



NY Power
Authority

NYPA's Driving Asset Performance - Asset Strategy

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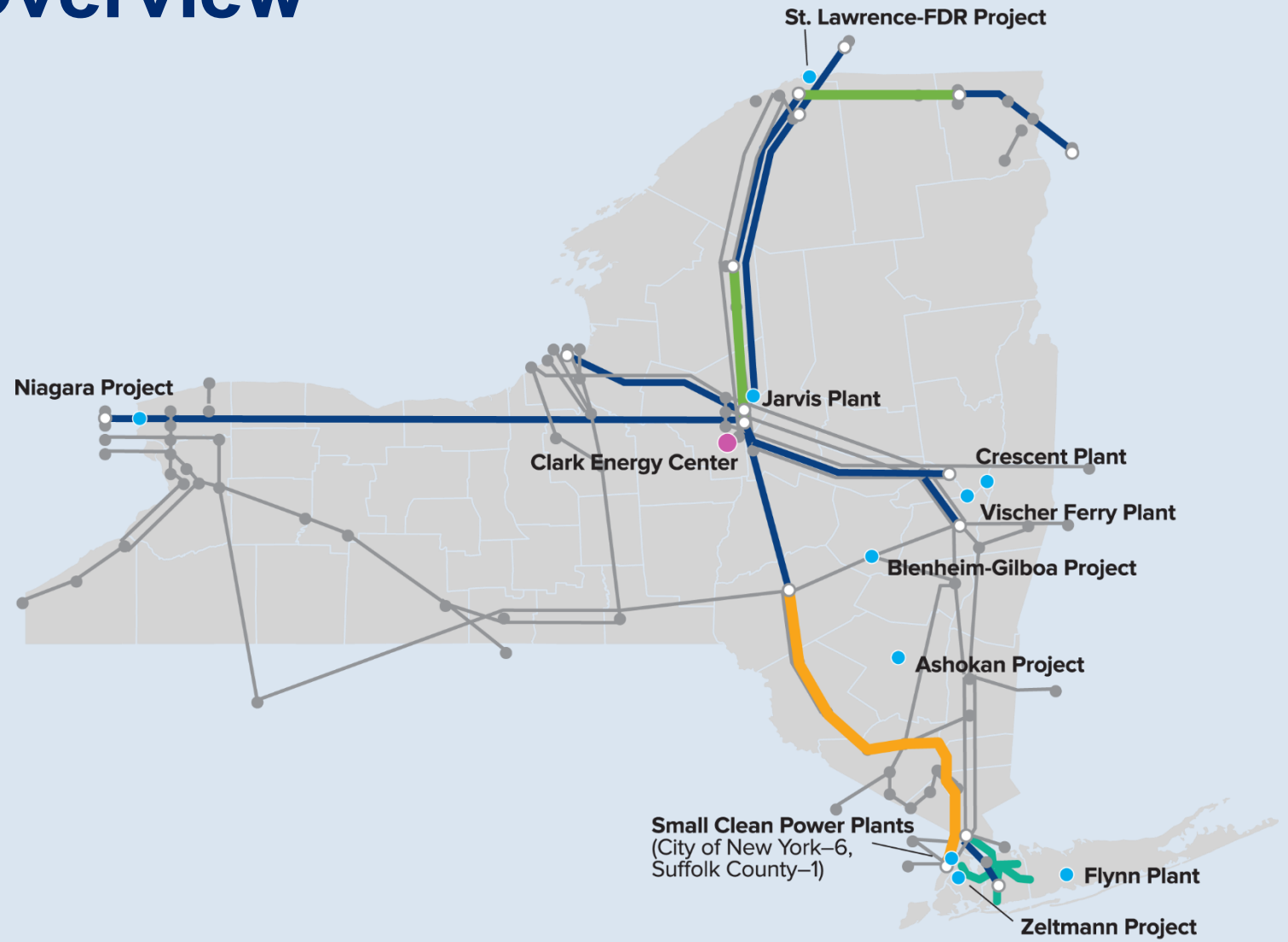
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NYPA Asset Base Overview

- Established in 1931
 - 1st power 1958
- 17 Generating Facilities
 - 6,000 MW Capacity
- 1550+ Circuit Miles
- 2250+ Employees



VISION2030 Renewed



Drive the
CLEAN ENERGY
transformation through
emissions-free generation



Be the leading
TRANSMISSION
developer, owner and
operator for New York State



Enable
CUSTOMERS
to achieve their
decarbonization goals



Revitalize
the New York State
CANAL System



Uplift our
PEOPLE and live
our **VALUES**



Support the diverse
needs of the
COMMUNITIES in
which we operate
and impact



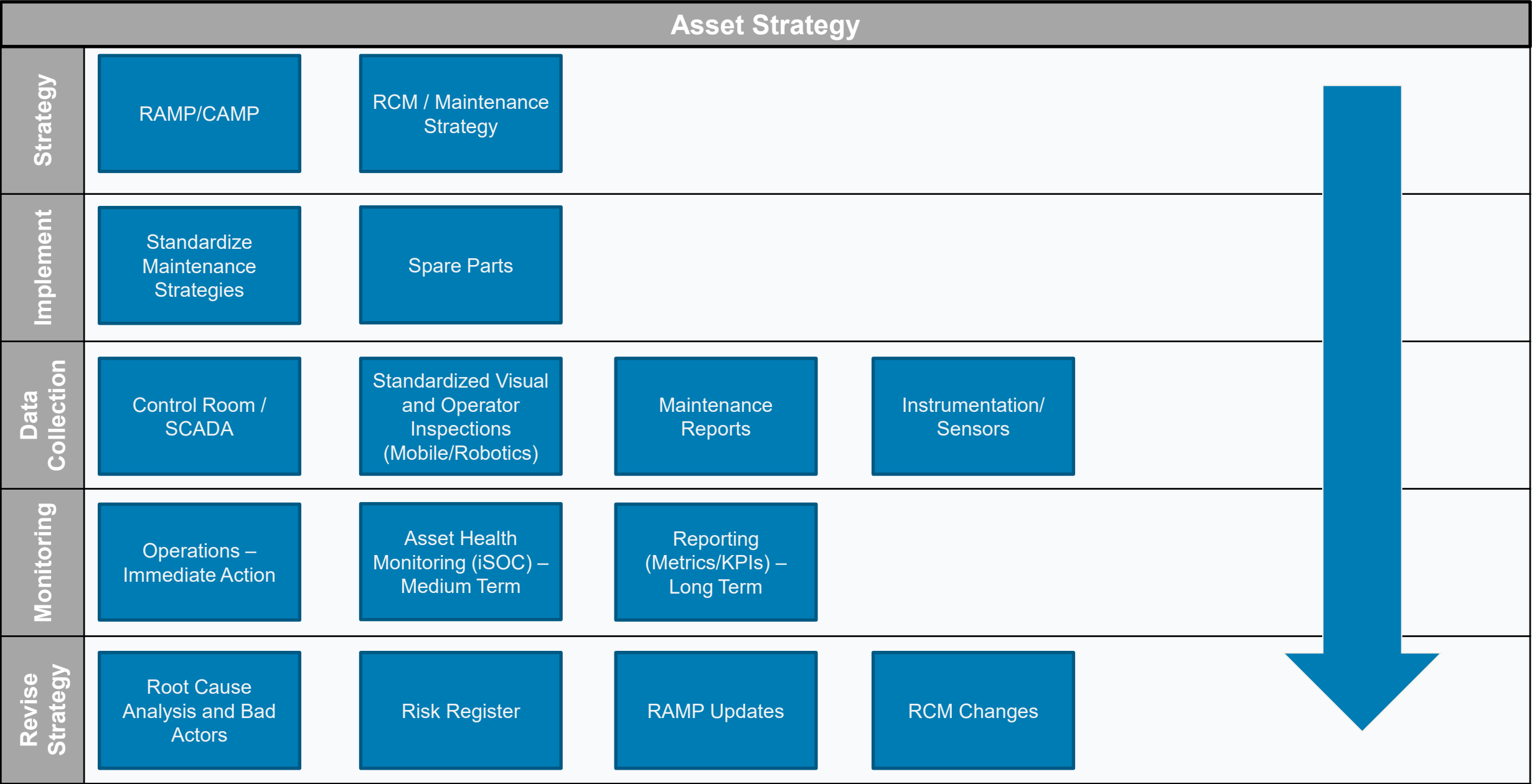
Build an
INNOVATION
ecosystem that
accelerates
customer and grid
decarbonization



Integrate
SUSTAINABILITY
into how we operate
to drive value



Strengthen our
RESILIENCE
for long-term
viability



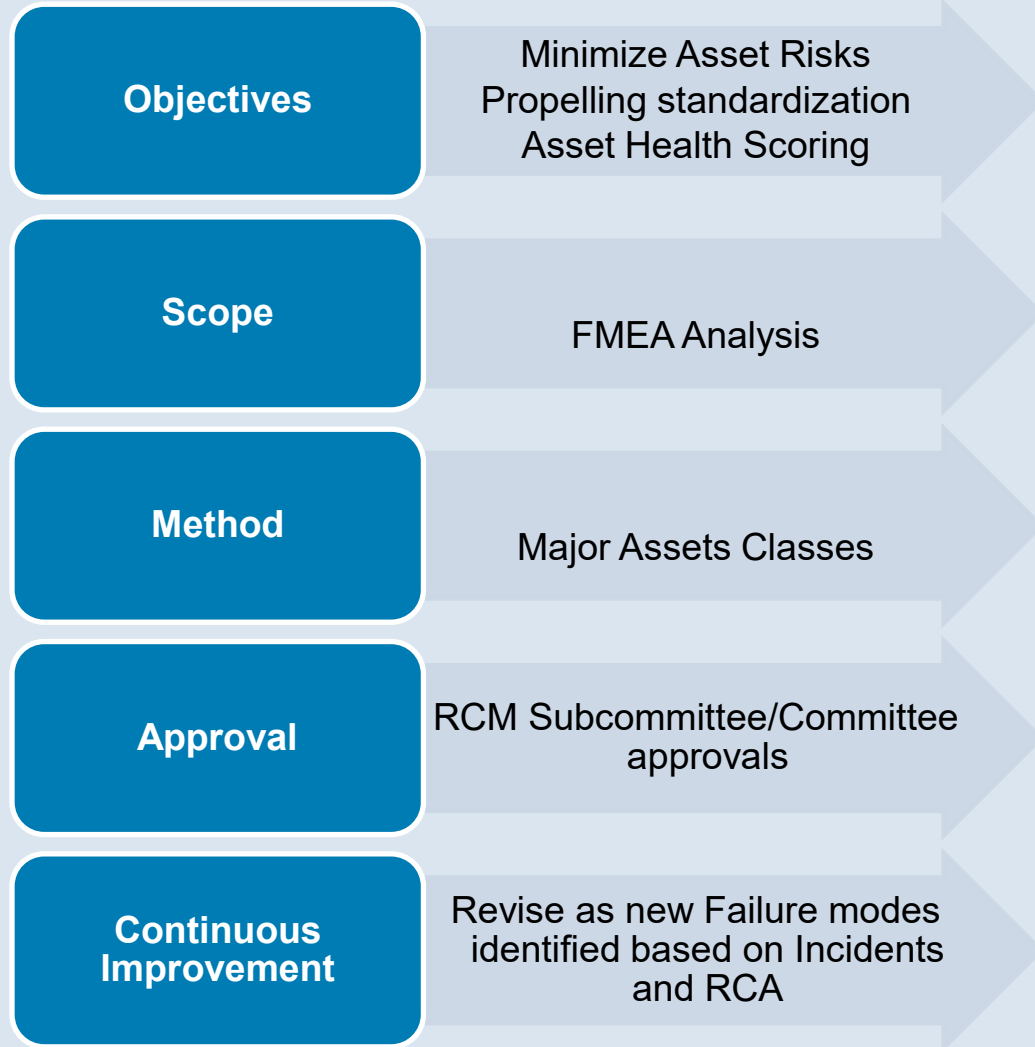


Laying the Foundation

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Reliability Centered Maintenance

Defining our Maintenance Strategies



- ✓ 7 RCM Approved and Implementations in progress
- ✓ Identified **Risk Mitigations / FMEA**
- ✓ **Documented maintenance** strategies and Frequency
- ✓ Established **STANDARDIZED** criteria & thresholds
- ✓ **Data Collection Methods** (Sensors, Test/Manual inspection, third party inspection, Robotics etc.)
- ✓ **Spare Parts** requirements
- ✓ **Asset Health Scoring**

Maintenance Summary						
Maintenance Interval	Interval Units	Activity	Discovery Methods	Expected Value / Range	Data Requirement	Data Capture Mechanism
8 to 12	YEARS	Functional Test	Verify all trip paths to the trip coils operate as designed	Test lockout generally used to prevent breaker operations	Pass / Fail	PM
18-24 Years Based on Manufacturer	YEARS	Internal Maintenance	TBD	TBD	TBD	PM
Operator Rounds						
1 MONTHS		Annunciator Inspection	Lamp test and reset of annunciator	No burned out windows or windows that can't be reset	# of Issues	Mobile Round
1 MONTHS		Trip Coil Light Inspection	Trip / Close coil lights illuminated	No burned out bulbs / failed trip coils	Issue location and description	Mobile Round
1 MONTHS		Bushing & Connection Inspection	No signs of damage, discoloration, leakage, corrosion, cracking, or water ingress	No noted bushing or connection issues	Issue location and description	Mobile Round
1 MONTHS		Door Gasket Inspection	Inspect for signs of deterioration, wear, or leakage	No signs of deterioration, wear, or leakage	Issue location and description	Mobile Round
1 MONTHS		Linkage Inspection	Visual inspection of linkages	No abnormalities noted	Issue location and description	Mobile Round
1 MONTHS		Hydraulic Compressor Inspection	Visual inspection of hydraulic compressor	No signs of leaking hydraulic fluid	Issue location and description	Mobile Round
1 MONTHS		SF6 Compressor Inspection	Visual inspection of SF6 compressor	No signs of leaking hydraulic fluid	Issue location and description	Mobile Round
1 MONTHS		Breaker Tank Inspection	Visual inspection of tank	No cracks or leaks detected	Issue location and description	Mobile Round
1 MONTHS		Wiring Inspection	Visual inspection of cabinet and breaker wiring	No signs of arcing, heat damage, or wear	Issue location and description	Mobile Round
1 MONTHS		Grading Resistor Inspection	Visual inspection of grading resistors (if installed externally)	No discoloration or damage noted	Issue location and description	Mobile Round
1 MONTHS		Operations Counter Reading	Record number on operations counter	Increases with operations	Number	Mobile Round
As Required		Stand Off Insulator Inspection	Visual inspection of porcelain stand off insulators	No signs of damage, discoloration, or discharge	Issue location and description	Mobile Round
On Condition Maintenance						
On Condition Maintenance	Service Alarm	CBS Life Coil Alarm	Alarm light on CBS life / alarm on CSI PI	No alarm for loss of close / trip coils	CBS Life CSI PI	Digital Maximo CM WCO
		Replace worn contacts on	CBS Life Contact Wear Calculation			

Battery Bank Maintenance Summary Example

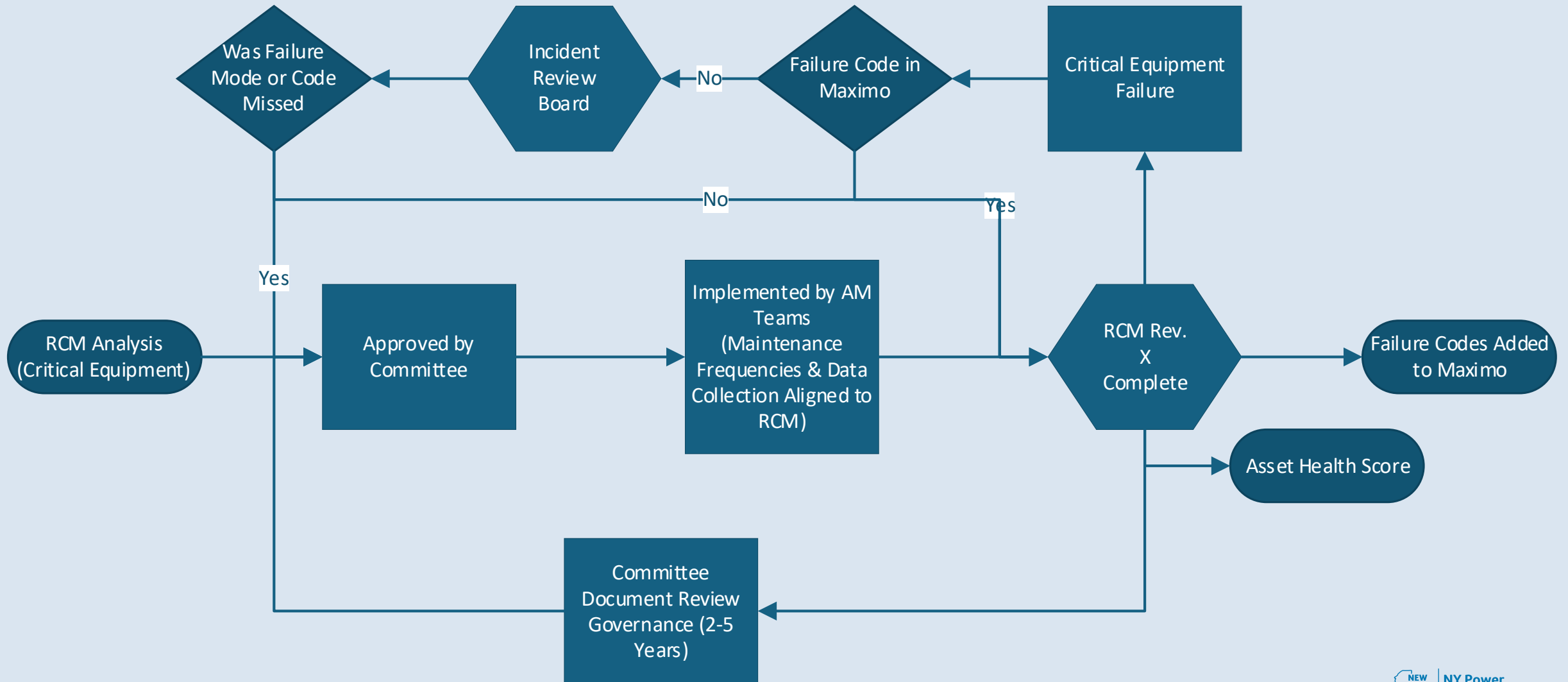
Maintenance Summary							
Maintenance Interval	Interval Unit	Activity	Discovery Methods	Expected Value / Range	Data Requirement	Data Capture Mechanism	Health Score Range
3	MONTHS	Inspection - material on bottom of jar, appearance of grid	Verify there is no material on bottom of jar and the appearance of grid is satisfactory	No material present Negative plates medium gray Positive plates deep chocolate brown	Cell number(s) with material present or discoloration	Maximo WO - Visual Inspection Mobile Round	# of cells with material present or discoloration
3	MONTHS	Inspection of sediment space for mossing or sedimentation	Inspection of sediment space for mossing or sedimentation	No sedimentation or mossing present	Cell number(s)	Maximo WO - Visual Inspection Mobile Round	< 25% > 25% and < 75% > 75%
3	MONTHS	Inspection/Loss of Data (Eagle Eye)	Inspection/Loss of Data (Eagle Eye)	No electrolyte present	Cell number(s)	Maximo WO - Visual Inspection Mobile Round	Clean affected area
3	MONTHS	Monitor area temperature	Monitor area temperature	77 deg F	Cell number(s)	Maximo WO - Manual Measurement Mobile Round	77 deg F 72-76, 78-83 deg F 66-72, 84-88 deg F < 66 or > 88 degF
3	MONTHS	Monitor float current and voltage	Record values on battery charger	52-54 (24 cell) 129-132 (59 cell) 133-135 (60 cell) Variable	Volts Volts Volts Amps	Maximo WO - Manual Measurement Sensor (Eagle Eye)	Percentage above/below expected value would trigger investigation
3	MONTHS	Inspection - post height	Verify that the positive post is not higher than negative post	No height difference between posts	Cell number(s) with height differences	Maximo WO - Manual Measurement Mobile Round	# of cells with height difference
3	MONTHS	Record voltage of jars / cells	Measurement with DVM Measurement with Eagle Eye	No cells with individual voltage below 2.13 V	Record voltage of all cells	Maximo WO - Manual Measurement Mobile Round Sensor (Eagle Eye)	# of cells measuring < 2.13 V

Future Proofing

- Maximo Mobile Rollout
 - Planned over 5 years
- Data Collection Preferences
- Living Document



RCM Feedback Process



Critical RCM Elements

- Process is king
- Closing Open Loops





Bird's Eye View of Failure Codes

May 5, 2026

Perspective Shift

- Problem / Cause / Remedy
 - Not in List
- Improve not Reinvent
 - Leverage existing tools



Stakeholder Engagement

- Asset Information & Systems
- Asset Performance Teams
- M&D Center



Challenges

- Maximo Hierarchies
 - Not standardized
- Downstream Use
 - Naming Conventions
 - Planned Visualization
- Implementation



Forging Ahead

- Pilot Project
- Training Requirements





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Ground Floor View of Failure Codes & Asset Health



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Utilizing RCM for Structured Insights

Core Message:

- Reliability-Centered Maintenance (RCM) is more than an analysis exercise — providing a methodology for standardizing maintenance practices
- Providing foundation for consistent data collection and failure documentation
- Going forward consistent maintenance practices, data collection and failure documentation will provide the structured insights that will help ensure NYPA's ongoing reliable operation

Why It's Important:

- **Without Structured Insights:** Failure codes are ad hoc, generic, and inconsistent.
- **With Structured Insights:** Failure codes are intentionally engineered, consistent, and standardized.
- This foundation enables **reliable, data-driven Root Cause Analysis** instead of relying on assumptions or guesswork.

Enhancing Asset Performance via Standardized Failure Codes & Reporting

✓ Why Failure Codes Matter?

- Enable consistent, structured capture of failure data
- Improve root cause identification and reliability analysis
- Support data-driven decisions to reduce downtime and cost
- Highlight systemic issues and recurring failure trends

✓ Evidence-Based Asset Strategies

- Standardized failure data supports condition assessments and reviews of maintenance strategies.
- Validates whether asset strategies are effective or need redesign based on actual performance data.

Smarter Codes, Stronger Insights

From failure codes to failure intelligence!

- Sunsetting Problem, Cause, Remedy
- Unveiling FIFE – Failure Intelligence Framework Engine:
 - Failure Category
 - Component
 - Failure Mode
- Resolution will be captured in CM (repaired, replaced, etc.)



Failure Class:		Organization:		Attachments	
XFMR		TRANSFORMER		NYPA	
Problems					
1 - 10 of 23					
Failure Code	Description				
> ACRITICAL	ALARM-CRITICAL				
> ANONCRIT	ALARM - NONCRITICAL				
> BADRATIO	INCORRECT TTR RESULTS				
> DGA	IRREGULAR GASSES IN OIL				
> FAILURE	FAILURE				
> HIGHTEMP	HIGH TEMPERATURE				
> PROBNIL	PROBLEM NOT IN LIST				
> RUST	RUST ON OUTSIDE OF TANK				
> LIGHT_ON	SERVICE LIGHT ON				
> FUSE_BLOWN	FUSE BLOWN				
New Row					
Causes for ACRITICAL					
1 - 7 of 7					
Failure Code	Description				
> CAUSENIL	CAUSE NOT IN LIST				
> HILEVLIQID	HIGH LEVEL - LIQUID				
> HITEMPLIQUII	HIGH TEMP - LIQUID				
> HITEMPWDG	HIGH TEMP - WINDING				
> GAS_SUPP_FAI	GAS SUPPLY SYSTEM FAILURE				
> INCRLT	LOOSE CONNECTION				
> TIME_DELAY	TIME DELAY				
New Row					
Remedies for CAUSENIL					
1 - 1 of 1					
Failure Code	Description				
> REMEDYNIL	REMEDY NOT IN LIST				

Failure Code Categories Methodology

Loss of Primary Function (Equipment)

- Complete asset failure or critical component fault
- Requires immediate repair or replacement

Loss of Performance (Secondary Function)

- Degraded function, capacity, or efficiency
- May continue operating with reduced capacity or reliability

Loss of Instrumentation

- Monitoring / control failure or signal loss
- Online Monitor Loss
- Reduces visibility and diagnostic capability

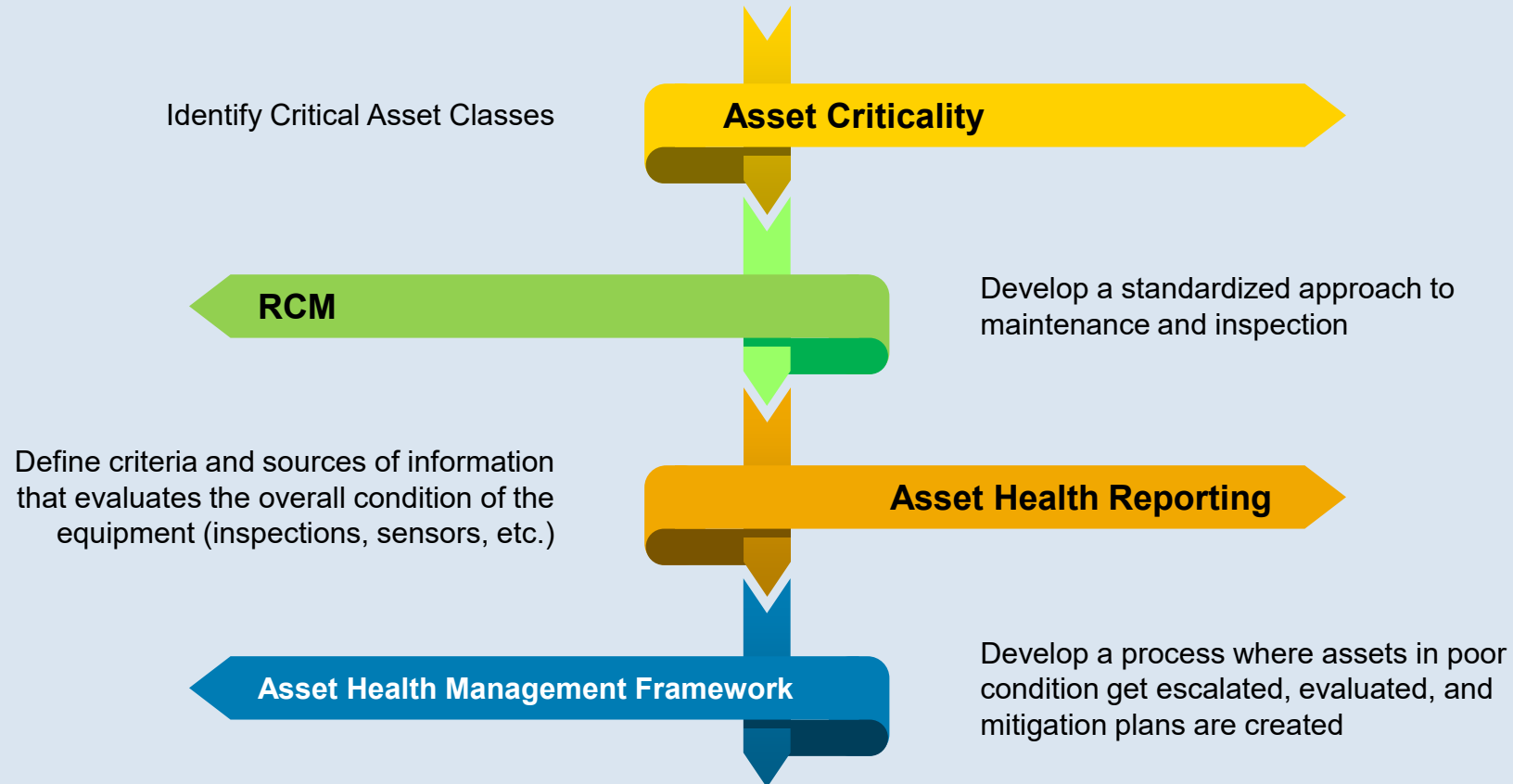
Failure Code Example

Circuit Breaker – Bushing tracking

- Failure Category – Loss of Primary Function
- Component – Bushings / Bushing CT
- Failure Mode – External Contamination

Failure Category	Consolidated Component	Consolidated Failure Mode
Loss of Primary Function	Bushings / Bushing CT	High Resistance
Loss of Primary Function	Bushings / Bushing CT	External Contamination
Loss of Primary Function	Bushings / Bushing CT	Leakage
Loss of Primary Function	Bushings / Bushing CT	Loss of BIL
Loss of Primary Function	Bushings / Bushing CT	Mechanical Failure
Loss of Primary Function	Bushings / Bushing CT	Thermal Failure
Loss of Primary Function	Bushings / Bushing CT	Enviromental Failure
Loss of Primary Function	Bushings / Bushing CT	Wiring Failure
Loss of Primary Function	Bushings / Bushing CT	Open

How do we identify assets in poor health?



Existing Gaps

- Clear criteria for evaluation of equipment
- Digitized and consistent data across enterprise
- Framework for determining best action and prioritization for work
- These gaps have existing plans that were identified in the APP Roadmap and are incorporated into the overall Improvement Activity plan

Battery Bank Evaluation Results

Battery Health Index Evaluation

Category	Weighting Percentage	Evaluation
Performance	18%	9%
Physical Inspection	12%	9%
Battery Measurements (NERC PMs, BQMS)	30%	21%
Electrical Testing (Yearly / 5 year)	40%	40%
Asset Health Index - Overall Asset Score Based on 100%		79%

Evaluation Metrics Example

80-100	Excellent Health
50-80	Poor Health
0-50	Failed asset

Methodology – Equipment Health Next Steps

	Objective	Involvement	Deliverable
Define	For selected Asset Class, define standard for equipment evaluation – approval through committee	Standing Committee, SMEs	- Standardized criteria for performance of asset - Data, thresholds, scoring
Gap Analysis	Define data owner, determine ease of access for reporting	Site Superintendents, Asset Information, Asset Maintenance	Responsible discipline / group for each data point, current system of record (PDF, Maximo, PI, Mobile)
Job Plan/ Form Update	Verify data is being collected consistently across all regions	Planners, Asset Managers, Asset Information (Mobile, PI, Maximo), IT	Data is being collected in accessible, digital format
Automation Effort	- Access to scoring data and report for all, minimal effort to maintain - Drill down of scoring to determine cause	iSOC, IT, Planners, APS	- Online / real-time report of asset health - Auditing of completeness of data



Analytics for reporting asset Health

Output From RCM

Maintenance/Operator Inspections or BQMS	Cell Resistance - number of cells exceeding threshold	Y 1A10 - Battery cell failed	0 cells	NYPA Engineering Maintenance and Testing of Flooded Stationary Battery Systems (Page 15)	100	4.21%
					75	
			15% of cells in battery bank have an impedance greater than 20% above baseline		50	
			15% of cells in battery bank have an impedance greater than 50% above baseline		25	
Maintenance/Operator Inspections or BQMS	Cell Temperature - number of cells exceeding threshold	Y - Thermal Scan if not measured	77F	NYPA Engineering Battery Recommendation - IEEE 946 Any reading at these levels	100	6.17%
			76-72F or 78-83F		75	
					50	
			66-75F or 84-88F Less than 66F or greater than 88F		25	
Maintenance/Operator Inspections or BQMS	Ambient Temperature	Y 1A5 - Battery cell failed	77F	Suggestion from GE Grid Policy	100	3.36%
			76-72F or 78-83F		75	
					50	
			66-75F or 84-88F Less than 66F or greater than 88F		25	
Maintenance/Operator Inspections or BQMS	Output Voltage	1A3 - Casing weld deteriorated 1A9- Battery cell failed	Between 123 and 135V	NYPA Engineering Battery Recommendation - IEEE 946	100	8.13%
			105 -123V or 135-140V		75	
					50	
			Greater than 140V or less than 105V		25	

Calculations in PI AF

Category	Name	Value
Category: 07b - Asset Health Scoring - CP1	Battery Measurement Total Weight	10
	Electrical Testing Total Weight	30
	Performance Total Weight	16
	Physical Inspection Total Weight	10
Category: 07c - Battery Health - Battery Measurements (NERC PMs, BQMS) - CP2	Category: 07c - Battery Health - Electrical Testing (Yearly / 5 year) - CP2	
	ElectricalTestingCapacityRatingWeightedIndicatedScore (DUMMY)	75
Category: 07c - Battery Health - Performance Scoring - CP2	PerformanceBankAgeWeightedIndicatedScore (DUMMY)	37.5
	PerformanceHistoryIssuesWeightedIndicatedScore (DUMMY)	8.335
	PerformanceNumberOfCellsReplacedWeightedIndicatedScore (DUMMY)	33.33
Category: 07c - Battery Health - Physical Inspection Scoring - CP2	PhysicalInspectionCellJarConditionWeightedIndicatedScore (DUMMY)	7.97
	PhysicalInspectionElectrolyteLevelWeightedIndicatedScore (DUMMY)	22.46
	PhysicalInspectionElectrolyteLevelScore	100
	PhysicalInspectionElectrolyteLevelWeight	22.46
	PhysicalInspectionElectrolyteQualityWeightedIndicatedScore (DUMMY)	3.62
	PhysicalInspectionInterCellandInterTierConnectorsWeightedIndicatedScore (DUMMY)	11.59
	PhysicalInspectionPlateConditionWeightedIndicatedScore (DUMMY)	18.12
	PhysicalInspectionPortsConditionWeightedIndicatedScore (DUMMY)	12.32
	PhysicalInspectionThermographyBQMSWeightedIndicatedScore (DUMMY)	23.91
Category: 08 Battery Health - Battery Measurements (NERC PMs, BQMS)	Ambient Temperature - Health Scoring	84
	Cell Resistance Alarm Count	1
	Cell Resistance Caution Count	3
	Cell Temperature Count	74
	Cell Voltage Count	10
	H	0.15
	Maximum	100
	Minimum	0
	Output Voltage	0

Equipment Health Scoring Visualizations - Fleet

Create dashboards for enterprise-wide health scores of similar asset types

NYPA - Region - Battery Asset Health Score Comparison - Fleet View

AHS = BatteryMeasurement (30%) + Electrical (40%) + Performance (20%) + Physical (10%)

NYPA - Region - Northern

Asset	Maximo_Asset_Link	Total Health Score	Battery Measurement ...	Electrical Testing T...	Performance Total...	Physical Inspection ...	Communication Status
ADK 1 Battery Bank		3	0	0	3	0	0
CHS Battery Bank		3	0	0	3	0	0
CPH Battery Bank		3	0	0	3	0	1
DUS 1 Battery Bank		3	0	0	3	0	0
DUS 2 Battery Bank		3	0	0	3	0	0
MAS 4 Battery Bank		70	2	40	18	10	0
PLS 1 Battery Bank	No Data	3	0	0	3	0	0
PLS 2 Battery Bank		3	0	0	3	0	0
PLS 24 Battery Bank		3	0	0	3	0	0
PTS1 Battery Bank		3	0	0	3	0	0
PTS2 Battery Bank		82	18	40	14	10	0
RMP 5A Battery Bank - Pending Replacement		3	0	0	3	0	0
RMP 7 Battery Bank		3	0	0	3	0	0
RMS 10 Battery Bank		3	0	0	3	0	0
RMS 3 Battery Bank		3	0	0	3	0	0
RMS 9 Battery Bank		3	0	0	3	0	0
RYS1 Battery Bank		3	0	0	3	0	0
RYS2 Battery Bank		3	0	0	3	0	0
RYSMW Battery Bank		3	0	0	3	0	0
WLS1 Battery Bank		3	0	0	3	0	0
WLS2 Battery Bank		3	0	0	3	0	0
WLS4 Battery Bank		3	0	0	3	0	0

NYPA - Region - Southeast

Asset	Maximo_Asset_Link	Total Health Score	Battery Measurement ...	Electrical Testing T...	Performance Total...	Physical Inspection ...	Communication Status
7A Battery Bank		3	0	0	3	0	0
7B Battery Bank		82	21	40	11	10	0
SS1 Battery Bank		3	0	0	3	0	0
SS2 Battery Bank		3	0	0	3	0	0

Asset	Maximo_Asset_Link	Total Health Score	Battery Measurement	Electrical Testing T	Performance Total	Physical Inspection	Communication Status
GW Battery Bank		3	0	0	3	0	0
HG1 Battery Bank		95	17	40	18	10	0
HG2 Battery Bank		3	0	0	3	0	0
HR Battery Bank		3	0	0	3	0	0
KT Battery Bank		3	0	0	3	0	0
PT Battery Bank		3	0	0	3	0	0

Asset	Maximo_Asse_Link	Total Health Score	Battery Measurement ...	Electrical Testing T...	Performance Total...	Physical Inspection ...	Communication Status
BW Battery Bank		3	0	0	3	0	0
FLN Battery Bank		3	0	0	3	0	0

NYPA - Region - Western

Asset	Maximo_Asset_Link	Total Health Score	Battery Measurement	Electrical Testing T...	Performance Total...	Physical Inspection	Communication Status
NIA 115 230 1A Battery Bank		3	0	0	3	0	0
NIA 115 230 1B Battery Bank		3	0	0	3	0	0
NIA 115 230 2A Battery Bank		3	0	0	3	0	0
NIA 115 230 2B Battery Bank		92	24	40	18	10	0
NIA 115 230 3A Battery Bank - pending replacement		3	0	0	3	0	snafix
NIA 115 230 3B Battery Bank - pending replacement		3	0	0	3	0	snafix
NIA 345 1 Battery Bank		3	0	0	3	0	0
NIA 345 2 Battery Bank		85	18	40	17	10	0
NIA RI 2 Battery Bank		3	0	0	3	0	0
RMN 2 Battery Bank		3	0	0	3	0	1
RMN Comp Battery Bank		3	0	0	3	0	0

NYPA - Region - Central

Asset	Maximo Asset Link	Total Health Score	Battery Measurement	Electrical Testing T	Performance Total	Physical Inspection	Communication Status
BG PH 1 Battery Bank		3	0	0	3	0	0
BG PH 2 Battery Bank		3	0	0	3	0	0
BG PH 3 Battery Bank		83	15	40	18	10	1
DAS 1 Battery Bank		3	0	0	3	0	0
DAS 2 Battery Bank		83	15	40	18	10	0
ETS 1 Battery Bank		3	0	0	3	0	0
WTS 1 Battery Bank		3	0	0	3	0	0

NYPA - Region - Transmission

Asset	Maximo_Asset_Link	Total Health Score	Battery Measurement	Electrical Testing T	Performance Total	Physical Inspection	Communication Status
AST 1 Battery Bank		3	0	0	3	0	0
AST 2 Battery Bank		3	0	0	3	0	0
EGC 1 Battery Bank		66	10	30	16	10	0
EGC 2 Battery Bank		3	0	0	3	0	1
NTS 1 Battery Bank		3	0	0	3	0	0
STS 1 Battery Bank		3	0	0	3	0	0
STS 2 Battery Bank	No Data	3	0	0	3	0	0

Asset	Maximo_Asset_Link	Total Health Score	Battery Measurement...	Electrical Testing T...	Performance Total...	Physical Inspection ...	Communication Status
BEL 11 Battery Bank	[Link]	3	0	0	3	0	1
Marcy 345kV 12 Battery Bank	[Link]	3	0	0	3	0	0
Marcy 345kV 13 Battery Bank	[Link]	3	0	0	3	0	0
Marcy 345kV CSC1 Battery Bank	[Link]	3	0	0	3	0	0
Marcy 765kV 1 Battery Bank	[Link]	3	0	0	3	0	0
Marcy 765kV 2 Battery Bank	[Link]	76	14	40	13	9	0
Marcy 765kV 9 Battery Bank	[Link]	3	0	0	3	0	0
TAL 10 Battery Bank	[Link]	3	0	0	3	0	0

Equipment Health Scoring Visualizations - Detailed

Battery Detailed Category View

NIA 345 2 Battery Bank
<http://maximo:80/maximo/ui/?event=loadapp&value=asset&uniqueid=64710>

AHS = BatteryMeasurement (30%) + Electrical (40%) + Performance (20%) + Physical (10%)

Asset	Total Health Score	Battery Measurement Total Weight	Electrical Testing Total Weight	Performance Total Weight	Physical Inspection Total Weight
NIA 345 2 Battery Bank	85	18	40	17	10

Asset	Ambient Temperature -...	Cell Resistance Alarm Count	Cell Resistance Caution Count	Cell Temperature Count	Cell Voltage Count	Output Voltage	Ripple Current ... ▲
NIA 345 2 Battery Bank	69	0	32	68	9	131	1

Asset	Capacity Rating Test (%) ...
NIA 345 2 Battery Bank	100

Asset	Battery Bank Age (Years)...	History of Issues - Battery Bank ...	Number Of Cells Replaced ...
NIA 345 2 Battery Bank	9	8	0

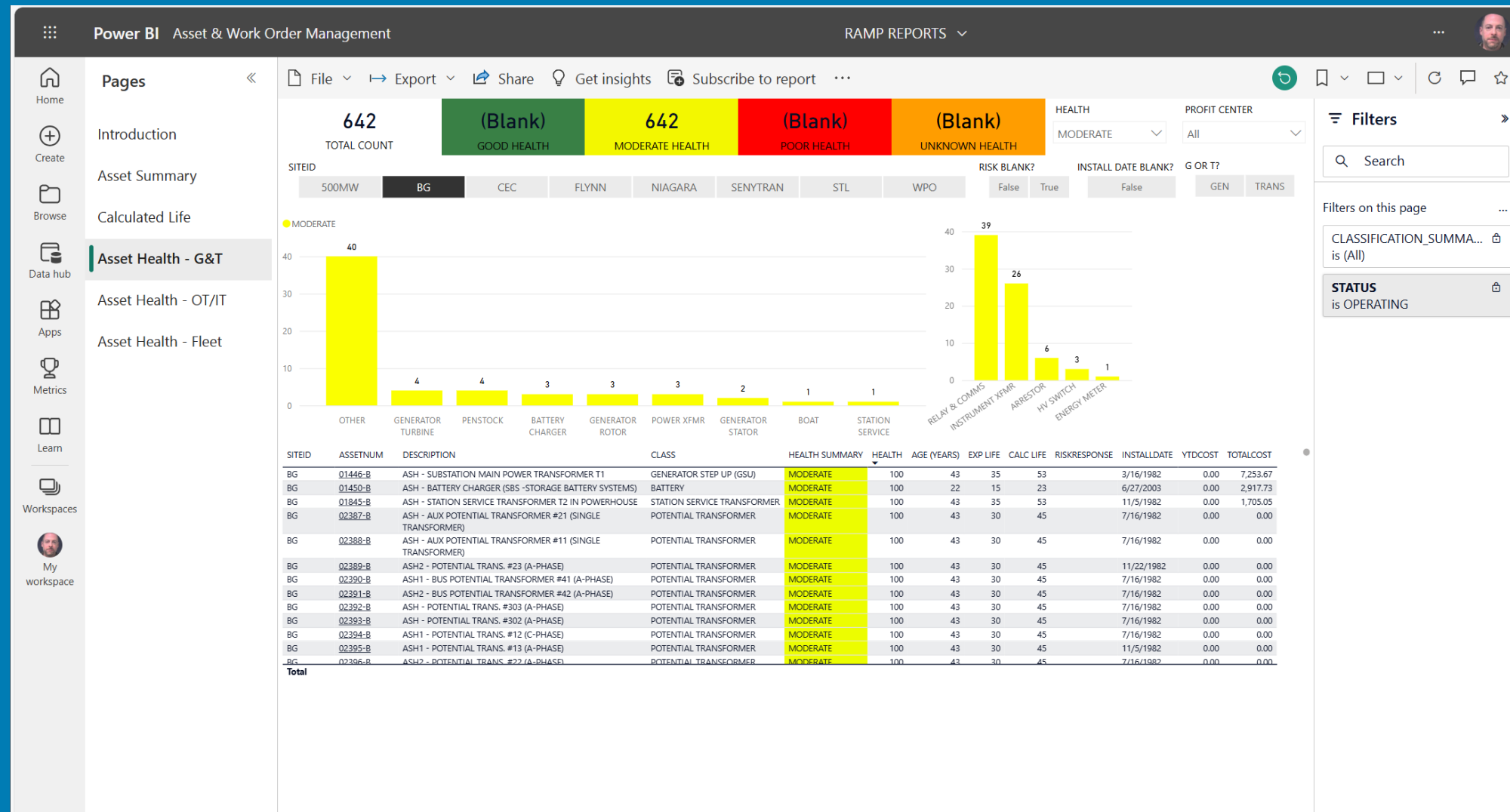
Asset	Cell/Jar Co...	Electrolyte ...	Electrolyte Quality <...	InterCell an...	Plate Condition <AIS to provide>	Posts Condition ...	Thermography ...
NIA 345 2 Battery Bank	0	0	0	0	0	0	0

Utilization of Asset Health for Capital Planning / RAMP updates

Equipment Assessment / Asset Health

Work prioritization / asset replacement strategies require clear criticality / risk assessment of assets. Currently there is a lack of consistent evaluation of asset performance.

Note* Current Health Scoring is only based on Age



Final Thoughts

Key Takeaways

- RCM outputs are the foundation
- Failure Codes = Data capture of RCM logic
- AHI = Quantification of RCM-defined degradation
- Alignment creates a true reliability-centered enterprise



Thank You





Q&A

May 5, 2026