



## Sustainable Infrastructure Hub



OHIO  
UNIVERSITY

Buildings  
Energy  
Waste  
Water

# Buildings

Hub: Infrastructure

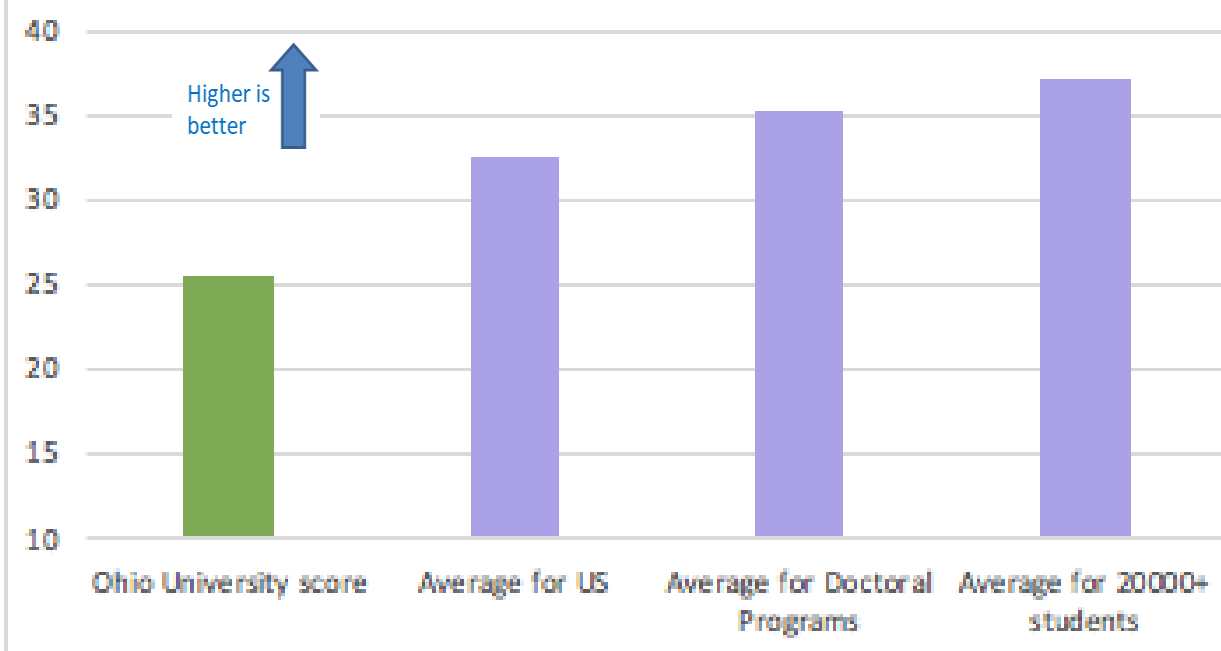
*Aspiration: Minimize impacts from buildings so that educational assets can be maximized*



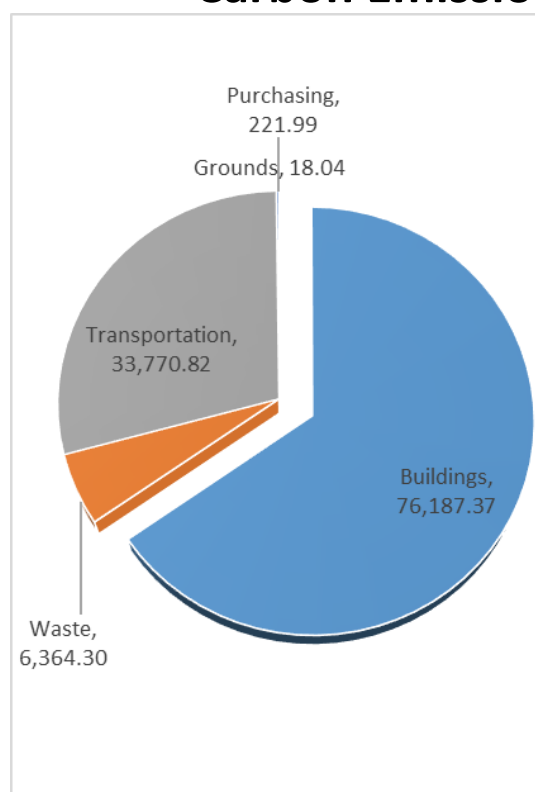
## Where we are now

- ✓ Benchmark 4 : LEED certify new buildings and major renovations on all campuses. **Until 2019, target met: 13 new construction or renovation projects exceeding costs of \$2 million were built to LEED Silver standards for 13 building projects.**
- ✓ Benchmark 12 : Evaluate LEED EBOM of existing facilities. **Target met: Tupper evaluated for LEED EBOM in 2018 and ARC in 2019; Cutler partially evaluated in 2012.**

STARS Buildings Comparisons



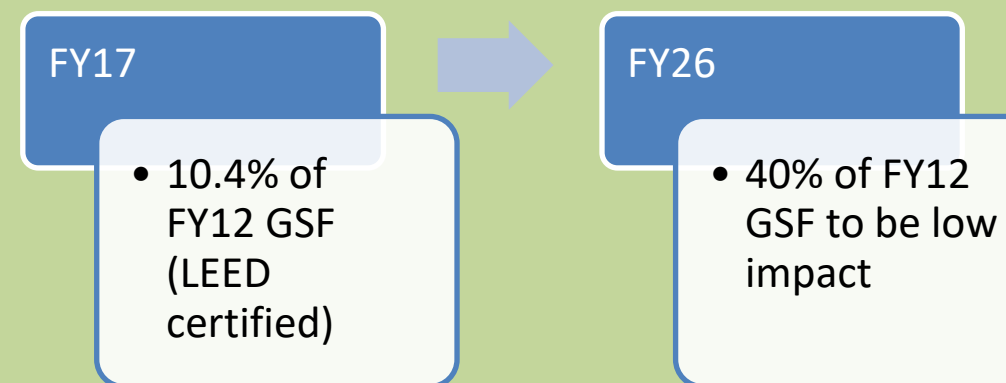
## Carbon Emissions from OHIO buildings



Buildings produce 65% of our Athens campus emissions. The **76187 metric tons** of CO2 equivalent emitted by our buildings each year is equal to **189,046,628 miles** driven by an average passenger vehicle. (US EPA)

## Moving forward

**Goal 1: Reduce building impacts by using best practices in construction or divestment (including private partnership, demolition, or sell)** (Metric: Percent of FY12 GSF of low/zero impact buildings)



- Reduce overall gross square footage (GSF) per student
- Create and implement Ohio University Low Impact<sup>1</sup> Building Standards for construction, renovation and demolition projects
- Support curriculum related to low impact buildings

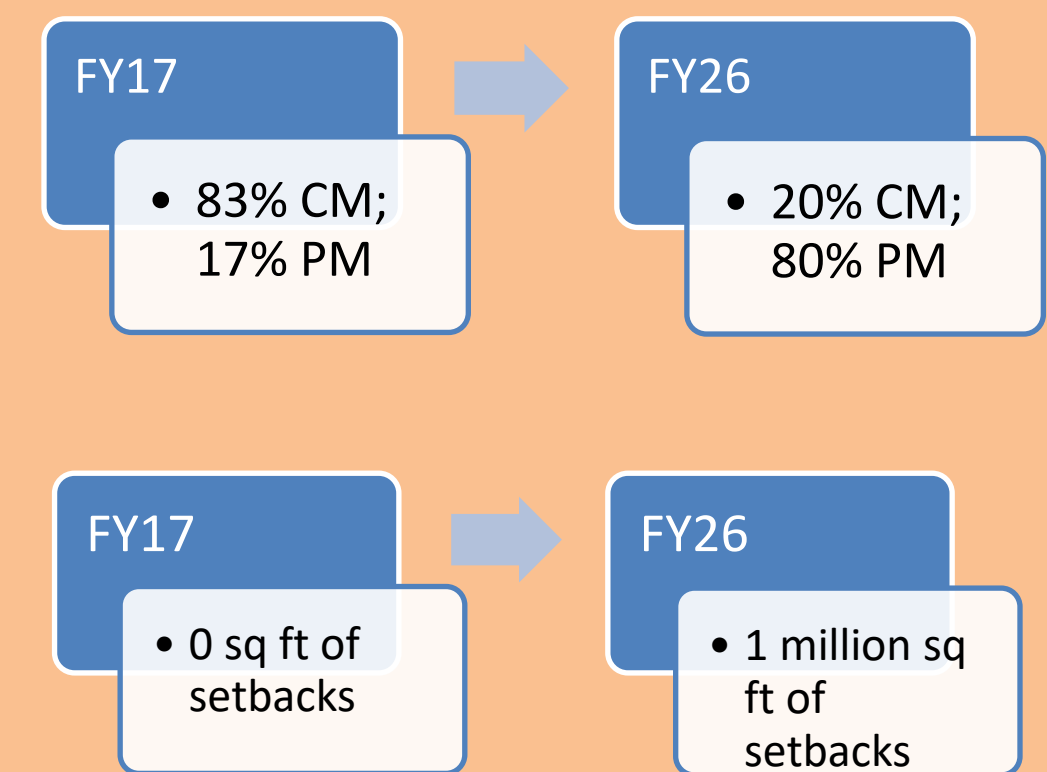
Benefits of Goal #1 Strategies	Costs of Goal #1 Strategies
Operating cost (for energy, water and waste) reduction	Capital cost increase (including demolition costs)
Carbon emissions reduction	Maintenance cost increase possible
Improved occupant comfort & productivity	
Educational and reputational benefits	

### Notes and Definitions

- <sup>1</sup>“Low impact” will be defined in more detail in the proposed OHIO Low Impact Building Standards, and depends on building type and usage.
- <sup>2</sup>“Corrective maintenance” & “preventative maintenance” are as currently defined by OHIO Facilities Management & Safety.
- <sup>3</sup>“Setbacks” are adjustments to temperature settings during times of low/no building usage.

## Moving forward

**Goal 2: Maintain & operate existing buildings to reduce impacts** (Metrics: % hours of corrective maintenance (CM) and % hours of preventative maintenance (PM)<sup>2</sup>; square footage of setbacks or reduced HVAC schedules)

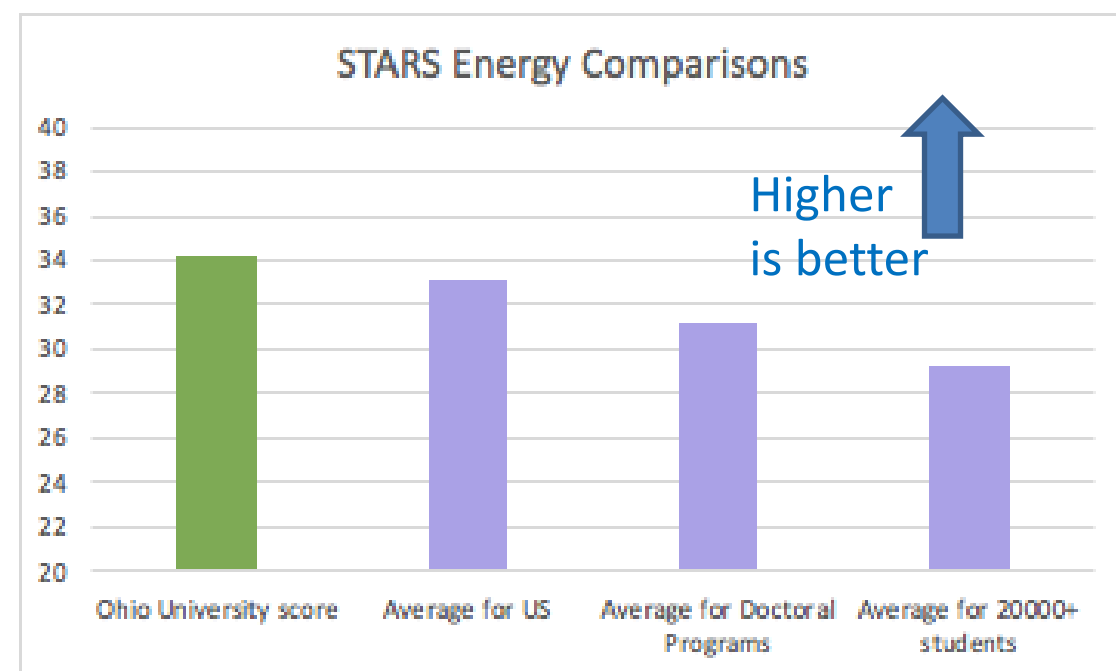


- Expand and institutionalize an OHIO Sustainable Building Operations & Maintenance Program
- Reduce building resources usage through strategic planning & setback<sup>3</sup> utilization
- Increase OHIO communication & education on reducing building impacts; consider building competitions

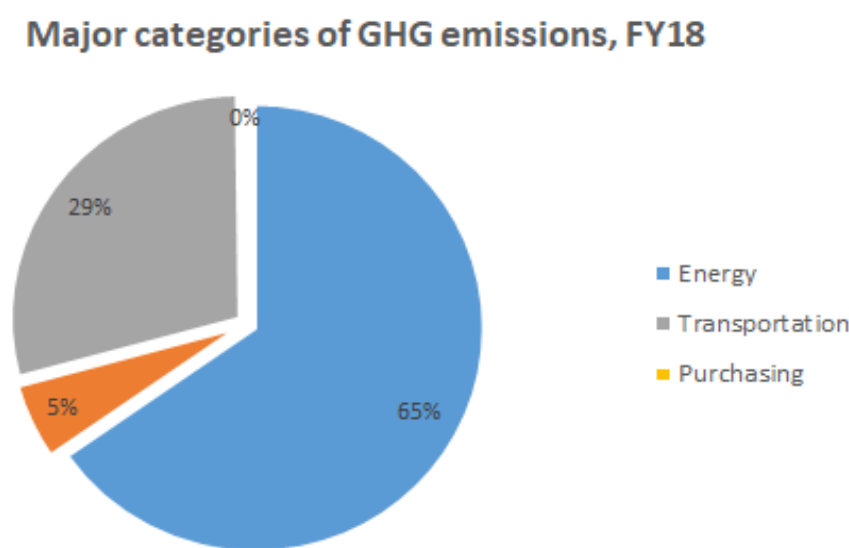
Benefits of Goal #2 Strategies	Costs of Goal #2 Strategies
Carbon emissions reduction	Increase in staff training time
Operating cost reduction	
Improved occupant comfort & productivity	
Possible maintenance cost reduction	
Educational & reputational benefits	

### Where we are now

- ✓ Benchmark 1 : Reduce institutional greenhouse gas emissions **Target of 25% below baseline exceeded. Between Fiscal Year 2012 (FY12) and FY18, net emissions decreased by 30%.**
- ✓ Benchmark 2 : Reduce campus and building energy intensity **Nearing target of 20% reduction from 2004 baseline at 15% reduction.**
- ✓ Benchmark 3 : Increase renewable energy **Nearing target of 20% renewables at 17.9%.**

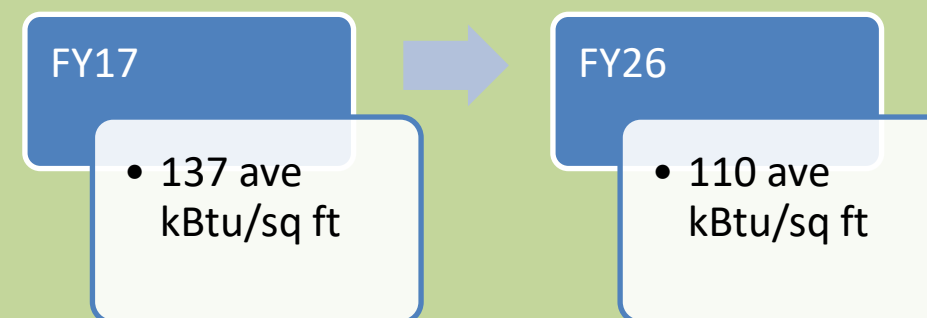


OHIO's highest percentage of carbon emissions comes from energy usage



### Moving forward

**Goal 1: Reduce campus and building energy intensity** (Metric: EUI for campus and for building types)



- Create and implement Ohio University Low Impact Building Standards<sup>1</sup> for construction/renovation projects which align with our sustainability commitments
- Expand and institutionalize OHIO Sustainable Building Operations & Maintenance program
- Restart building energy competitions; educate OHIO campus and communities about energy efficiency

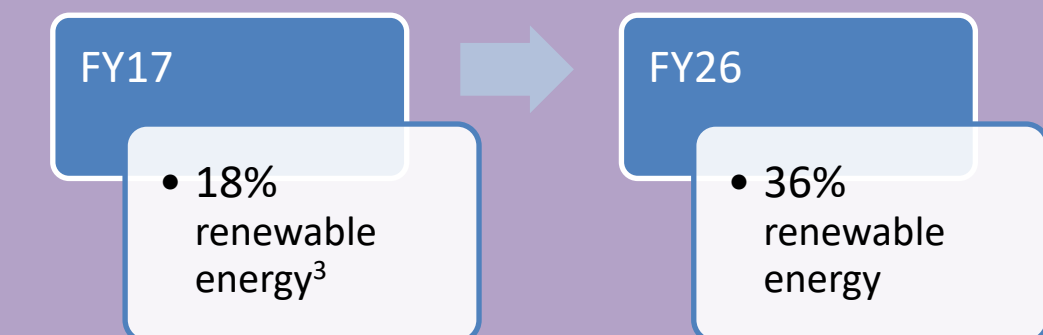
Benefits of Goal #1 Strategies	Costs of Goal #1 Strategies
Operating cost reductions – electrical and natural gas bills; peak load charges	Capital expenditure increase possible
Carbon emission reductions	Maintenance cost increase possible
Occupant comfort/productivity improvements	
Enhanced academic quality	

#### Notes and Definitions

- <sup>1</sup>“Low impact” will be defined in the proposed OHIO Low Impact Building Standards.
- <sup>2</sup>Transportation fossil fuel energy is from gasoline & diesel used to operate OHIO fleet vehicles, as well as fuels used in commuting by faculty, staff & students, as required by the [SIMAP Reporting Platform](#).
- <sup>3</sup>Renewable energy as defined by [AASHE STARS, p 5](#) of Technical Manual, OP6.

### Moving forward

**Goal 2: Decrease reliance on fossil fuel energy** (Metric: Percent of energy from fossil fuels: electricity, heating, cooling, and transportation<sup>2</sup>)



- Pursue innovative and sustainable renewable energy options for all or parts of campus energy
- Consider regional campuses for siting of large on-site renewables

Benefits of Goal #2 Strategies	Costs of Goal #2 Strategies
Operating cost reductions possible	Capital expenditure increases
Carbon emission reductions	Maintenance costs increases
Resiliency benefits	



Caption: Alex Burke, MSES student, with PV array at Building 22. Photo credit: Voinovich School of Leadership and Public Affairs

# Waste

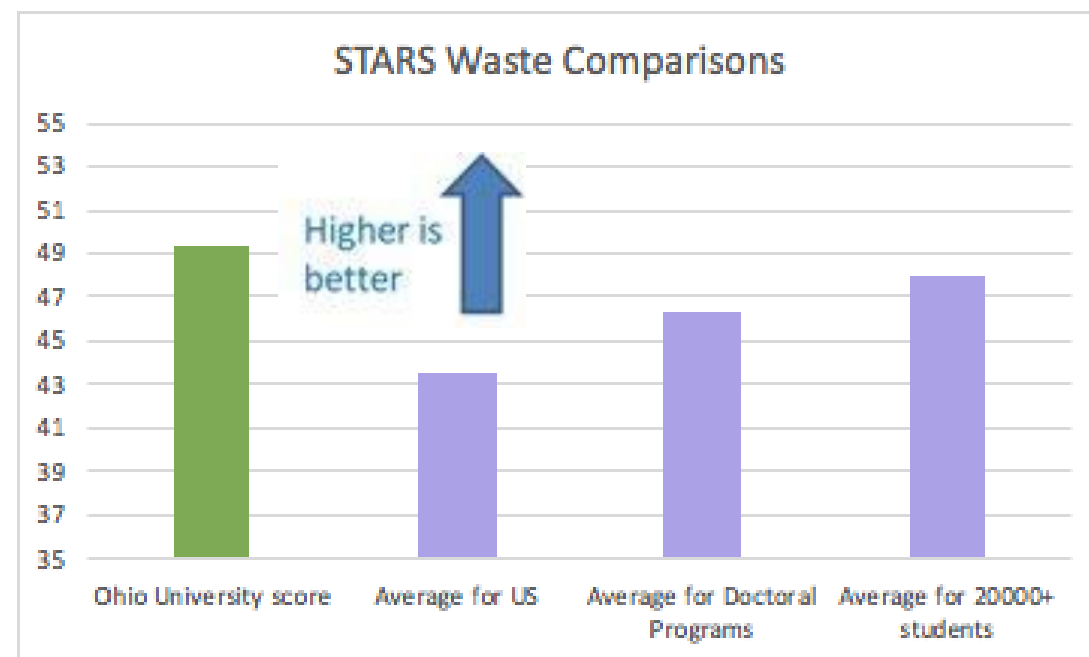
## Hub: Infrastructure

Aspiration: Responsibly manage all waste; become a Zero Waste institution

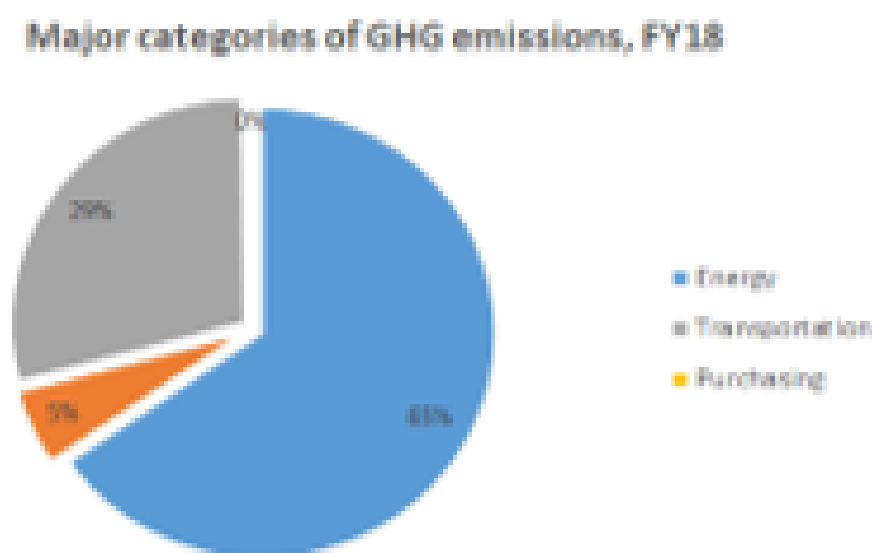


### Where we are now

- ✓ Benchmark 5 : Reduce solid waste. **Target exceeded. 8.2% annual reduction surpassing the 5% reduction target.**
- ✓ Benchmark 7: Increase recycling rates. **Currently not meeting target.**
- ✓ Benchmark 15 : Improve identification and proper handling of hazardous waste. **Target met. Approval, tracking and notification system in place.**
- ✓ Benchmark 32 : Increase food donations to local service organizations. **Target met and in progress.**
- ✓ Benchmark 34 : Implement notification system for local service organizations regarding availability of surplus items. **Target met and in progress (website).**

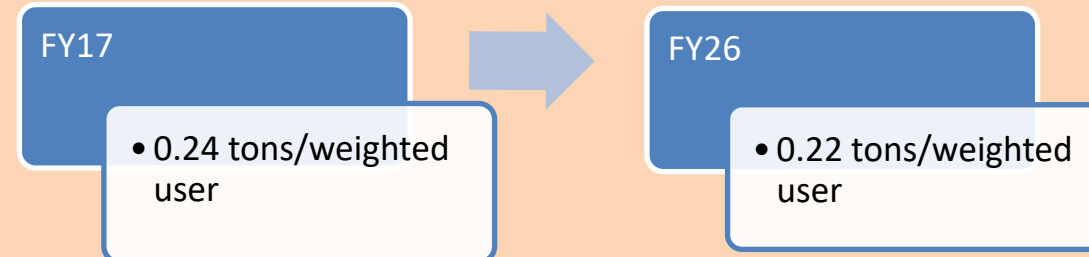


The 3<sup>rd</sup> highest percentage of carbon emissions at OHIO come from waste.



### Moving forward

**Goal 1: Reduce municipal and Universal Solid Waste** (Metric: tons solid waste per weighted user)



#### Potential Strategies

- Educational campaigns for zero waste dining/events; Learning Communities; university events; orientations
- Resource sharing/reuse incentives
- Regional nonprofit salvage/circular economy opportunities
- Print reduction campaigns
- Dining Hall food waste reduction competitions
- Self-serve vs staff-served food portions in dining halls
- Laboratory chemical reuse
- Waste reduction through sustainable procurement; including sustainability goals in new/renewing contracts

#### Abbreviated TBL CBA for Waste Category

Benefits of Goal #1 strategies	Costs of Goal #1 strategies
Operating cost reduction	Staff time
Emissions reduction	Job retraining
Reduced resource extraction	
Circular economic benefits	

#### Notes and Definitions

- "Weighted user" as defined by AASHE STARS
- "Universal" includes batteries, pesticides, mercury-containing equipment (thermostats, lamps)
- Construction & Demolition Debris (C&DD) tracking is currently only in place for LEED projects, though C&D materials are recycled whenever possible for all construction projects. By 2026, OHIO Low Impact Building standard will replace LEED for all buildings.
- "Hazardous" waste audits will be conducted on an annual basis to correct and calculate percentage targets.

### Moving forward

**Goal 2: Increase diversion from landfill to reuse, recycling and composting** (Metric: Percent diversion from landfill)

Subgoals and Targets	FY17	FY26
Municipal	56.1%	60%
- Food (estimated)	70%	75%
- Landscape	100%	100%
Universal <sup>2</sup> (estimated)	90%	95%
C&DD <sup>3</sup> LEED certified	77.5%	80%
C&DD non-LEED <sup>3</sup> certified	N/A	25%
Hazardous <sup>4</sup>	100%	100%

#### Potential Strategies

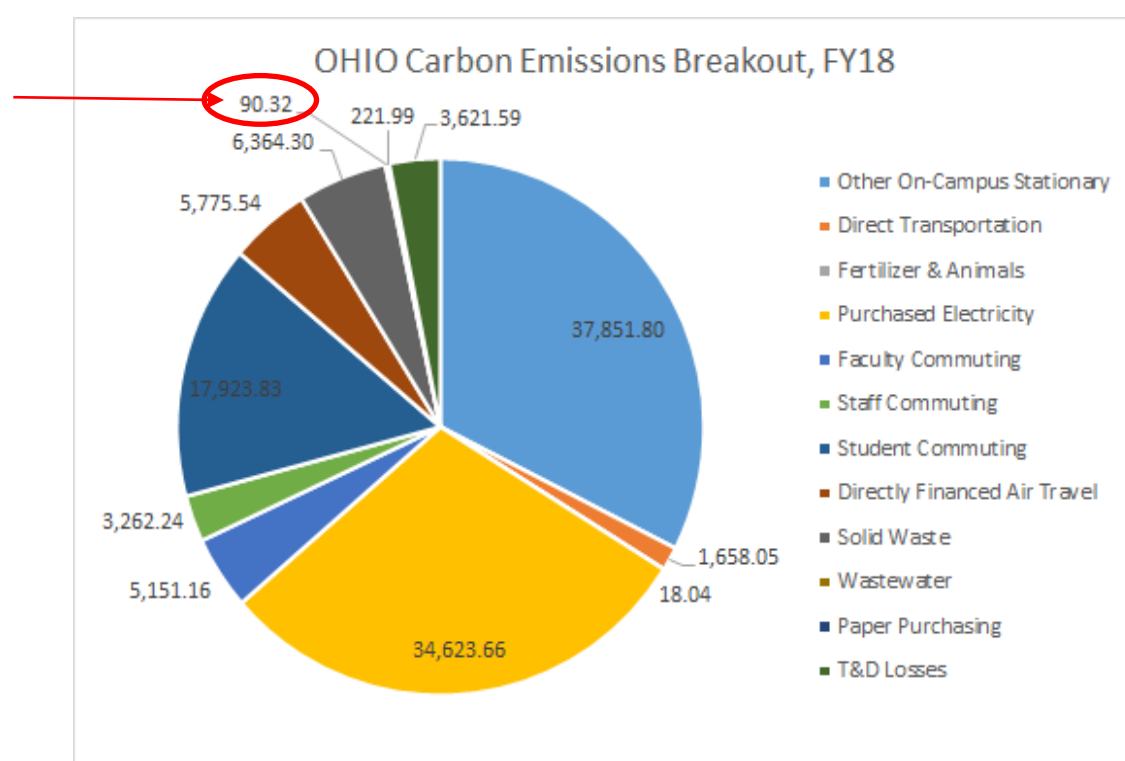
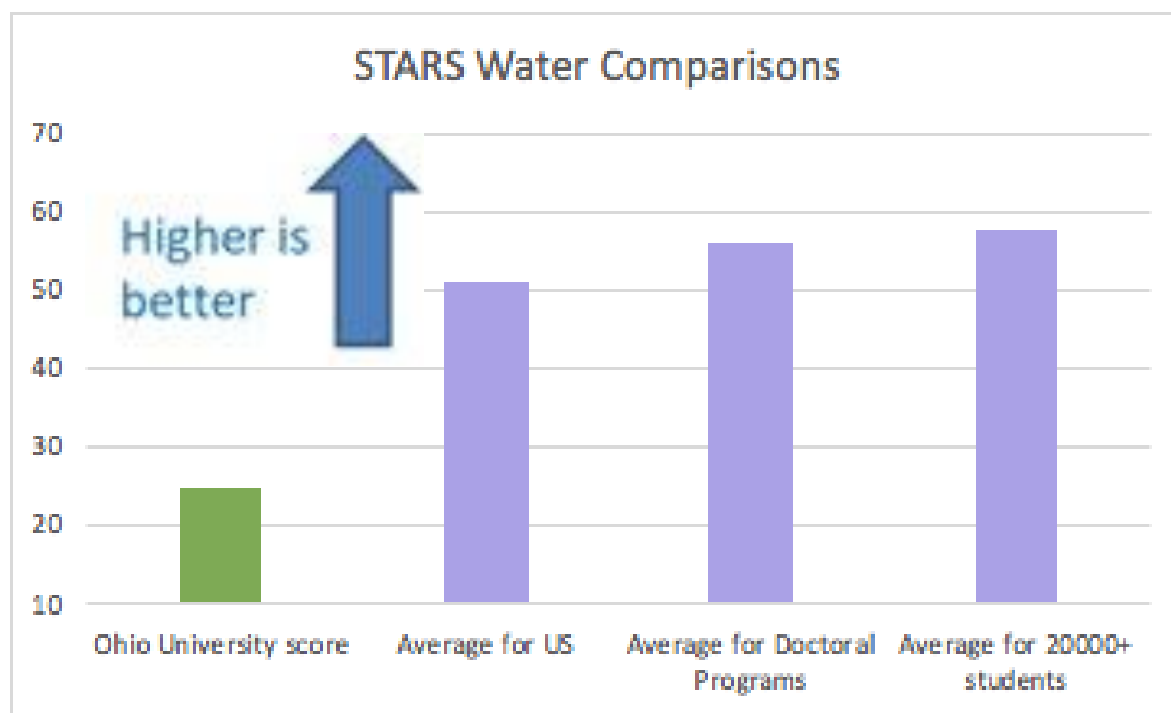
- Continued co-location of recycling and trash across all campus operations
- Waste diversion videos for orientation programs
- Food recovery programs
- Composting pilot programs (student/faculty/staff)
- Pallet recycling
- Low-cost C&DD recycling program; with salvage included in timeline for community partners
- Waste management plan requirement in contracts for construction and demolition projects
- Waste reduction emphasis at athletic events
- Hazardous waste spill tracking
- Bobcat Buy tracking and notification system for hazardous waste

#### Abbreviated TBL CBA for Waste Category

Benefits of Goal #2 strategies	Costs of Goal #2 strategies
Emissions reduction	Increased operational costs
Reduced resource extraction	Staff time
Enhanced community engagement	
Circular economic benefits	

### Where we are now

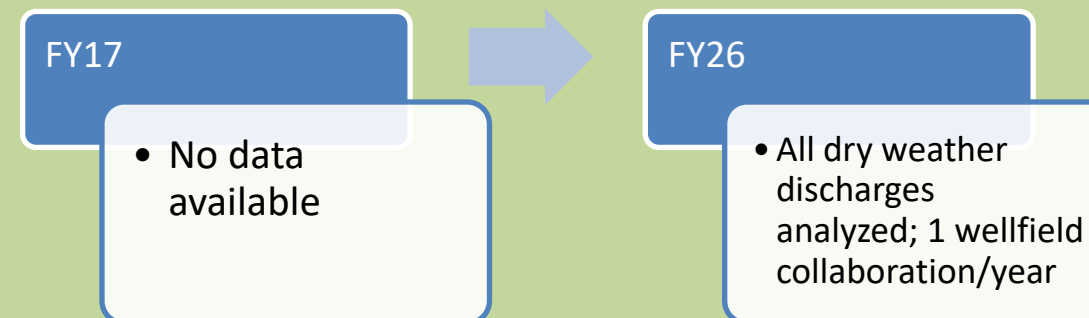
- ✓ Benchmark 13: Prohibit the installation of permanent irrigation systems that rely on potable water. **Target met: Prohibition exists**
- ✓ Benchmark 17: Institute storm water management plan. **Target met: Plan exists**



Emissions from wastewater are the only water-based carbon emissions reported by OHIO. They are a very small percentage of our emissions.

### Moving forward

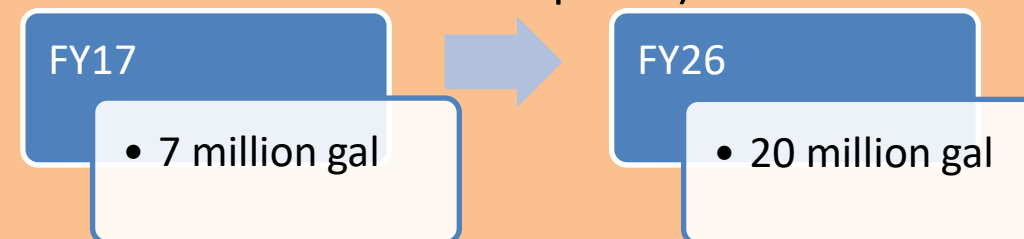
**Goal 1: Work with communities to protect ground water quality and surface waters** (Metric: storm drain discharge analysis in channelized reaches; wellhead emergency planning collaboration with City of Athens)



- Collaborate with faculty and community members to monitor & eliminate dry weather storm drain discharges
- Collaborate with City of Athens on wellfield protection regulations and emergency planning

Benefits of Goal #1	Costs of Goal #1
Public health benefits	Employee time
Enrollment benefits	Maintenance costs

**Goal 2: Reduce impacts from storm water** (Metric: gal storm water retained on campuses)

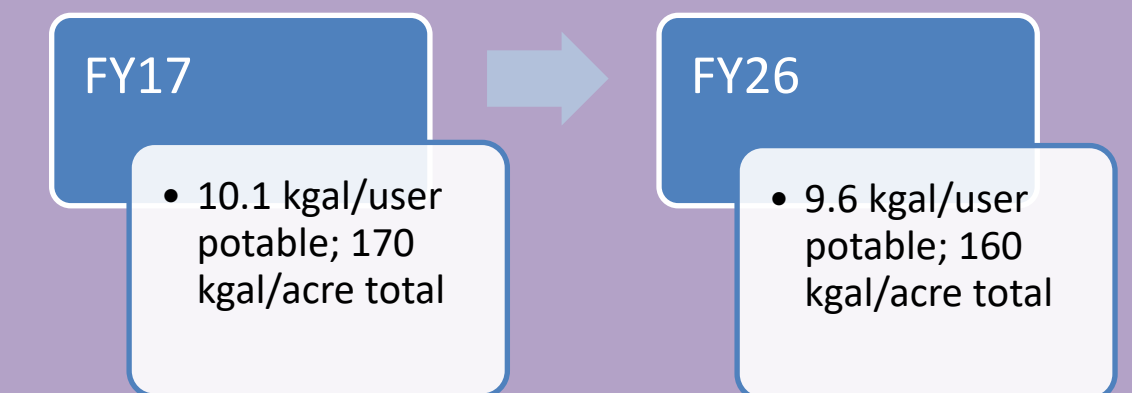


- Increase pervious groundcover, including native plantings
- Use rain barrels, cisterns, or ponds to capture & reuse water
- Use low impact development (LID) strategies<sup>1</sup> in site designs
- Collaborate with community partners to reduce impacts from the channelized section of the Hocking River
- Continue OHIO's Storm Water Management Program

Benefits of Goal #2	Costs of Goal #2
Operations cost reduction	Capital cost increase
Emissions reduction	Maintenance costs increase
Flooding risk mitigation	

### Moving forward

**Goal 3: Reduce potable water usage and water used for irrigation** (Metric: kilo-gallons per weighted user<sup>2</sup> of potable water, kilo-gallons per acres of vegetated land<sup>3</sup> of potable + non-potable water used for irrigation)



- Increase native and xeriscaped<sup>4</sup> plantings
- Use rain barrels or cisterns to capture and reuse water
- Consider capturing boiler water to use in cooling towers
- Use low-flow fixtures in building renovations and construction where practical
- Create on-site recycling water system for at least one building on one campus

Benefits of Goal #3	Costs of Goal #3
Operations cost reduction	Capital cost increase
Emissions reduction	

### Notes and Definitions

<sup>1</sup>Example low impact development strategies are outlined in the [ODNR Rainwater and Land Development standards](#).

<sup>2</sup>Weighted users as defined by AASHE STARS.

<sup>3</sup>Vegetated grounds as reported to AASHE STARS

<sup>4</sup>[Xeriscaping](#) is the practice of designing landscapes to reduce or eliminate the need for irrigation..