

Carbon Free DC 2050



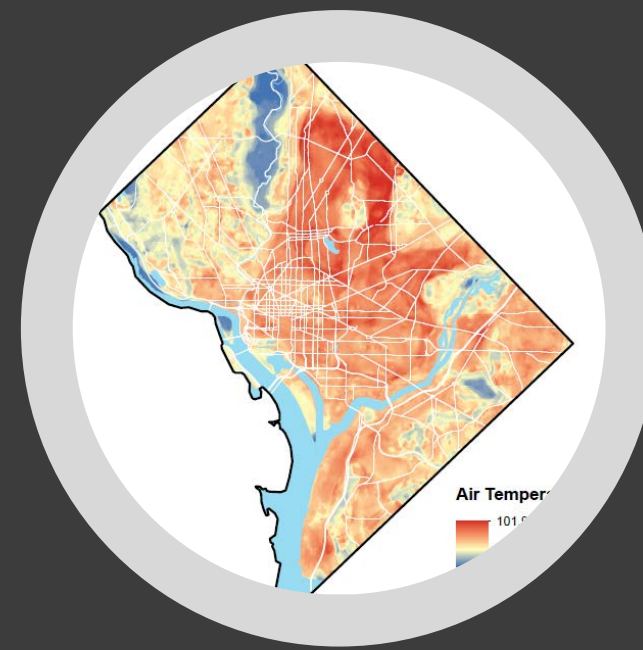
AGENDA

- **Why carbon? Why now?**
Overview of climate change in the District & our 2050 commitment
- **What is carbon neutrality?**
Defining carbon neutrality & our approach to getting there
- **What does it look like?**
Community priorities for 2050 driving change in our homes, neighborhoods, the region
- **How do we get there?**
Pathways to eliminate carbon and key milestones
- **What's next?**
Upcoming focused policy discussions
- **Questions & Answers**

WHY CARBON?

Warmer, Wetter, Wilder Future:

- Extreme Heat
- Heavy Rains and Snow
- Storm Surge
- Sea Level Rise
- Extreme Weather





"Climate change is here.

It is critically important that we reduce our own contribution to the greenhouse gas emissions that cause climate change."

Mayor Muriel Bowser

GOAL: Carbon Neutral & Climate Resilient by 2050

Pathways
Toward a

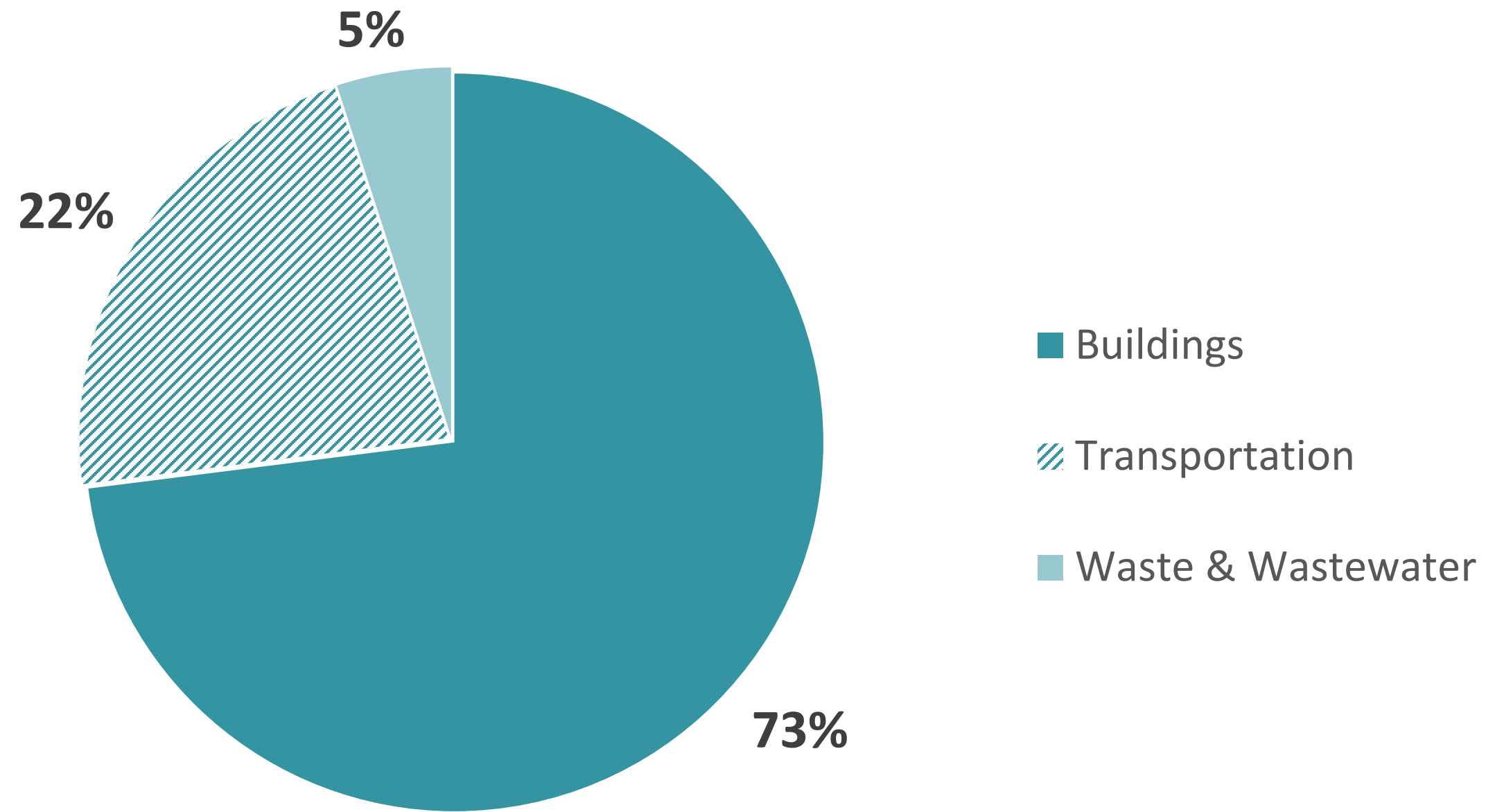
Safe
Equitable
Livable
Accessible
Prosperous
Healthy
Resilient

+ Carbon
Free DC

OUR CURRENT EMISSIONS



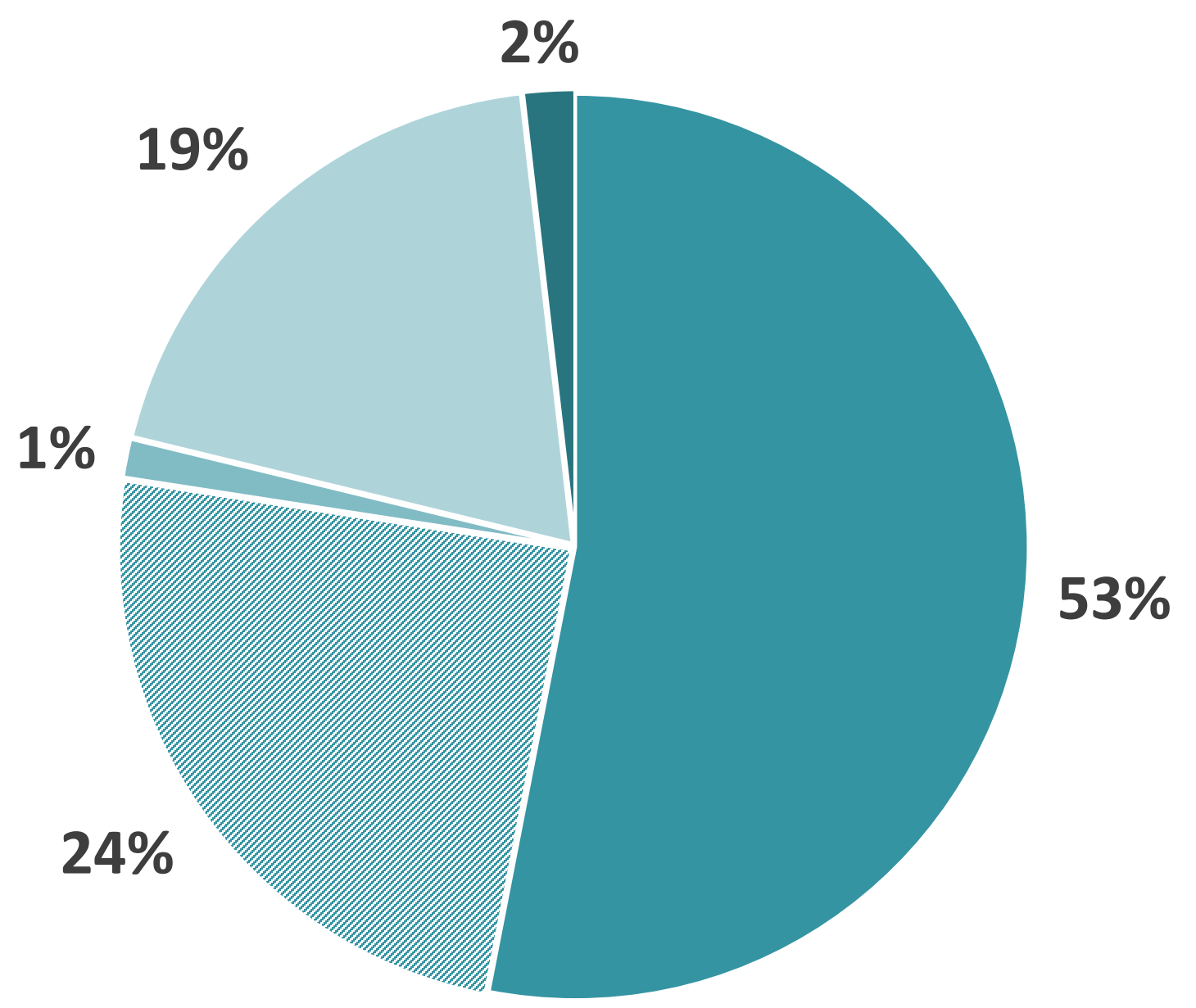
CURRENT EMISSIONS



7.6M tons
(2018)



EMISSIONS FROM ENERGY USE



- Electricity
- Natural Gas
- Fuel Oil
- Gasoline
- Diesel

95% of total emissions

CITYWIDE EMISSIONS AND TARGETS



A NEXT STEP IN CITY PLANNING

2013

Sustainable DC
Envisioned a 20-year citywide plan for sustainability



2014

moveDC
Set a 25-year vision for the District's transportation system



2021 UPDATE
IN PROGRESS

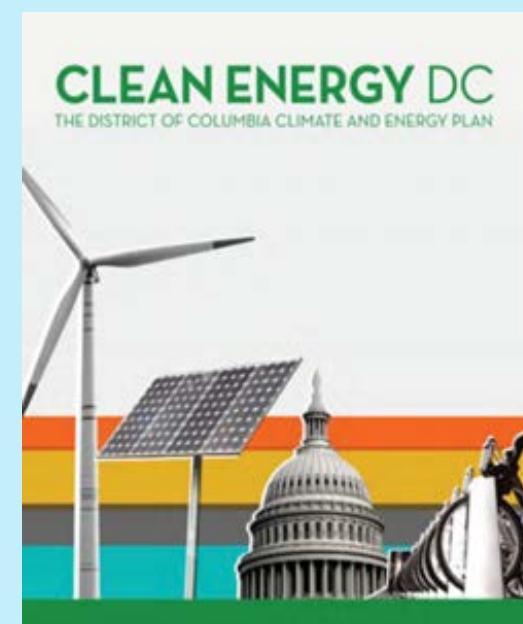
2016

Climate Ready DC
Identified resilience strategies to address key climate risks



2018

Clean Energy DC
Outlined a roadmap to achieve 50% GHG reduction by 2032



2019

SDC 2.0
Updated the 2013 plan, recommitting to innovative and inclusive ways to meet sustainability goals by 2032



2020

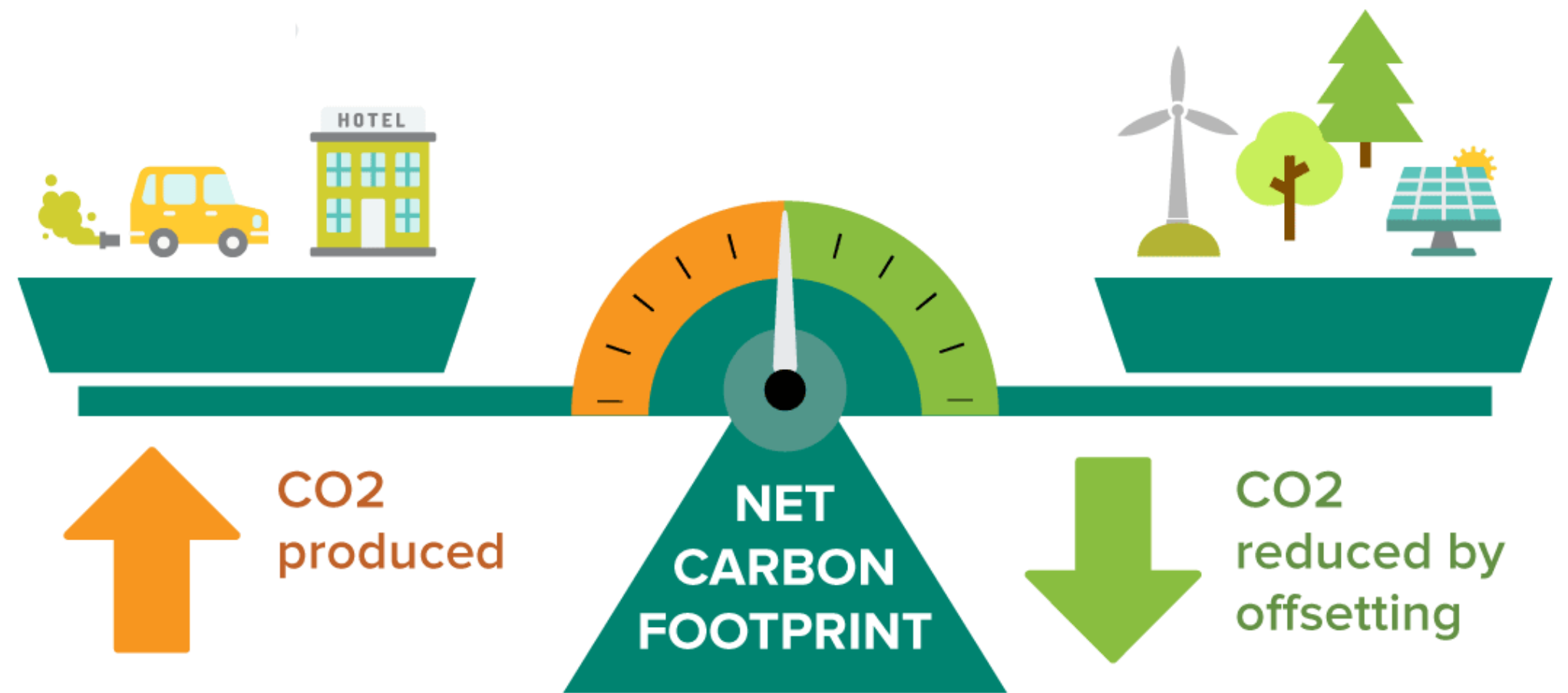
Carbon Free DC Strategy
Will chart the District's pathway to be carbon neutral by 2050



Carbon Neutrality Defined

WHAT IS CARBON NEUTRALITY?

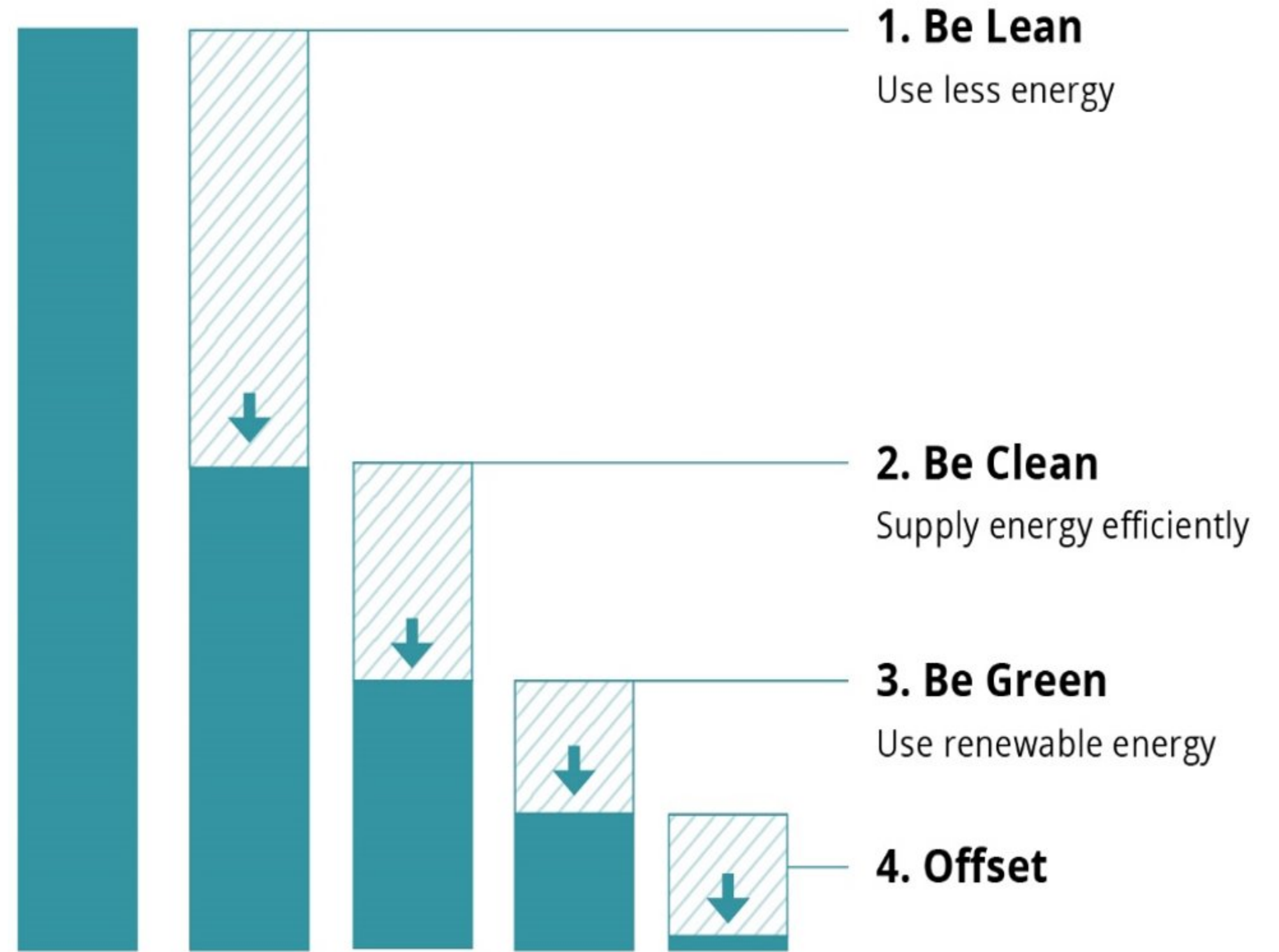
- Carbon neutrality is an absolute target.
- Achieving net-zero carbon means that each year, the emissions produced from our **buildings, energy supply, transportation** and **waste** are equal to the emissions we capture locally or offset.



Adapted from Sustainable Travel International

OUR APPROACH

- **Reduce** annual greenhouse gas emissions as much as possible from each sector (buildings, energy supply, transportation, and waste).
- Start with **efficiency first** -- to use less and waste less.
- Offset remaining emissions through local carbon sequestration strategies and purchasing carbon offsets.



A VISION FOR 2050





WHAT WE'VE HEARD

IN 2050, ALL DISTRICT RESIDENTS HAVE...



HOUSING

Anyone living here today can still afford to live here, in quality, safe housing in vibrant, walkable neighborhoods across all 8 Wards



HEALTH

Residents have mental & physical well-being regardless of neighborhood



TRANSPORTATION

Safe, reliable, convenient, accessible, and clean options serve residents of all neighborhoods, schedules, and income levels



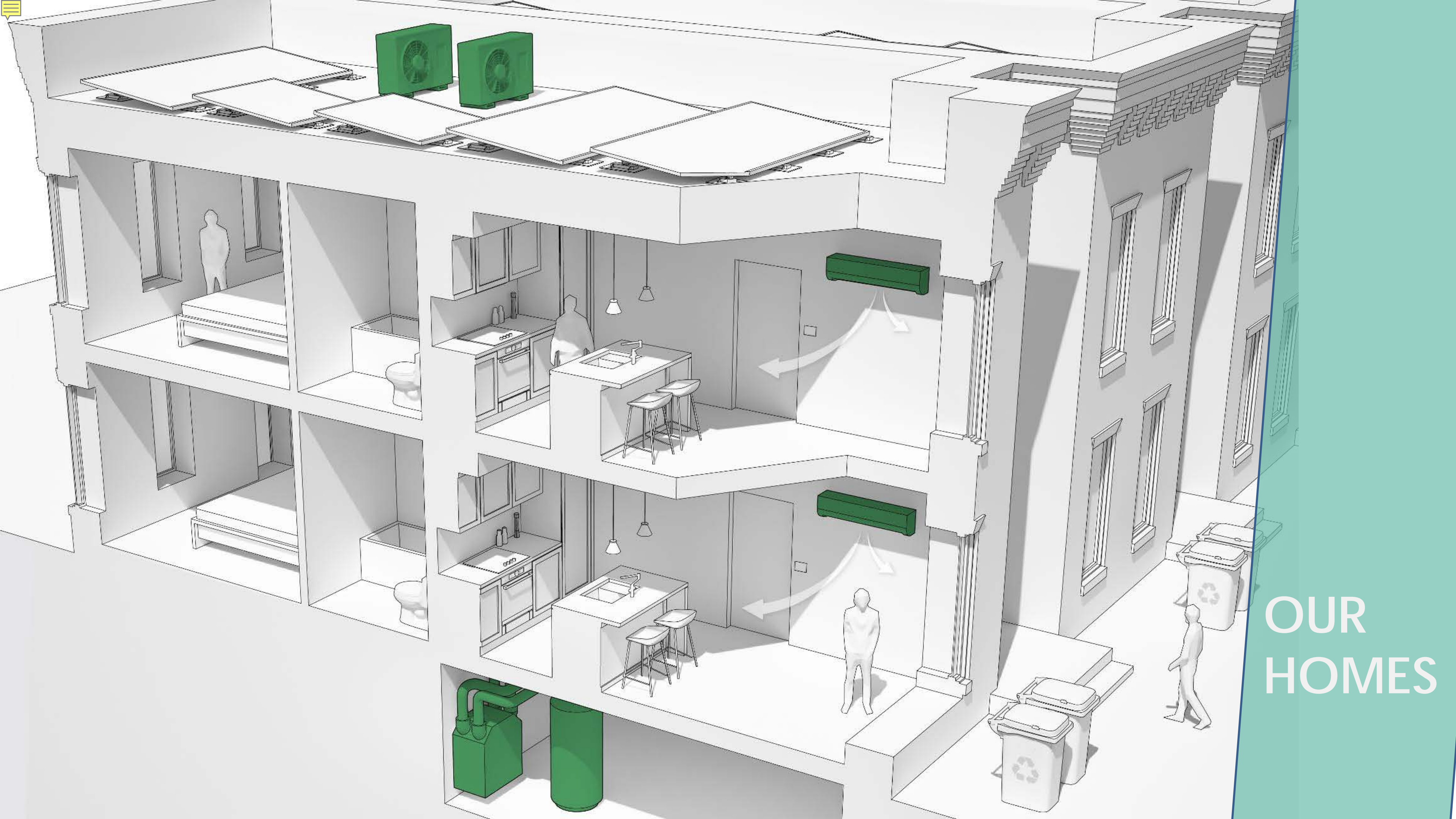
OPPORTUNITY

A green economy benefits all residents and jobs, green or otherwise, pay fair and livable wages



TOOLS & RESOURCES

Residents are ready for the impacts of climate change and have the tools to live green



OUR
HOMES



OUR
NEIGHBORHOODS

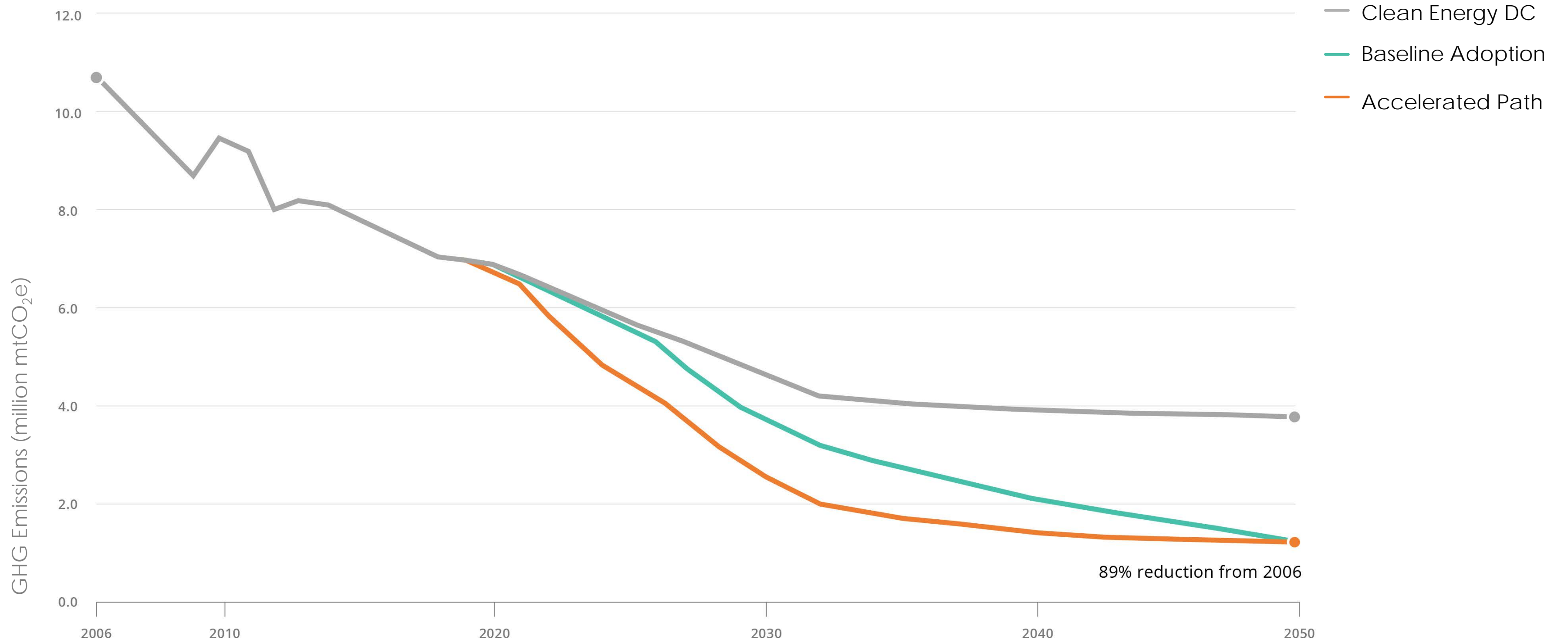


OUR REGION



PATHWAYS TO ELIMINATE CARBON

MODELED PATHWAYS



CUMULATIVE EMISSIONS

All Policies (Buildings, Transport, Waste)

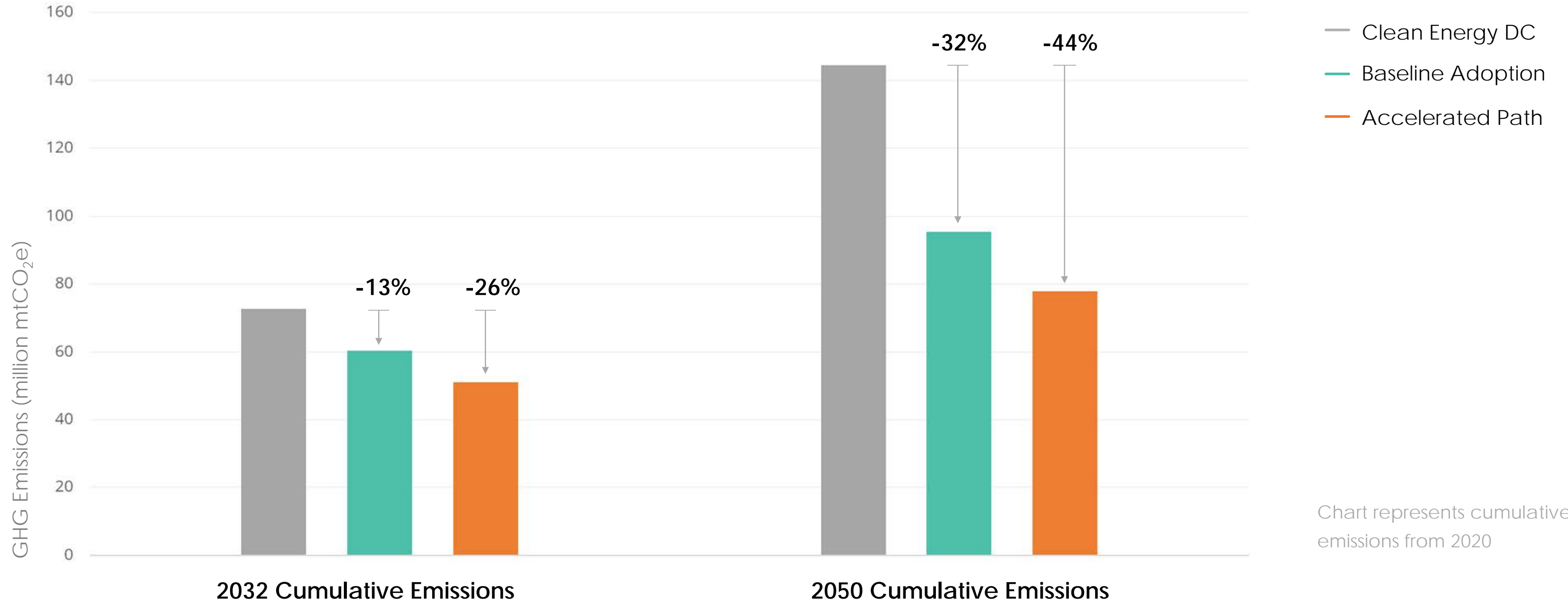
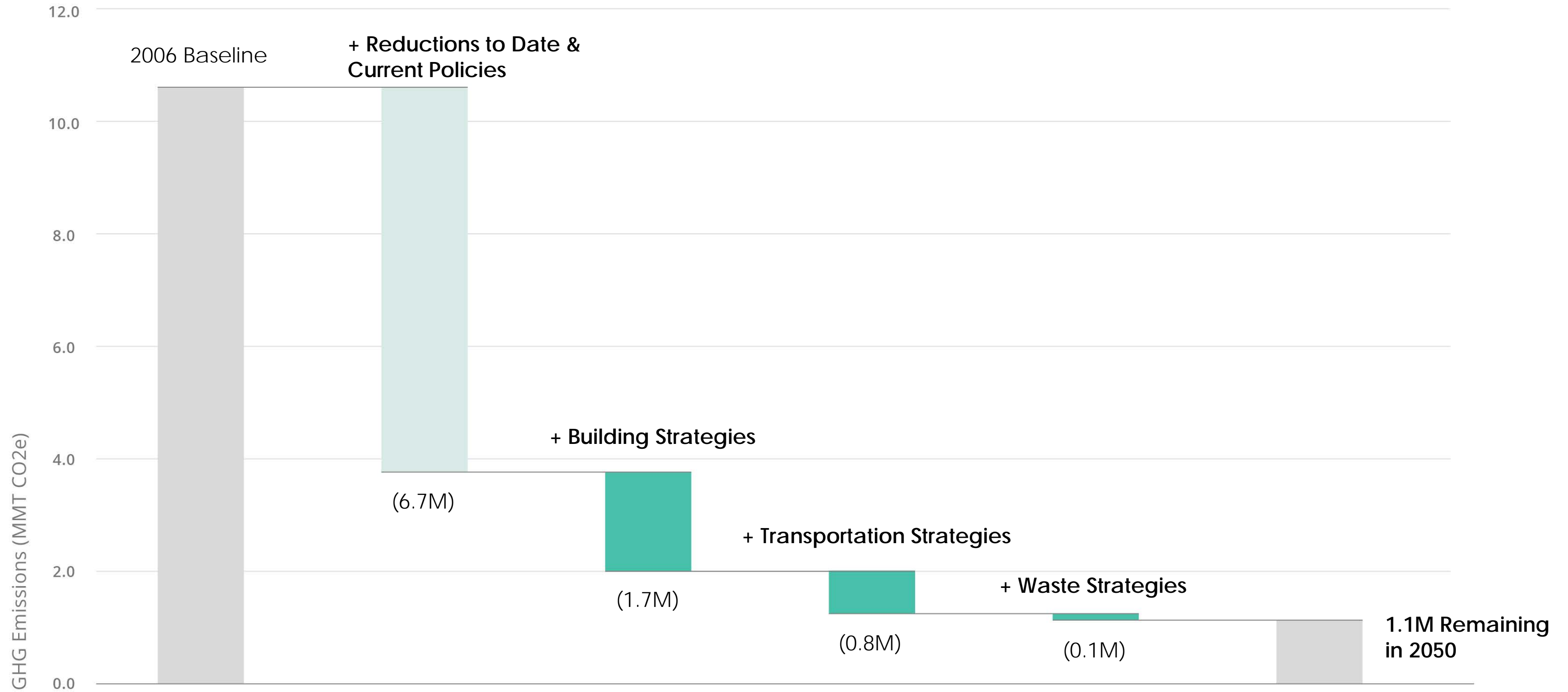


Chart represents cumulative emissions from 2020

EMISSIONS REDUCTIONS BY SECTOR



KEY MILESTONES

2026: Net-zero energy construction for new homes & buildings

2035: Replacement heat & hot water systems are all electric

2040: 70% of existing homes are all-electric

2032: 60% of organic waste from homes and businesses is composted

2032: 75% of commute trips are made without a car

2045: All new cars registered in the District are electric



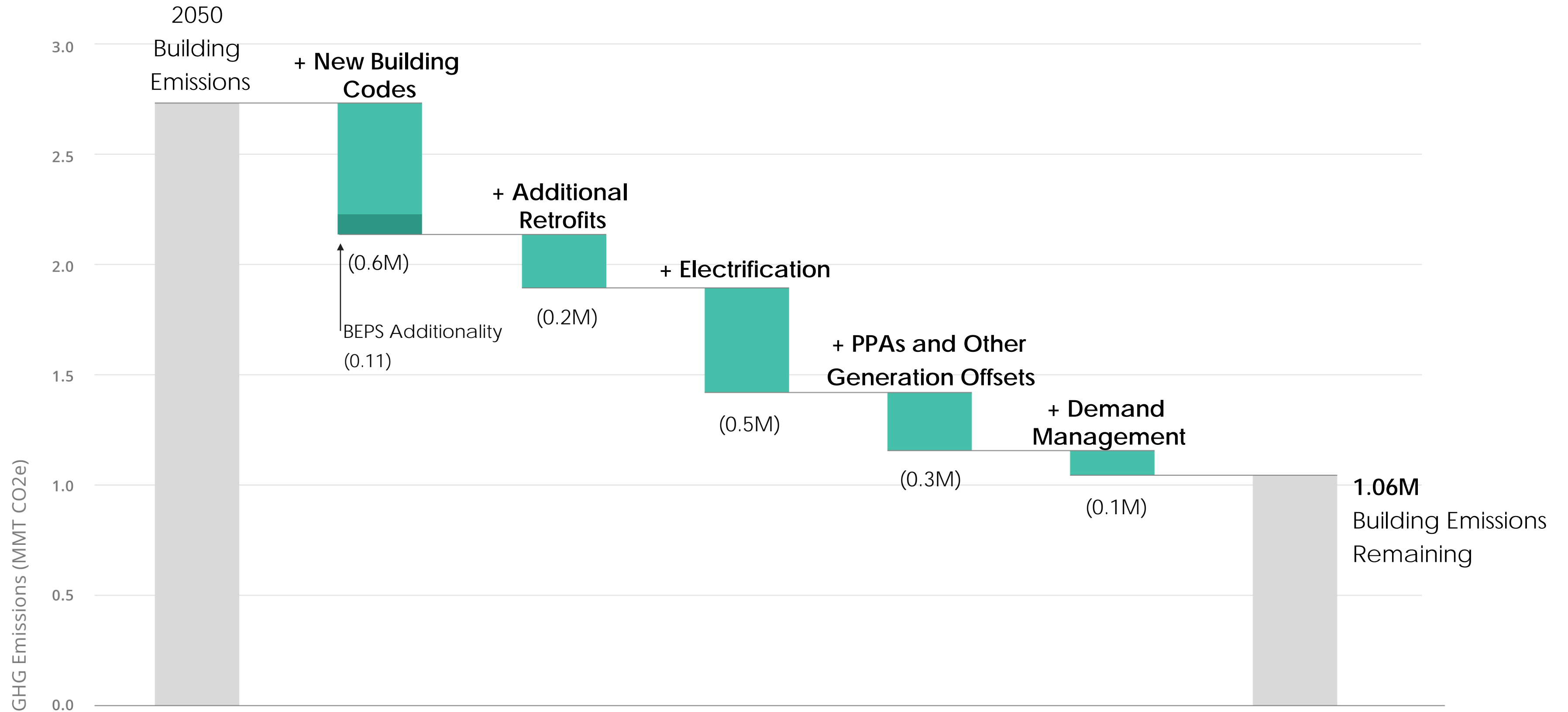
2020 2025 2030 2035 2040 2045 2050



BUILDINGS & ENERGY

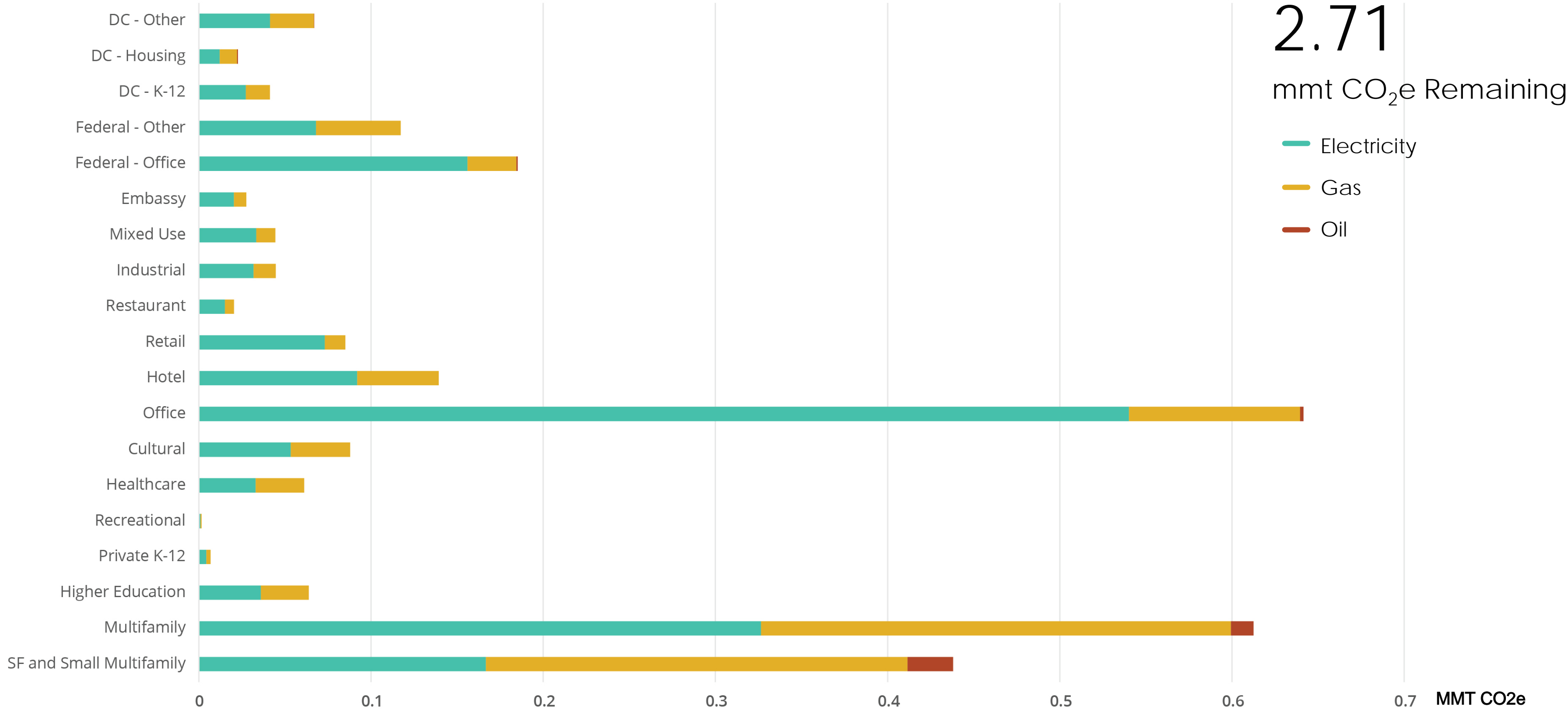


STRATEGIES FOR BUILDINGS

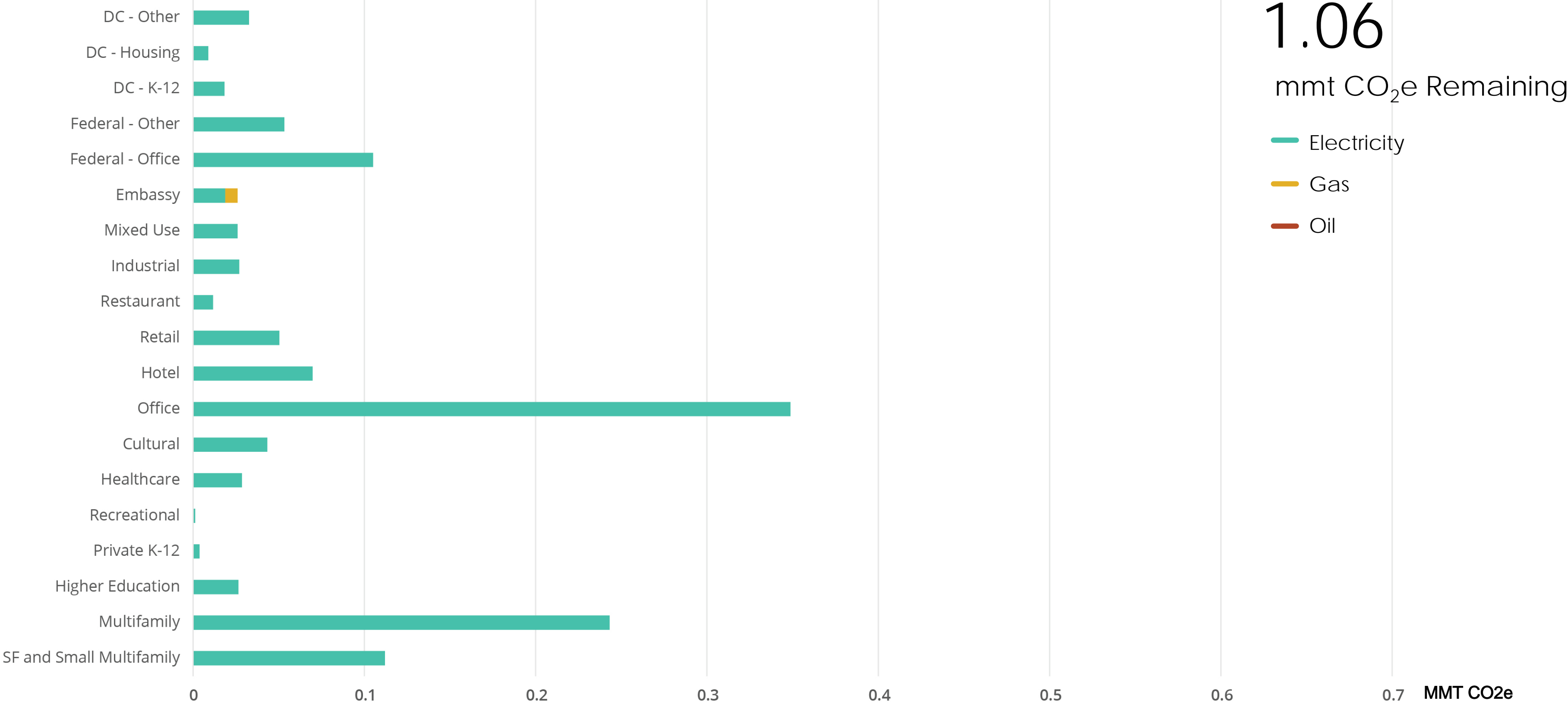


2050 EMISSIONS WITH CURRENT POLICIES

2.71
mmt CO₂e Remaining



2050 EMISSIONS WITH ADDITIONAL STRATEGIES



MILESTONES & METRICS: BUILDINGS



TARGETS:

- Net-zero energy new construction & major renovation by 2026 (Clean Energy DC)
- No new gas appliances hookups after 2035
- All homes electric by 2050

MEASURE OF PROGRESS:

↓ Energy Use Intensity (EUI)

↑ ENERGYSTAR scores

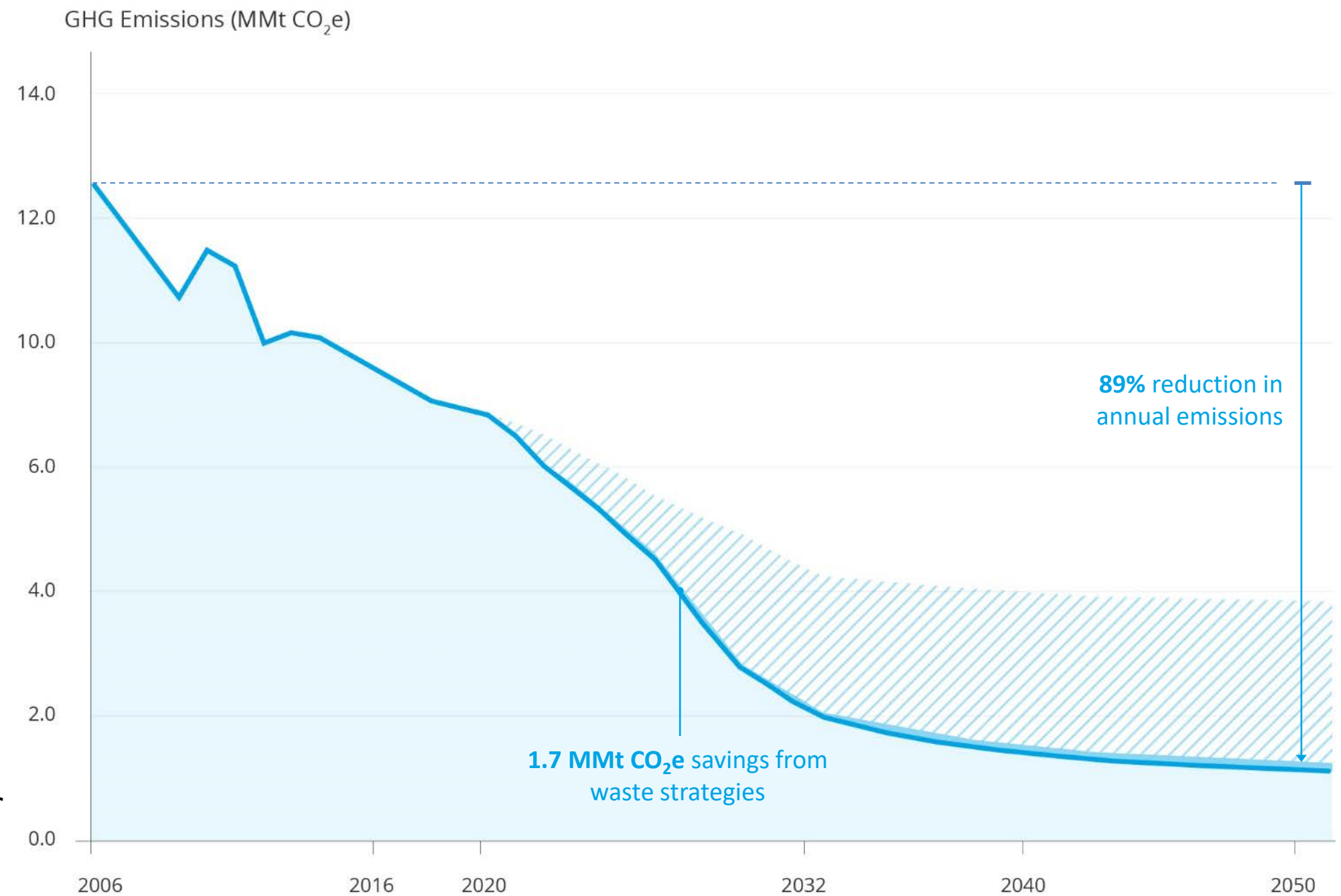


POSSIBLE BUILDING ENERGY DEMAND STRATEGIES

- Net-Zero Energy (NZE) code for new construction by 2026
- Building Energy Performance Standard (BEPS)
 - New codes will drive higher performance standards
 - BEPS may one day be based on greenhouse gas performance
- Phase out fossil fuels for heating/hot water, starting with new construction
- Increase efficiency incentives to encourage deep retrofits
- Energy upgrade requirements at time of sale for smaller properties
- Building-grid integration and demand management strategies

STRATEGIES FOR ENERGY SUPPLY

- RPS included in the baseline scenario
- Power Purchase Agreement for Standard Offer Service (CEDC)
- Local generation strategies:
 - Food waste digestion
 - Thermal energy from wastewater



Annual emissions after all carbon neutrality framework strategies

MILESTONES & METRICS: ENERGY SUPPLY

TARGETS:

- 100% renewable electricity by 2032
(Clean Energy DC)
- Virtually no natural gas & fuel oil in buildings by 2050

MEASURE OF PROGRESS:

↓ Grid Emissions Factor

↑ % Energy from Electricity

POSSIBLE BUILDING ENERGY SUPPLY STRATEGIES

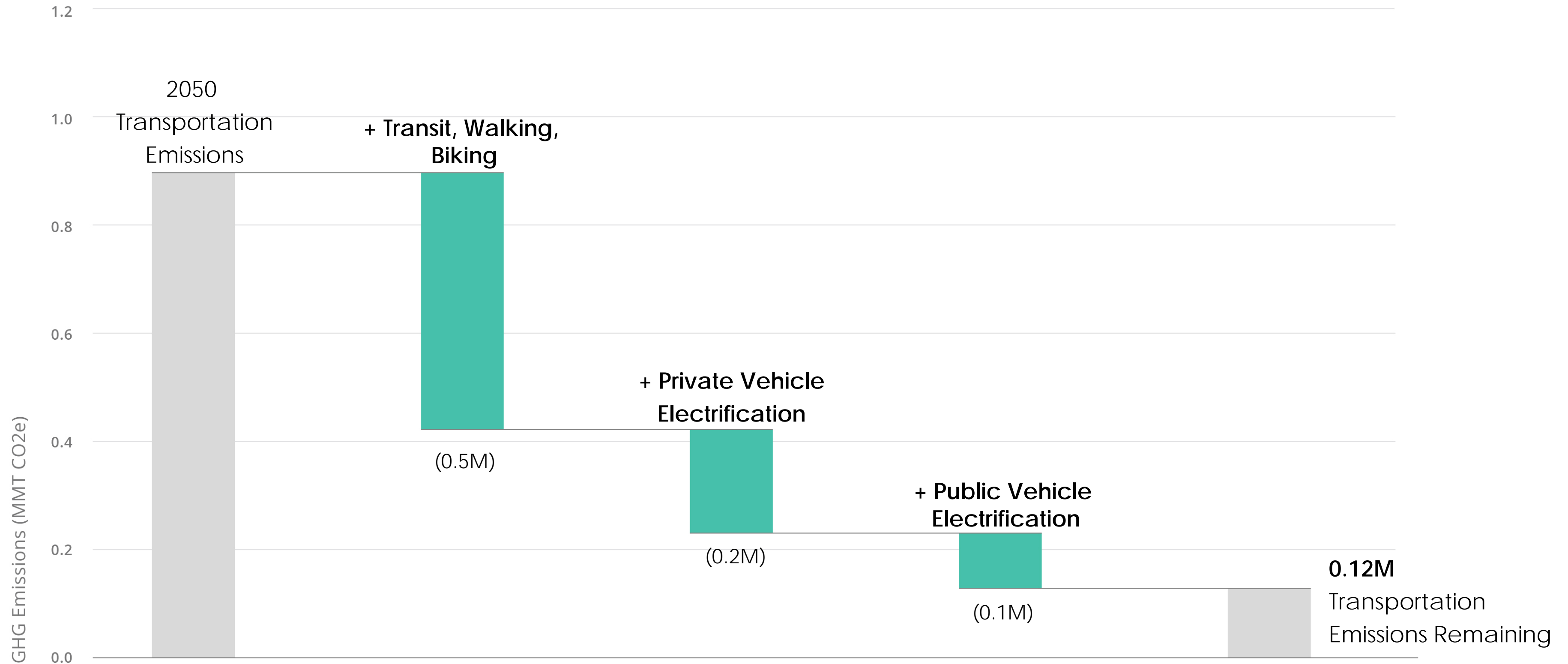
- Power Purchase Agreements for Standard Offer Service
- Anaerobic Digestion of Food Waste
 - Address waste disposal emissions while also generating biogas locally for high-heat applications
- Expand use of wastewater thermal systems for heating and cooling
- Strategies to work regionally to decarbonize the regional electric grid



TRANSPORTATION



STRATEGIES FOR TRANSPORTATION



MILESTONES & METRICS: TRANSPORTATION



TARGETS:

- 75% commute trips made without a car by 2032 (moveDC)
- All new vehicles registered after 2045 are electric (except heavy-duty)

MEASURE OF PROGRESS:

↓ Vehicle Miles Traveled (VMT)

↑ % of VMT from electric vehicles



STRATEGIES FOR TRANSPORTATION



Commuter Trip Shifts



Transit Improvements



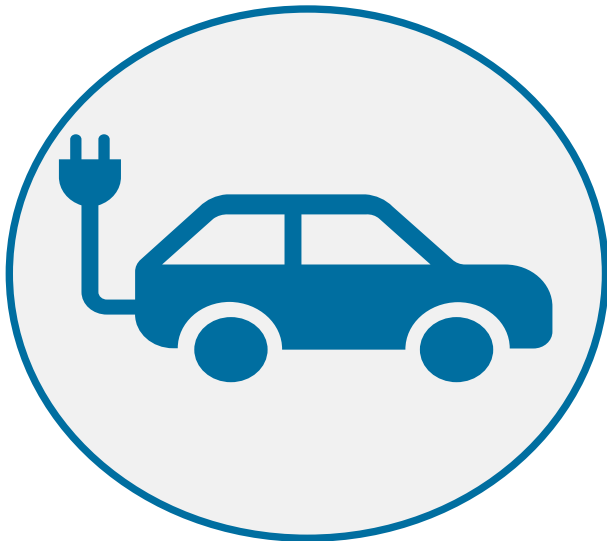
Road Pricing/Management



Land Use & Neighborhood Enhancements



Parking Policy / Pricing



Vehicle Emission Reductions



POSSIBLE TRANSPORTATION POLICIES

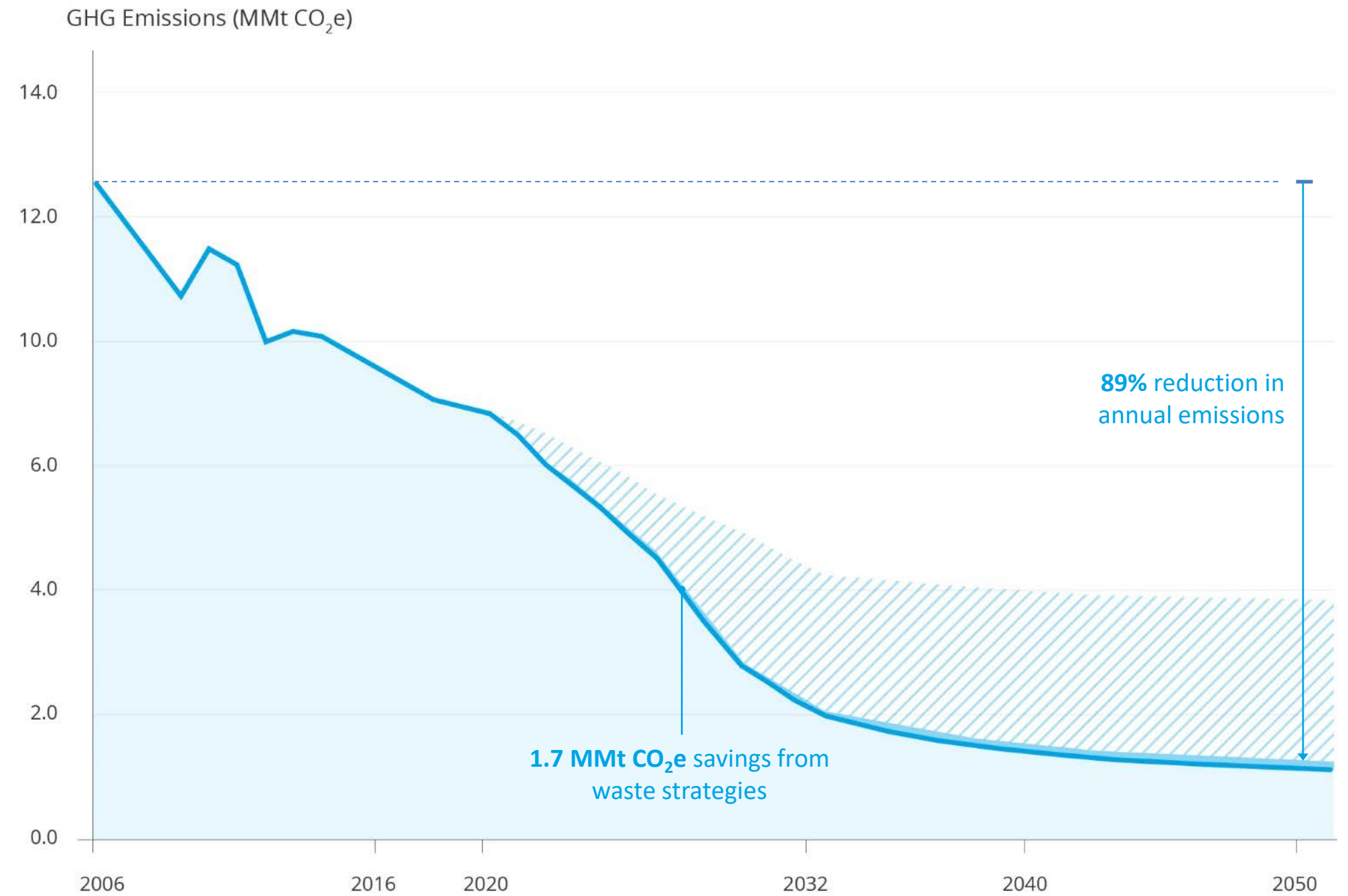
- Reduce vehicle trips through:
 - Fare-free transit
 - Improved transit service
 - Efficient land use / Transit-oriented development
 - Improved safety, infrastructure, and comfort for walking and biking
 - Increased parking costs
 - Congestion pricing
- Reduce vehicle emissions through:
 - Electrification of public vehicles and regional rail
 - Electrification of private vehicles
 - Incentives for zero-emission vehicles (ZEVs)
 - Minimum efficiency standards for new registrations
 - Require fleets using public space to be all ZEV
 - Cap-and-invest policy to curb emissions from transportation fuels

WASTE



STRATEGIES FOR WASTE

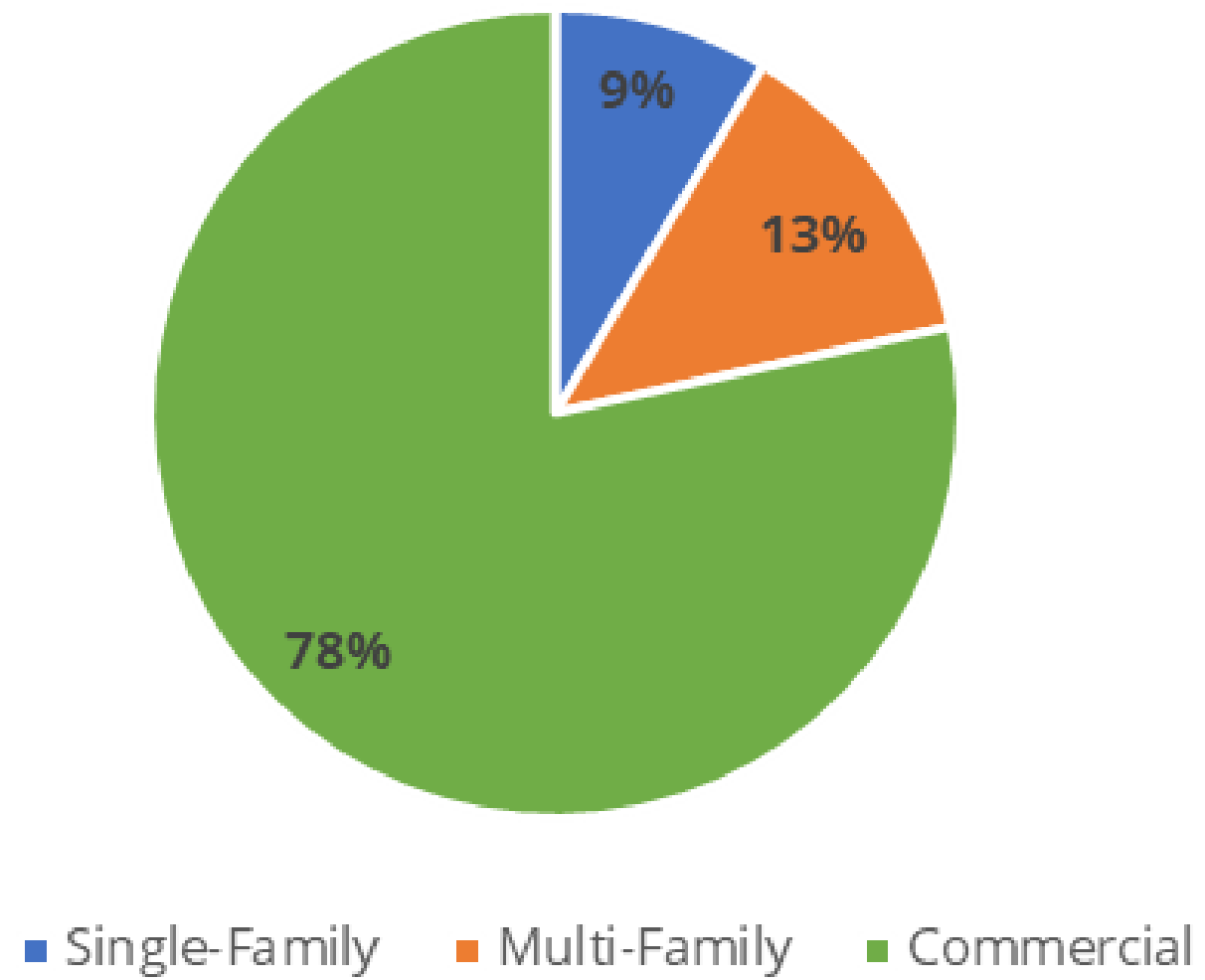
- Source Reduction
- Increase Composting & Recycling
- Consider Lifecycle Emissions



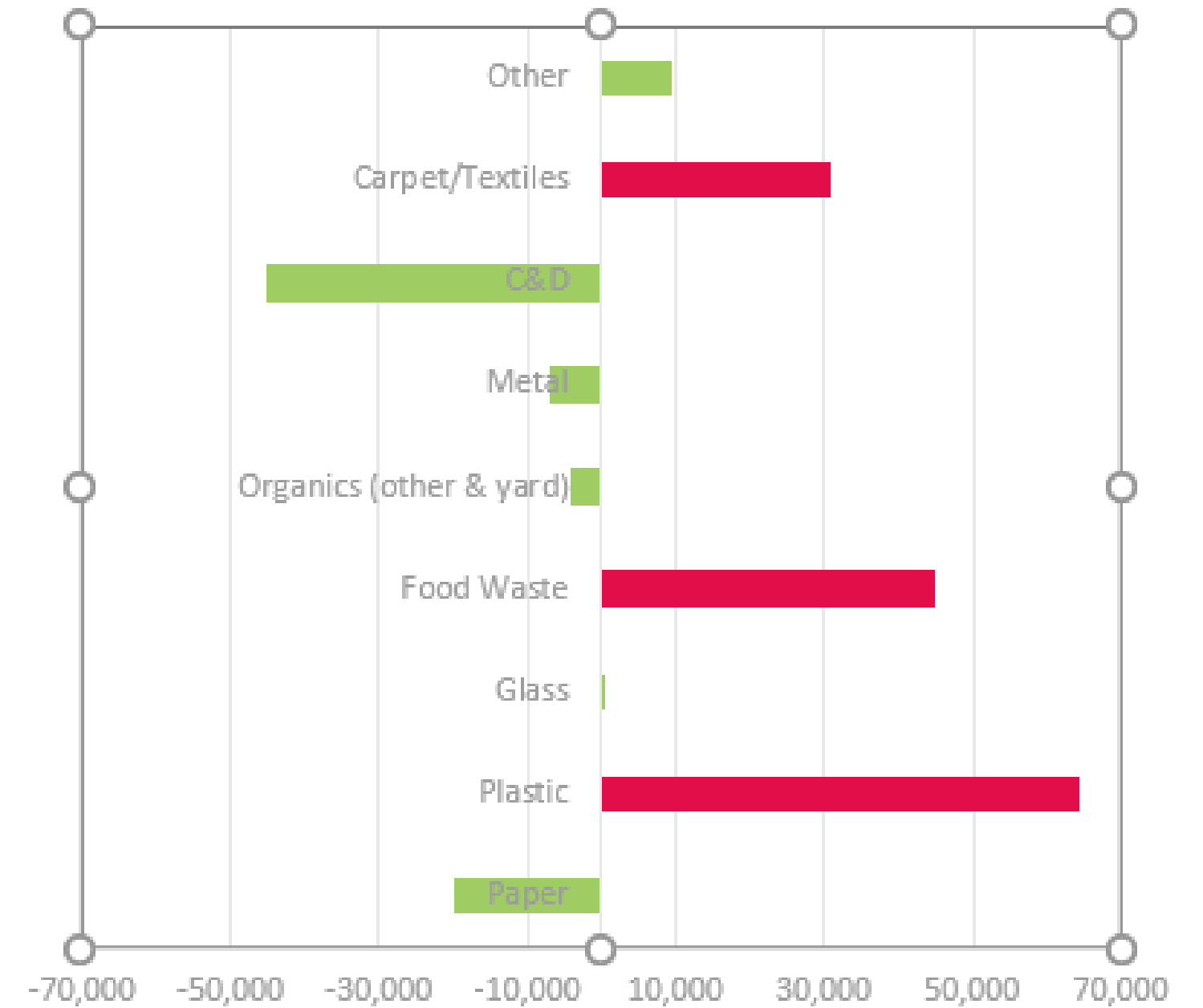
Annual emissions after all carbon neutrality framework strategies

KEY FOCUS AREAS

Disposal Emissions by Source



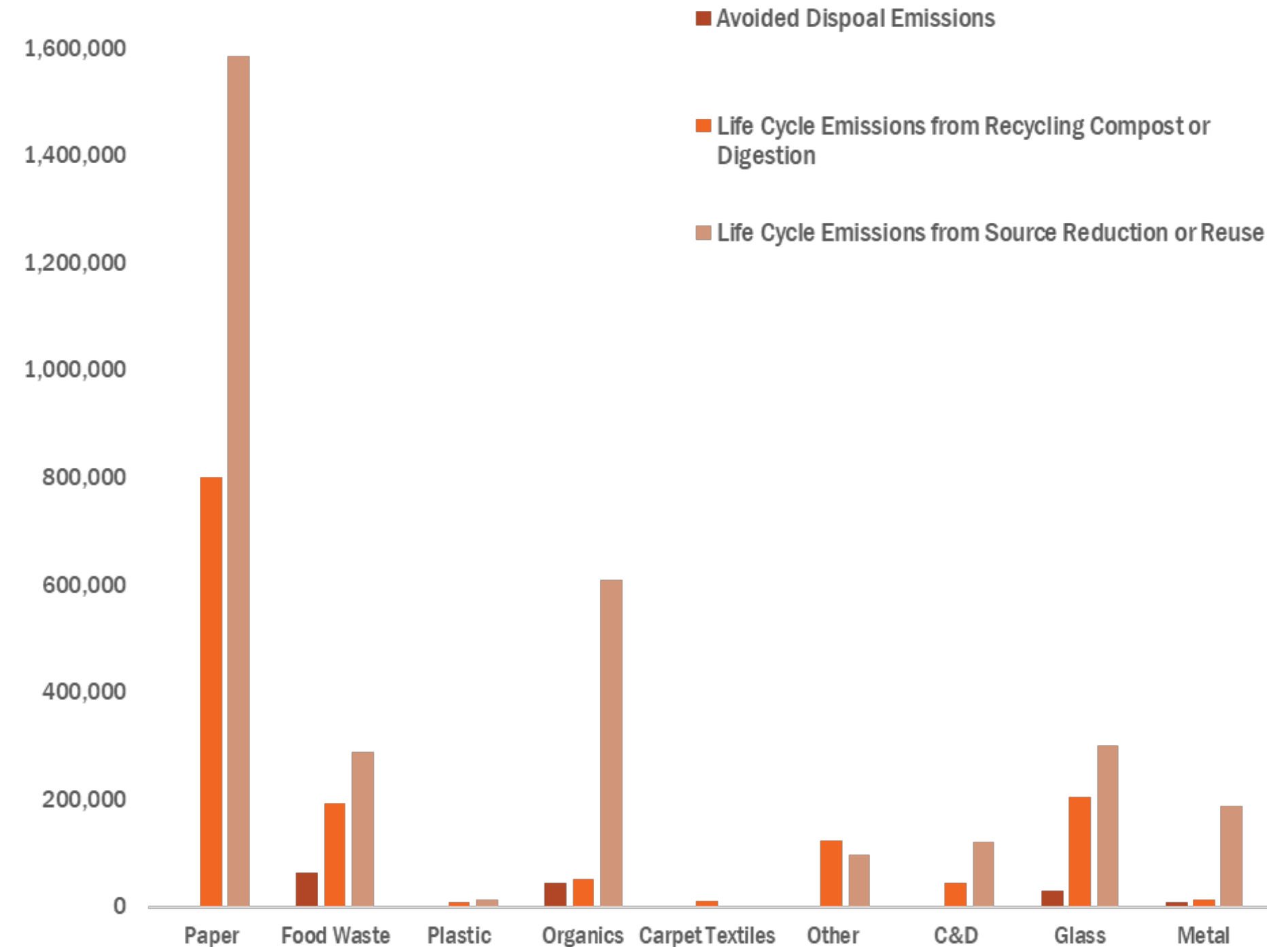
Disposal Emissions by Material



LIFECYCLE EMISSIONS BY MATERIAL

- Disposal emissions are only a fraction of the lifecycle emissions from our waste stream
- Addressing **source reduction**, **reuse**, and **recycling** cut carbon emissions throughout the supply chain that far outweigh savings from disposal alone

Potential Annual Emissions Savings by Material Type
(100% diverted)



MILESTONES & METRICS: WASTE



TARGETS:

- 60% of organics composted by 2032
- Zero Waste (80% diversion) by 2050

MEASURE OF PROGRESS:

↓ Per Capita Waste Generation

↑ Citywide Diversion Rate

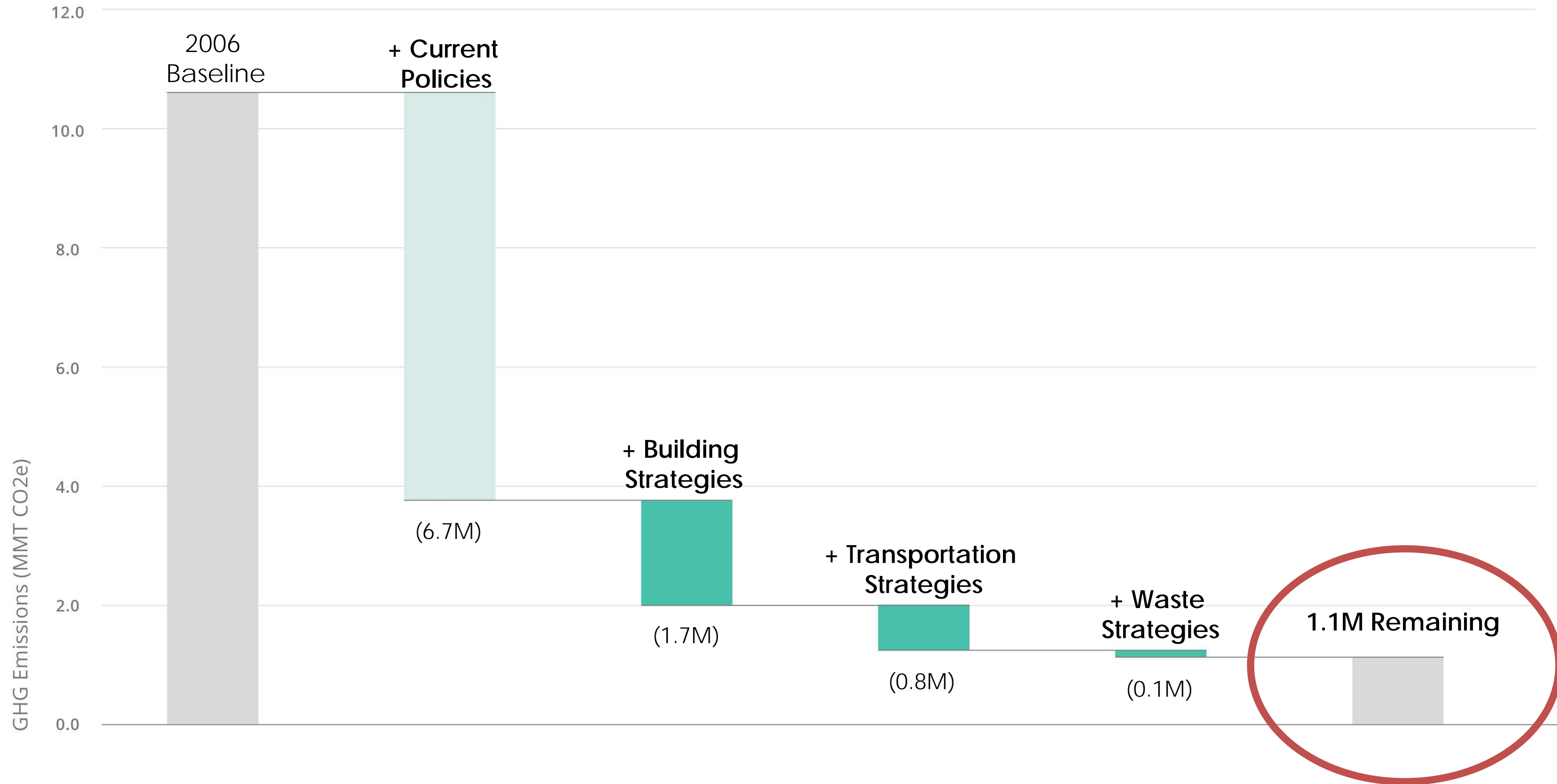


POSSIBLE WASTE POLICIES

- Increase organic waste diversion by:
 - Developing regional organics processing facility
 - Offering curbside food and yard material collection
 - Require private organics collection
- Optimize recycling for target material streams (e.g. textiles, hard to recycle plastics and corrugated materials)
 - Establish public/private partnerships
- Facilitate behavior shifts District-wide by:
 - Evaluating obstacles to purchasing and disposal options
 - Evaluating incentive structures to reduce waste and increase recycling and composting

WHAT'S LEFT

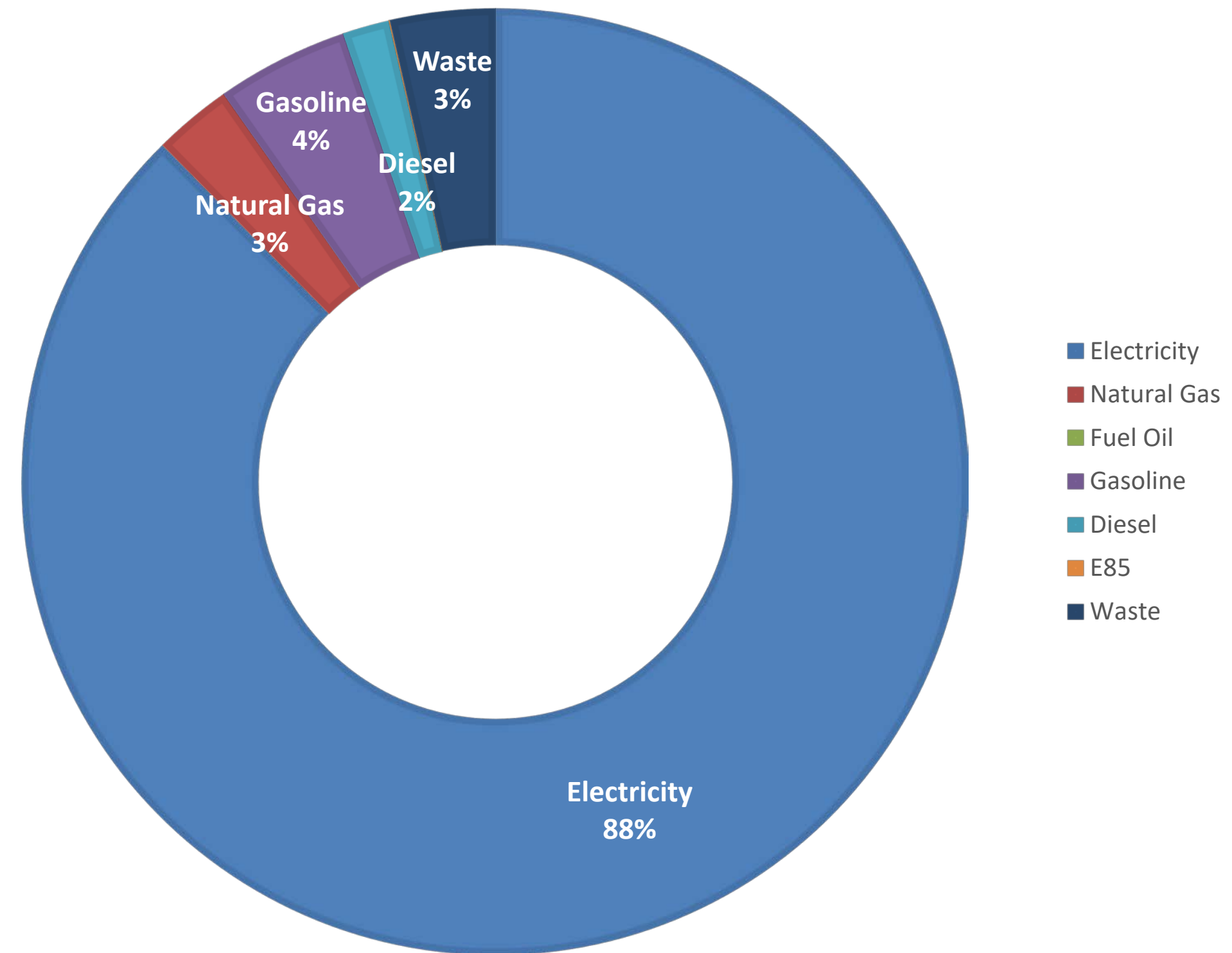
KEY STRATEGIES



WHY OFFSETS?

Remaining ~1 million metric tons CO₂e

- <100% electrification
- Not all electricity assumed to be renewable
- Zero Waste is 80% diversion



Emissions by Fuel Type in 2050

EQUITY & RESILIENCE

OUR APPROACH

The community tells us what goals to solve for.

The technical assessment tells us what systems we must change.

The community identifies what we'll need to tackle in order to meet these targets.

And the policy roadmap will identify what we need from policies to meet both our carbon and equity goals.



**Policies to
Achieve a**

Safe
Equitable
Livable
Accessible
Prosperous
Healthy
Resilient

**+ Carbon
Free DC**

Equity & Resilience Evaluation Criteria



Health & Wellbeing



Safety



Affordability



Jobs & Economic Development



Access



Extreme Heat



Extreme Weather



Flooding & Sea Level Rise



Air Quality



Safety

SAMPLE MATRIX

CATEGORY	KEY MILESTONES		GHG REDUCTION POTENTIAL [Tons of CO2e] ■ = 250,000 Tons		SAMPLE POLICIES/ACTIONS	EQUITY POTENTIAL	RESILIENCE CO-BENEFITS	FINANCING STRATEGIES
	Gradual	Accelerated	Gradual	Accelerated				
New Buildings	2026	2021			Establish a path toward NZE codes in all residential and commercial buildings.			Energy Service Companies, DC Green Bank, DC PACE, Energy Efficiency Incentives, Other Third-Party Finance Structures
Transit Improvements	2044	2024			Transit Priority Improvements			Operations funding: Local taxes and user fees Capital funding: Federal grants



TYING POLICIES BACK TO THE COMMUNITY VISIONS

A home to live in that is healthy, safe, and affordable to keep comfortable



Affordable housing for all income levels & household sizes enabling residents to remain in the District



City residents have lower per capita emissions

Allowing density for all income levels promotes this and prevents increased transportation emissions from suburban commutes



Indoor air quality, free of mold and lead



Modern, electric appliances promote safety and healthy indoor air

Green construction practices promote ventilation, natural light, and humidity controls



Residents have and can use their air conditioning in the summer, and heat in the winter without worry



Energy-efficient, weatherized homes use less energy to keep comfortable, lowering energy bills

Increased local solar & battery storage reduces electricity bills

NEXT STEPS

NEXT STEPS

- Webinar recording & slides will be posted to DOEE website
<https://doee.dc.gov/service/climate-change>
- Focused discussions on policy ideas & approaches:
<https://carbon-neutral-2050.eventbrite.com>

Buildings:

- Housing Affordability: Wednesday, 9/23, 2-3pm
- New Construction & Embodied Carbon: Wednesday, 9/23, 3-4pm
- Electrification: Monday, 9/28, 3-4pm
- Existing Building Efficiency: Wednesday, 9/30, 2-3pm

Transportation:

- Mobility & Mode Shift: Thursday, 9/24, 11am – 12pm
- Electrification: Thursday, 10/1, 10am – 11am

QUESTIONS?

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