2026 CSHE ANNUAL INSTITUTE

Achieving Sustainable Energy Efficiency through Occupancy-Based Ventilation in Healthcare Facilities

SILICON SYSTEMS: POWERING THE FUTURE OF OF HEALTHCARE FACILITIES

MAY 13 - 15
SANTA CLARA, CA

Stanford Medicine Children's Health

One of America's most technologically advanced,

family-friendly, and environmentally sustainable hospitals for children and pregnant women

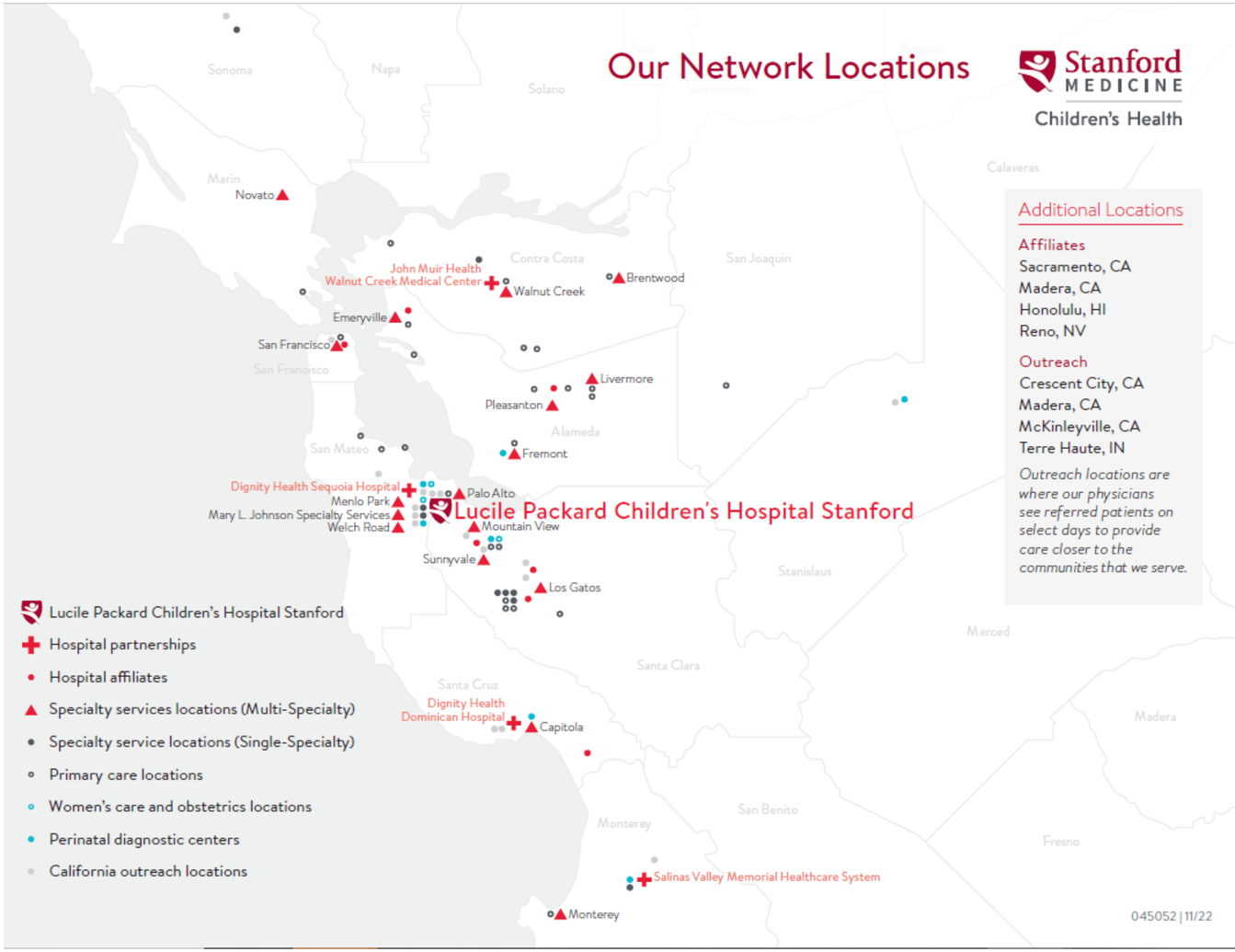
3½ acres

of gardens and green space

394 licensed beds

LEED Platinum certified

One of two children's hospitals in the world to earn the highest designation for sustainability



Our “Why”

Climate change and children’s health

“Climate change poses threats to human health, safety, and security, and children are uniquely vulnerable to these threats ... Given this knowledge, **failure to take prompt, substantive action would be an act of injustice to all children**.” – American Academy of Pediatrics, 2015

- Children are particularly vulnerable to the health impacts of climate change, including heat stroke, asthma, allergies, mental illness, and much more
  → In the Bay Area, air pollution contributes 5,210 new childhood asthma cases each year*
- Extreme heat and poor air quality can contribute to low birth weight and pre-term delivery

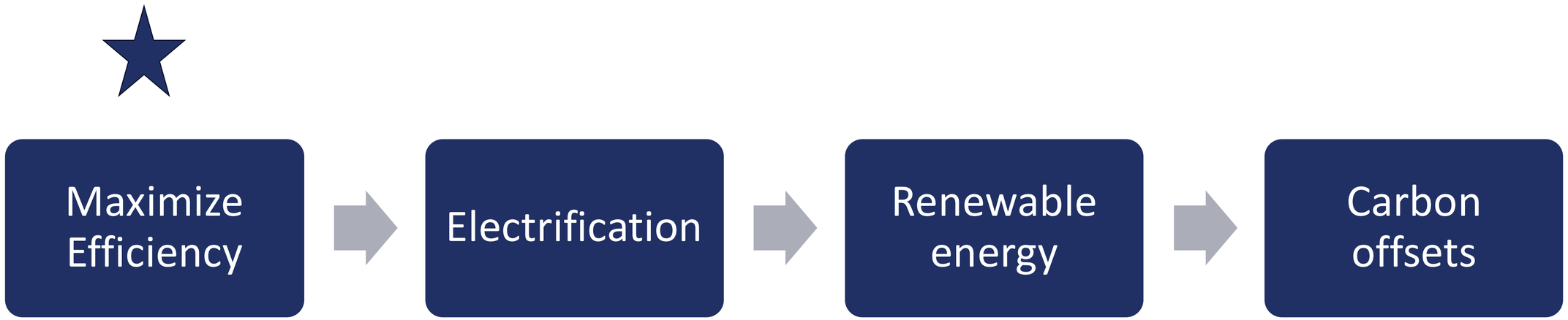
*Southerland et al.

Stanford Medicine Children's Health Climate Action Goals

50% Reduction in Scope 1 and 2 Emissions by 2030 (Baseline Year 2019)

Net Zero by 2050

High Level Strategy



Foundations

- LEED Platinum building, with design for occupancy based ventilation
- Planned for patient rooms, but required a manual workflow
- Key stakeholders unable to support this workflow

The Opportunity

Occupancy Sensors installed for space management

BMS/Digital Controls

Pilot Idea Development

- Learned about another local hospital doing occupancy based ventilation
- Began exploring possibilities for our facility

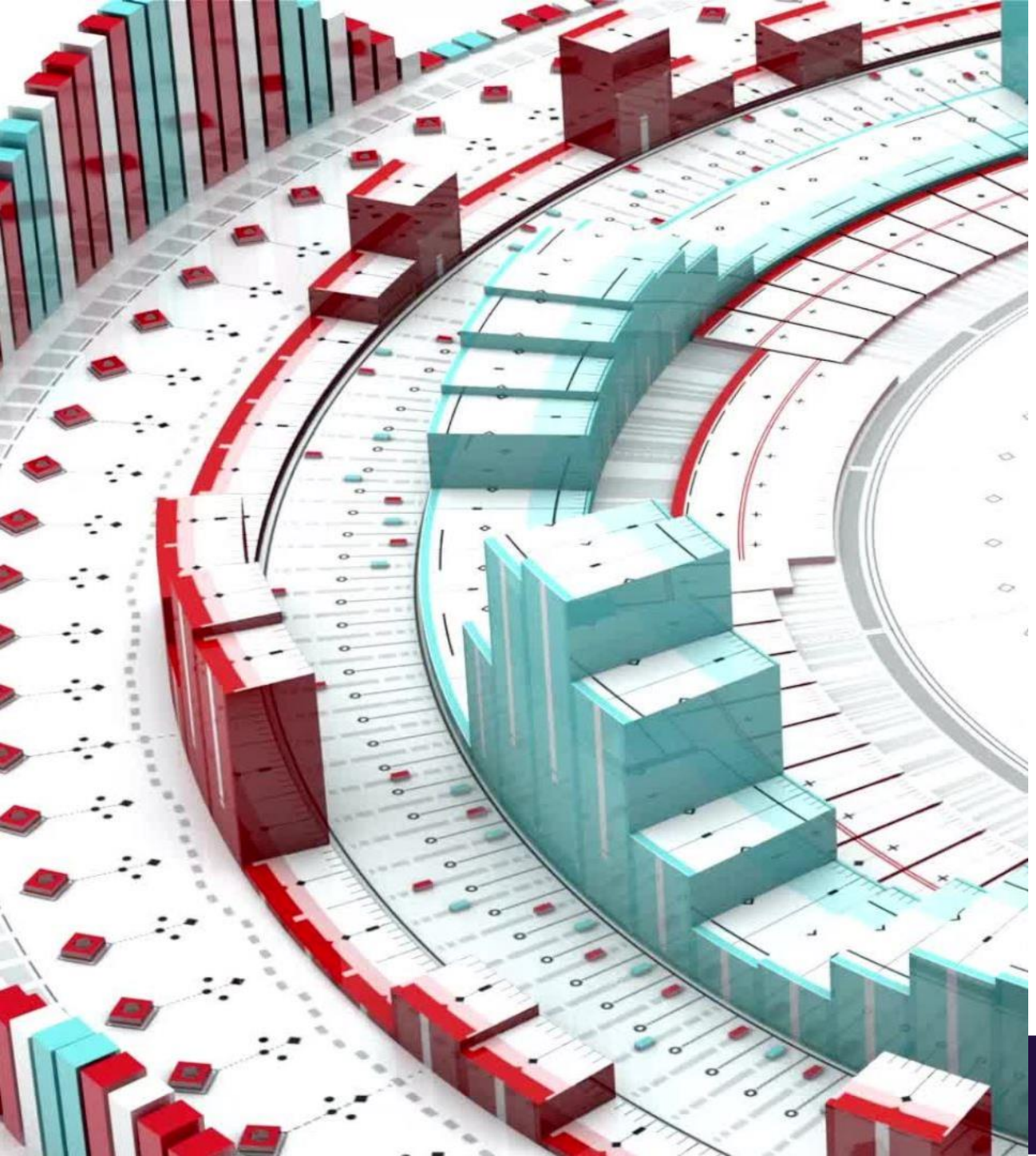
Vendor approached us to explore the idea

Began conversation with controls vendor

- Determined feasibility
- Consulted with IS

- 3-month study
- Big opportunity for savings

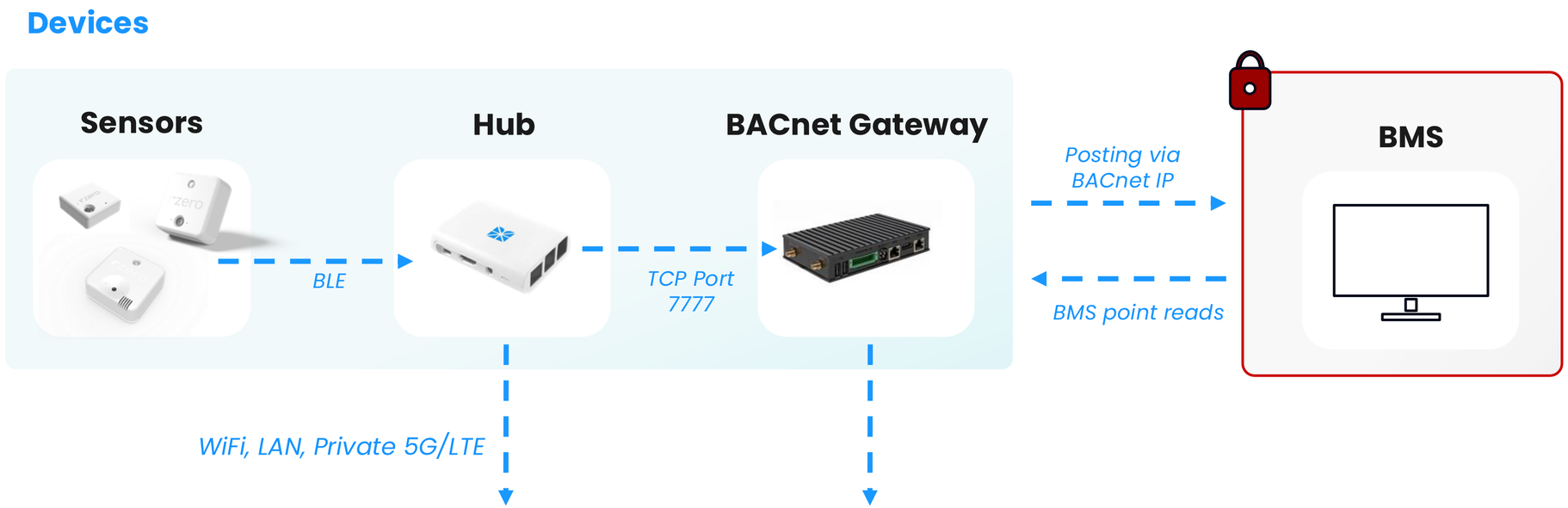
Analyzed the data



Pilot Project Details

- Occupancy sensor technology utilized in 25,000 Ft2 of admin space
- Deployed across 4 floors of our newer hospital building within administrative spaces
- Closed loop flow from occupancy and people counting sensors to the BMS through a BACnet gateway and back to cloud-based M&V system
- New sequence of operations based on real-time occupancy

O-DCV System Architecture



Cloud Intelligence: Energy, Carbon, Utilization, Controls Validation

Operational Details

Started Small

- Started with 4 zones for 2 weeks
- Moved to entre 25,000 pilot area after small test.
- Included on-call rooms

01

IS Partnership

- Needed to ensure that the WiFi network could get data from servers to Compass

02

Adjustments

- Weekly meetings
- Change in data flow
- Bullet points

03

Measurement

- Data form BMS
- Monitoring for comfort complaints

04

Pilot Results

- 30% energy savings
- 9.72 Metric tons of CO2 avoidance
- 100% temperature and comfort satisfaction
- 66% Standby mode
- 72% airflow reduction
- 23,000 kWh saved
- Annual cost savings estimated at $95,623

Annualized Savings	
Electricity Savings (kWh)	218,197
LTHW Savings (kBtu)	117,688
CHW Savings (ton-hrs)	49,069

Learnings

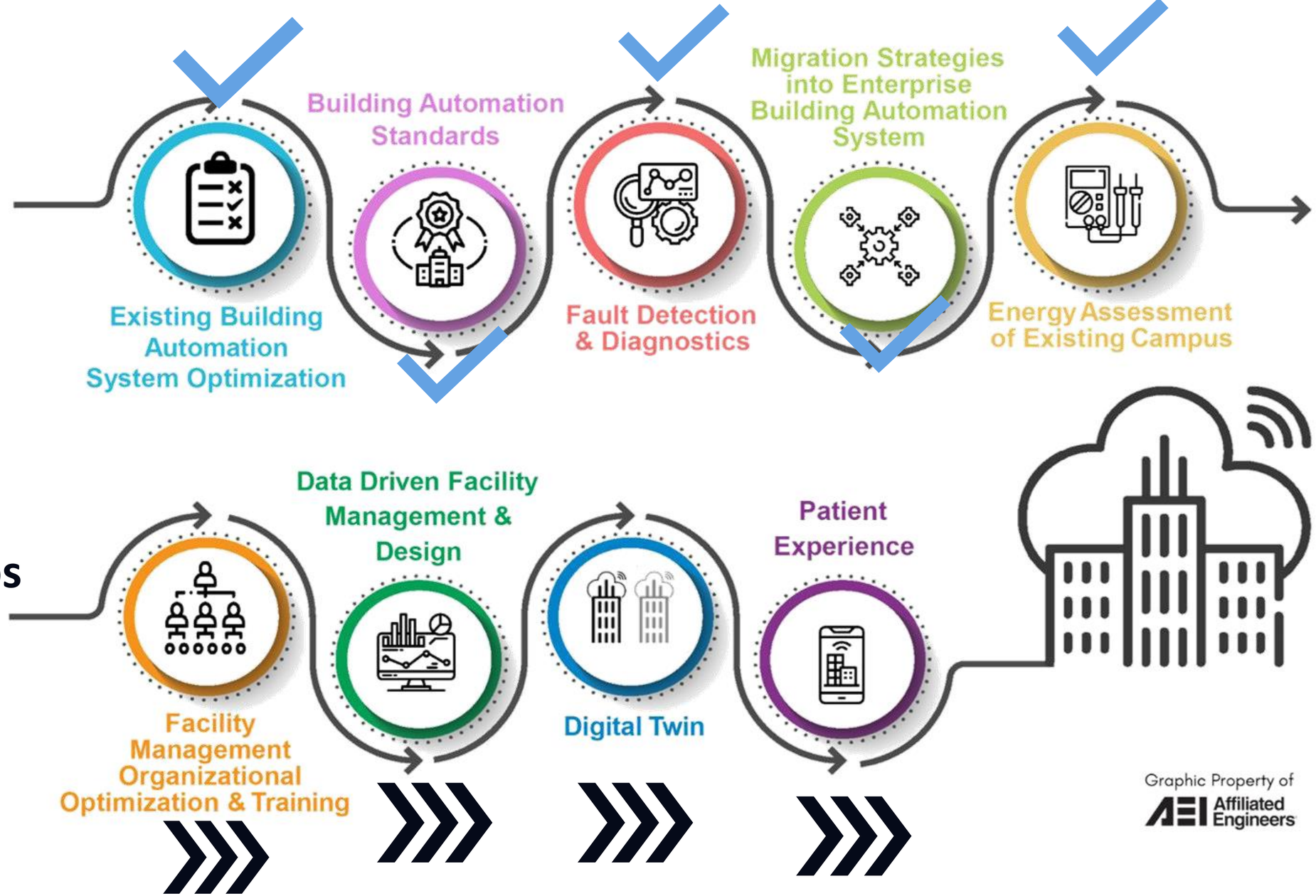
- IS project manager is best to lead these projects
- Low up-front cost
- More consistency if sensors are hardwired
  - **Hard wiring sensors during initial construction is best approach**
- Diagnosing may need to involve more teams
- This project allowed us proof of concept for larger occupancy-based ventilation projects
- These opportunities do not exist in our clinics due to zone set up and utilization of space
- Education needs to be on-going

Next Steps/Future Projects

- EMR connected occupancy-based ventilation – vacant patient rooms
  - **+ opportunities to improve clinical outcomes → nurse call/code blue integration**
- Exploring other buildings for sensor-based opportunity

In flight | ongoing

started | planned | future steps



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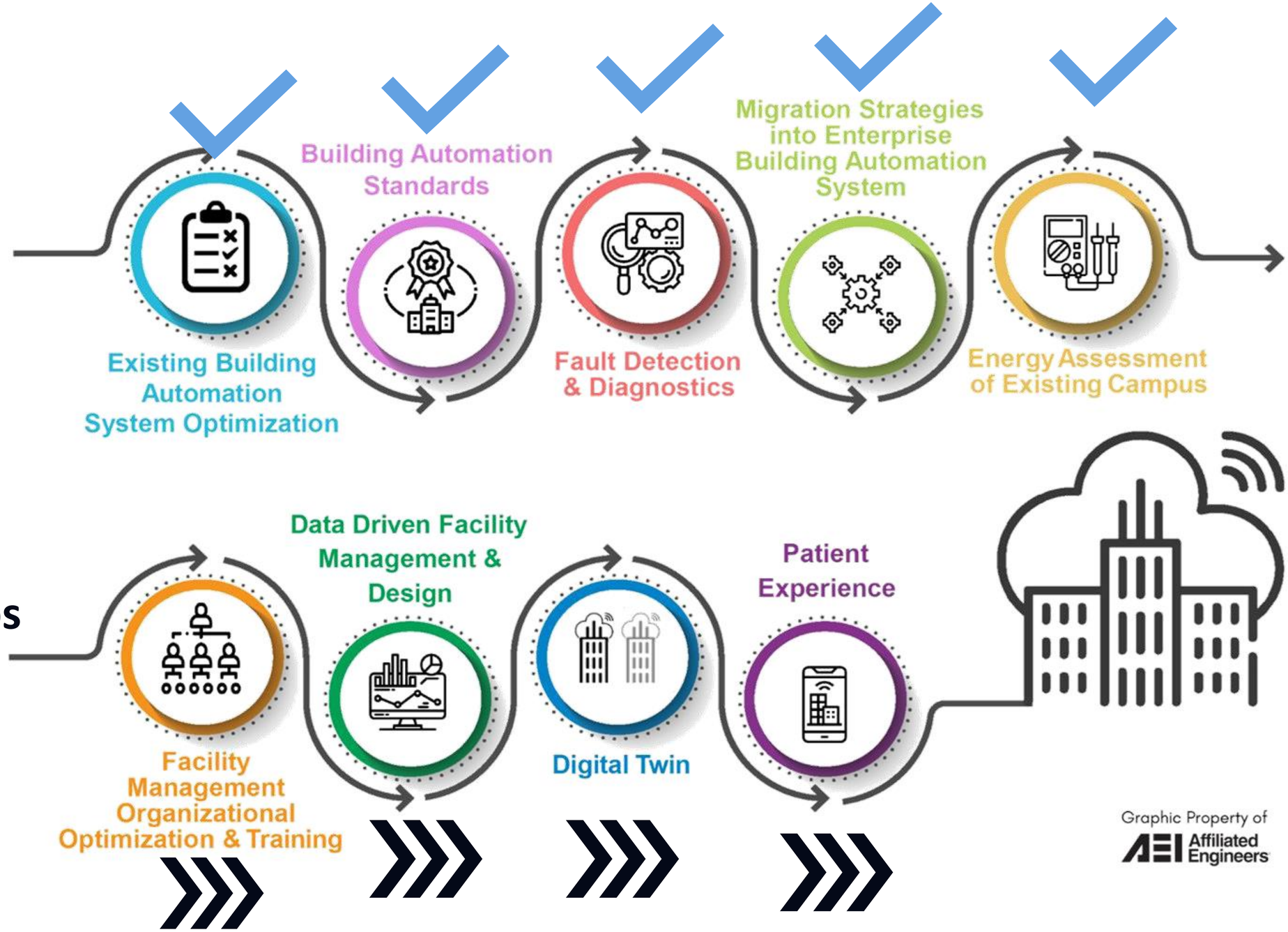

Digital Transformation Roadmap/Next Steps

Complete:

- Implementation of FDD in hospital buildings and 1 of 2 major offsite clinics (Palo Alto)
- HVAC air hander temperature resets (8) for energy efficiency → **$**40,000 annual savings
- **Systems Integration: Energy Efficiency → HVAC setbacks when offices unoccupied**
  - **Occupancy sensors & BMS**

Current:

- Digital transformation/digital twin roadmap development
- Implementation of FDD in major outpatient site (Sunnyvale)
- HVAC air hander temperature resets (8) for energy efficiency
- Condition-based Maintenance | Reliability Centered Maintenance
  - Preventative → Predictive Maintenance
  - Improved FTE efficiency

Future:

- Systems Integration → **Digital Twin**
  - FDD and CMMS (Nuvolo/Service Now; asset management program)
  - EPIC and BMS → HVAC setbacks when patient rooms unoccupied
  - CMMS and ERP (workday)

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THANK YOU!

QUESTIONS?

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