



George Mason University

Climate Action Plan Town Hall

November 18th, 2021

ARUP

Agenda

Mason Climate Action History

Climate Action Plan Process

Climate Action Plan Context

Peer Benchmarking

Next Steps & Idea Gathering

Objectives

- Celebrate Mason's climate progress
- Share the CAP process
- Understand CAP purpose
- Outline points of engagement

Panelists



Greg Farley

Director of University
Sustainability



Dr. Dann Sklarew

Professor,
Environmental Science
and Policy



Cameron Thomson

Associate Principal, Arup



Linda Toth

Associate, Arup



Gregory Janks

Co-founder, Dumont
Janks

Mason Climate Action History



THE GLOBAL GOALS
For Sustainable Development

7 RENEWABLE
ENERGY



13 CLIMATE
ACTION



Mason's Climate Commitments

2007: Pres. Merten signs [Second Nature Climate Commitment](#) (ACUPCC)
→ carbon neutrality by 2050

2007: Board of Visitors pledges LEED Silver+ standard for new buildings.

2010: 1st Climate Action Plan (CAP) → -50% energy intensity & -20% net GHG by 2020

2014: Natural resource stewardship as core value in 2024 Strategic Plan

2015: Pres. Cabrera signs White House's American Campuses Act on Climate initiative.

2019: Pres. Holton re-commits to carbon neutrality by 2050 + new CAP w/benchmarks.
at student-led 'Fridays for Future' climate change rally.

2020: Pres. Washington signs "America Is Still In." >1,500 orgs for US net-zero by 2050.

2022: Renewable to power 30% of VA government electricity, per VA EO 43 (2019).



THE GLOBAL GOALS
For Sustainable Development

7 RENEWABLE
ENERGY



13 CLIMATE
ACTION



Mason's Follow Through

2007: Office of Sustainability launched, in part, to pursue ACUPCC.

2008: 1st annual Greenhouse Gas (GHG) Inventory.

2009: \$16.7 mil. for energy & water efficiency saves \$2.5 mil./yr.

2009: Capital projects drop yearly GHGs by 20,505 metric tons.

2010: 1st Climate Action Plan

2011: Transportation Master Plan w/alternative transport focus

2013: Environmental Standards added to Design Info. Manual

2014: New facility energy management system saves \$\$\$\$.

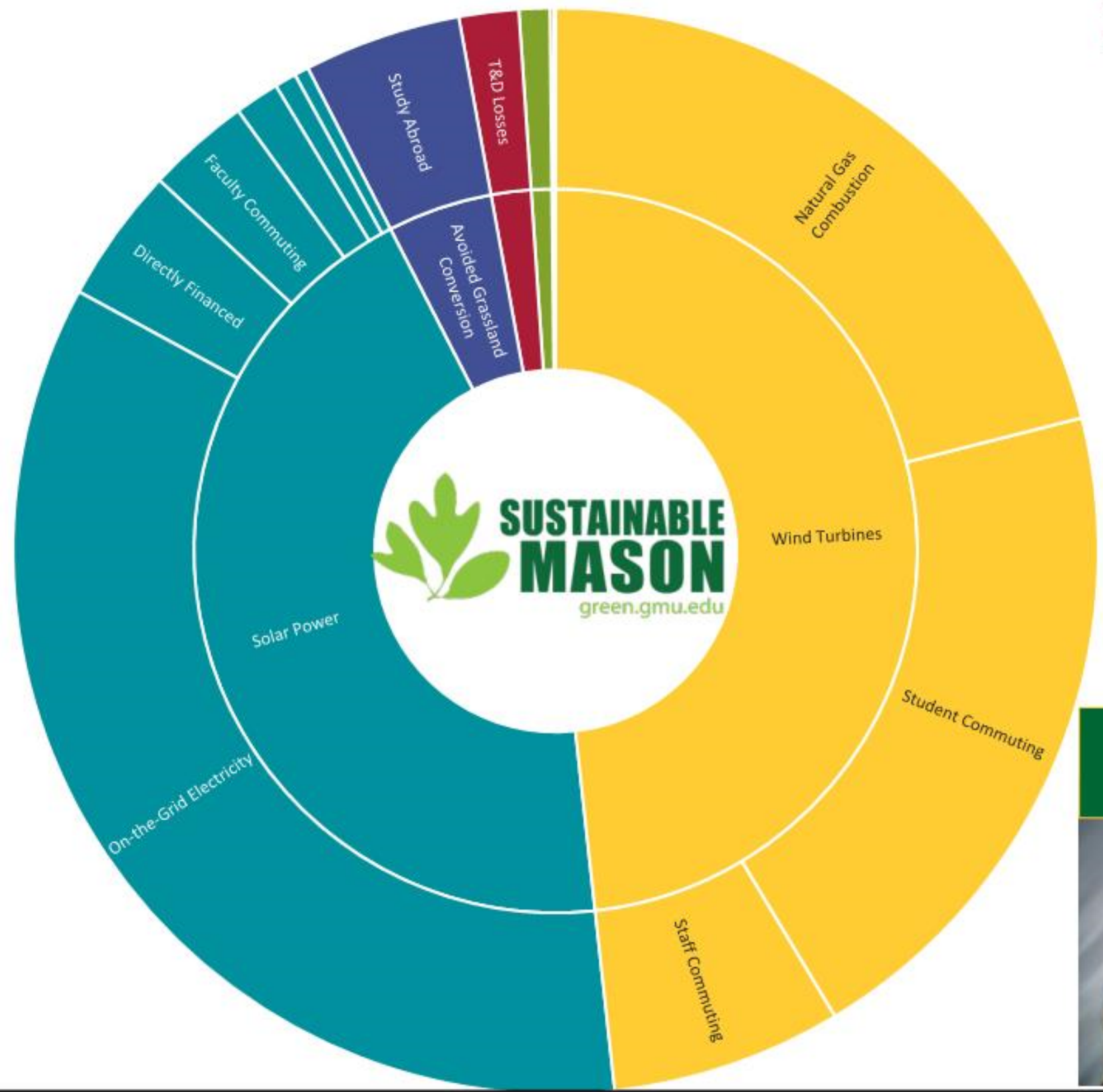
2020: ~90,000 square feet converted to LEDs.

2021: Climate Neutrality Task Force launch for Phase 1 CAP in 2022



Mason Students' Climate Rally (2019)

Students' Top Strategy to Reach Carbon Neutrality by 2030



- Wind Turbines
- Solar Power
- Avoided Grassland Conversion
- Conversion of Cropfields to Grassland
- On-Campus Afforestation
- Renewable Natural Gas
- Forest Preservation

Climate Champion



Suzanne Grand Pré, lead author, students' Climate Action Plan 2021 (> 500 pages!)

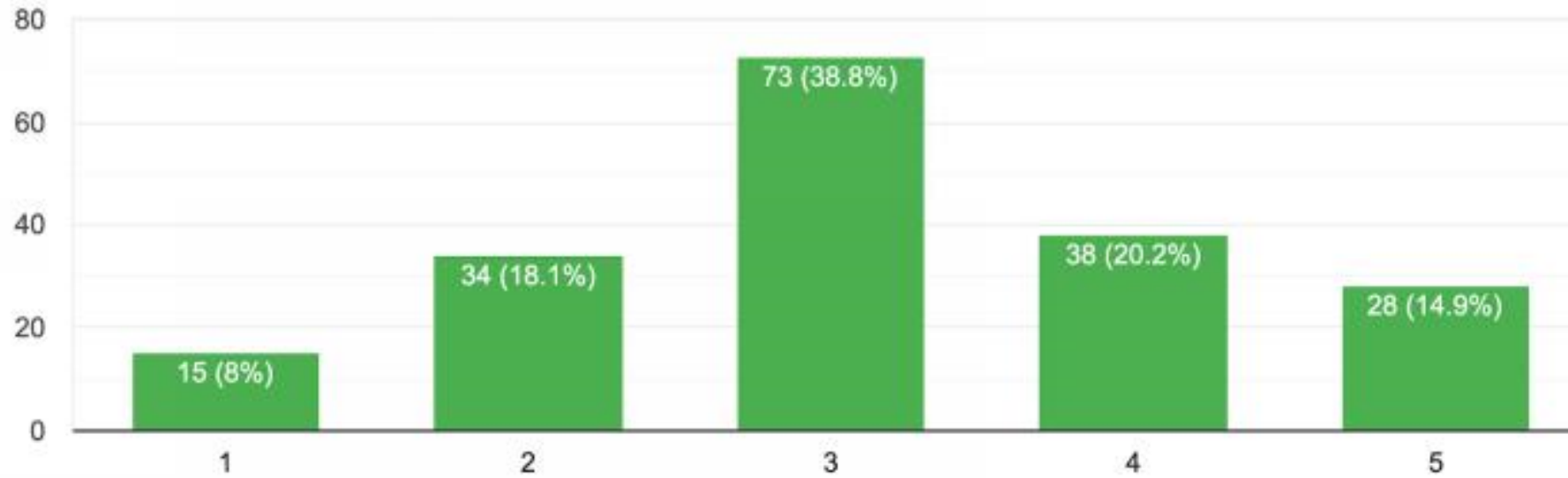
1. **Carbon Neutrality by 2030**
(est. \$ < 1% of Mason budget/y x 10 y)
2. **Net Zero GHG Emissions by 2040**
3. **Carbon Sink for GHGs by 2050**

Undergrads Survey 188 Peers

(Nov. 13, 2021)

How likely are you to get involved with the university's climate plan?

188 responses

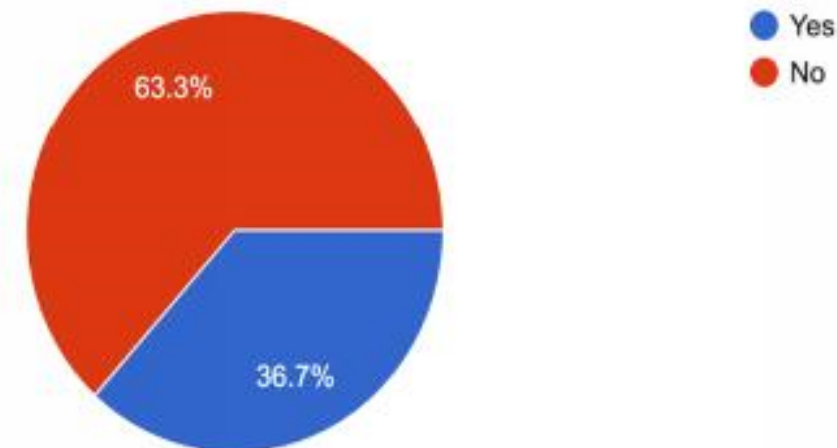


66+ Climate Champions!



Are you aware of any actions on Mason's campus which could be better done to promote climate action?

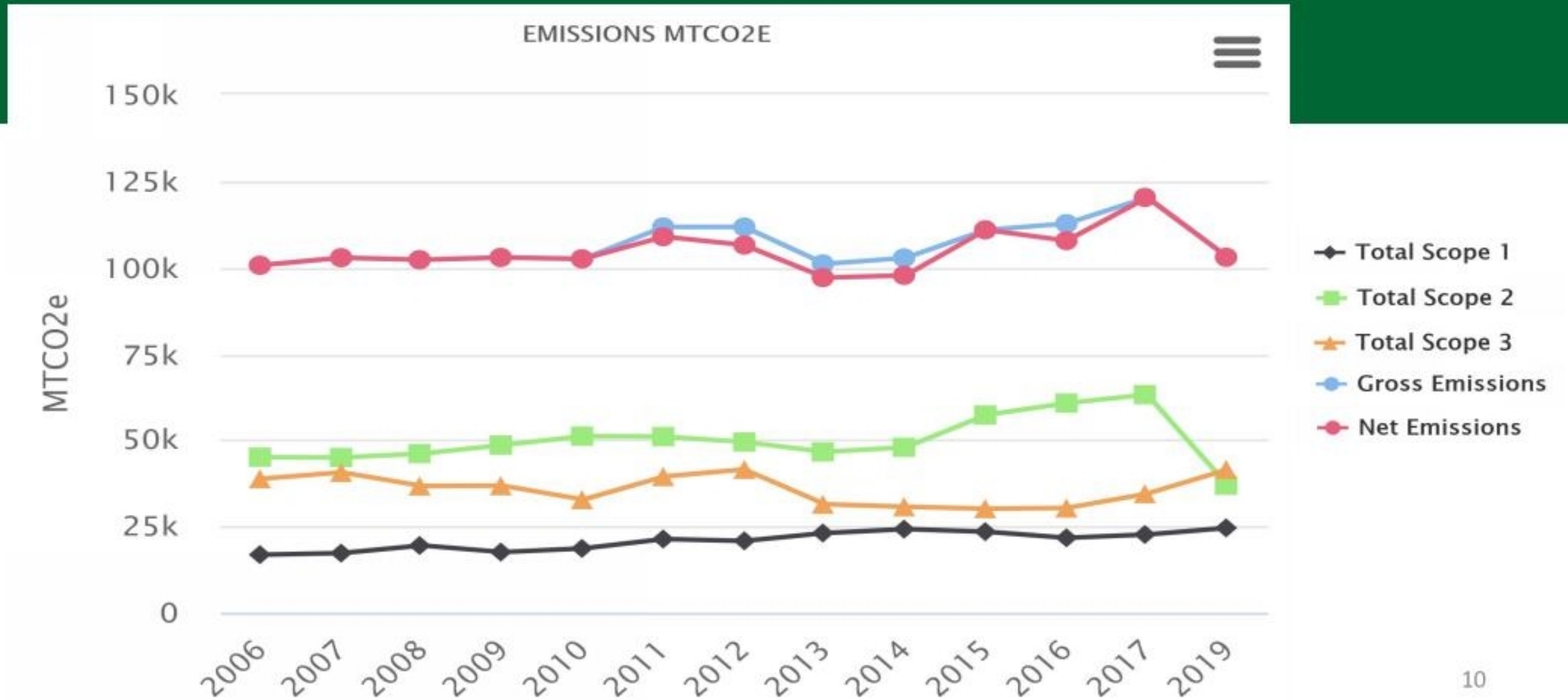
188 responses



Source: Kyle Ellingsen, Olivia Garcia & Laura Scudder (EVPP 480)

Mason's Carbon Footprint

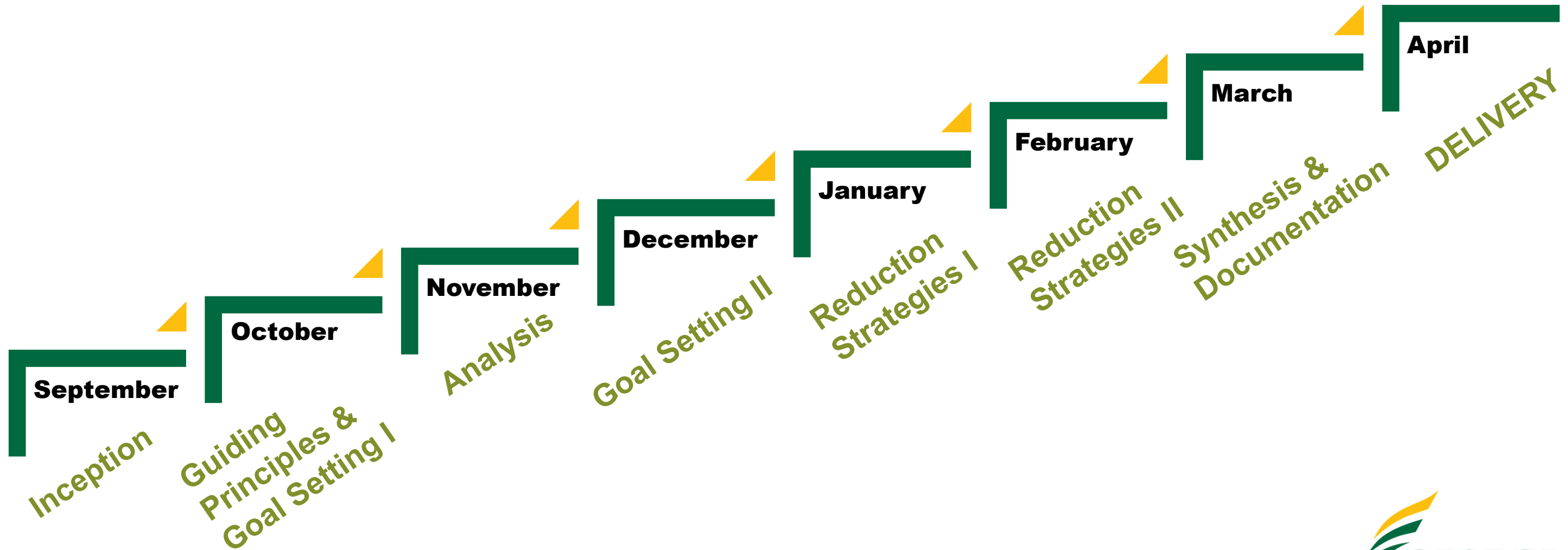
FY2006 – FY2019 (grew w/enrollment)



CAP Process

Climate Action Planning Timeline

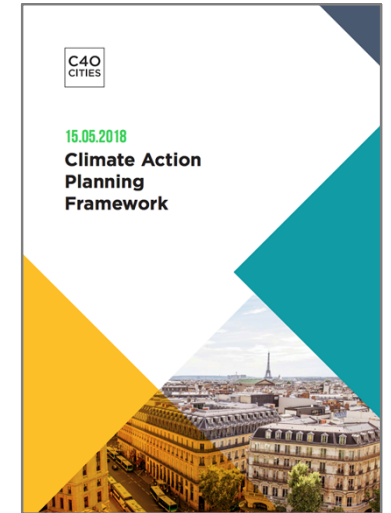
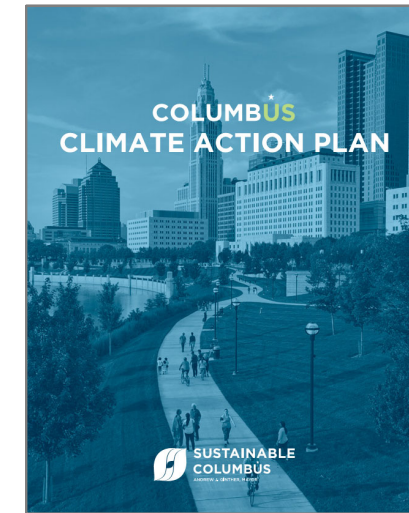
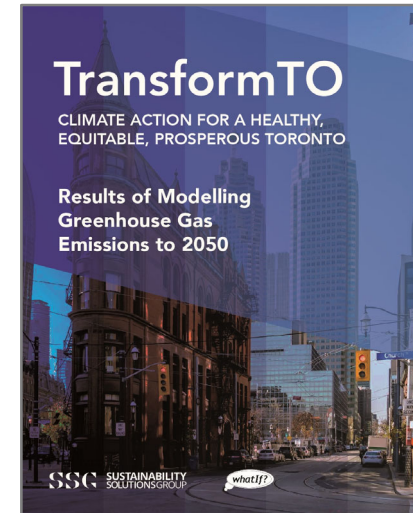
Phase I: September 2021 to April 2022



Phase II: April 2022 and forward



What is a Climate Action Plan?



#1

Baseline Inventory



#2

Adopt Target



#3

Forecast Emissions



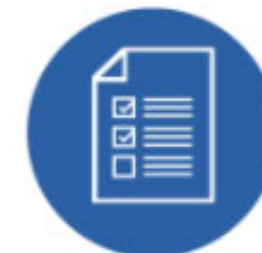
#4

Strategy Selection



#5

Funding & Implementation



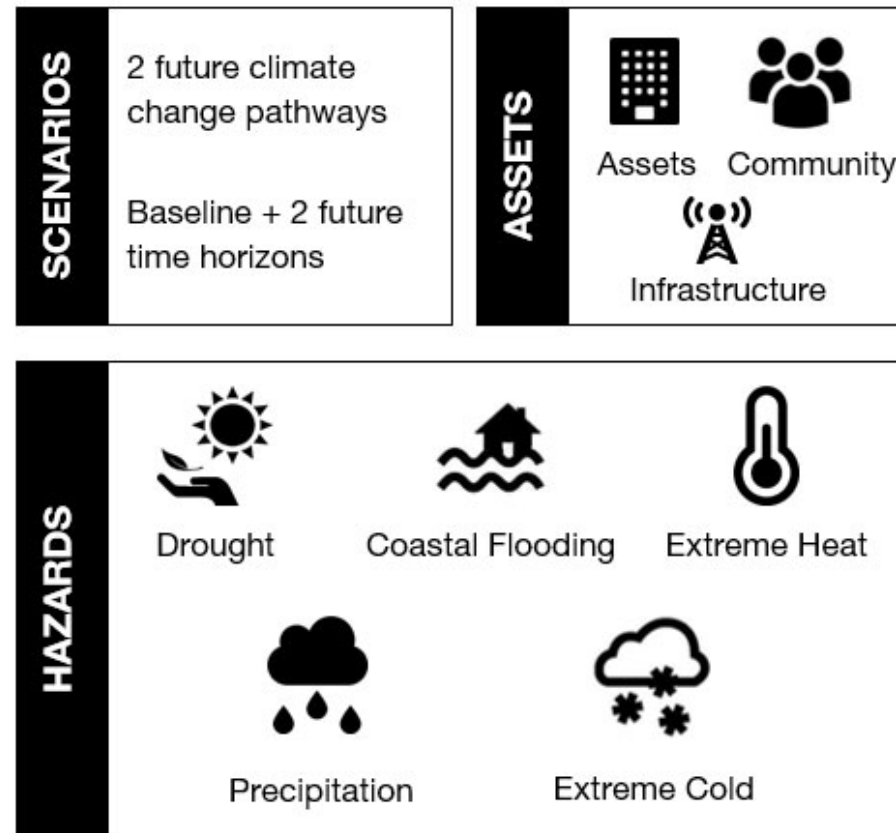
#6

Monitor & Track Progress

Climate Resilience

- What are the climate Risks?
- What are Mason's vulnerabilities?
- Other exacerbating factors?
- Impacts?
- High level adaptation measures

Climate Vulnerability Assessment



EPA August 2016
EPA 430-F-16-048

What Climate Change Means for Virginia

Virginia's climate is changing. Most of the state has warmed about one degree (F) in the last century, and the sea is rising one to two inches every decade. Higher water levels are eroding beaches, submerging low lands, exacerbating coastal flooding, and increasing the salinity of estuaries and aquifers. The southeastern United States has warmed less than most of the nation. But in the coming decades, the region's changing climate is likely to reduce crop yields, harm livestock, increase the number of unpleasantly hot days, and increase the risk of heat stroke and other heat-related illnesses.

Our climate is changing because the earth is warming. People have increased the amount of carbon dioxide in the air by 40 percent since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places—but contributes to drought in others.

Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed about one degree during the last 80 years. Warming is causing snow to melt earlier in spring, and mountain glaciers are retreating. Even the great ice sheets on Greenland and Antarctica are shrinking. Thus the sea is rising at an increasing rate.

Rising Seas and Retreating Shores

Sea level is rising more rapidly along Virginia's shores than in most coastal areas because the land is sinking. If the oceans and atmosphere continue to warm, sea level along the Virginia coast is likely to rise sixteen inches to four feet in the next century.

Oceanfront houses in Virginia Beach are vulnerable to severe storms, flooding, and coastal erosion. © James G. Titus; used by permission.

As sea level rises, the lowest dry lands are submerged and become either tidal wetland or open water. The freshwater wetlands in the upper tidal portions of the Potomac, Rappahannock, York, and James rivers build their own land by capturing floating sediments, and they are likely to keep pace with the rising sea during the next century. But most salt marshes along the brackish portions of those rivers and along Chesapeake Bay are unlikely to keep pace if sea level rises three feet. The wetlands of Back Bay and the North Landing River are even more vulnerable and may be lost if the sea rises two feet. Beaches also erode as sea level rises. A higher ocean level makes it more likely that storm waters will wash over a barrier island or open new inlets. The United States Geological Survey estimates that Virginia's barrier islands could be broken up by new inlets or lost to erosion if sea level rises two feet by the year 2100. Beach erosion will threaten the oceanfront portion of Virginia Beach, unless people take measures to offset the erosion. Rising sea level also threatens bay beaches and tidal flats.

Saltwater Intrusion

As sea level rises, salt water can mix farther inland or upstream in bays, rivers, and wetlands. Because water on the surface is connected to ground water, salt water can also intrude into aquifers near the coast. Soils may become too salty for farms or forests. For example, some of the freshwater swamps along the York River's tidal tributaries have standing dead trees that were killed by saltwater intrusion made possible by rising sea level.

Rising temperatures in the last century. The eastern half of Virginia has warmed more than the western half. Source: EPA, Climate Change Indicators in the United States.

Sustainability and Climate Action

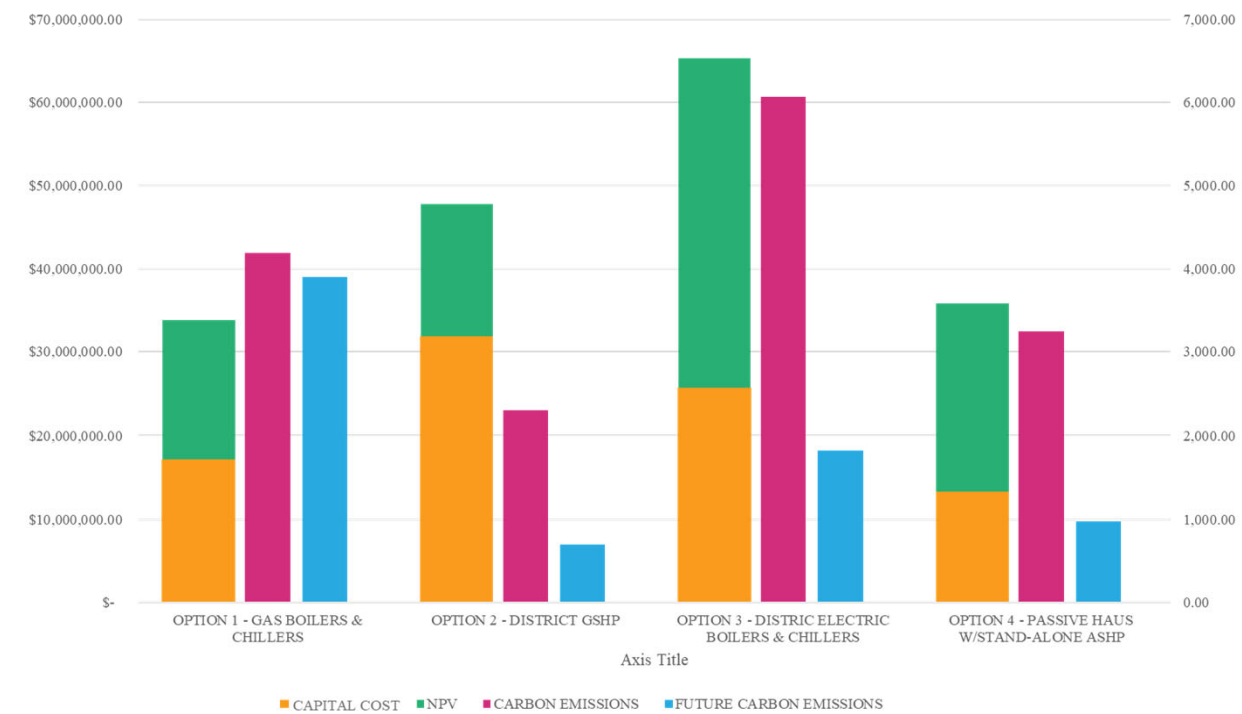


SUSTAINABLE
DEVELOPMENT
GOALS

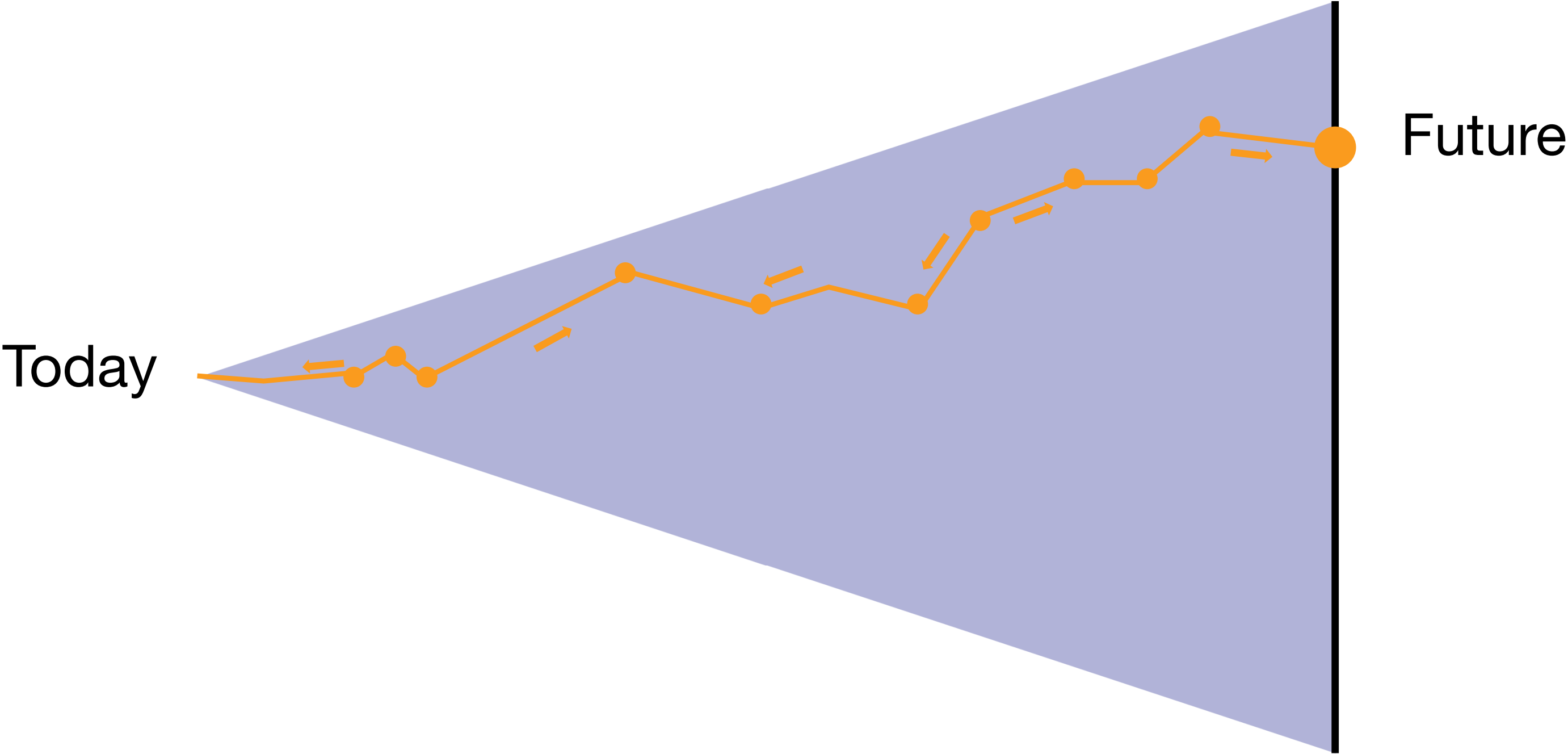
Masterplan Integration

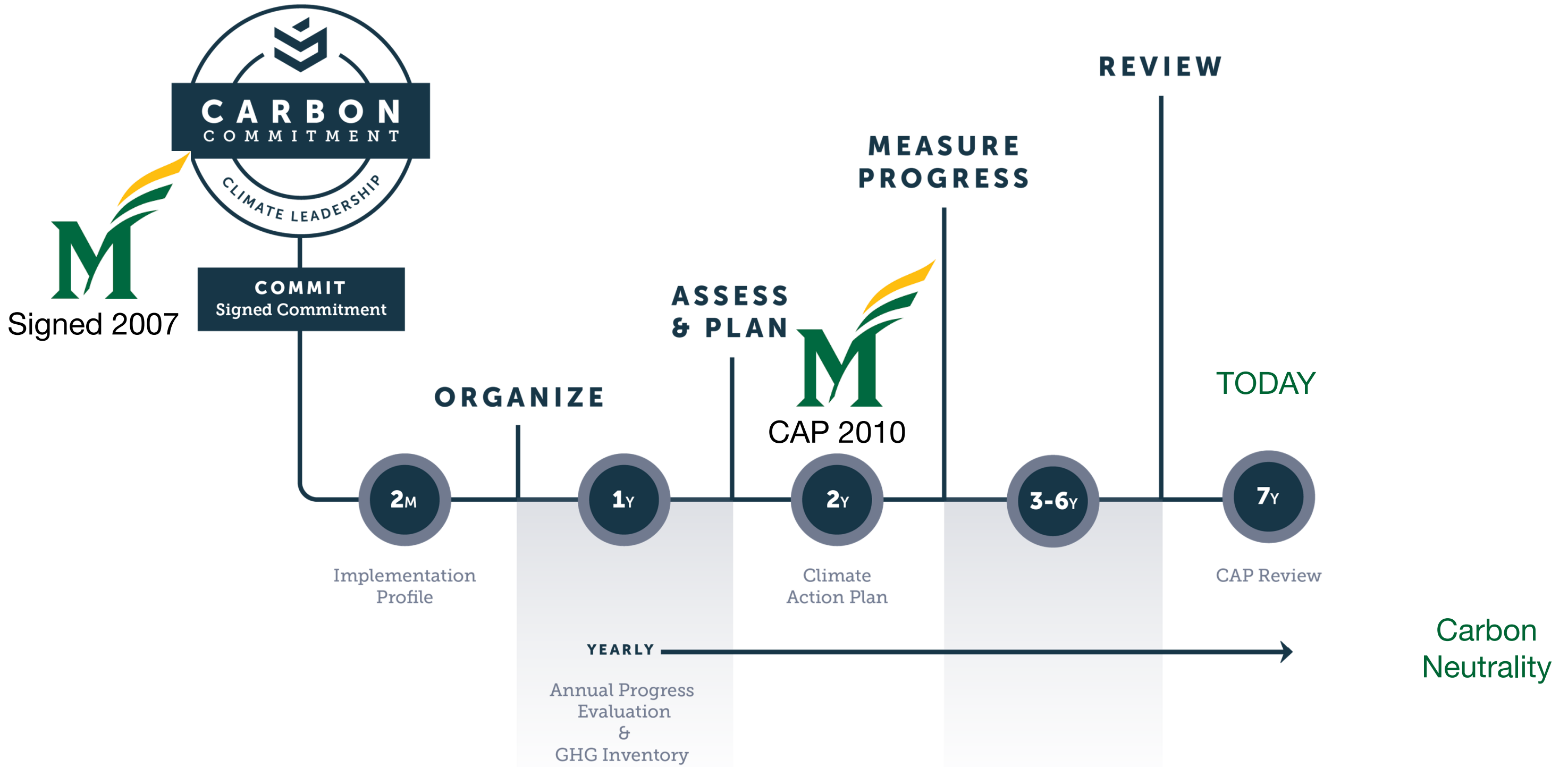


Total NPV vs. Carbon Emissions



Creating a Roadmap

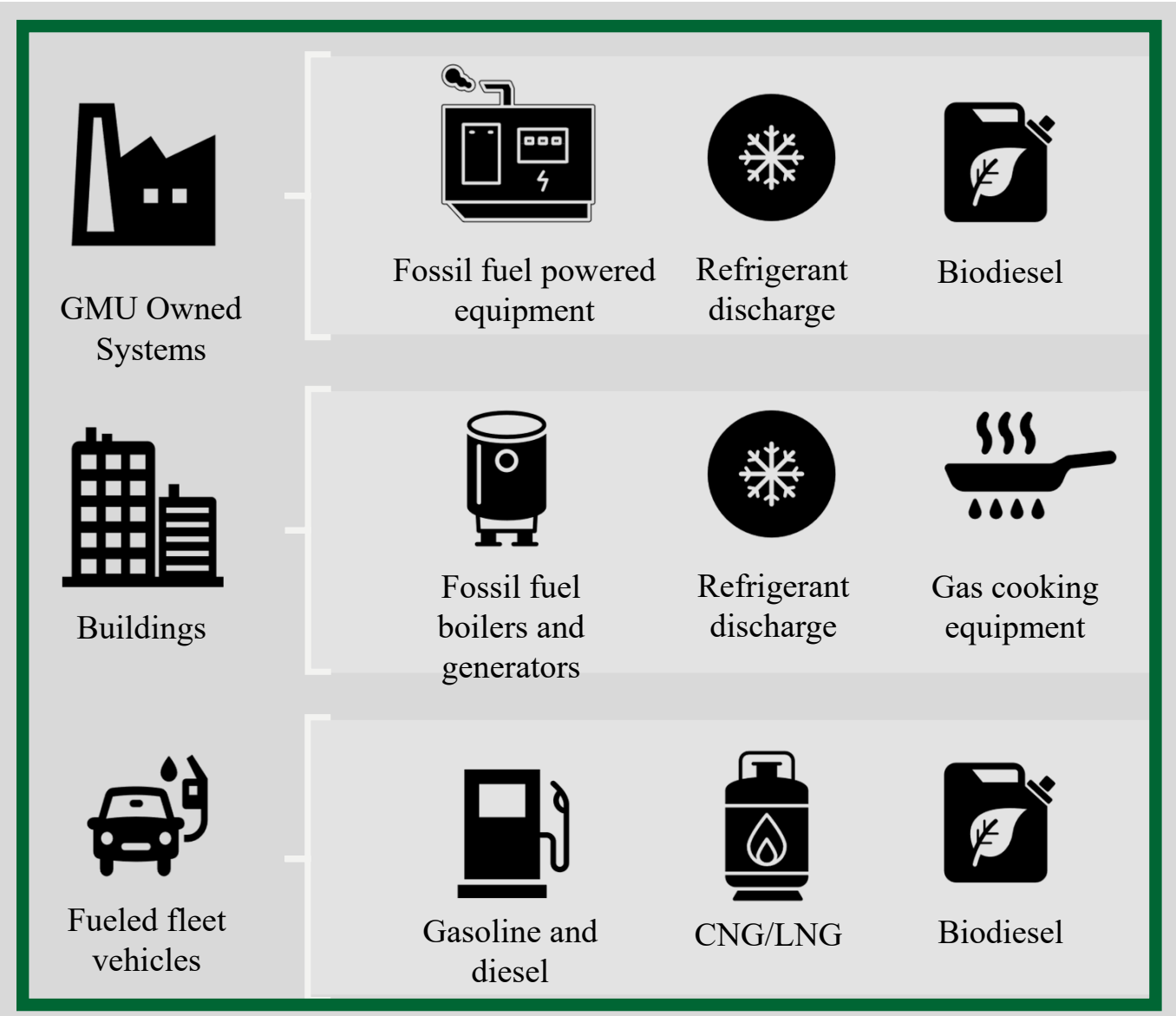




Emission Scopes

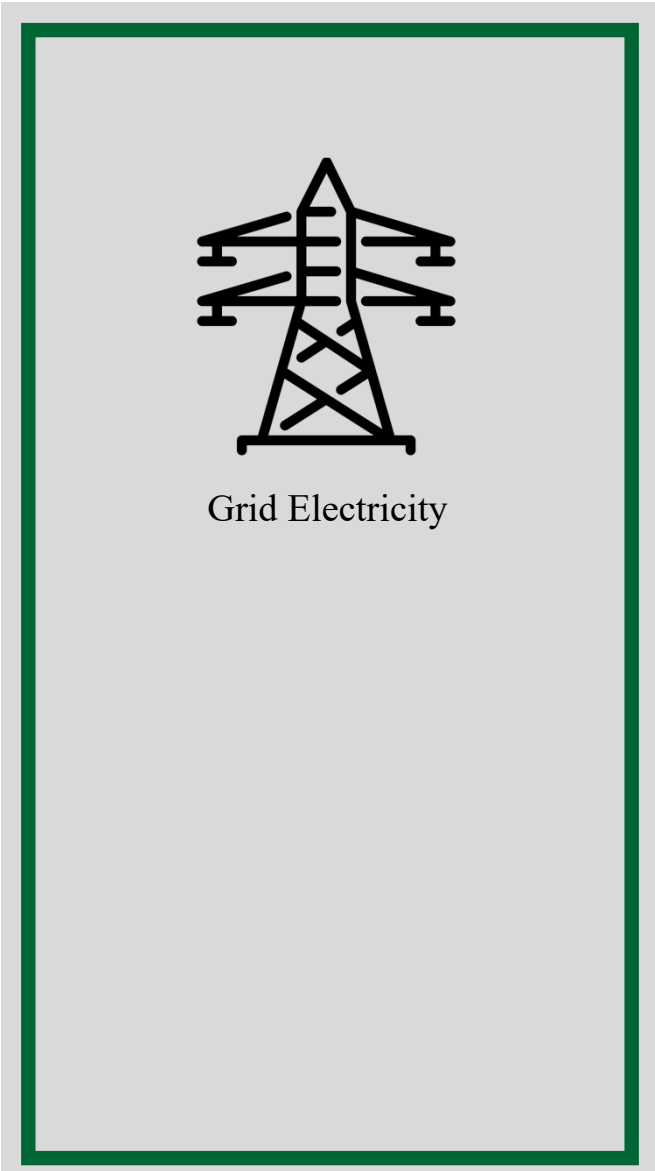
Scope 1

Emissions from sources owned / controlled by the University



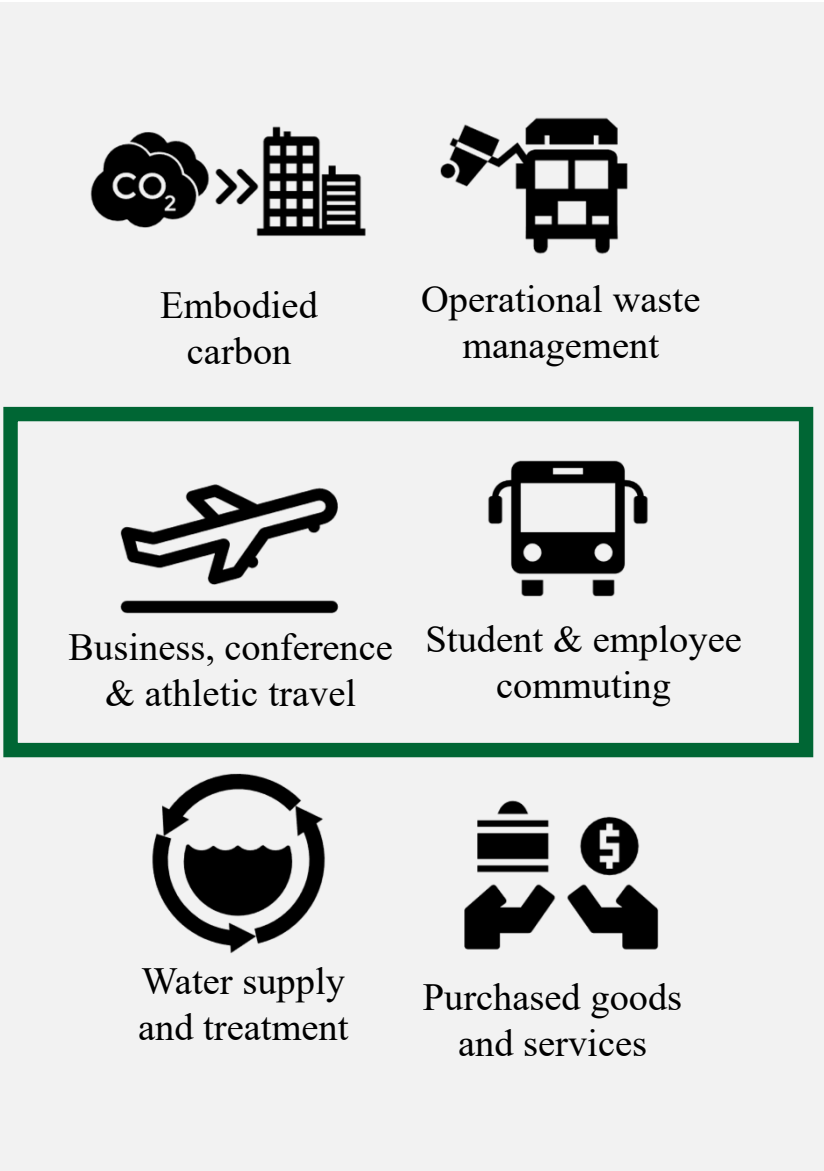
Scope 2

Indirect emissions from utilities purchased by the University



Scope 3

University emissions from activities which sources are not owned / controlled by the University



Included in Second Nature Carbon Commitment

GHG Emissions Definitions

Carbon Neutrality

Carbon neutrality is defined as having no net greenhouse gas (GHG) emissions, to be achieved by either;

- a. eliminating net GHG emissions, or
- b. by minimizing GHG emissions as much as possible and using carbon offsets or other measures to mitigate the remaining emissions.

Second Nature – The Presidents' Climate Leadership Commitments
<https://secondnature.org/signatory-handbook/frequently-asked-questions/>

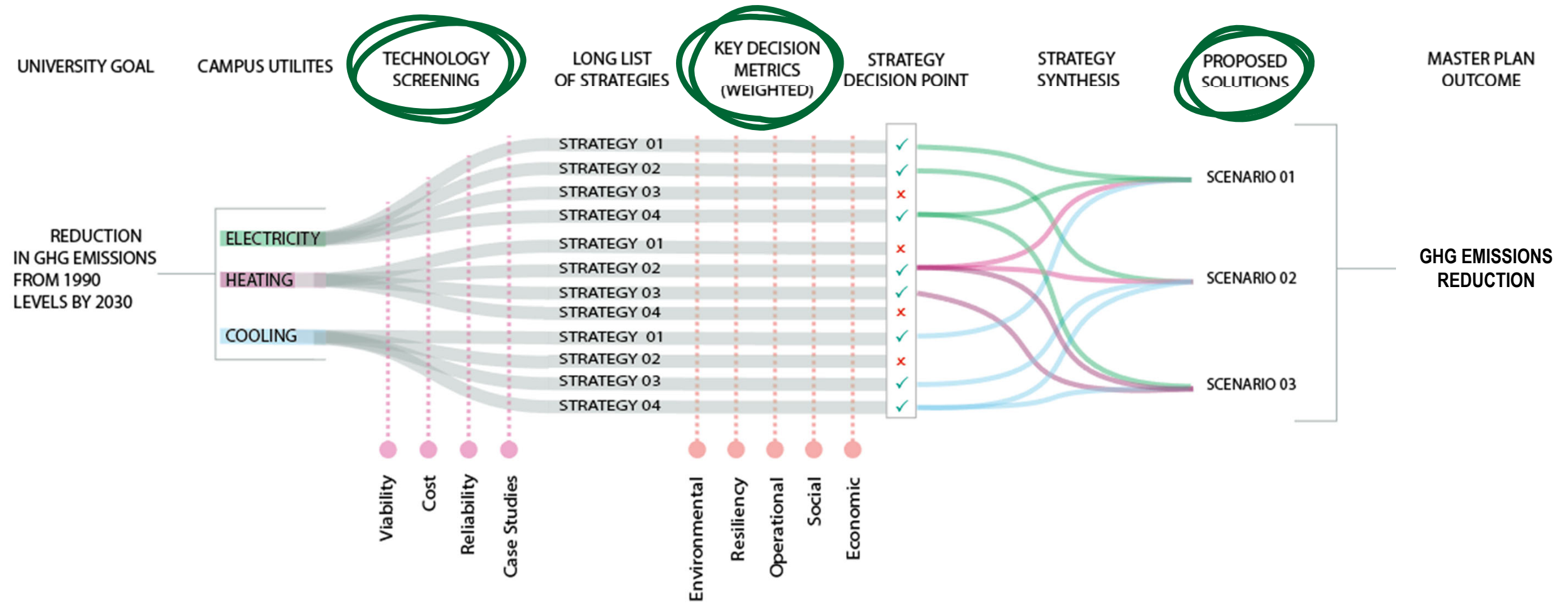
Zero Emissions / Fossil Fuel-Free / Zero Operational Carbon

No burning fossil fuels on-site (scope 1) and no use of utilities generated using fossil fuels (scope 2) to result in zero emissions associated with campus energy consumption.

Net-Positive / Carbon Negative

Reduce the overall emission of CO₂e by removing more CO₂e from the atmosphere than campus requires for its own energy consumption.

CAP strategy and evaluation criteria



Climate Action Planning Context

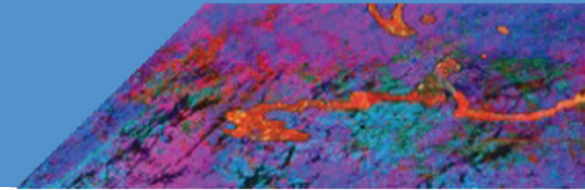
The Climate Emergency



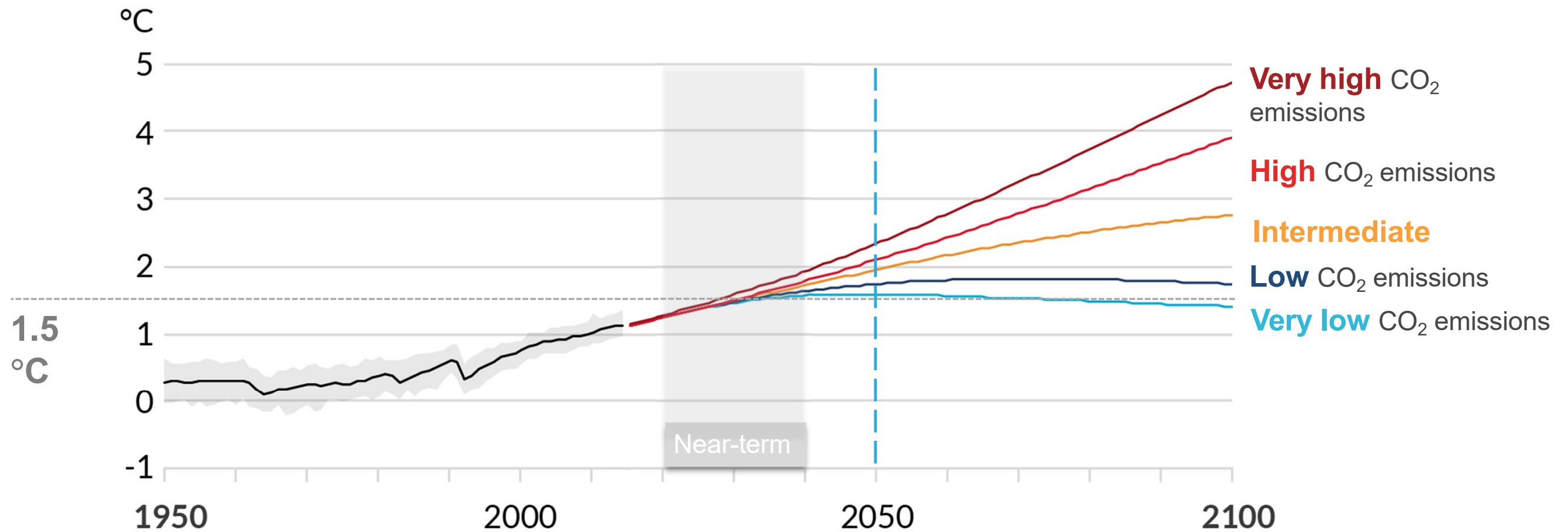
IPCC Sixth Assessment Report

Same goal from Paris agreement, but now outlined as best case scenario

But we are on a 2-3 deg trajectory



Future emissions cause future additional warming



Not a lot of new info,

➔ but is said with more urgency

➔ but the effects are more visible

➔ but the emissions have grown

Virginia Energy and Carbon context

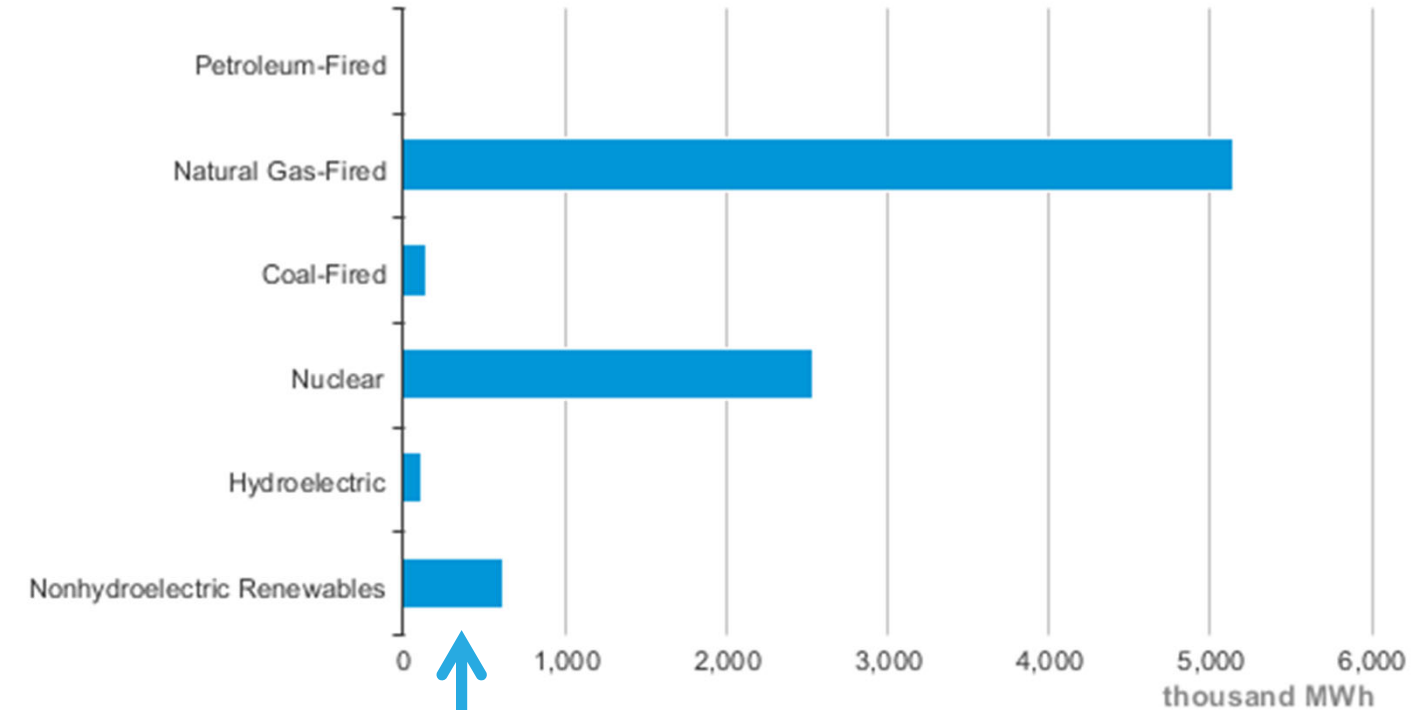
VA Clean Economy Act, 2020

- 30% renewable energy generation x 2030
- 100% carbon free energy generation x 2045
- Joined Regional Greenhouse Gas Initiative (RGGI) placing price on carbon

VA Clean Energy & Community Flood Preparedness, 2020

- Address recurrent flooding areas
- Supports low-income energy efficiency
- Enables CO2 cap and trade

Virginia Net Electricity Generation by Source, Jun. 2021



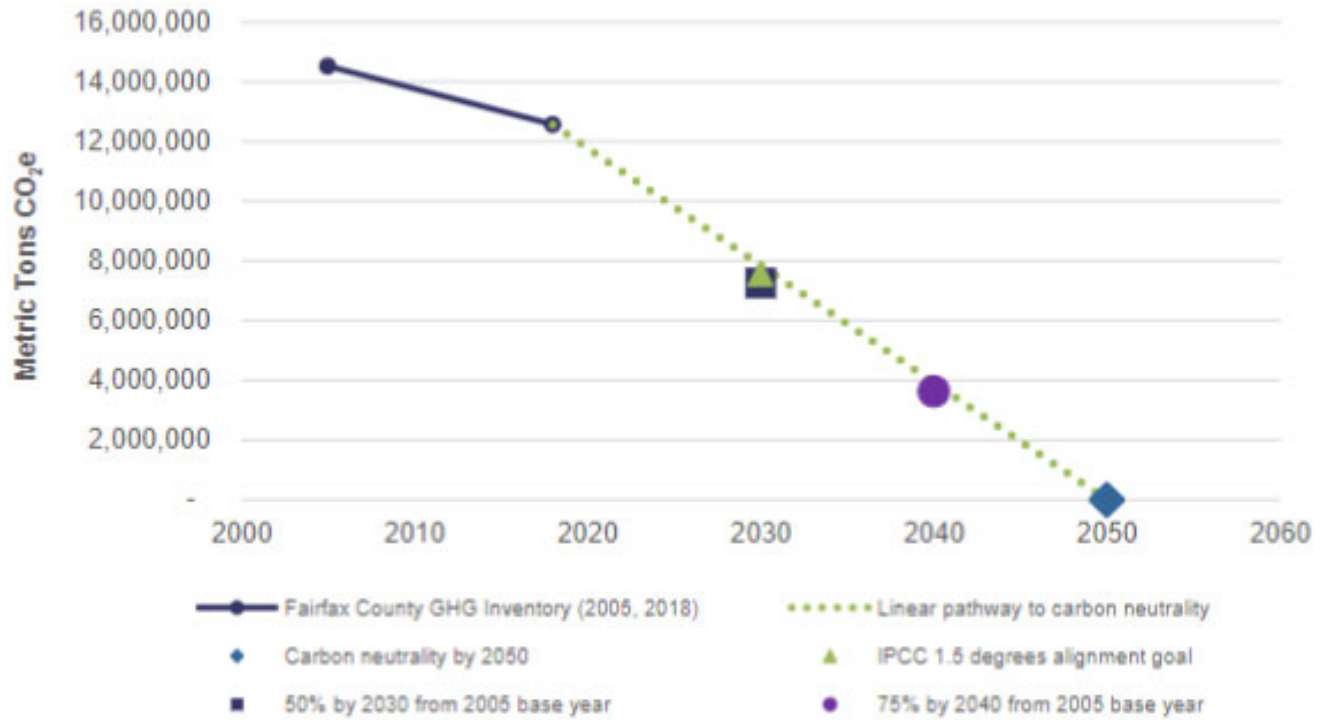
eia Source: Energy Information Administration, Electric Power Monthly

MAJORITY BIOMASS!

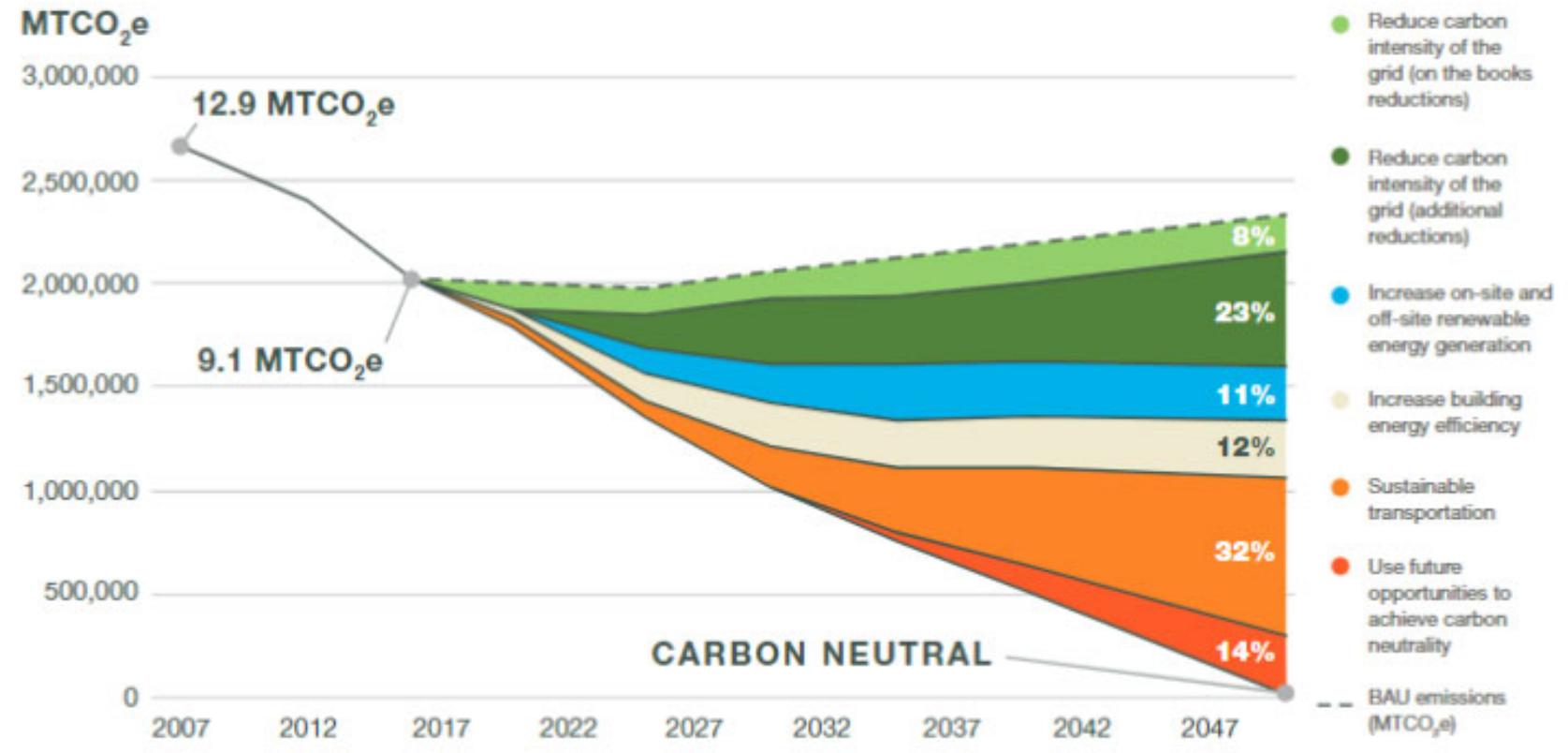
County Commitments



Fairfax County Climate Action Plan

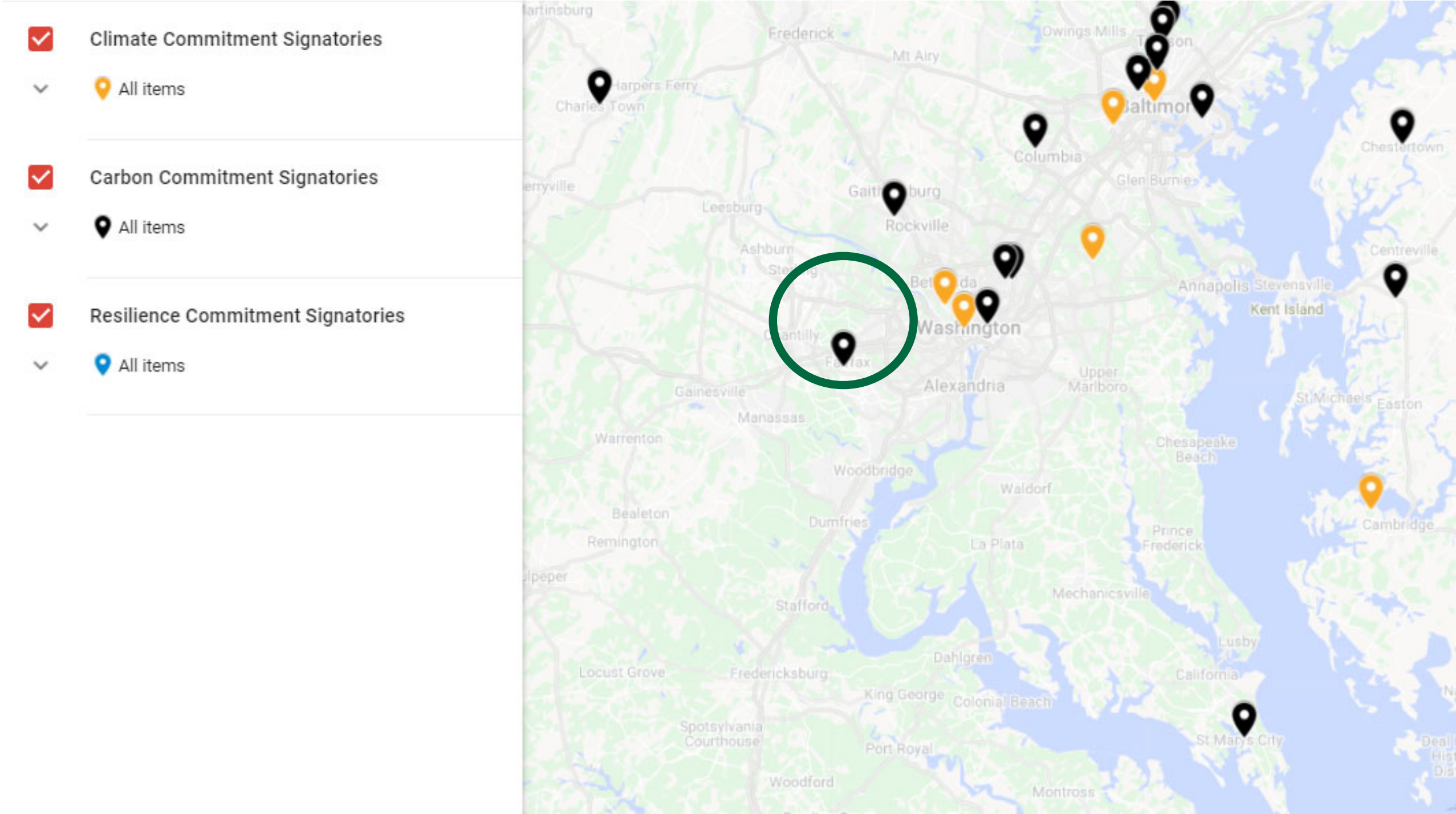


Arlington County Climate Action Plan



Peer Benchmarking

Second Nature Climate Leaders



American University

American University is the largest post-secondary educational institute in the U.S. **to achieve carbon neutrality** - “*net-zero GHG emissions*” - in 2018, 2 years ahead of their goal

Carbon Neutrality Strategies

1. **Reduction:** Reduced overall energy use per square foot by **21% since 2005**; **6 LEED** certified buildings
2. **Renewables:** 100% of AU's electricity comes from a renewable source (on-site solar, solar farm in North Carolina, RECs)
3. **Carbon Offsets:** Efficient wood-burning cookstoves in Kenya, wind power from India to match commuting emissions, capturing landfill gas, planting local trees in DC, and investing in efficient trucking

2021-2026 Climate Action Plan Goals

1. **Engagement** Sustainability Courses Student Wellness Integration of Environmental Justice
2. **Environment** Achieve 35% above ASHRAE standards Establish construction standards for renewable energy
3. **Administration** The Sustainability Advisory Committee will continue to review sustainability progress

Arizona State University

Through its *Global Institute of Sustainability and Innovation*, ASU commits to carbon neutrality by 2035 with 20% GHG emission reduction left.

Climate Action Strategies

Renewable Energy



Campus Solarization Program with over 50 MW_{dc} equivalent solar generating capacity development from both on-site and off-site components.

Green Building Design



ASU is committed to **LEED Silver certification** for all new construction of university-owned and operated buildings. As of May 2021, ASU has seven Platinum, 33 Gold, 24 Silver, and one certified LEED Building Certifications.

Transportation



ASU provides rental bikes to students at no cost and access to fuel efficient rental vehicles in partnership with Zipcar.

Carbon Offsets



Local tree planting in collaboration with Phoenix, Scottsdale and Tempe.

George Washington University

Commitment

- Carbon neutral by 2040 through a limited use of carbon offsets
- GW also aspires to remove all the historical greenhouse gas emissions the university has produced since its founding in 1821

Progress

- **Capital Partners Solar Project** - North Carolina renewable energy project that provides 53.5 MW of solar power for GW, American University and the George Washington University Hospital (GWUH). Provides ~50% electric demand.
- **Eco Building Program** - installing more modern and efficient equipment in selected buildings on-campus to reduce energy and water use, operating costs, and greenhouse gas emissions

Goals in the *GW Progress Report 2018*



GOAL 1

Strengthen habitat and optimize natural space



GOAL 2

Promote healthy air and climate



GOAL 3

Foster clean and abundant fresh water



GOAL 4

Support sustainable food production systems



GOAL 5

Optimize waste decomposition and treatment



GOAL 6

Encourage a connection to the natural environment



GOAL 7

Develop sustainable investment strategies.

Targets & Commitments: Benchmarking



Microsoft

	1	2	3	4	5	7	8	9	10	11
Organization	ASU	GW	American U	UVA	Harvard	Fairfax County	Arlington County	Google	Amazon	Microsoft
End Target	Carbon neutral x 2035	Carbon neutral x 2040	Carbon neutral x 2020	Fossil fuel free x 2050	Fossil fuel free X 2050	Carbon neutral x 2050	Carbon neutral x 2050	Carbon free x 2040	Net zero carbon x 2040	Carbon negative x 2030
Interim Target	-	40% reduction x 2025	-	Carbon neutral x 2030	Fossil fuel neutral x 2026	1.5 deg aligned by 2030	-	-	-	-
Emissions Reduction Target (scope 1 & 2)	80%	80%	ND	ND	100%	ND	ND	100%	ND	100%
Includes Scope 3 Emissions		○	●						○	●
Utilizes Purchased Offsets	●	●	●	ND	Interim only		●	●	●	●
Fossil Fuel-Free Operation				●	●			●	●	●

- Yes
- Partial
- ND Not defined

Next Steps

CAP Progress

Review
ongoing

Next
action



#1

Baseline
Inventory



#2

Adopt
Target



#3

Forecast
Emissions



#4

Strategy
Selection



#5

Funding &
Implementation



#6

Monitor & Track
Progress

Carbon Neutral

by...

2030?

2040?

2050?

Gathering Your Input

- Share climate action strategies and ideas today via Zoom
- Use the CAP website Contact Us form

<https://facilities.gmu.edu/resources/climate-action-plan/>

Climate Action Plan

[HOME](#) / [RESOURCES](#) / CLIMATE ACTION PLAN

Looking to the future... of Climate Action

Planning is essential to success, especially when we are already experiencing the initial impacts of global climate warming. In order for Mason to continue on our trajectory toward the "university of the future," we must be rigorous, consultative, and imaginative in formulating strategic climate actions reduce our contribution to global warming. We must identify data-informed opportunities to realize our values so that we can reduce greenhouse gas emissions.

George Mason University is accelerating action in response to the climate crisis by developing a new [Climate Action Plan](#) (CAP).

The CAP development is an initiative led by a partnership between [GMU Facilities](#) and the Mason Sustainability Council's [Carbon Neutrality Task Force](#). The [Mason Sustainability Council](#) is a group of academic and operational leaders from across the University that is tasked with developing and directing sustainability strategy, planning and action, and identifying opportunities that benefit research, curricular, and operational sustainability simultaneously.



JOIN

Meet the Task Force

View the Timeline

Document Library

Key Definitions

Townhalls

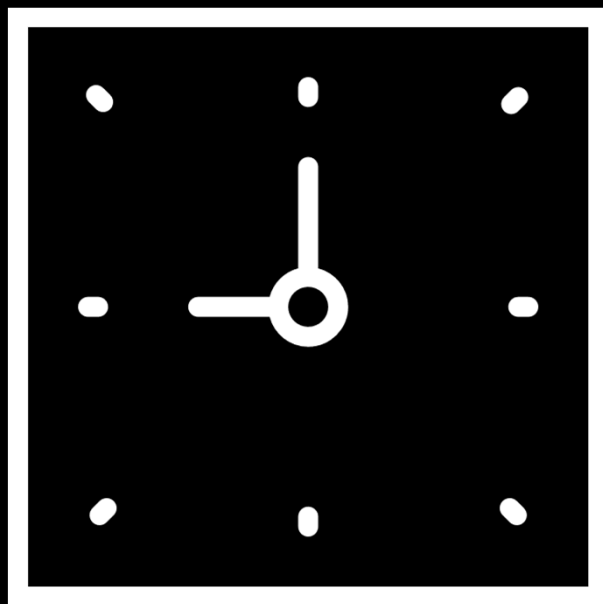
Contact Us

10 CLIMATE ACTION WINS at Mason in the last 11 years



Upcoming Town Hall Schedule

- Wednesday, December 15th
- Thursday, January 27th
- Friday, February 18th
- Wednesday, March 9th



Thank you!