



City of Cleveland - Sustainable Cleveland Initiatives **Focus on Energy Efficiency & Climate Action**

Association of Energy Engineers (AEE) N. Ohio Chapter

April 19, 2018

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Sustainable Cleveland - Mission

Sustainable Cleveland is a 10-year initiative that engages people from all walks of life, working together to design and develop a thriving and resilient Cleveland region that leverages its wealth of assets to build economic, social and environmental well-being for all.



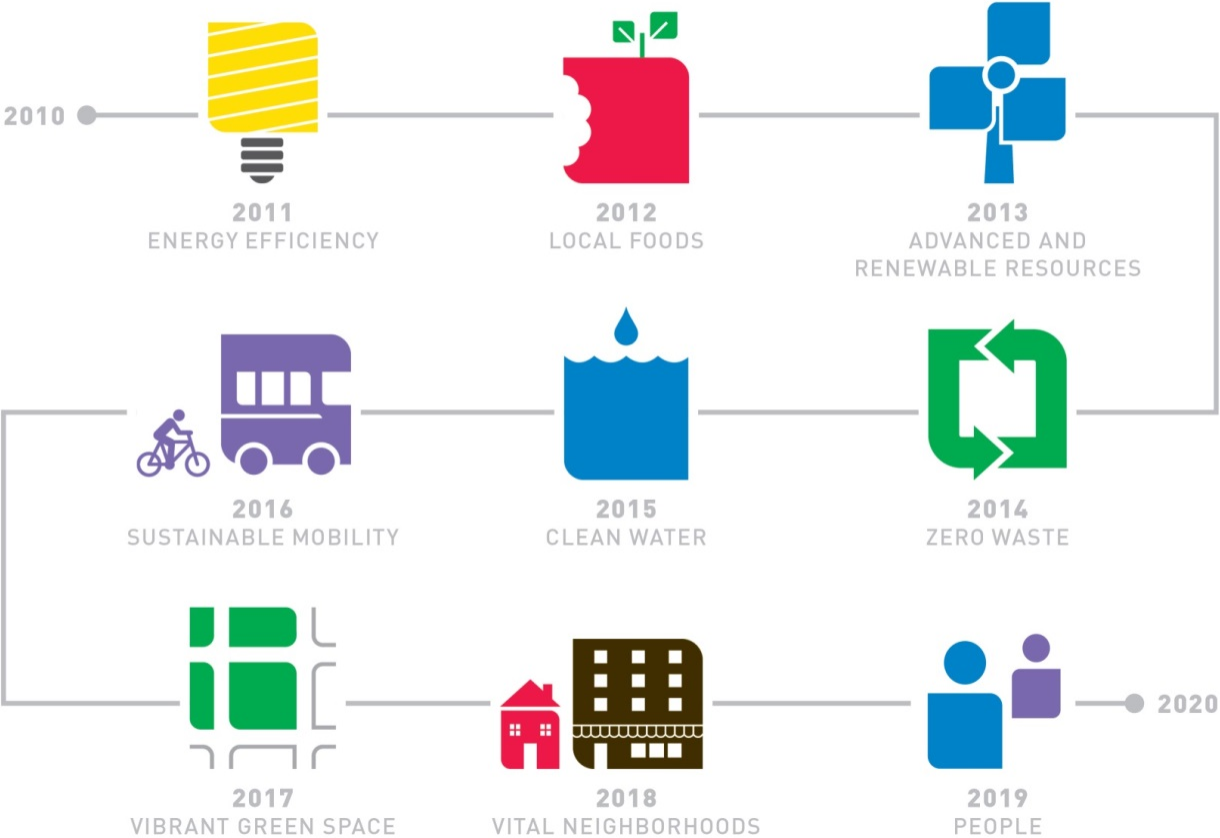
1969



50 Years Later We Will Surprise and Amaze with our Transformation



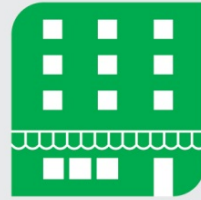
Celebration Years



Taking Action



at **HOME**



at **WORK**

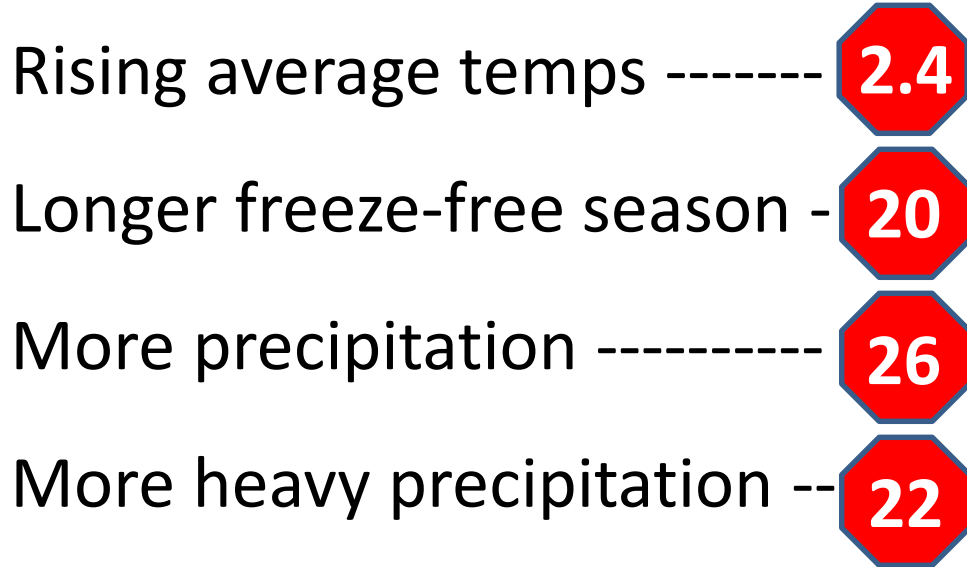


in your **COMMUNITY**

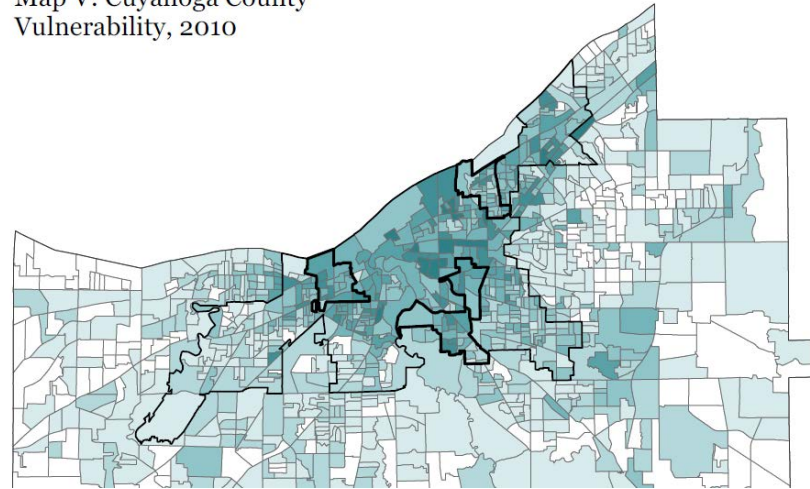


Climate Resilience & Urban Opportunity Initiative

OBSERVED CHANGES IN NEO:



Map V: Cuyahoga County
Vulnerability, 2010



*Climate Vulnerability
by Neighborhood*

Climate Action More Urgent Than Ever



33 Actions



33 Climate Actions



at HOME



at WORK



in your COMMUNITY

Focus Area	# of Actions
Energy Efficiency & Green Building	7
Advanced & Renewable Energy	8
Sustainable Mobility	6
Waste Reduction & Resource Conservation	3
Land Use & Clean Water	6
Community Engagement & Public Health	3

GOALS: Reduce Emissions 16% by 2020, 40% by 2030, 80% by 2050

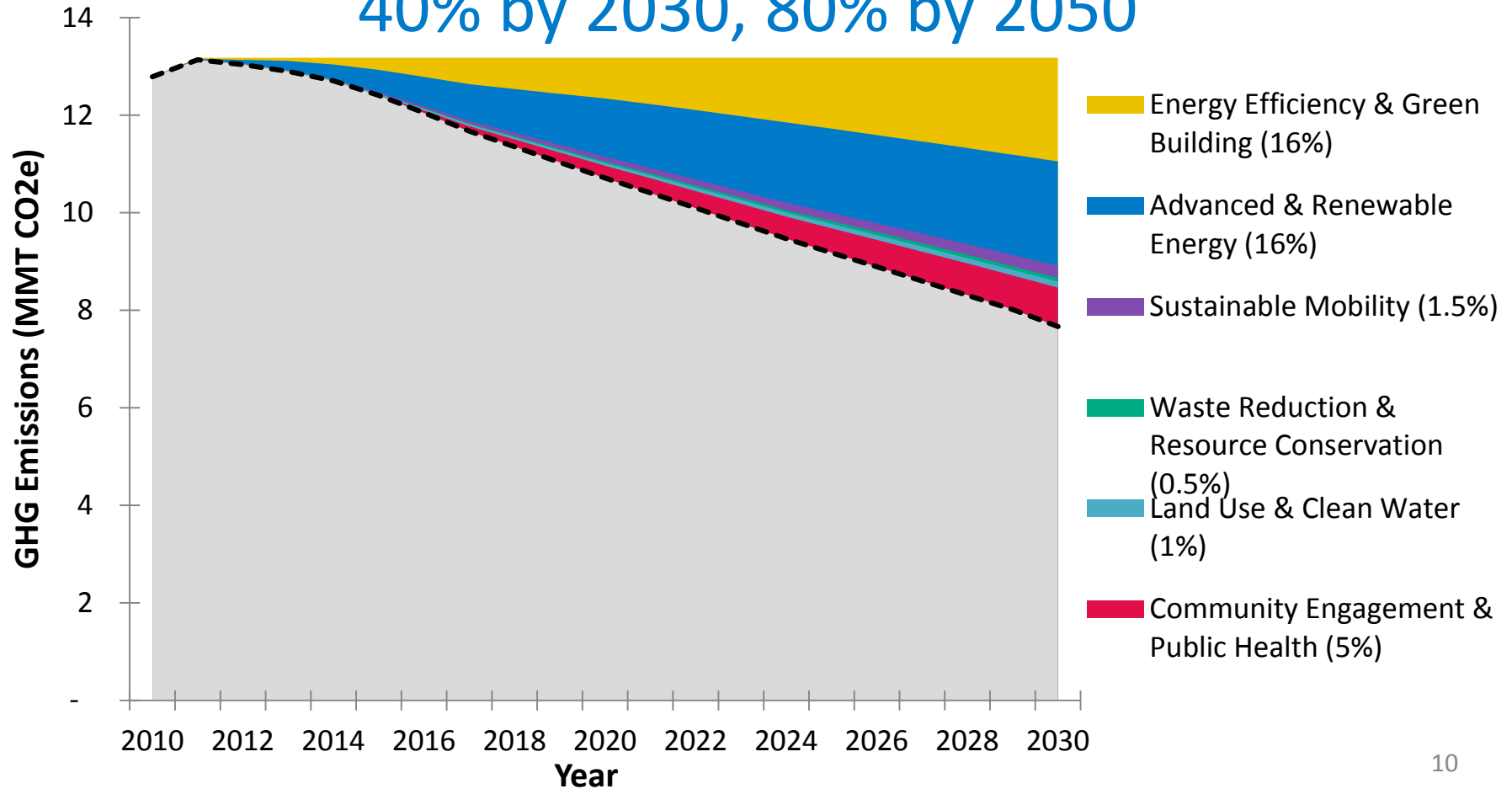

















Table 1: Cleveland's Climate Action Plan at a Glance

Focus Area	Objective	Sectors	Climate Change Impact	Action	Annual Reduction Potential by 2030 (MT CO ₂ e/yr)	
ENERGY EFFICIENCY & GREEN BUILDING Annual Emissions Reduction by 2030 = 2,100,000 MT CO ₂ e (39% of total GHG reduction)	Retrofit and renovate existing buildings		M A	Action 1. Support programs and policies to retrofit residential buildings	430,000 8%	
			M	Action 2. Support programs and policies to retrofit commercial and industrial buildings	1,300,000 24%	
	Make green building the standard for all new construction		M A	Action 3. Incentivize new construction to exceed existing building codes	1,500 0.03%	
		Implement neighborhood-level solutions		M	Action 4. Make utility data easily accessible for residents and businesses	n/a
				M	Action 5. Expand use of smart grid and advanced meter technologies	120,000 2%
				M	Action 6. Expand energy and green building challenges	290,000 5%
				M A	Action 7. Build on existing green school initiatives in the City	n/a
ADVANCED & RENEWABLE ENERGY Annual Emissions Reduction by 2030 = 2,100,000 MT CO ₂ e (38% of total GHG reduction)	Accelerate renewable energy use by Cleveland's residents and small businesses		M A	Action 8. Increase distributed energy installations	35,000 0.6%	
			M	Action 9. Incorporate renewable energy into municipal aggregation	340,000 6%	
	Use local projects to help meet or exceed the utility renewable energy standards		M	Action 10. Become national leader in reusing vacant land for renewable energy projects	23,000 0.4%	
			M	Action 11. Develop a pilot offshore wind farm	67,000 1%	
			M	Action 12. Utilities invest in additional projects to meet renewable energy standards	1,100,000 20%	
	Implement advanced energy technologies		M	Action 13. Accelerate conversion of organic waste to energy using anaerobic digestion	52,000 1%	
			M	Action 14. Switch to low-carbon fuel sources for district heating and cooling systems	120,000 2%	
			M	Action 15. Support Cleveland businesses to reduce industrial process emissions	390,000 7%	

Climate Action Plan Updates



City of Cleveland's
Community Reinvestment Area Program
Residential Tax Abatement
Single and Two Family Structures

The City of Cleveland's Residential Tax Abatement Policy is designed to stimulate private investment through job creation, neighborhood stabilization and residential development



CITY OF CLEVELAND
Mayor, Frank G. Jackson

Daryl P. Rush, Director
James Greene, Acting Commissioner & Housing Officer
Cecilia Rodriguez, Program Manager
(216) 664-3442
(216) 664-4000

Department of Community Development
601 Lakeside Avenue – Room 320
Cleveland, Ohio 44114

Revised 6/1/2016

Building Category*	New Construction	Substantial Rehab	Moderate Rehab
Single Family And Multifamily Low-Rise (Affordable)	A. EGC Certified Through Enterprise C. LEED Silver D. NGBS Silver	A. EGC Certified Through Enterprise B. LEED Silver D. NGBS Silver	A. EGC Certified Through Enterprise D. NGBS Silver
Single Family And Multifamily Low-Rise (Market Rate)**	B. EGC Compliant And Energy Requirements C. LEED Silver D. NGBS Silver	B. EGC Compliant And Energy Requirements C. LEED Silver D. NGBS Silver	B. EGC Compliant And Energy Requirements D. NGBS Silver
Multifamily Mid/High Rise (Affordable)	A. EGC Certified Through Enterprise C. LEED Silver D. NGBS Silver	A. EGC Certified Through Enterprise C. LEED Silver D. NGBS Silver	A. EGC Certified Through Enterprise D. NGBS Silver
Multifamily Mid/High Rise (Marketrate)**	B. EGC Compliant And Energy Requirements C. LEED Silver D. NGBS Silver	B. EGC Compliant And Energy Requirements C. LEED Silver D. NGBS Silver	B. EGC Compliant And Energy Requirements D. NGBS Silver

NOTE: In the above chart, "Enterprise Green Communities Compliant & Energy Requirements" indicates that some projects are able to verify requirements with assistance of a City-Approved Verifier (HLMS Sustainability Solutions is a City-Approved Verifier). The City-Approved Verifier is a third-party verification entity confirming that a project meets the Enterprise Green Communities v2015 Standard and will qualify for tax abatement without official Enterprise Green Communities certification. A City-Approved Verifier is necessary in these instances because Enterprise Green Communities is a rating system designed for low-income and affordable housing only and is not applicable to market rate projects.

Energy & Testing & Ventilation

Single Family - Midrise

- HERS Rating
 - LEED Homes: 70 or better OR LEED Energy Budget
 - EGC: 85 or better
 - 100 for pre-1980 bldgs
 - NGBS: ~ 75
- Energy Star v.3 (New Const)
- Pre-Drywall (New & Sub)
- Blower door (all)

Midrise - Highrise

- Whole Building Energy Model
 - LEED: v.4 ASHRAE 2010
 - Multi-family midrise: 5% improvement
 - Highrise: 5% new 3% rehab
 - EGC New: 15% better
 - EGC Rehab: Even
- EGC Certified or Compliance & LEED Midrise:
 - Commissioning + Blower Door
 - + Energy Star High Rise (New)
 - More stringent Ventilation Requirements (EGC)
- LEED High Rise: Commissioning only

Key Factors

- HVAC & DWH Selections
- New v. Reno & # floors
- Historic



Measuring Progress

1 CHOOSE AN ENVIRONMENT



Business



Personal/
Social



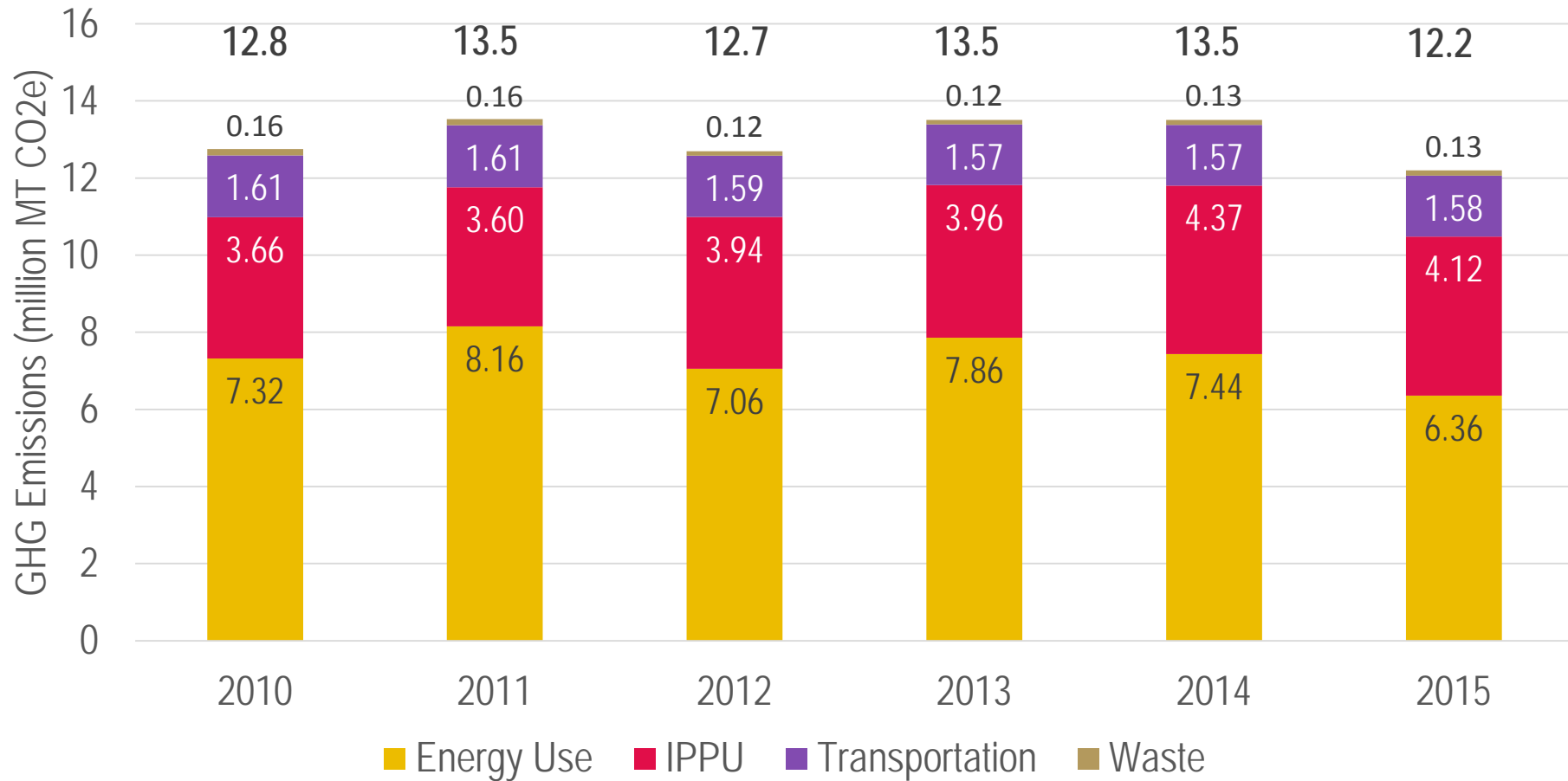
Built



Natural

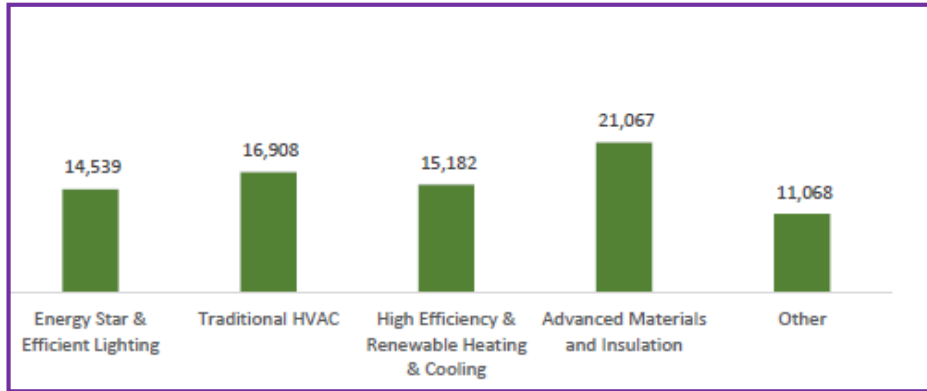
www.sustainablecleveland.org/dashboard

Cleveland's Carbon Footprint (DRAFT)

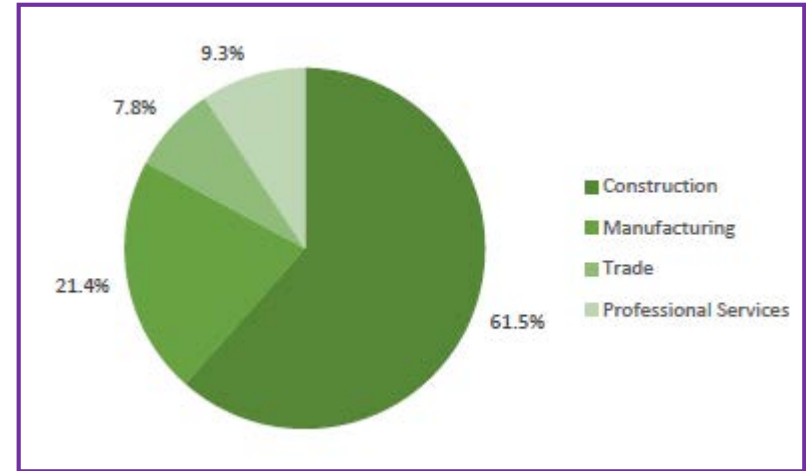


Energy Efficiency & Jobs

The 78,764 energy efficiency jobs in **Ohio** represents 3.6% of all energy efficiency jobs nationally. The largest number of these employees work in advanced materials and insulation firms, followed by traditional HVAC. Energy Efficiency employment is found in the construction industry.



Energy Efficiency Employment by Sub Technology

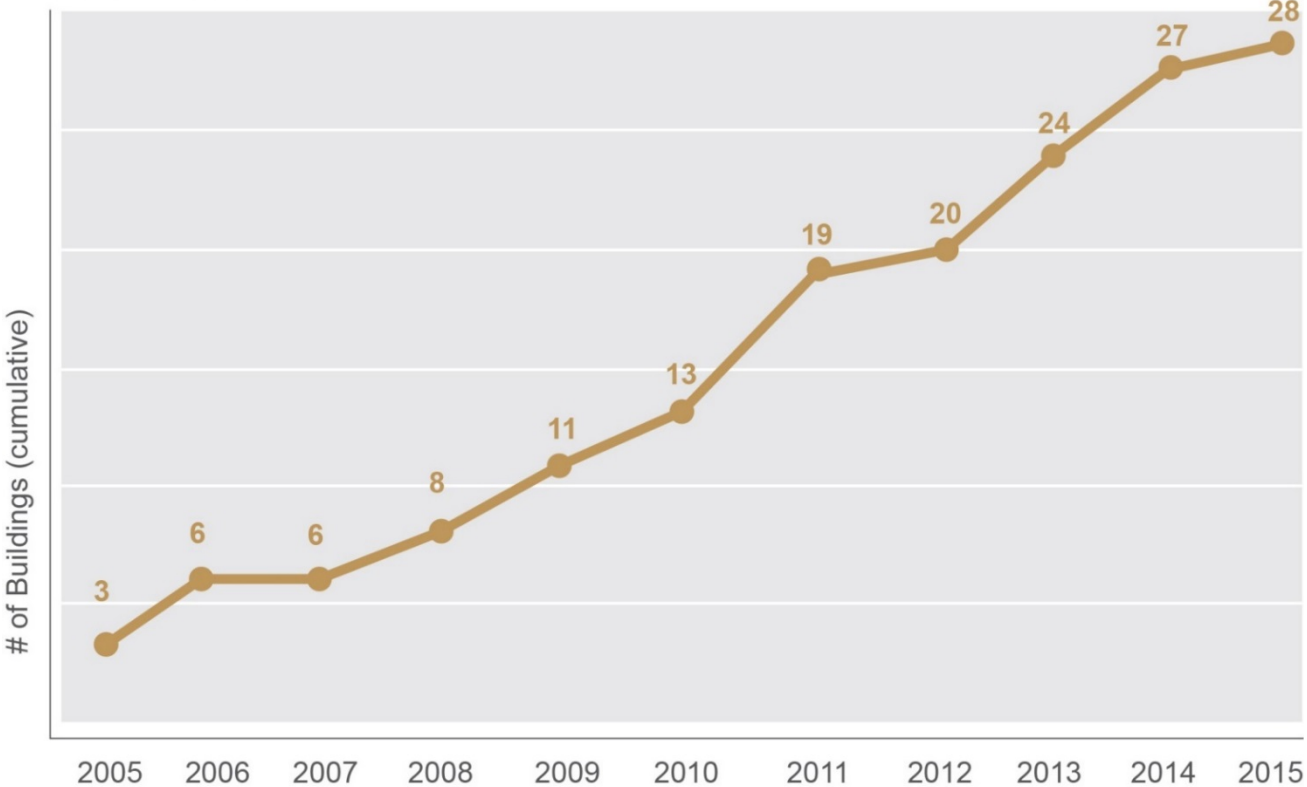


Energy Efficiency Employment by Industry Sectors

Source: 2017 Data - <https://energy.gov/downloads/2017-us-energy-and-employment-report>

Green Buildings and Energy Efficiency

ENERGY STAR

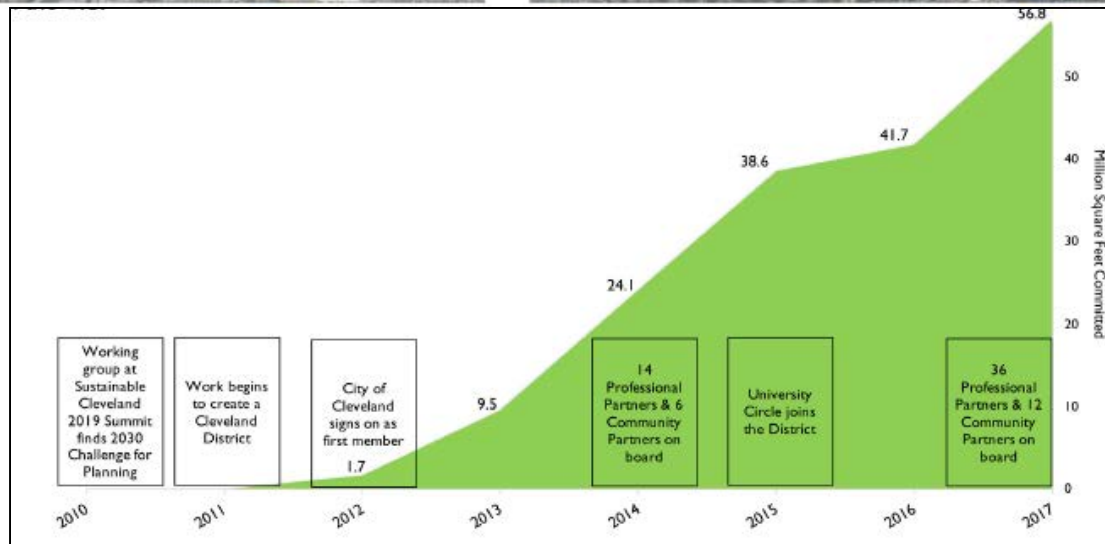


Non-Energy Benefits: Competitiveness, ROI

CLEVELAND
2030
DISTRICT

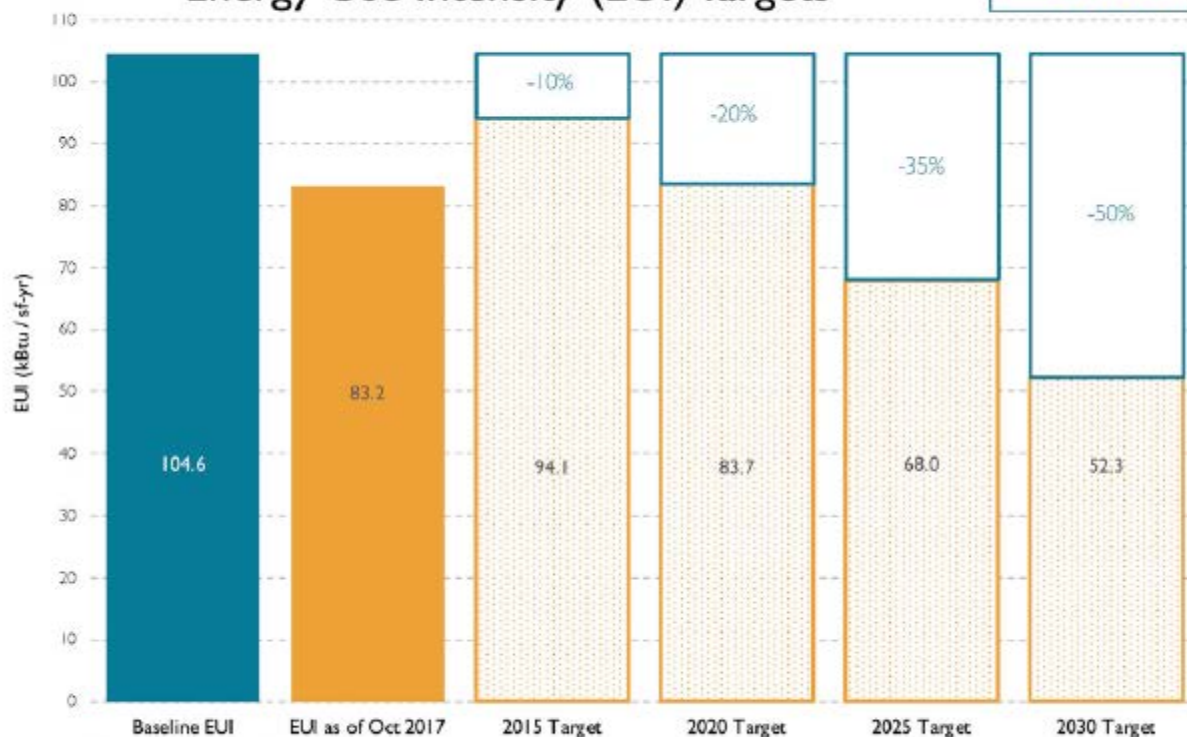


CLEVELAND
2030
DISTRICT



Cleveland 2030 District Participating Properties¹ Energy Use Intensity (EUI) Targets

Reduction
20%



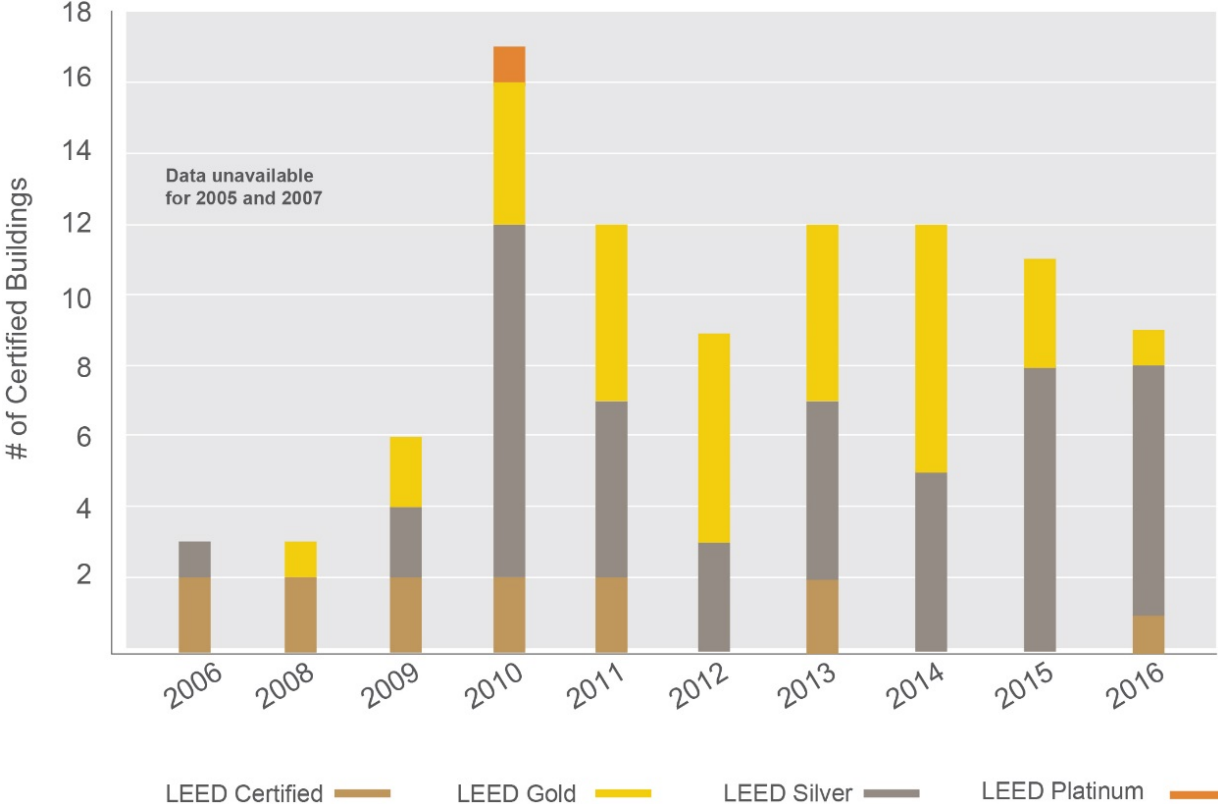
Data Last Updated: 10/31/17

Baseline set using National Median values from ENERGYSTAR Portfolio Manager

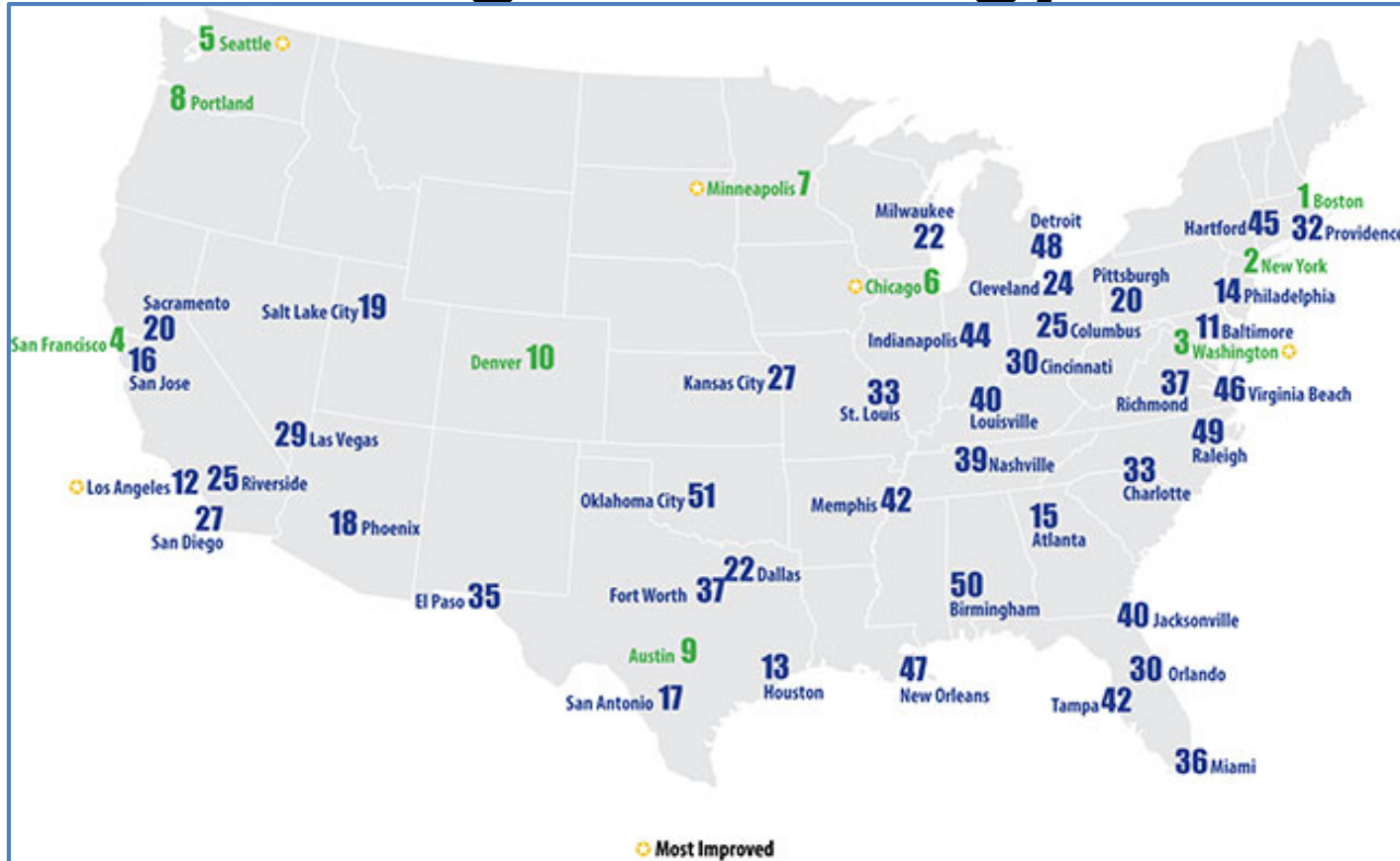
¹Includes C2030D participating properties with accurate and complete Portfolio Manager accounts and National Median EUI values

Green Buildings and Energy Efficiency

LEED Certified Buildings



Green Buildings and Energy Efficiency



- ❑ **Northeast Ohio Advanced Energy District - Special Improvement District:**
 - ❑ City of Cleveland & First Suburbs Development Council (2010)
 - ❑ Property Assessed Clean Energy (PACE):
 - ❑ Assessment for special energy improvements
 - ❑ Improvement stays with property
 - ❑ Public, Non-Profit and Private (Commercial-PACE) Financing
 - ❑ Recent project (2017):
 - ❑ Solar PV and energy efficiency improvements for Lakefront Development - Cumberland Project Plan (Approx. \$12M). Ord# 936-17
 - ❑ Special revenue bonds issued by the Cleveland Cuyahoga Port Authority, 15 years project
 - ❑ Cooperative agreement among the Port Authority, City of Cleveland, the District and the owner

SUSTAINABLE CLEVELAND MUNICIPAL ACTION PLAN

EXECUTIVE SUMMARY

October 2013



CITY OF CLEVELAND

Mayor Frank G. Jackson



**SUSTAINABLE
CLEVELAND 2019**

5 Focus Areas - 25 Actions

20% reduction in GHG emissions by 2020 (45% by 2030)

Goals	Actions	Descriptions	Leads
Design, Construction, and Maintenance			
Goal 1: Sustainable Building policy implemented across all departments <ul style="list-style-type: none"> 2013: LEED Silver for New Construction and Major Renovations 2016: LEED Gold 2020: BBC goals 2030: Cleveland 2030 District targets 	DCM-1: Green Building for New Construction and Major Renovations	Adopt and implement a Sustainable Building Policy.	Capital Projects, DPM, Sustainability
	DCM-2: Capital Improvement Project Sustainability Review	Incorporate sustainability and a systems thinking approach into the planning, decision-making, and design process for capital improvement projects, expanding upon the City's current efforts in sustainable building.	Capital Projects, Operations, Sustainability
	DCM-3: Preventative Maintenance	Establish a City-wide preventative maintenance program to better evaluate replacement/maintenance options.	DPM, Enterprise Funds

Goals	Actions	Descriptions	Leads
Energy			
Goal 1: Total energy reduction below 2010 baseline <ul style="list-style-type: none"> 2016: 5% 2020: 10% 2030: 20% Goal 2: Building energy reduction below 2010 baseline <ul style="list-style-type: none"> 2016: 10% 2020: 20% 2030: 50% Goal 3: Percent of City total energy use by on-site renewable energy <ul style="list-style-type: none"> 2016: 1% 2020: 2% 2030: 5% Goal 4: Meet CPP's Advanced Energy Portfolio Standard (AEPS) goals <ul style="list-style-type: none"> 2015: 15% 2020: 20% 2025: 25% 	E-1: Energy Efficiency in Existing Buildings	Significantly reduce energy consumption, demand and cost across all City departments through energy efficiency.	Sustainability, DPU, DPC, DPW, Finance
	E-2: Energy Conservation in Existing Buildings	Reduce energy use in City buildings through no- and low-cost conservation measures.	Sustainability
	E-3: Building Automation System	Install new Building Automation Systems (BAS) for City buildings with high energy use or complex systems, and fully utilize existing systems.	Div. of Architecture, DPM
	E-4: Re-Commissioning Tune-Up	Establish a building re-commissioning and tune-up program.	DPM
	E-5: Cleveland Division of Water (CWD) System Pumping and Treatment Optimization	Finalize and implement an Energy Management Plan to reduce energy consumption and costs for CWD.	CWD Energy Task Force
	E-6: Streetlight Upgrades	Replace streetlights with LED lights, thereby saving the City money through reduced energy and maintenance costs.	CPP
	E-7: Renewable Energy	Install a variety of renewable energy systems at City facilities and on City lands.	Sustainability, DPU, DPC, DPW
	E-8: Cleveland Public Power's Advanced Energy Portfolio Standard	Increase the amount of advanced and renewable energy in the electricity supply portfolio that serves City facilities.	CPP
	E-9: Smart Savings	Maximize cost savings for the City by utilizing various strategies, including energy demand curtailment, utility bill analysis, rate negotiation, etc.	Sustainability, DPU, DPW

LED Streetlights



Sodium Vapor and LED Pilot Streetlights comparison – Cleveland Public Power/City of Cleveland

Benefits: Efficiency, Cost and GHG Savings

Non-Energy Benefits: Outages monitoring & Overall safety

Sustainable Municipal Building Policy

“The City of Cleveland shall incorporate green building practices into the **siting, design, construction, remodeling, repair, maintenance, operation, and deconstruction** of all City facilities.”

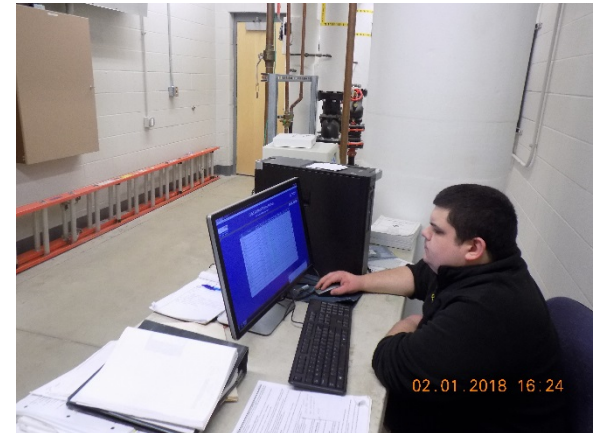
- **New Construction and Major Renovations:** LEED Silver Certification minimum + energy requirements.
- **Tenant and Leased Spaces:** Preference for certification under ENERGY STAR, LEED, and/or an equivalent standard.
- **“Fix it First” Projects:** Capital repairs to City facilities will use Energy Star and Water Sense products...

Collinwood Recreation Center (2011) – LEED Gold Certified



Non-Energy Benefits: Occupant Comfort, Better Lighting, More Productive, Longer Equipment Life

3rd District Police Headquarters (2015) – Built to LEED Certified standards; Importance of ongoing maintenance





PERSPECTIVE



NORTH ELEVATION



New City of Cleveland Kennel

DAVID GREENE ARCHITECTS



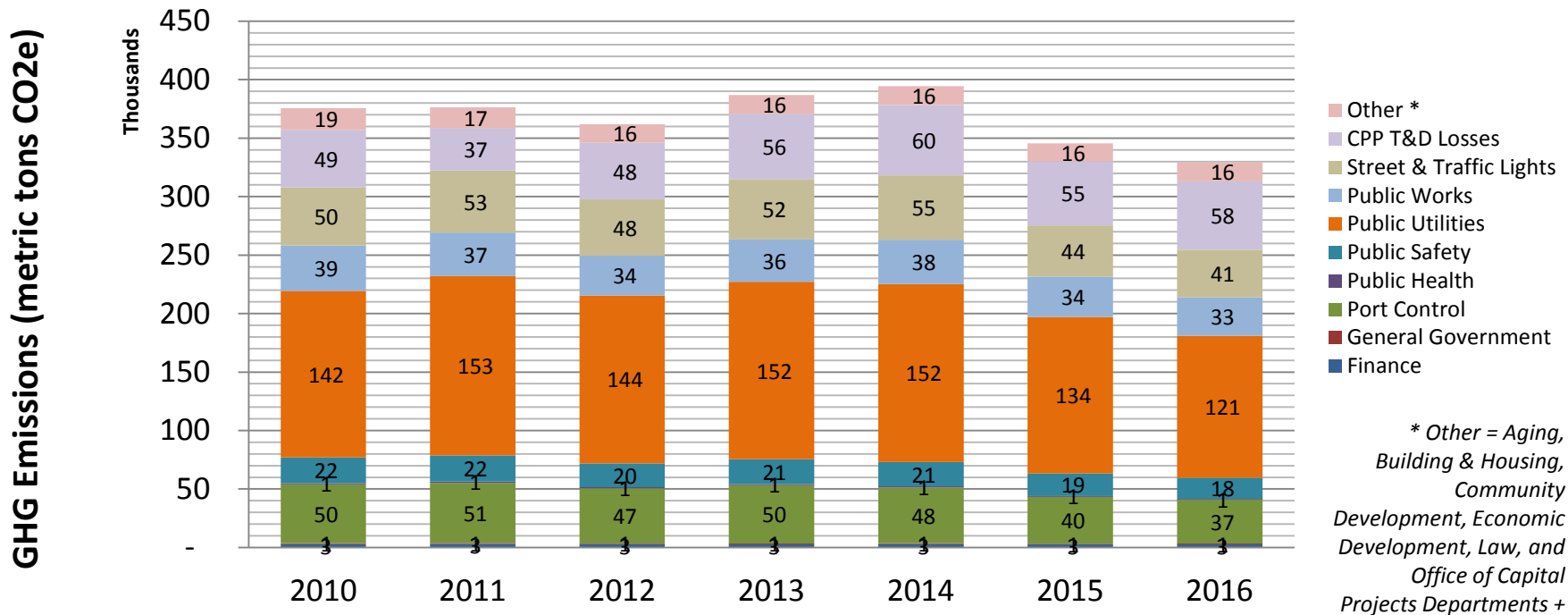
New City of Cleveland Kennel – Late 2018 open

Goal: LEED Silver (v3)

Occupant comfort includes animals



Annual GHG Emissions by Department, 2010-2016 (DRAFT)



(PENDING VALIDATION): Annual emissions have decreased from 375,570 MTCO₂e (**revised**) in 2010 to 329,360 MTCO₂e in 2016 (**12% reduction**)



SAVE THE DATE

AUGUST 21-23,
2018

CLEVELAND, OHIO



@BetterBldgsDOE

#EnergyExchange2018

#BBSummit2018

U.S. DEPARTMENT OF
ENERGY

<https://www.2018energyexchange.com/registration/>

Thank you!

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A photograph of the Cleveland skyline under a clear blue sky. In the foreground, there is a lush green lawn with some exercise equipment. The skyline includes several prominent skyscrapers, including the Terminal Tower and the Shaker Square building. The text is overlaid on the image.

Sustainable Cleveland

Together, We're Building a Thriving Green City on a Blue Lake