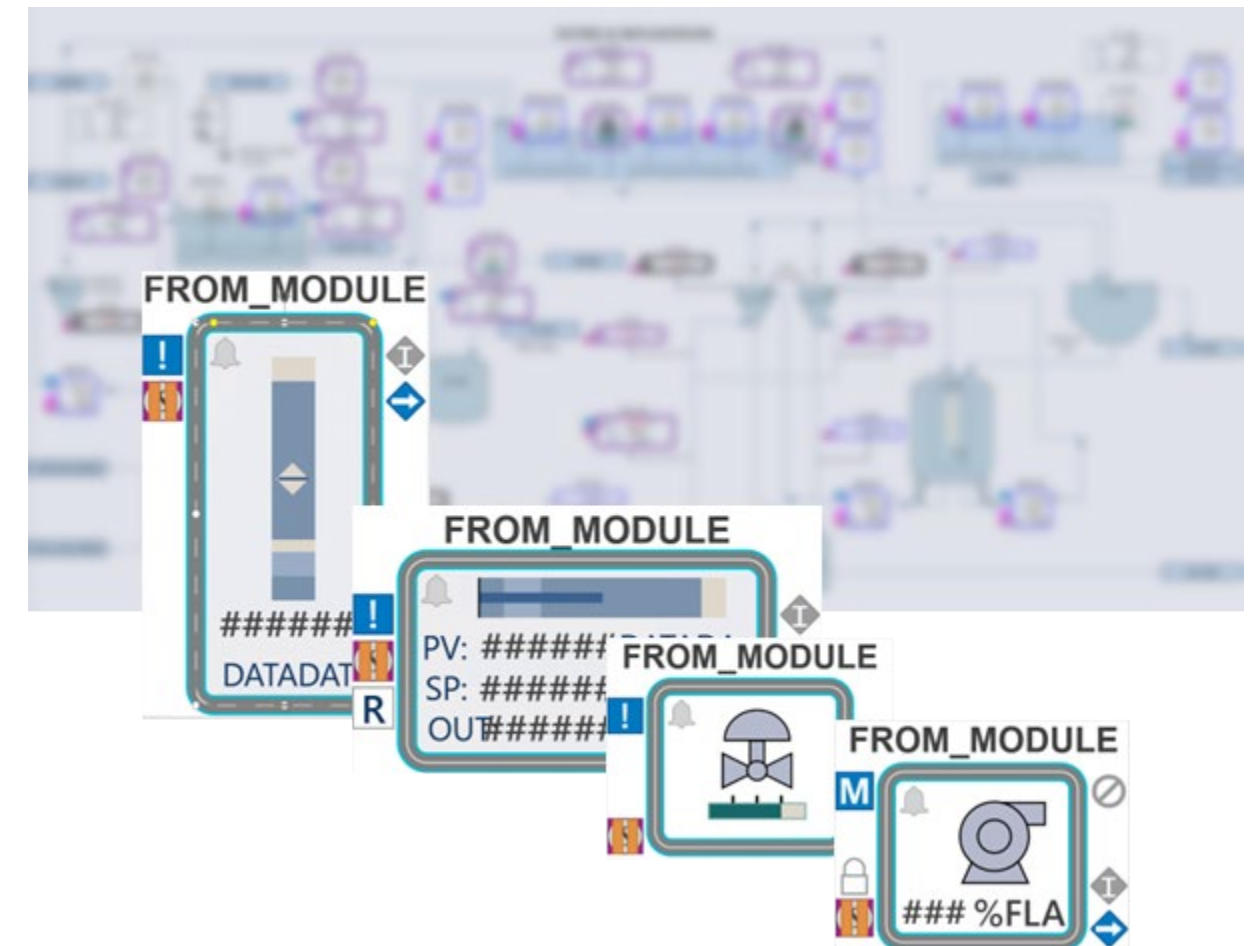
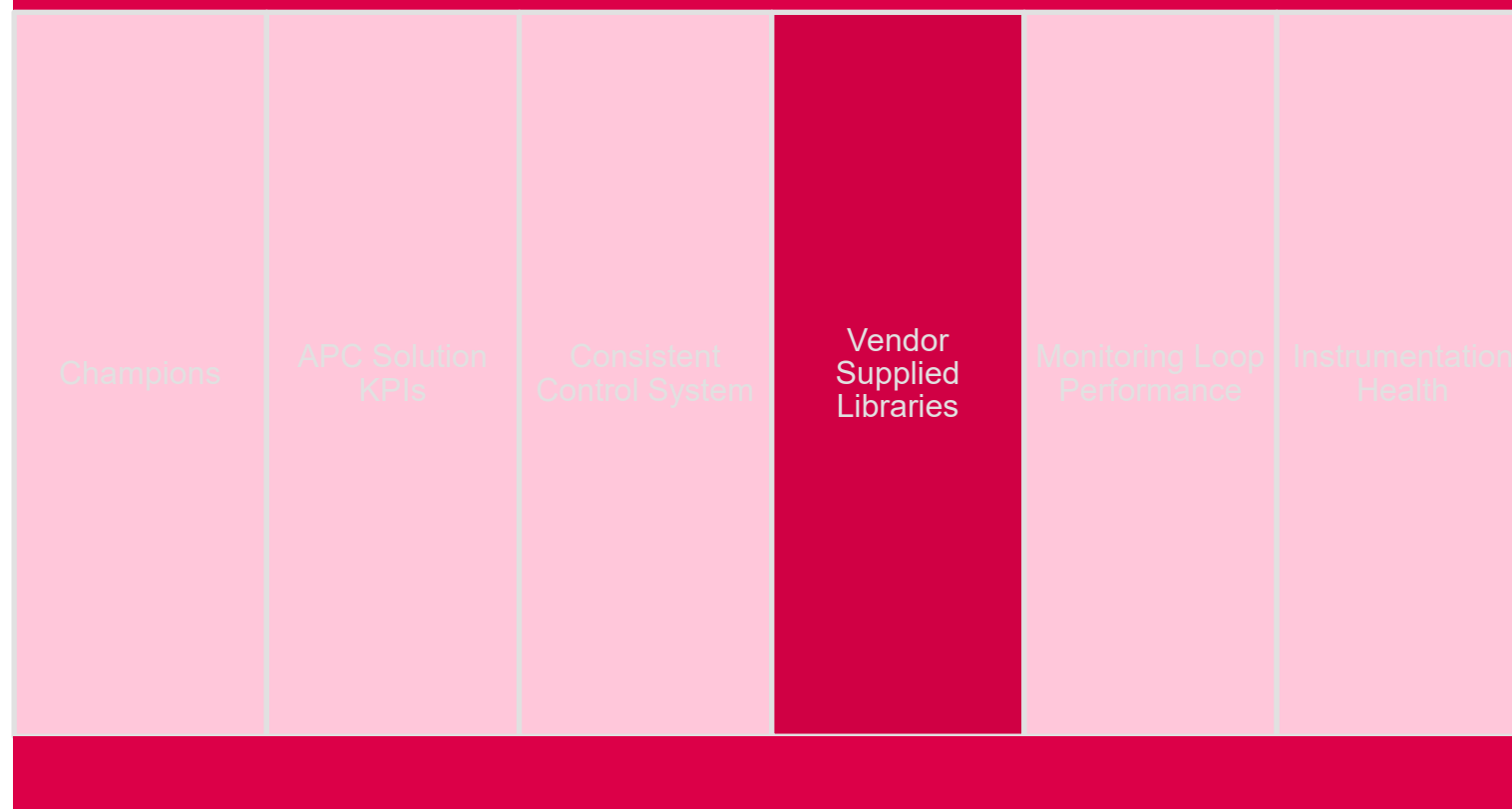


Lessons Learned - Foundational Considerations

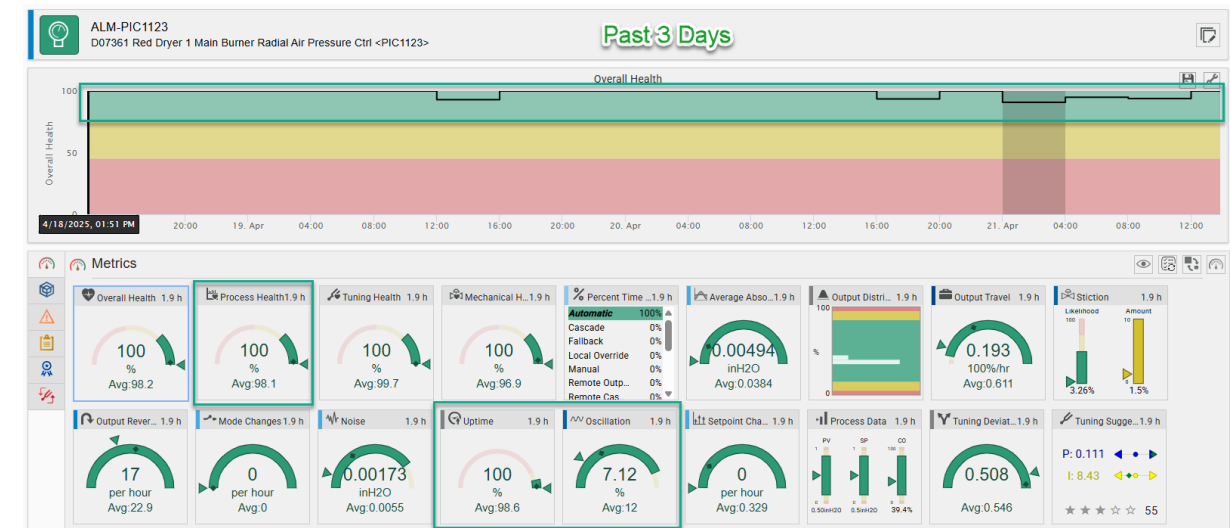
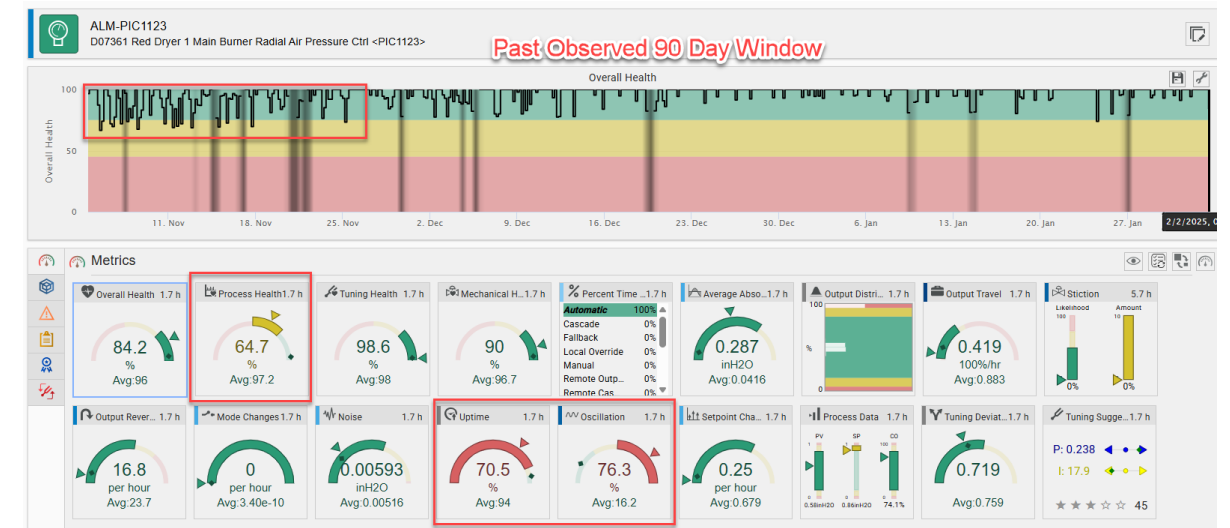
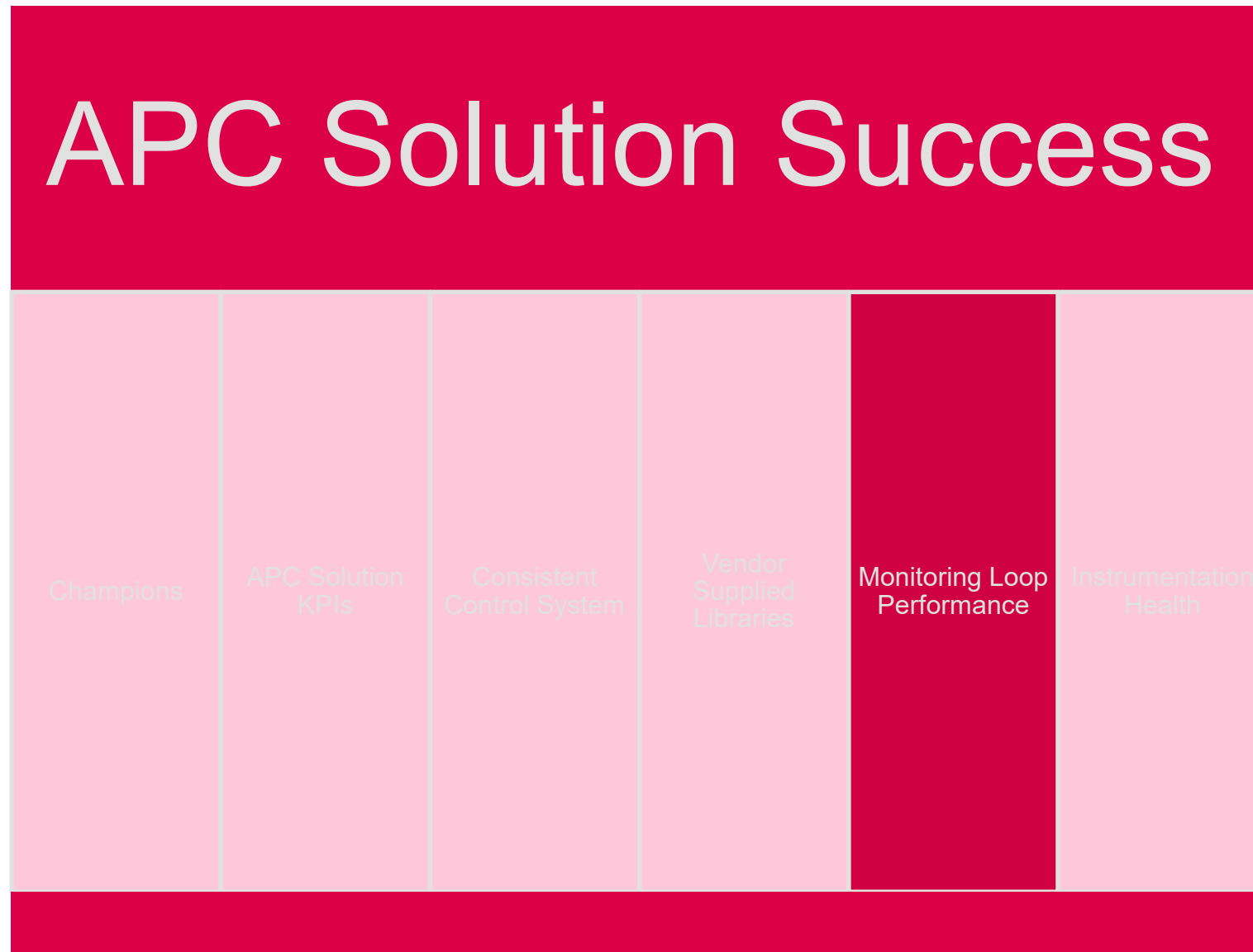


Lessons Learned - Foundational Considerations

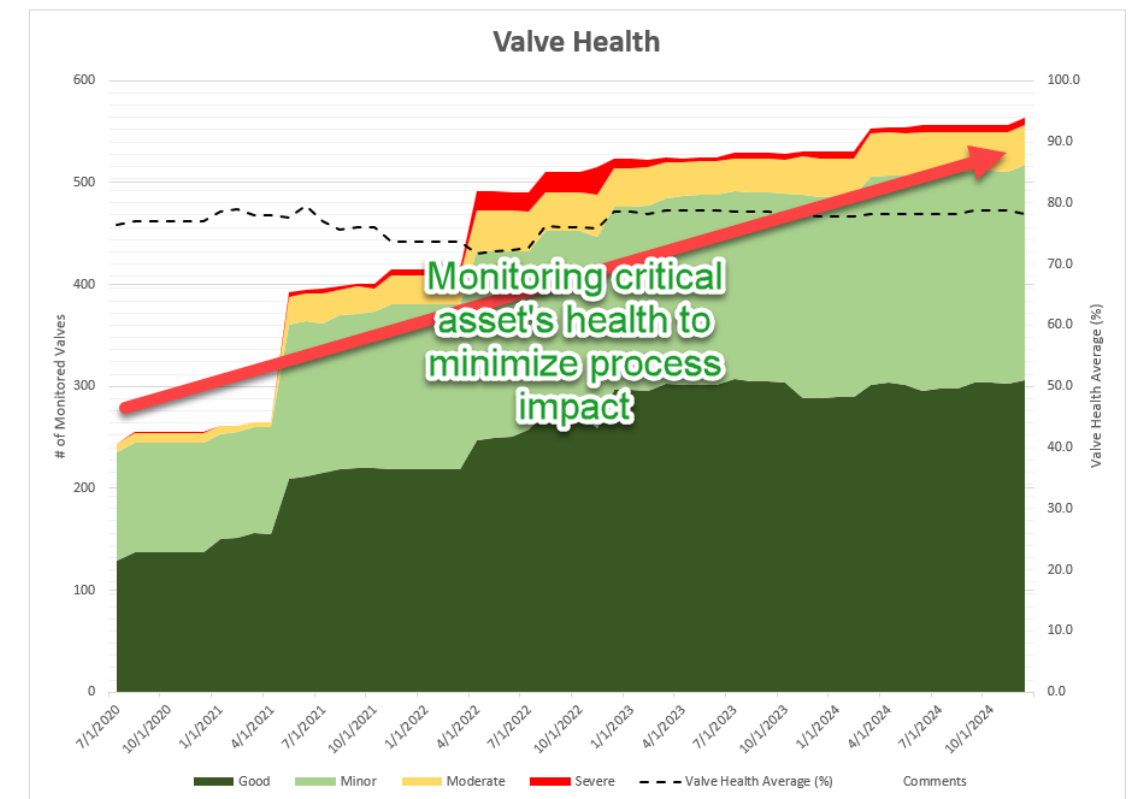
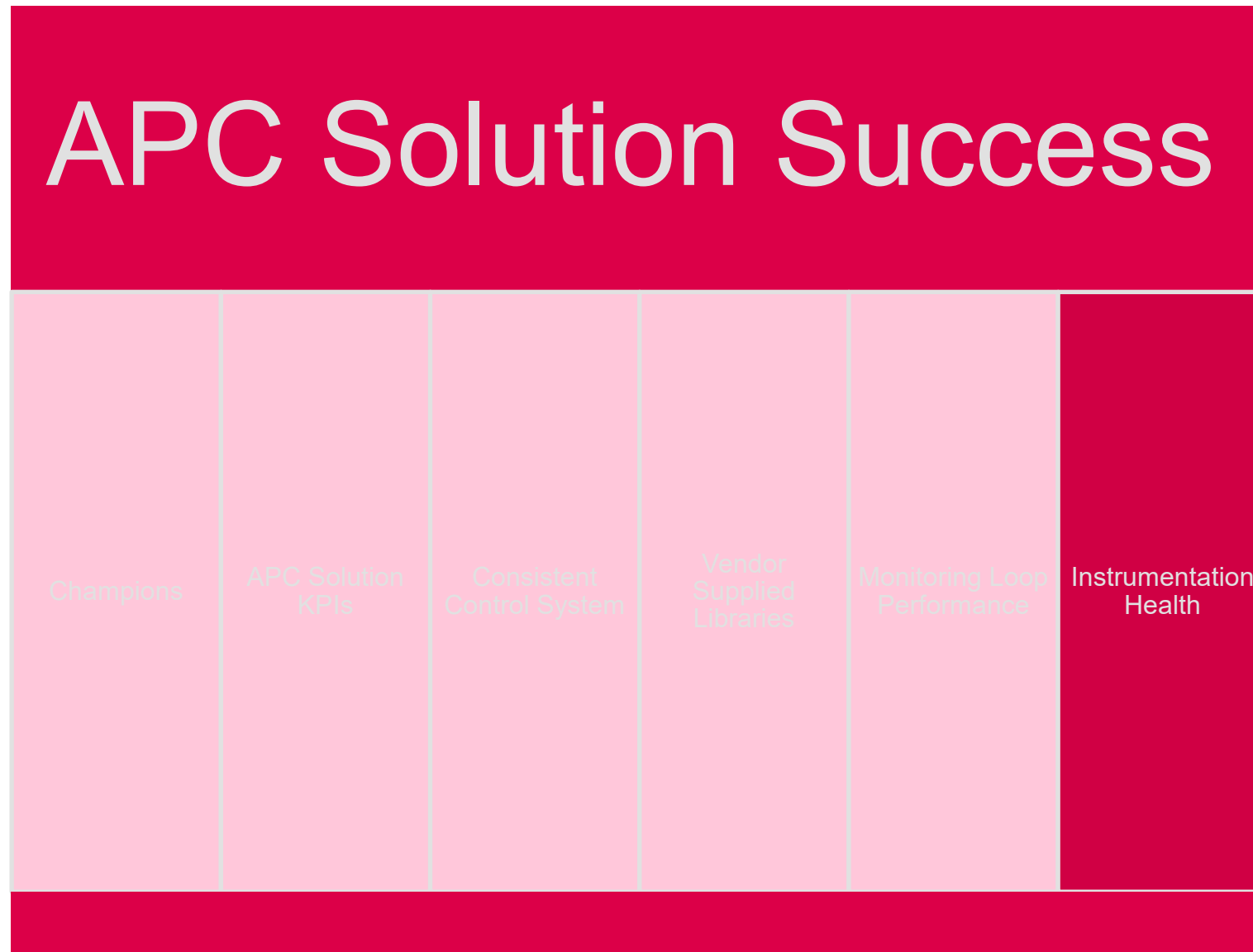
APC Solution Success



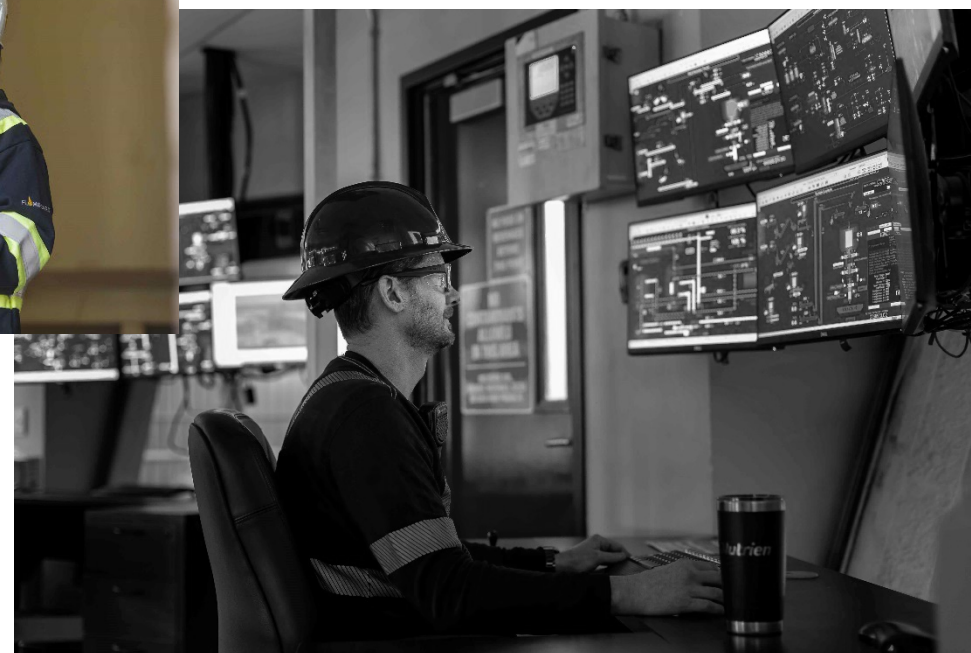
Lessons Learned - Foundational Considerations



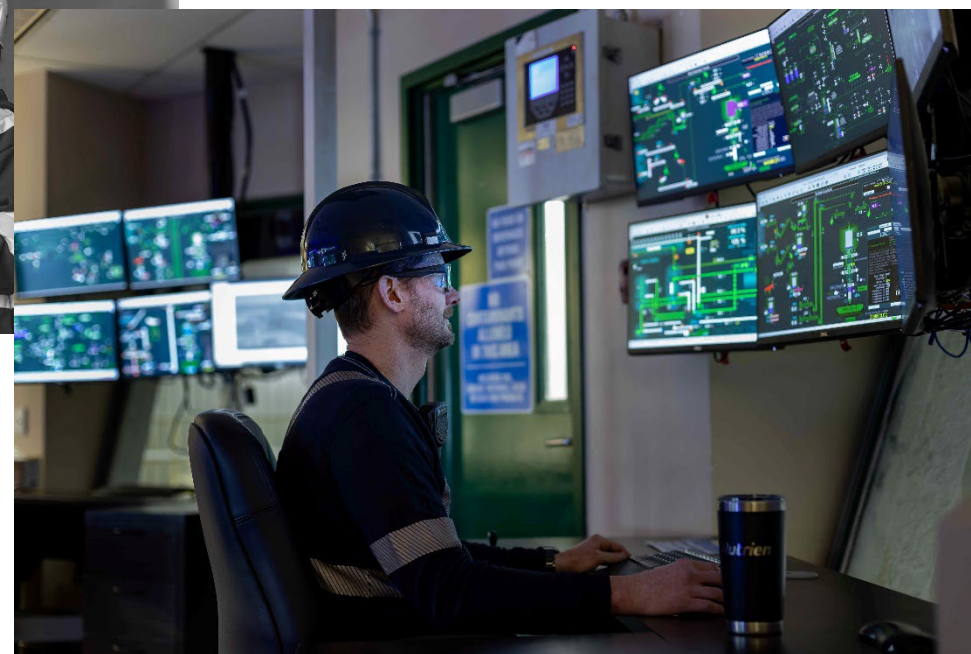
Lessons Learned - Foundational Considerations



Lessons Learned - Stakeholders



Lessons Learned - Operators



Lessons Learned - Feedback



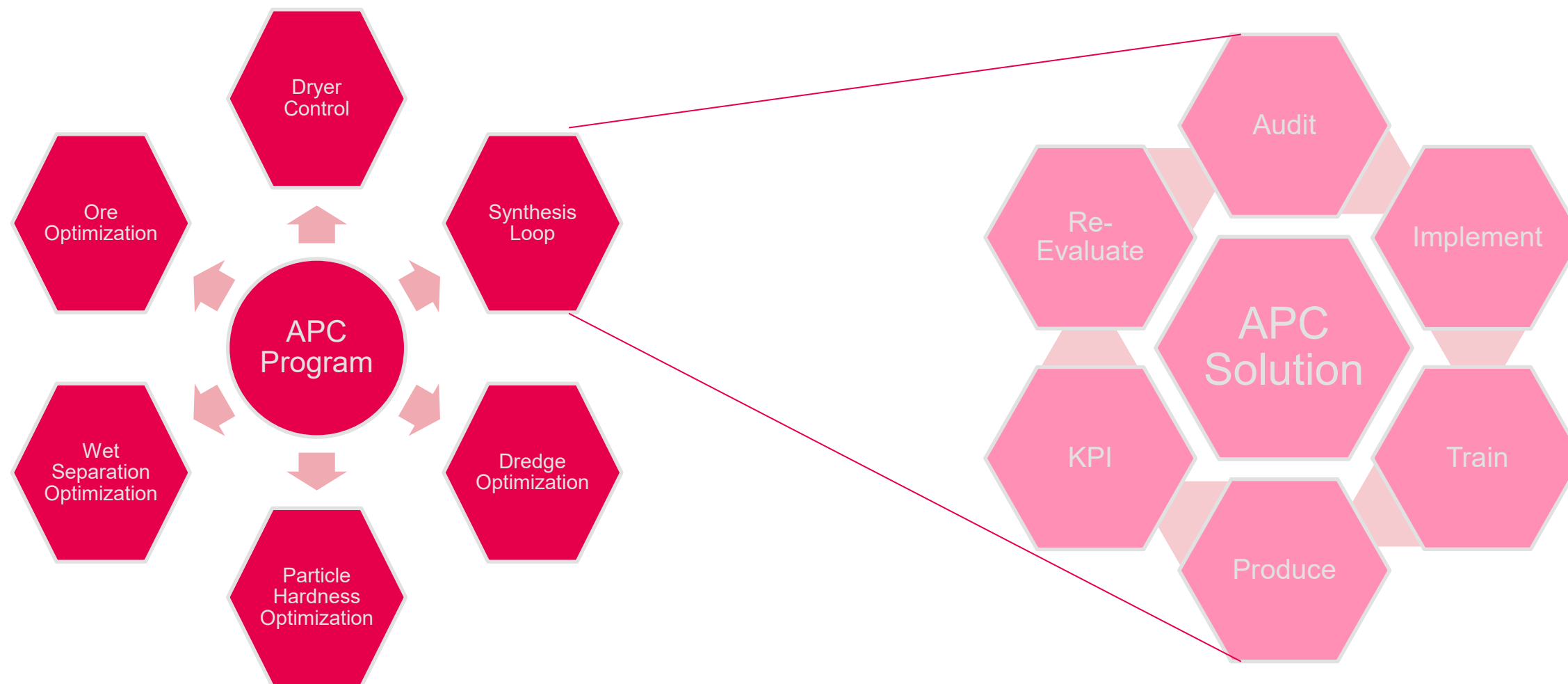
APC Solution Lifecycle



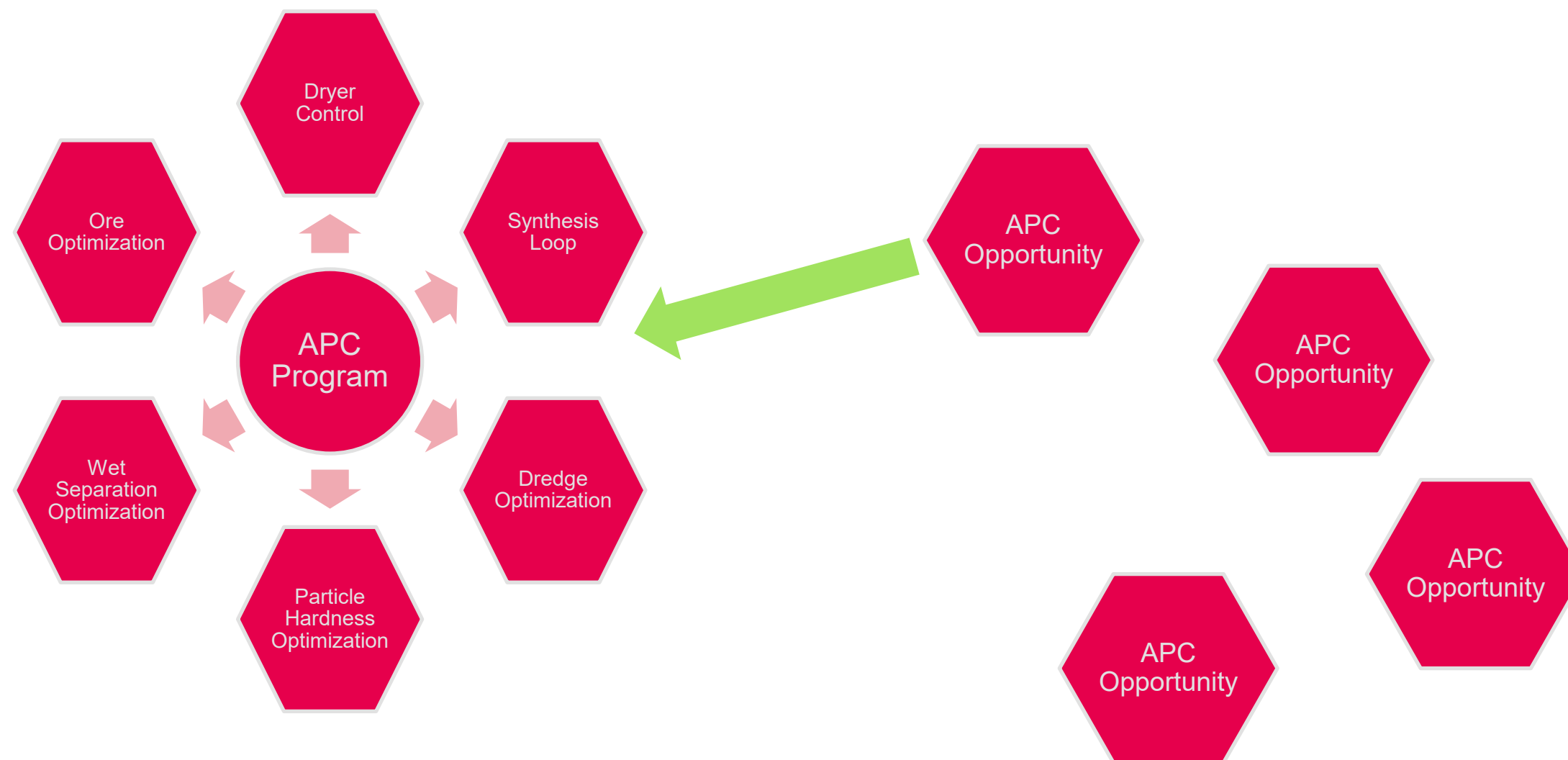
APC Solution Lifecycle



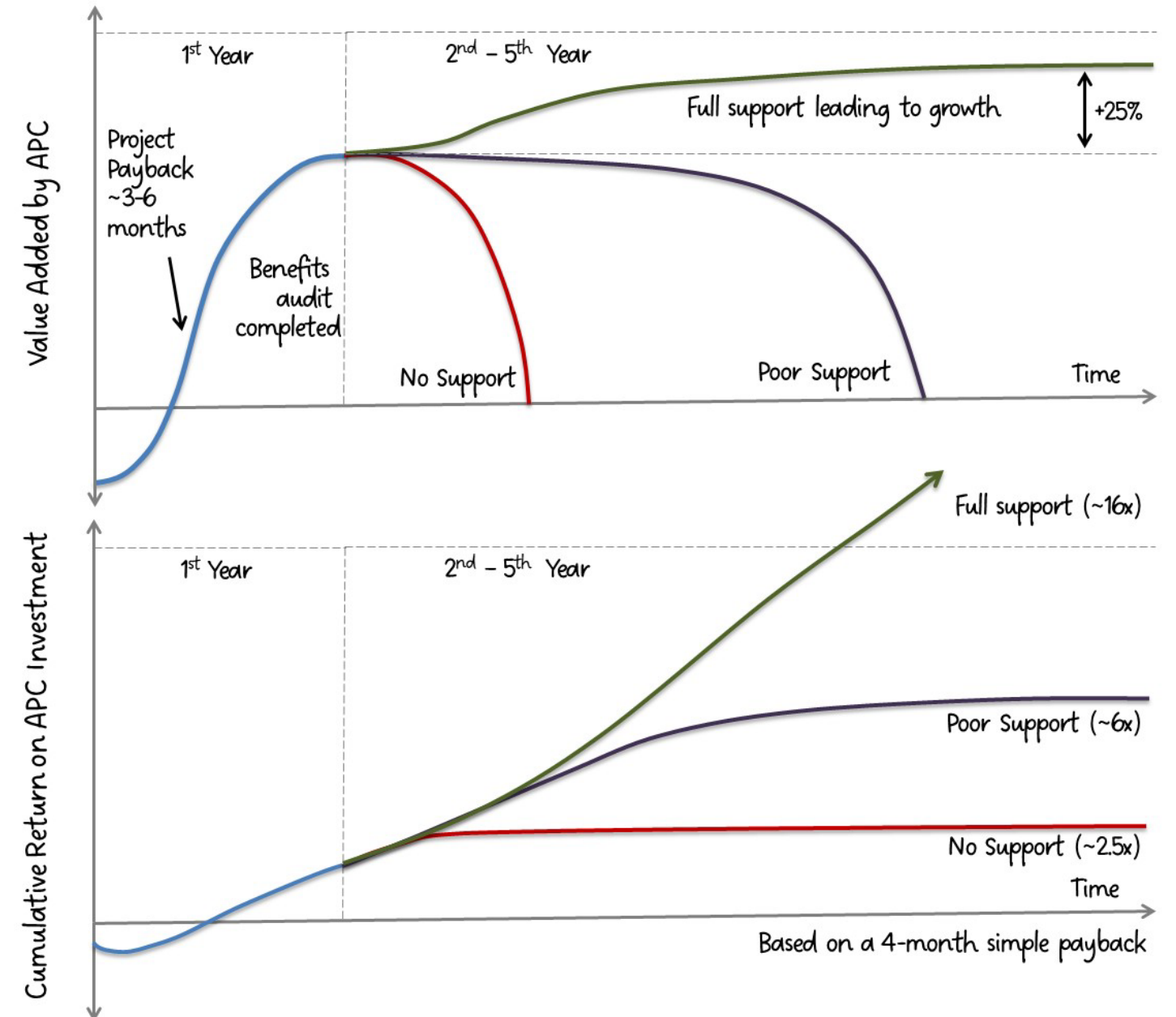
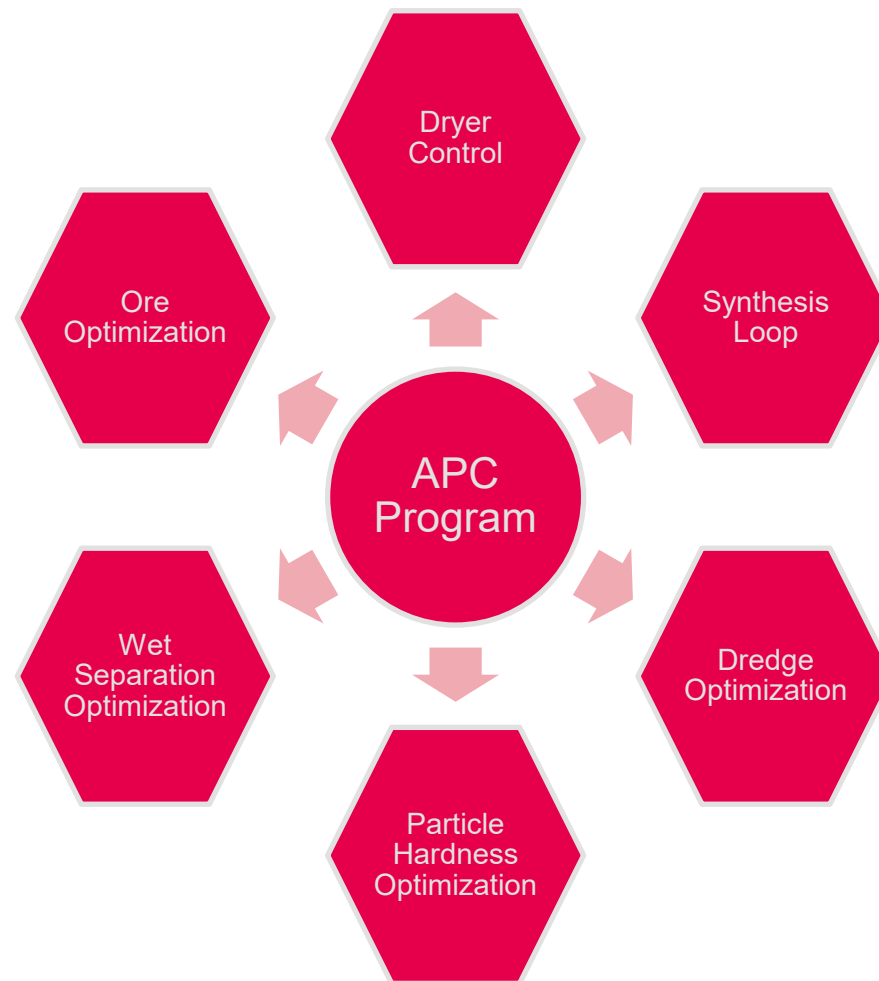
What the APC program looks like



Handling new opportunities



Sustaining Value



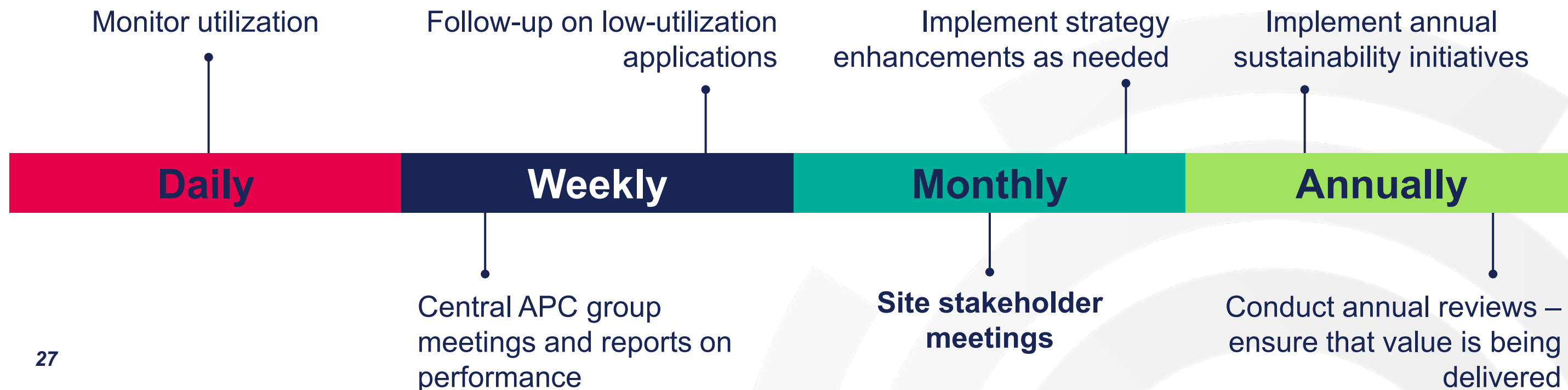
Proactive – Planned Sustainability Actions

Role of APC Support – APC Expertise

- Deep technical support & troubleshooting
- Analysis of benefits
- Provide updates based on learnings

Role of Site Personnel – First line of Defense

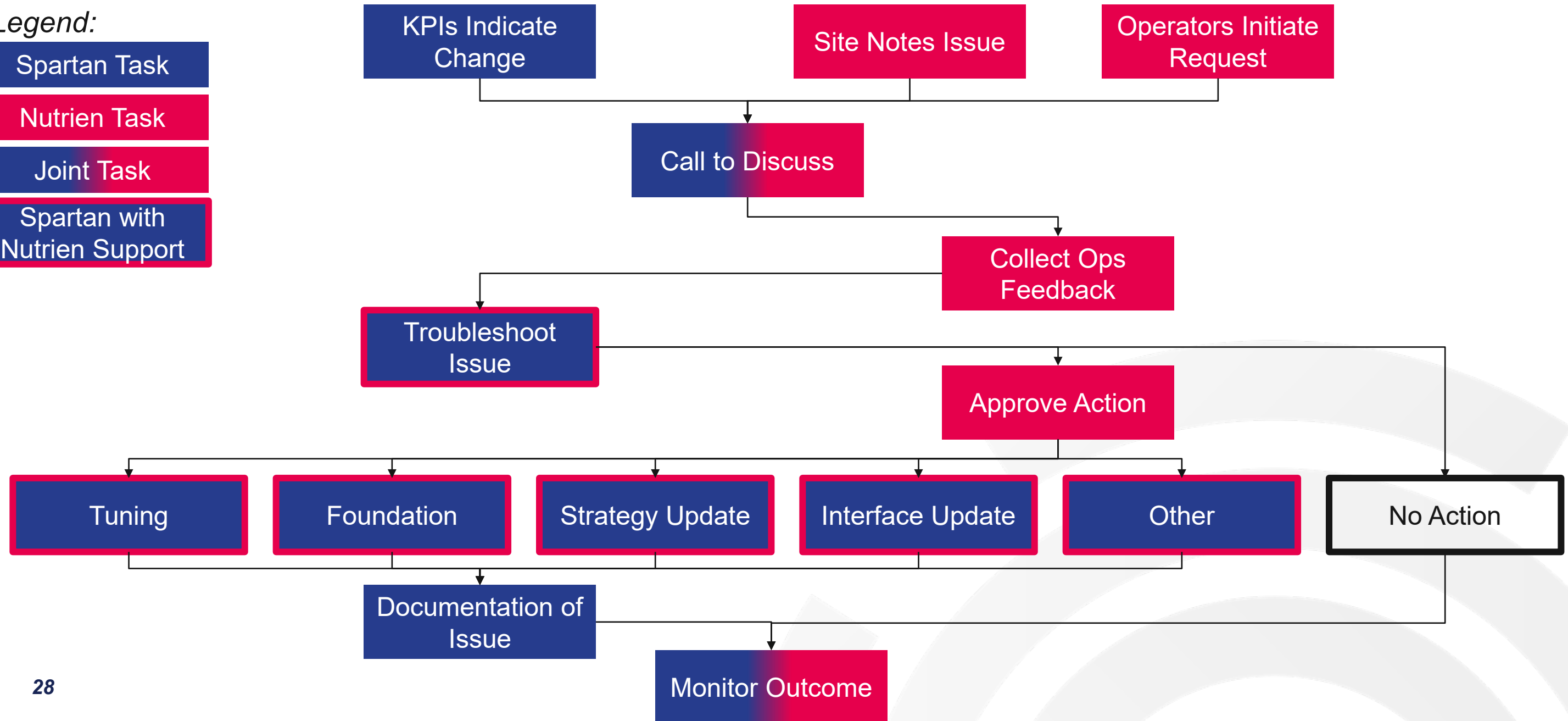
- Direct feedback from operators
- Knowledge of site activities
- Prioritization of opportunities



Reactive - Easy Communication to Support

Legend:

- Spartan Task
- Nutrien Task
- Joint Task
- Spartan with Nutrien Support

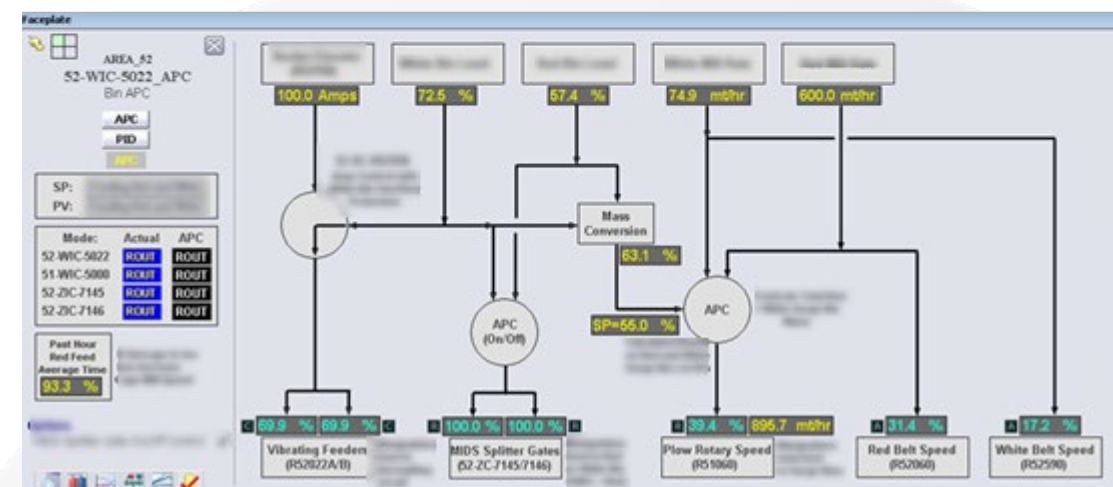
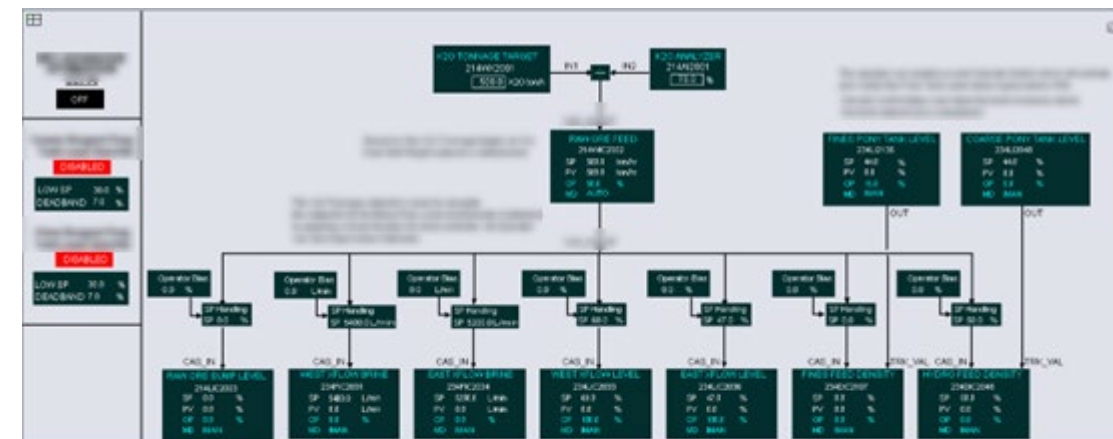
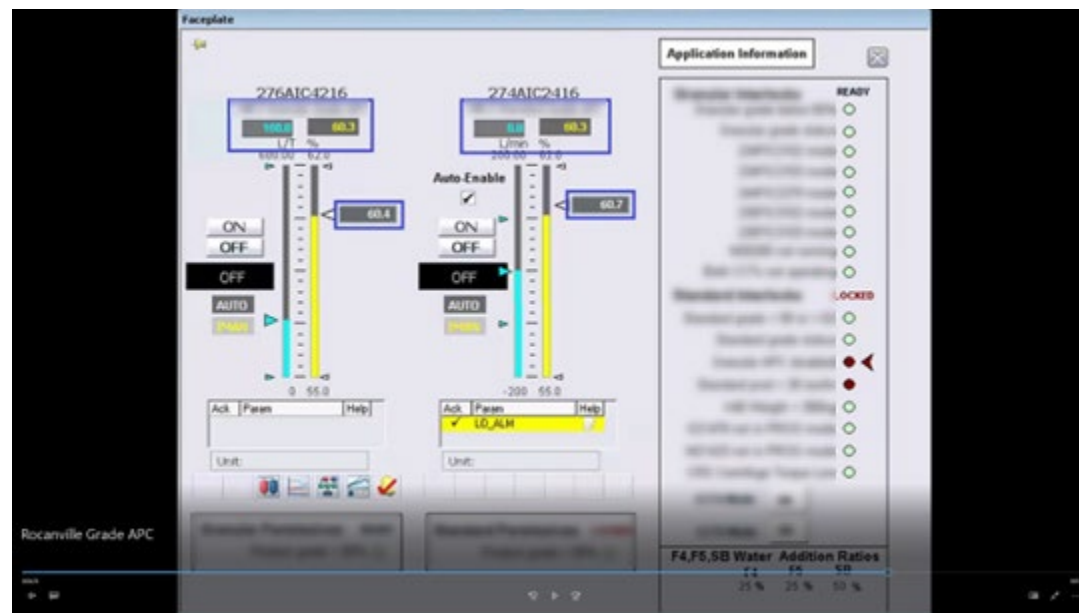
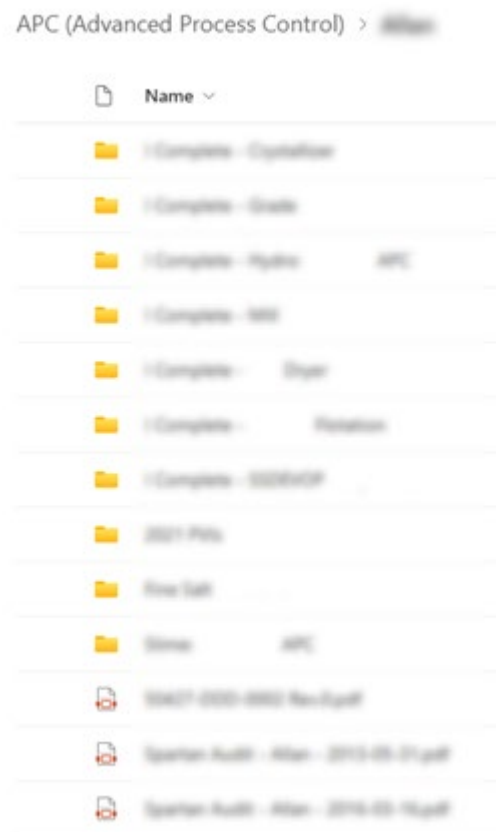


Enhancing – Annual Sustainability Initiatives

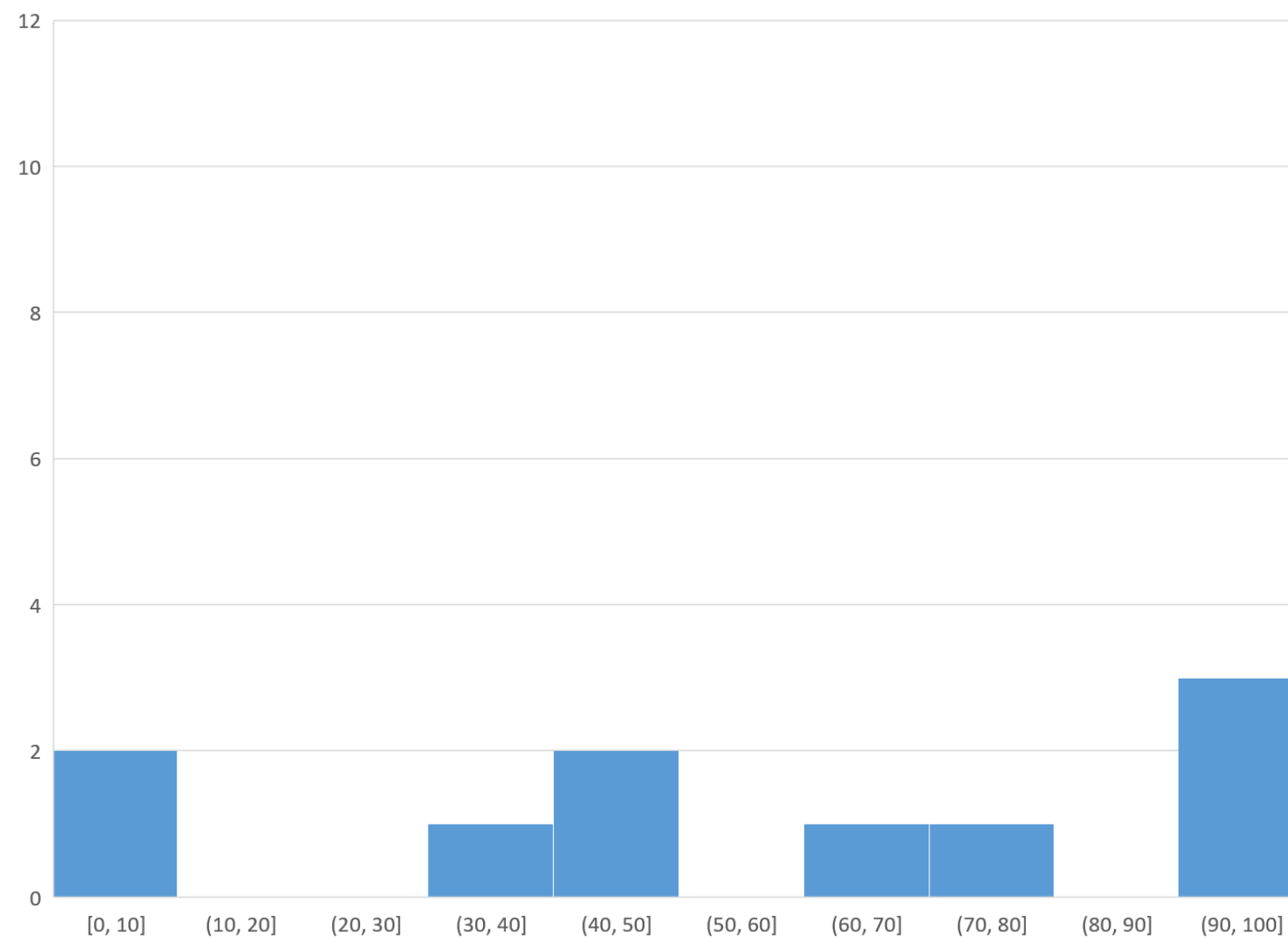
Ever-green documentation database

Operator Training Videos

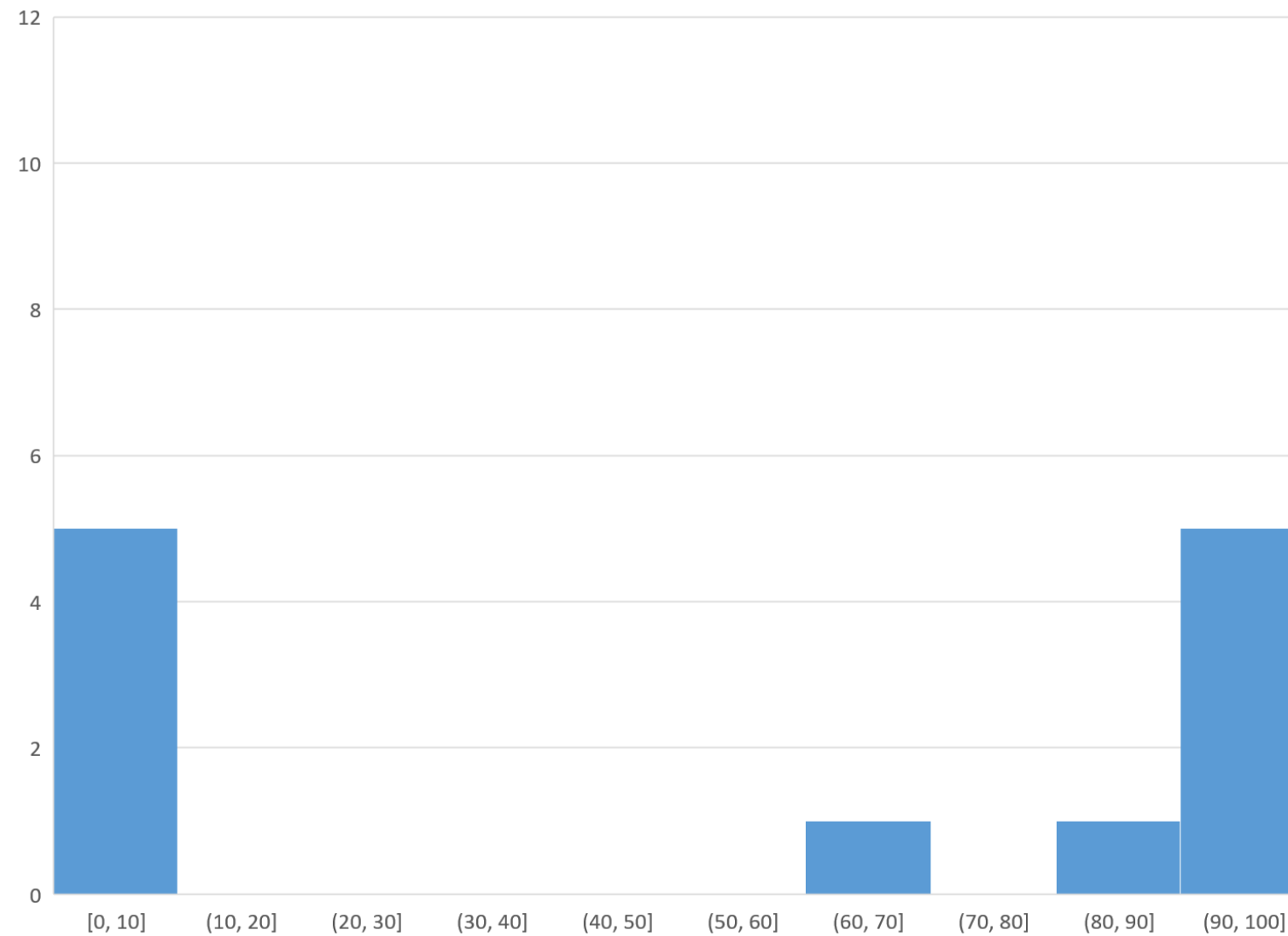
DeltaV Enhanced Operator Faceplates



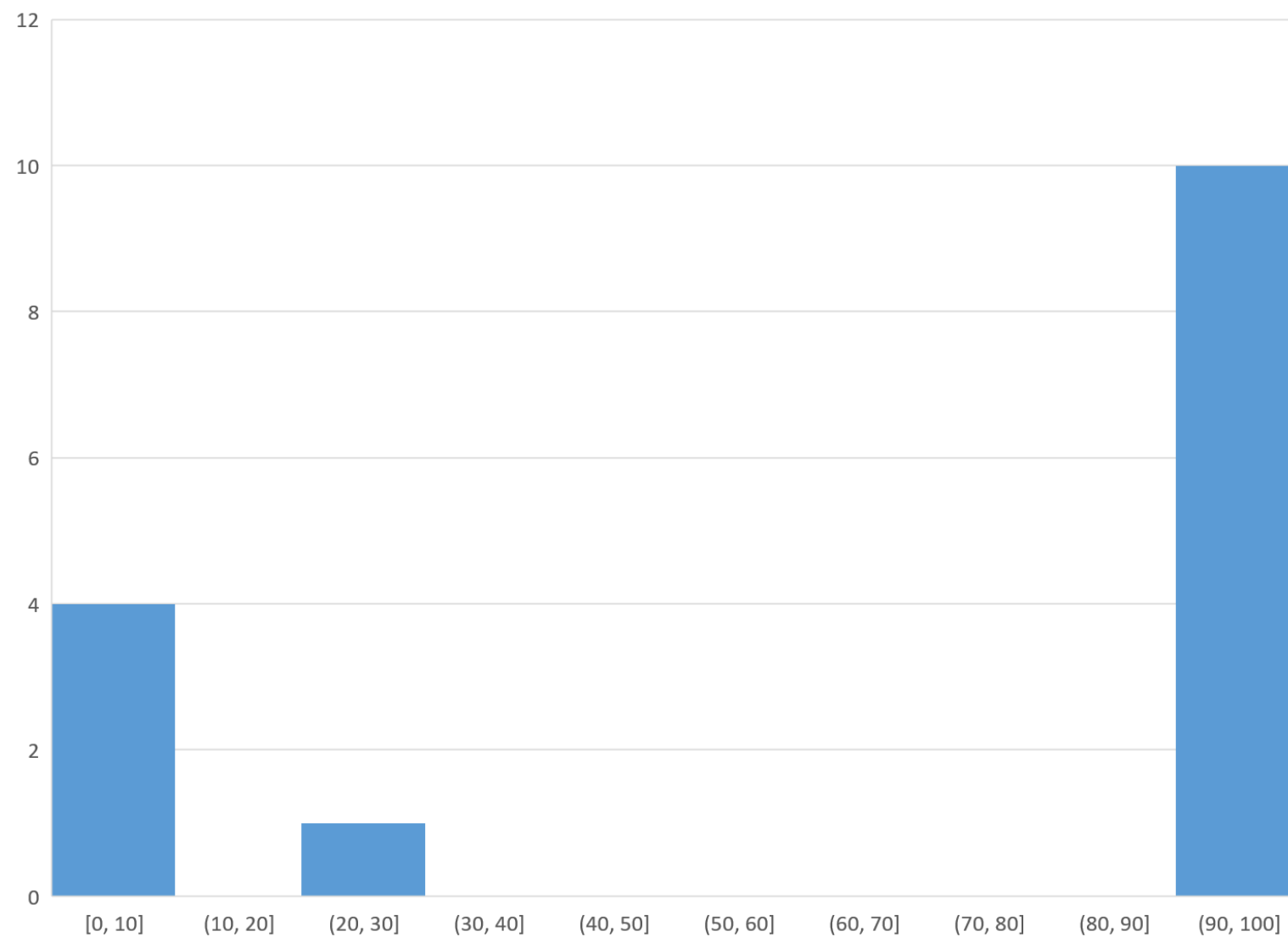
Distribution of Utilization - 2020



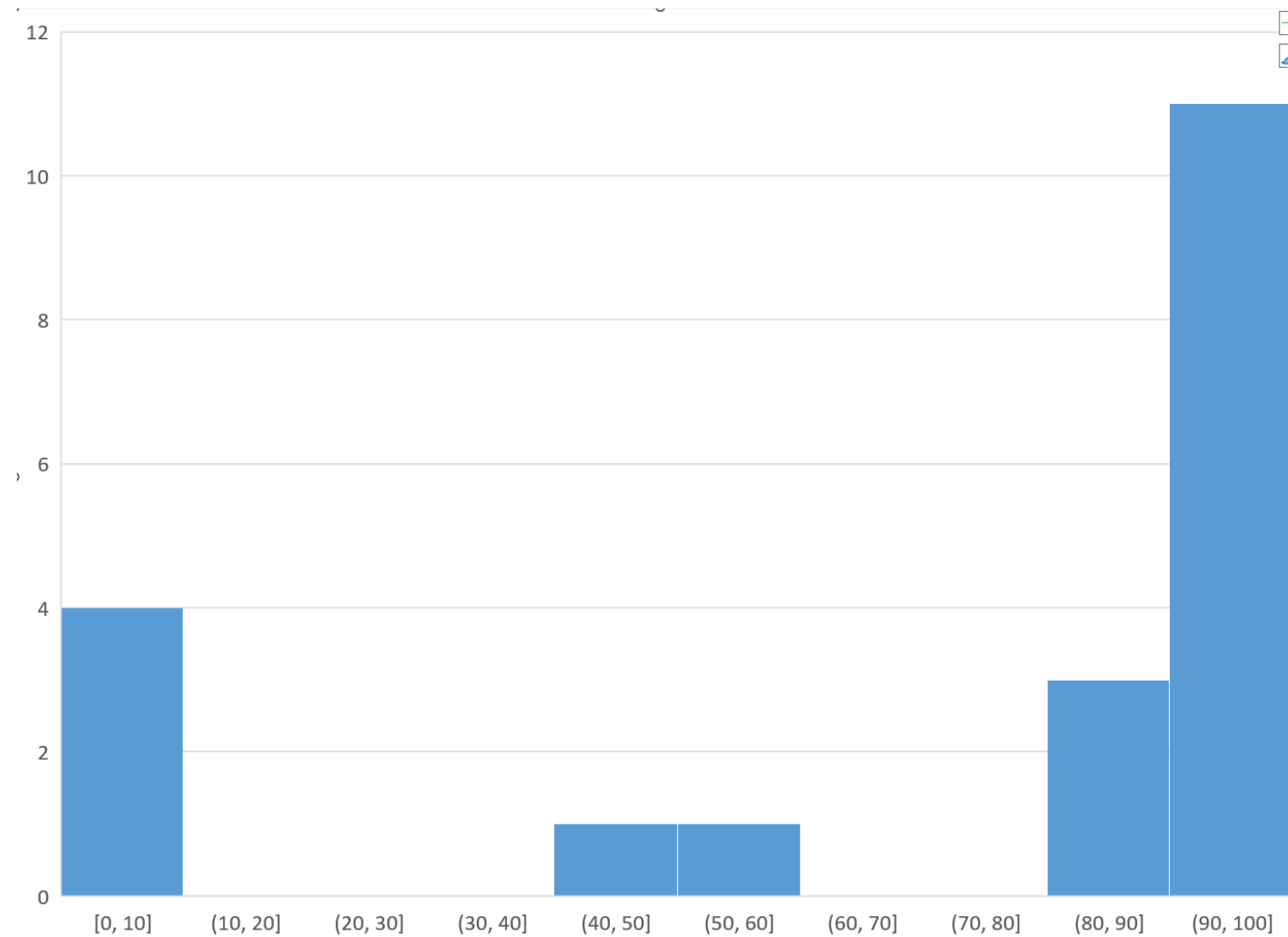
Distribution of Utilization - 2021



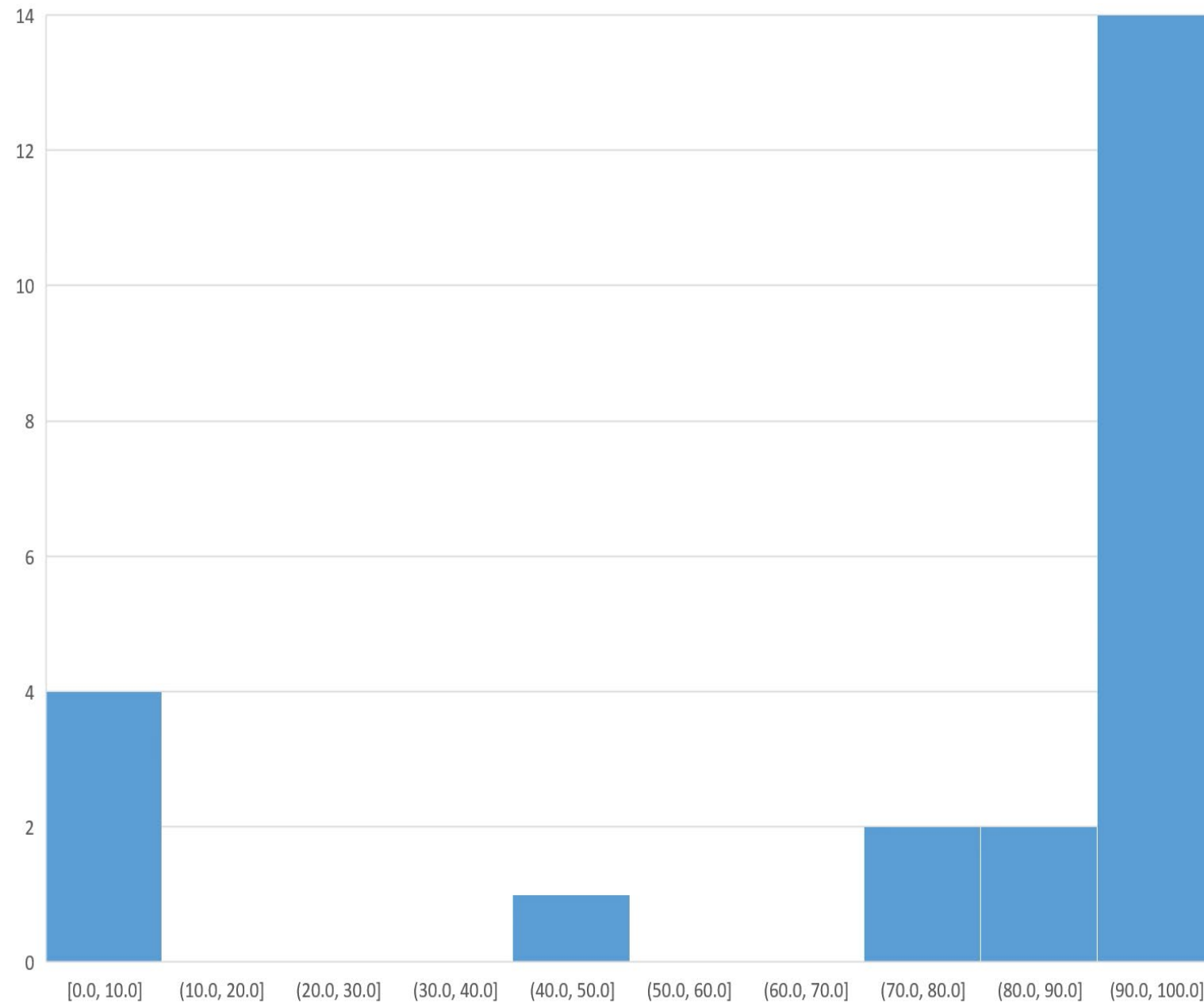
Distribution of Utilization - 2022



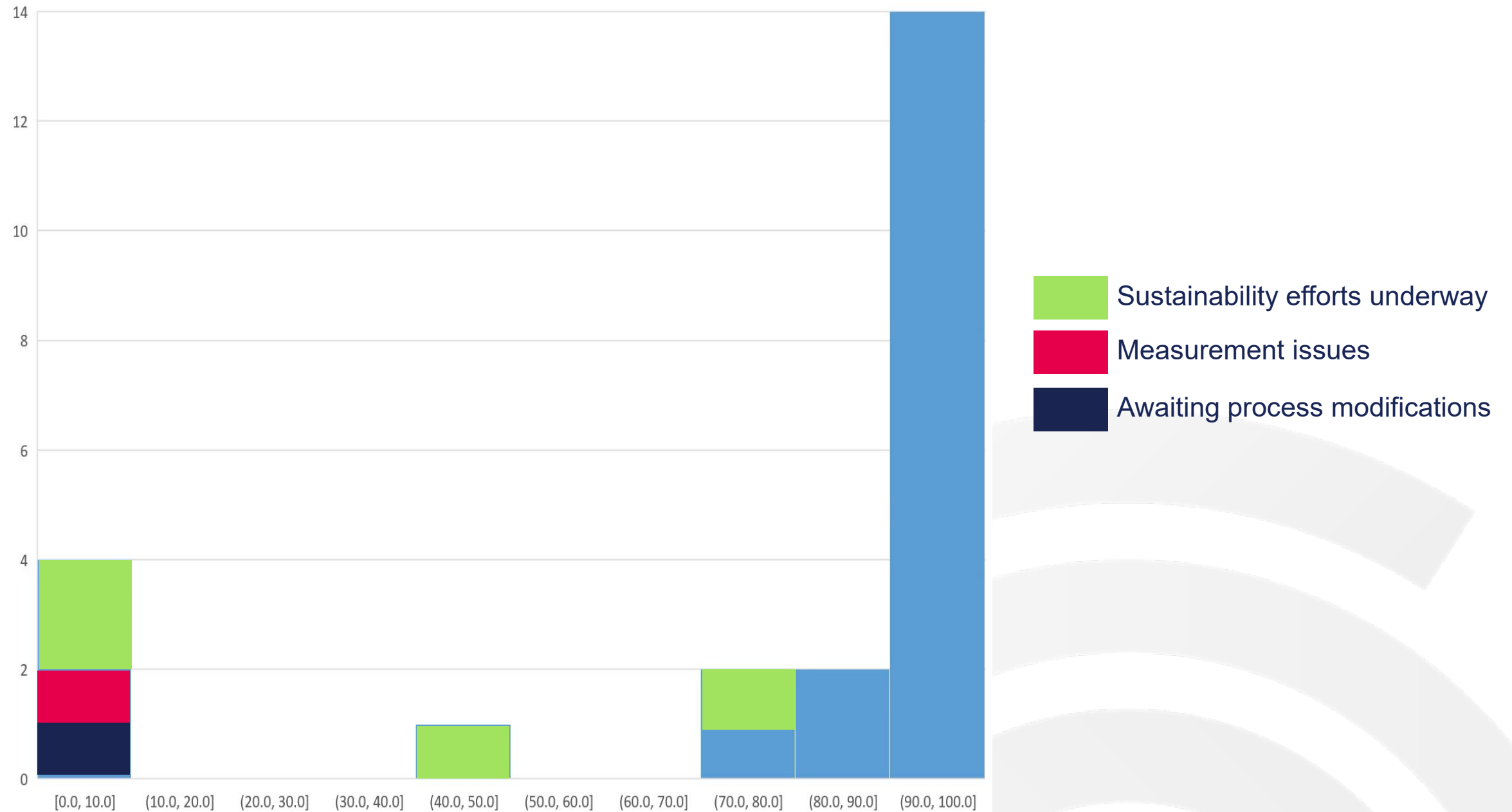
Distribution of Utilization - 2023



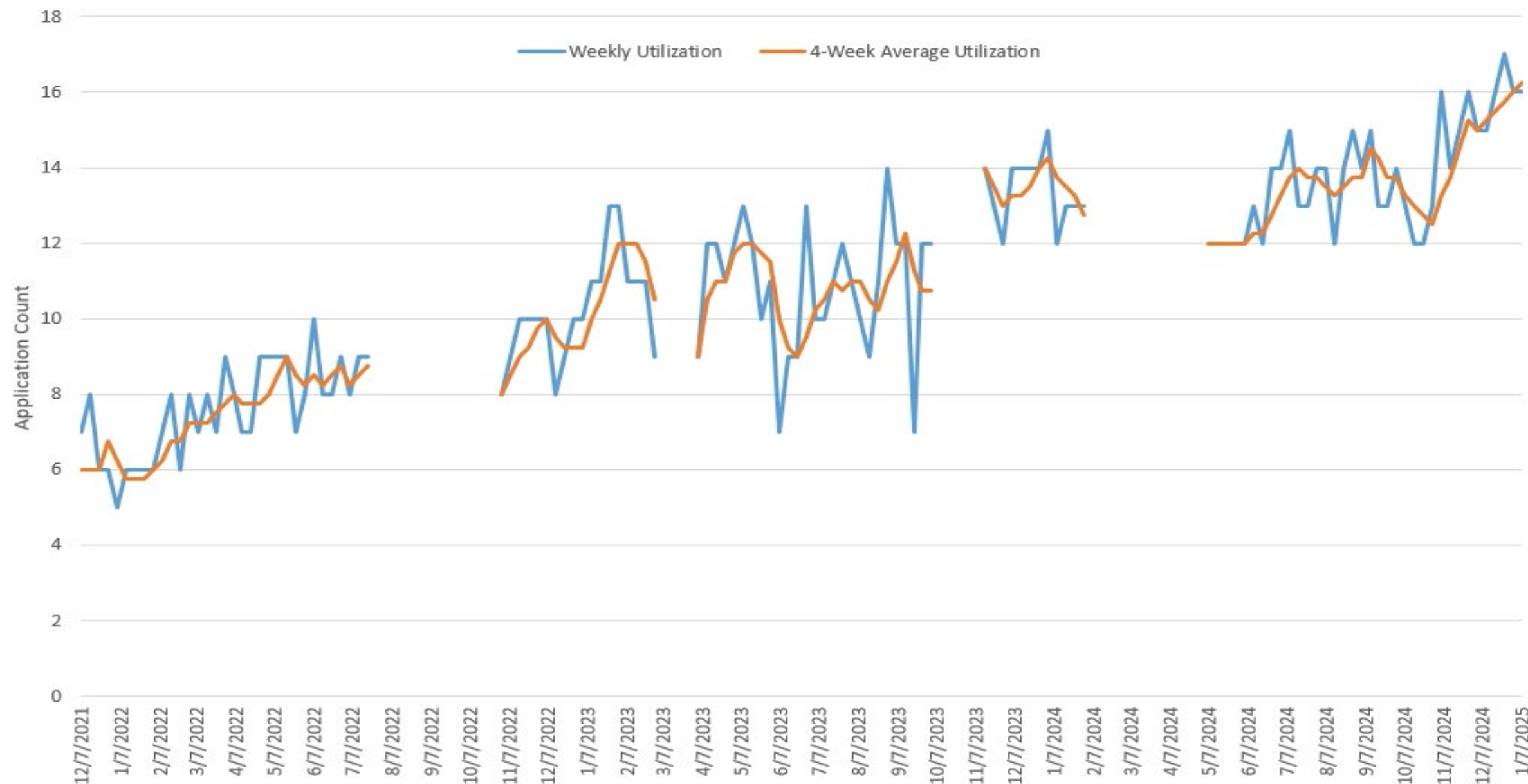
Distribution of Utilization - 2024



Distribution of Utilization



Applications with High (>85%) Weekly Utilization 2021-2025



APC Sustainability Program

Allan		0.0	0.0	0.0		
Allan		97.1	99.9	2.8	Improved product recovery	
Allan		99.1	99.3	0.1	Reduced CO2 usage	
Allan		100.0	100.0	0.0	Reduced cost and emissions	
Allan		100.0	100.0	0.0	Reduced cost and emissions	
Allan		100.0	100.0	0.0	Reduced cost and emissions	
Allan		100.0	99.9	0.0	Reduced cost and emissions	
Allan		99.9	100.0	0.1	Improved product recovery	
Allan						
Allan						
Allan						
Cory						
Lanigan						
Lanigan						
Lanigan						
Lanigan		100.0	59.6	-40.3	Reduced cost and emissions	
Lanigan		99.4	94.0	-5.4	Improved water quality	
Patience Lake		81.2	14.9	-66.3	Reduced cost and emissions	
Rocanville		98.9	99.7	0.8	Increased standard product recovery	
Rocanville		0.0	0.0	0.0	Increased product recovery	
Rocanville		0.0	0.0	0.0	Increased product recovery	
Rocanville		100.0	99.0	-1.0	Improved product recovery	
Fort Sask		0.0	100.0	100.0	Improved production efficiency	

From just 8 of 23 applications with active tracking direct value...

3.8% Dryer Gas/Emission Savings

in 2024

Thanks & Acknowledgements



Emerson Impact Partner

- Talented dedicated site champions who are enthusiastic in operational excellence
- Site stakeholders who see the value in this program
- Site operators for their continued feedback
- Corporate stakeholders who support the program

- All members of the Advance Process Control Team
- Members of the Service Team
- Our asset specialists in keeping the valves healthy



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Thank You