

DEPAUW UNIVERSITY

CAMPUS ENERGY MASTER PLAN (CEMP)

September 23, 2021

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DEPAUW
UNIVERSITY

Est. 1837

HISTORICAL CONTEXT

2016 - Issues and Opportunities

- A need to progress DePauw carbon neutrality commitment
- Increased University financial challenges – need for energy savings
- Growing deferred maintenance burden for physical assets

Final CEMP Objectives

- 1. Achieve long-term energy cost reduction for the University**
- 2. Advance the University's carbon neutrality commitment**
- 3. Reduce the University's existing deferred maintenance burden**

CEMP – FIRST STEPS

Dec 2016

RFP for external partner issued

Mar 2017

Partner chosen (EcoSystems) and campus study began w/
significant influence from DePauw

Jun 2017

CEMP scope, cost, and benefits formally defined & presented for
BOT approval

CEMP

Scope

I. District Energy

I. Campus heat energy conversion from steam to hot water

- I. More efficient process and equipment
- II. Enables future renewable opportunities
- III. Impacts NG, electricity, and water use
- IV. Large impact to deferred maintenance (boilers & underground piping)

II. Campus cooling energy efficiency upgrade

- I. More efficient equipment
- II. Deferred maintenance impact (chillers & underground piping)

II. Campus lighting LED conversion

III. HVAC controls optimization

- I. Scheduling, VFDs, CO2 monitoring, etc.

IV. Low flow water fixture deployment

V. ITTC solar project

Cost

\$15,185,000

Benefits

Annual energy savings = \$780,000

Annual maintenance savings = \$70,000

Deferred maintenance savings = \$5,000,000

Annual GHG reduction = 7,400 MT

CEMP – DISTRICT ENERGY PROJECT

May 2018 – Sep 2019

Campus district energy underground distribution piping install

Nov 2019 – Apr 2020

Campus Chiller Plant construction

May 2020 – Sep 2020

Campus Heat Plant construction

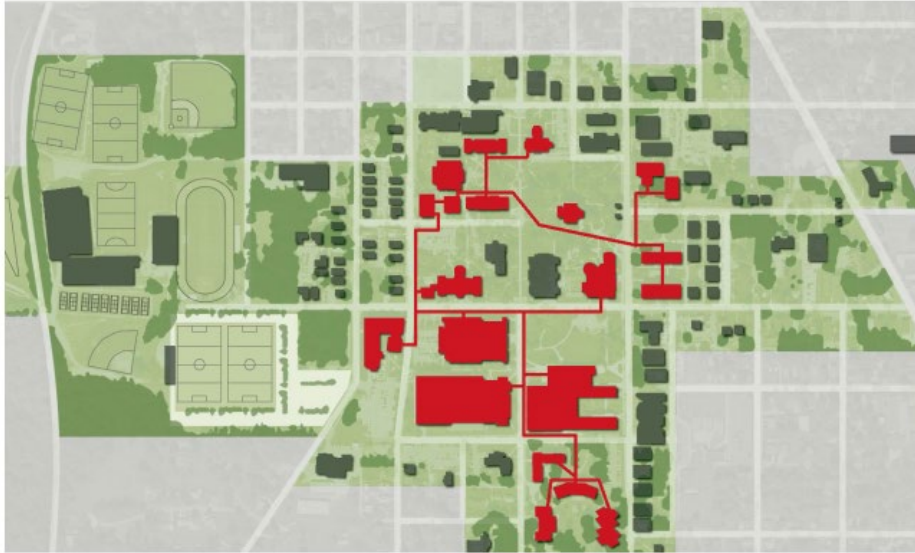
Nov 2019 – Sep 2020

Building Tie-Ins

Apr 2020 – Mar 2021

Central plant controls install and optimization

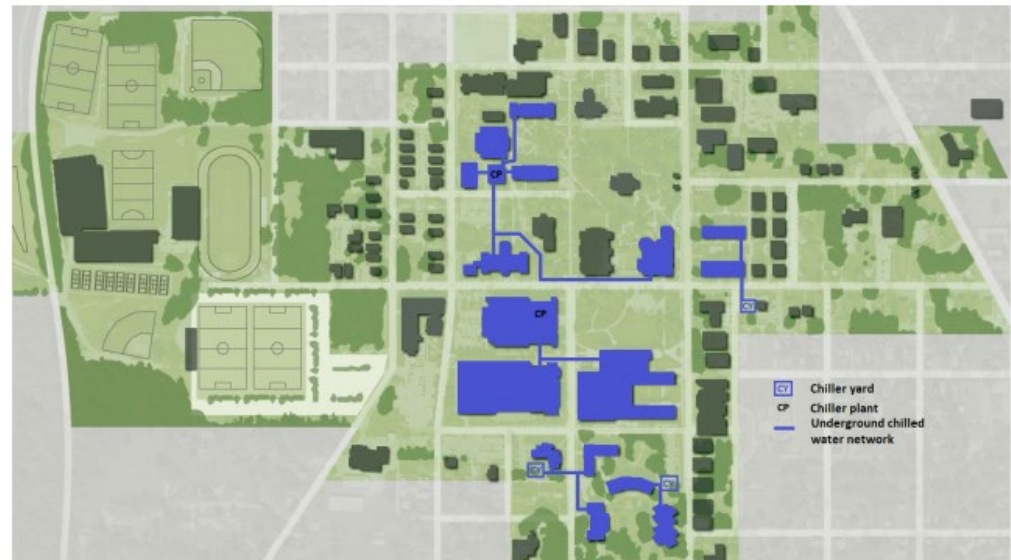
CEMP – DISTRICT ENERGY PROJECT



The steam network and buildings fed by the central heating plant

- New Central Heat Plant serves 21 campus buildings
- New underground poly based piping
- New boilers, pumps, and building tie-in systems

- New Central Chiller Plants serve 17 campus buildings
- Eight (8) less efficient air cooled chillers removed from service & centralized to new & more efficient water cooled chillers



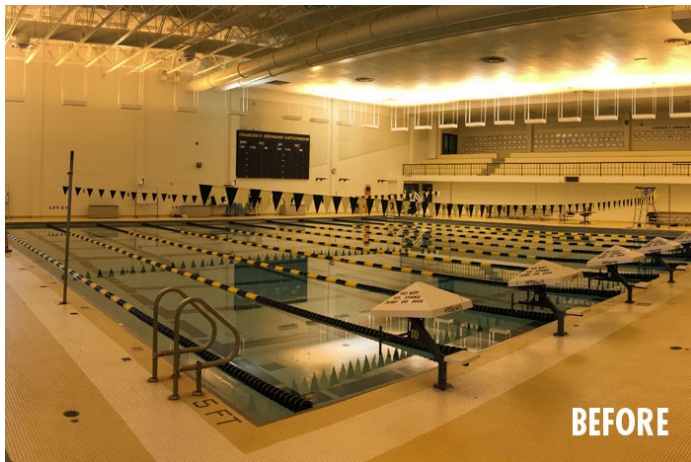
The cooling network

CEMP – LED LIGHTING

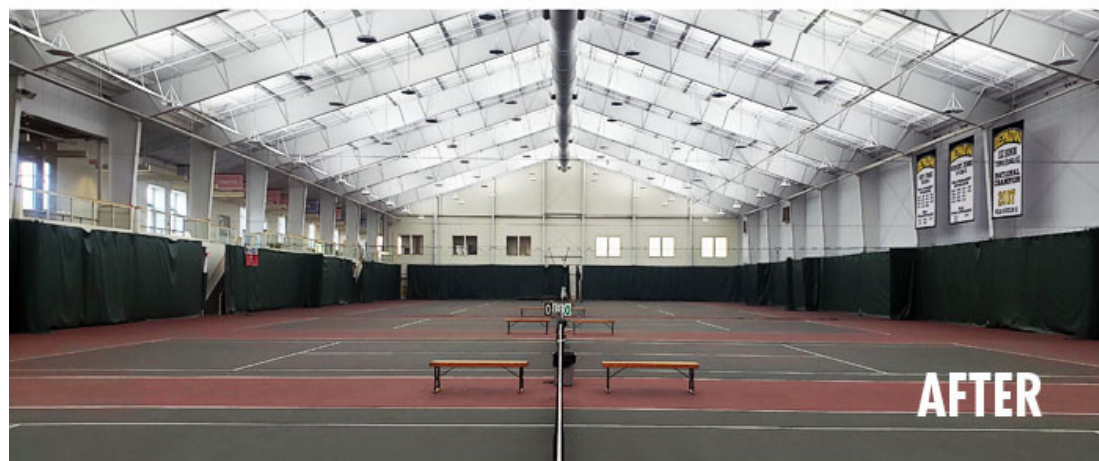
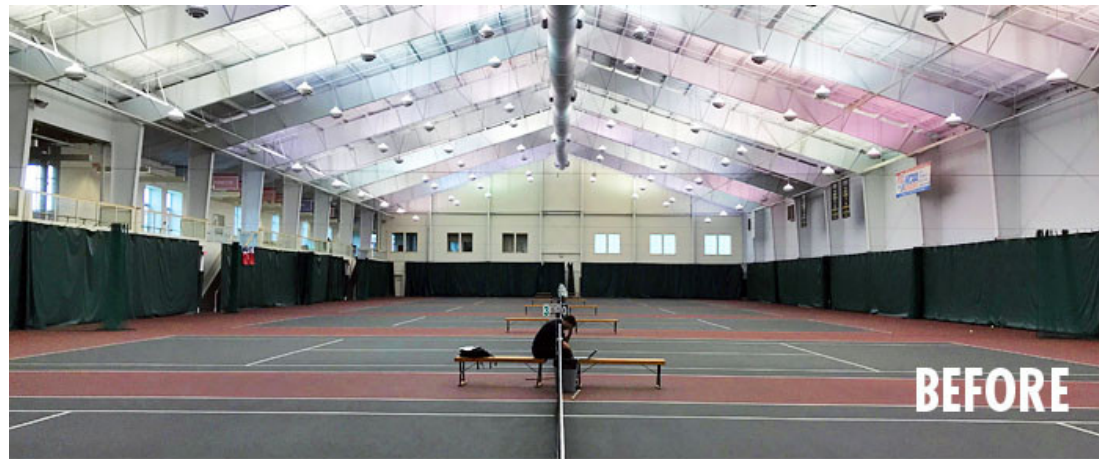
- May 2019 – Sep 2019 - Campus LED lighting conversion
 - ITTC and Lilly Natatorium were largest projects
- Only approx 75% campus conversion
- Many bulb replacements instead of fixture replacements
- Need to continue this work (piecemeal)

CEMP – LED LIGHTING

LILLY NATATORIUM



ITTC - TENNIS



CEMP – HVAC CONTROLS OPTIMIZATION

- Jan 2020 – Dec 2020
 - AHU and pump VFD additions
 - HVAC scheduling
 - Use of occupancy and CO2 sensors

CEMP – LOW FLOW WATER FIXTURES

- Jun 2019 – Aug 2019
- Low flow toilet, sink, and shower fixtures were deployed
- Feedback reduced campus scope to sink and shower fixtures

CEMP – INDOOR TRACK & TENNIS PV PROJECT

- Aug 2019 – Nov 2019 ----- Apr 2020 – May 2020
- Delays:
 - Roof structural reinforcement requirements
 - Material delays
 - Safety concerns
- “Grid-tied” installation
- 240 KW_{DC} array
- 30% annual utility offset (avg \$34,000 annual savings)
- Dashboard available to campus

ITTC PV PROJECT



QUESTIONS ????