



**Council Work Session:
Carbon Neutrality and A²ZERO
September 14th, 2020**

Presentation Outline

1. Refresher on A²ZERO
2. Updated Greenhouse Gas Emissions Inventory
3. Activities Since June 2020
4. Upcoming Activities
5. Next Steps and Discussion

COVID-19 & OSI

- Emergency Operations Center
- Dependent care coordination
- Work from home committee
- Internal website for caregivers

A²ZERO REFRESHER

A²ZERO VISION



Together, creating and implementing a just transition to carbon neutrality by the year **2030.**



ANN ARBOR'S
LIVING CARBON NEUTRALITY PLAN
MARCH 2020

The Plan

ACTION SUMMARY TABLE

	Total Costs	GHG Reduction	%Total emissions	\$/ton	Co-Benefits
STRATEGY 1					
Community Choice Aggregation	\$3,245,000	784,000	35.8%	\$4	Coming Soon
Bulk Purchase of Renewables	\$605,000	85,000	3.9%	\$7	
Community Solar Program	\$205,000	11,500	0.5%	\$18	
Landfill Solar Project	\$80,000	23,000	1.1%	\$3.5	
STRATEGY 2					
Electrification	\$7,100,000	362,200	16.5%	\$20	Coming Soon
Electrify All Buses	\$80,575,000	13,800	0.6%	\$5,839	
Bulk Purchase EVs	\$700,000	122,900	5.6%	\$6	
Private EV Fleets	\$123,000	0	0.0%		
City EV Fleet	\$4,000,000	1,100	0.1%	\$3,636	
EV Infrastructure	\$42,000,000	0	0.0%		
STRATEGY 3					
Bulk Purchase of Energy Efficiency	\$7,100,000	242,500	16.5%	\$4	Coming Soon
Building Code Requirements	\$80,575,000	48,300	0.6%	\$40	
LED Lighting	\$700,000	2,600	5.6%	\$1,208	
Benchmarking	\$123,000	0	0.0%		
Loan Loss Reserve	\$4,000,000	0	0.0%		
Energy Concierge & Community Education	\$42,000,000	0	0.0%		
Net Zero Energy Affordable Housing	\$600,000	400	0.0%	\$2,000	
Green Rental Housing Program	\$530,000	0	0.0%		
Green Business Challenge	\$700,000	0	0.0%		
Aging in Place Efficiently	\$150,000	0	0.0%		
Weatherization Expansion	\$1,550,000	0	0.0%		
STRATEGY 4					
Non-Motorized Plan	\$3,245,000	60,400	2.8%	\$40	Coming Soon
Expand Local and Regional Transit	\$605,000	93,200	4.3%	\$7047	
Park and Ride	\$205,000	28,400	1.3%	\$5,986	
Duplex/Triplex/ADUs	\$80,000	2,200	0.1%	\$114	
Mixed-Use Zoning	\$365,000	0	0.0%		
Parking Rates	\$4,500,000	0	0.0%		
STRATEGY 5					
Year Round Composting	\$26,000,000	400	0.1%	\$65,000	Coming Soon
Expand Commercial Recycling	\$18,400,000	5,600	0.3%	\$3,286	
Sustainable Material Use and Reuse	\$270,000	0	0.0%		
Circular Economy	\$270,000	0	0.0%		
Plant-Based Diet	\$208,400	0	0.0%		
Refrigerant Recycling	\$179,400	0	0.0%		
STRATEGY 6					
Resilience Hubs	\$5,025,000	2,500	0.1%	\$2,010	Coming Soon
Neighborhood and Youth Ambassadors	\$350,000	0	0.0%		
Tree Canopy	\$1,160,000	450	0.0%	\$2,578	
Neighborhood Asset Mapping	\$300,000	0	0.0%		
Emergency Kits	\$350,000	0	0.0%		
Community and Local Market	\$300,000	0	0.0%		
Equity Program	\$200,000	0	0.1%		
STRATEGY 7					
SA2T Carbon Plan	\$1,000,000	0	0.0%		Coming Soon
Internal Carbon Tax	\$75,000	0	0.0%		
Offsets	\$9,440,000	298,500	13.6%	\$32	
Total	\$1,056,403,800	2,188,950	100.0%		



A²ZERO STRATEGIES

STRATEGY 1:

Power Our Electrical Grid with 100% Renewable Energy

STRATEGY 3:

Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

STRATEGY 5:

Change the Way We Use, Reuse, and Dispose of Materials

STRATEGY 2:

Switch our Appliances and Vehicles from Gasoline, Diesel, Propane, Coal, and Natural Gas to Electric

STRATEGY 4:

Reduce the Miles we Travel in our Vehicles by at least 50%

STRATEGY 6:

Enhance the Resilience of Our People and Our Place

OTHER STRATEGIES:

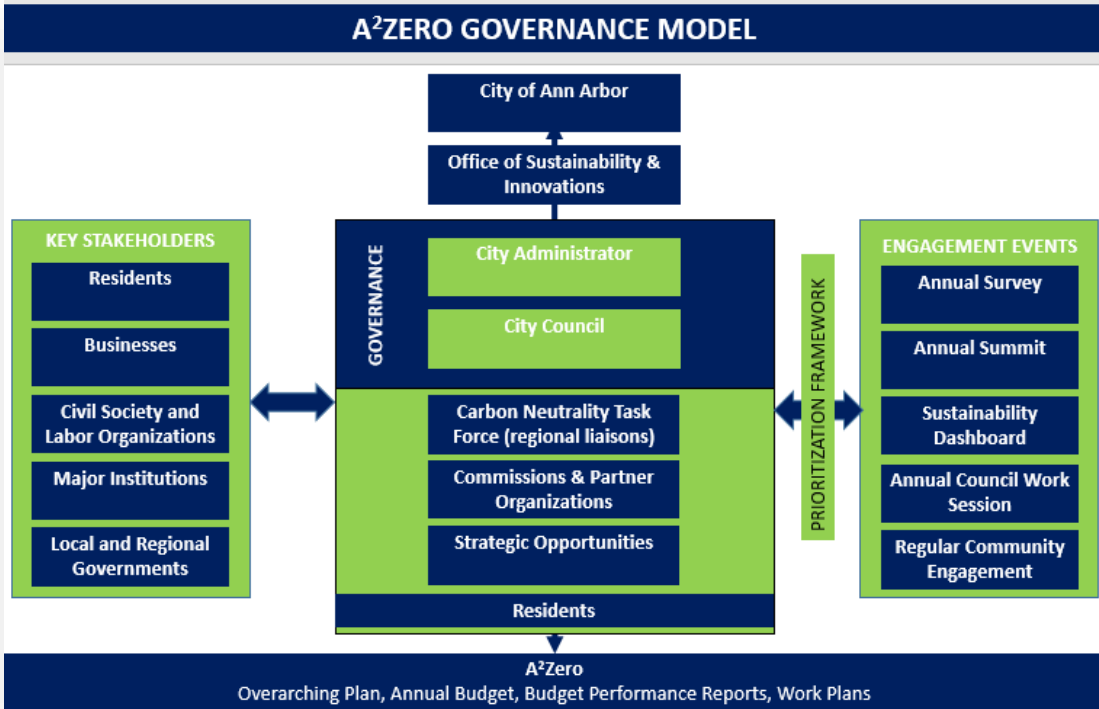
This strategy covers the remaining programs and activities that don't fit into other areas. It also includes greenhouse gas emissions offsets to close out any

THE ACTIONS

1. Community Choice Aggregation
2. On-Site Renewable Energy Generation with Battery Storage (Bulk Buys)
3. Community Solar Program
4. Landfill Solar Project
5. Home and Business Electrification Policies and Support
6. Electrify Buses
7. Support Community Electric Vehicle and Solar Bulk Buys
8. Electrify City Fleet
9. Electrify Private Fleet
10. Expansion of Electric Vehicle Charging Infrastructure
11. Support Transition to More Energy Efficient Homes and Businesses
12. Update Building Codes
13. LED Powered Streetlights and Traffic Signals
14. Energy Disclosure / Benchmarking
15. Loan Loss Reserve
16. Energy Concierge and Community Education
17. Net Zero Energy Affordable Housing
18. Green Business Challenge
19. Green Rental Housing Program
20. Aging in Place Efficiently
21. Expansion of Weatherization Program
22. Implement Non-Motorized Plan
23. Expand and Improve Local Transit
24. Expand and Improve Regional Transit
25. Increase Number of Park and Rides and Ensure Seamless Connection to Transit
26. Increase Housing Opportunity
27. Mixed-Use Neighborhoods
28. Tiered Parking Rates
29. Expansion of Composting Program
30. Expansion of Commercial Recycling
31. Require Sustainable Materials in New and Existing Developments
32. Move Toward a Circular Economy
33. Support a Plant Rich Diet
34. Enhance Refrigerant Recycling and Reuse Program
35. Invest in Resilience Hubs
36. Foster Neighborhood and Youth Ambassadors
37. Preserve & Enhance Local Tree Canopy
38. Conduct Asset and Needs Mapping of Neighborhoods
39. Assist in Assembling and Disseminating Emergency Preparedness Kits
40. Implement Sensors to Monitor Heat, Air Quality, Waterways, and Flooding
41. Equity Programs
42. Sustaining Ann Arbor Together Grant Program
43. Internal Carbon Price
44. Greenhouse Gas Emissions Offsets

SUPPORTING DOCUMENTS

A²ZERO GOVERNANCE MODEL



A²Zero Investment Plan

OVERVIEW

This document outlines an investment approach for the A²Zero Carbon Neutrality Plan. It includes an alternative framing around our community's commitment to carbon neutrality, a look at the historical impact of our community's greenhouse gas emissions, and a projected investment scenario, highlighting investments and costs specific to actions identified as falling under the responsibility of the City of Ann Arbor, and a presentation of the cost of inaction. As there is no way to know exactly what the funding landscape will look like 10 or 11 years into the future, the investment scenario should be viewed as directional and only one possible scenario of what the future may look like. Many things will inform what resources are actually available to do this work and staff will continue to aggressively pursue funding opportunities, collaborations, and innovative financing mechanisms to lower the upfront cost to the city and our residents.

FRAMING

To-date, the financial conversation around A²Zero has focused on the costs to implement the plan. While there will be costs, nearly all actions are investments. What this means is that investing in nearly all of the actions return benefits to the City, to our residents, to our businesses, or to society as a whole. As illustration, data shows that \$1 invested in energy efficiency saves between \$4 and \$5 in energy costs (DTE's figures are closer to \$5).^{1,2} Moreover, every one dollar invested in preparedness and resilience shows a return on investment of \$7 in avoided costs.³ Onsite renewable energy has a payback of 10-12 years but are warranted for 25 years meaning 13-15 years of free energy.⁵

PRIORITIZATION FRAMEWORK

GHG MITIGATION CRITERIA		Scoring
The action has a high (over 5%) community greenhouse gas emissions reduction potential past 2030		6
The action has a medium (between 3%-5%) community-wide greenhouse gas reduction potential past 2030		4
The action has a small (between 0%-2%) community greenhouse gas reduction potential past 2030		2
The action has a high (over 5%) community greenhouse gas reduction potential before the year 2030		6
The action has a medium (between 3%-5%) community greenhouse gas reduction potential before 2030		4
The action has a small (between 0%-2%) community greenhouse gas reduction potential before 2030		2

COST CRITERIA

COST CRITERIA		Scoring	
City Cost Effectiveness	Benefits Significantly Outweigh Costs	Long-term financial benefits greatly outweigh implementation costs	2
	Benefits Outweigh Costs	Long-term financial benefits outweigh implementation costs	1
	Benefits Match Costs	Long-term financial benefits match implementation costs OR don't know the overall cost effectiveness of the action	0
	Costs Outweigh Benefits	Implementation costs slightly outweigh the long-term financial benefits	-1
	Costs Significantly Outweigh Benefits	Implementation costs significantly outweigh the long-term financial benefits	-2
City Relative Cost (Capital)	None	The City can pursue without a major capital investment	2
	<\$5M	The City can pursue with a modest capital investment OR don't know what kind of capital investment is needed	1
	>\$5M	The City requires a major capital investment to pursue this action	0
City Relative Cost (Operation)	Decreases Costs	Action will minimize operating costs for the City (i.e., staffing, maintenance)	2
	No Impact	Action will have no impact on operating cost for the City OR don't know the relative operating costs	0
	Increases Costs	Action will not minimize and may increase operating costs (i.e., staffing, maintenance) for the City	-2
Residential and Businesses Cost Effectiveness	Benefits Outweigh Costs	Long-term financial benefits outweigh implementation costs	2
	Benefits Match Costs	Long-term financial benefits match implementation costs OR don't know the overall cost effectiveness of the action	0
	Costs Outweigh Benefits	Long-term financial benefits do not outweigh implementation costs	-2

order to create an opportunity or to reduce future costs. In much the same way, to make an investment in our community. A²Zero is a proposal to spend money on our community's greenhouse gas emissions and thereby eliminate future social costs of climate change, businesses, and the surrounding area which will more than pay back the initial investment.

SCENARIO

Put together a projected investment scenario for A²Zero. There are many possible scenarios that could be funded so the attached document should be viewed as one possible scenario, but it should be considered directional as it is impossible to know what types of investments or public-private partnership may exist for all 7 strategies identified in the Plan over the plan were modeled using today's dollars. It is highly likely, however, that many of the costs within the plan.



GREENHOUSE GAS EMISSIONS INVENTORY UPDATE



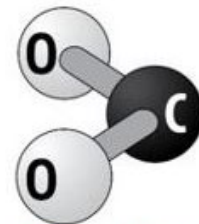
GHG Inventory Background

Best guess based on aggregate, scaled, and/or modeled data

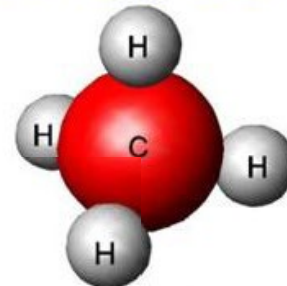
Estimated using ICLEI US Community Protocol

Greenhouse gases included:

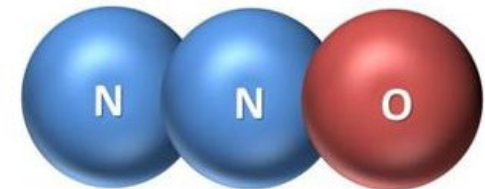
1. CO_2
2. N_2O – 28x more potent than CO_2
3. CH_4 – 265x more potent than CO_2



Carbon Dioxide

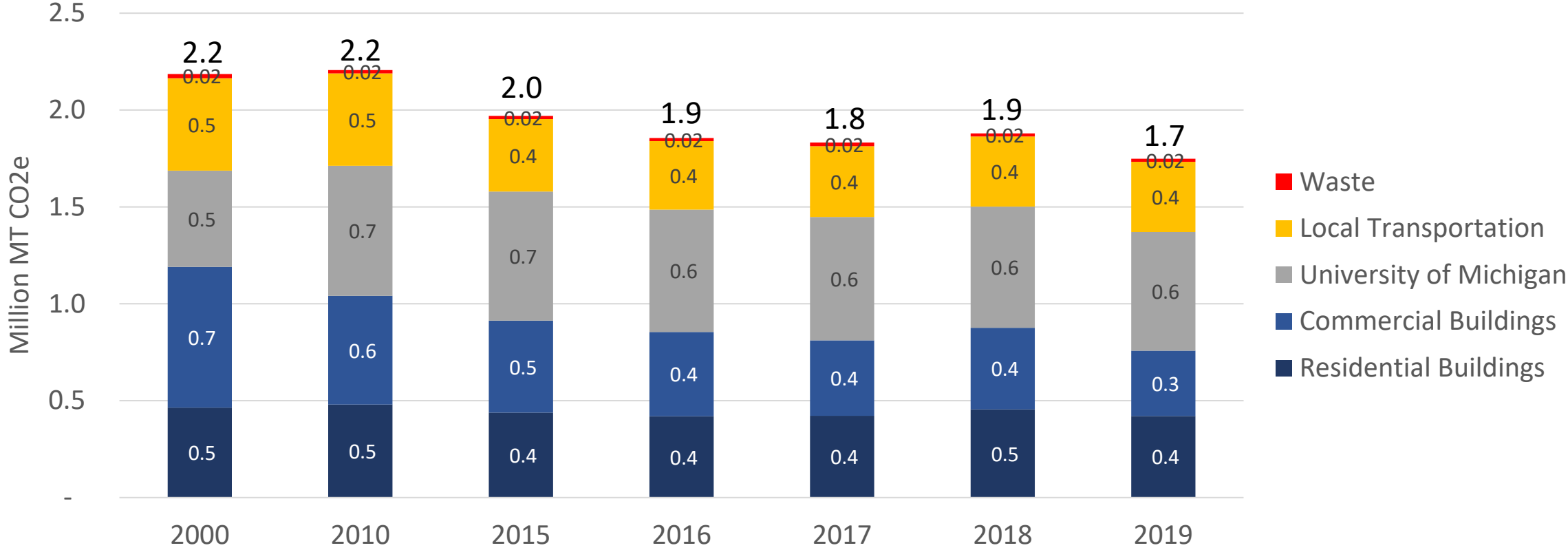


Methane



Nitrous Oxide

Simple Inventory Trend



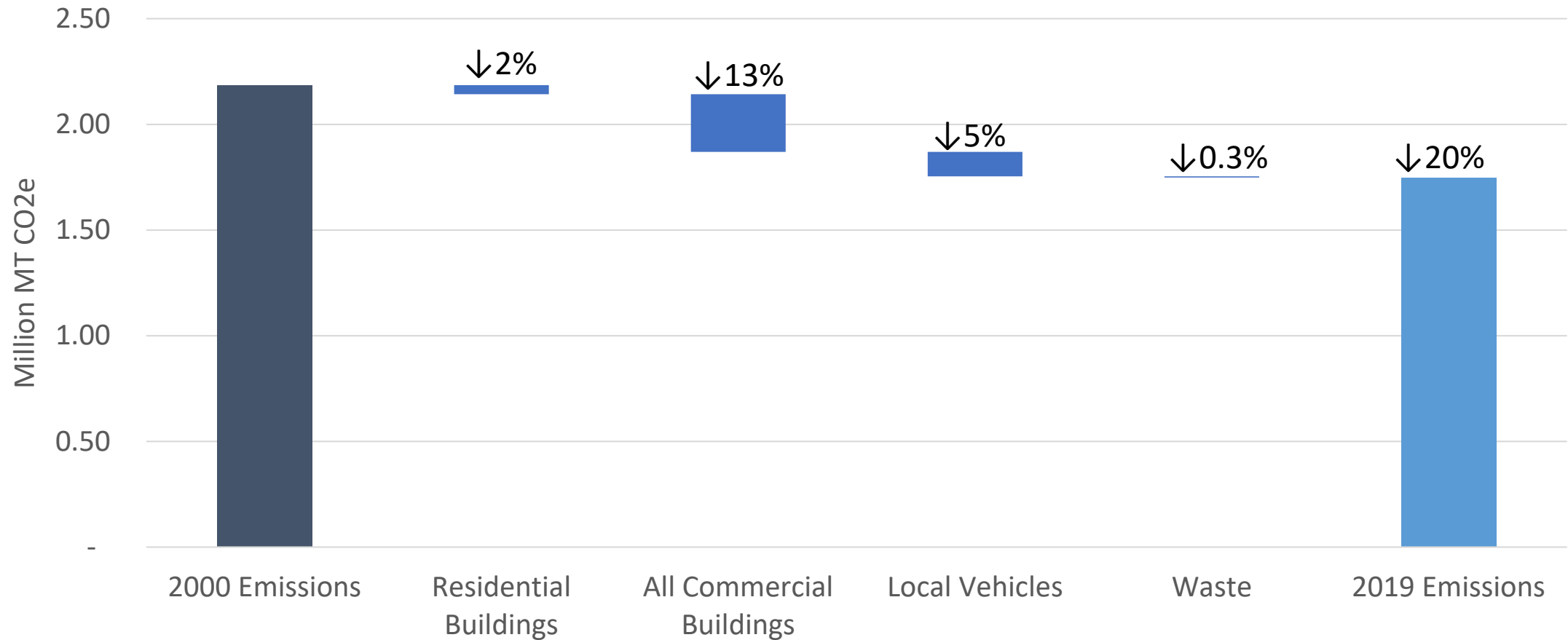
Change in emission levels since 2000:

0%

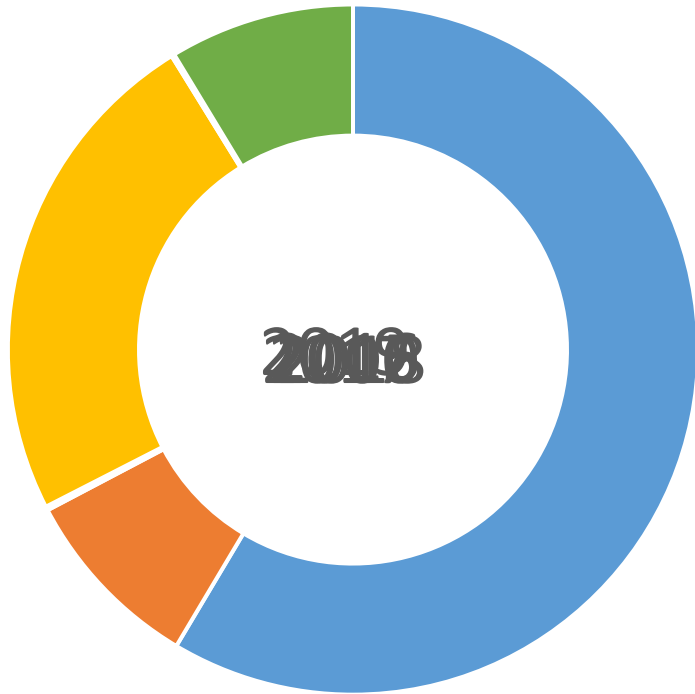
1%



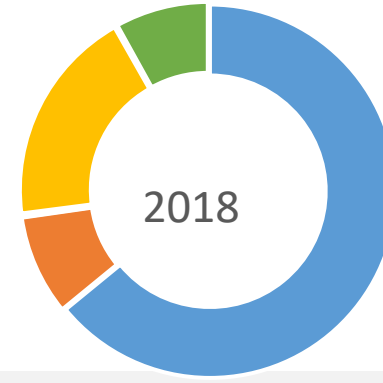
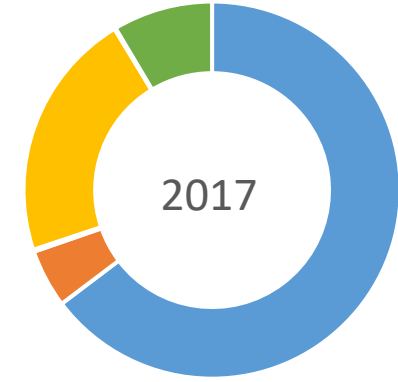
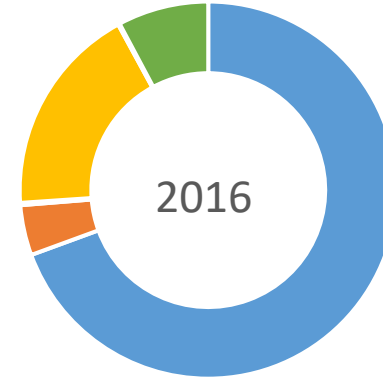
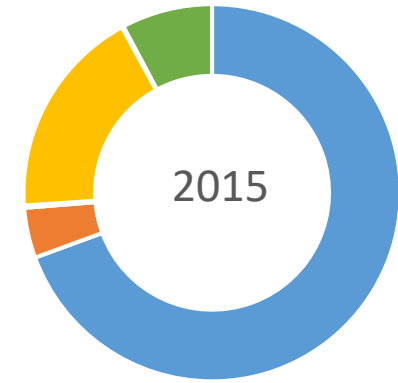
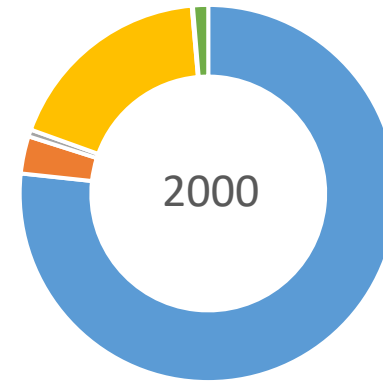
Changes from 2000 to 2019



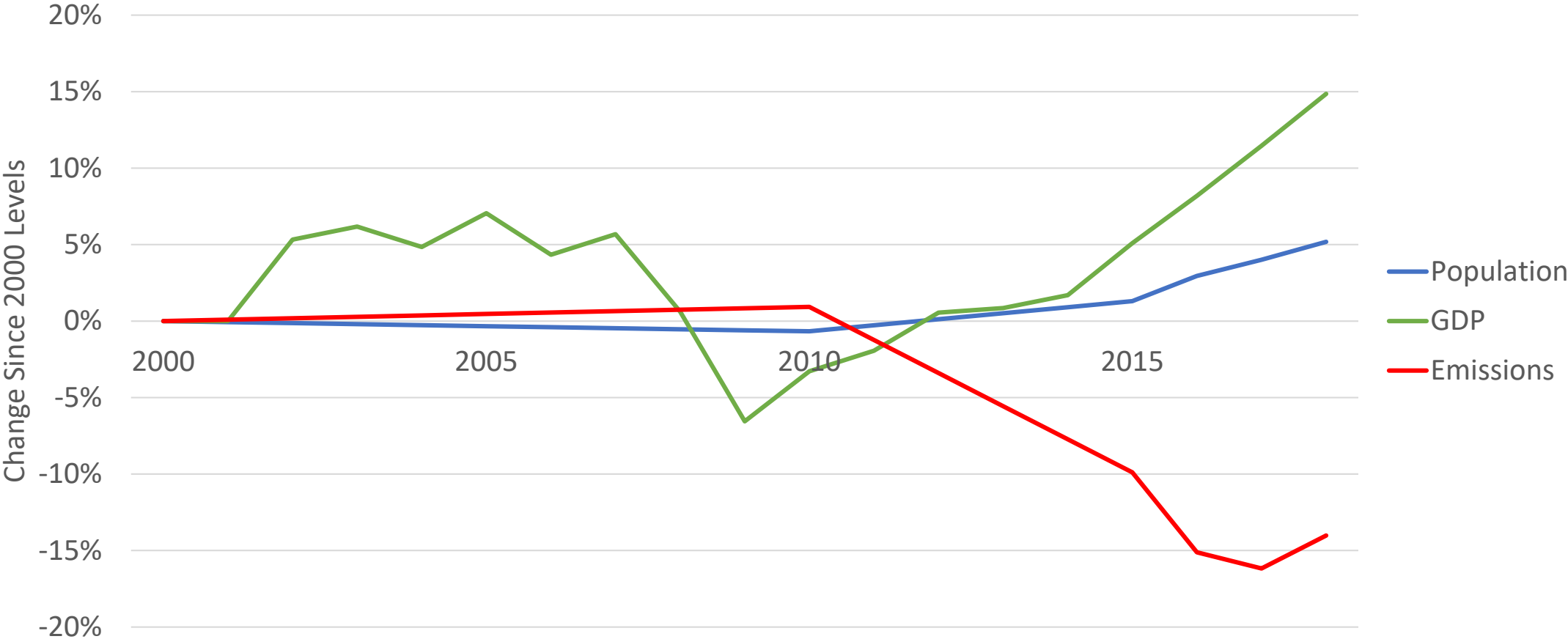
DTE Fuel Mix



- Coal
- Natural Gas
- Oil
- Nuclear
- Hydro
- Renewables



Emission Trends



Simple and Expanded Inventory

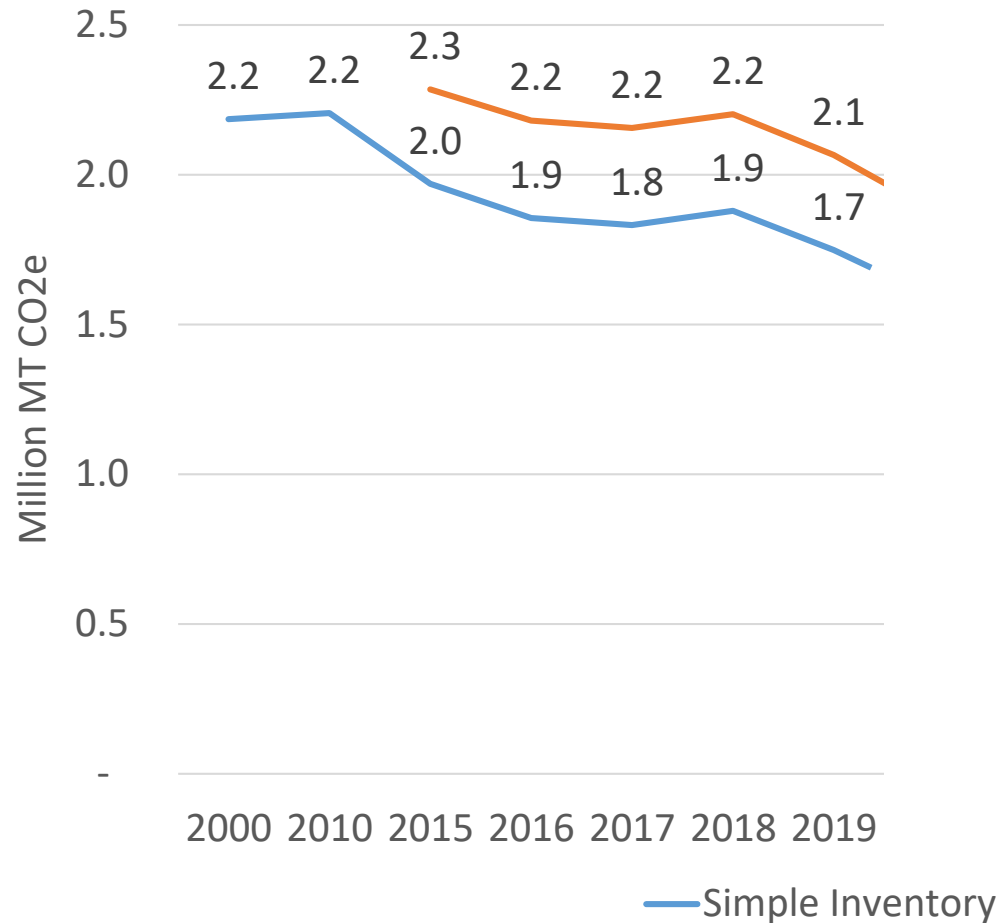
Simple Inventory:

- Use of electricity and natural gas in buildings
- In-boundary passenger and commercial vehicles
- Generated solid waste
- Wastewater processing

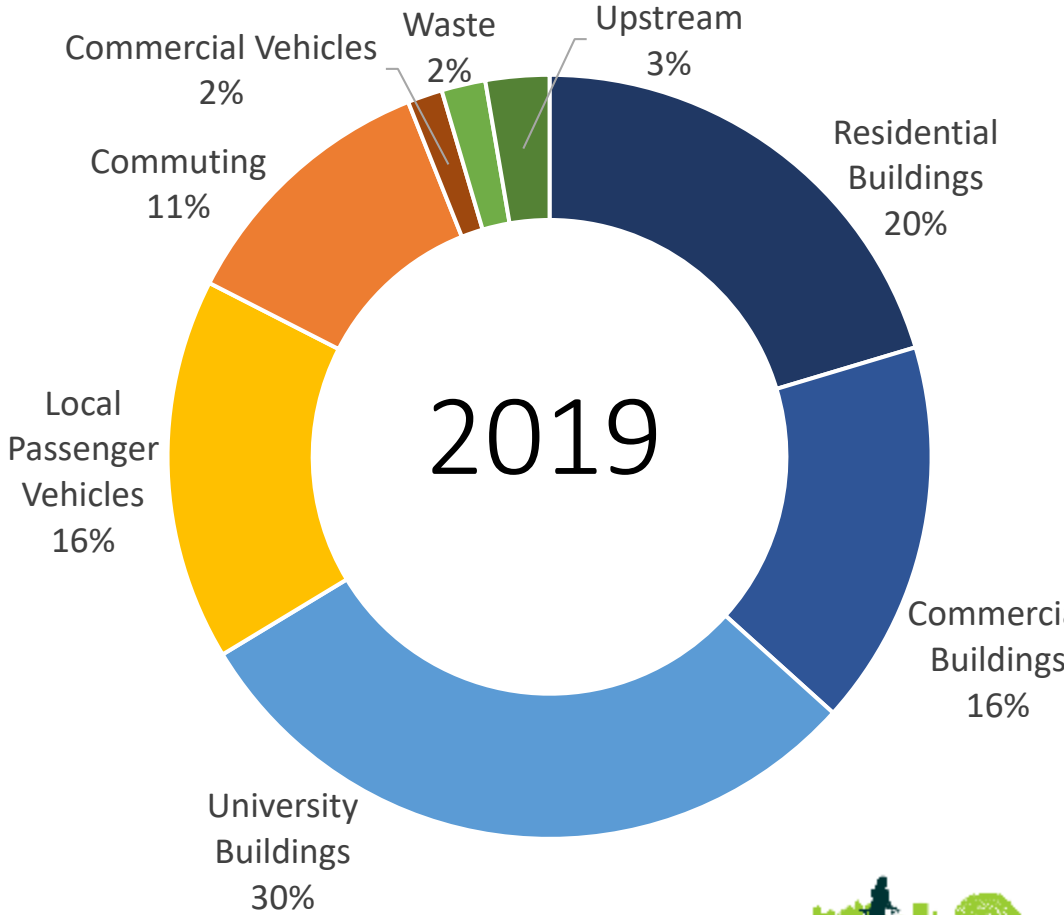
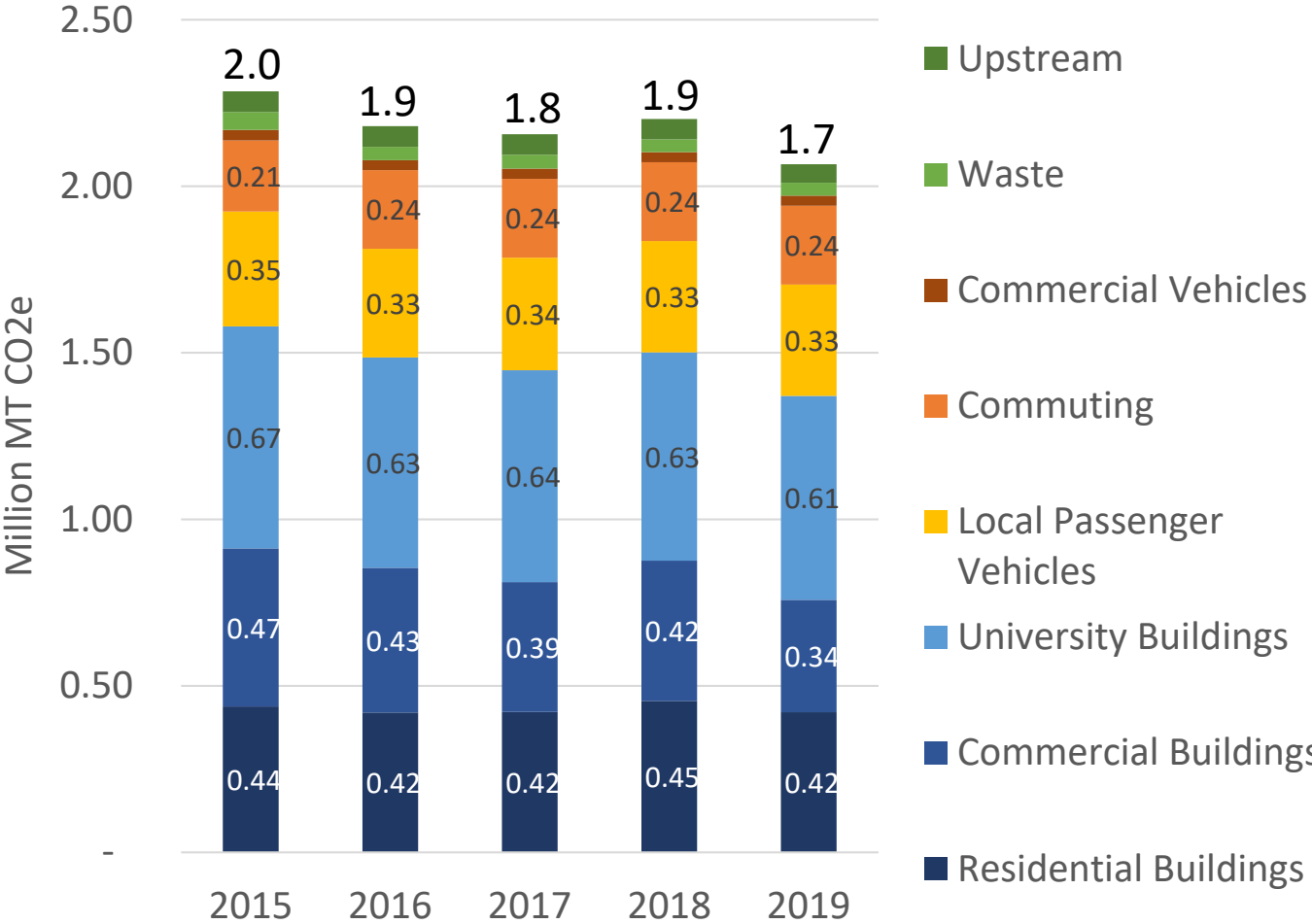
Expanded Inventory

- Use of electricity and natural gas in buildings
- In-boundary passenger and commercial vehicles
- Commuting passenger vehicles
- Rail and aviation
- Generated solid waste
- Closed City landfill
- Wastewater processing
- Upstream emissions

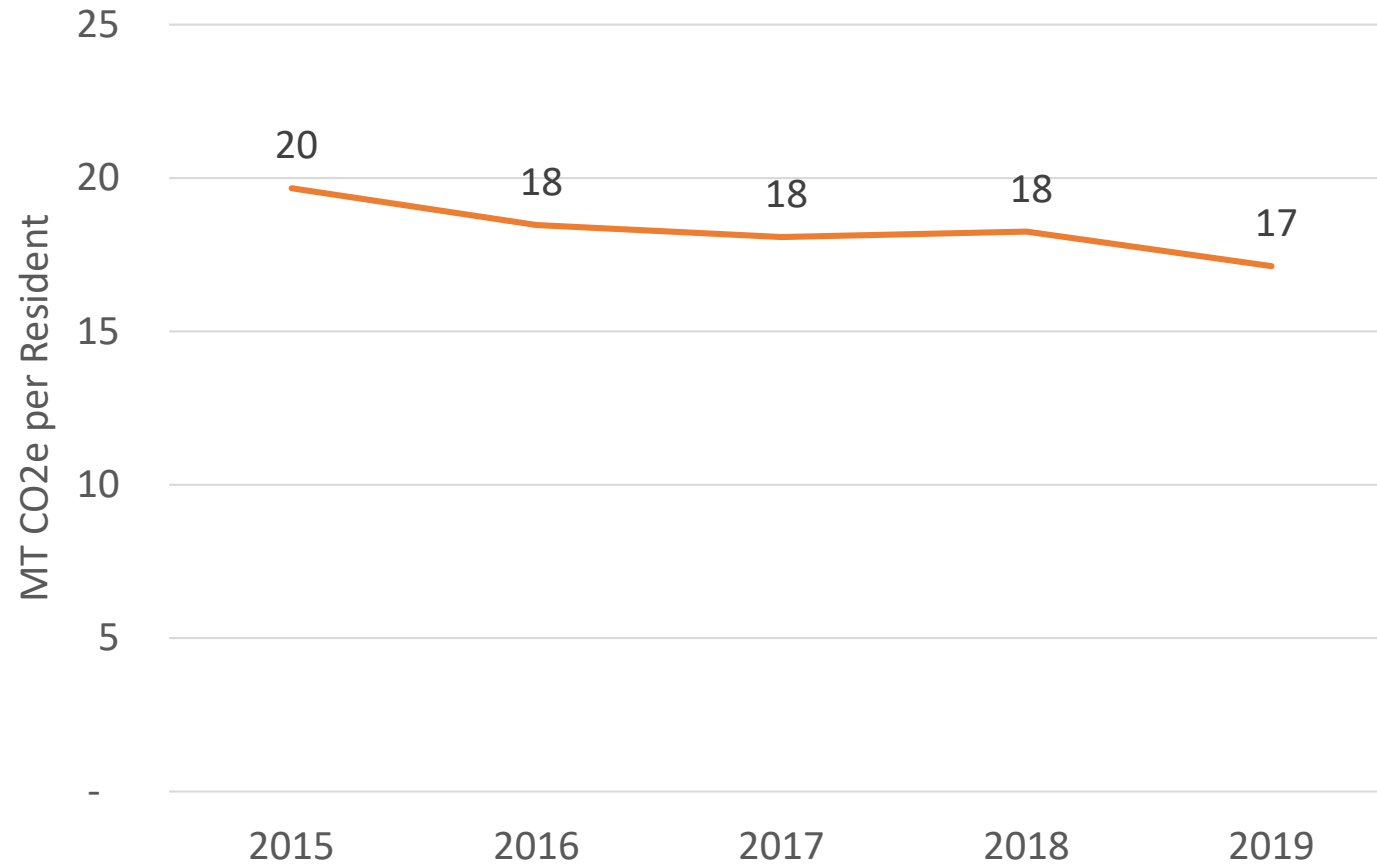
Simple and Expanded Inventory Trends



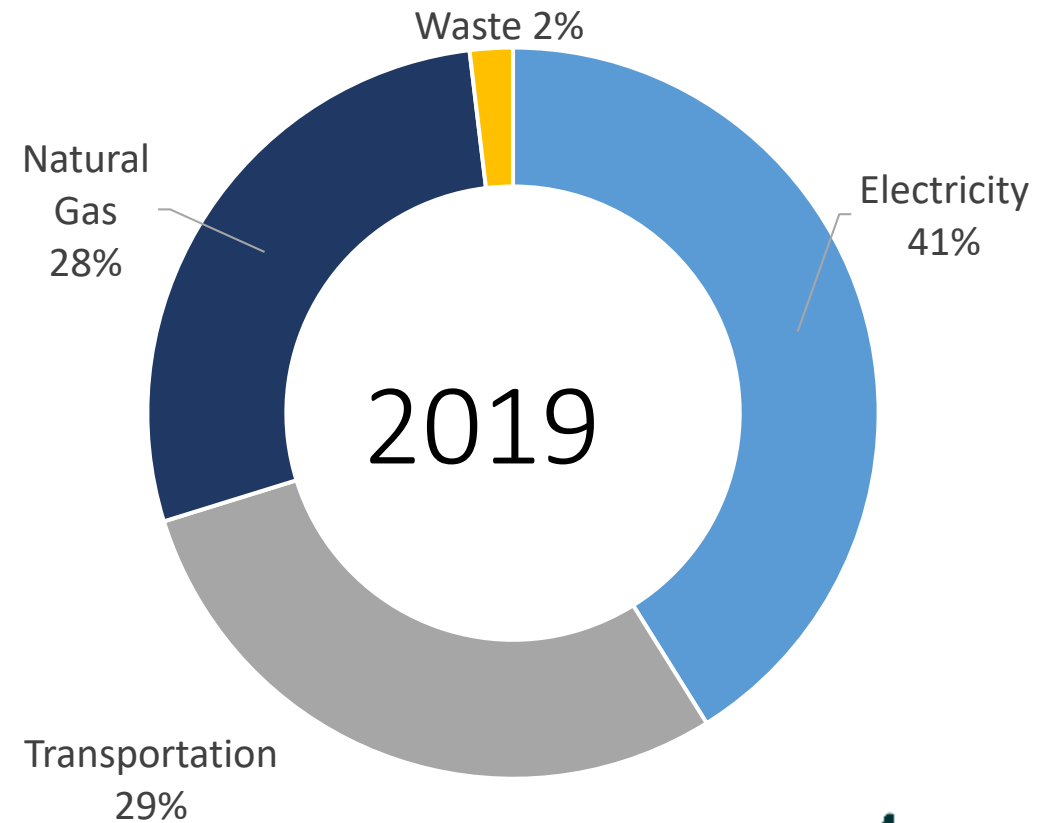
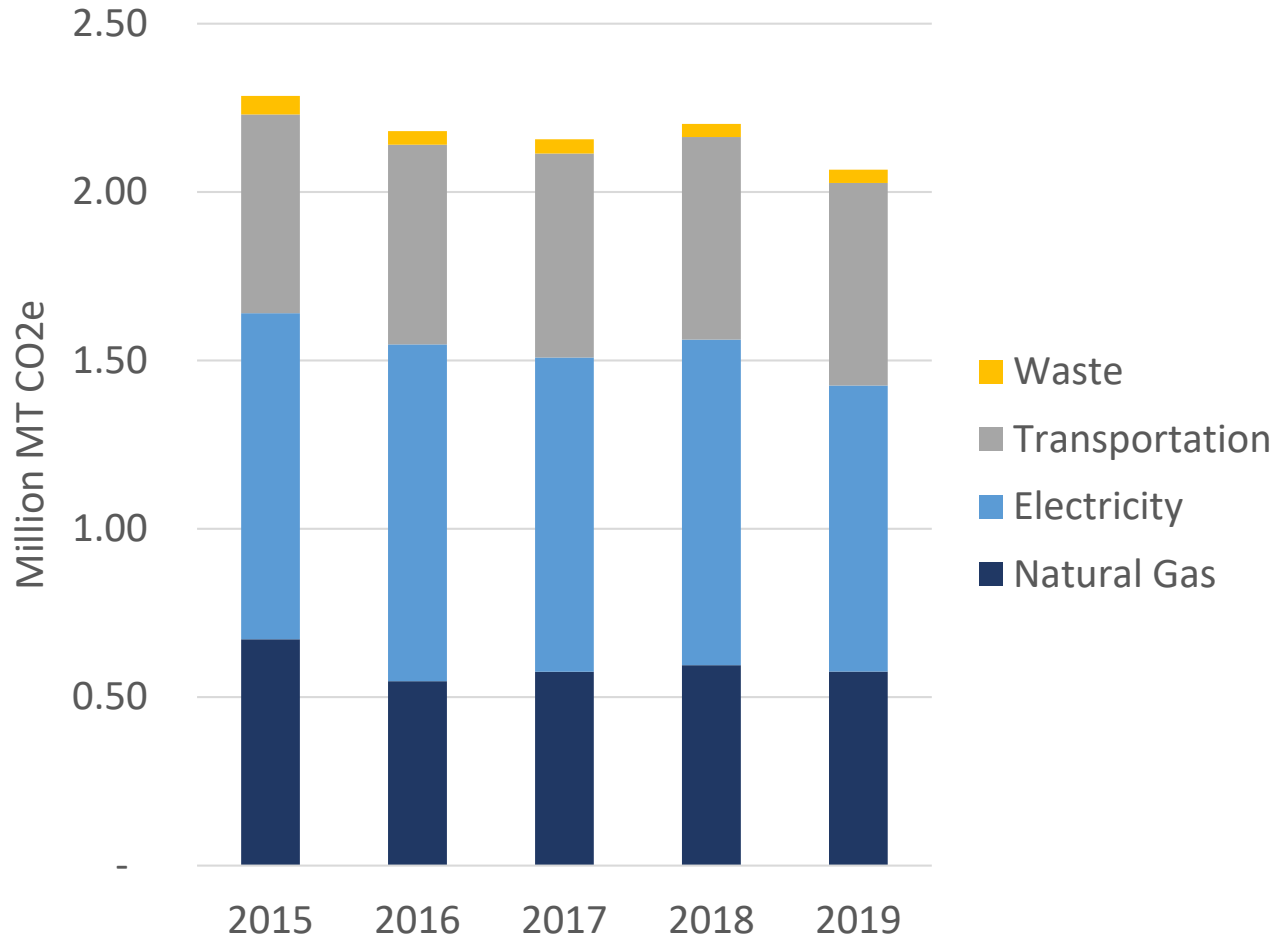
Expanded Inventory by Sector



Emissions per Capita



Expanded Inventory by Source



Looking Forward

Simple Inventory

- Evaluate long-term progress



Expanded Inventory

- A better understanding of where we are now



Expanded+ Inventory

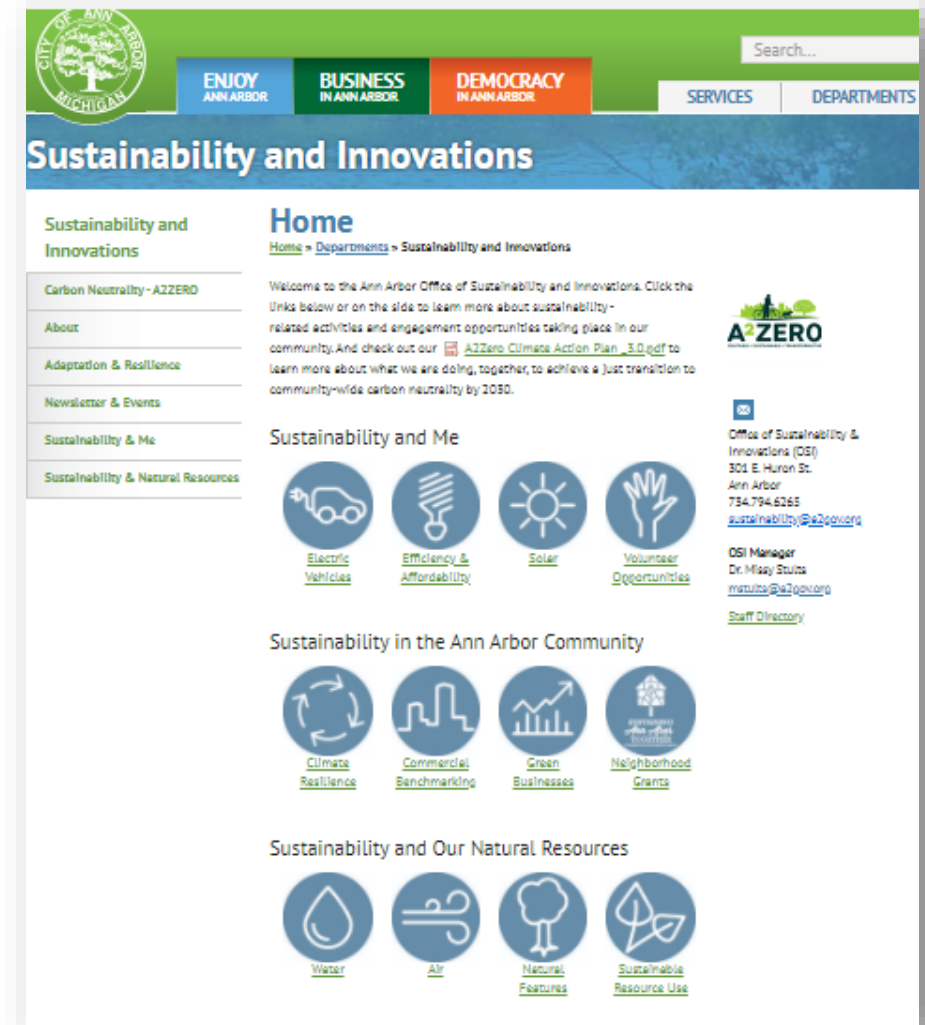
- **Next steps:** Include consumption-based emission sources
 - More transportation activities (flights)
 - Food, goods, and services
 - Embodied carbon in buildings
 - RECs and offsets



ACTIVITIES SINCE JUNE 2020

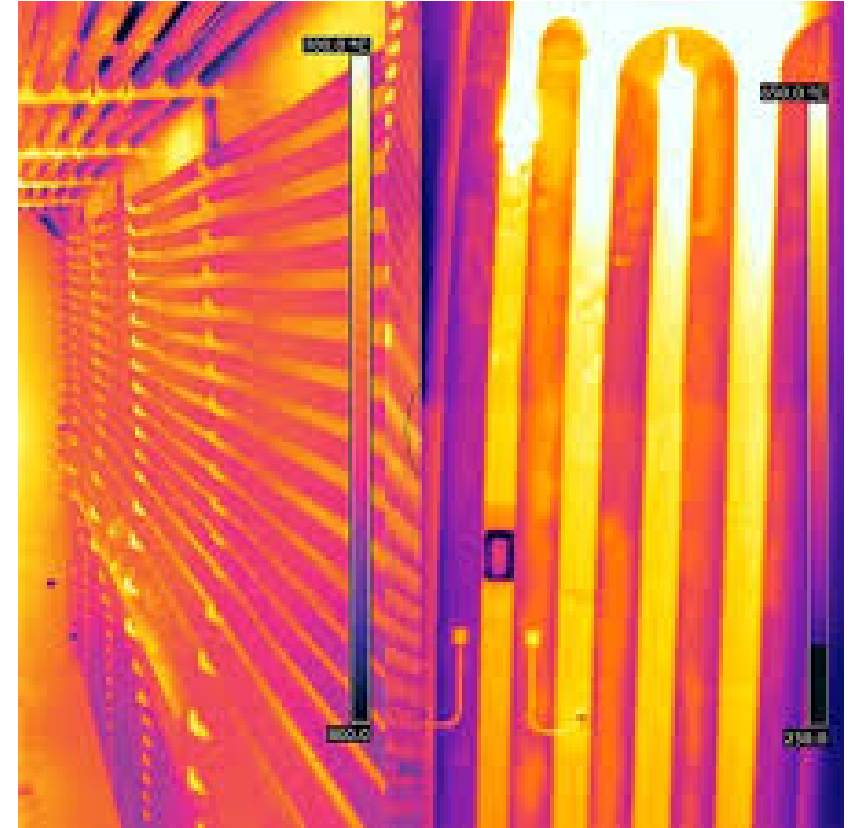
INTERNAL ACTIVITIES

- New project management process and platform
- Website redesign
- Developed
 - Community engagement strategy
 - Energy strategy
- Established quarterly newsletter
- Continued quarterly reporting
- Added youth Commissioners to Energy and Environmental Commissions
- Launched YouTube Channel in partnership with CTN



INTERNAL ACTIVITIES

- 7 City facilities registered for energy audits (partnership with **2030** District)
- Advancing a solar RFP for rooftop solar on select city facilities
- Established CNCC framework and extended invitations
- Continued collaboration on net zero energy affordable housing
- Priority Based Budgeting
- CIP and A²ZERO integration
- A²ZERO Metrics Reporting



POLICY ACTIVITIES

- Testified on need to raise the Distributed Generation cap
- Initiated streetlight reliability, responsiveness, and sustainability strategy
- Supported City's work on International Code Council and initiated coordination around state building and electrical codes
- Launched work on local benchmarking requirements
- Developed Council policy memo



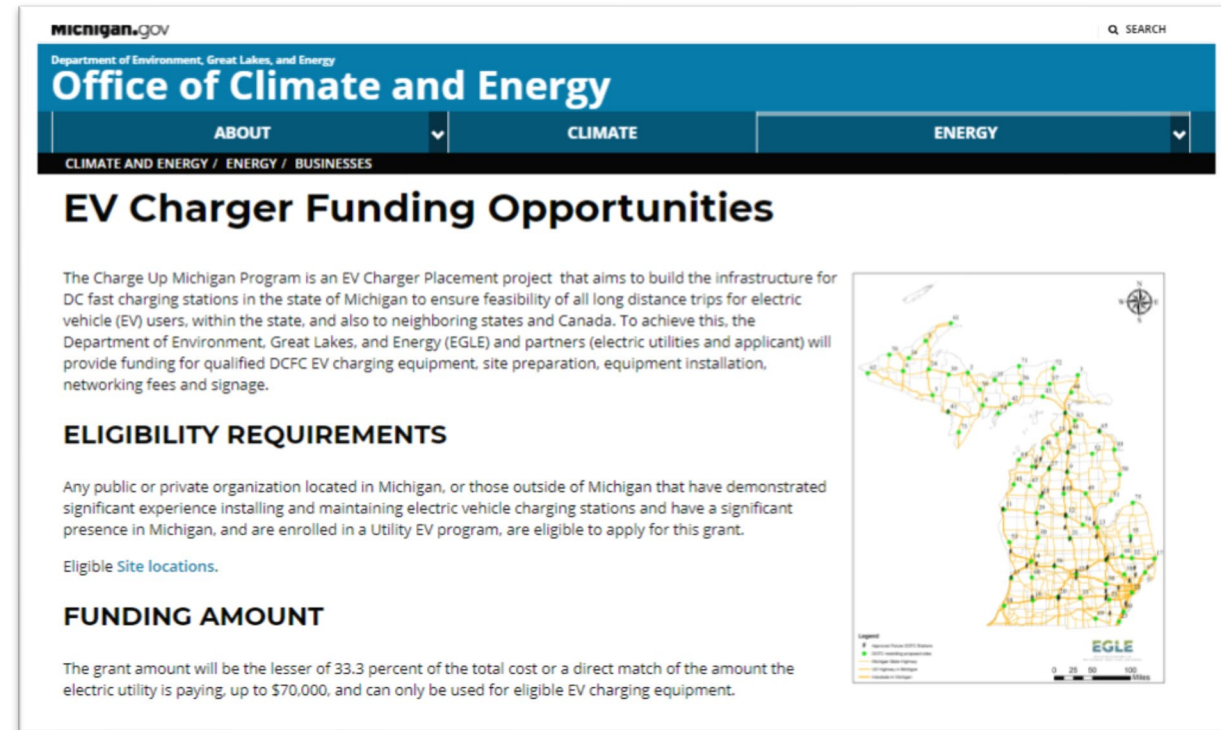
EXTERNAL ACTIVITIES

- Resilience hub award for Northside Community Center
- Awarded **10** SA²T Grants
 - Shelter Association of Washtenaw County
 - Peace Neighborhood Center
 - Children's Literacy Network
 - Michigan Ability Partners
 - Northside Community Center
 - Arrowwood Hills
 - Bryant Community Center
 - Creekside County Community Center
 - Miller Manor
 - Baker Commons



EXTERNAL ACTIVITIES

- Solarize program
- Launched e-bike bulk buy
- Initiated landfill solar study
- Won small grant on bridging electrification, energy efficiency, energy storage, equity, and renewable energy
 - Created simple electrification model
- Pursuing **2** dual-port DCFC fast chargers for City Hall (**4** charging points)
- Finalizing EV readiness ordinance – with legal



The screenshot shows the Michigan Office of Climate and Energy website. The page title is "EV Charger Funding Opportunities". The navigation menu includes "ABOUT", "CLIMATE", and "ENERGY". The main content area describes the Charge Up Michigan Program, which aims to build DC fast charging stations in Michigan. It lists eligibility requirements and funding amounts. A map of Michigan is shown on the right side of the page, highlighting eligible site locations.

EV Charger Funding Opportunities

The Charge Up Michigan Program is an EV Charger Placement project that aims to build the infrastructure for DC fast charging stations in the state of Michigan to ensure feasibility of all long distance trips for electric vehicle (EV) users, within the state, and also to neighboring states and Canada. To achieve this, the Department of Environment, Great Lakes, and Energy (EGLE) and partners (electric utilities and applicant) will provide funding for qualified DCFC EV charging equipment, site preparation, equipment installation, networking fees and signage.

ELIGIBILITY REQUIREMENTS

Any public or private organization located in Michigan, or those outside of Michigan that have demonstrated significant experience installing and maintaining electric vehicle charging stations and have a significant presence in Michigan, and are enrolled in a Utility EV program, are eligible to apply for this grant.

Eligible Site locations.

FUNDING AMOUNT

The grant amount will be the lesser of 33.3 percent of the total cost or a direct match of the amount the electric utility is paying, up to \$70,000, and can only be used for eligible EV charging equipment.

EXTERNAL ACTIVITIES

- Solarize program
 - **7** group buys completed or in process
 - ~**530** households reached via meetings, happy hours, educational events
 - **60** new solar arrays installed / planned...and counting
 - Roughly **400** kw of new distributed solar
 - Growth of small businesses
 - **2** new engineers
 - Installation teams
 - Interns
 - Salesperson
 - Electrician



EXTERNAL ACTIVITIES

- Energy kit and food distribution @ Peace Neighborhood Center
- Hosted Neighborhood Association meeting
- **Drafted curriculum for A²ZERO Ambassadors**
- Continued A²ZERO partner engagement – event; survey; one on one outreach
- A²ZERO announcement in Quality Water Matters
- Launched first year of Aging in Place Efficiently program
- Re-initiated coordination with OEMs around EV bulk buy



UPCOMING ACTIVITIES



A2ZERO
EQUITABLE - SUSTAINABLE - TRANSFORMATIVE

INTERNAL ACTIVITIES

- Internal Coordination
 - Building Department
 - Planning
 - **GIVE 365**
- Continued implementation of green fleets policy
- A²ZERO Metrics automation and reporting



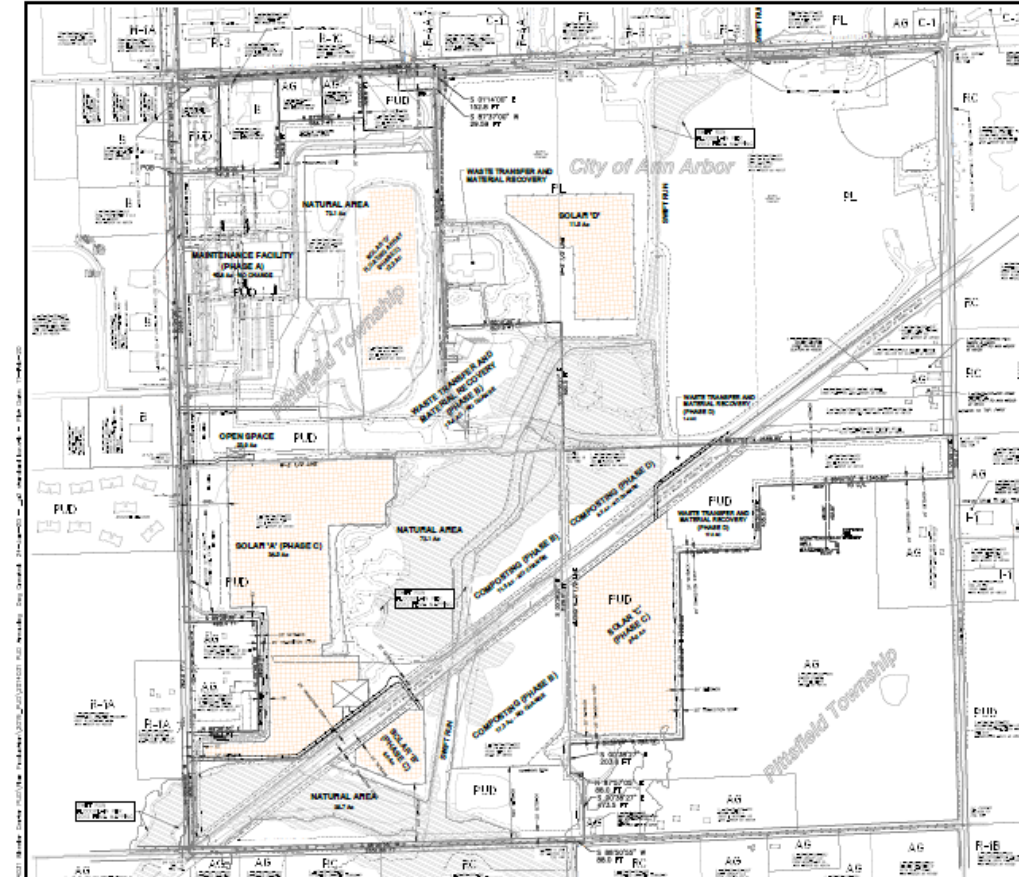
POLICY ACTIVITIES

- Utility and Energy policy analysis
 - Monitoring the Voluntary Green Pricing Filing
 - Continue monitoring DG cap
 - Monitor other pertinent energy-legislation (i.e., community solar, net metering)
- Advance streetlight strategy
- Recruit stakeholders to create benchmarking requirements
- Explore collaboration around building and electrical codes



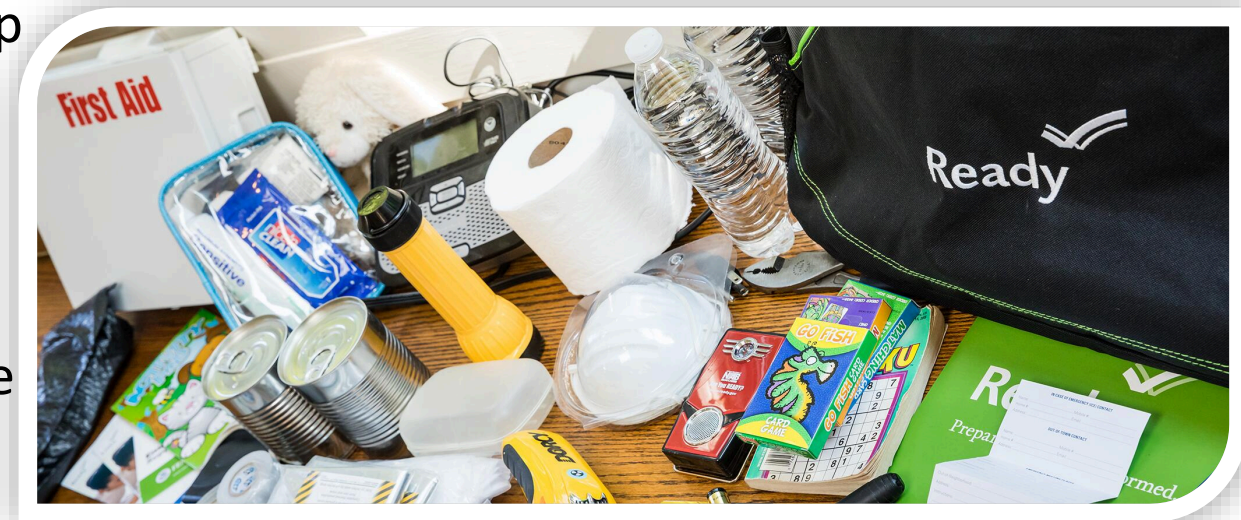
EXTERNAL ACTIVITIES

- Conduct distribution study on landfill solar project
- Collaborate with partners around building code advancements
- Host electrification, efficiency, etc., meeting
 - Draft strategy
- Present EV Readiness Ordinance to Council
- Finalize EV readiness strategy
 - Apply for funds to support **L2** chargers
 - Community EV bulk buy



EXTERNAL ACTIVITIES

- Distribute more energy kits
- Explore community engagement partnership with utility
- Distribute emergency preparedness kits
- Host 3rd solar energy forum with installers
- Launch A²ZERO Ambassadors program
- Hire program coordinators for Aging in Place Efficiently (grant funding)



EXTERNAL ACTIVITIES

- Solarize expansion
 - Continue residential
 - Commercial opportunities
 - Ground mounted options
 - Batteries backups
- Launch stakeholder committee for Green Rental Efficiency initiative
- Ongoing community engagement
 - Event with Chamber
 - Solar Options



WCDP | Community Forum & Membership Meeting

A²ZERO
EQUITABLE • SUSTAINABLE • TRANSFORMATIVE

April 4, 9:30 a.m.

Panel Discussion:
Carbon Neutrality
in Ann Arbor

SPEAKERS
Nuola Akinde
Matthew Grocoff
Galen Hardy
Christopher Taylor

NEW 10,000 TREES INITIATIVE



**We Are Planting
10,000 Trees**

Thanks For Your Contribution

NEXT STEPS & DISCUSSION

OPPORTUNITIES

- Recruit stakeholders for:
 - Benchmarking
 - Green rental housing
- Identify potential A²ZERO Ambassadors
- Organize Ward meetings, including:
 - Energy kit distribution
 - Emergency kit distribution
- Policy intervention:
 - Building and electrical codes
 - Energy legislation
 - Governor's climate commitment
- Advertise:
 - SA²T grants
 - Solarize

