Energy & Utilities Master Plan

• Utilities Overview

• Energy Initiatives

• Energy Results
Future Planning

- Assessed all utilities against current, 10-year, and 30-year needs for:
  - Condition
  - Capacity
  - Configuration
Oakland campus (147 bldgs. at 15 MSF):

• **Heating:** Pitt/UPMC generate steam and augment it with steam generated from Bellefield Boiler Plant.

• **Cooling:** Chilled Water is provided by our three plants (Posvar, Petersen, and BST) which is distributed via Pitt chilled water lines.

• **Electricity:** Electricity is received at Oakland Substation and distributed across campus via Pitt’s six substations and feeder cables.

• **Gas, Water and Sewer:** Provided by local suppliers.
Utilities to meet Master Plan implementation

• Current full capacity of our steam plants is “just enough” to meet future needs.

• Electrical capacity is close for Upper Campus and we’ll need to add a 7th substation. This will also provide greater redundancy.

• Gas, Water and Sewer: Provided by local suppliers and are adequate in terms of configuration, capacity and condition.

• Chilled Water generation has reached capacity and additional capacity is needed.
  o We are constructing a new Chilled Water Plant and distribution lines
  o The new system will tie into one of our three plants for redundancy and eventually all chilled water systems will be inter-connected
UTILITIES OVERVIEW – Current Utility Usage

- **Electricity**, $7,437,182, 40%
- **Gas**, $406,234, 2%
- **Water & sewer**, $2,565,784, 14%
- **Steam**, $4,618,423, 25%
- **Steamline Maint**, $150,219, 1%
- **Chilled Water**, $3,385,556, 18%

Total: $14,740,647
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A huge driver is the University’s commitment to Carbon Neutrality by 2037
• We’ve accomplished a lot, but our goal posts were extended & raised here.
• Facilities will lead ~ 60% of the remaining GHG emissions reduction

Two Strategies
• Reducing Demand
  • Reduce consumption in all buildings, with focus on highest energy intensity bldgs.
  • Six buildings account for 40% of our energy use

• Cleaning Supply ➔ Purchase Renewable Energy
  • 2 small short-term contracts for 100% renewables today
  • 2 long-term agreements for local hydro & solar (~40% total need)
ENERGY INITIATIVES – Oakland Campus

• Renovation & Construction have strict energy guidelines
  o Our Energy and Water Usage Intensity standards exceed industry guidelines
  o We are completing documentation to LEED certify 5 new buildings recently completed

• Campus Energy Center
  o Extensive (800K+ sensors) and 24/7/365 monitoring
  o Retro-Commissioning and Continuous Fault Detection

• Power Purchase Agreements for hydroelectric and solar power
  o In 2020, 18% of our energy originated from renewable energy sources
  o Hydropower ~25% of all our electrical needs (in 2024)
  o Solar Agreement will amount to 13% of all our electrical needs (in 2023)

• Stormwater Planning
  o New stormwater management infrastructure on new Bigelow Boulevard and WPU plaza
  o Upper Campus Chilled Water Plant will capture & reuse > 3 million gallons of stormwater
  o Plan has identified many opportunities to capture and reuse stormwater
Most favorable energy saving strategies for the 16 buildings are:

- Converting existing lighting to LED lighting
- Air change and temperature setbacks per occupancy or schedule
- Commissioning fume hood zone presence sensors (rapid payback)
- Demand control ventilation using air quality or particulate-sensing (lab spaces)

Created Energy Dashboard for these projects
Energy & Utilities Master Plan

• Utilities Overview

• Utility and Energy Initiatives

• *Energy Results*
Energy Results – Energy Consumption

Campus Energy Consumption/GSF - 2008+
*(Campus Wide, Excluding Property Management)*

- Electric
- Steam
- Gas
- Chilled Water (based on kW)
- Total
- 2030 District Baseline
- Goal
- Total Degree Days

Fiscal Year:
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030

Degree Days:
- 8000
- 7000
- 6000
- 5000
- 4000
- 3000
- 2000
- 1000
- 0

Energy Consumption:
- 20%
- 35%
- 50%
ENERGY RESULTS – Water Consumption
ENERGY RESULTS – Recent Specific Achievements

• Achieved lowest energy use since tracking began in 2008 – usage held flat last year

• Fault detection and diagnostics system installed on 19 buildings and in FY22 (to-date) has yielded $231,000 in avoided energy costs

• LED lighting upgrade program saving more than $390,000 annually across 17 buildings
  • Four additional buildings in “construction” now and will add another $138,000 in annual savings

• Water Conservation projects helped the campus decrease water use by 27% since 2015

• Team monitors data for leaks – and saved an average of $163,000/month last year

• 15 buildings have been LEED certified, with another 3 pending (Gold and Platinum)
Grounds Department

What We Do

- Annual planting and landscape planning
- Maintenance of landscaping across campus
- Special Event and Sporting Event Preparations
- Pavement clearing (snow/debris/etc...)
- Exterior trash cans
- On-Call 24/7
Who We Are

Workgroup 6
1 Senior Manger, 2 Assistant Managers, 2 Crew Leaders,
1 Mechanic, 31 Groundskeepers

The Grounds department provides all of the landscaping services required to make the University of Pittsburgh Oakland campus a diamond in the rough.

The department spends over 500 hours annually training all of the Groundskeepers proper horticulture practices, lawn maintenance techniques, equipment safety and operation.

Everyone of our dedicated team members takes pride in their work and strives to provide the University community a beautiful campus to learn, work, relax, and live in.
Year in Review

- Two student groups planted over 100 pollinator friendly plants on campus
- Purchased a battery powered large area mower, reducing one large diesel powered mower
- Reduced gas powered backpack blower use by 90%, only using gas powered blowers during the heaviest leaf fall and some snow events
- Enabling project reforested with 1,773 new trees
- Goatscaped Japanese knotweed on Centre Ave below Sports Dome twice in 2021
Snow and Ice Management

• Over 32 miles of sidewalks, 2,000 steps, 35 parking lots

• Call-in between 15 and 45 staff for snow removal

• Campus is sectioned into 13 zones and 4 truck routes

• 4 different ice-melter products used throughout campus

• Snow removal also provided for athletic fields, crosswalks, fire hydrants, emergency call boxes and Sports Dome
Grounds Department

Snow and Ice Management
Looking Forward

• Enabling project landscape and tree grow-in

• Extensive tree maintenance around Cathedral of Learning

• Tree Campus USA application being sent in by end of January

• Continue phasing in battery powered equipment

• Develop plans to continue towards our 2030 goal of increasing the tree canopy and reducing mowable grass areas