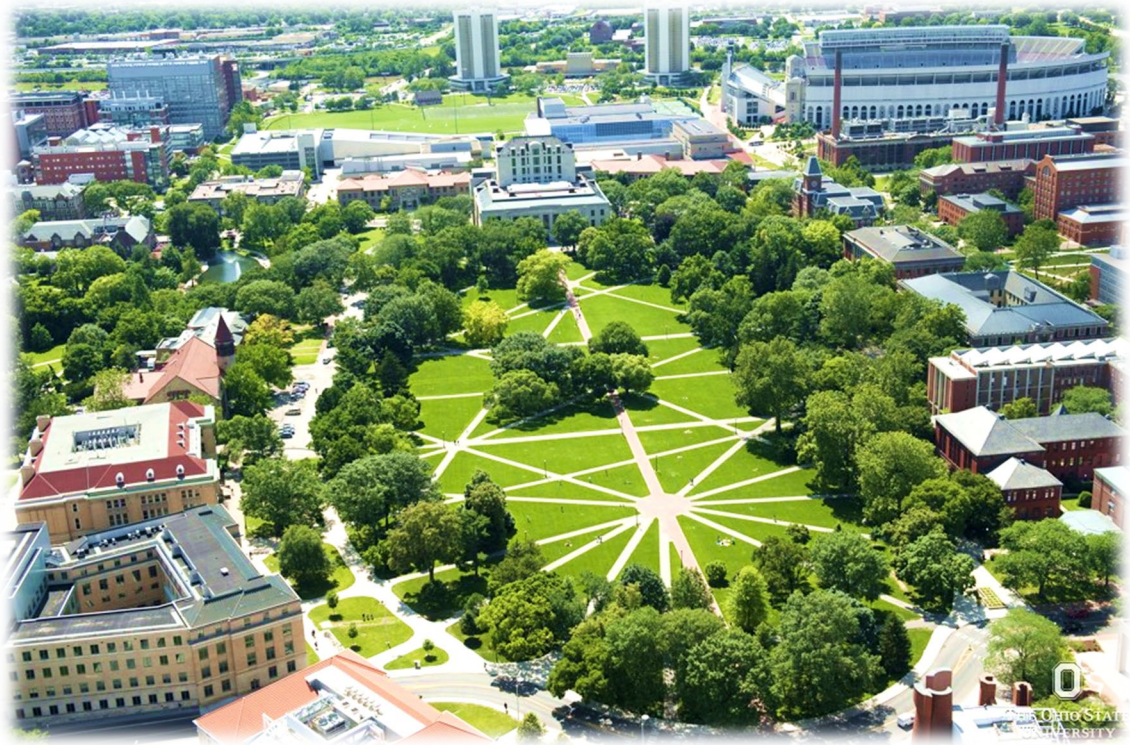


Ohio State's Leadership in Campus Energy Infrastructure Development

Denver, CO
Feb 13, 2020

Serdar Tufekci



THE OHIO STATE UNIVERSITY

Footprint & Energy Profile

- 490 buildings on $\approx 2,000$ acres
- 100,000 people daily
- 1,300 hospital & 14,000 student beds
- Elect., gas, steam, chilled water
- 2 high voltage substations
- 110 MW_e , 181 MW_t peak & 33 MW_t minimum steam demand
- \$115 million annual spend

THE OHIO STATE UNIVERSITY - **CHALLENGES**

- Aging energy infrastructure
- Dwindling state funds
- Competition for university capital
- Extremely high reliability requirements (>99.996%)
- Signatory to American C&U Presidents' Climate Commitment
 - Carbon neutrality target by 2050
- Desire to reduce energy costs

THE OHIO STATE UNIVERSITY – **ACTIONS**

- 50-yr comprehensive energy partnership agreement
- Financial structure to address upfront payment issue
- 10-yr ECM program (>25% EUI reduction guarantee)
- Infrastructure projects
 - Extending the district heating and cooling networks
 - Connecting chilled water networks
 - Smart Campus^E vision

SMART CAMPUS^E— **DESIGN EVOLUTION**

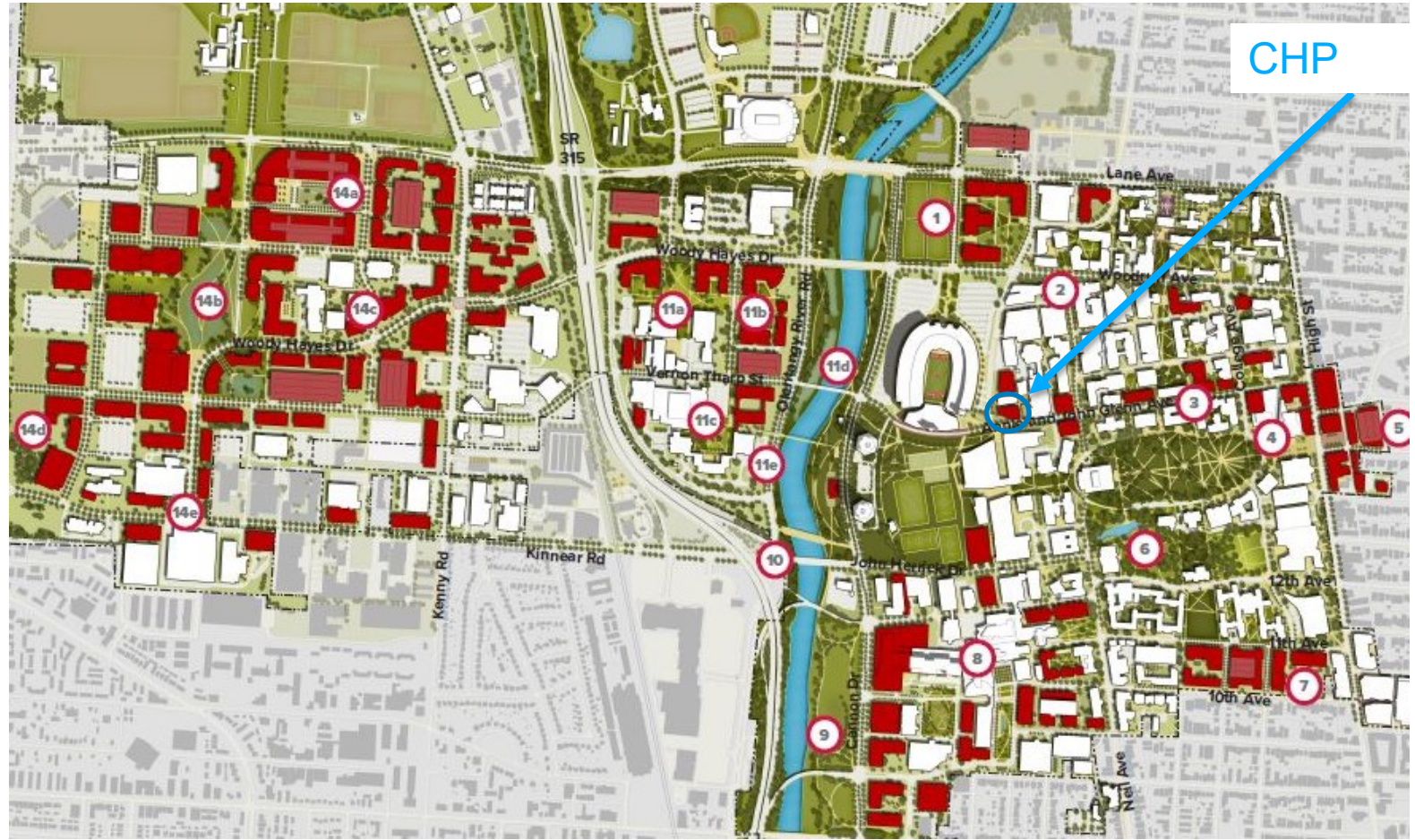
BEFORE

- Next to McCracken central plant & Ohio Stadium

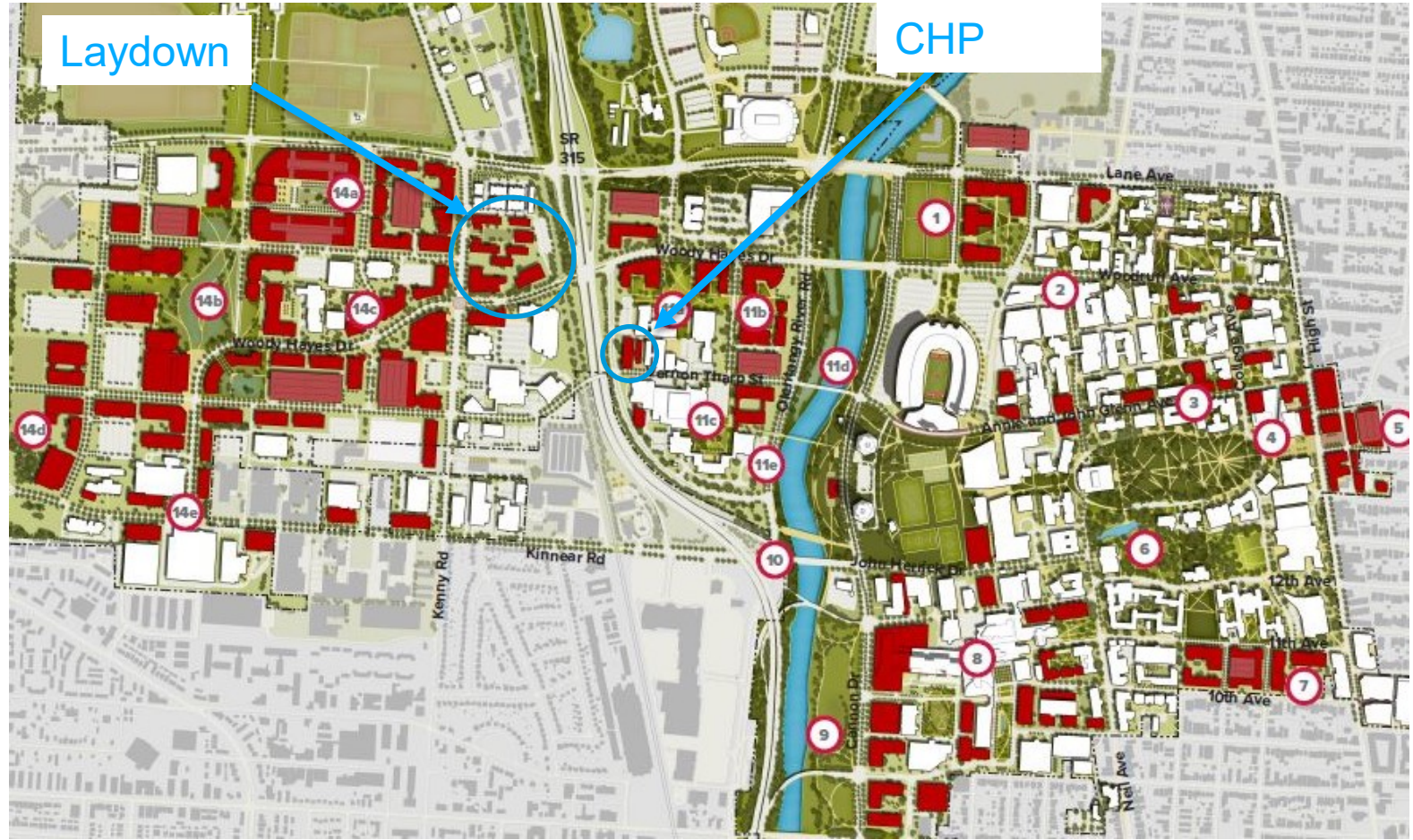
NOW

- West side of the river

CHP LOCATION - BEFORE



CHP LOCATION - NOW



SMART CAMPUS^E— **DESIGN EVOLUTION**

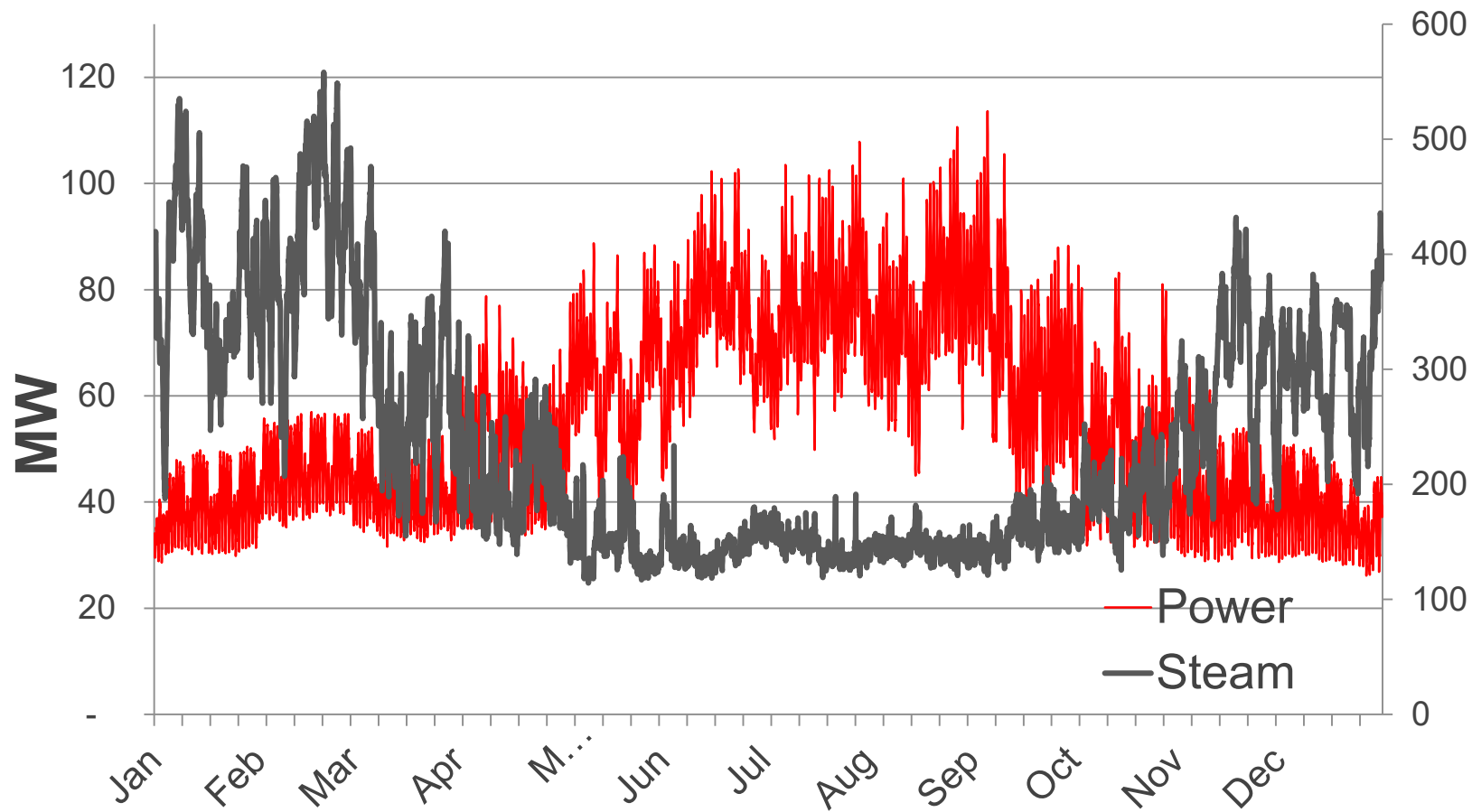
BEFORE

- Next to McCracken central plant & Ohio Stadium
- 2x0 configuration - 43MW

NOW

- West side of the river

SMART CAMPUS^E— ENERGY DEMAND



SMART CAMPUS^E— **DESIGN EVOLUTION**

BEFORE

- Next to McCracken central plant & Ohio Stadium
- 2x0 configuration - 43MW

NOW

- West side of the river
- 2x1 configuration – CHP/CCGT modes

SMART CAMPUS^E— **DESIGN EVOLUTION**

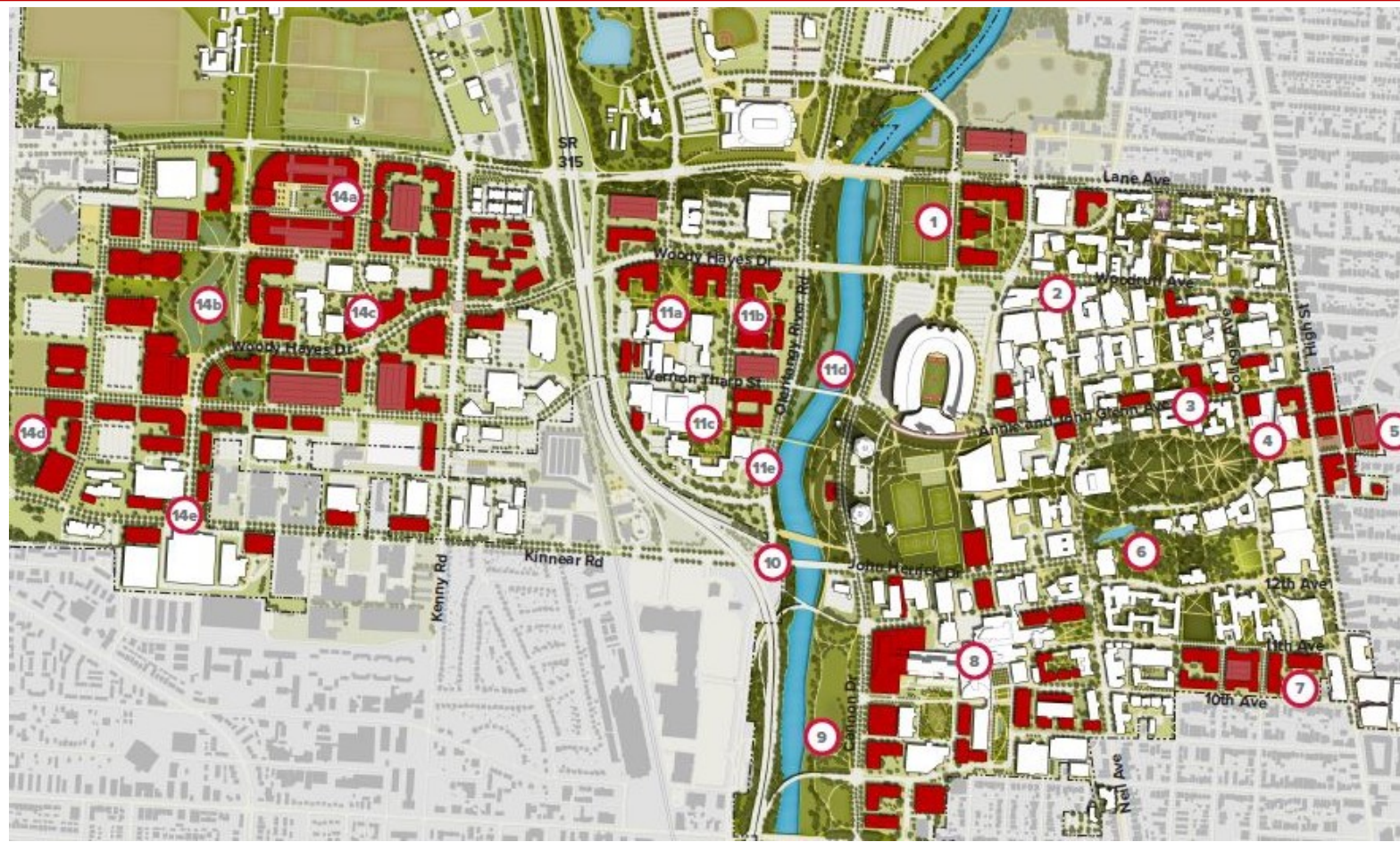
BEFORE

- Next to McCracken central plant & Ohio Stadium
- 2x0 configuration - 43MW
- No improvement on west campus

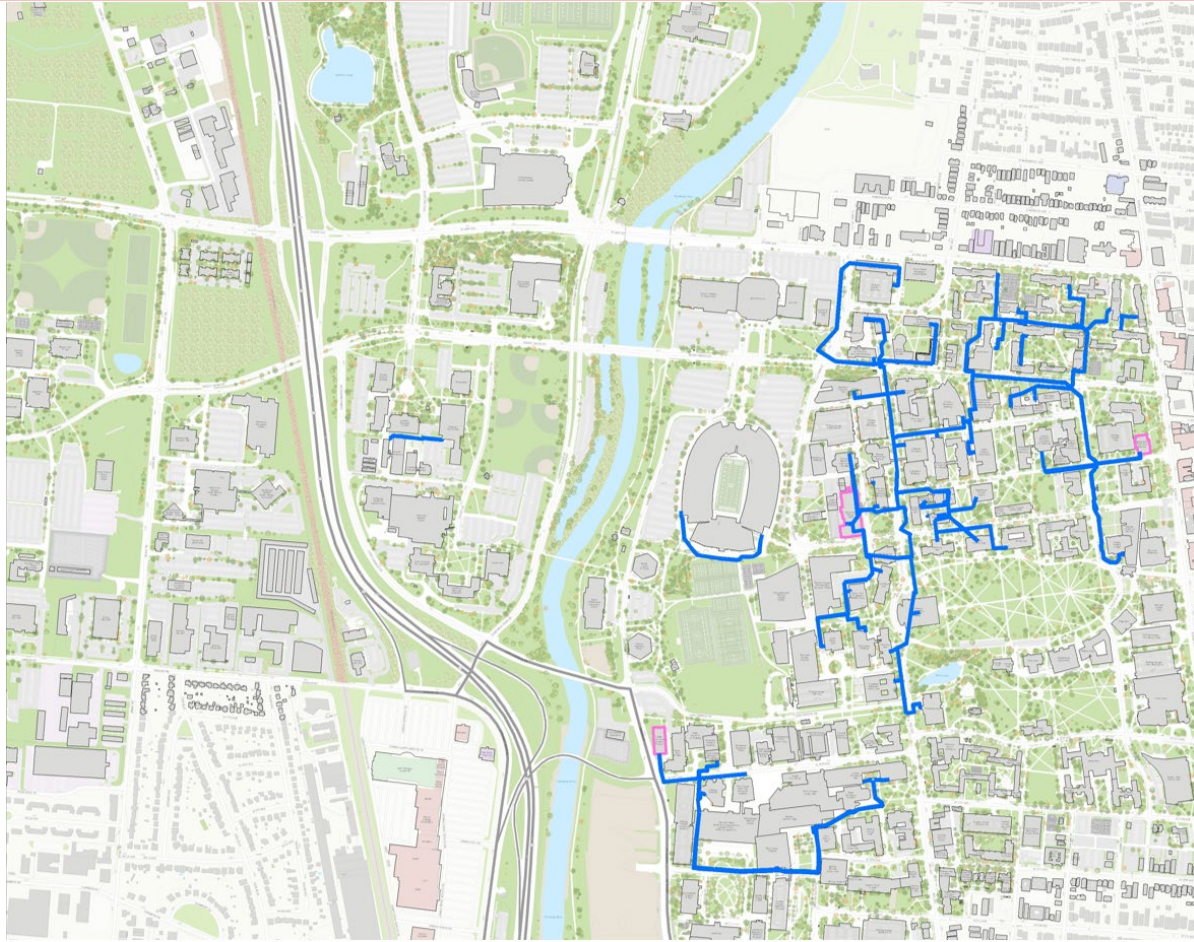
NOW

- West side of the river
- 2x1 configuration – CHP/CCGT modes up to 100 MW

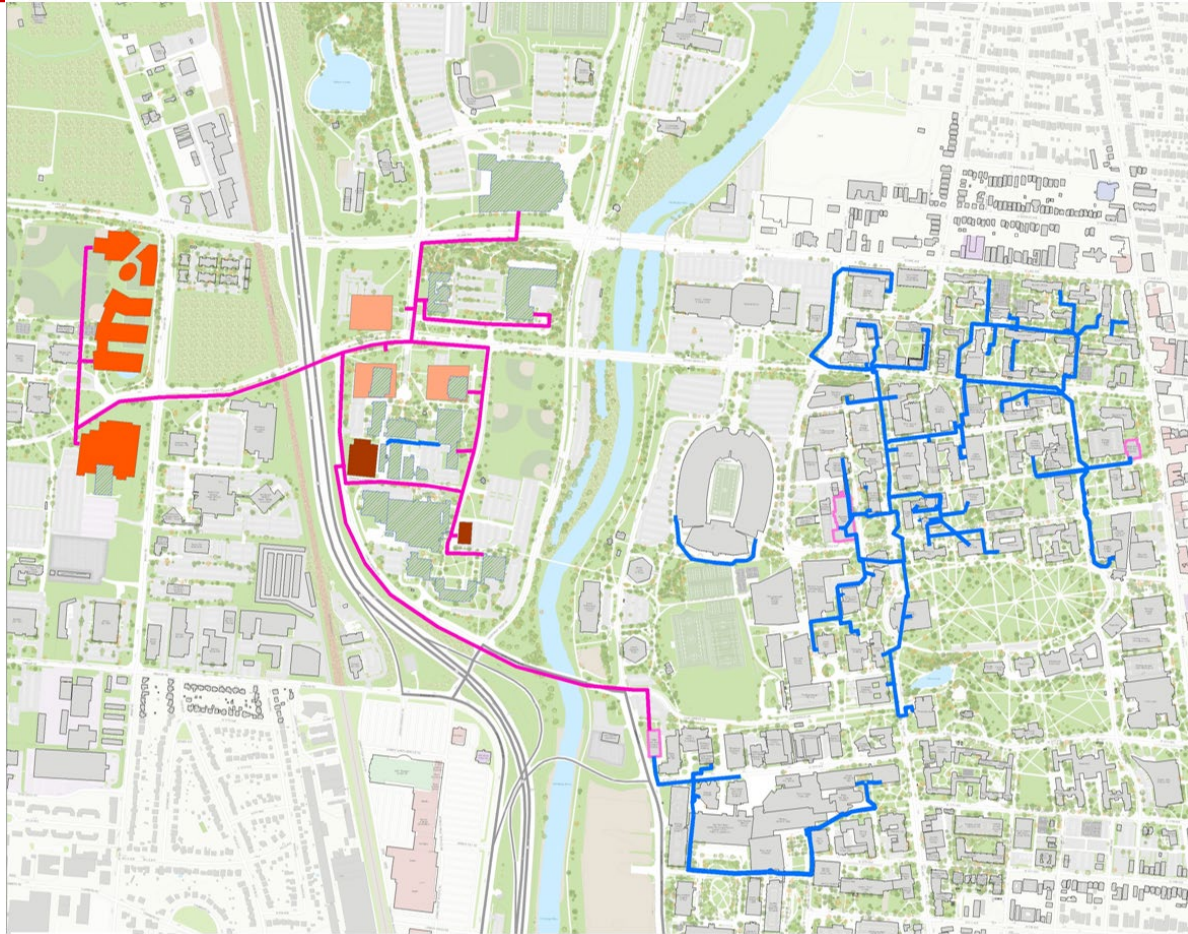
FUTURE DEVELOPMENT IN WEST OF OLENTANGY



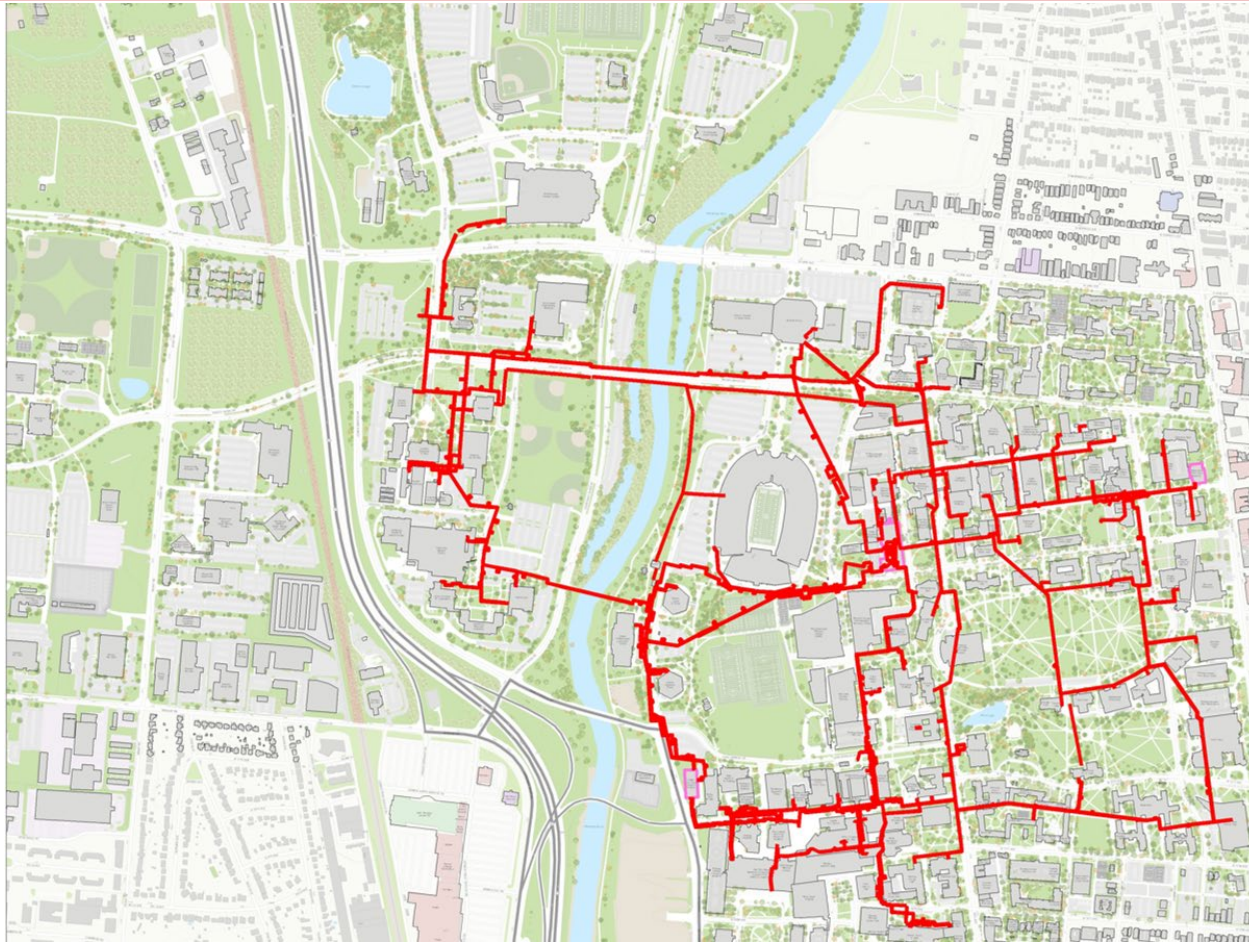
EXISTING CHILLED WATER NETWORKS



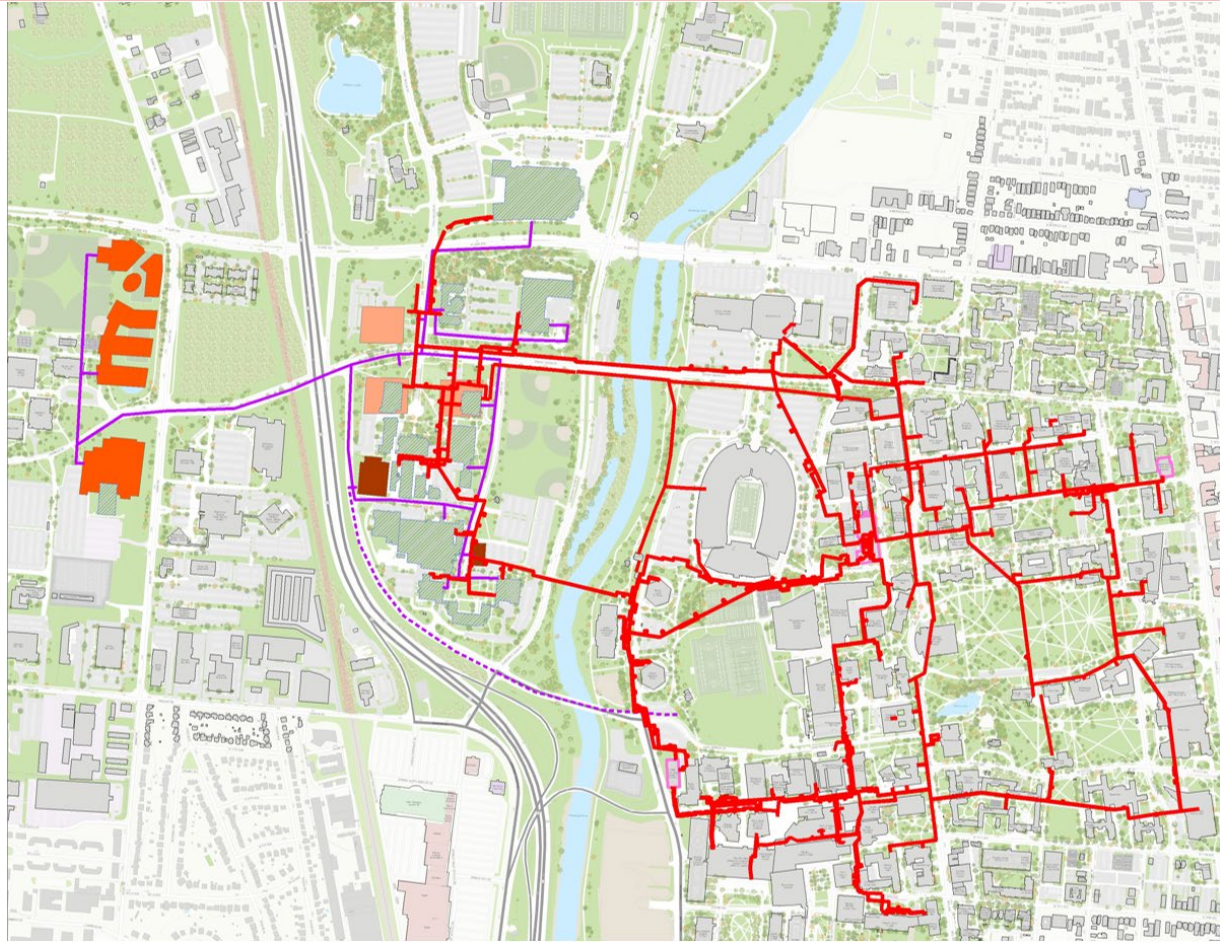
NEW CHILLED WATER NETWORK EXPANSION



CURRENT STEAM NETWORK



NEW STEAM & HHW NETWORK



SMART CAMPUS^E— DESIGN EVOLUTION

BEFORE

- Next to McCracken central plant & Ohio Stadium
- 2x0 configuration - 43MW
- No improvement on west campus

NOW

- West side of the river
- 2x1 configuration – CHP/CCGT modes up to 100 MW
- Serves main, mid-west, and west campus
- Includes a new central chilled water plant

SMART CAMPUS^E



DIGITAL PLATFORM

⁰² Campus Energy Sources

Rooftop Solar

Combined
Heat & Power
Plant (CHP)

⁰³ Physical Energy
Infrastructure

Chilled H₂O

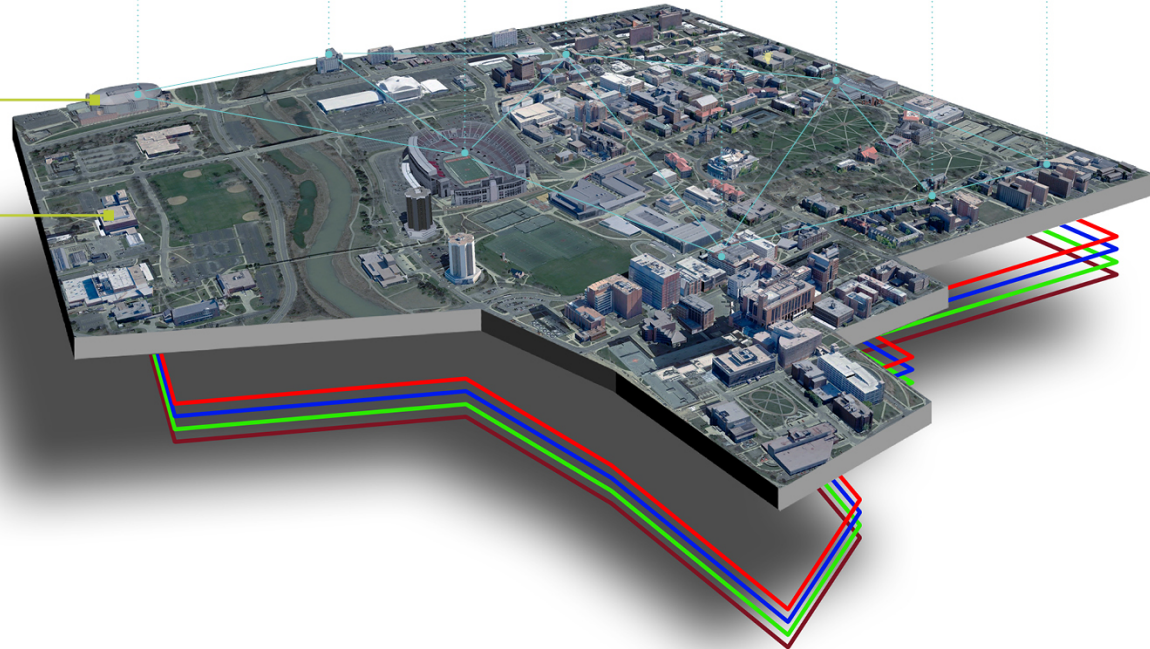
Steam & HW

Electricity

Natural Gas

⁰¹ Digital Infrastructure

Market Info Building Info Production Decisions BMS Control Weather Forecasting
Occupancy Data Smart Meters Demand Response



SMART CAMPUS^E— **CURRENT PROGRESS**

- Detailed design in progress w/CHP EPC contractor
- Ohio Power Siting Board application in progress
- AEP interconnection application in progress
- Construction Manager @Risk contract – for the DHC - near finalization
- Construction to start in May 2020
- COD January 2022

Thank you!

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