Pitt Climate Action Plan

Dr. Aurora Sharrard
Executive Director of Sustainability

Defining Sustainability

Balancing equity, environment, & economics so current & future generations can thrive.
Pitt Plans

• Plan for Pitt
• Pitt Campus Master Plan
  • Pitt Institutional Master Plan
• Pitt Campus Energy Plan
• Pitt Sustainability Plan
• Pitt Climate Action Plan

Pitt Sustainability Plan
2020 GOAL:
Reduce greenhouse gas emissions 50% by 2030 (below 2008 baseline) & achieve carbon neutrality by 2037.
REDUCE THE GHGs OF PITTSBURGH by actively engaging all Pittsburgh region colleges and universities to:

1) COLLABORATE,

2) SHARE INFORMATION, &

3) SET GOALS REGARDING:
   - Research agenda
   - Education curricula,
   - Operations,
   - Outreach activities, &
   - Commitments that reduce GHG emissions

City of Pittsburgh Sustainability

PITTSBURGH CLIMATE ACTION PLAN v3

- 50% energy & water consumption reduction
- 100% renewable electricity by 2035
- 50% transportation emissions reduction
- Fossil fuel free fleet
- Zero Waste
- Pension divestment
- Advance carbon neutrality objectives

<table>
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<tr>
<th>20%</th>
<th>50%</th>
<th>80%</th>
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<tbody>
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<td>Below 2003 levels by 2023</td>
<td>Below 2003 levels by 2030</td>
<td>Below 2003 levels by 2050</td>
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DEPARTMENT OF MOBILITY & INFRASTRUCTURE

- Zero traffic related deaths or serious injuries on city streets
- Every household in Pittsburgh can access fresh fruits and vegetables within 20 minutes travel of home, without the requirement of a private vehicle
- All trips <1 mile are easily & most enjoyably achieved by non-vehicle travel
- Streets and intersections can be intuitively navigated by a 14-year-old
- The combined cost of transportation and housing does not exceed 45% of household income for any population quintile.
Pennsylvania Carbon Goals
(Jan 2019)

Governor Wolf Establishes First Statewide Goal to Reduce Carbon Pollution in Pennsylvania
January 06, 2019

Harrisburg, PA—Governor Tom Wolf announced that he has signed a new executive order establishing the first statewide goal to reduce carbon pollution in Pennsylvania, which is contributing to climate change. The executive order also establishes the CleanGov Council to boost green and sustainable practices in state government to help achieve the goals set in the executive order, while saving taxpayers money and creating jobs in the state’s clean energy economy.

• Below 2005 levels,
  • 26% reduction of greenhouse gas emissions by 2025
  • 80% reduction by 2050
• Reduce energy consumption 3% per year, and 21% by 2025
• Replace 25% of state passenger car fleet with battery electric and plug-in electric hybrid cars by 2025.
• Procure renewable energy to offset at least 40% of Commonwealth’s annual electricity use.

The University of Pittsburgh will be Carbon Neutral by 2037.
http://pi.tt/2037
Carbon Commitment

1) Institutional Structure
   • Annual Second Nature Dues

2) Annual GHG Inventories
   • Annual Reporting to Second Nature

3) Climate Action Plan

4) Develop operational, curricular, research, and community engagement strategies related to carbon neutrality.

5) Celebrate accomplishments and performance.

6) (Re)focus on existing and emerging areas of GHG emissions reduction opportunity.

Carbon, Climate, & Resilience Commitments

438 colleges & universities
Carbon Commitment Committee

As part of our commitment to achieve carbon neutrality on our Pittsburgh campus by 2037, the University of Pittsburgh is creating a Carbon Commitment Committee.

- The Committee's goals are to:
  - Hone, design, and manage the University's plan to achieve its carbon neutrality goal by 2037.
  - Develop a Pitt Climate Action Plan to achieve carbon neutrality.
  - Annually evaluate progress towards carbon neutral goal and submit progress evaluations.
  - Develop operational, curricular, research, and community engagement strategies related to carbon neutrality.
  - Celebrate accomplishments and performance.
  - (Re)focus on existing and emerging areas of GHG emissions reduction opportunity.

MEMBERS

- **CHAIR:** Dr. Aurora Sharrard, Director of Sustainability, Office of Sustainability
- **Joshua Ash,** PhD Candidate, Graduate School of Public and International Affairs
- **Jennifer Barnes,** Supplier Diversity & Sustainability Coordinator, Purchasing Services
- **Scott Bernotas,** Vice Chancellor, Office of Facilities Management
- **Dr. Melissa Bilec,** Co-Director, Mascaro Center for Sustainable Innovation; Professor, Civil and Environmental Engineering
- **Federica Geremicca,** PhD Candidate, Civil and Environmental Engineering
- **Dustin Gray,** Executive Associate Athletic Director for Administration, Athletics
- **Dr. Michael Holland,** Vice Chancellor for Science Policy and Research Strategies, Office the Senior Vice Chancellor for Research
- **Mary Beth McGrew,** Vice Chancellor, Planning, Design, and Real Estate
- **Rebecca Roadman,** Chief of Staff, Business and Operations
- **Annie Ryan,** Undergraduate Student, Environmental Science, ’23

PAST MEMBERS (2020-21)

- **Dr. Max Harleman,** Alum, Graduate School of Public and International Affairs (GSPIA ’21)
- **Dr. Katrina Kelly-Pitou,** Former Assistant Research Professor, Electrical and Computer Engineering
- **Ellen Oordt,** Undergraduate Student, Ecology and Evolution, ’22

University of Pittsburgh Climate Action Plan

Our Pathway to Neutrality
What We Measure

- **SCOPE 1**: Direct Emissions from Combustion
  - Purchased Electricity
  - Steam from Bellefield Boiler Plant
  - Steam from Carrillo Street Steam Plant
  - Natural Gas to Buildings
  - Pitt Fleet Vehicles
  - Refrigerants & Chemicals

- **SCOPE 2**: Indirect Emissions
  - CO₂
  - N₂O
  - CH₄
  - SF₆
  - HFCs
  - PFCs

- **SCOPE 3**: Other Indirect Emissions
  - Commuter Travel
  - Air Travel
  - Other Pitt-Sponsored Travel
  - Paper Purchasing
  - Solid Waste
  - Wastewater
  - Transmission & Distribution
  - Electricity Losses

Pitt GHG Boundaries

- **Pittsburgh campus only.**
- **Leased Space NOT included**
  - Currently: 10.3% space & GHGs ↑ 8.4%
  - Could be reduced in future given changing space needs
- **Embodied Carbon**
  - Research & practice consideration
  - A couple projects in design exploring
- **Investments**
  - GHG Protocol → GHG emissions from investments counted by financial service companies
- **Food**
  - Tracking w/World Resources Institute’s Cool Food Pledge
FY19 GHG Inventory

**Connecting Our Community**

- Travel (Other Pitt Sponsored): 0.3%
- Commuter Travel (Students): 5.6%
- Commuter Travel (Employees): 10.8%
- Air Travel (Study Abroad): 4.1%
- Air Travel (All Other Pitt Sponsored): 17.0%
- Pitt Fleet Vehicles: 0.9%
- Natural Gas to Buildings: 3.8%
- Refrigerants & Chemicals: 1.0%
- Steam from Carillo Plant: 11.6%
- Steam from Belfield Boiler Plant: 7.8%
- Purchased Electricity: 34.2%

**Other**

- 1.1%
  - Solid Waste (0.7%)
  - Paper Purchasing (0.3%)
  - Wastewater (0.1%)

**ENERGIZING OUR CAMPUS**

- 60.3%

**Pitt Greenhouse Gas Inventory (GHG) Progress to Date**

13.7% Decrease from FY19 to FY20

31.9% Decrease from FY08 Baseline

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*FY20 incorporates 3.5 months of COVID-19 Shutdown & Market-Based Method electricity emission (following national SIMAP recommendations)*
Pitt Climate Action Plan

OUR CHALLENGE
We are in a climate emergency. Our mission, our community, and our world, are at risk.

OUR CROSS-CUTTING THEMES
1. Enhance Academic Mission
2. Advance Equitable Action
3. Ensure Economic Resilience

OUR GOAL
Carbon Neutral Pitt by 2037

 PATHWAY TO NEUTRALITY

PRIORITIES:
1. ENERGY DEMAND REDUCTIONS via reduced building and campus use
2. CLEAN SUPPLY via renewable and clean energy investment
3. LOW CARBON CONNECTIONS via active, shared, and low carbon mobility

BASELINE YEAR (FY19) AND GROWTH
LEADING THE WAY TO CLIMATE NEUTRAL

Fiscal Year 2019 GHG Impact
315,200 (26,700)

ENERGY DEMAND REDUCTIONS

PRIORITIES:
1. ENERGY DEMAND REDUCTIONS
2. CLEAN SUPPLY
3. LOW CARBON CONNECTIONS

BASELINE YEAR (FY19) AND GROWTH
LEADING THE WAY TO CLIMATE NEUTRAL

STRATEGIES TO CARBON NEUTRALITY BY 2037

- External shifts causing indirect GHG reductions
- Carbon Reductions to be Procured
- Carbon Neutral Offsets

19

20
FY19 GHG Inventory: BUILDINGS

60.3% of campus emissions

Existing Building Efficiency 9.4%
GOALS:

Reduce energy & water intensity 50% by 2030 (from baselines)

Pittsburgh Campus Energy Use Intensity
2008+, Excluding Real Estate & Leases

FY20 & FY21 Lowest Energy Use Per Square Foot in a Decade
Pitt Green Buildings (2005 - present)

• 16 LEED certified projects
• 11+ current & recent projects pursuing LEED certification

• LEED Gold
  • Chevron Science Center Annex (2013)
  • McGowan Institute for Regenerative Medicine (2005)
  • Mascaro Center for Sustainable Innovation (2012)
  • Benedum Hall - Phase I Renovations (2011)
  • Biomedical Science Tower - 12th Floor Renovation (2013)
  • University of Pittsburgh at Greensburg, Cassell Hall (2014)

• LEED Silver
  • Benedum Hall - Phase 2a Renovation (2016)
  • Clapp Hall Renovation (2020)
  • School of Public Health Renovations (2021)
  • Mark A. Nordenberg Hall (2014)
  • Mid-Campus Research Complex – Nuclear Physics Laboratory Renovation (2014)
  • Salk Hall Pavilion (2016)
  • University of Pittsburgh at Johnstown, Nursing and Health Sciences Building (2015)
  • University of Pittsburgh at Bradford, Livingston Alexander House (2020)

• LEED Certified
  • School of Public Health Addition (2018)
  • University of Pittsburgh at Johnstown, John P. Murtha Center for Service (2022)
Pitt Green Buildings (In Process)

- **Construction Completed**
  - Petersen Sports Complex – Addition & Renovation
  - Salk Hall
  - UPJ, Engineering & Science Building Renovation

- **In Construction**
  - Campus Recreation & Wellness Center
  - Hillman Library – Renovation
  - Scaife Hall
  - UPB, Engineering & Info Technologies Building
  - UPG, Life Sciences Building

- **Under Design**
  - Athletics Arena & Performance Center
  - Central Oakland Housing
  - Hillside Housing

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Existing PPAs

- 11.9%
GOALS:

Produce or procure 50% renewables by 2030 & 100% by 2037

Pitt Renewables on Campuses

- **2012 Benedum Hall**
  - 4.32 kW
  - 16 panel research array
  - 25 and 45° tilts
  - 3 directions (E,S,W)
  - ~4,000 kWh annually

- **2014 McDowell Hall Pitt Bradford**
  - 2.6 kW
  - 8 panels
  - ~2,500 kWh annually

- **2020 Energy Innovation Center**
  - ~50 kW
  - Dr. Brandon Grainger’s electric power technologies lab
  - Pitt leasee

- **2022 Engineering & IT Bldg Pitt Bradford**
  - ~130 kW
  - New building
  - MetEd/Penelec Sustainable Energy Fund grant

- **2022 Pittsburgh Campus**
  - ??? MWh
  - Bids under review for up to 8 buildings
  - New rooftop arrays in design
Gaucho Solar – 20 MW

Pitt Low-Impact Hydropower

Sustainability Goal:
50%
By 2030, 50% of Pitt’s electricity will be renewable

25%
In 2023, 25% of Pitt’s electricity will be hydropower
**Pitt Primary Fuel Sources to Emissions**

**FY19 MTCO₂e**

**GOAL:**
Reduce GHG emissions from fleet vehicles 50% by 2030
Electric Vehicles @ Pitt

- 238 fleet vehicles
  - 4 electric utility vehicles
    - 2 Athletics
    - 1 Pitt Eats
    - 1 Parking
  - 8 Pitt Police electric bikes
    - 4 Pittsburgh
    - 2 Greensburg
    - 2 Johnstown
  - 1 electric cargo bike

- 56 pieces electric grounds equipment (26%)
  - Up from 9 in 2014

FY19 Inventory

- Commuting 16.4%
- Energizing Our Campus 60.3%
- Purchased Electricity 34.2%
- Transmission + Distribution Electricity Losses 2.1%
- Other 1.1%
  - Solid Waste (0.7%)
  - Paper Purchasing (0.2%)
  - Natural Gas (Boilers and Cooling) 3.5%
  - Refrigerants/Chemicals 1.0%
  - Steam from Energy Plant 11.6%
  - Steam from Belfield Boiler Plant 7.8%
GOAL:

Reduce GHG emissions from commuting 50% by 2030

Commuting Assumptions

40% of Students Walk to Campus

~1/3 of Employees drive alone
Active, Shared, & Low Carbon Commuting

80 EV charging plugs @ Pitt
- The Assembly (5051 Baum)
- Meade Street
- Posvar Garage
- Residences at Bigelow
- Soldiers & Sailors Garage
- Schenley Garage (coming soon)

Pitt Employee Commuting Review (Pitt IT)
Connecting Our Campus
How Travel Impacts Pitt & GHGs

<table>
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<tr>
<th>Affiliation</th>
<th>Emissions (MT CO₂e / year)</th>
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<tbody>
<tr>
<td>First-year student</td>
<td>0.5</td>
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<tr>
<td>Non-Air Travel (Bus, Train, Rental Cars) Emissions</td>
<td>1.0</td>
</tr>
<tr>
<td>Medical researcher</td>
<td>2.0</td>
</tr>
<tr>
<td>Part-time instructor</td>
<td>2.5</td>
</tr>
<tr>
<td>Third-year student in the School of Nursing</td>
<td>2.5</td>
</tr>
<tr>
<td>Assistant swimming coach</td>
<td>4.5</td>
</tr>
<tr>
<td>Economics professor [acclaimed global speaker]</td>
<td>15.0</td>
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<thead>
<tr>
<th>Commute</th>
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<tbody>
<tr>
<td>Bikes to campus</td>
<td>Drives in from Munrysville, PA</td>
</tr>
<tr>
<td>Bus from neighboring Squirrel Hill</td>
<td>Drives from neighboring North Oakland community</td>
</tr>
<tr>
<td>Walks to campus</td>
<td>Drives from South Oakland</td>
</tr>
<tr>
<td>Drives from Mt. Lebanon, PA</td>
<td>Bikes or walks most days. Bus sometimes</td>
</tr>
<tr>
<td>None</td>
<td>Ubers from Downtown when in Pittsburgh</td>
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<table>
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<th>Air and Ground Travel</th>
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<tbody>
<tr>
<td>None</td>
<td>2 Flights for conferences</td>
</tr>
<tr>
<td>None</td>
<td>Regional travel for research by air and bus</td>
</tr>
<tr>
<td>2 Flights for conferences</td>
<td>None</td>
</tr>
<tr>
<td>None</td>
<td>Air and bus travel for the wrestling team</td>
</tr>
<tr>
<td>Regional travel for research by air and bus</td>
<td>None</td>
</tr>
<tr>
<td>None</td>
<td>Air and bus travel for the swimming team and recruiting</td>
</tr>
<tr>
<td>None</td>
<td>Air travel for course abroad, plus train or plane to conferences</td>
</tr>
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Individual Profiles

FY19 GHG Inventory: Air Travel

Air Travel
21.1%
Air Travel Reductions

In FY19, Pitt faculty and staff purchased $11,769,526 worth of air travel, and traveled an estimated 303,572 land miles, resulting in total emissions of 37,142 MT CO$_2$e. From FY17 to FY19, land miles increased by about 8% from FY17 to FY19, a total of 21,899 miles. In all of the previous inventories, the air

- Core to academic, research, and athletic success.

- Some minor reductions possible
  - ~1.5% reductions

- Increased proportionally with FTE
Air Travel Reductions via Mode Switch

- AIR: 2,341 BTU/Passenger Mile
  AMTRAK is 34% more energy efficient

- AUTO: 2,840 BTU/Passenger Mile
  AMTRAK is 46% more energy efficient

- PERSONAL TRUCK: 3,278 BTU/Passenger Mile
  AMTRAK is 53% more energy efficient

Air Travel Offset Policy 19.4%

[Graph showing various strategies for reducing carbon footprint]
Air Travel Offsets

- **Need for offset strategy**
  - Campus unwillingness to pay
  - Who can pay & with fund sources?
  - How to capture funds?
  - Incremental solutions

- Leverage towards local, equitable, & impactful programs

Pathway to 2037 Neutrality

- **Milestone Goal**: 60% by 2030 (from FY18 baseline)
- **Goal**: Climate Neutrality by 2037

- **Energy Demand Reductions**
  - Space use optimization and new building performance
  - Existing building efficiencies

- **Clean Supply**
  - Direct energy efficiencies
  - Electrical grid shifts
  - Existing local renewable agreements
  - Future electrical generation & procurement

- **Low Carbon Connections**
  - One standards
  - Committing reductions
  - Air travel reductions
  - Air travel offset policy

- **Leading the Way to Climate Neutrality**
  - Campus education & behavior shifts
  - Carbon insets & offsets
New & Coming Soon

• Sustainability Website Relaunch at sustainable.pitt.edu
• 2022 Progress Report
• Commuter Survey

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