



George Mason University

Climate Action Plan Town Hall

January 28th, 2022

Agenda

Brief Review of Climate Action Plan Process

Electric Grid Impacts

Future Trajectory Scenarios

Next Steps & Idea Gathering

Objectives

- Share the CAP progress
- Review levels of influence and control
- Understand different future scenarios
- Outline points of engagement

CAP Process



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.

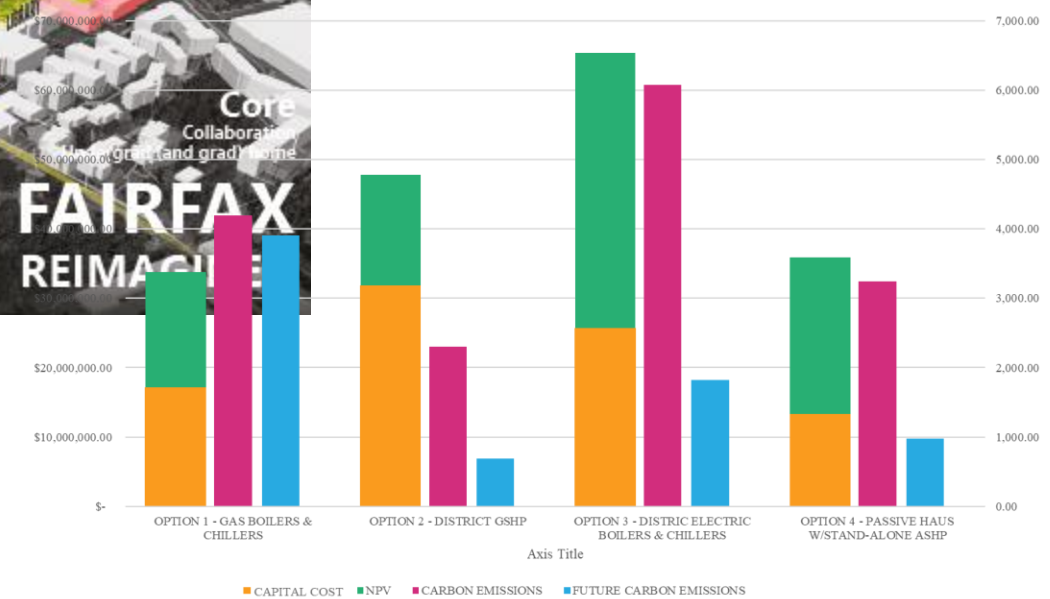
2022: Renewable to power 30% of VA government electricity, per VA EO 43 (2019).



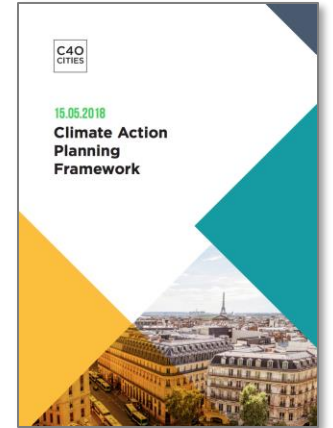
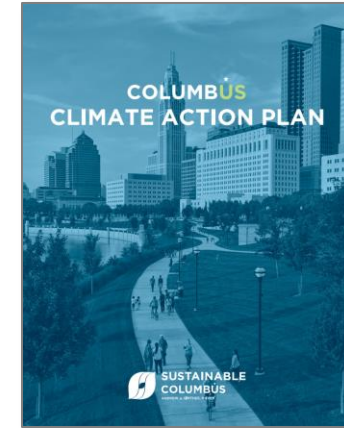
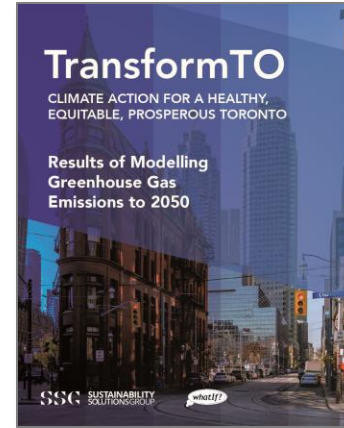
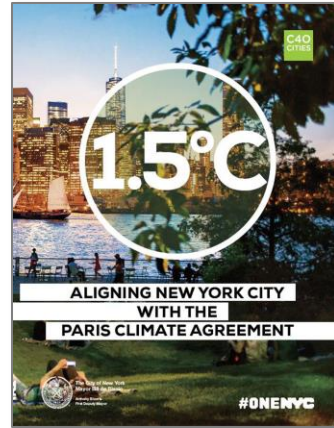
Mason Students' Climate Rally (2019)



Total NPV vs. Carbon Emissions



What is a Climate Action Plan?



#1

Baseline Inventory



#2

Adopt Target



#3

Forecast Emissions



#4

Strategy Selection



#5

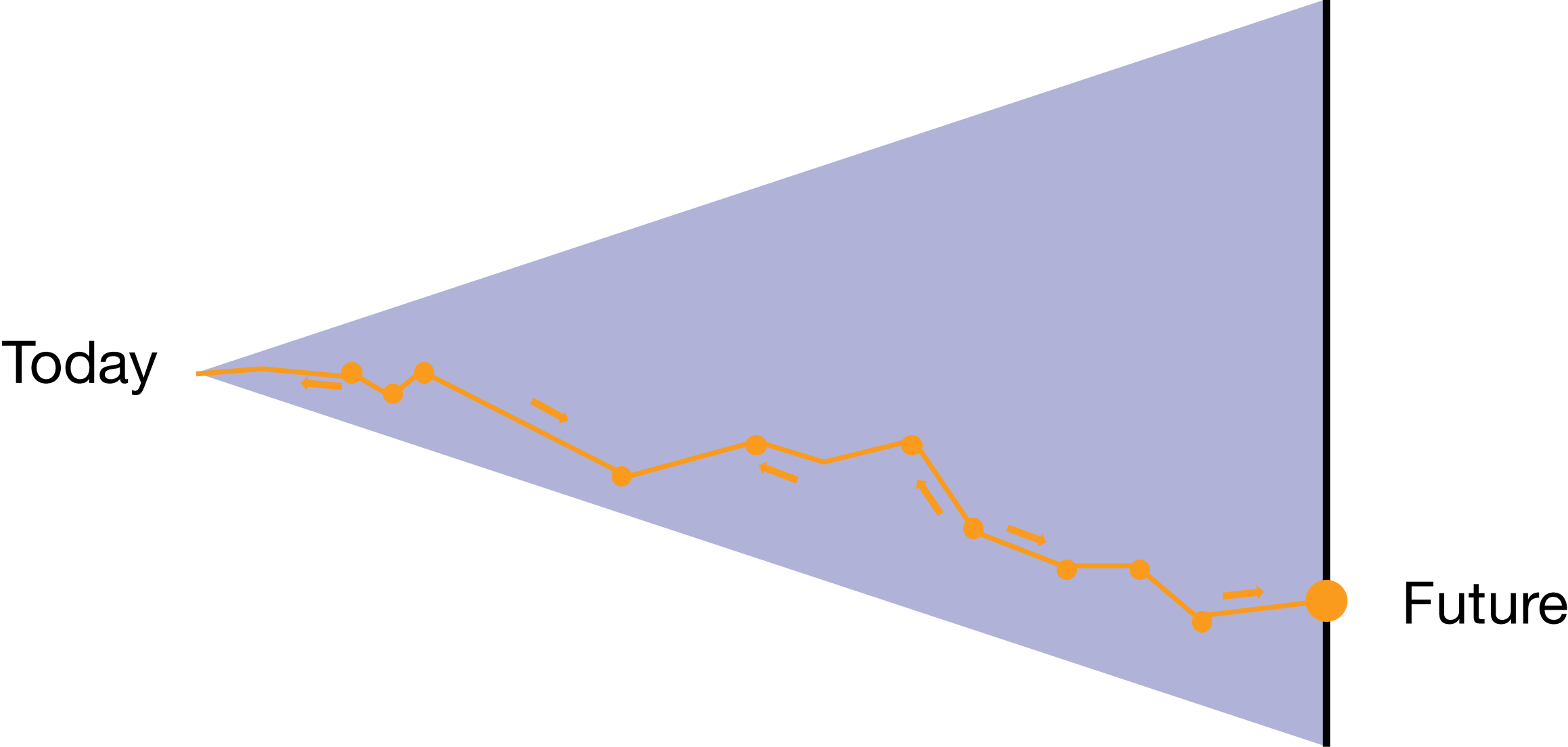
Funding & Implementation



#6

Monitor & Track Progress

Creating a Roadmap



GHG Emissions Definition

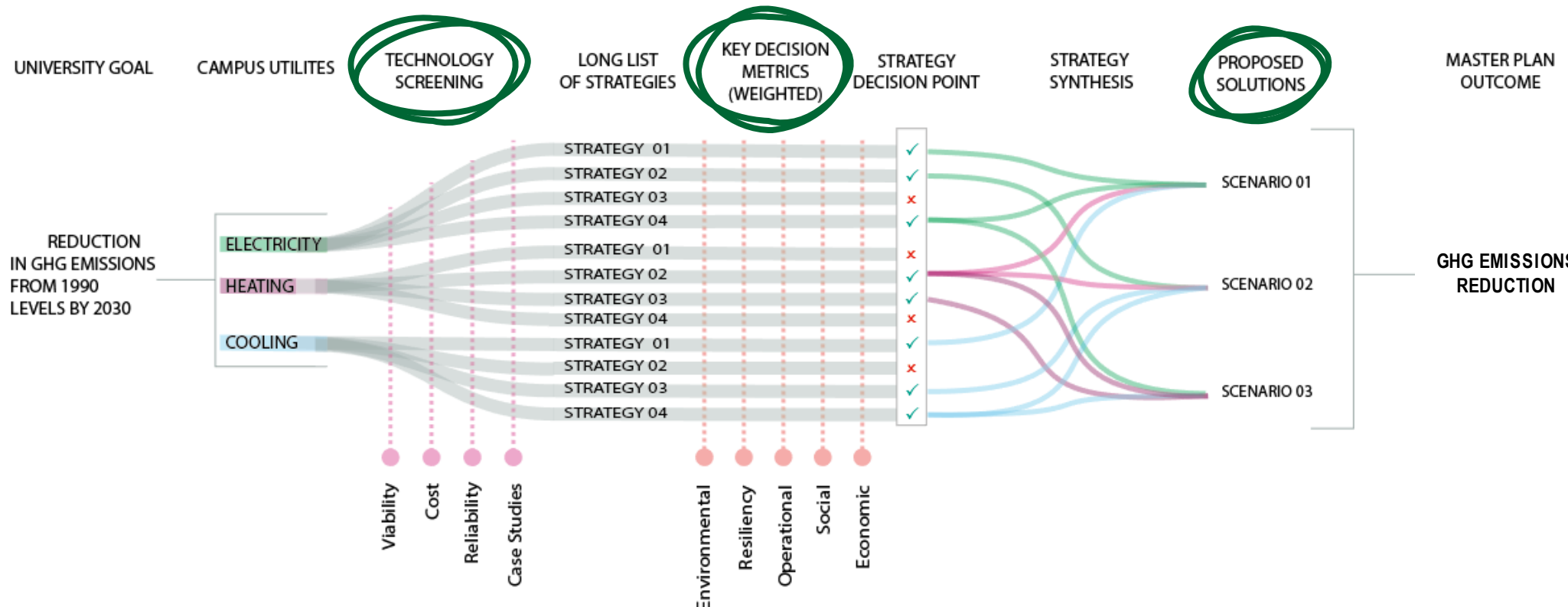
Carbon Neutrality

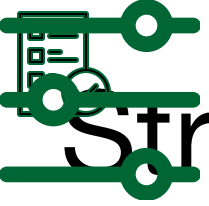
Carbon neutrality is defined as having no net greenhouse gas (GHG) emissions, to be achieved by either;

- 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/>

CAP strategy and evaluation criteria





Strategy Decision Making and Prioritization

Evaluation Criteria

Carbon / GHG reduction

Operational energy use

Water use

Capital costs

O&M costs

Co-Benefits

Economics / Job Creation

Resilience

Social Justice / Community Engagement

Environmental/Ecological

Education/Curriculum opps

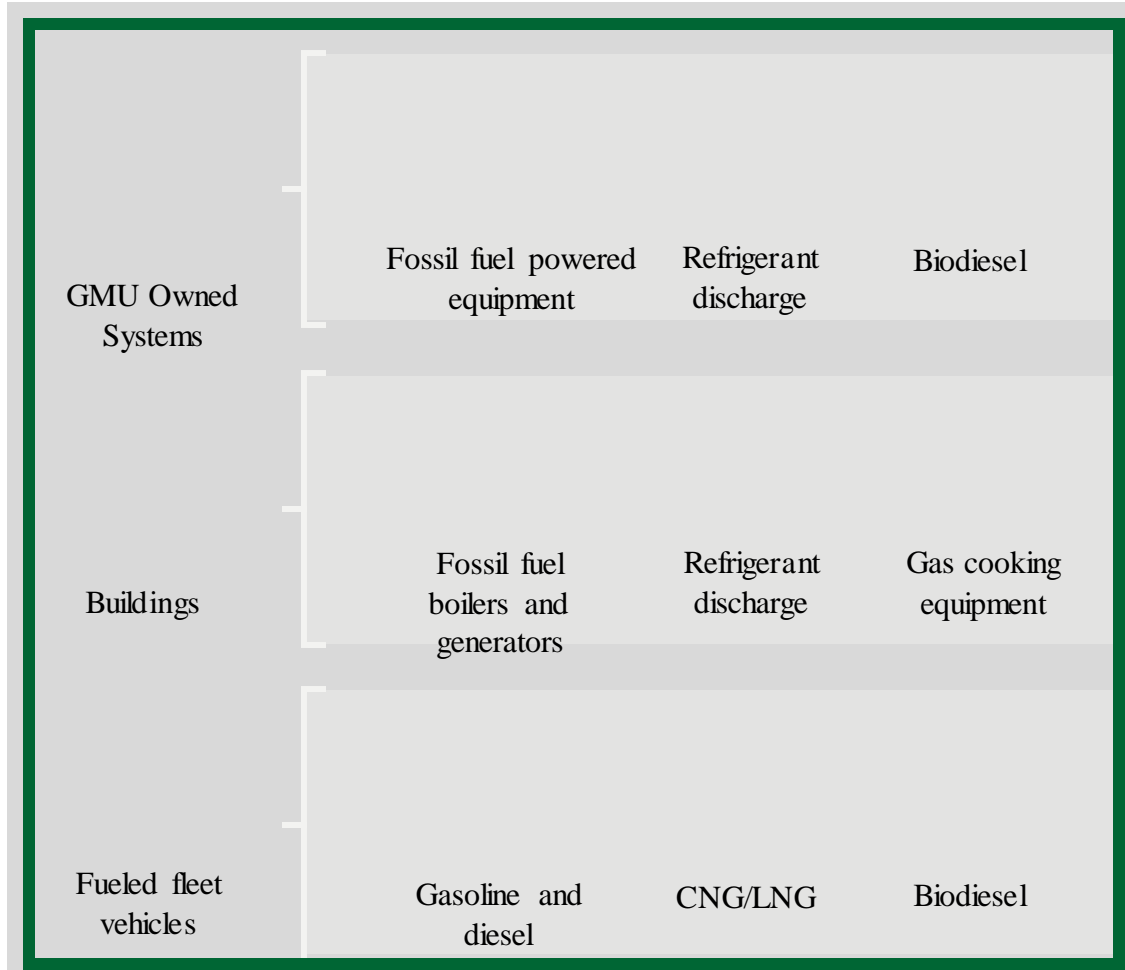
Health and Wellness

Electricity Impact on GHG Emissions

Emission Scopes

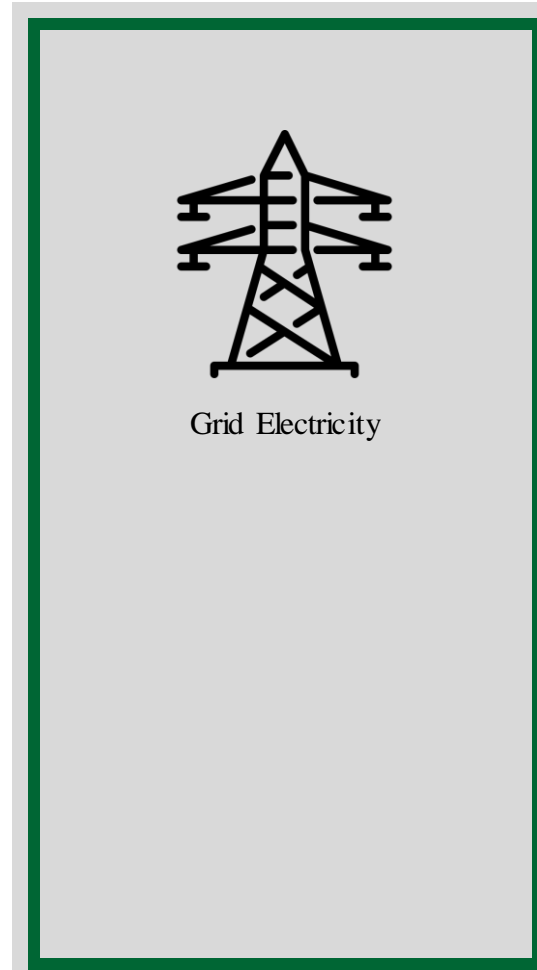
Scope 1

Emissions from sources owned / controlled by the University



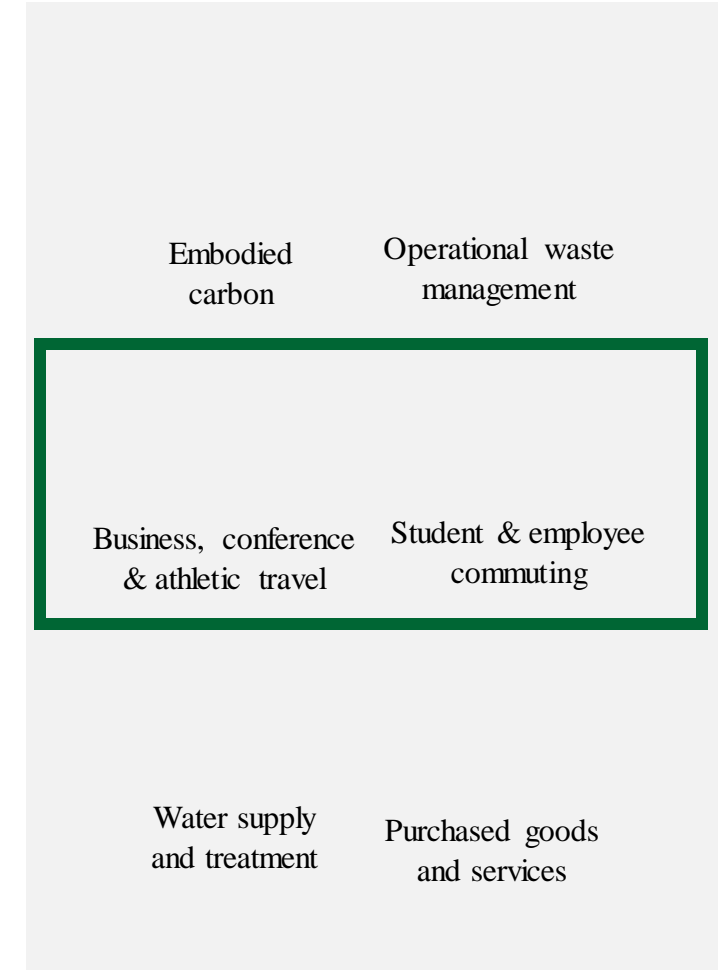
Scope 2

Indirect emissions from utilities purchased by the University



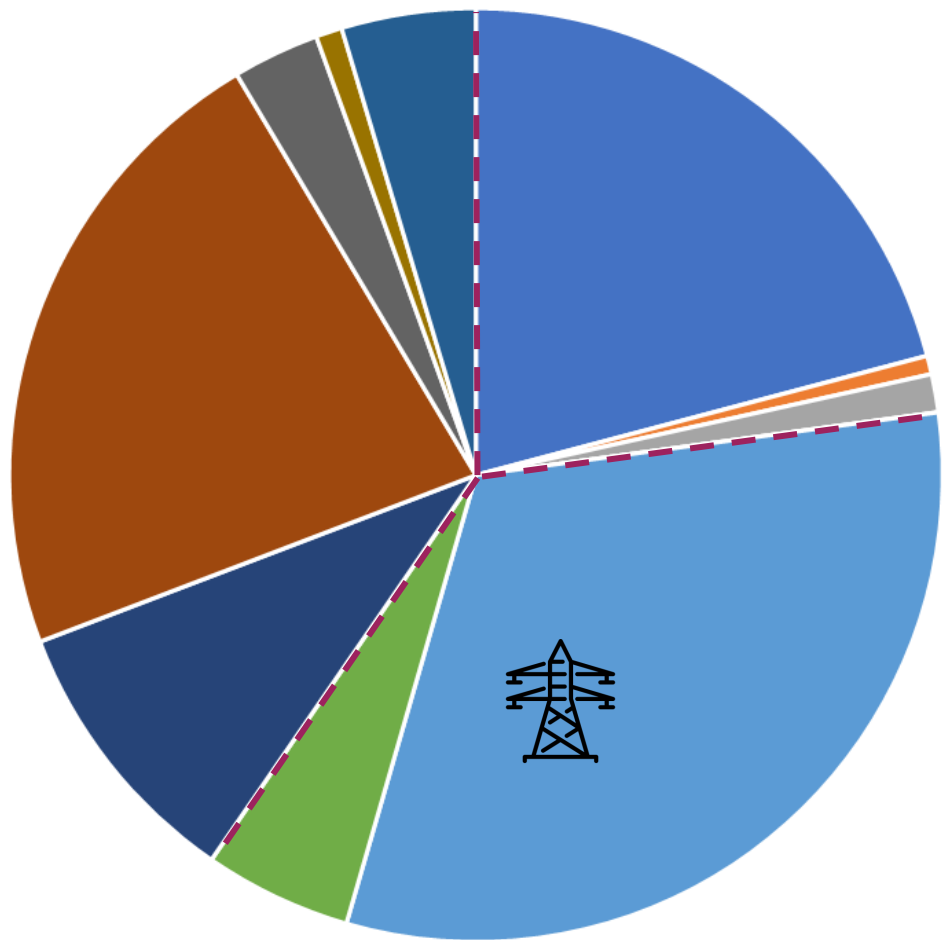
Scope 3

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



Included in Second Nature Carbon Commitment

2019 GHG Inventory

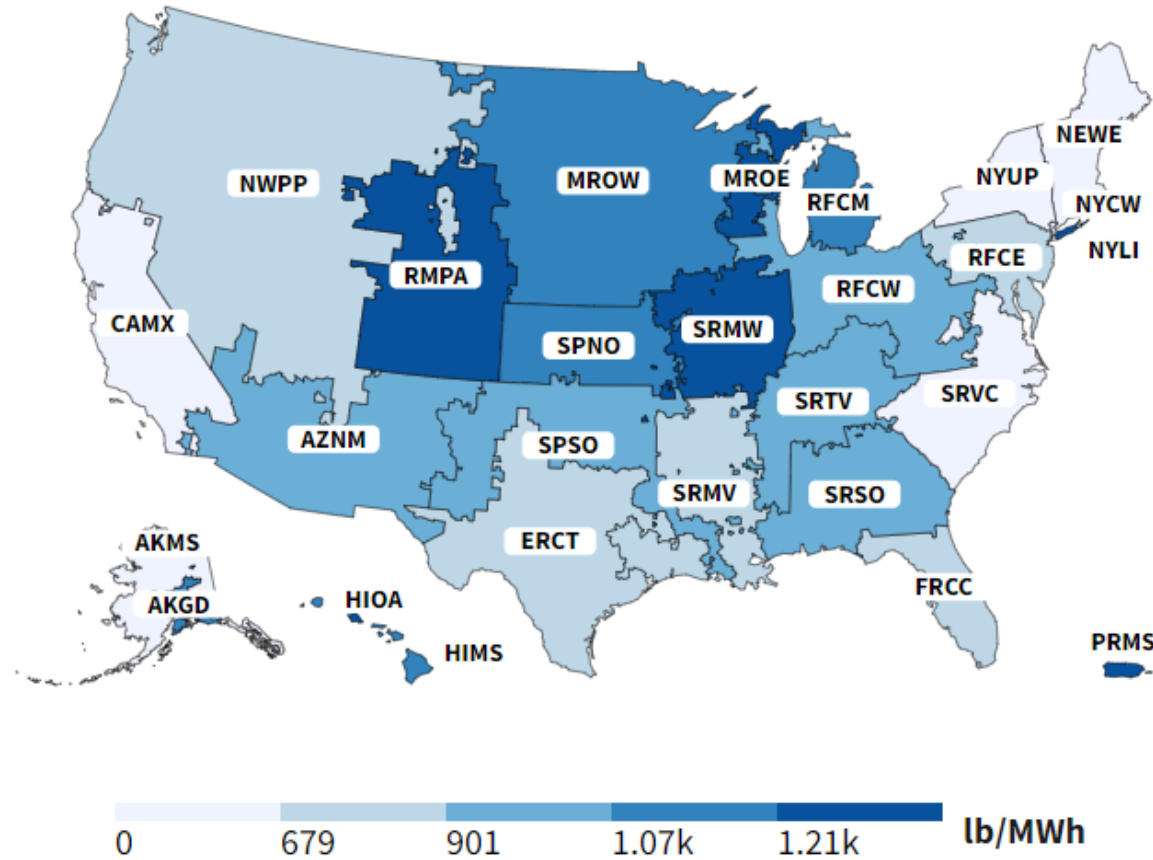


Scope		Emissions Source	MTCDE
1		Other On-Campus Stationary	22,373
		Direct Transportation	690
		Refrigerants & Chemicals	1,410
		Fertilizer & Animals/ Agriculture	8
2		Purchased Electricity	33,885
		Electricity from CHCP	*5,480*
3		Faculty / Staff Commuting	10,290
		Student Commuting	23,818
		Directly Financed Air Travel	3,225
		Other Directly Financed Travel	974
		Study Abroad Air Travel	4,984

*Emissions from CHCP Electricity is estimated based on EPA eGRID emissions factor

Electric Grid – Carbon Intensity

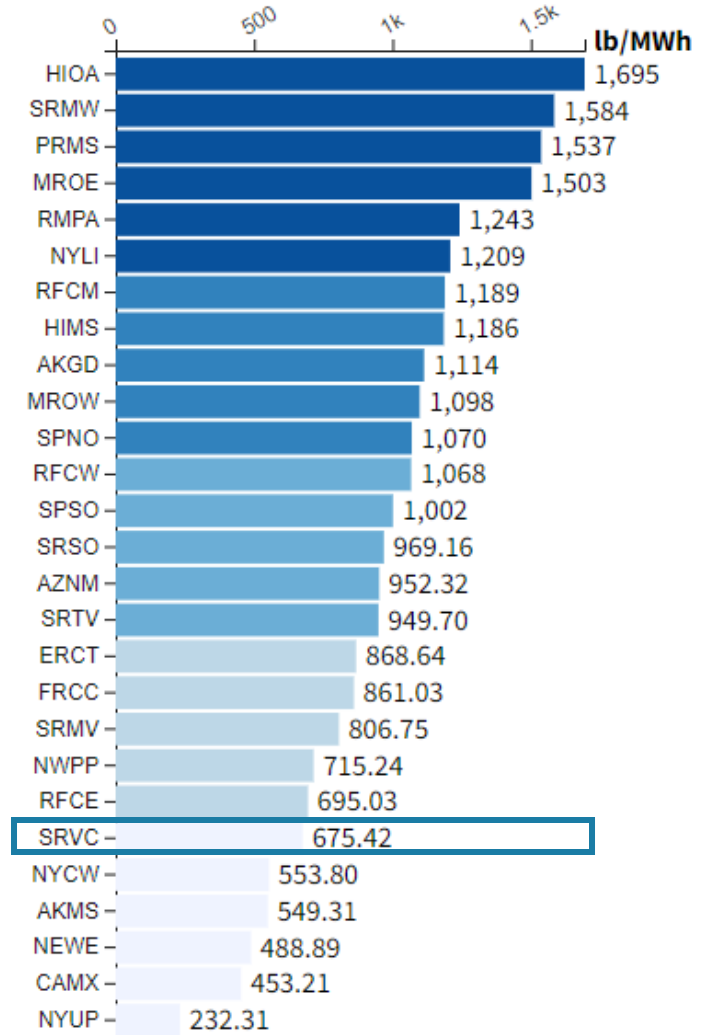
CO₂ total output emission rate (lb/MWh)
by eGRID subregion, 2019



Sort A to Z

Sort by Amount

US: 884.23 (lb/MWh)



Virginia Electric Utilities

Investor Owned Utilities

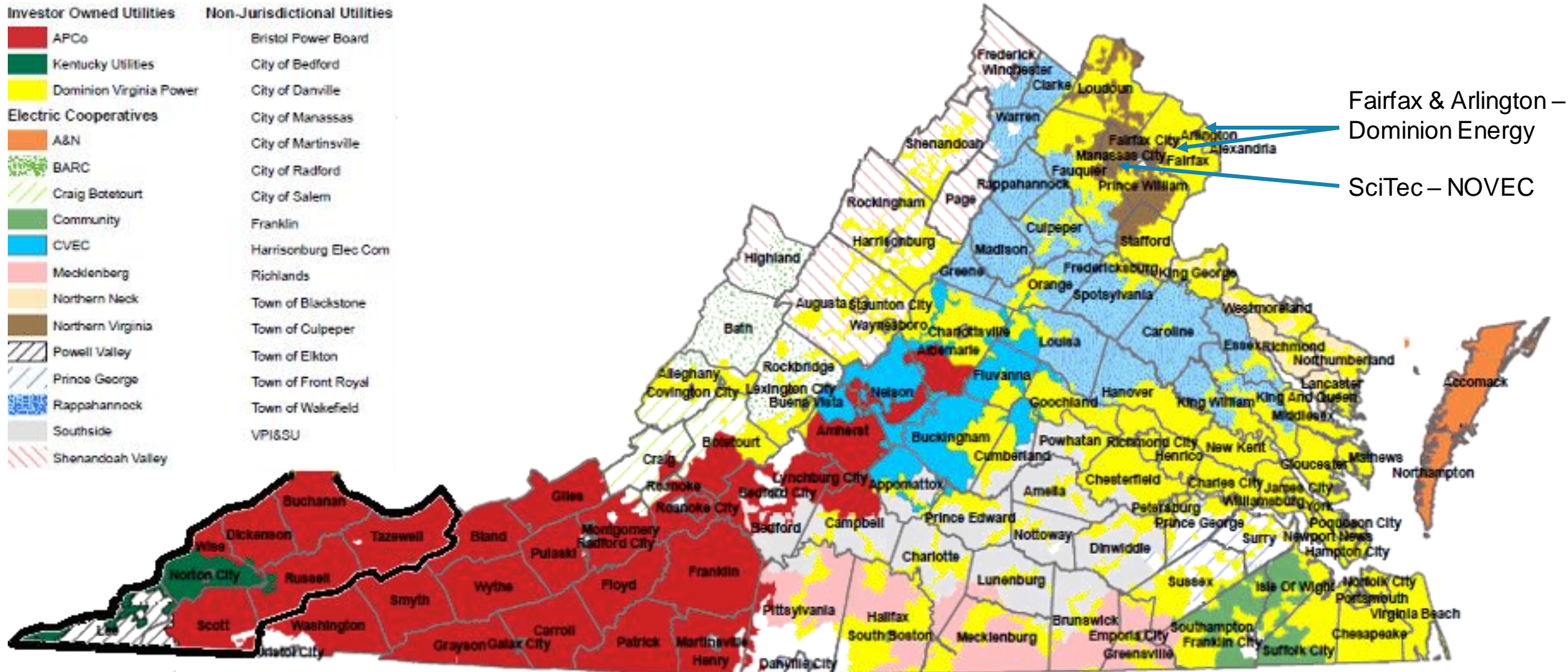
- APCo
- Kentucky Utilities
- Dominion Virginia Power

Electric Cooperatives

- A&N
- BARC
- Craig Botetourt
- Community
- CVEC
- Mecklenberg
- Northern Neck
- Northern Virginia
- Powell Valley
- Prince George
- Rappahannock
- Southside
- Shenandoah Valley

Non-Jurisdictional Utilities

- Bristol Power Board
- City of Bedford
- City of Danville
- City of Manassas
- City of Martinsville
- City of Radford
- City of Salem
- Franklin
- Harrisonburg Elec Com
- Richlands
- Town of Blackstone
- Town of Culpeper
- Town of Elkton
- Town of Front Royal
- Town of Wakefield
- VPI&SU

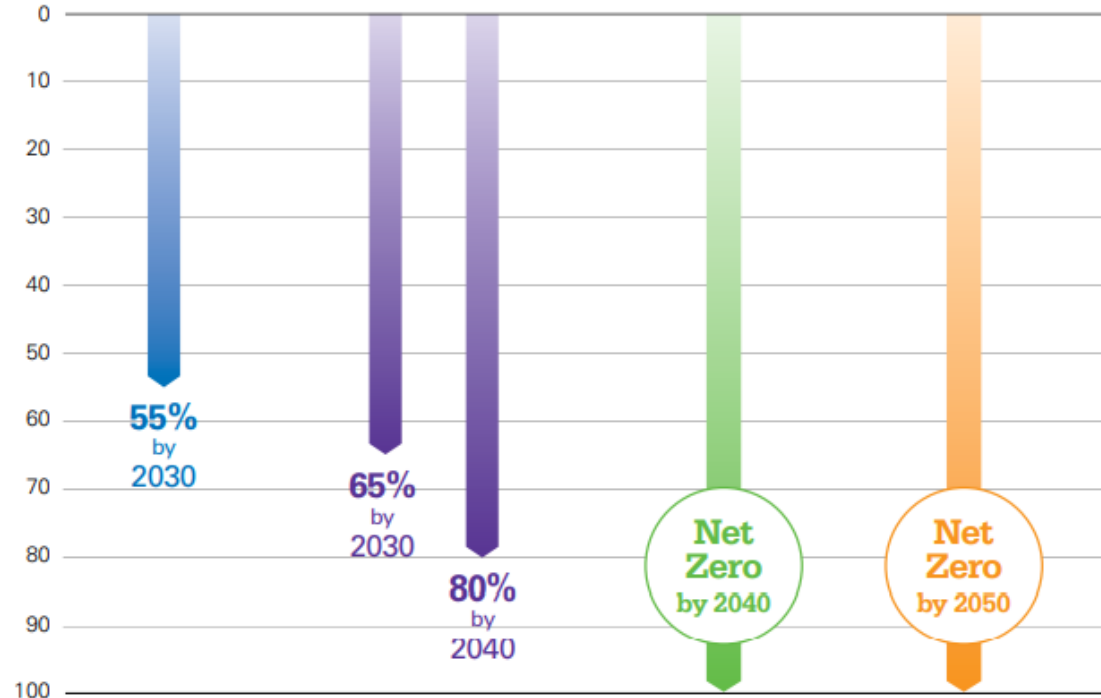


Dominion Energy – Scope 2 Impact

Interim Scope 1 Emissions Reduction Targets

To achieve company-wide Net Zero carbon and methane emissions

Percent emission reductions*



- Electric business (carbon)
- Gas business (methane)
- Gas business (carbon and methane)
- Electric business (carbon and methane)

*Gas baseline year 2010, Electric baseline year 2005

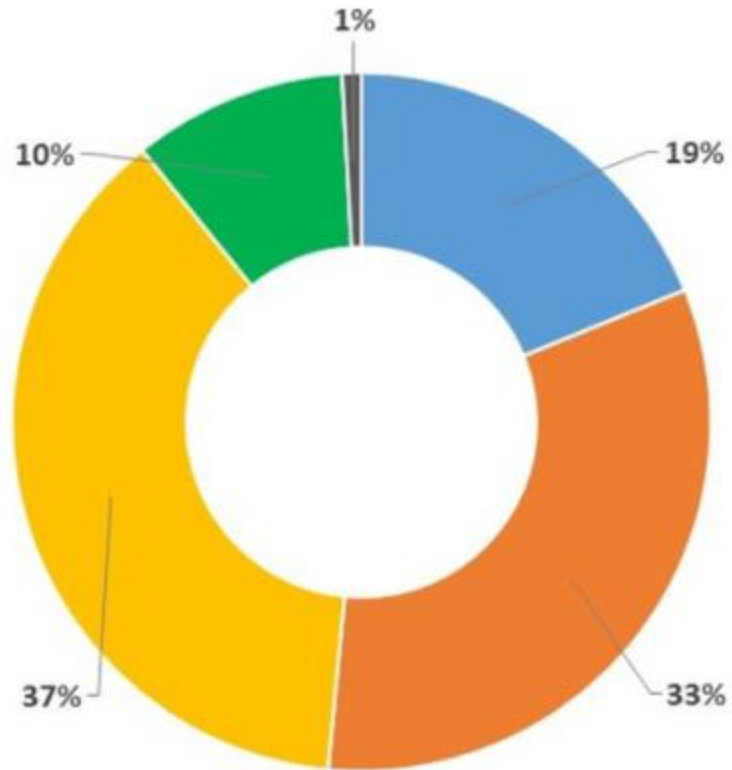
“Dominion Energy is accelerating the transformation of the energy sector through our pursuit of achieving Net Zero emissions by 2050 in our clean energy strategy.”

Dominion Energy Climate Report 2021

NOVEC – Scope 2 Impact

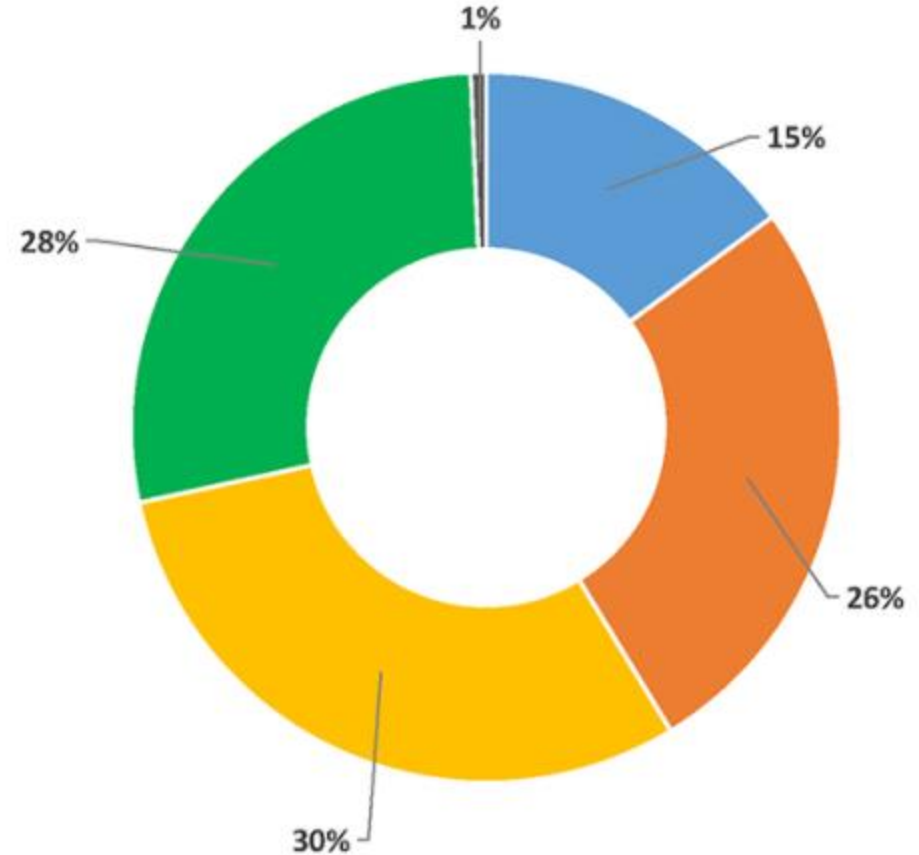
NOVEC Resource Mix (2020)

■ Coal ■ Nuclear ■ Gas ■ Renewable ■ Oil/Waste



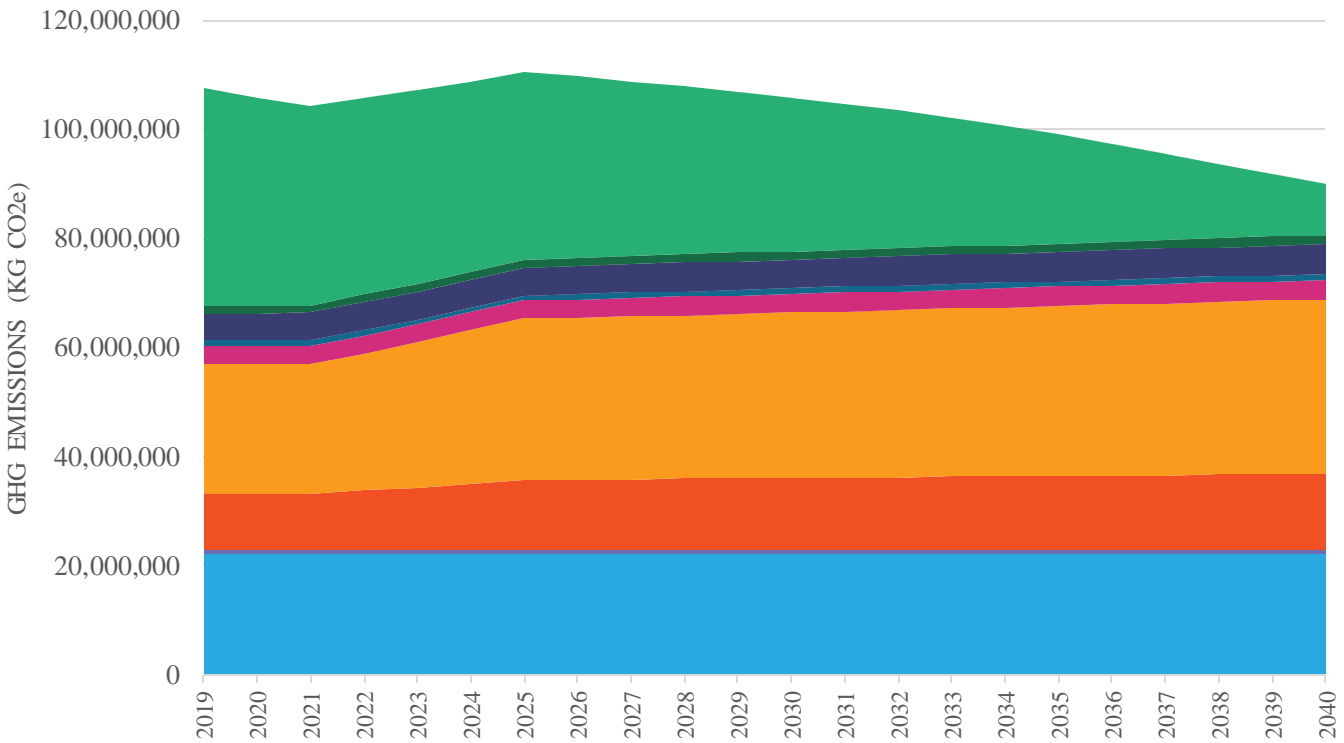
NOVEC's Projected 2024 Energy Resource Mix

■ Coal ■ Nuclear ■ Gas ■ Renewable ■ Oil/Waste



CAP Business as Usual Growth Assumptions

BAU Trajectory



- Other On-Campus Stationary
- Faculty/Staff Commuting
- Directly Financed Air Travel
- Study Abroad Air Travel
- Purchased Electricity
- Direct Transportation
- Student Commuting
- Other Directly Financed Travel
- Refrigerants/Chemicals/Fertilizer

	Current	2025 President's Goals	2026 – 2050 Annual Growth
Total Building GSF	8,830,000 GSF	9,657,212 GSF	+1.828%
On-Campus Students	6,118 FTE	6,118 FTE	+0.816%
Off-Campus Students	19,248 FTE	23,248 FTE	+0.215%
Virtual Student	3,890 FTE	6,890 FTE	+1.451%
On-Campus Faculty/Staff	4,394 FTE	5,445 FTE*	+0.509%
Virtual Faculty/Staff	488 FTE	605 FTE*	+0.562%
SRVC Grid	85% reduction by 2040		

*Assumptions based on current student : faculty/staff ratios

Future Scenario Trajectories

Scenarios Overview

- High level mitigation strategies charted against BAU trajectory
 - 2030, 2035 & 2040 goals
 - Initial, high level list of strategies
- Reduction impact minus offsets from remaining emissions
 - Carbon offset purchases for Scope 1 & 3
 - RECs/PPA for Scope 2
- Timelines influence ability to implement and finance projects

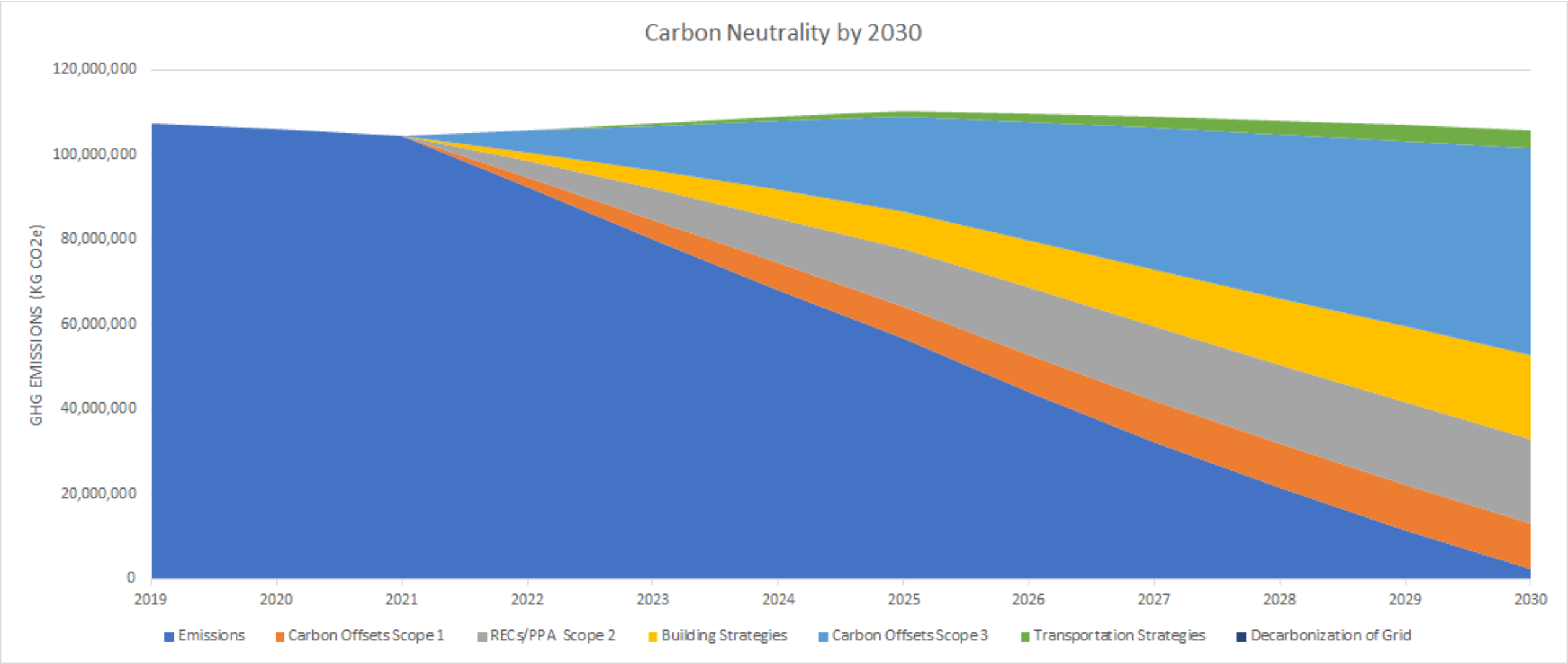
Carbon Neutral x 2030

Scope	Strategy	Metric	GHG Impact (MT)
1	Standalone Building Efficiency	10% increase from baseline	2,000
1	Building electrification	N/A – increase in this timeline	N/A
1	Existing Central Plant Efficiency (FFX)	15% increase from baseline	3,000
1	Central Plant Upgrades/Expansion (FFX)	N/A – longer timeline	N/A
1	Remaining Scope 1 Carbon	Remaining tons	20,000
2	On-site renewables	2 MW PV	500
2	Remaining Scope 2 – Electricity Purchasing	Remaining 130,000 MWh	25,00

Carbon Neutral x 2030

Scope	Strategy	Metric	GHG Impact
1	Standalone Building Efficiency Increase	10% increase from baseline	2,000
1	Building electrification	N/A – increase in this timeline	N/A
1	Existing Central Plant Efficiency (FFX)	15% increase from baseline	3,000
1	Central Plant Upgrades/Expansion (FFX)	N/A – longer timeline	N/A
1	Remaining Scope 1 – Carbon Offset Purchasing	Remaining tons	20,000
2	On-site renewables	2 MW PV	500
2	Remaining Scope 2 – Electricity Purchasing	Remaining 130,000 MWh	25,00
3	Single Occupant Vehicle Miles Traveled	10% decrease	2,000
3	Mode Shift Emissions Factor	15% decrease	4,000
3	Remaining Commuter Emissions – Carbon Offsets	Tons remaining	43,000
3	Air/Business Travel Emissions – Carbon Offsets	Tons remaining	10,000

Carbon Neutral x 2030



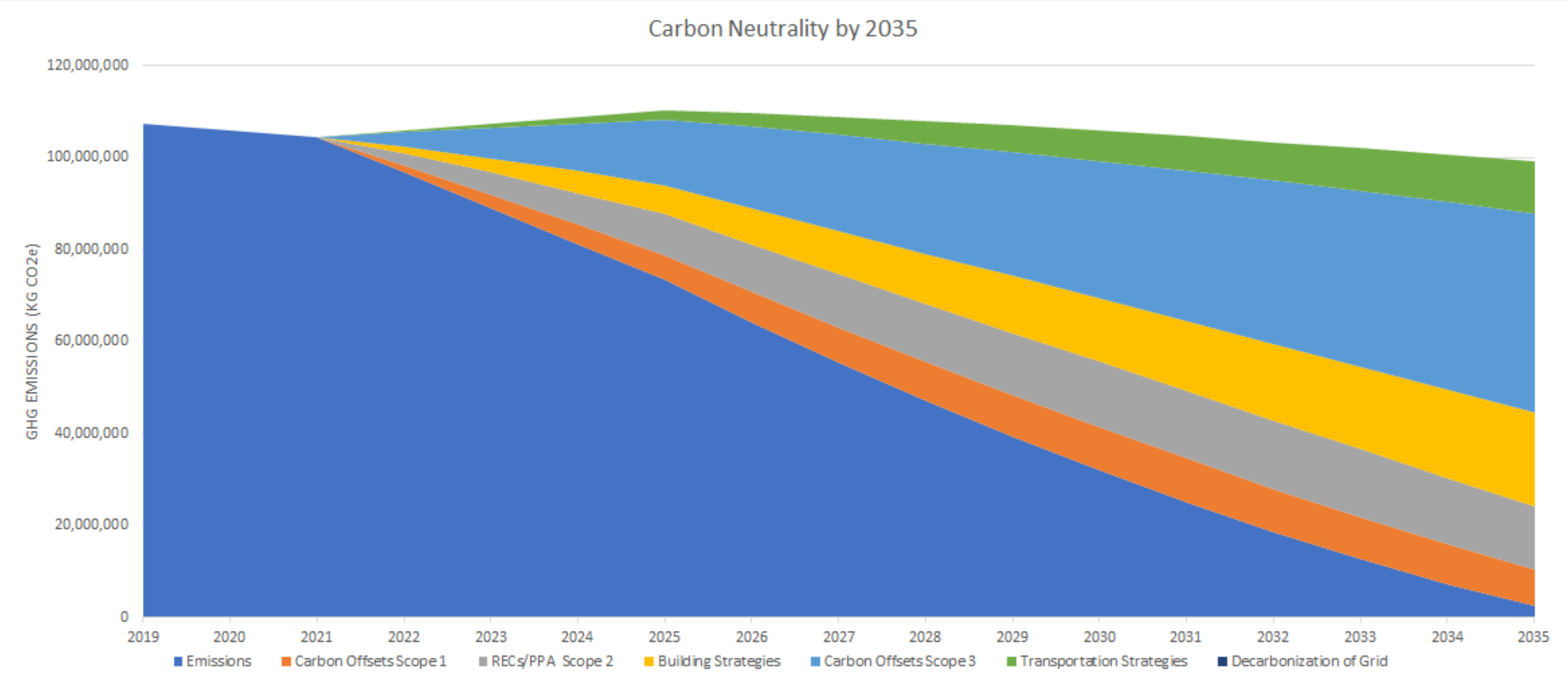
Carbon Neutral x 2035

Scope	Strategy	Metric	GHG Impact (MT)
1	Standalone Building Efficiency	10% increase	2,000
1	Building electrification	20% of existing buildings	400
1	Existing Central Plant Efficiency (FFX)	20% increase	3,500
1	Central Plant Upgrades/Expansion (FFX)	All new construction	4,000
1	Remaining Scope 1 Carbon	Remaining tons	18,000
2	On-site renewables	4 MW PV	650
2	Remaining Scope 2 – Electricity Purchasing	Remaining 150,000 MWh	14,000

Carbon Neutral x 2035

Scope	Strategy	Metric	GHG Impact
1	Standalone Building Efficiency	10% increase	2,000
1	Building electrification	20% of existing buildings	400
1	Existing Central Plant Efficiency (FFX)	20% increase	3,500
1	Central Plant Upgrades/Expansion (FFX)	All new construction	4,000
1	Remaining Scope 1 Carbon	Remaining tons	18,000
2	On-site renewables	4 MW PV	650
2	Remaining Scope 2 – Electricity Purchasing	Remaining 150,000 MWh	14,000
3	Single Occupant Vehicle Miles Traveled	15% decrease	3,000
3	Mode Shift Emissions Factor	25% decrease	5,000
3	Remaining Commuter Emissions – Carbon Offsets	Tons remaining	44,000
3	Air/Business Travel Emissions – Carbon Offsets	Tons remaining	10,000

Carbon Neutral x 2035



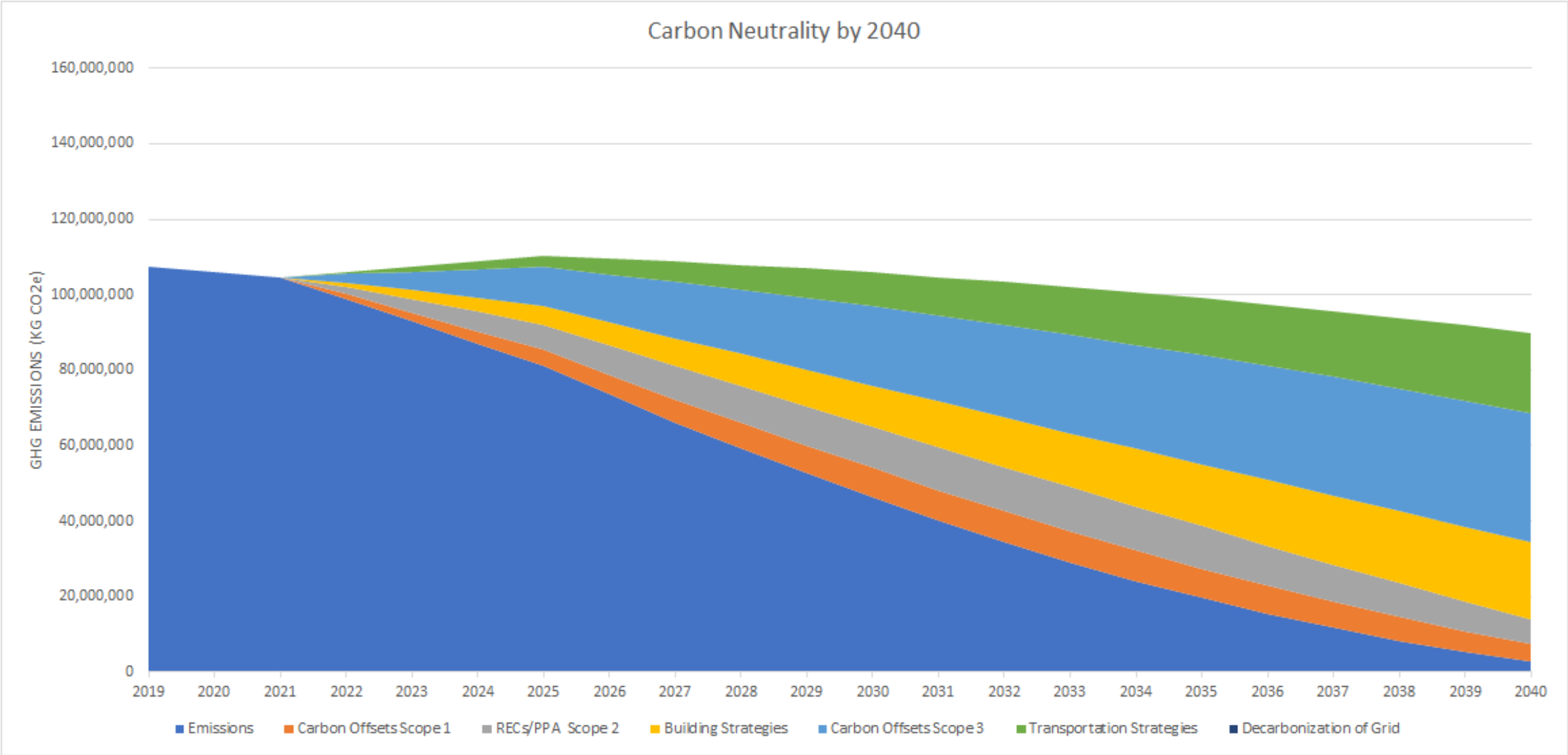
Carbon Neutral x 2040

Scope	Strategy	Metric	GHG Impact (MT)
1	Standalone Building Efficiency	25% increase	1,000
1	Building electrification	35% of existing buildings	2,000
1	Existing Central Plant Efficiency (FFX)	20% increase	4,000
1	Central Plant Upgrades/Expansion (FFX)	All new construction	2,500
1	Remaining Scope 1 Carbon	Remaining tons	17,000
2	On-site renewables	6 MW PV	400
2	Remaining Scope 2 – Electricity Purchasing	Remaining 160,000 MWh	5,000

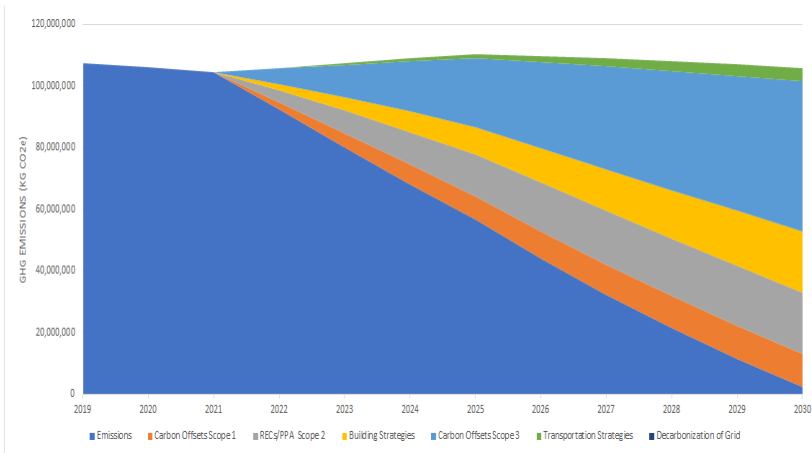
Carbon Neutral x 2040

Scope	Strategy	Metric	GHG Impact
1	Standalone Building Efficiency	25% increase	1,000
1	Building electrification	35% of existing buildings	2,000
1	Existing Central Plant Efficiency (FFX)	20% increase	4,000
1	Central Plant Upgrades/Expansion (FFX)	All new construction	2,500
1	Remaining Scope 1 Carbon	Remaining tons	17,000
2	On-site renewables	6 MW PV	400
2	Remaining Scope 2 – Electricity Purchasing	Remaining 160,000 MWh	5,000
3	Single Occupant Vehicle Miles Traveled	15% decrease	4,000
3	Mode Shift Emissions Factor	25% decrease	8,000
3	Remaining Commuter Emissions – Carbon Offsets	Tons remaining	45,000
3	Air/Business Travel Emissions – Carbon Offsets	Tons remaining	10,000

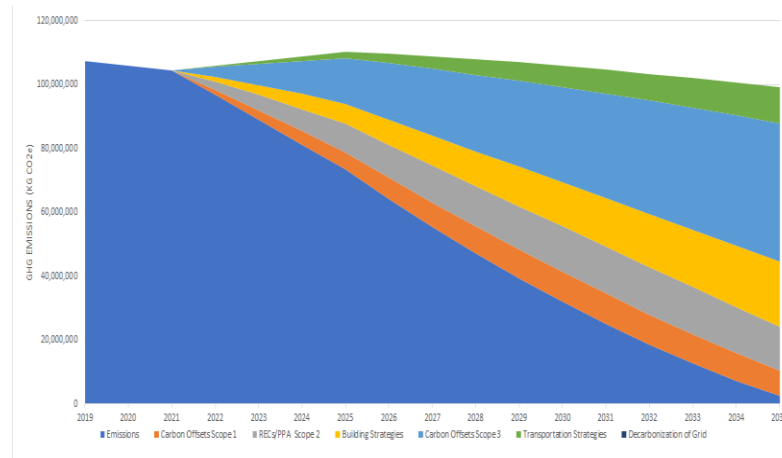
Carbon Neutral x 2040



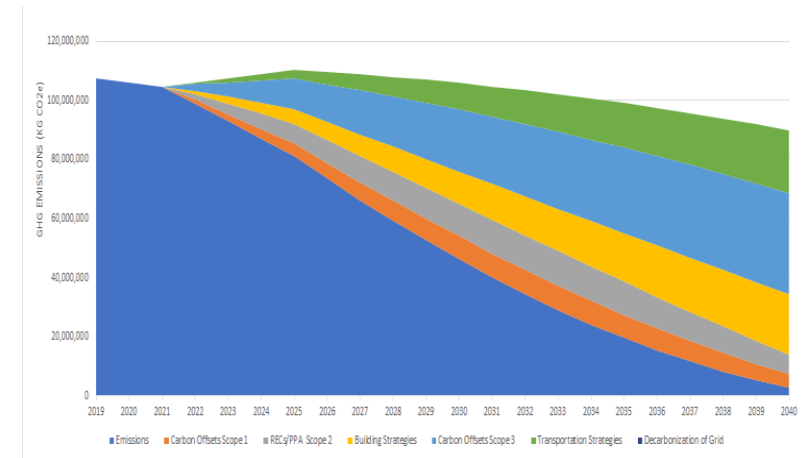
2030



2035



2040



Next Steps

Climate Action Planning Timeline

Phase I: September 2021 to April 2022



Phase II: April 2022 and forward

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

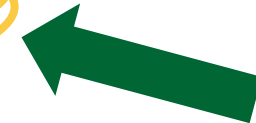
Document Library

Key Definitions

Townhalls

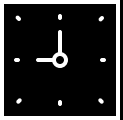
Contact Us

10 CLIMATE ACTION WINS at Mason in the last 11 years



Upcoming Town Hall Schedule

- Friday, February 18th
- Wednesday, March 9th



Thank you!