

# Ohio State's Leadership in Campus Energy Infrastructure Development

Denver, CO  
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## 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
- $110 \text{ MW}_e$ ,  $181 \text{ MW}_t$  peak &  $33 \text{ MW}_t$  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<sup>E</sup> vision

# SMART CAMPUS<sup>E</sup>— **DESIGN EVOLUTION**

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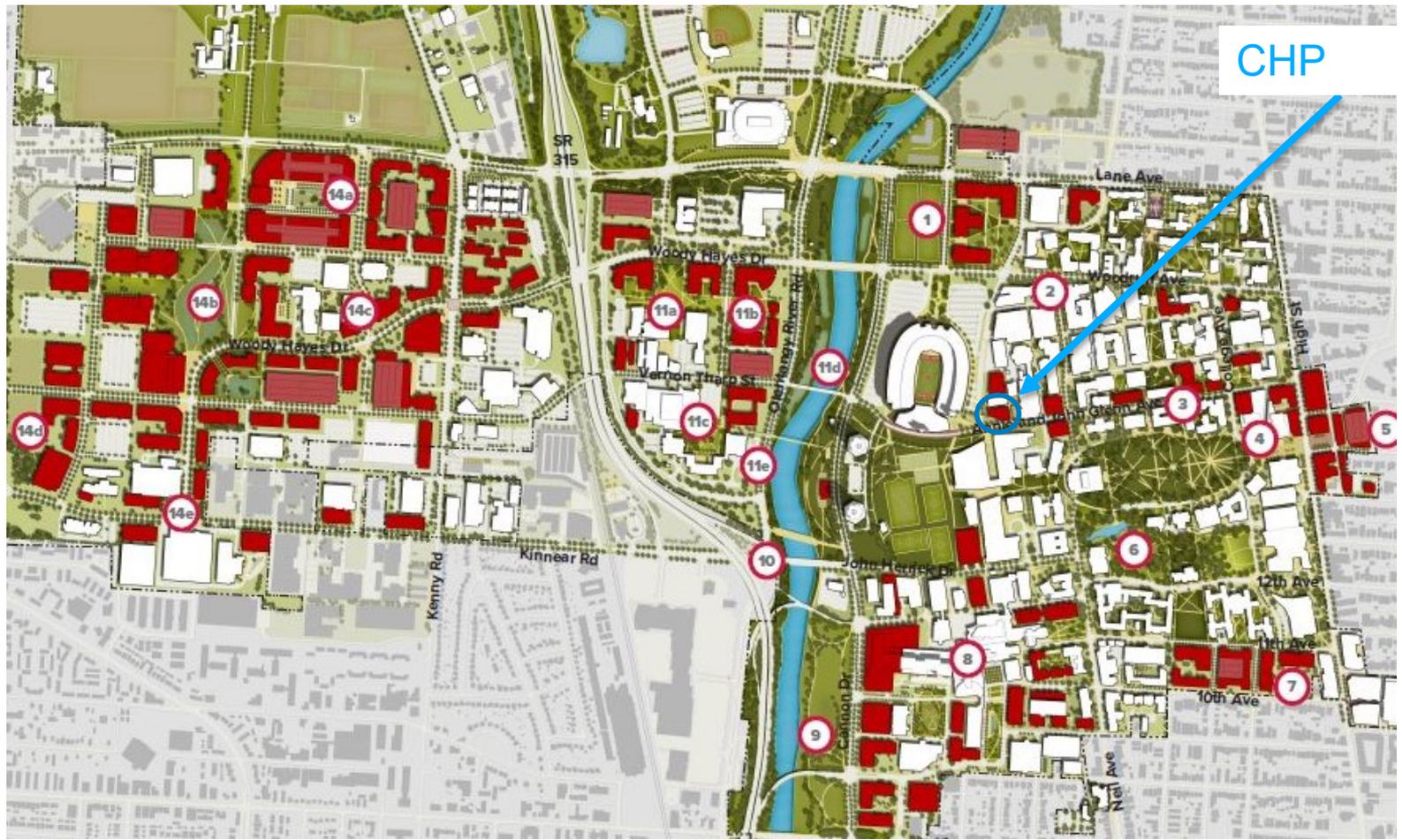
## **BEFORE**

- Next to McCracken central plant & Ohio Stadium

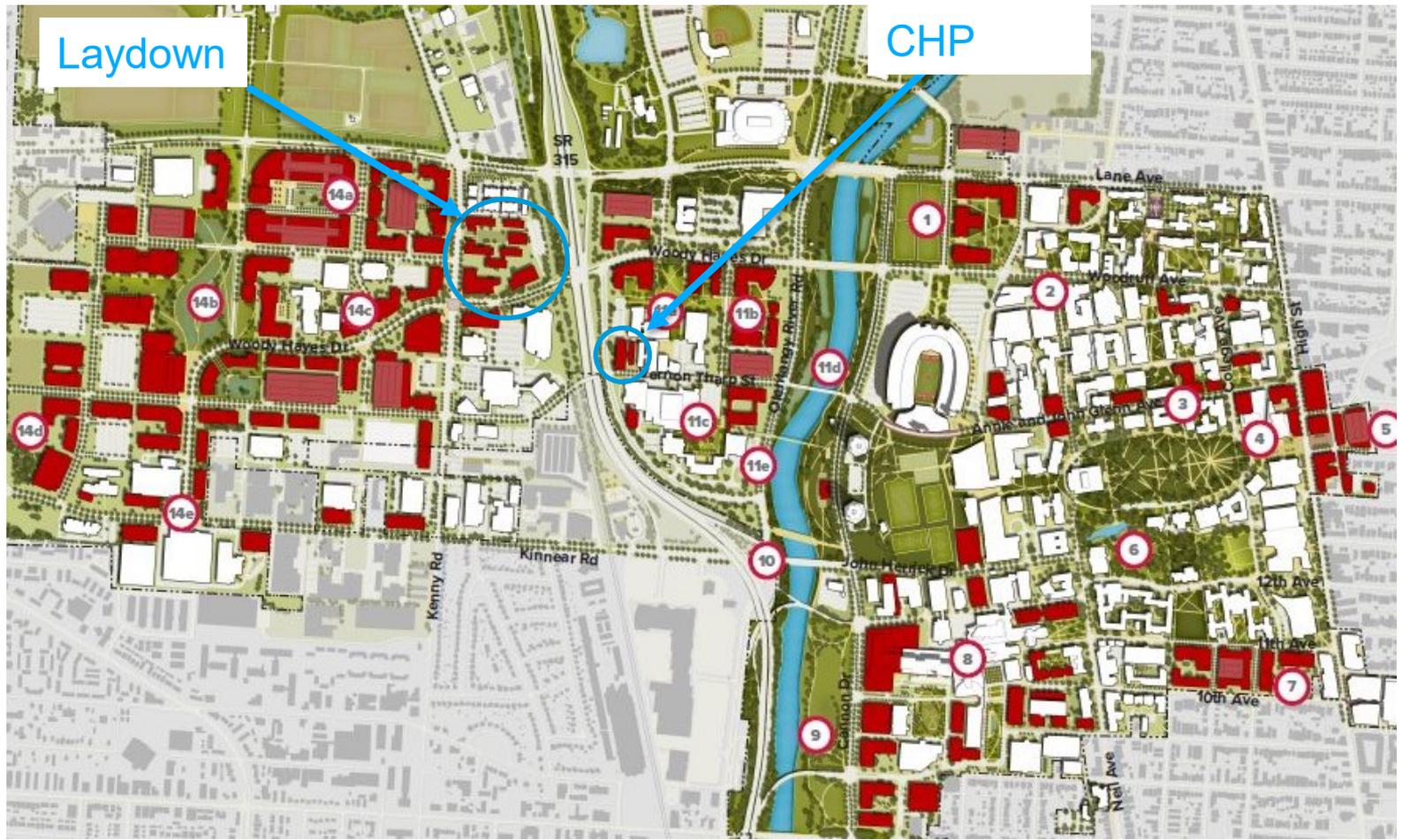
## **NOW**

- West side of the river

# CHP LOCATION - BEFORE



# CHP LOCATION - NOW



# SMART CAMPUS<sup>E</sup>— **DESIGN EVOLUTION**

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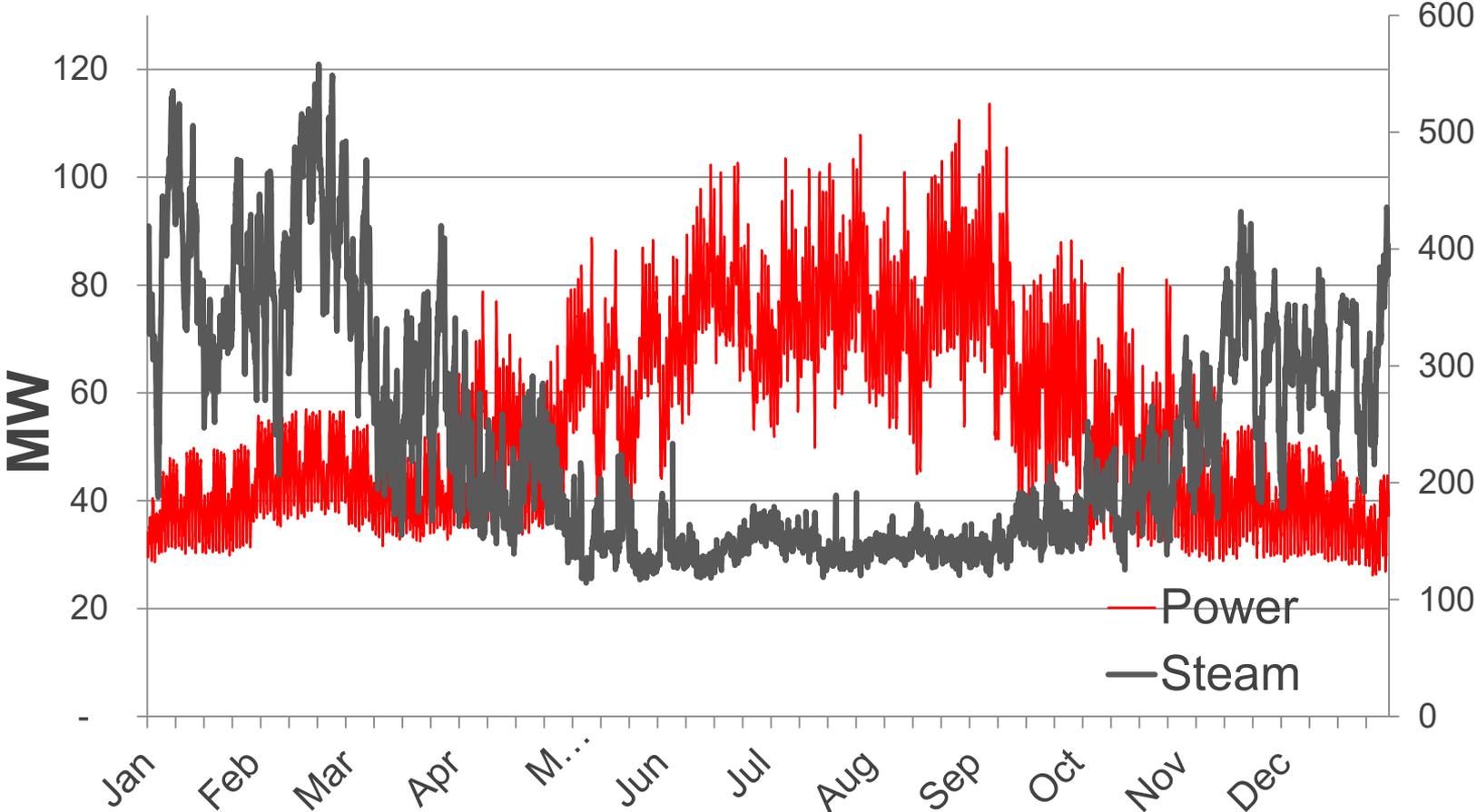
## BEFORE

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

## NOW

- West side of the river

# SMART CAMPUS<sup>E</sup> ENERGY DEMAND



# SMART CAMPUS<sup>E</sup>— **DESIGN EVOLUTION**

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## BEFORE

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

## NOW

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

# SMART CAMPUS<sup>E</sup>— DESIGN EVOLUTION

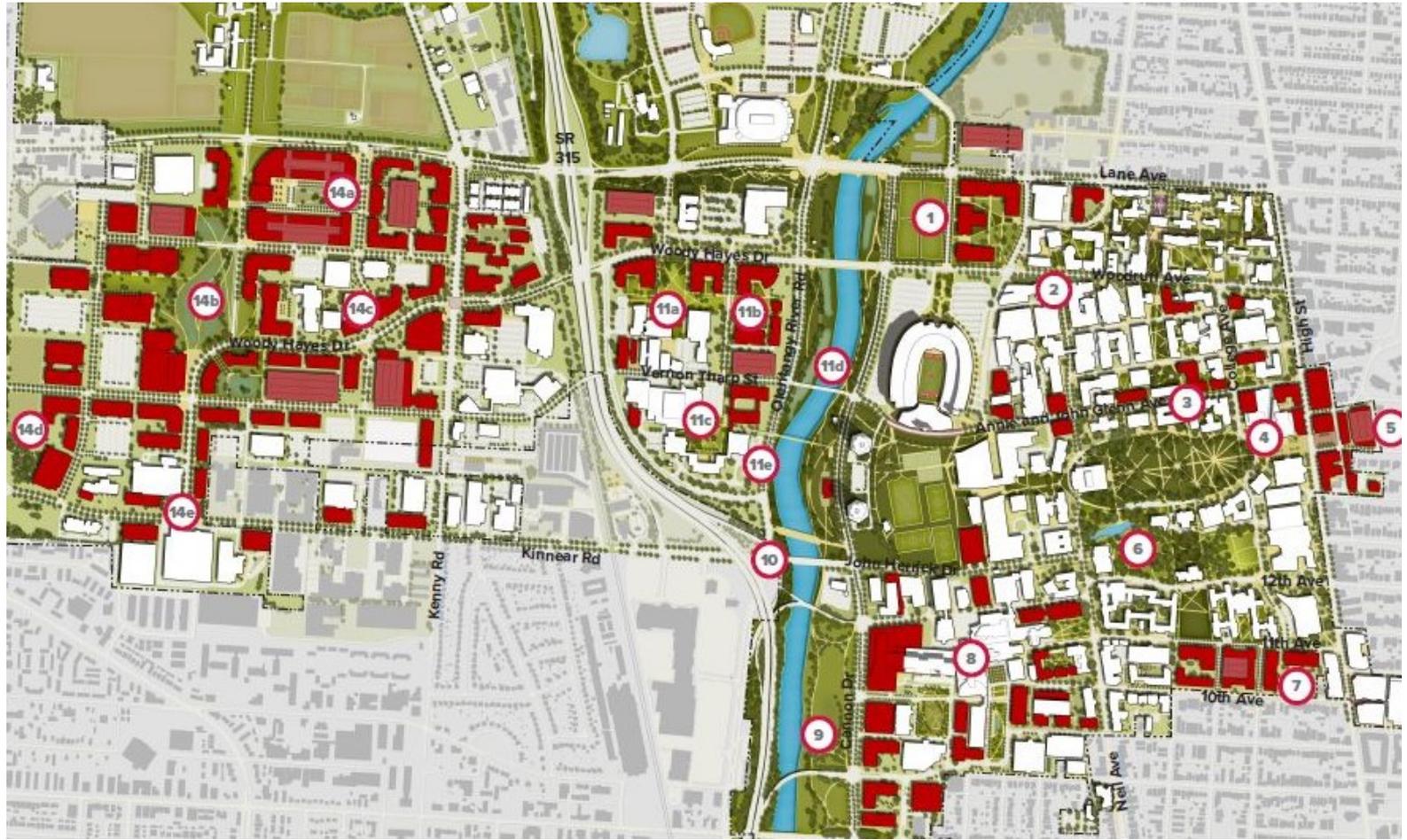
## BEFORE

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

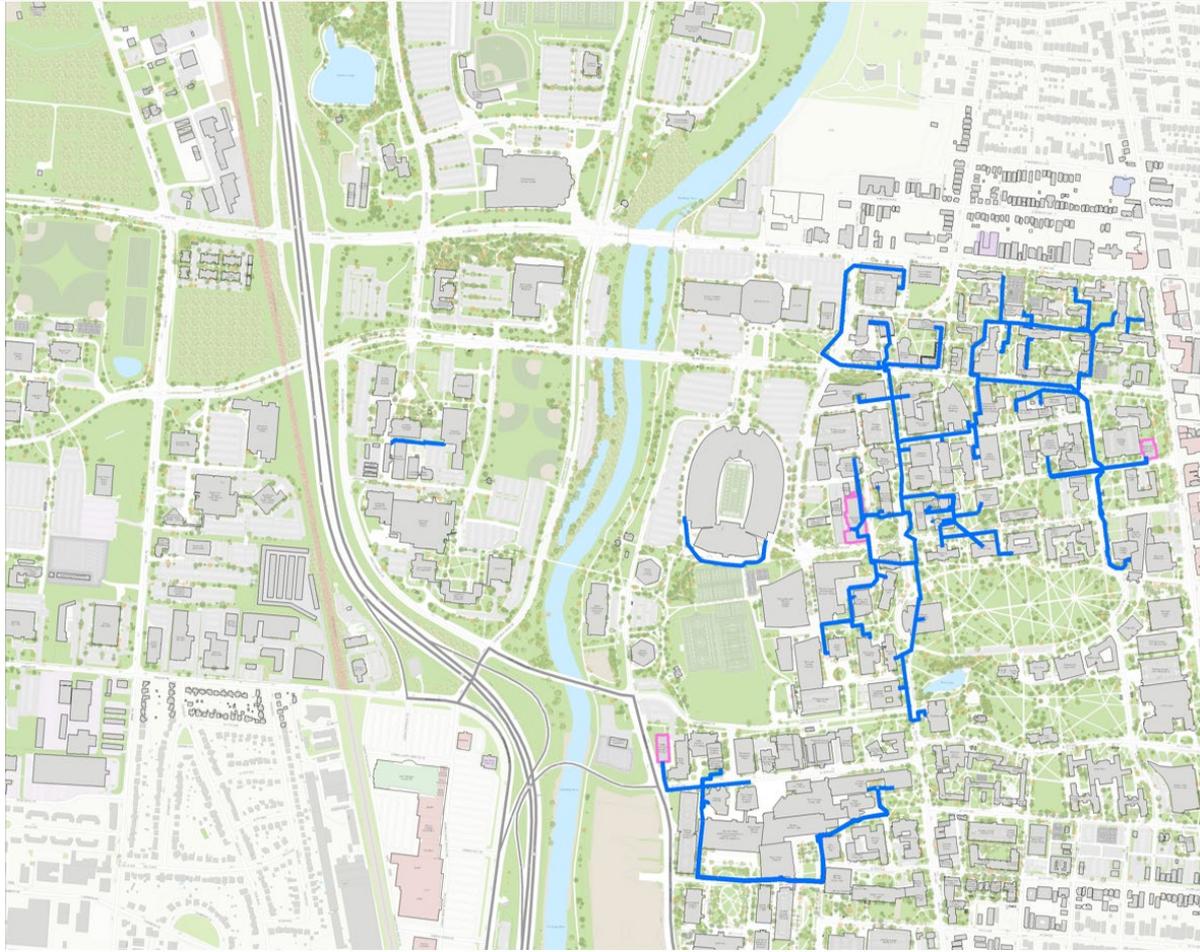
## NOW

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

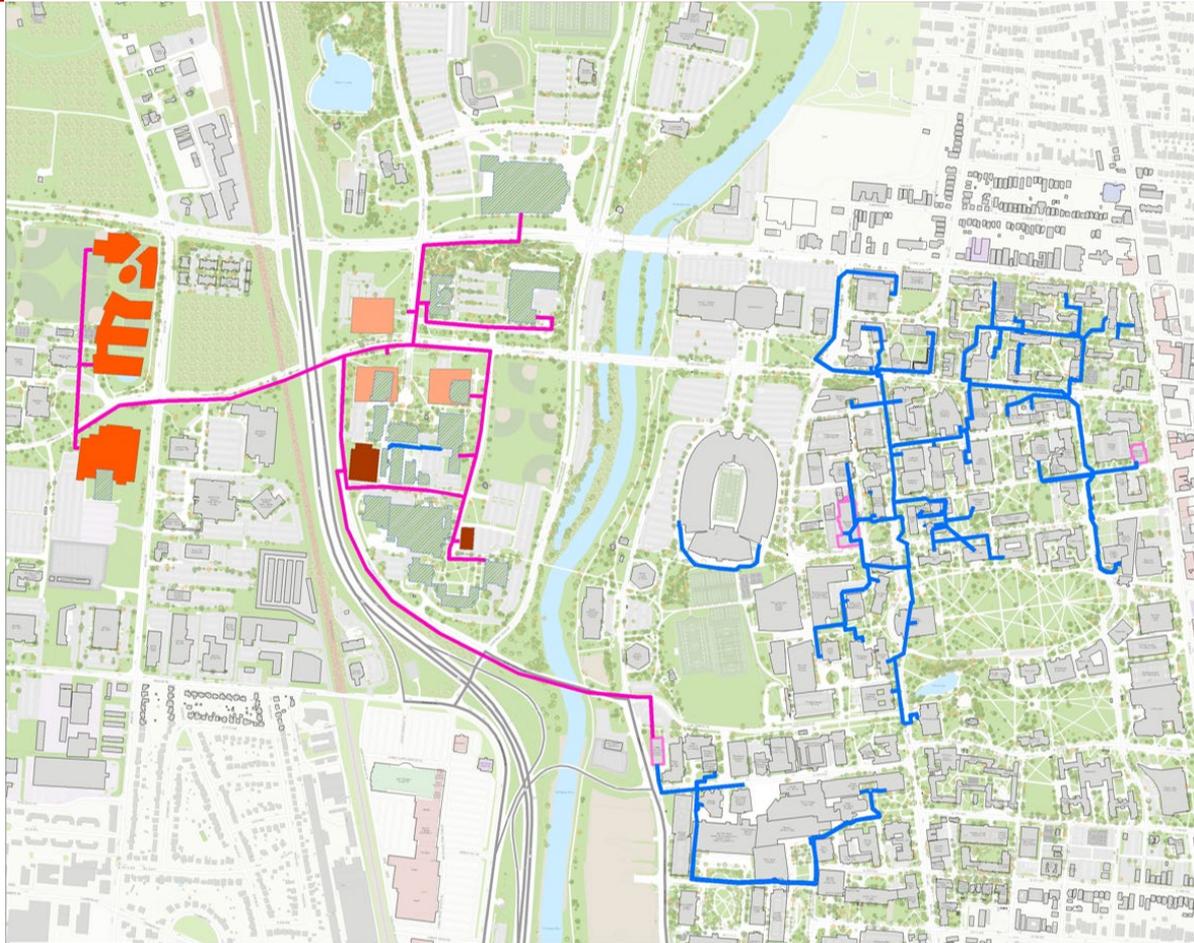
# FUTURE DEVELOPMENT IN WEST OF OLENTANGY



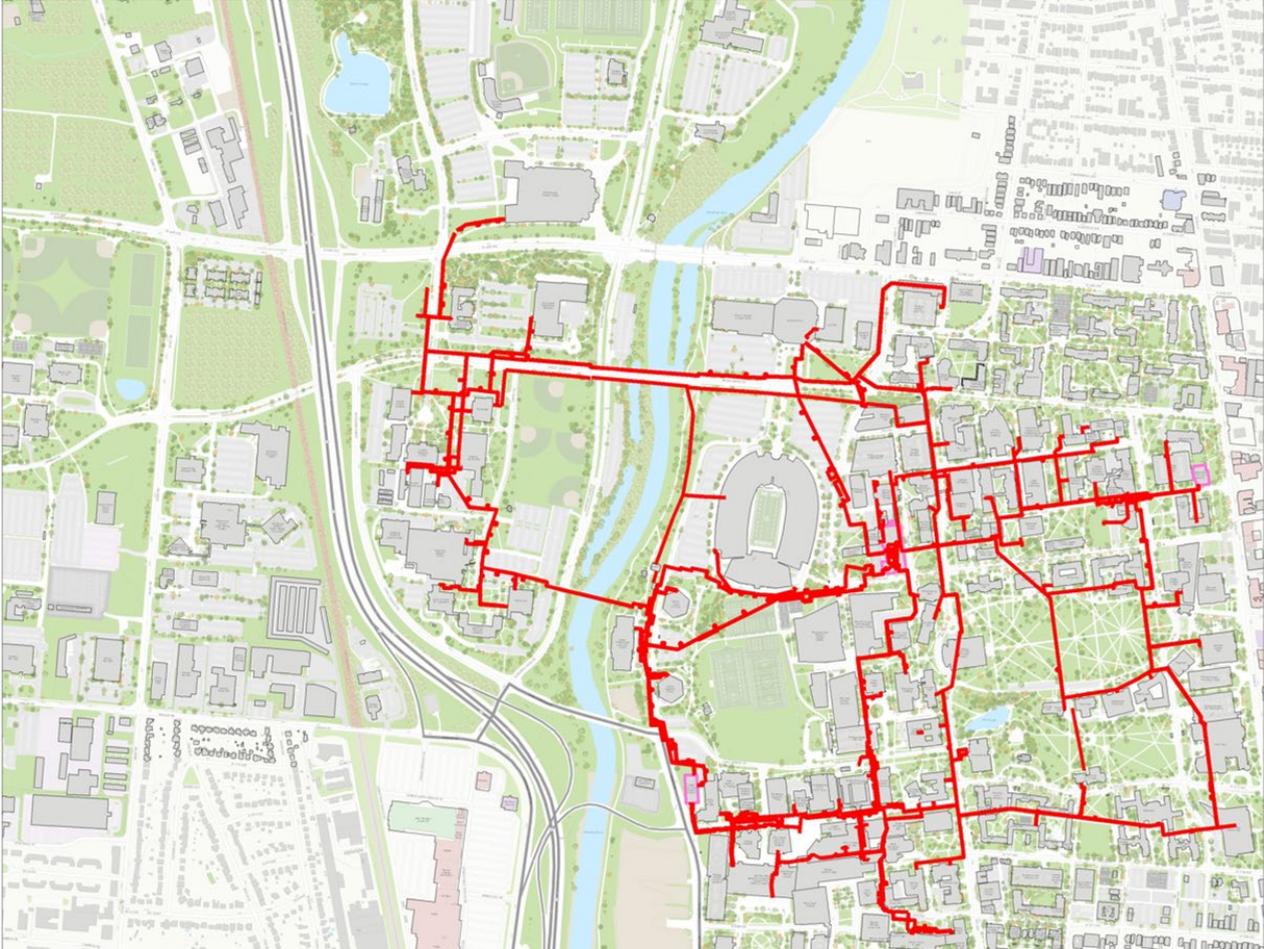
# EXISTING CHILLED WATER NETWORKS



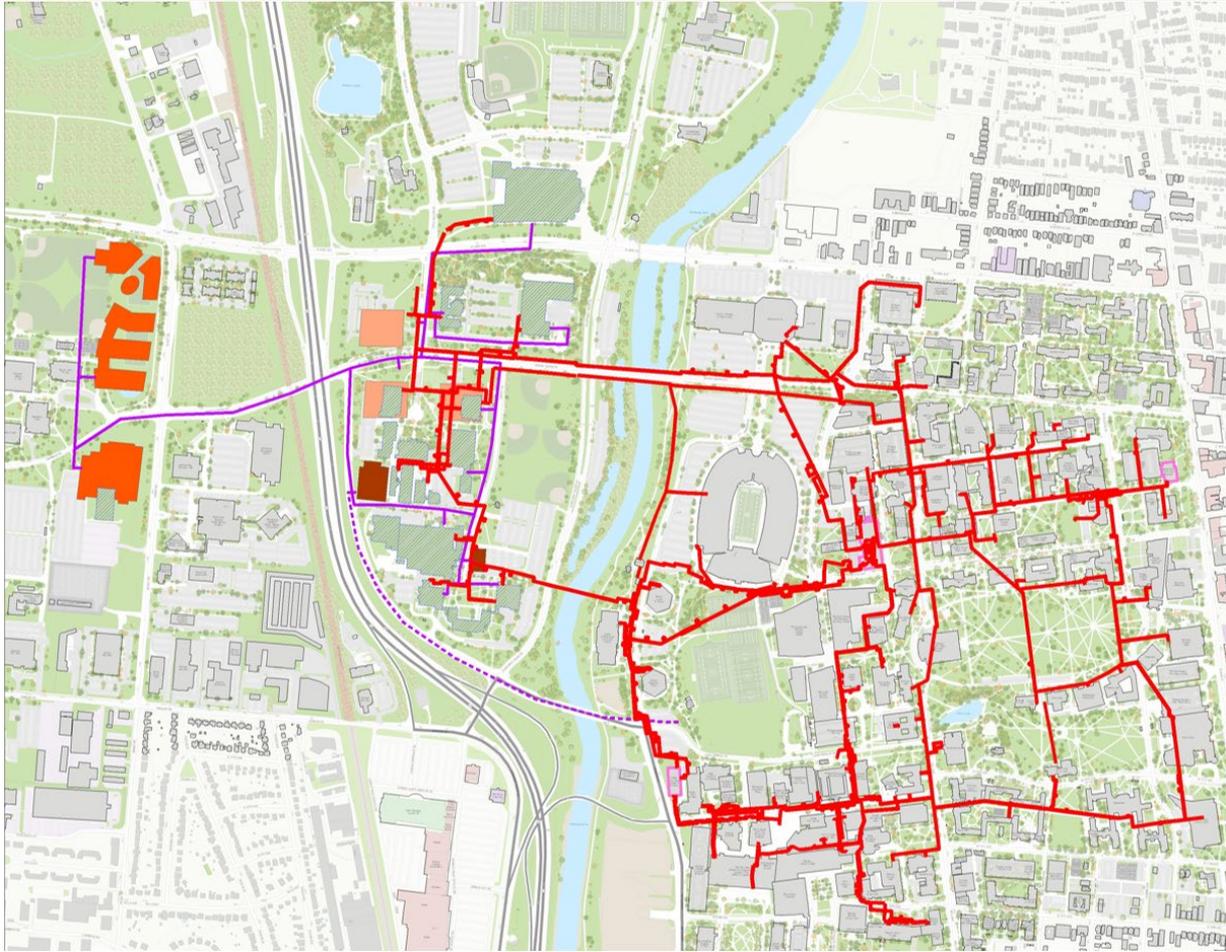
# NEW CHILLED WATER NETWORK EXPANSION



# CURRENT STEAM NETWORK



# NEW STEAM & HHW NETWORK



# SMART CAMPUS<sup>E</sup>— **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<sup>E</sup>



DIGITAL PLATFORM

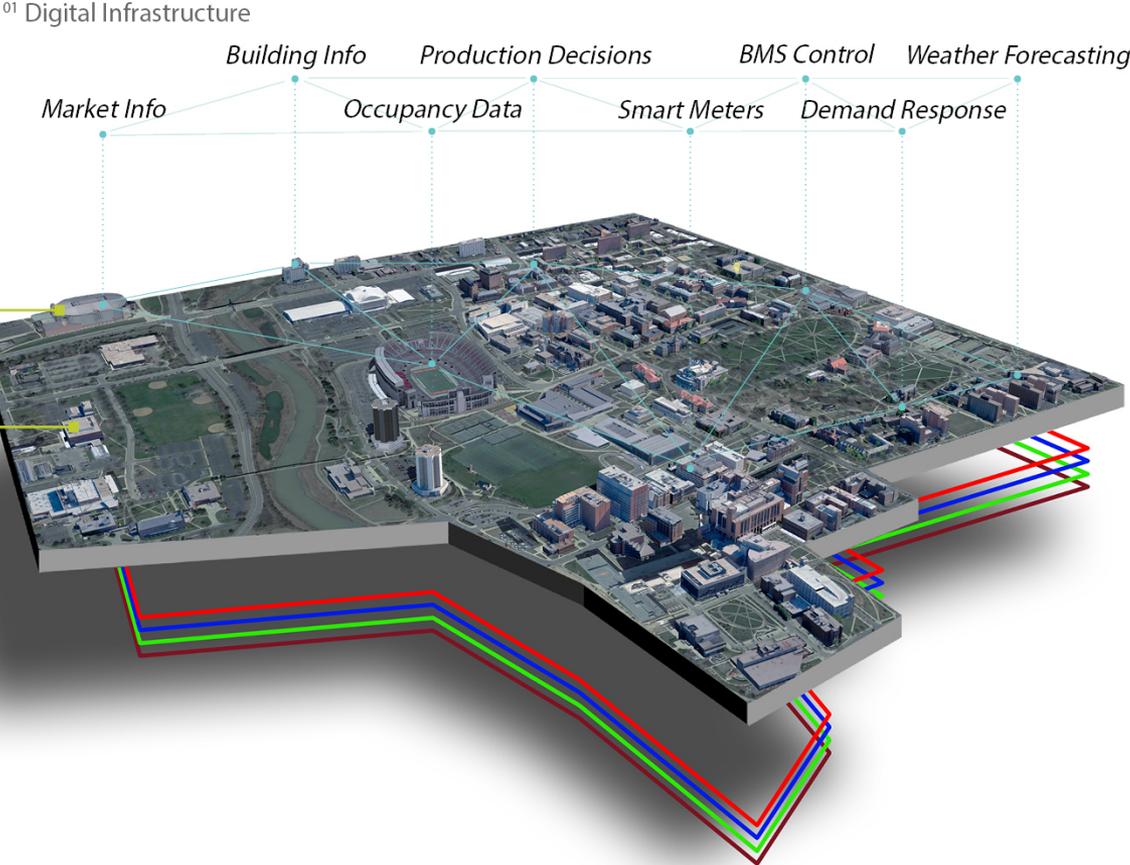
<sup>02</sup> Campus Energy Sources

Rooftop Solar

Combined Heat & Power Plant (CHP)

<sup>03</sup> Physical Energy Infrastructure

- Chilled H<sub>2</sub>O
- Steam & HW
- Electricity
- Natural Gas



# SMART CAMPUS<sup>E</sup> – **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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