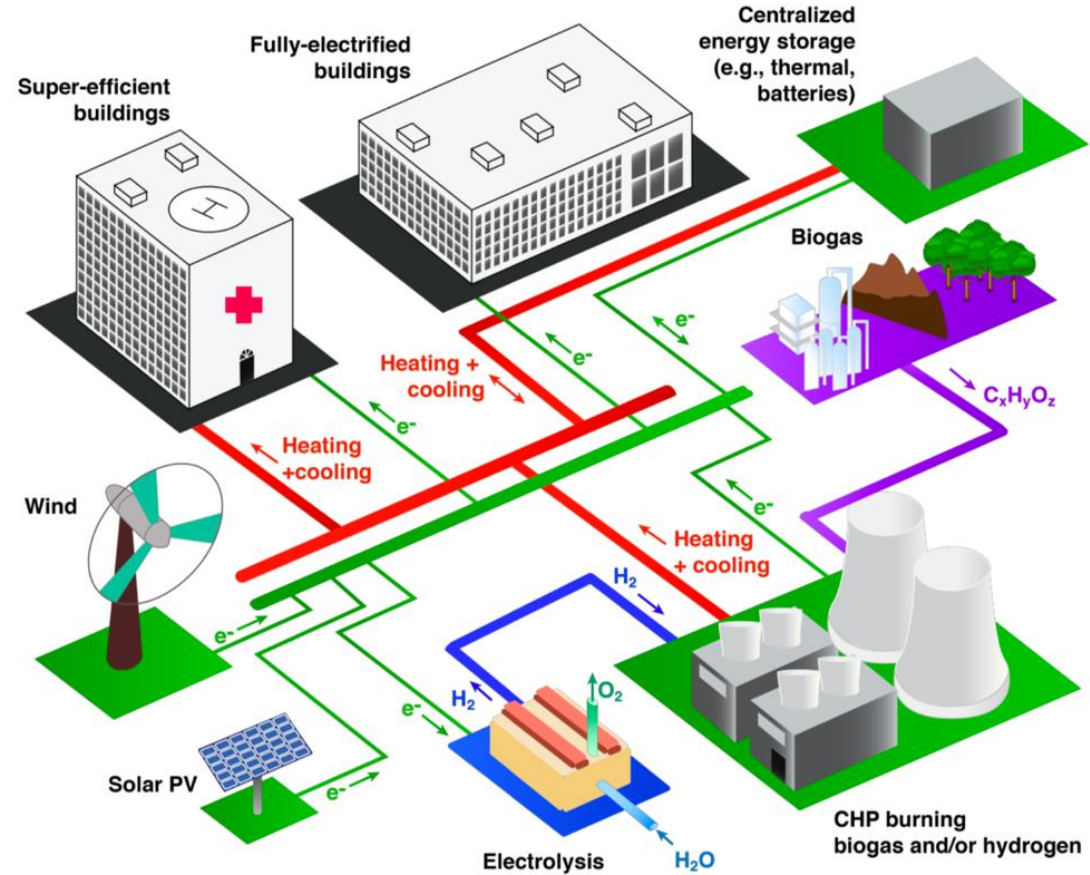


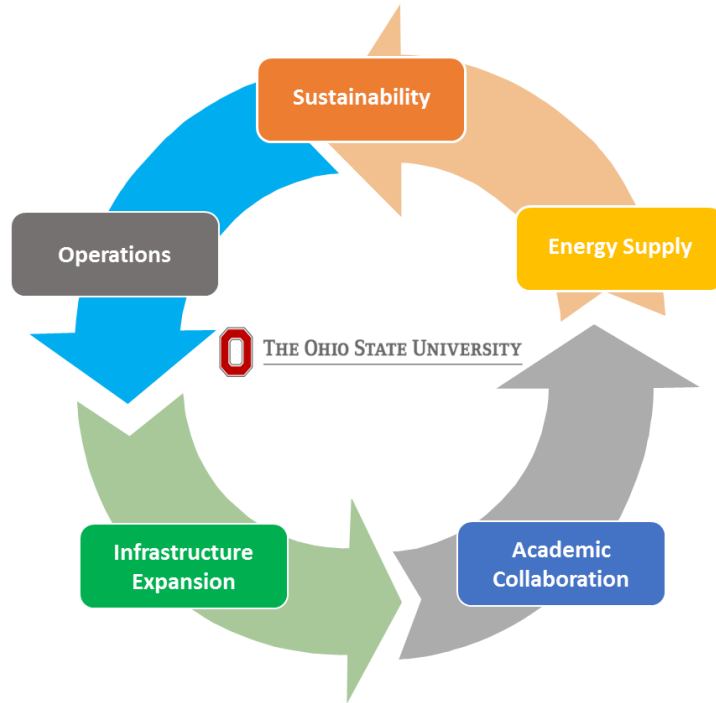
A Digital Network to Control a Modern DES

Pittsburgh, PA
June 26, 2019

Serdar Tufekci



Highlights of Ohio State's 50-year Public-Private Partnership



50-year

partnership to operate OSU power, heating, and cooling systems

\$1.2 billion

upfront investment into university endowment

>\$1.8 billion

additional infrastructure investment over 50 years

\$150 million

commitment to support academics, research

>25%

energy consumption reduction within 10 years



4 Key Elements of Energy Strategy for Institutions

1

**Reliability &
Resiliency**



2

Sustainability



3

Affordability



4

Predictability



Energy as a Service™ Platform

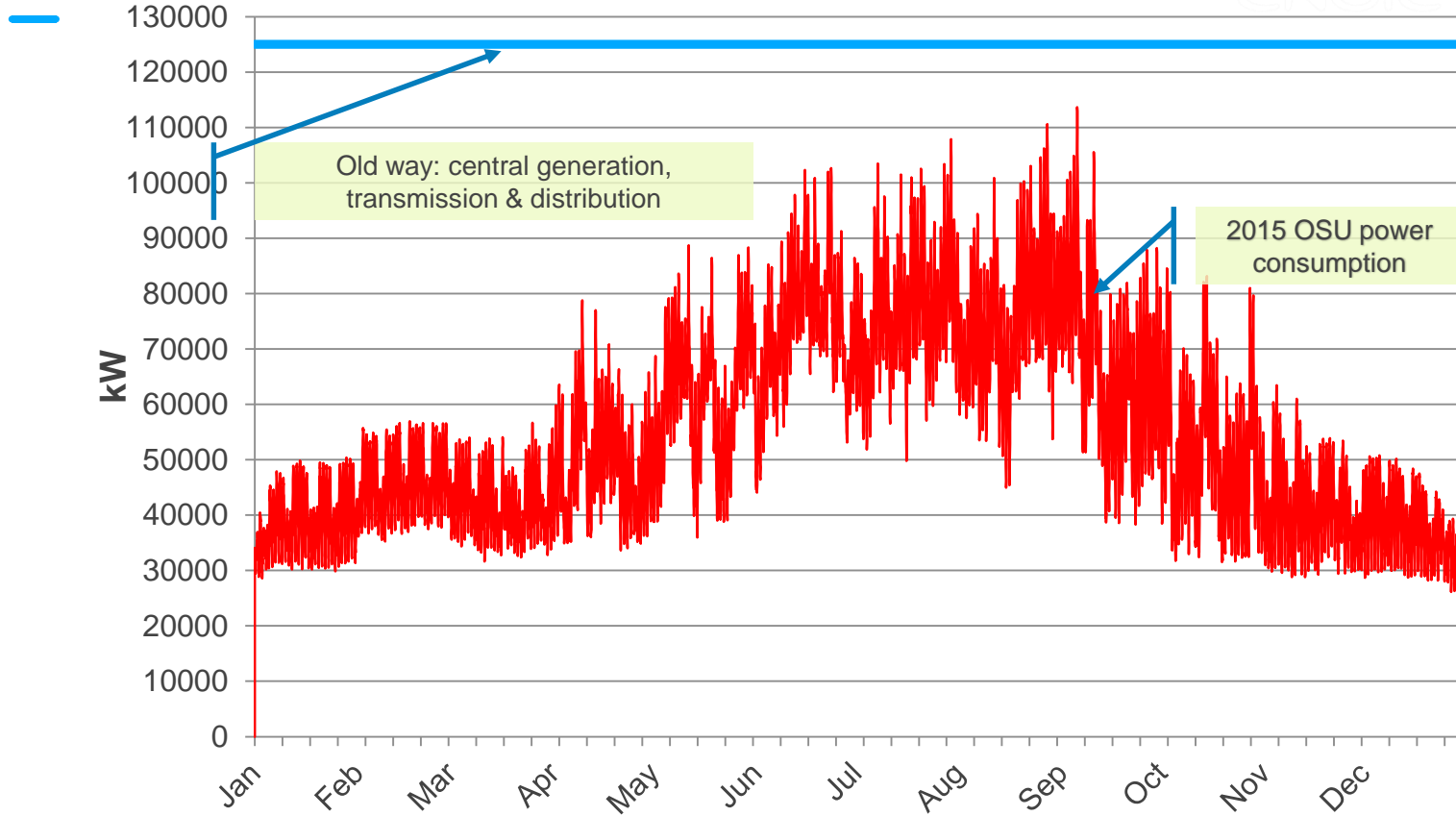
THE OHIO STATE UNIVERSITY

Footprint & Energy Profile

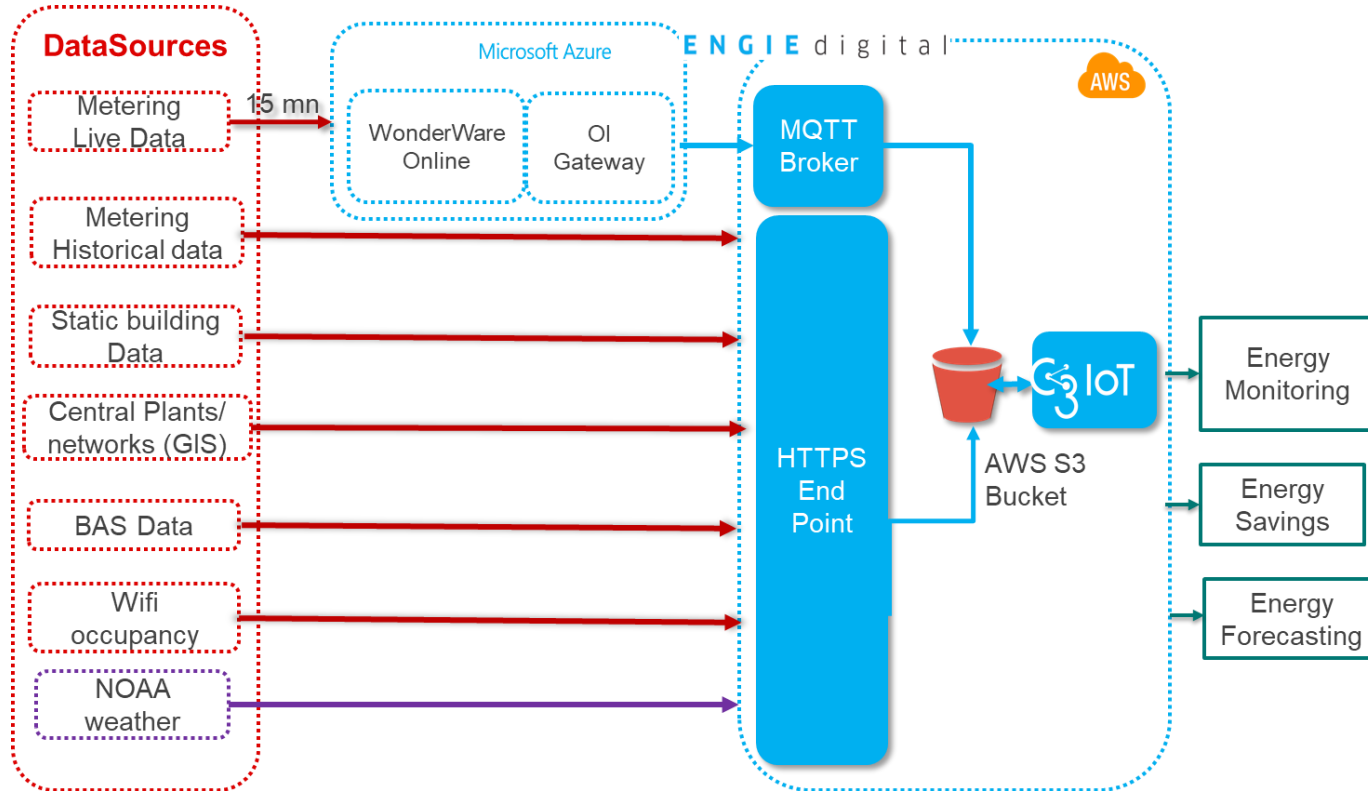
- 490 buildings on $\approx 2,000$ acres
- 100,000 people daily
- 1,300 hospital beds
- 14,000+ student residence beds
- 3 stadiums = 120,000 seats
- Elect., gas, steam, chilled water
- 3 high voltage substations
- 110 MW peak demand
- 2.9 million MMBtu's of steam
- \$115 million annual spend
- High reliability requirements



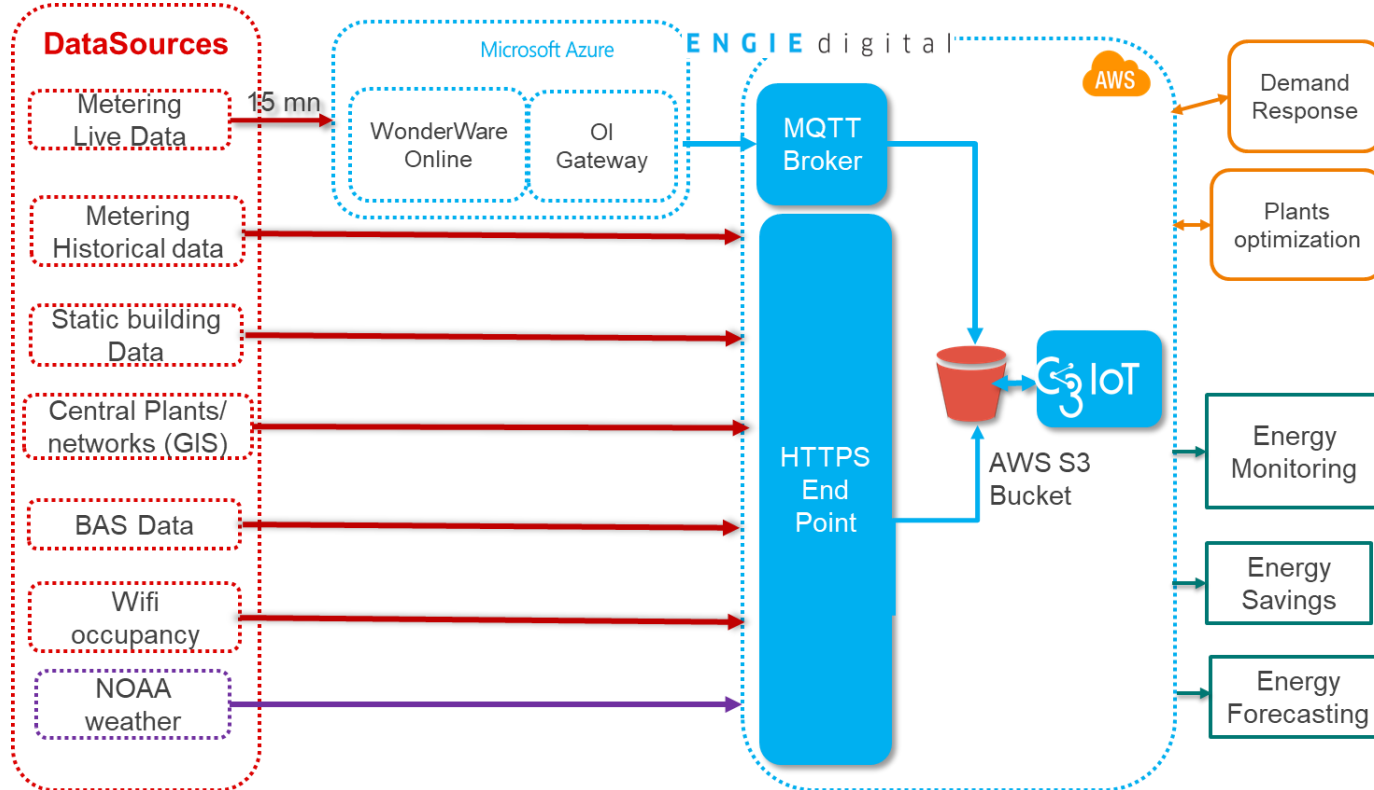
OHIO STATE POWER DEMAND



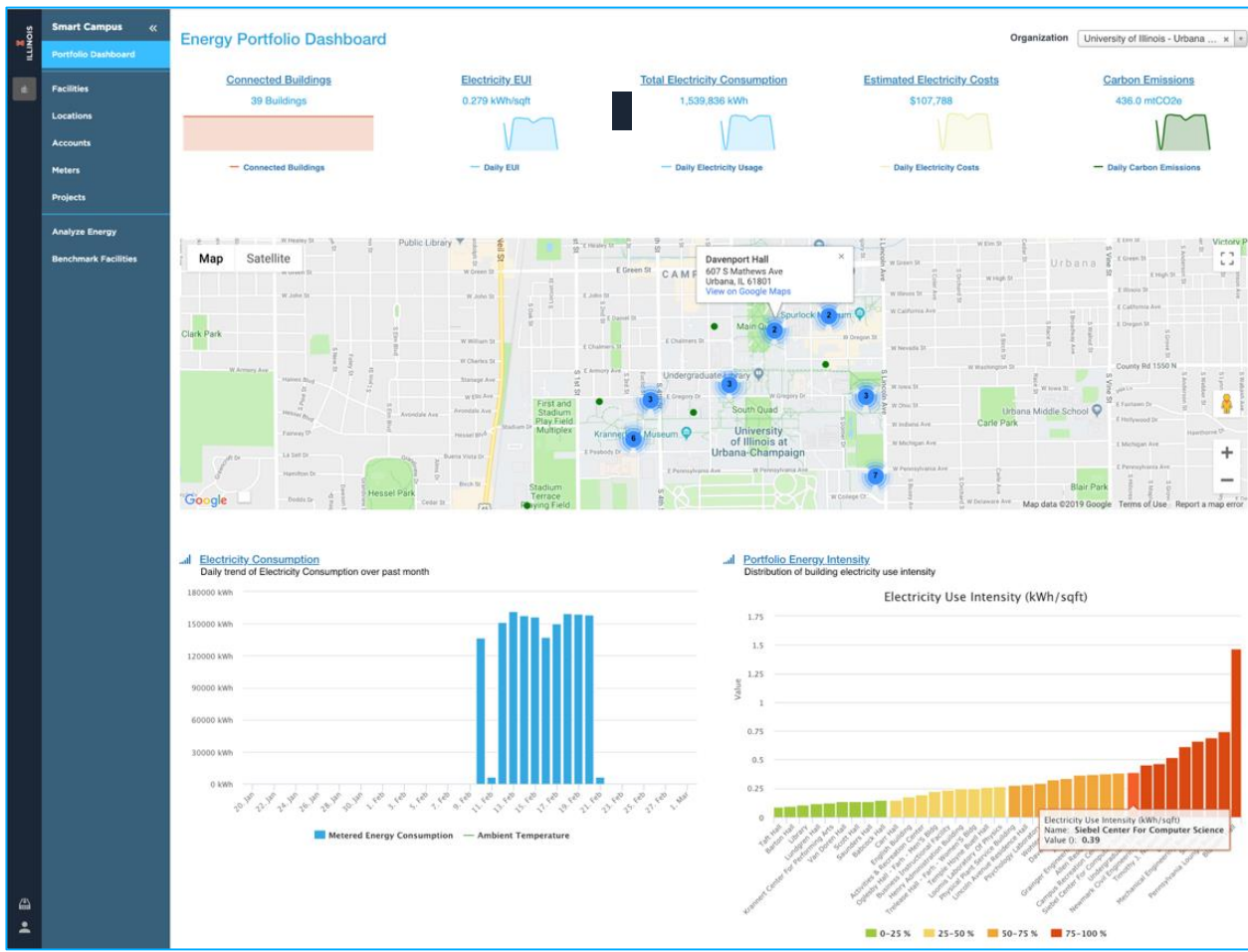
DIGITAL PLATFORM ARCHITECTURE – PHASE I



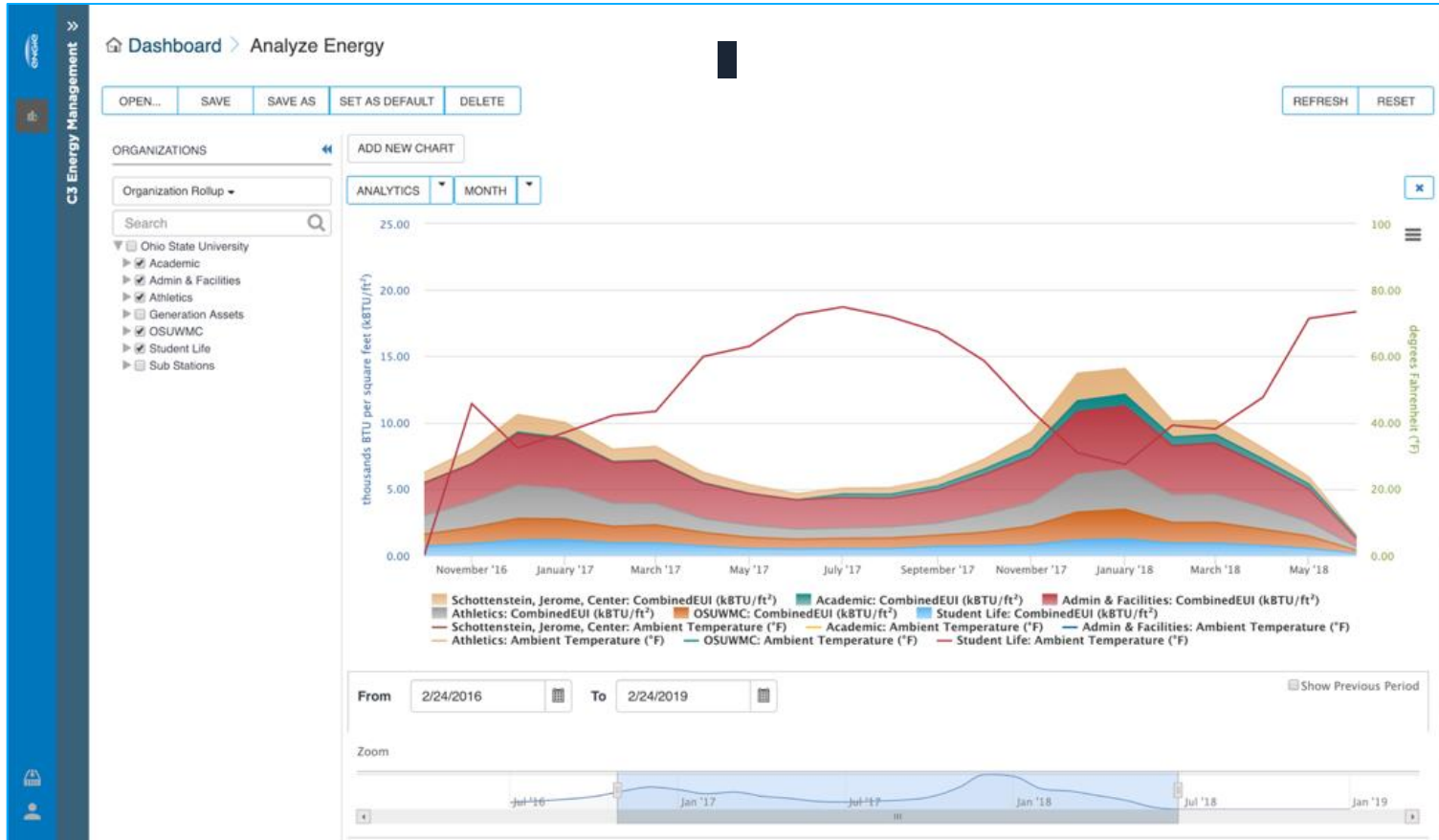
DIGITAL PLATFORM ARCHITECTURE – PHASE II

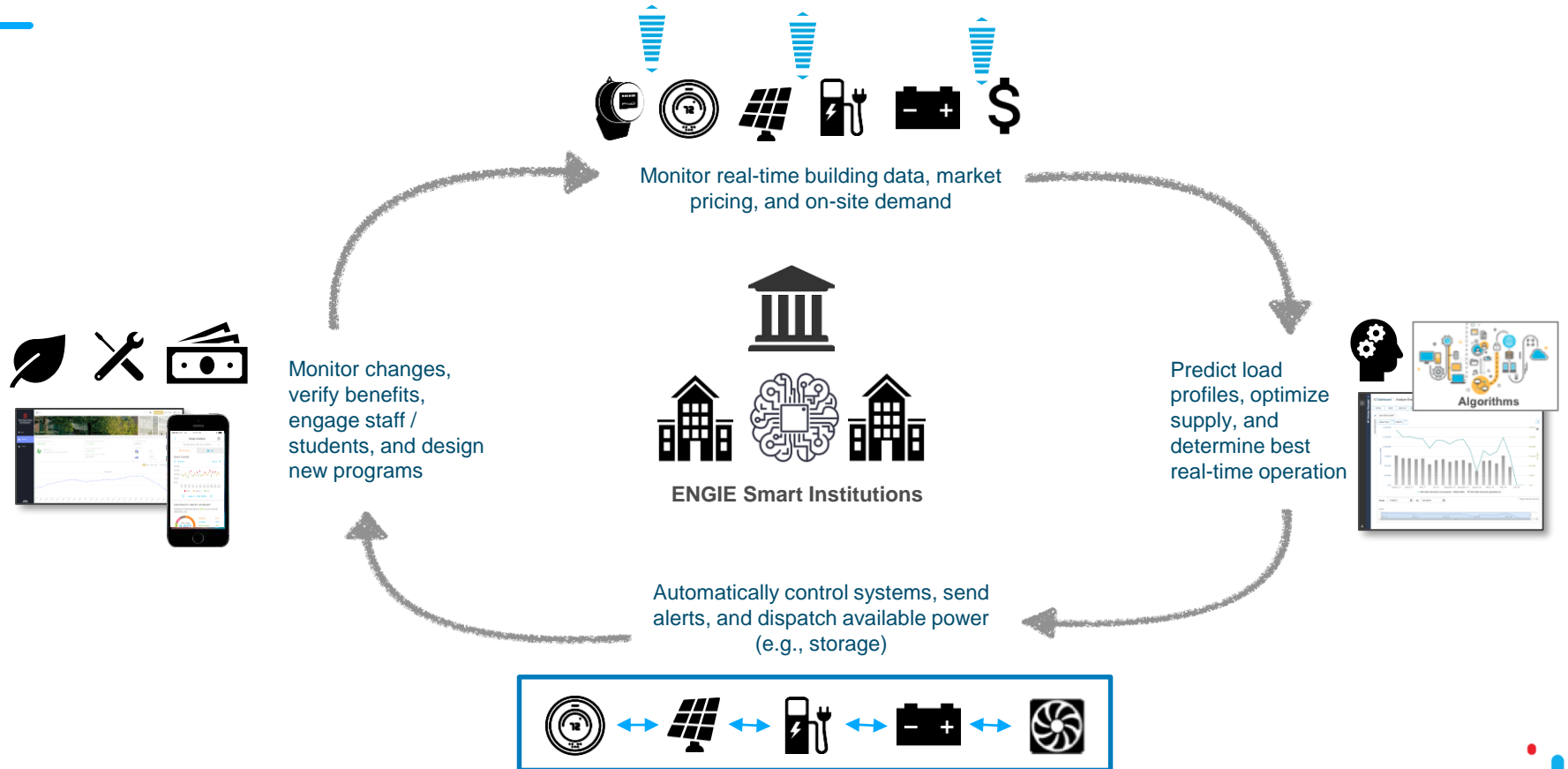


DIGITAL PLATFORM – PUBLIC USER INTERFACE

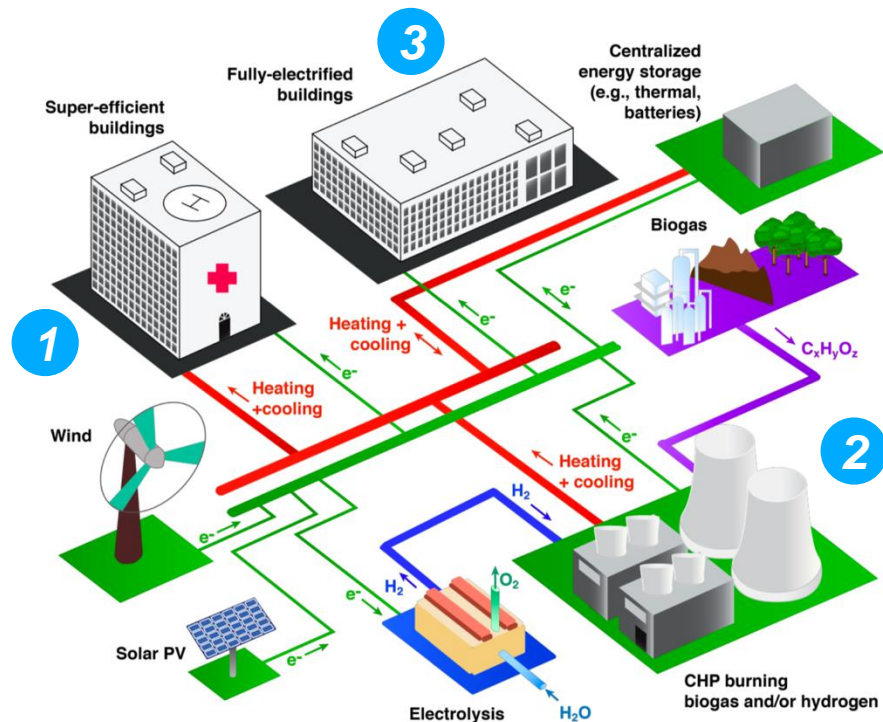


DIGITAL PLATFORM – PUBLIC USER INTERFACE





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1

Energy efficiency. Reducing energy demand through investments in deep energy efficiency.

↳ *Global leader in energy services*

2

Biogas. Replacing natural gas with renewable biogas, with a potential role for hydrogen.

↳ *Transitioning all gas operations to biogas and renewable hydrogen*

3

Electrification. Electrifying end uses that currently depend on natural gas and obtaining electricity from carbon-free energy sources.

↳ *Focused expertise on retrocommissioning and building infrastructure modernization*

IDEA 2019 PITTSBURGH



DIGITAL PLATFORM

02 Campus Energy Sources

Rooftop Solar

Mini CHP

Combined
Heat & Power
Plant (CHP)

03 Physical Energy Infrastructure

Chilled H₂O

Steam & HW Lines

Electricity

Natural Gas

01 Digital Infrastructure

Building Info

Smart Meters

BMS Control

Weather Forecasting

Market Info

Occupancy Data

Production Decisions

Demand Response

