# Making the Transition to Sustainable Operations at the University of Utah:

## A Framework for Closing the Performance Gap


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**Joseph Ashurst**
Associate Director of Facility Management
University of Utah
joseph.ashurst@fm.utah.edu | 801-581-6254

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**Danielle Dahan**
Technical Services Program Manager
McKinstry
danielled@mckinstry.com | 720-577-2010


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# Learning Objectives

- ✓ Identify existing gaps in the transition of your buildings & utilize industry best practices to build new procedures and processes. These often include the development of an asset management system, a warranty management system and standard operating procedures.
- ✓ Leverage fault detection and diagnostics tools to continually monitor new or retrofitted equipment.
- ✓ Develop and define Key Performance Indicators (KPIs) early in the design process to track the critical components of a successful transition.

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# A Framework for Closing the Performance Gap

## The Performance Gap

- High Performance, Sustainable Design buildings often do not perform as designed
- 50% of energy is wasted in buildings
- Operators and technicians are not provided with the right tools to manage new, complex controls systems

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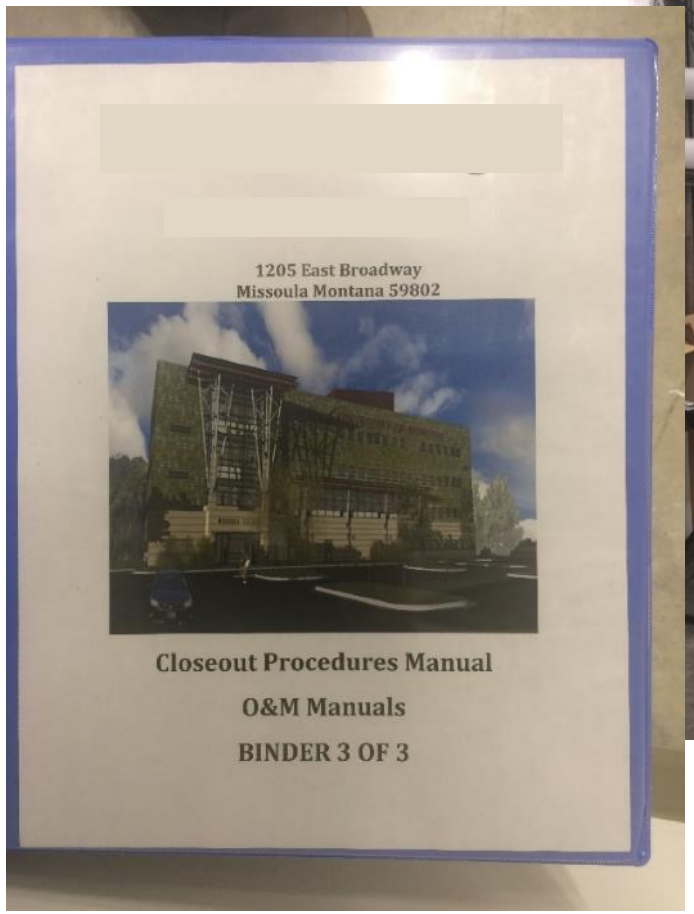
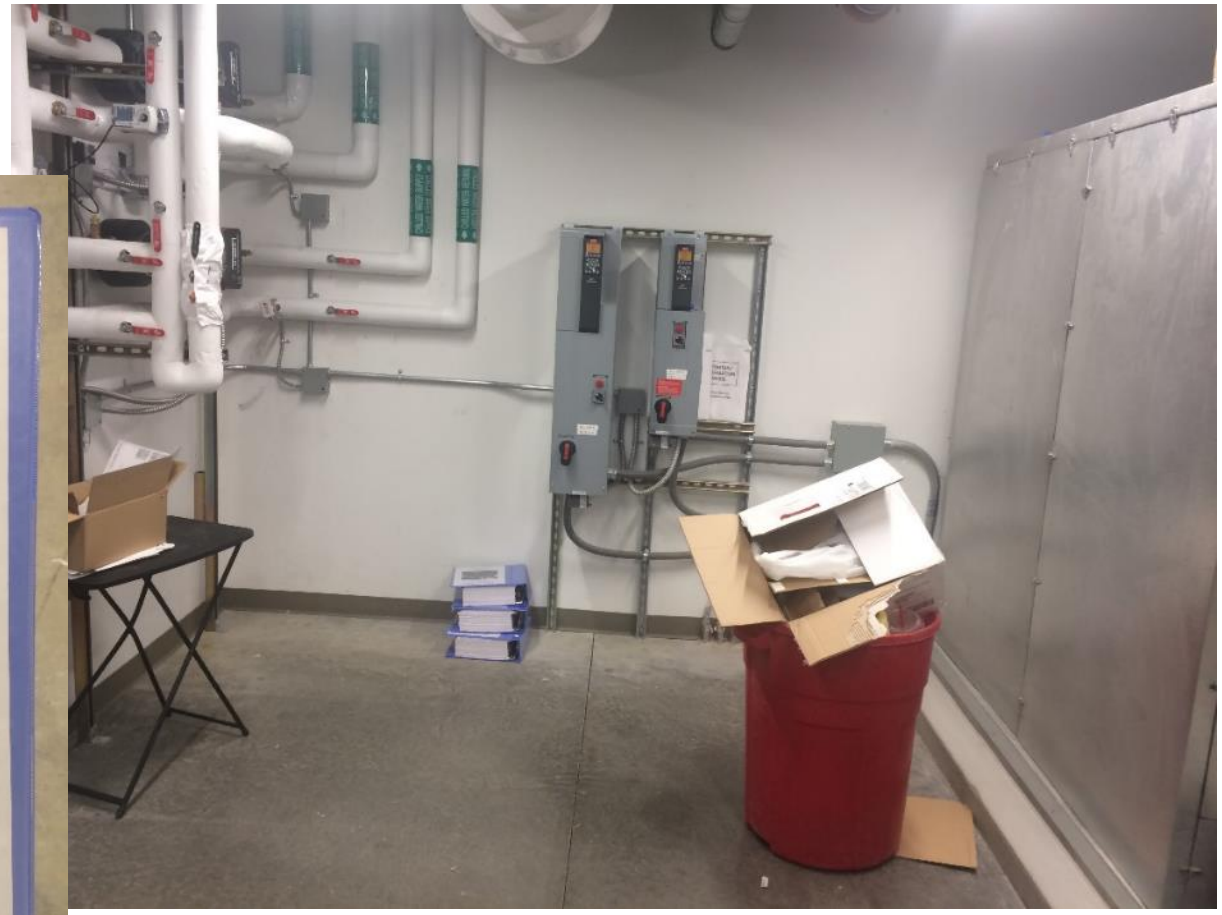
# The Performance Gap



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# University of Utah by the Numbers

**32,760**
**Total University Enrollment**

**1,535**
**Acres of University-Owned Land**

**>500**
**Buildings**

**15MM**
**Square Feet**

**3**
**High-Temperature, Hot Water Plants**

**5**
**Chilled Water Plants**

# University of Utah Health Sciences

- **Only university health care system in the state of Utah**
- **Training ground for Utah health care professionals**
- **14,000 faculty & staff**
- **4 million sqft; 23 buildings**

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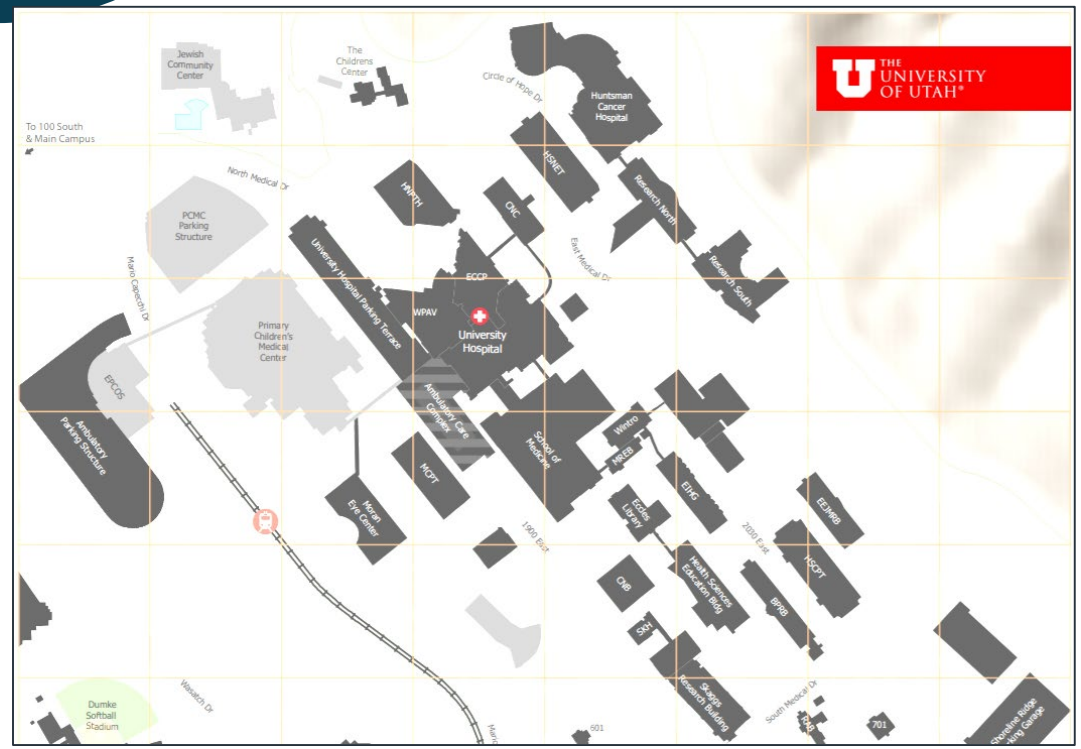
# University of Utah Health Sciences Campus



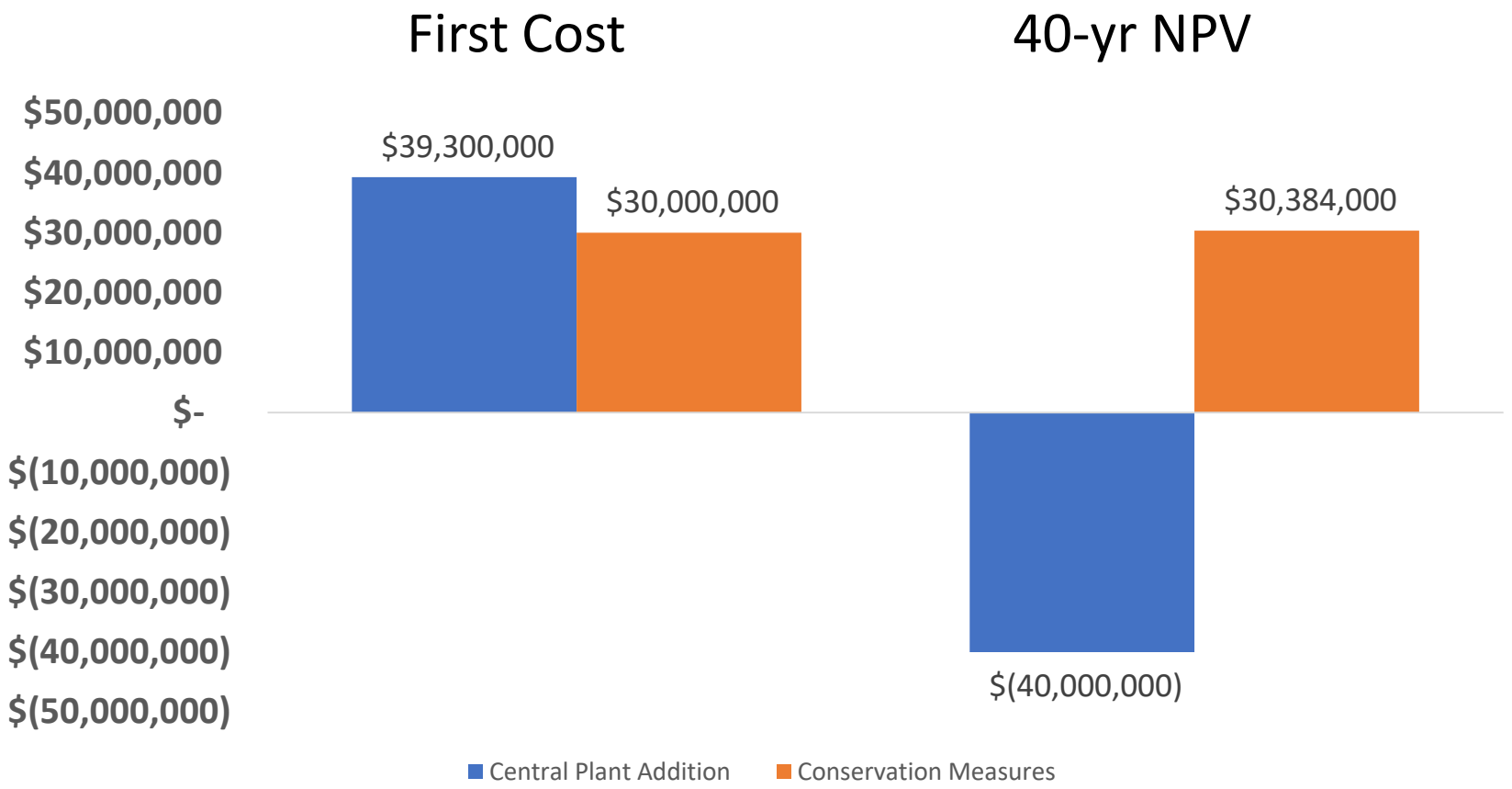

1. Health Sciences Academic & Research Buildings 1.7M sqft
2. University Hospital Campus 1.3M sqft
3. Huntsman Cancer Institute & Hospital 1M sqft

## The Need

The U needed help addressing four major deficiency areas with the campus:

1. Capacity Issues
2. Lack of Redundancy
3. Aging Equipment
4. Lack of Automation

# Building a Central Plant vs Optimizing Portfolio

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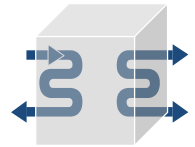
# Energy Efficiency Improvement Needs

**Recover plant capacity through efficiency & load reduction**

**Cost & Schedule Strategies**

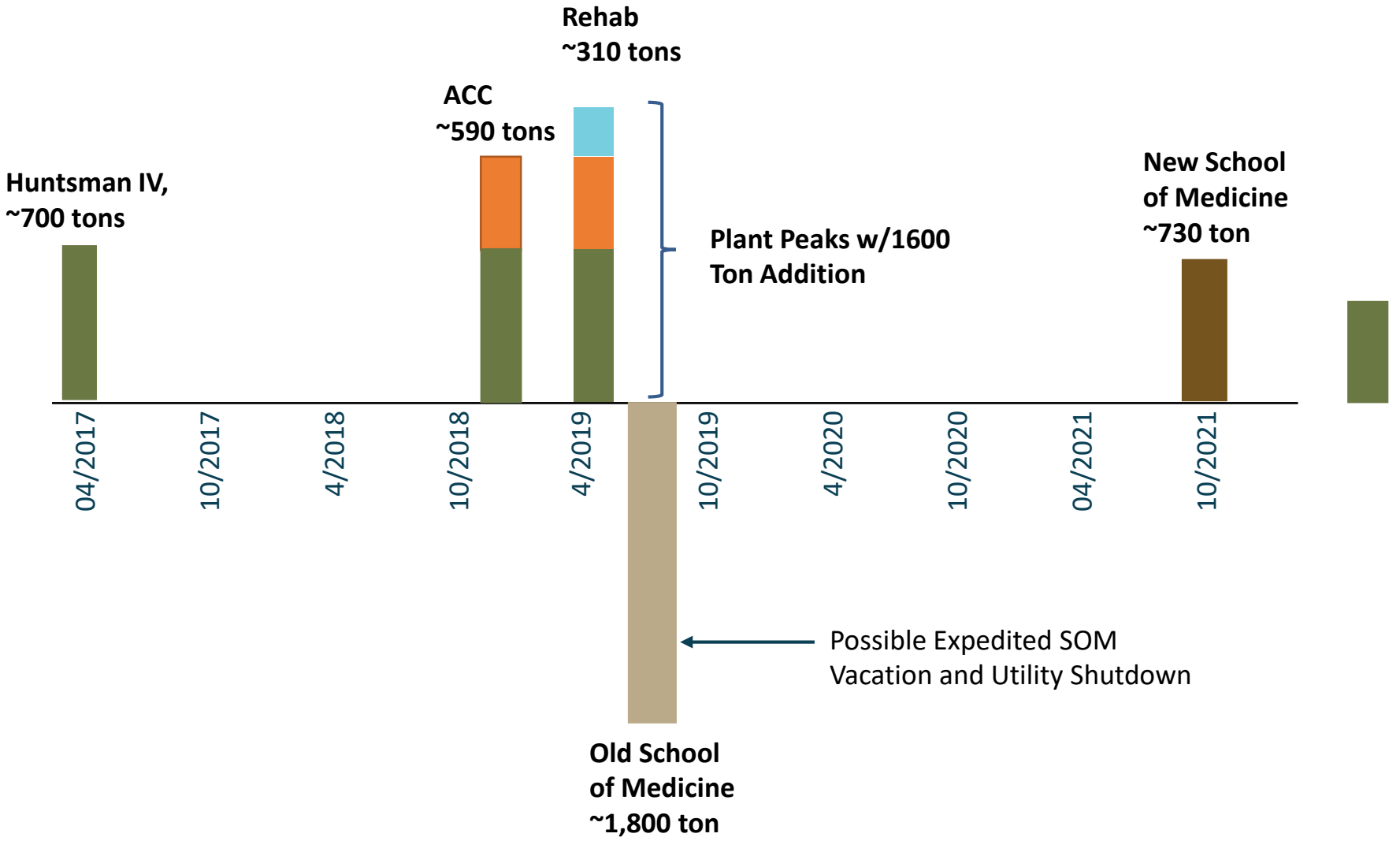
**Future Growth of HSC**

**N+1 Redundancy**

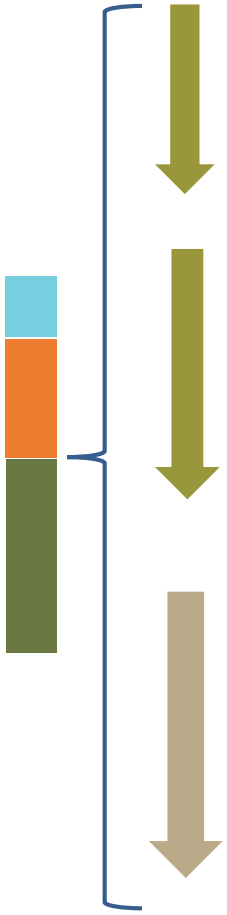


**No Impact to Operations**

# Campus Energy Efficiency Project (CEEP)



# Conservation Strategies



**400 to 600 Ton Load Reduction** w/ Evaporative Cooling on Lab AHUs w/ 100% OA

**200-300 Ton Load Reduction** w/Lab Fume Hood VAV Retrofit w/Occupancy Sensor

- Utilize critical space controls and venturi air valves
- Occupancy sensors in building zones
- Targeted lighting retrofit

**700 to 1100 Ton Capacity Increase on Central Plant**

- Increase CHWST from 39F to 42F w/elimination of building-level HX
- Coil level independent flow control valve retrofit for better control and better delta T
- Increase CWST to increase chiller capacity

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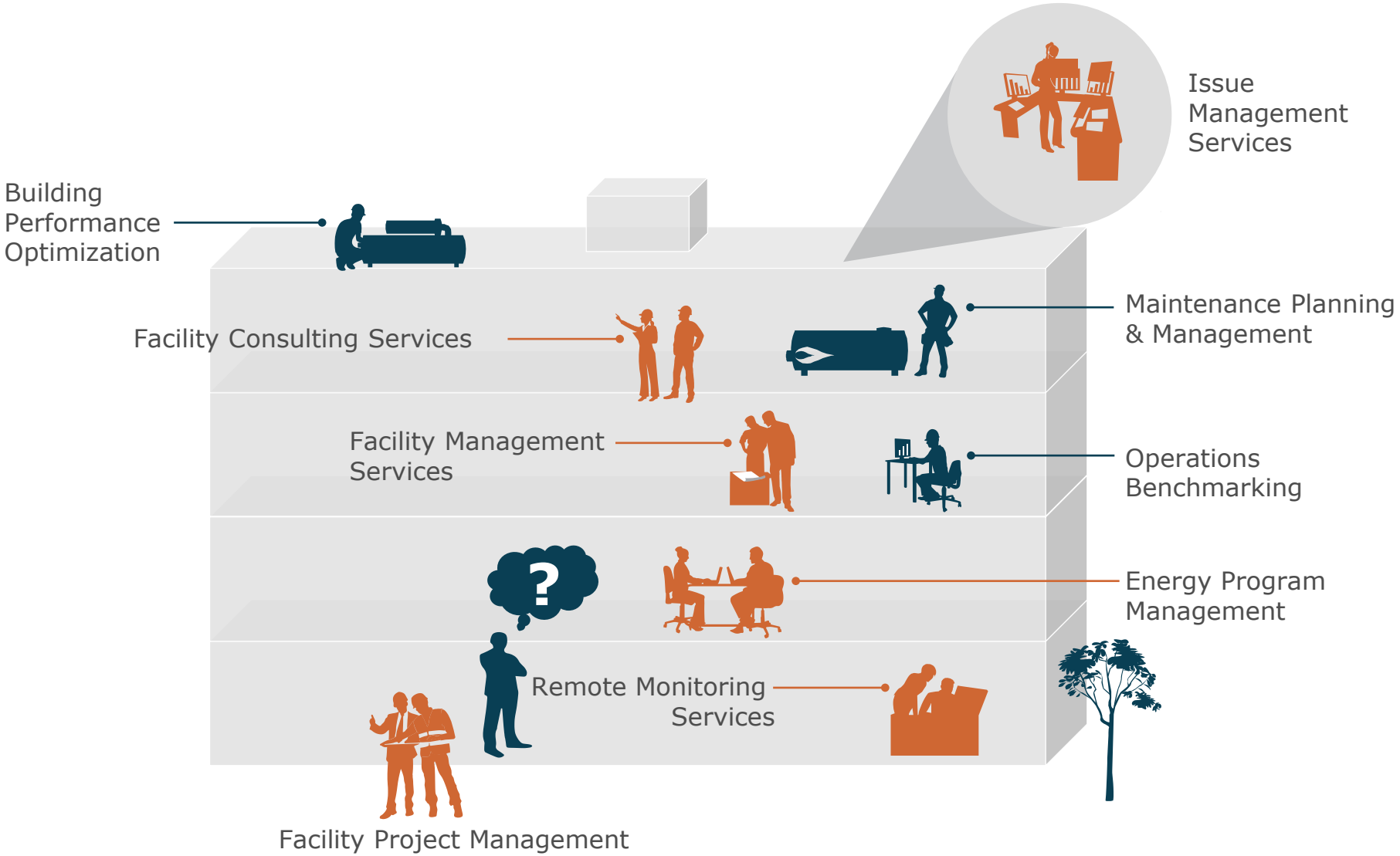
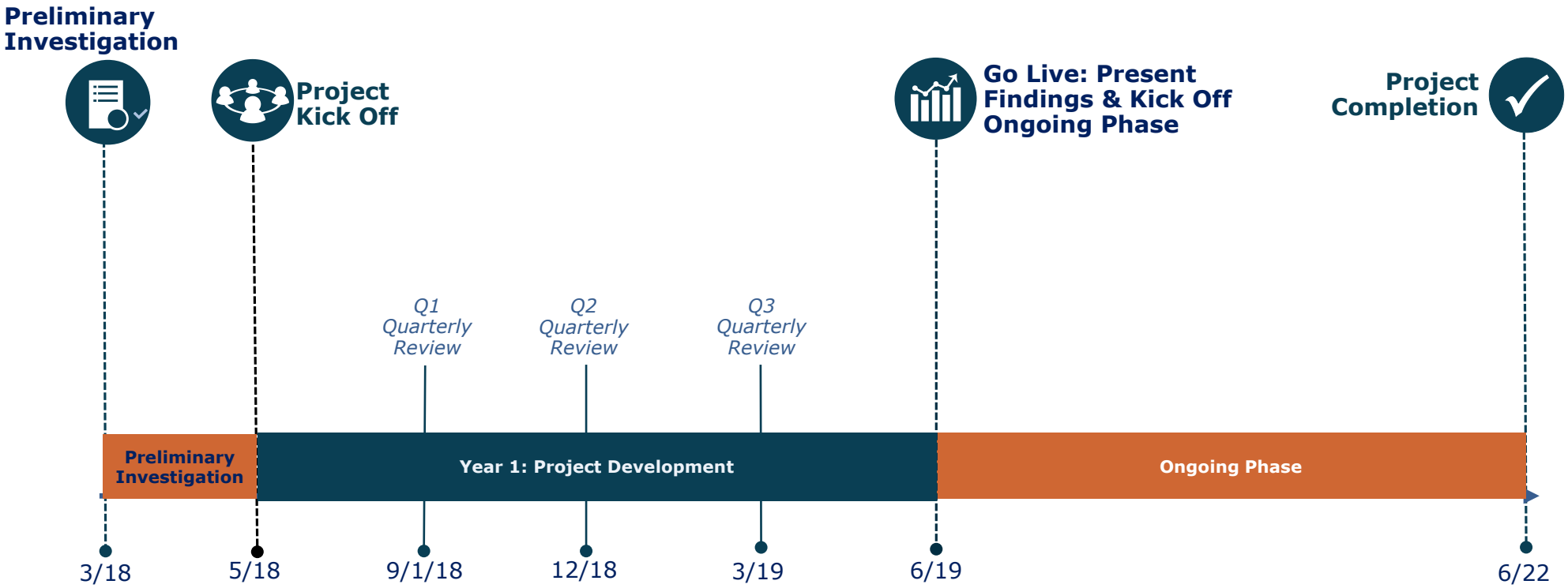
# Opportunities to Fill Gaps & Optimize Transition



# Transition to Sustainable Operations Program

# TSO at University of Utah

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# Setting Key Performance Indicators (KPIs)

- **Characteristics of a KPI**
  - ✓ Measurable
  - ✓ Time component
  - ✓ Demonstrate success of the project
  - ✓ Allows for further optimization

- **Example KPIs**
  - ✓ Building energy usage
  - ✓ Campus energy usage
  - ✓ Cost of corrective maintenance per asset
  - ✓ Percent of assets that have warranty information documented

**KPIs allow us to monitor, analyze, and optimize the performance of the TSO program**

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# Identifying Gaps & Opportunities

## Key Steps in Identifying Gaps

- One-on-one conversations with various staff
- Data collection & analytics
- Site observations & building walkthroughs

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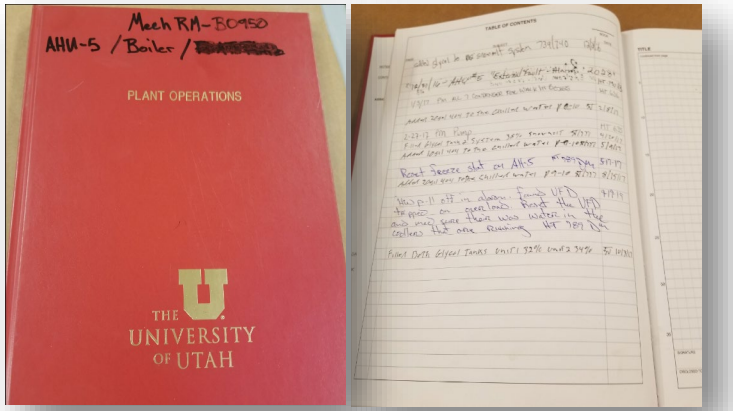
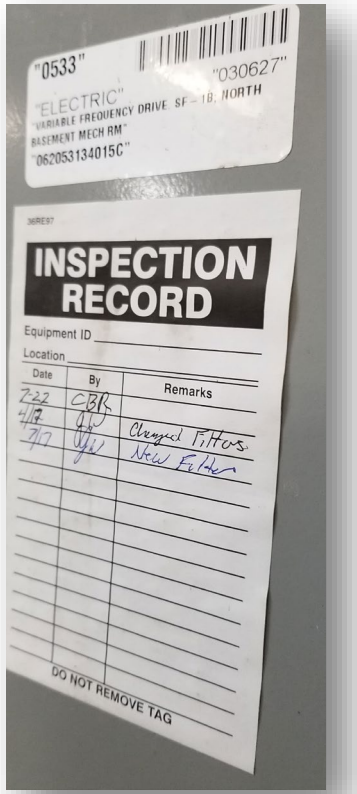
# Asset Management

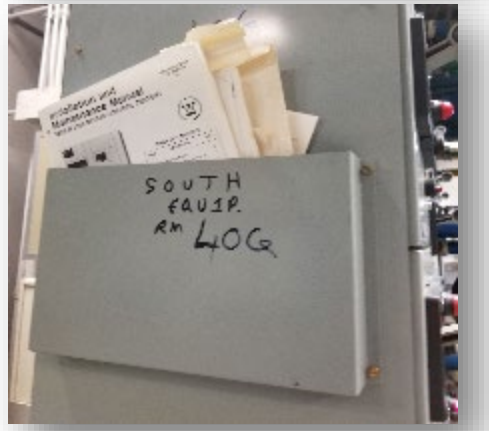
- Asset Tagging
- Capital planning tool
- CMMS data
- Pilot demonstration

# Operating Procedures

- Developing procedures for maintaining all equipment
  - Standard Operating Procedures (SOPs)
  - Maintenance Operating Procedures (MOPs)
  - Emergency Operating Procedures (EOPs)
- Working closely with building maintenance staff to develop procedures
- Training staff
- Standardized naming & storing of procedures for ease of access

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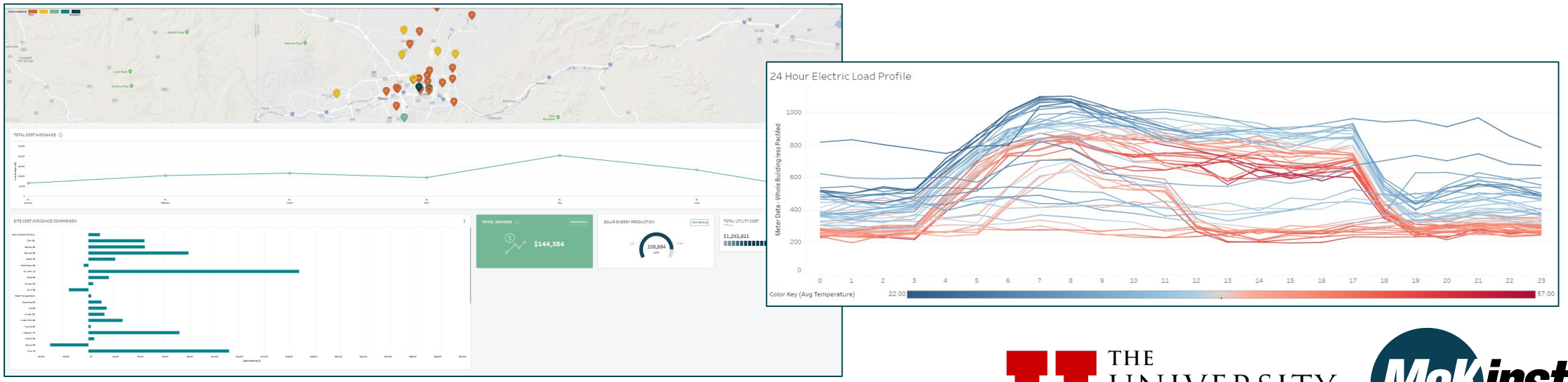
# Active Energy Management

- Fault Detection for identifying energy savings measures
- Dashboard for University staff to view measures & building performance
- Implementing energy savings measures

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# Overcoming Challenges

- Many different staff in an organization can have very different views on what the standards should look like
- Some staff may feel protective of their area of work and be hesitant to outside input
- Large organizations may have many similar or overlapping initiatives occurring at once

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# Questions?


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