FEDERAL ENVIRONMENTAL SYMPOSIUM

BEST PRACTICES FROM ACADEMIA

MARK STEWART — UNIVERSITY OF MARYLAND

NINA MORRIS — UNIVERSITY of VIRGINIA

JASON MATHIAS — JOHNS HOPKINS UNIVERSITY

UNIVERSITY OF MARYLAND

Climate Action at UMD

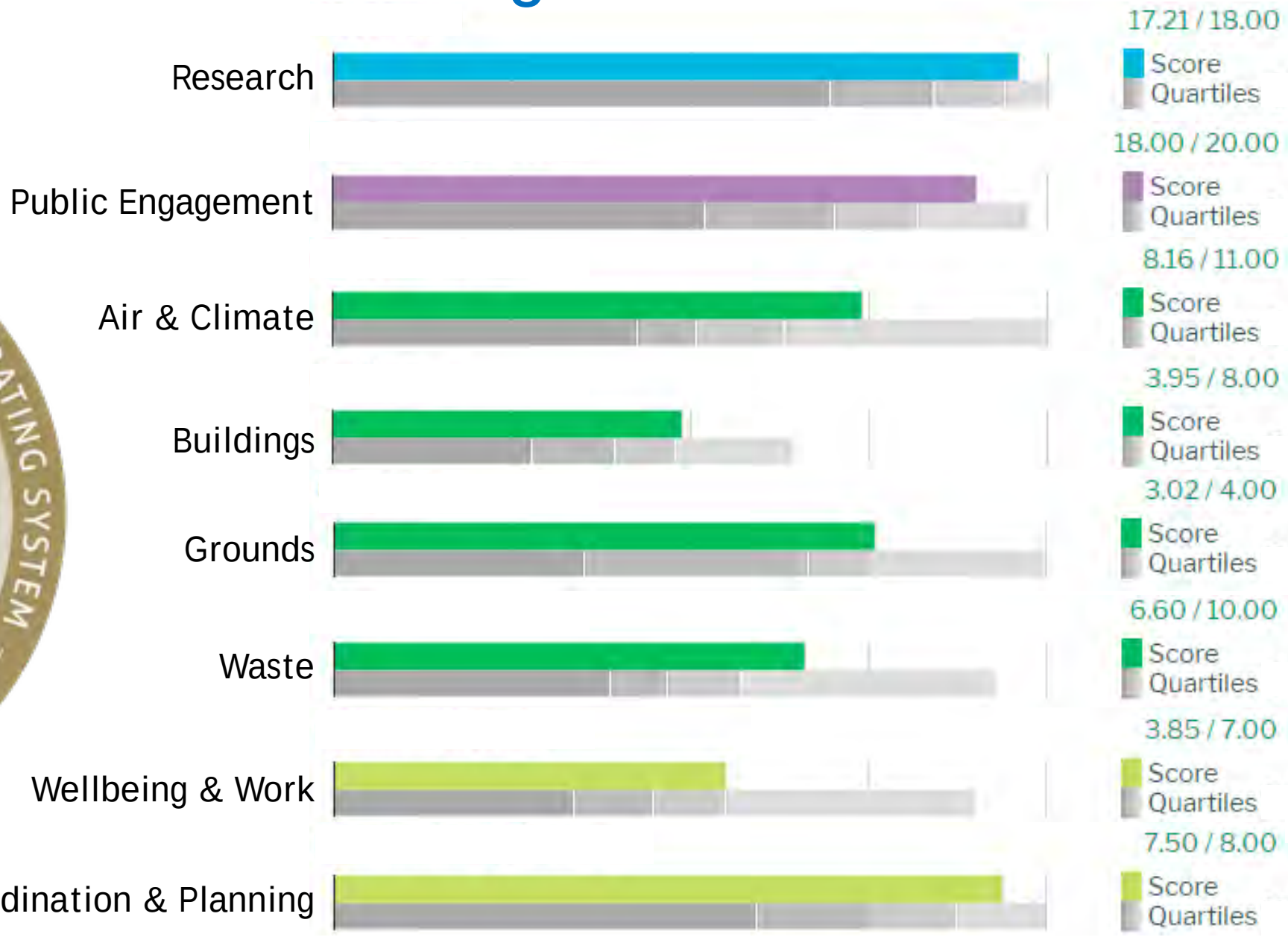
Mark Stewart – Sustainability Manager – Office of Sustainability

UMD's Sustainability Goals:

1. Achieve Carbon Neutrality
2. Demonstrate Excellence in Smart Growth
3. Minimize Waste
4. Use Water Sustainably
5. Educate All Students about Sustainability
6. Advance Sustainability Locally and Globally

2700 solar panels at the Severn Building

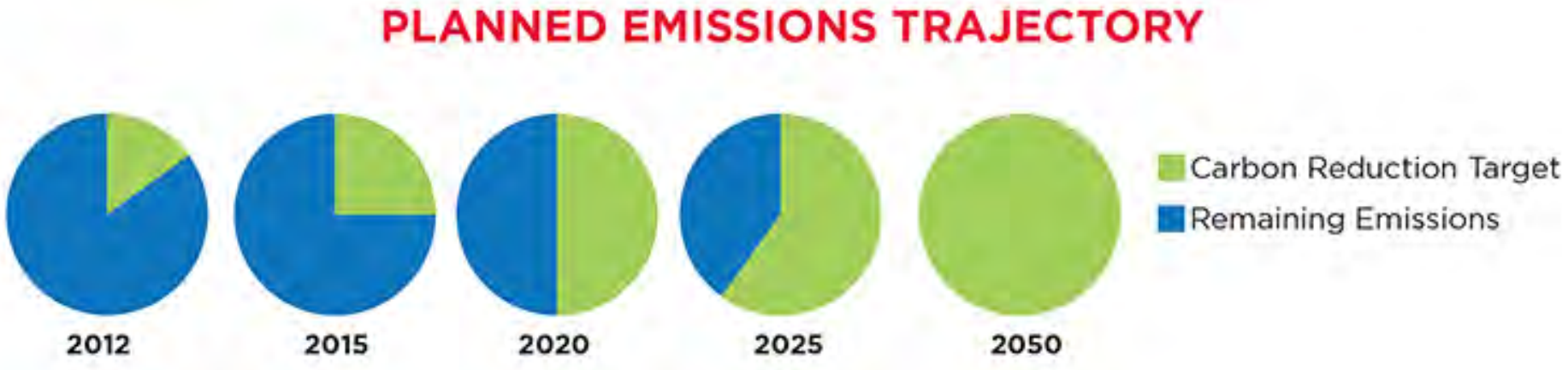
UMD Earns a STARS Gold Rating



Climate Action Plan (CAP) Targets

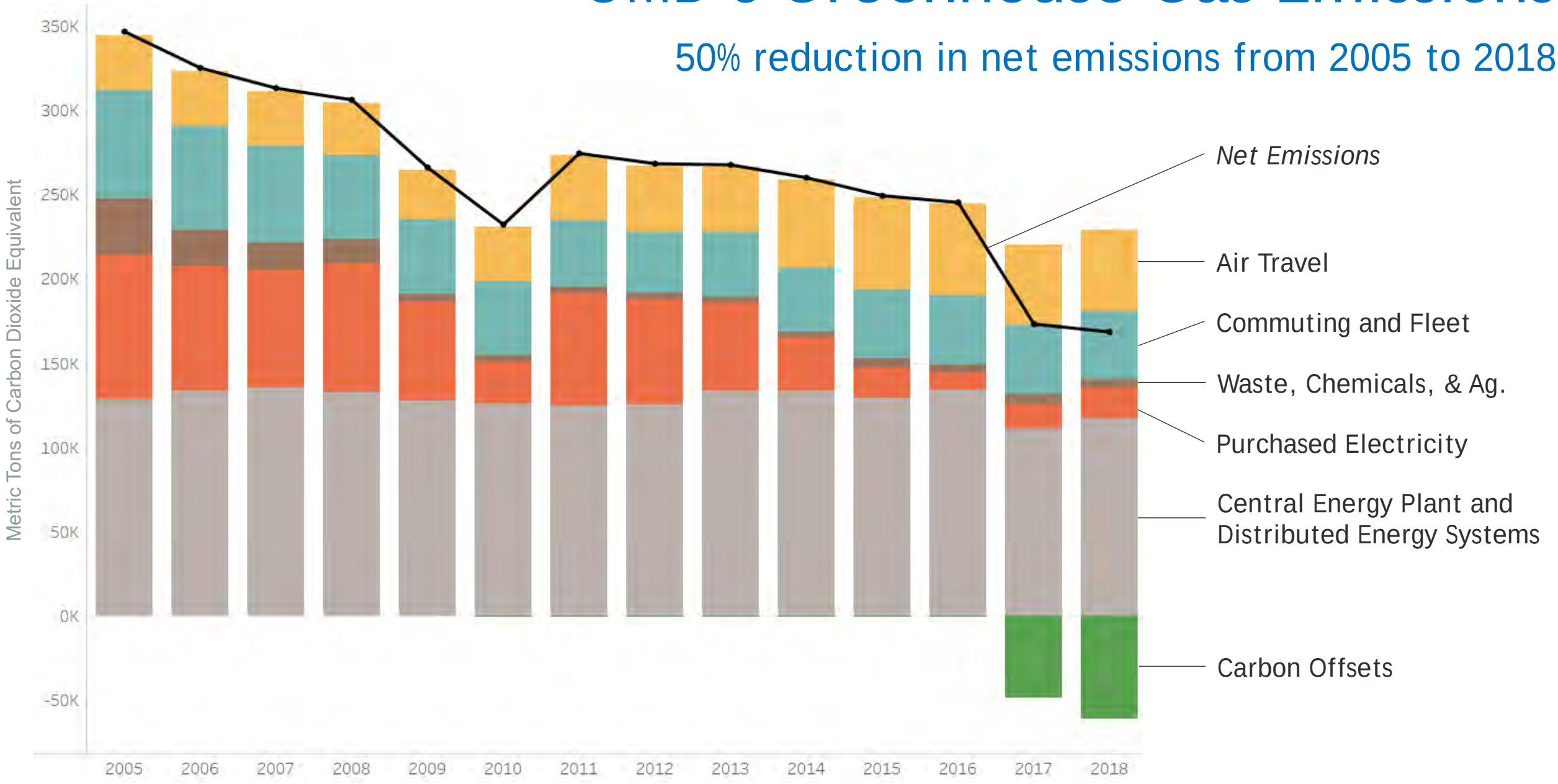
- 50% reduction in GHG emissions by 2020*
- 60% reduction in GHG emissions by 2025*
- Carbon Neutral (net-zero GHG emissions) by 2050

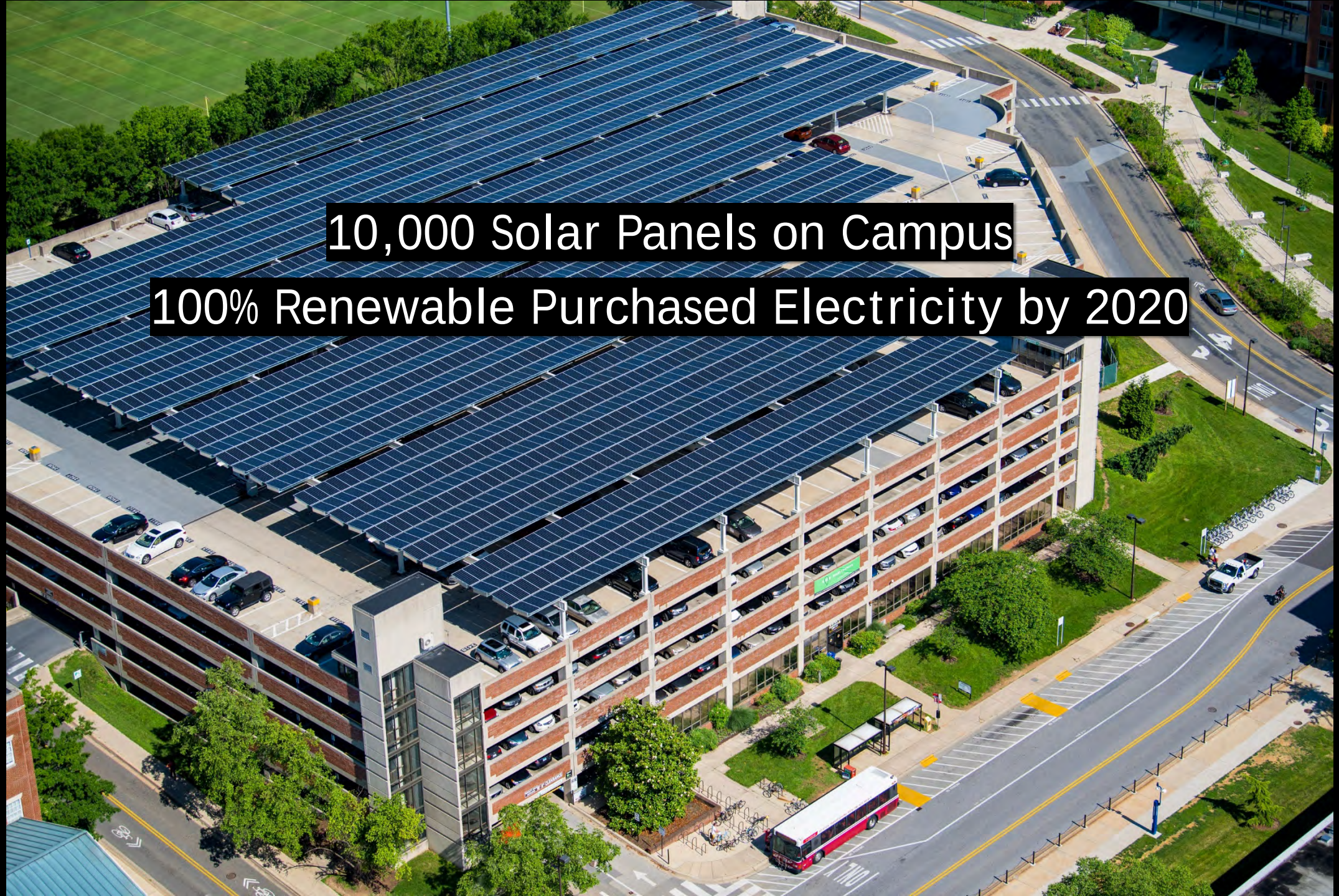
* from 2005 baseline



UMD's Greenhouse Gas Emissions

50% reduction in net emissions from 2005 to 2018




10,000 Solar Panels on Campus
100% Renewable Purchased Electricity by 2020

Net-Zero Greenhouse Gas Emissions from New Buildings

Offsetting 100% of Air Travel Emissions

Offsetting 100% of Undergraduate Student Commuting Emissions

Remaining Sources of GHG Emissions

Central Energy Plant

Faculty, Staff, and Graduate Student Commuting

Fleet Vehicles

Boilers, Generators, etc.

climateplan.umd.edu

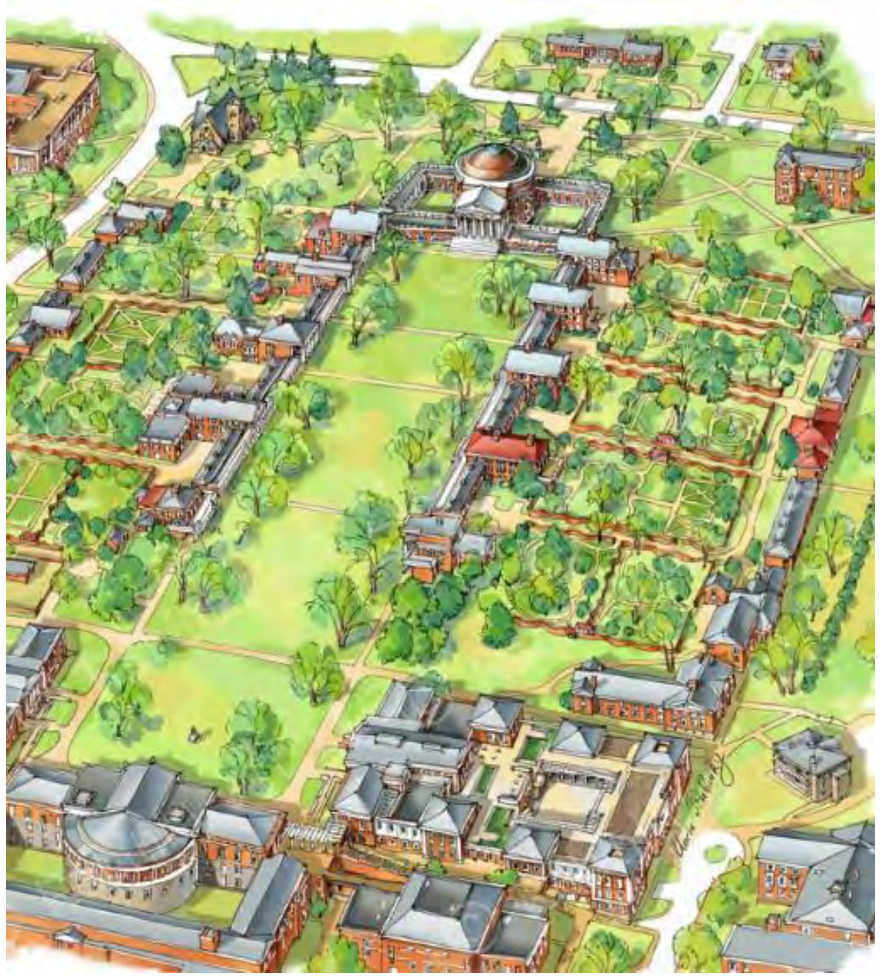
UVA SUSTAINABILITY

LIVING OUR VALUES:CLIMATE

Nina Morris, Sustainability Program Manager-
Outreach & Engagement, Office for Sustainability

UNIVERSITY of VIRGINIA

UNIVERSITY OF VIRGINIA



- 500+ buildings
- 16.5+ million square feet
- 14,600 undergrad, 6,300 grad students
- 13,000 faculty and staff
- 11 schools
- 1600 acres
- UNESCO World Heritage site
- Health System – 604 bed hospital, trauma center, 750,000 outpatient visits

UVA SUSTAINABILITY FRAMEWORK

ENGAGE in our community, serve our community, and build sustainability awareness

DISCOVER new solutions to global challenges through research, curriculum, and using the Grounds as a learning tool.

STEWARD our resources on Grounds and beyond by living our values through our actions and operations

UVA SUSTAINABILITY STRUCTURE

EVP & Provost

- 350+ faculty engaged in sustainability-related research
- 160+ sustainability-related courses

- Environmental Resilience Institute (D)
- Global Sustainability Major and Minor (D, S)
- Darden Business Innovation and Climate Change Initiative (D)
- McIntire Sustainability Certificate (D)
- Morven Sustainability Research and Summer Institute (D)

VP and Chief Student Affairs Officer

- Student Council Sustainability Committee (E, S)
- 30+ sustainability-related student organizations (E, S)

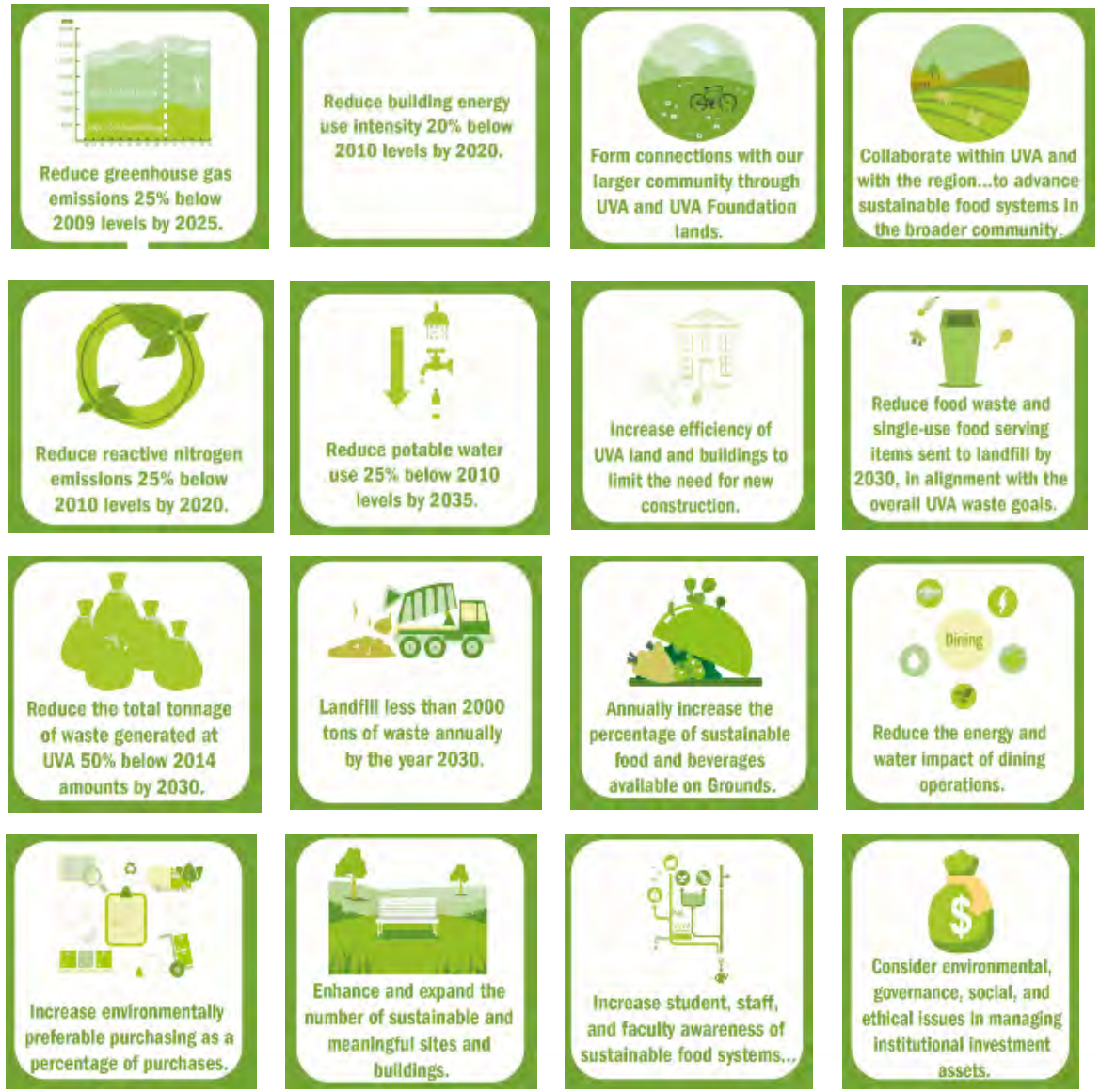
EVP & COO

- Facilities Management (S, E, D)
  - Office for Sustainability (S, E, D)
  - Environmental Resources (S)
- Transportation Demand Management Program (S, E)
- Green Dining Program (S, E)
- Office of the Architect (S, D)

EVP for Health Affairs

- Health System Sustainability Committee (S, E, D)

UVA SUSTAINABILITY PLAN STEWARD GOALS



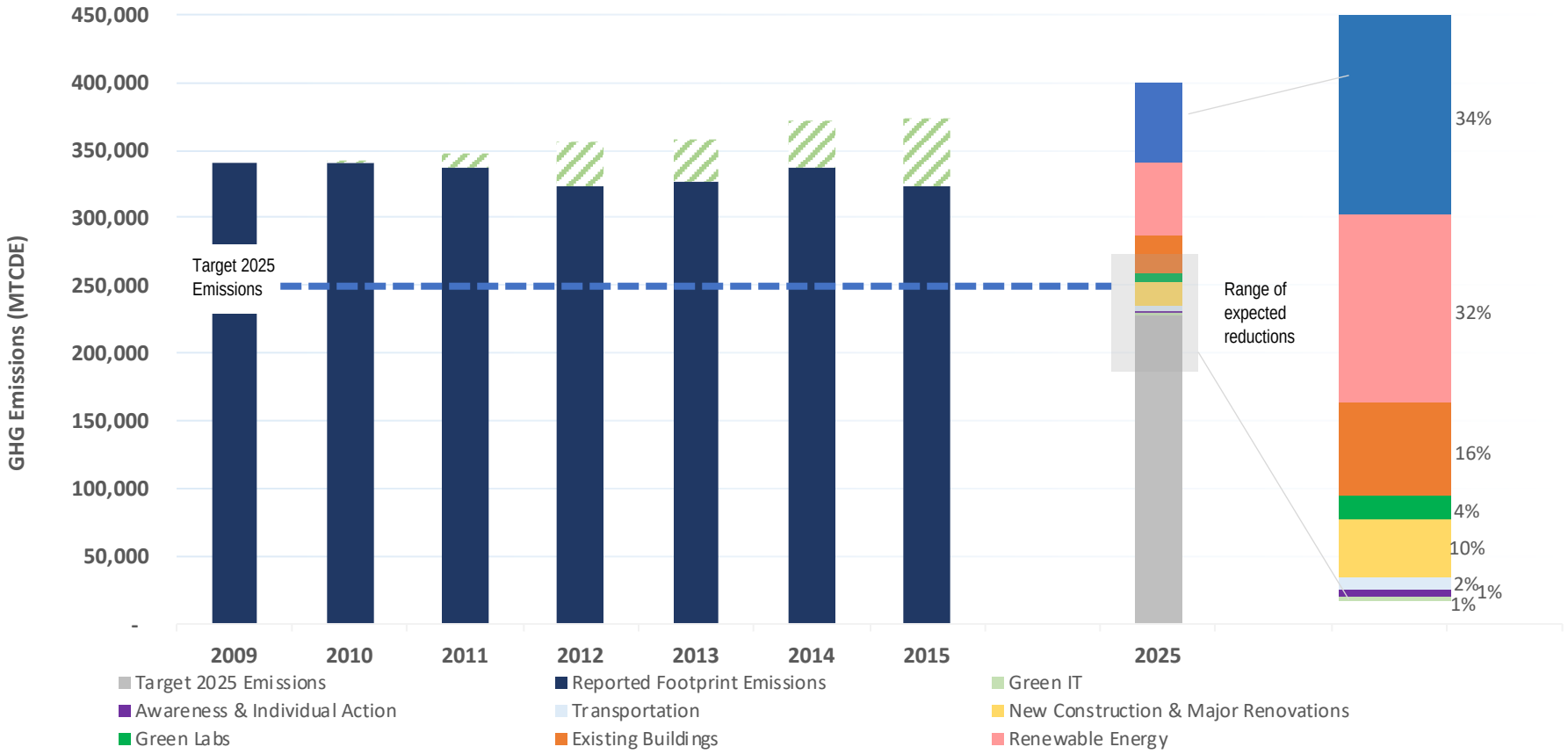
<u>16 Goals</u>

- Energy
- Greenhouse Gas
- Water
- Waste/Materials
- Food
- Land

<u>Action Plans</u>

- Greenhouse Gas Action Plan
- Nitrogen Action Plan
- Food Action Plan
- *Materials Action Plan (in progress)*
- *Water Action Plan (in progress)*

GHG ACTION PLAN SUMMARY



Estimated total reductions needed by 2025: 110,000 MTCDE – 130,000 MTCDE

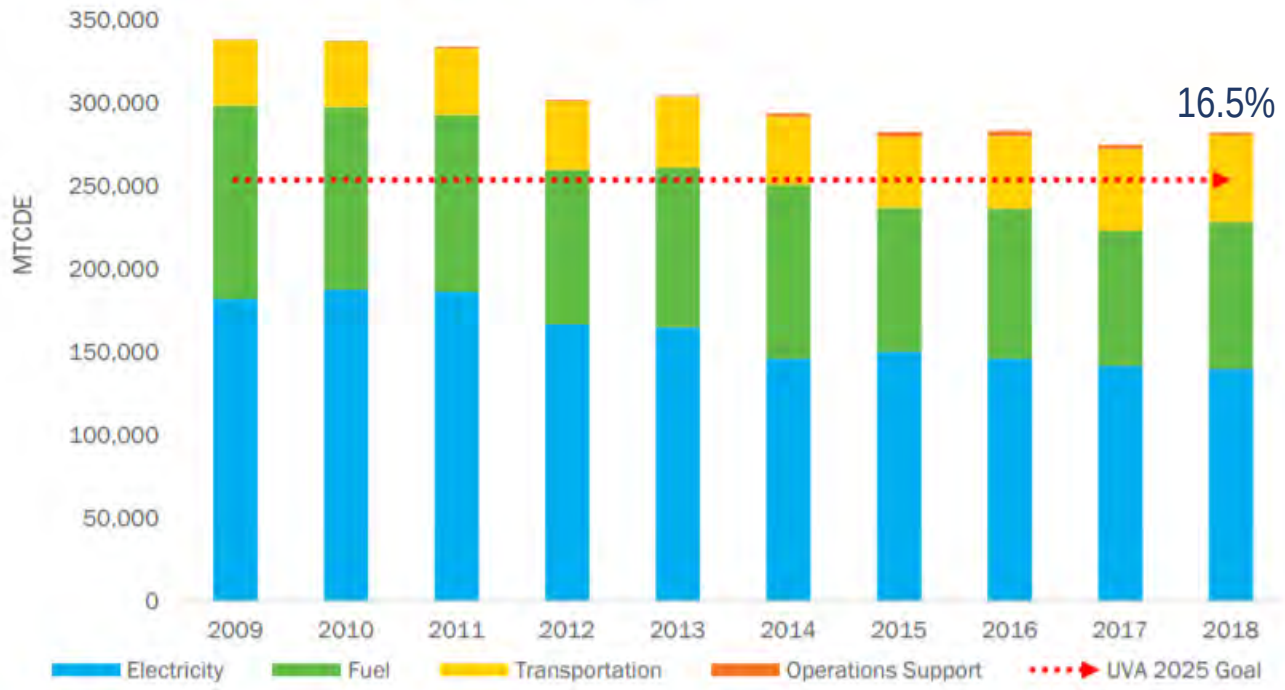
Estimated total reductions from GHG Action Plan strategies: 126,000 – 216,000 MTCDE

STEWARD

Living Our Values: Climate

GOAL: Reduce greenhouse gas emissions 25% below 2009 levels by 2025

Figure 1: UVA GHG Emissions by source (MTCDE), 2009-2018



Expect to meet goal in 2019, six years early.

Energy efficiency, district energy improvements, and renewables have played a major role

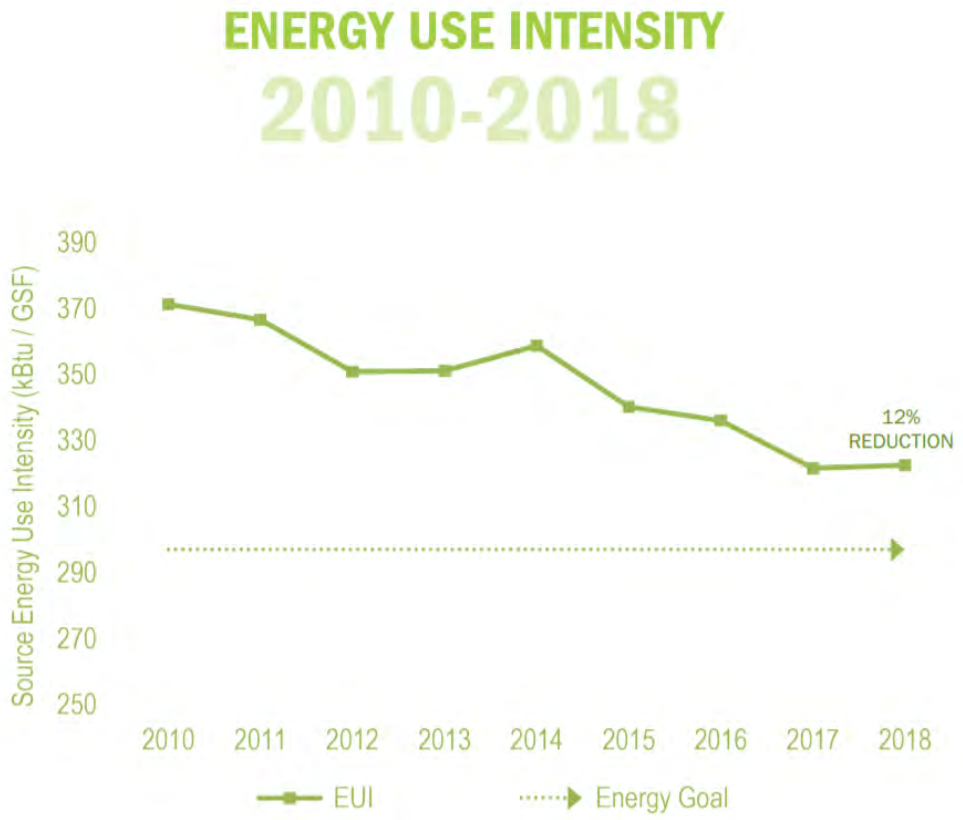
As of 2019, 20% of UVA's electricity is generated by two utility-scale solar projects: UVA Hollyfield (17 MW) and UVA Puller (15 MW)

UVA BOOKSTORE
624 solar panels
140 kW peak capacity
CLEMONS LIBRARY
325 solar panels
126 kW peak capacity
RUFFNER HALL
965 solar panels
224 kW peak capacity
SKIPWITH HALL
55 solar panels
15 kW peak capacity

STEWARD

Living Our Values: Energy

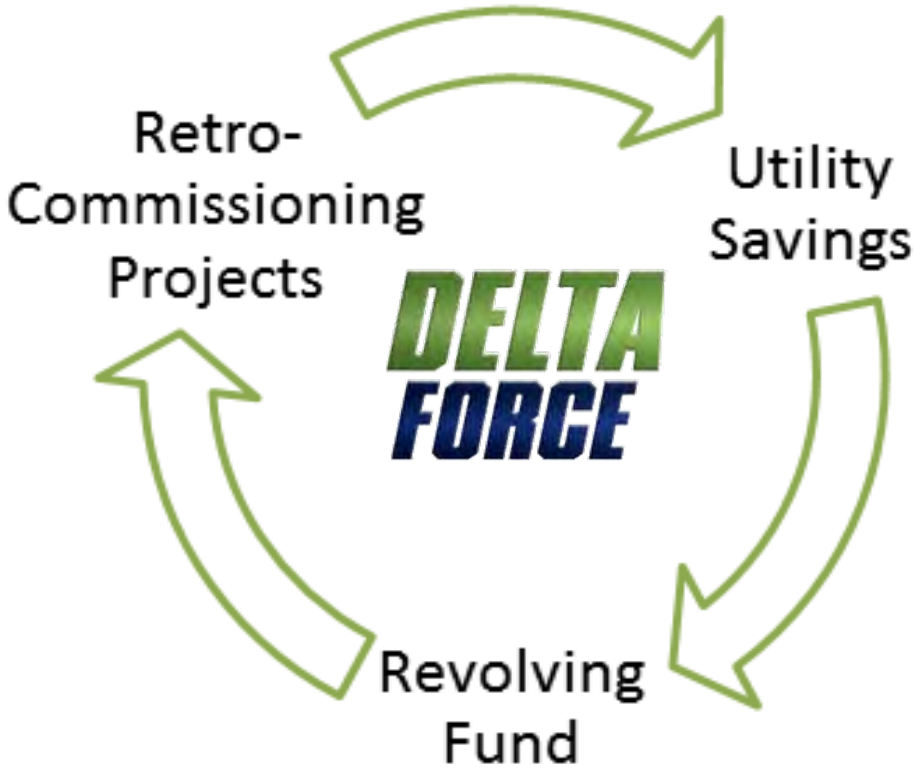
GOAL: Reduce building energy use intensity 20% below 2010 by 2020 (Better Buildings Challenge)



- Plant Optimization
- LEED & Green Building Standards (New Construction & Renovations)
- Energy Efficiency in Existing Buildings
  - Delta Force Retro-Commissioning
  - Green Workplace Program
  - Smart Labs
  - Green Labs

DELTA FORCE

SAVINGS: $41.9 MILLION SINCE 2008
30,000 MTCDE IN 2017



- Monthly baseline (previous fiscal year) established at project initiation.
- Customer billed monthly based on baseline. Difference between baseline and actual consumption x commodity rates = recovery to the Delta Force account
- Billing on baseline recovery continues until 125% of cost is recovered

CLARK HALL

SAVINGS:

- 67% REDUCTION IN ENERGY COSTS
- 3,000 MTCDE ANNUALLY

- LEED EB+OM Silver Certified
- All lighting converted to energy-efficient LEDs
- HVAC controls upgrades
- Air Handling Units optimized
- Optimization of air flow rates in labs
- Repaired energy recovery system
- Green labs & Green Workplace Initiatives

GREEN WORKPLACE

2,500+ employees engaged in 20+ certified schools & departments

GREEN WORKPLACE
SUMMARY OF ACTIONS

AWARENESS & EDUCATION

A-1	Public Leadership Commitment	
A-2	Sustainability 101 Presentation	
A-3	Green Workplace Survey	
A-4	New Employee Onboarding	
A-5	Green Purchaser Training	
A-6	Zero Waste Event Training	

REMINDER SIGNAGE

S-1	Light Switch Reminders	
S-2	Thermostat Stickers	
S-3	Water Conservation Clings	
S-4	Paper Towel Prompts	
S-5	Public Transit Poster	
S-6	Earn Your Steps Sign	

ENERGY & WATER

E-1	HVAC Check Up	
E-2	IT Sleep Settings	
E-3	Efficient Equipment & Appliances	
E-4	Appliance Census	
E-5	Leak Check	
E-6	Bottle-Free Workplace	

WASTE REDUCTION

W-1	Recycling Check Up	
W-2	Deskside Recycling Boxes	
W-3	Electronics Recycling	
W-4	Office Supply Reuse	
W-5	30+% Recycled Content Paper	
W-6	Double-Sided Printing	

ONGOING COMMUNICATIONS

C-1	Electronic Communications	
C-2	Print Communications	
C-3	Updates at Staff Meetings	
C-4	Sustainability Lunch & Learns	
C-5	Newsletter Subscribers	
C-6	Green Workplace Sharing	

WE'RE HERE TO HELP!

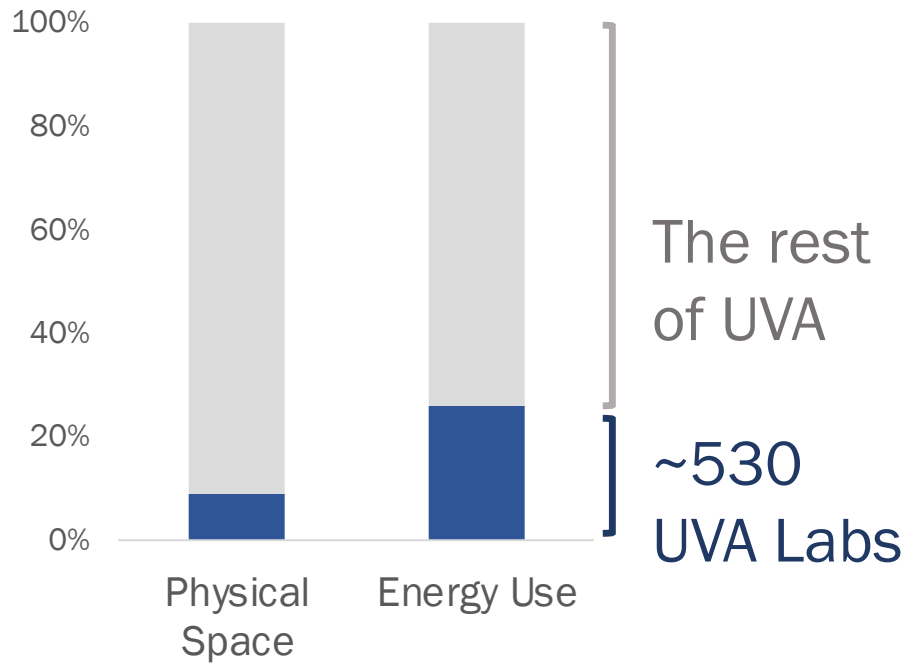
Ask questions or schedule a check in:
greenworkplace@virginia.edu
434-297-7964

Find resources that correspond to each action on our website.

LABS

SAVINGS POTENTIAL:

- $5.5 MILLION ANNUALLY
- 40% REDUCTION IN LAB ENERGY



SMART LABS

- HVAC
- LIGHTING

GREEN LABS

- COLD STORAGE
- CHEMICALS
- ELECTRONICS
- MATERIALS
- ENGAGEMENT

GREEN LABS

SAVINGS: $10,000 FROM OUTREACH EFFORTS

Programs:

- Green Labs Pilot Program
  - Space Optimization
  - Outreach Programs

Initiatives:

- Freezer Challenge
- Shut the Sash Annual Competition
- Energy Impact Tracker-Chemical Fume Hoods

SMART LABS

PHYSICAL & LIFE SCIENCES BUILDING
SAVINGS POTENTIAL: $265,000

Phase 1: COMPLETED- 100% LAB ENGAGEMENT
Assess lab risk levels & optimized airflow, identify performance and energy improvement measures and develop a scope of work to optimize performance

Phase 2:
Engineering, design and implementation of performance improvement measures

Phase 3:
Implementation of management programs for the ventilation systems to ensure long term safety and efficiency for the lifecycle of the building

DISCOVER

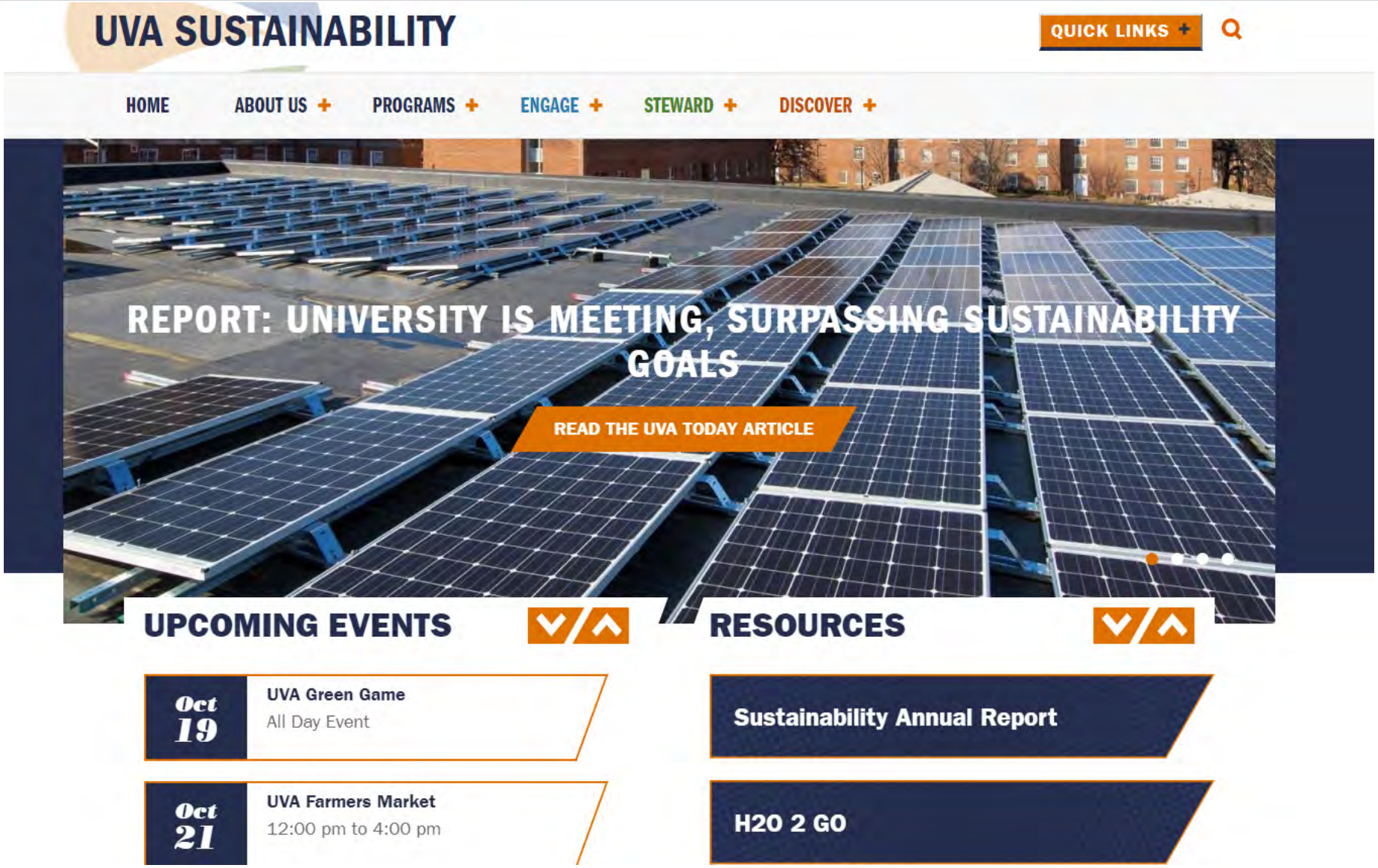
Living Our Values: Renewable Energy Research

GIANT WIND TURBINES INSPIRED BY PALM TREES

UVA Mechanical Space & Engineering Department Chair, Eric Loth

- 50 MW Turbines
- 650 FT Blades
- Prototype at NREL
- Potential to cut wind energy costs by 50%

SUSTAINABILITY.VIRGINIA.EDU



HOPKINS**SUSTAINABILITY**

Federal Environmental Symposium
October 31, 2019

ABOUT JHU

- First research institution in the United States
- **1,000+** owned acres
- **14.5 million+** square feet of owned real estate
- **21,000** employees
- **24,000** students
- Campuses in Baltimore, Montgomery County, Laurel, and Washington, D.C.
- Largest private employer in the state of MD

RECENT SUSTAINABILITY MILESTONES

2006 — Office of Sustainability is established

2009 — President's Task Force on Climate Change Report and Climate Implementation Plan are published

2010 — Environment, Energy, Sustainability, and Health Institute (E^2SHI) is established

2013 — President Daniels commits JHU to 35% Real Food Challenge goal

2014 — Climate Action Plan: Five Year Review is published

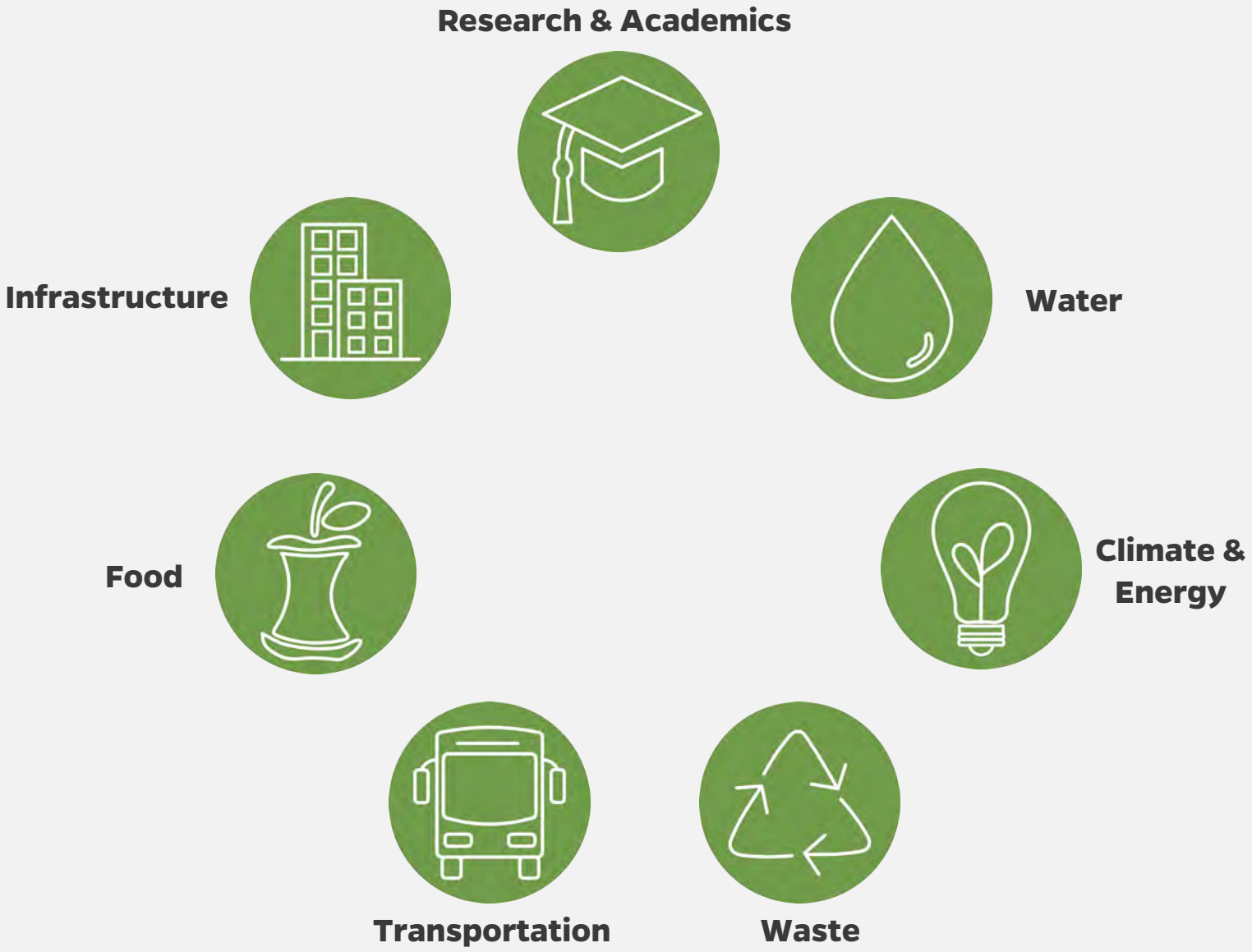
2017 — President Daniels signs multi-university letter committing JHU to Paris Climate Accord

2019 — JHU announces Solar PPA and Sustainability Leadership Council

2025 — **2025 Goal:** Reduce JHU's greenhouse gas emissions 51% from baseline

OFFICE OF SUSTAINABILITY

- Supports sustainability initiatives **university-wide**
- Located in Facilities & Real Estate
- Works to reduce the **institution's environmental impact** through:
  - Energy efficiency retrofits
  - Renewable energy projects
  - Behavior change initiatives



HIGH-PERFORMANCE BUILDINGS

- **1.8+ million sq. ft.** of LEED space
- 18 buildings & spaces across JHU
  - 1 LEED Platinum
  - 7 LEED Gold
  - 8 LEED Silver
  - 2 LEED Certified
- Undergraduate Teaching Labs (UTL) JHU's first LEED Platinum building
  - 50% less energy use than a traditional lab building
  - Awarded in 2017

GHG EMISSIONS

- **Goal:** Reduce JHU's greenhouse gas emissions **51% reduction by 2025** from 2008 baseline
  - Scope 1 and 2, JHU owned facilities and fleet
- **Strategies** to reduce emissions:
  - Energy conservation measures
  - High-performance buildings
  - Renewable energy projects
- President Daniels restated commitment to **Paris Climate Accord** in 2017
- Collaborating with other universities on Internal Carbon Pricing study

ENERGY EFFICIENCY

- More than **$85 million** in investments
- Cogeneration to capture the heat energy while creating electricity, **40% more efficient** than typical grid electricity
  - **4.6 MW** Cogeneration plant at Homewood
  - **15 MW** plant shared with the Hospital in East Baltimore
- Efficient HVAC equipment, variable air drives, lighting projects

ENERGY EFFICIENCY

Best Practices

- **Modular spaces** with improved HVAC controls to turn off sections (Malone & UTL)
- **Variable Air Volume** upgrades at School of Medicine and BSPH to allow Fume hoods to be lowered to reduce air flow when not in use
- BSPH started a **Freezer Farm** to move less frequently used samples to higher efficiency liquid nitrogen freezers
- **Mount Washington Data Center** to promote efficient data storage and take demand off HVAC systems at JHU campuses
- Use of **Clockworks** software for identifying building maintenance and energy savings

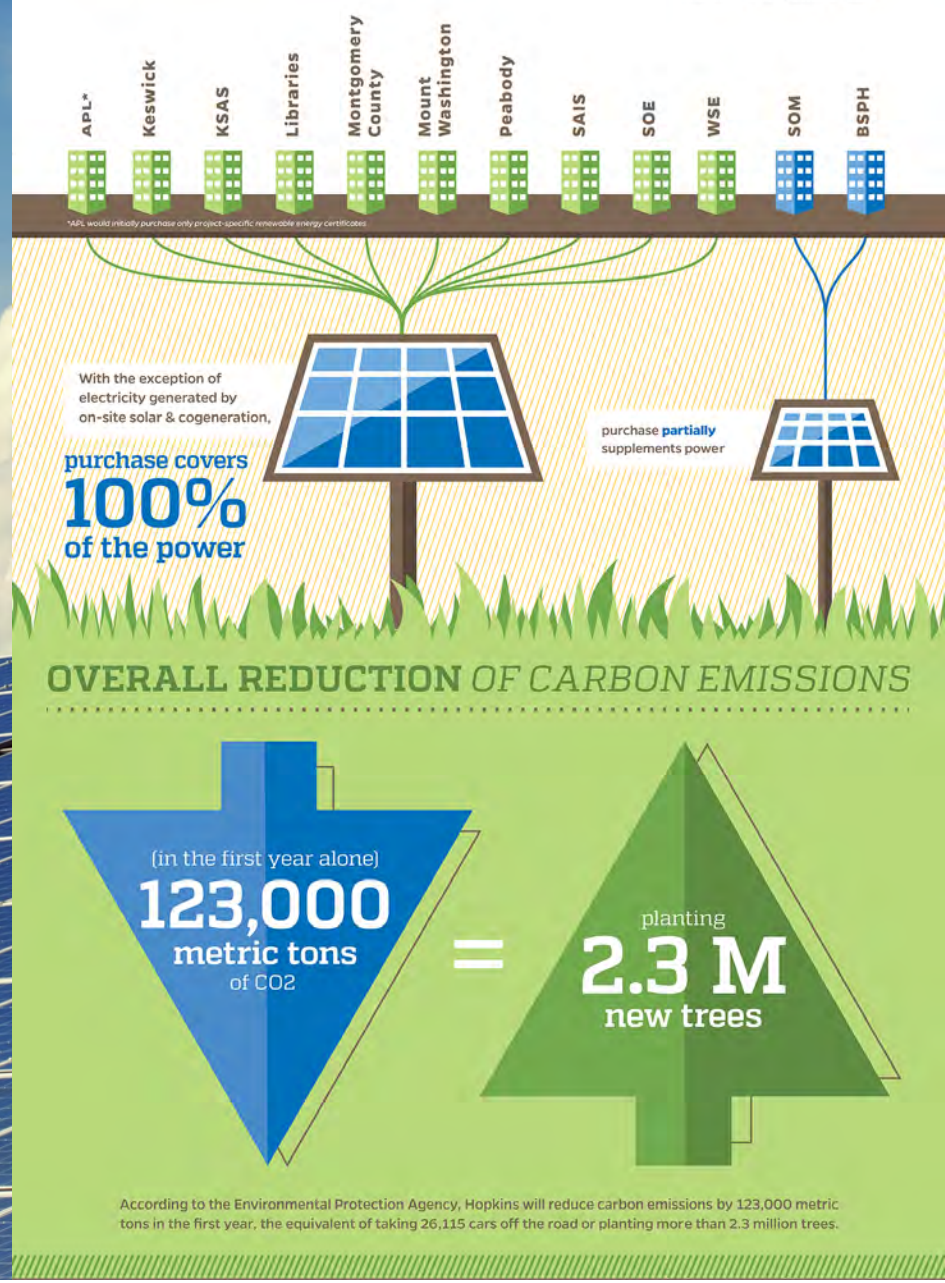
ENERGY EFFICIENCY

Future Planned Investments

- ❑ More than **$100 million** earmarked for future projects
- ❑ Planned projects through **FY26**
  - LED lighting upgrades throughout Homewood campus
  - Steam to hot water conversions
  - East Baltimore cogeneration addition
  - Aircuity pilot at Homewood campus
  - Efficient HVAC equipment, variable frequency drives, lighting retrofits

JHU SOLAR PPA

- ❑ **#1** Largest solar agreement in MD
- ❑ Roughly **two-thirds** of the university's overall electricity needs will be provided by solar power
- ❑ University has pledged to buy more than **250,000 megawatt hours** of solar power per year



WASTE REDUCTION

Focus: Maximize diversion from incineration through source reduction, recovery, and reuse

- ❑ JHU diverts approximately **43%** of the institution's total waste
- ❑ Recycling is present on all campuses with composting on select campuses
- ❑ Preferred Green Caterer list identifies vendors offering free compostable serviceware to JHU customers
- ❑ Terracycle collections available at multiple campuses for unconventional items (Homewood, Keswick, Carey)

WASTE REDUCTION

- **Free Food Alert** system on the Homewood Campus
- **Eco-Smart Move-Out** program donates clothing, houseware, unperishable food and toiletries from JHU students to Goodwill and Project Plase
- **Hop Reuse Hub** for furniture donation and resale
- **School supplies collection** and sharing with School of Education and Baltimore Public Schools
- **BSPH desk-side composting** and furniture fabrication initiatives
- **APL composting pilot** in cafeterias

WATER CONSERVATION

Focus: Design and implement efficient technologies to minimize domestic water use

- ❑ Low-flow fixtures standard
- ❑ Rainwater harvesting
- ❑ Evaluating black water reclamation for reuse in cooling towers operations

SUSTAINABILITY LEADERSHIP COUNCIL

The charge of the SLC is to provide advice and recommendations to the Provost on policies, programs, and other initiatives that will build a greater role for Johns Hopkins in teaching, research, and leadership on environmental sustainability, both locally and globally.

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JHU Sustainability

JHUSustainability

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