



# New York Power Authority: The Journey to World Class Asset Management

Kedaar Raman

Manager – Digital Utility Worker Program





**NY Power  
Authority**

**Canal  
Corporation**

# **New York Power Authority: The Journey to World Class Asset Management**

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# Agenda

- π About NYPA
- π NYPA Enterprise Strategy
- π The iSOC Mission
- π Sensor Deployment & Communications Backbone Programs
- π Digital Utility Worker, π Day, UAS and π in concert
- π Continuous Improvement & ISO 55001 Certification
- π Future Development

# History of NYPA

⌘ Founded by Franklin D. Roosevelt in 1931 - *Power Authority Act*

⌘ 2000+ employees

⌘ Governance

⌘ *7 member board*

⌘ Revenue sources

⌘ *Power contracts*

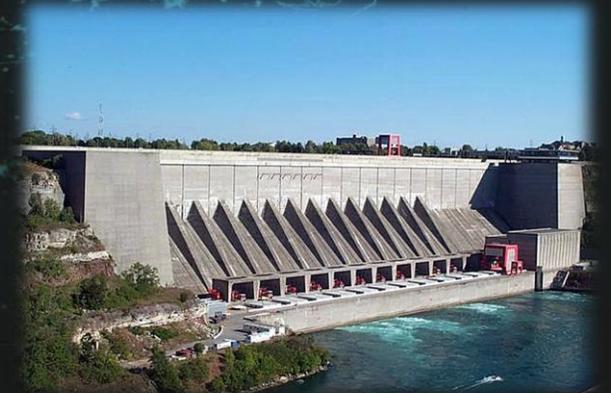
⌘ *Generation*

⌘ *Energy Efficiency Projects ( \$200-300M annually)*



⌘ NYS Canals transferred from the NYS Thruway Authority in 2017

⌘ 524 miles across NYS



**NY Power  
Authority**

# NYPA Mission

*"Power the economic growth and competitiveness of New York State by providing customers with low-cost, clean, reliable power and the innovative energy infrastructure and services they value."*



**NY Power  
Authority**

# Generation Assets: ~ 6 GW

St. Lawrence - FDR |  
Clark Energy Center |  
Niagara |  
NY Energy Manager |  
Blenheim-Gilboa |  
NYPA HQ |  
500MW |

- Own and operate 16 hydro and natural gas generation plants
- Manage two leased assets: *AEI* and *HTP* (partnership)

# Transmission Assets: ~ 1,400 miles

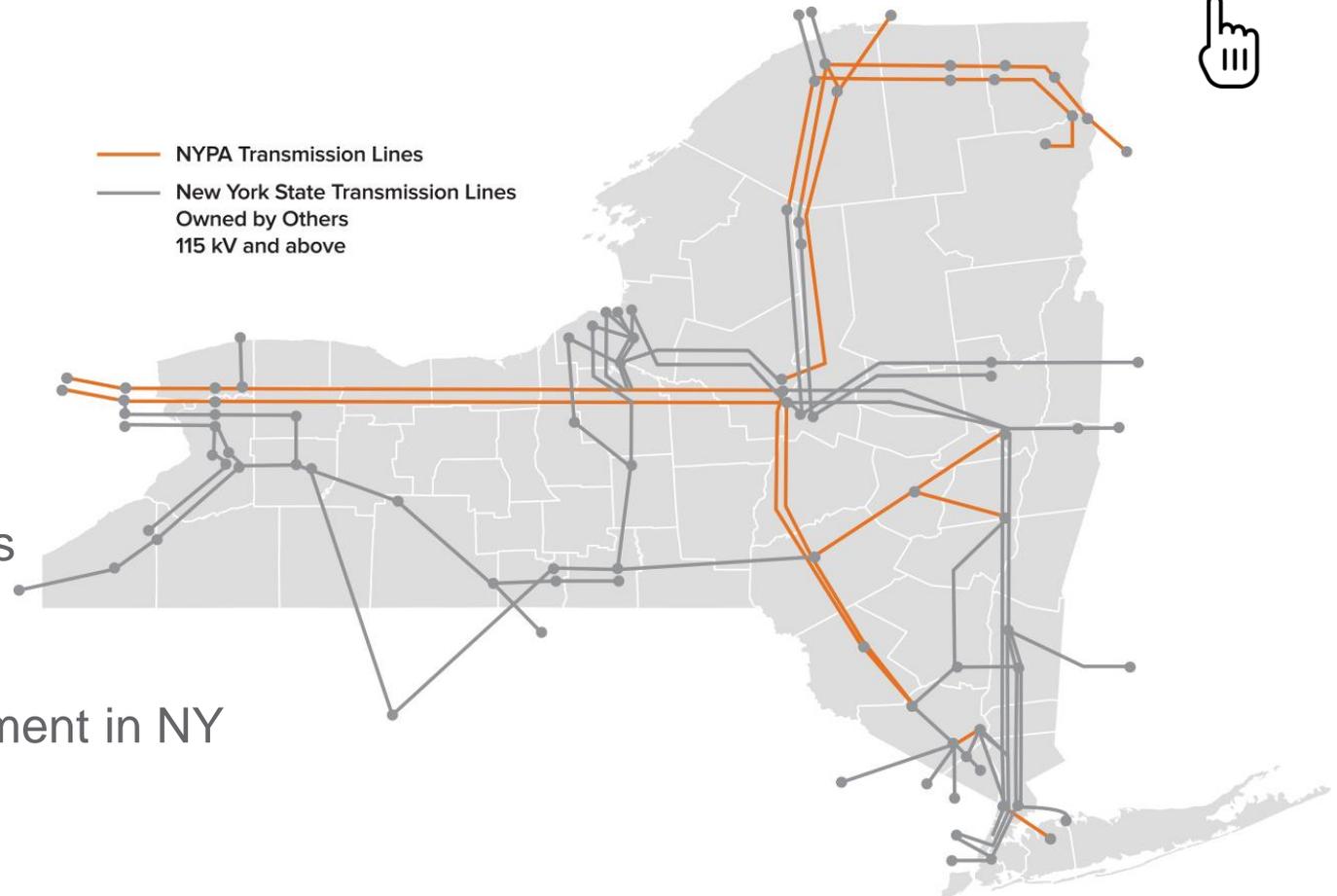
- NYPA TRANSMISSION LINES
- OTHER TRANSMISSION LINES



# About the New York Power Authority (NYPA)

[www.nypa.gov](http://www.nypa.gov)

- 6,000+ MW, low-cost fleet
- 83% of generation is renewable (hydro)
- Cleanest conventional fleet in the State
- 1,400 miles of transmission – 1/3 of New York's backbone grid
- Over \$200 million energy services business focused on efficiency
- Low-cost power drives Economic Development in NY
- AA credit rating from agencies



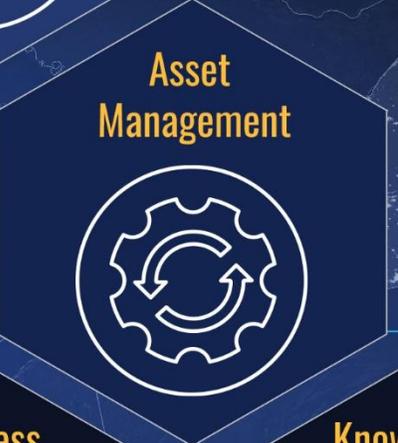
**Recognized and Awarded Innovation and Digitization leader**

# STRATEGIC PLAN

## CUSTOMER EMPOWERMENT



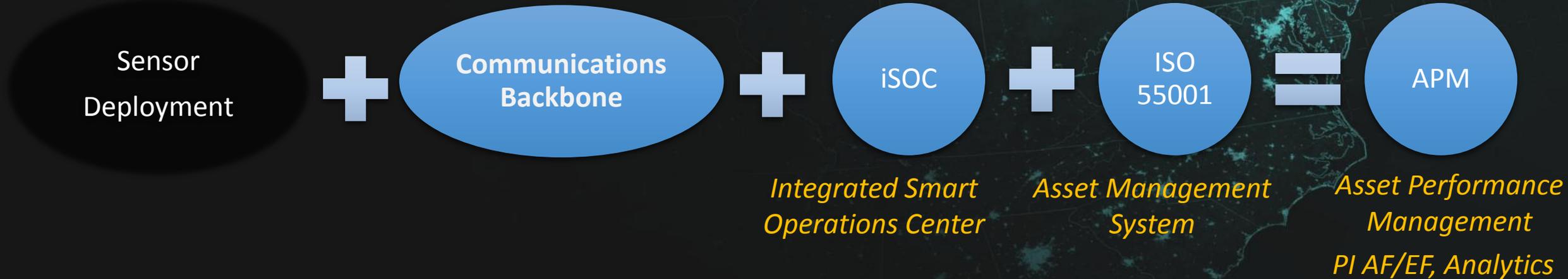
## INFRASTRUCTURE MODERNIZATION



## RESOURCE ALIGNMENT



# Implementing a Digital Strategy



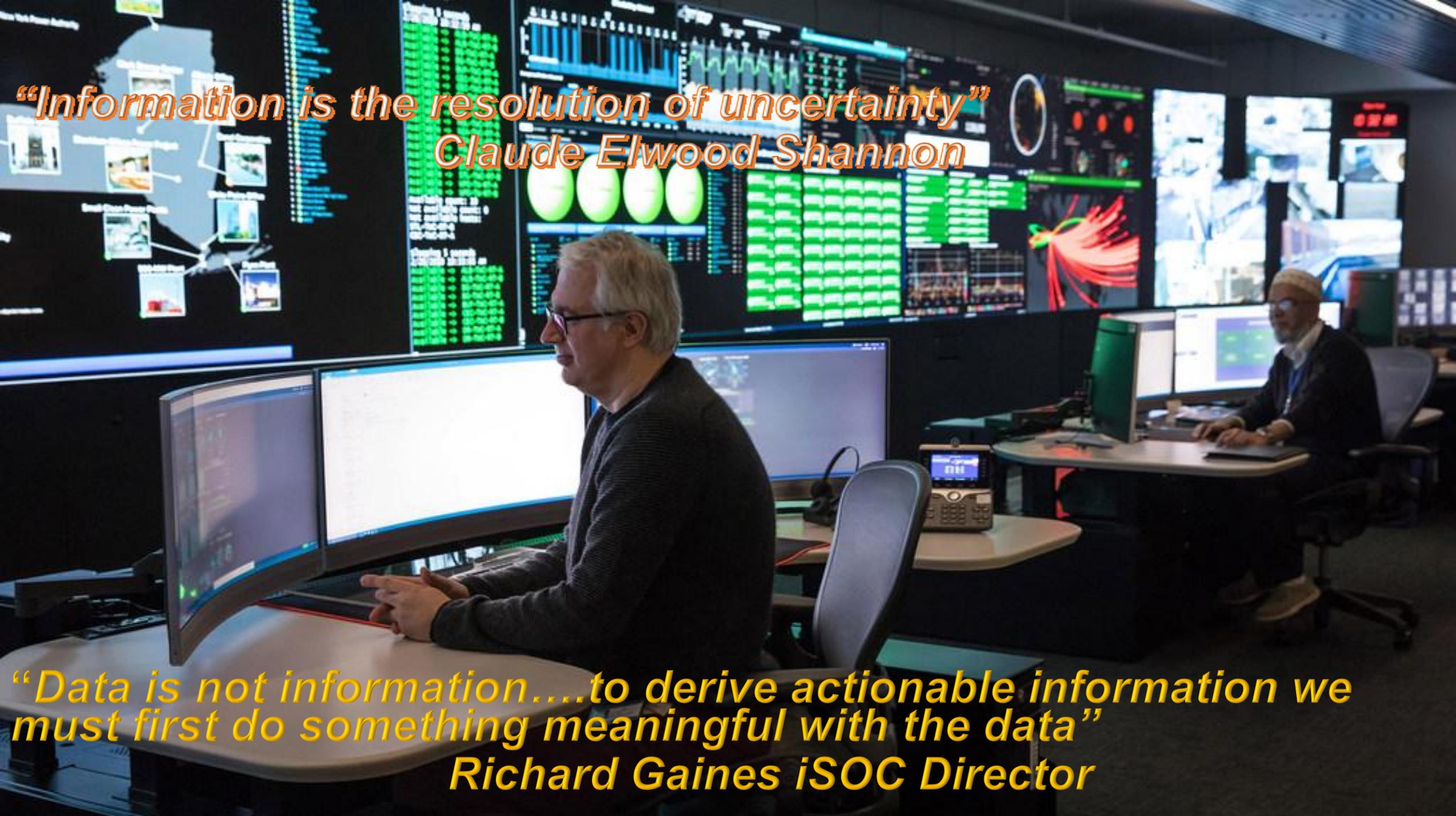
*EA Allows Data transfer and transparency :*

**Outage Avoidance | Improved Reliability & Performance | Long Term Planning & Modernization**

# The iSOC Mission

Provide actionable information that:

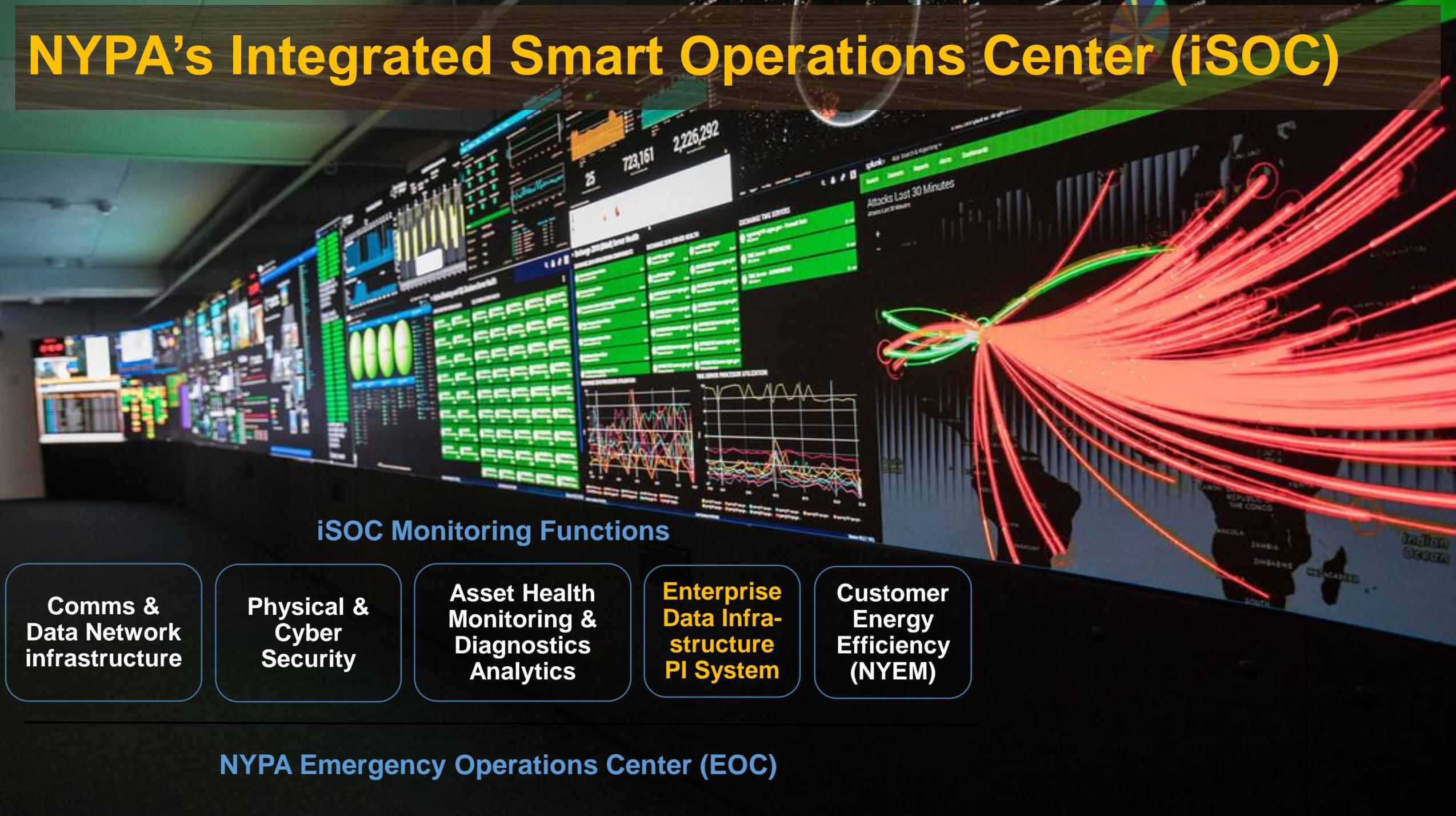
- Supports Outage Avoidance
- Supports Improved Reliability and Efficiency
- Supports Long Term Planning & Modernization



*“Information is the resolution of uncertainty”  
Claude Elwood Shannon*

*“Data is not information....to derive actionable information we  
must first do something meaningful with the data”  
Richard Gaines iSOC Director*

# NYPA's Integrated Smart Operations Center (iSOC)



## iSOC Monitoring Functions

**Comms &  
Data Network  
Infrastructure**

**Physical &  
Cyber  
Security**

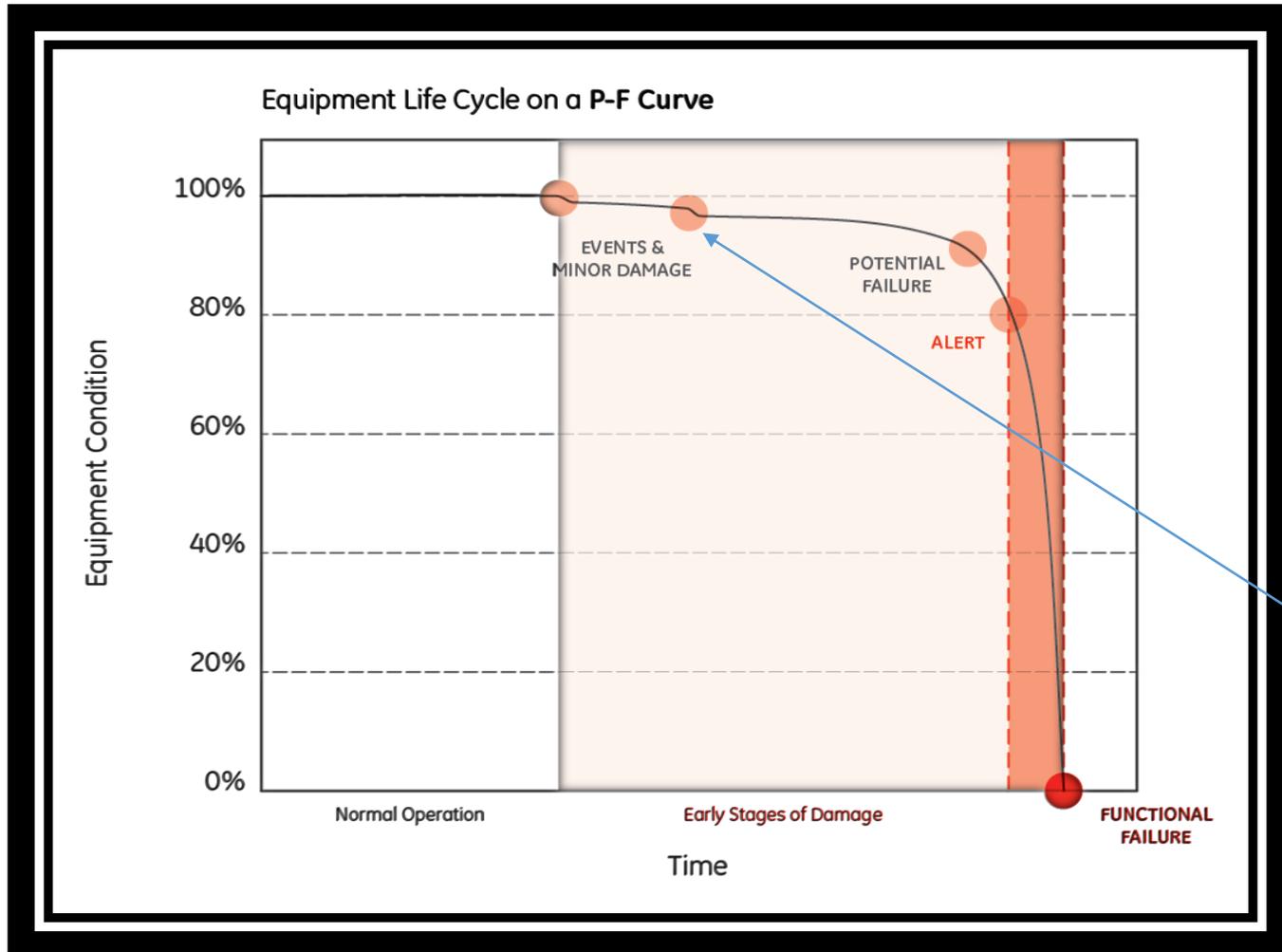
**Asset Health  
Monitoring &  
Diagnostics  
Analytics**

**Enterprise  
Data Infra-  
structure  
PI System**

**Customer  
Energy  
Efficiency  
(NYEM)**

**NYPA Emergency Operations Center (EOC)**

# Decision Point Transitions from Reactive to Predictive



- *Asset Performance Management*: APM uses historical data to create analytic models that represent normal equipment operation
- *NYPA APM* will monitor process data from multiple equipment sensors to determine when the asset is approaching non-normal behavior
- The early warning indication can be days, weeks, or months in advance of equipment failure

# ASSETS

These are the individual pieces of equipment that make up NYPA's G&T systems.

Sensors are being placed on assets, including:

- Transformers
- Reactors
- Turbines
- Generators
- Breakers
- Battery Banks
- Cables
- Transmission Lines

# SENSORS

Installed on NYPA's generation, substation and switchyard assets, sensors collect data that can be used in evaluating and predicting asset health. NYPA is installing sensors on its assets through the multiphase sensor deployment program:

- Phase 1:** 20,000 new and 26,000 existing data points
- Phase 2:** 65,000+ new data points
- Phase 3:** Implement & pilot test noncommercial sensors

# LOCAL CONTROL ROOMS

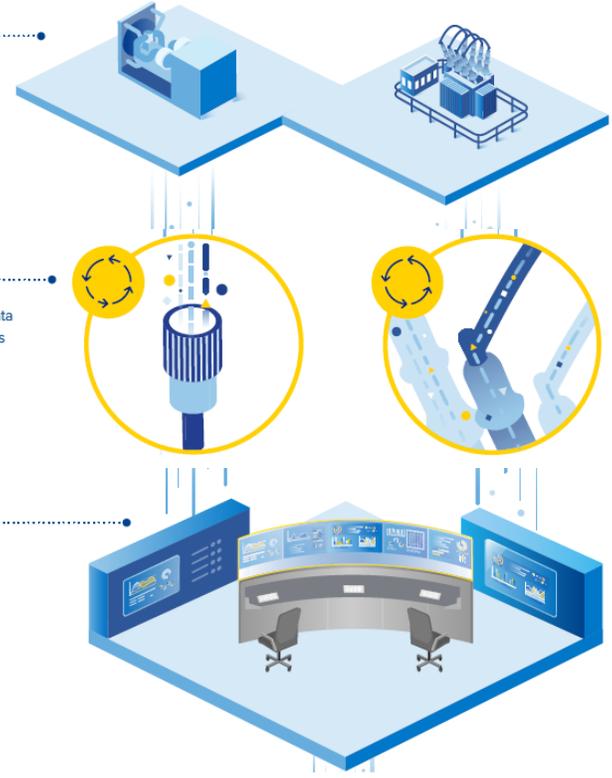
Data points captured by the sensors are transported to the local control room where they are mapped to the Process Integration (PI) system.

# COMMUNICATIONS BACKBONE

This transports the data from the local control room to the central PI system so it can be viewed, shared and analyzed by users across the organization.

# ASSET PERFORMANCE MANAGEMENT (APM)

The APM software uses data from the sensors and other data sources to perform advanced analytics that help optimize cost, risk and performance of assets. By calculating an asset health score, NYPA will identify potential issues, find the source of the issue and take appropriate action before the asset fails, reducing overall maintenance cost and avoiding unplanned outages.



# ACTION AT THE PLANTS

Making asset information available that enables plants to collaborate and optimize asset...

- Health
- Efficiency
- Risk
- Safety
- Criticality
- Cost
- Availability
- Regulatory Compliance

# ASSET INFORMATION USERS

**On-site at the facilities**

Including:

- Planners
- Operations and Maintenance Departments

**At facilities and in White Plains**

Including:

- Asset Managers
- Engineers
- Digital Worker Program

**White Plains**

Including:

- Asset Information Group
- Operations Portfolio Management Group

**ISOC**

Using asset information to provide the plants with actionable information



# COLLABORATION

Users share information to drive continual improvement across the organization and better inform Life Extension and Modernization and Reliability Centered Maintenance projects

# Sensor Deployment Program

CEC	# Sensors
Transformer	40
Circuit Breaker	26
Battery Bank	10
Reactor	16
<b>Total</b>	<b>92</b>

NIA	# Sensors
Hydro Turbine Generator	64
Transformer	96
Circuit Breaker	88
Battery Bank	15
System 1	2
<b>Total</b>	<b>265</b>

BG	# Sensors
Hydro Turbine Generator	32
Transformer	24
Circuit Breaker	13
Battery Bank	1
System 1	1
<b>Total</b>	<b>73</b>

STL	# Sensors
Hydro Turbine Generator	16
Transformer	124
Circuit Breaker	101
Battery Bank	33
Reactor	32
<b>Total</b>	<b>306</b>

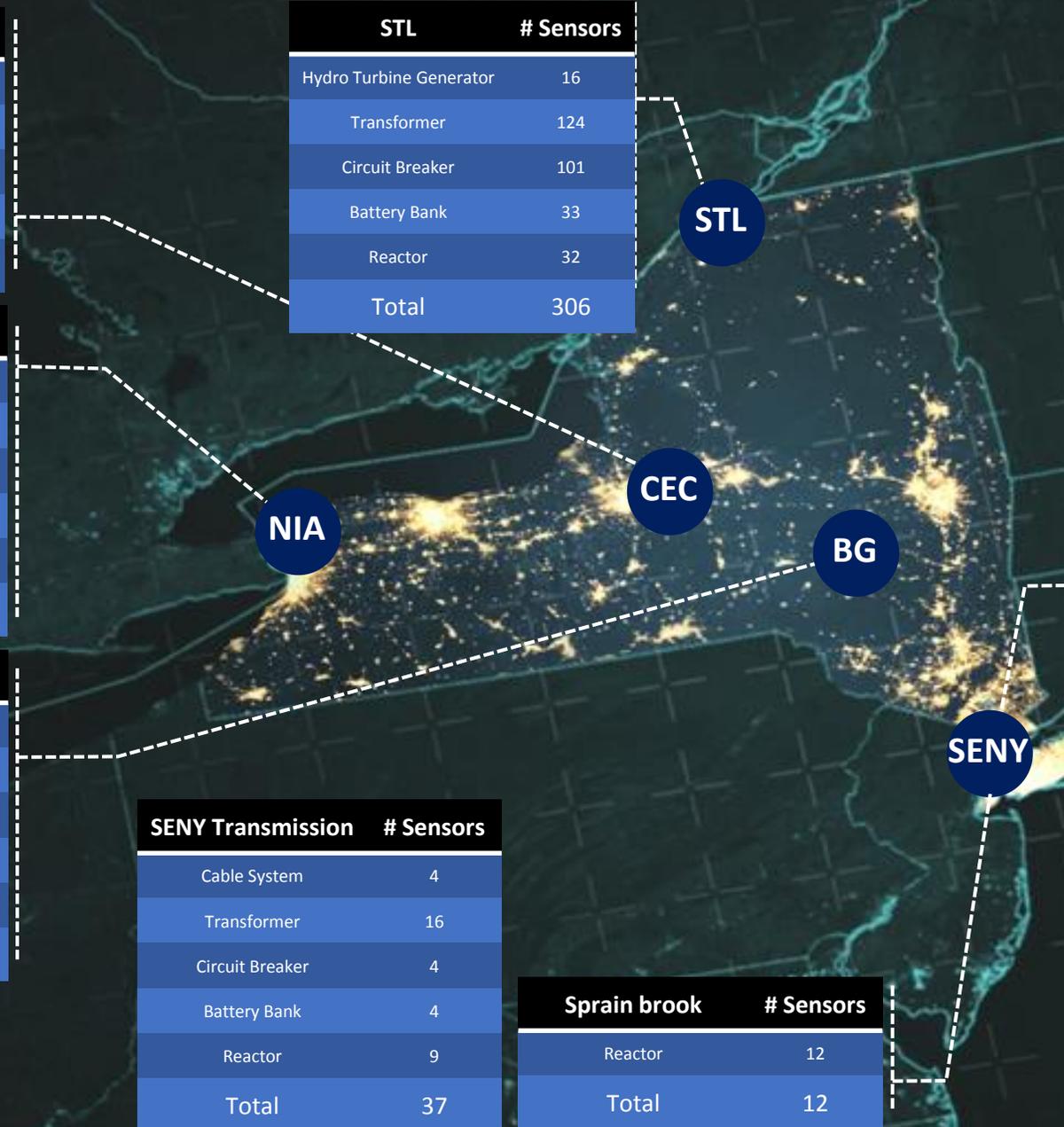
SENY Transmission	# Sensors
Cable System	4
Transformer	16
Circuit Breaker	4
Battery Bank	4
Reactor	9
<b>Total</b>	<b>37</b>

Sprain brook	# Sensors
Reactor	12
<b>Total</b>	<b>12</b>

SCPP	# Sensors
Combustion Turbine Generator	9
Transformer	36
Circuit Breaker	6
Battery Bank	7
System 1	4
<b>Total</b>	<b>62</b>

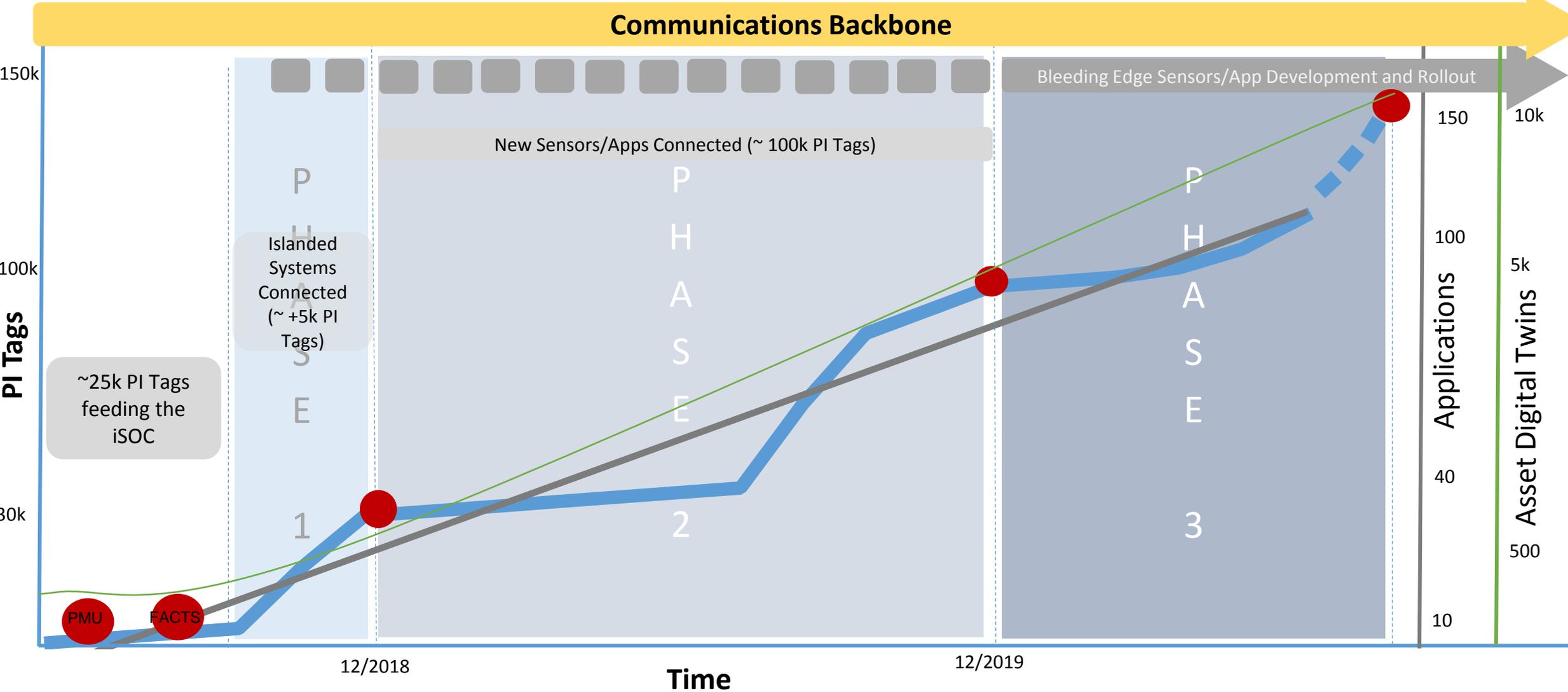
500MW	# Sensors
Combustion Turbine Generator	8
Steam Turbine Generator	2
Transformer	22
Circuit Breaker	9
Battery Bank	6
Reactor	8
System 1	1
<b>Total</b>	<b>56</b>

Flynn	# Sensors
Transformer	8
Circuit Breaker	1
Battery Bank	1
System 1	1
<b>Total</b>	<b>11</b>



# Data Journey and Acceleration

More sensors are being deployed across both our Generation and Transmission network. NYPA is currently installing three types of Apps : COTS, Common Core and Custom. A systematic approach is being taken to deploying sensors and leveraging data for situational awareness.



# Communications Backbone



## Optical Ground Wire Installation



- Major Facilities
- Substations
- Future OPGW Installation
- Completed and In-progress OPGW Installations



Optical Ground Wire

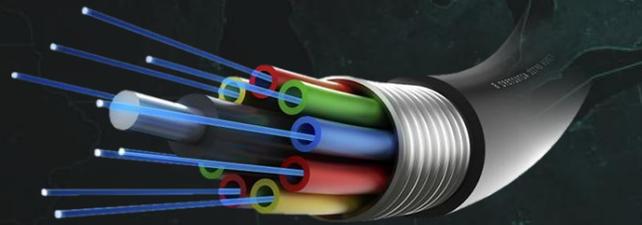
- Optical Fiber
- Stainless Steel Tube
- Optional Aluminium Tube
- Water blocking gel
- Aluminium-Clad Steel Wire



# Communications Backbone Program

## Fiber across New York State - 100 Mbps bandwidth

- π +683 miles of OPGW installation
- π 18 Segments
- π 11% complete
- π 31 Termination points, 48 Strand fiber, 100Gbps fiber bandwidth



## Microwave – 300 Mbps bandwidth

### North New York State

+117 miles of microwave coverage

- π 9 Microwave Towers
- π 45 Microwave Dishes



### NYC – Long Island – Westchester

+181 miles of microwave coverage

- π 19 Microwave Towers
- π 20 Microwave Dishes

# Digital Utility Worker Mission: More Digital Tools

Tools that enable our workforce to...



## ACCESS INFORMATION ANYWHERE



## FOCUS ON CORE FUNCTIONS



## SUPPORT DECISION MAKING

- Provide access to information to **support day-to-day tasks in real time**
- Apply proven digital solutions to **access the right information anywhere for any job**
- **Capture information more easily** in the field using mobile solutions

- Spend more time engaging in activities that allow increased **focus on core responsibilities**
- Take advantage of familiar technology to **reduce low value tasks**
- Simplify how work is done to **make life easier**

- Make smarter decisions. **Safer decisions.** Quicker decisions. Better decisions.
- Leverage tools to **make informed data-driven decisions**
- **Remotely share information** and collaborate with colleagues to support job tasks

Tools that  
result in  
**REAL** value:



INCREASE  
SAFETY



REDUCE  
RE-WORK



WORKER  
SATISFACTION



REDUCE  
TIME TO DECISION



ENHANCE  
TRAINING

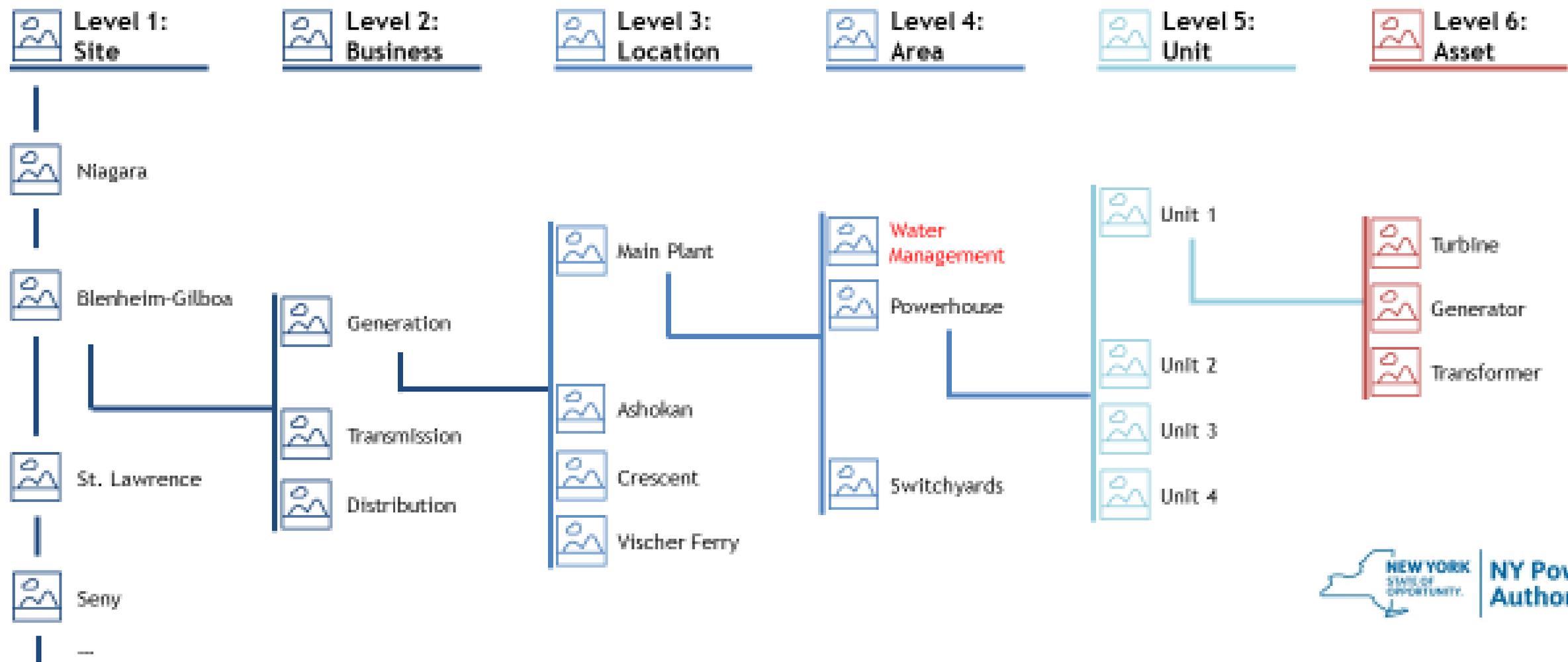
# PI Day @ NYPA – 09/06/18



25+ Stakeholders from  
 IT/OT R&D I&C  
 Site Operations  
 Digital Analytics  
 Asset Information  
 iSOC AGiLE OSISoft



# PI AF - Agile Development

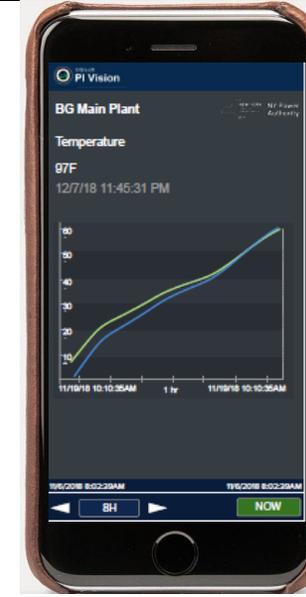
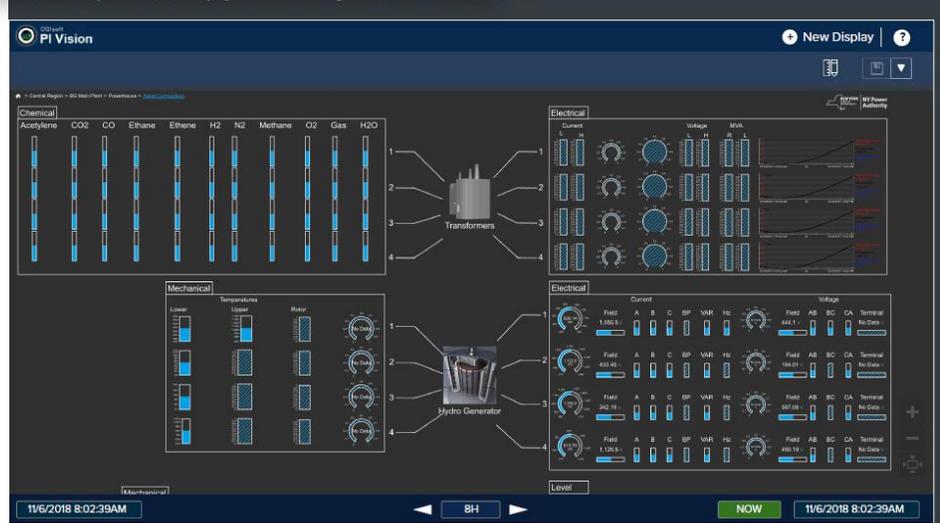


# PI Vision – UX takes priority!

Assimilation of Physical, Weather & Market/Financial Data in PI Vision allows Asset Utilization to be calculated. PI Vision serves as a Decision Support tool that provides both a diagnostic & holistic view of asset, system and environmental conditions.



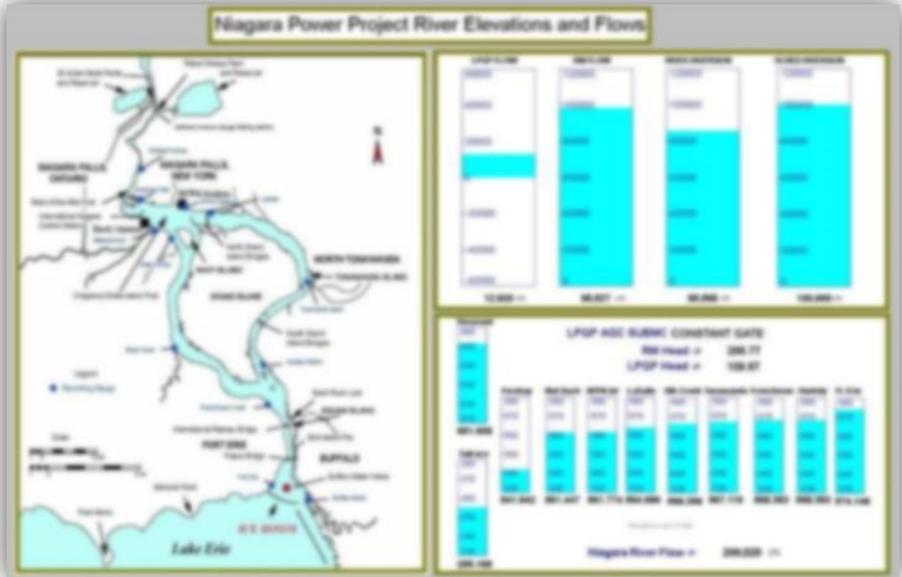
The asset comparison screen displays attributes amongst all assets in a location's units.



Having the complete picture via PI Vision enables NYPA to work smarter not harder!

**NYPA PI Vision**  
UX and Visual Guide

# Digital Utility Worker in Action



# ISO 55001



“ *Deploying breakthrough technologies and using advanced data analysis allows us to make optimal, cost-efficient asset management decisions so we can continue to provide low-cost and reliable power while making smart and efficient operating decisions.* ”

~ GIL C. QUINIONES  
President and CEO  
New York Power Authority



## Future Facing Efforts:

EF / Analytics /  
π Integrated Logbooks

# Contact Information



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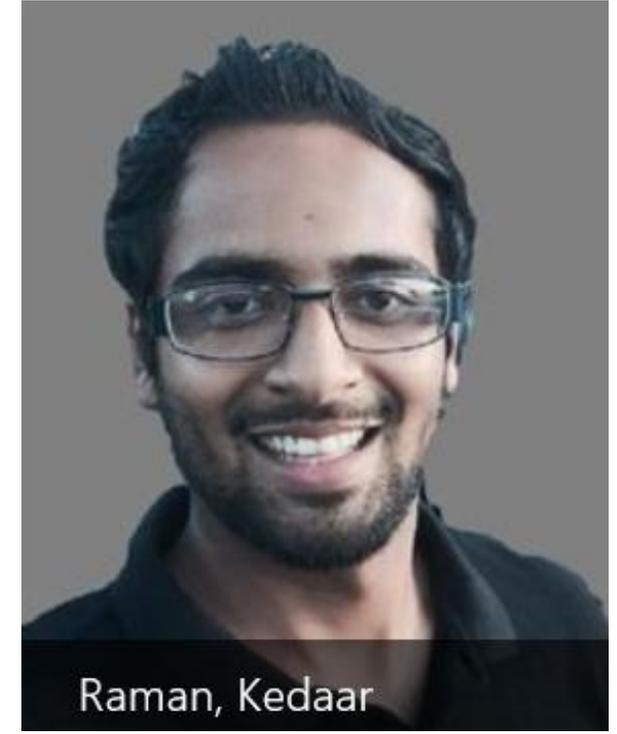
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# Questions?

Please wait for  
the **microphone**

State your  
**name & company**



# Please remember

TO DOWNLOAD  
APP, SEARCH  
OSISOFT



謝謝 KEA LEBOHA  
 TAPADH LEIBH 고맙습니다  
 БАЯРЛАЛАА MISAOTRA ANAO  
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRÁCIÉS  
**OBRIGADO** شكرا SALAMAT  
 DANKON TANK TAPADH LEAT  
 DANKIE TERIMA KASIH KÖSZÖNÖM  
 СПАСИБО  
 РАКМЕТ СИЗГЕ  
 GO RAIBH MAITH AGAT  
 БЛАГОДАРЯ GRACIAS MAHADSANID  
 ТИ БЛАГОДАРАМ  
 ТАК DANKE  
 RAHMAT **MERCI**  
 HATUR NUHUN  
 GRACIAS TIBI  
 EΥΧΑΡΙΣΤΩ GRATIAS TIBI  
 АЇЇ SALAMAT MAHALO IĀ 'OE TAKK SKALDU HA  
 GRAZZI ПAKKA ПЕР **GRAZIE**  
 HATUR NUHUN MATUR NUWUN  
 ありがとうございます  
 DI OU MÈSI  
 SIPAS JI WERE TERIMA KASIH  
 MATUR NUWUN  
 UA TSAUG RAU KOJ  
 TI БЛАГОДАРАМ  
 СИПОС  
 WAZVIITA  
 FALEMINDERIT  
 MULŢUMESC  
 HVALA  
 FAAFETAI  
 ESKERRIK ASKO  
 HVALA ХВАЛА ВАМ  
 TEŞEKKÜR EDERIM

