



Cities LEED the Charge on Efficiency

City of Cleveland's Perspectives

2019 Midwest Building Energy Codes Conference

November 13, 2019

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Office of Sustainability

- Save the City money and reduce its ecological footprint
- Use sustainability and climate action as a tool for economic development
- Provide tools and resources to make sustainability business-as-usual
- Foster a culture that embraces sustainability



June 22, 1969



2019: Surprise and Amaze with our Transformation





CBS THIS MORNING VIDEO



CLEVELAND CLIMATE ACTION PLAN 2018 UPDATE

**BUILDING THRIVING
AND RESILIENT
NEIGHBORHOODS
FOR ALL**



**Energy Efficiency &
Green Building**



**Clean
Energy**



**Sustainable
Transportation**



**Clean Water &
Vibrant Green Space**



**More Local Food,
Less Waste**



**Cross-Cutting
Priorities**



Energy Efficiency & Green Building



GOALS

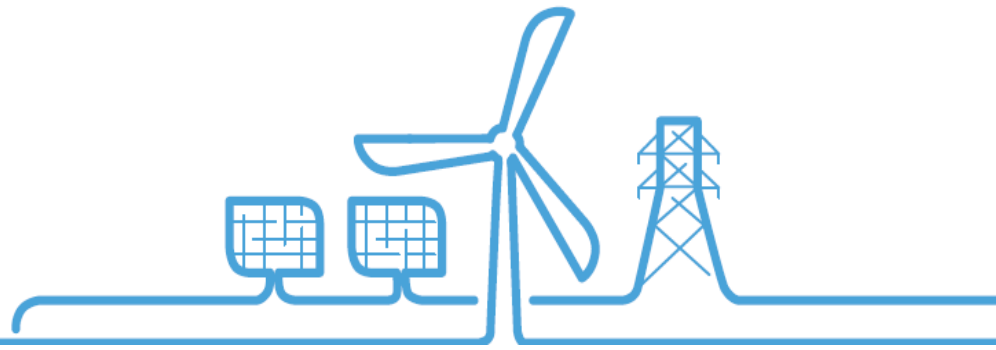
- By 2030, reduce residential and commercial energy use 50% and industrial use by 30% saving Cleveland households and businesses \$170 million annually from utility savings.
- All large commercial and industrial buildings are tracking and managing their energy use by 2023

OBJECTIVES

1. Make more homes affordable, comfortable, **healthy, and energy efficient**
2. Prioritize **energy efficiency** in small and mid-size businesses
3. **Support community hubs to be more efficient and resilient**
4. Promote new construction and major renovations that meet **high green building standards**



Clean
Energy



GOALS

- 25% of electricity use in Cleveland is supplied from renewable sources by 2030 (15% by 2022)
- Ensure all residents and businesses have access to affordable clean energy programs
- **100% of electricity demand from clean, renewable energy by 2050**

OBJECTIVES

5. Generate more solar energy locally
6. Improve access to affordable clean energy for residents and small organizations
7. Reduce commercial and industrial emissions with advanced technologies
8. Establish an offshore wind industry in Northeast Ohio
9. Use advanced technology to build a cleaner, safer, smarter city
10. Support clean energy policy

Cleveland Leading on Climate



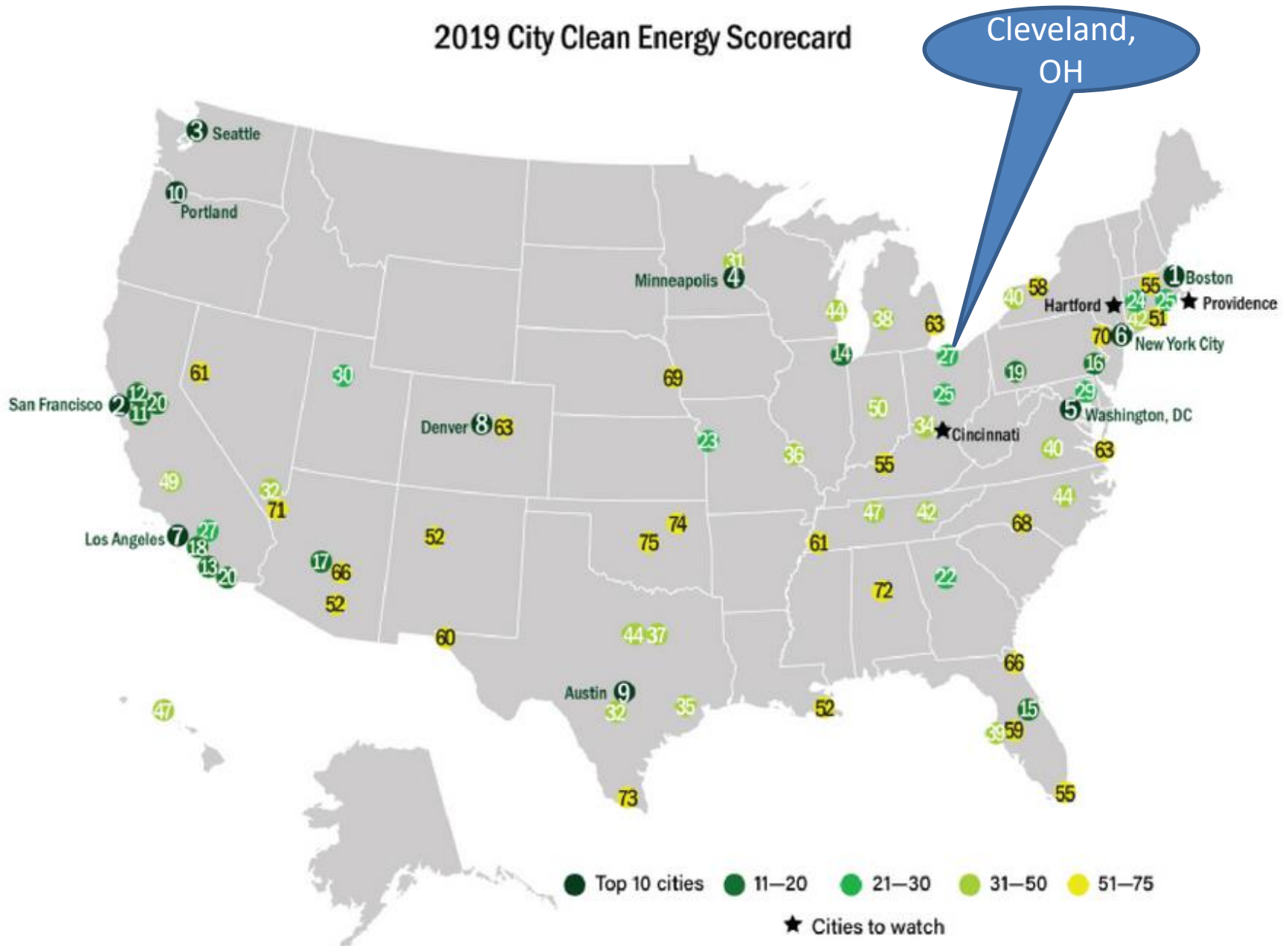
American Planning Association

Creating Great Communities for All

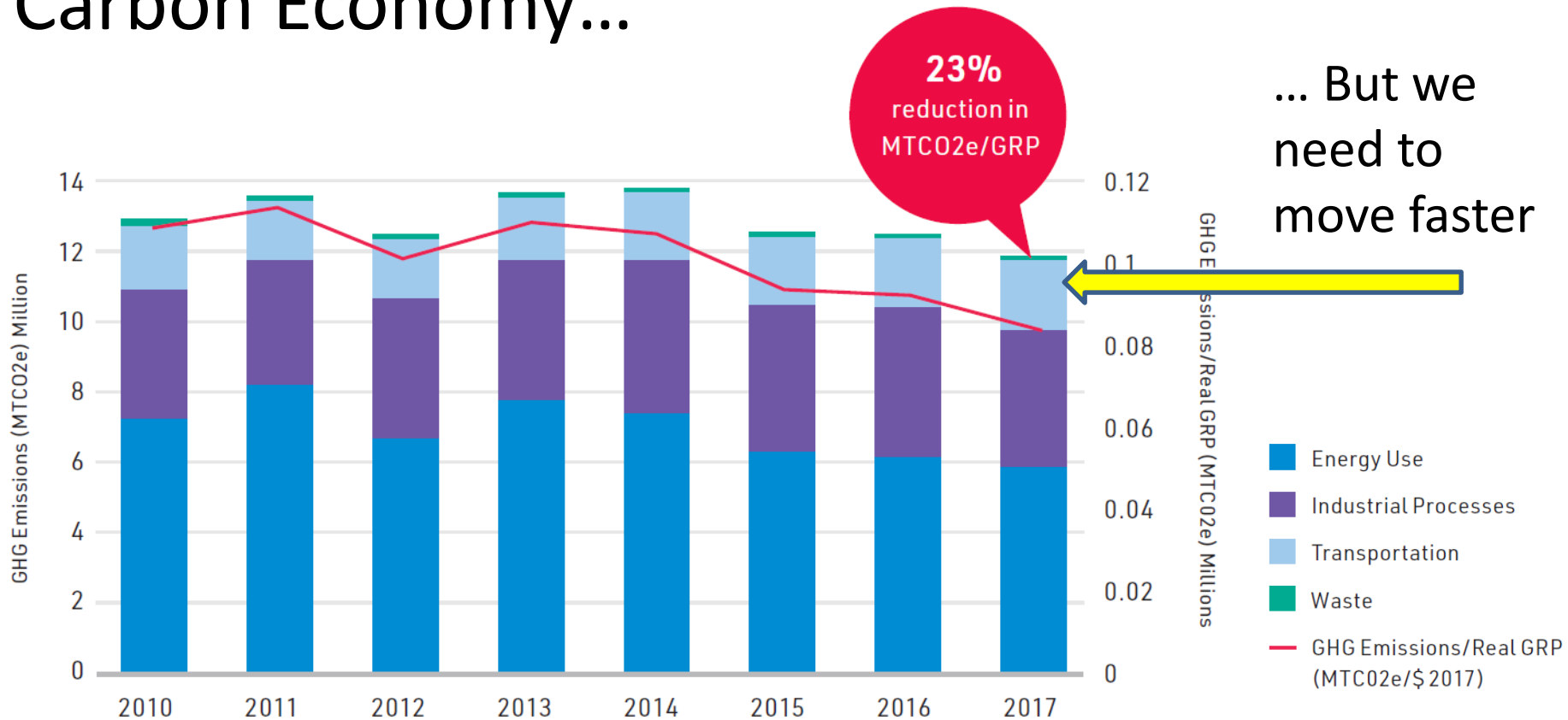


ACEEE's Energy Efficiency Ranking

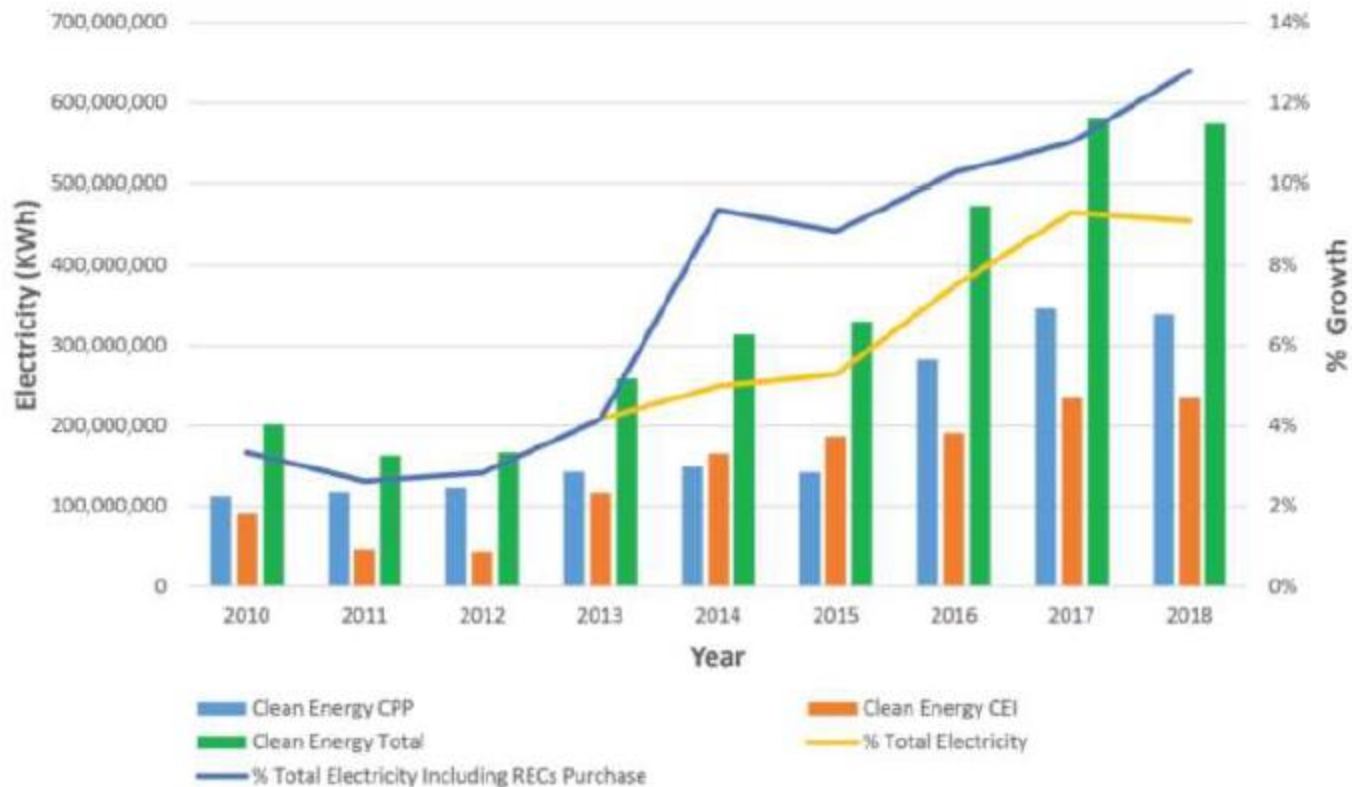
2019 City Clean Energy Scorecard



Cleveland's on its way to creating a Low-Carbon Economy...



400+% increase in clean energy since 2010



CLEVELAND
2030
DISTRICT



CLEVELAND
2030
DISTRICT





59 MSF

38 MSF

24 MSF

9 MSF

1 MSF

2011

2013

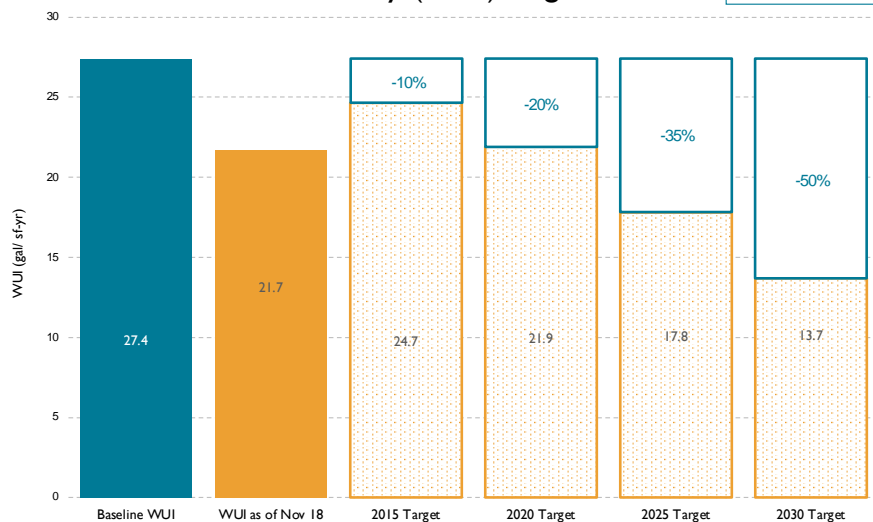
2015

2017

2019

Cleveland 2030 District Participating Properties¹ Water Use Intensity (WUI) Targets

Reduction
21%



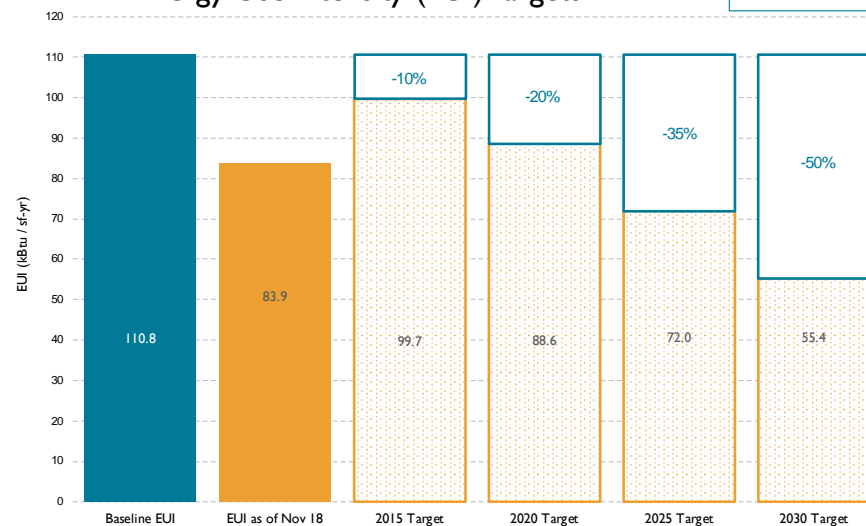
Data Last Updated: 11/30/18

Baseline set using Cleveland 2030 District participating properties 2010 or earliest available water consumption

¹Includes C2030D participating properties with water data in Portfolio Manager

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

Reduction
24%



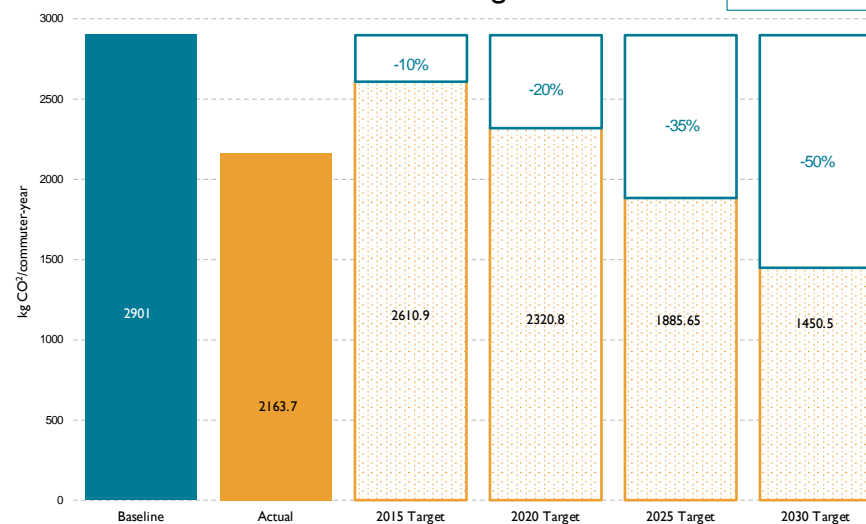
Data Last Updated: 11/30/18

Baseline set using the 2003 Commercial Building Energy Consumption Survey (CBECS)

¹Includes C2030D participating properties with accurate and complete ENERGY STAR Portfolio Manager accounts and baselines

Cleveland 2030 District¹ Commuter CO₂ Emissions Targets

Reduction
25.4%

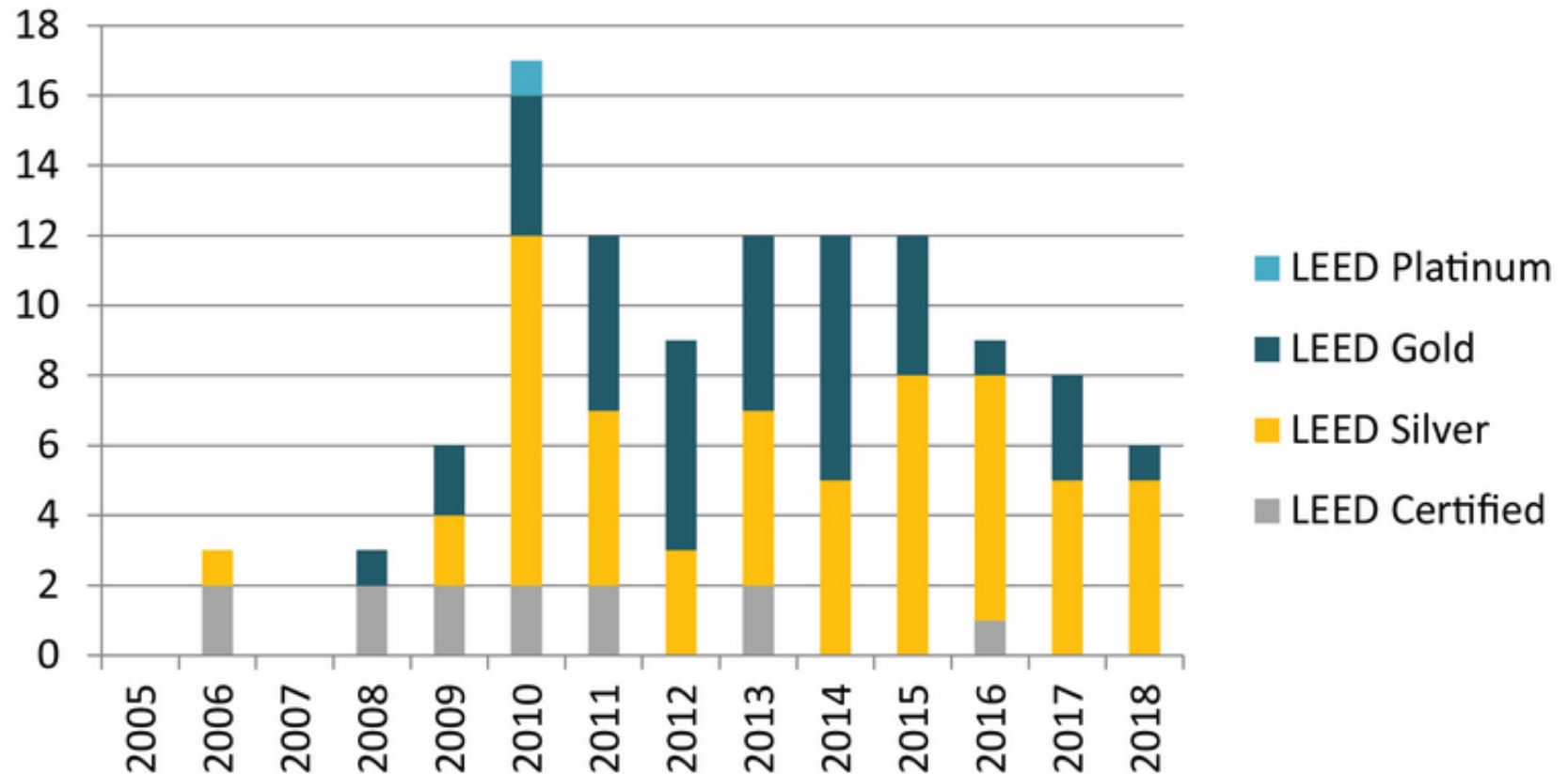


Data Last Updated: 12/31/18

Baseline set using National Household Travel Survey 2001; Actual reflects results from 2018 C2030D Commuter Transportation Survey

¹Includes C2030D participating properties that disbursed the 2018 C2030D Commuter Transportation Survey

LEED Certified Buildings in Cleveland





Celebrating the LEED Platinum
Certification at University Hospitals
Rainbow Center For Women and
Children, 2019



Celebrating the LEED Platinum Certification at
Children's Museum of Cleveland, 2019

Cleveland Residential Tax Abatement Program

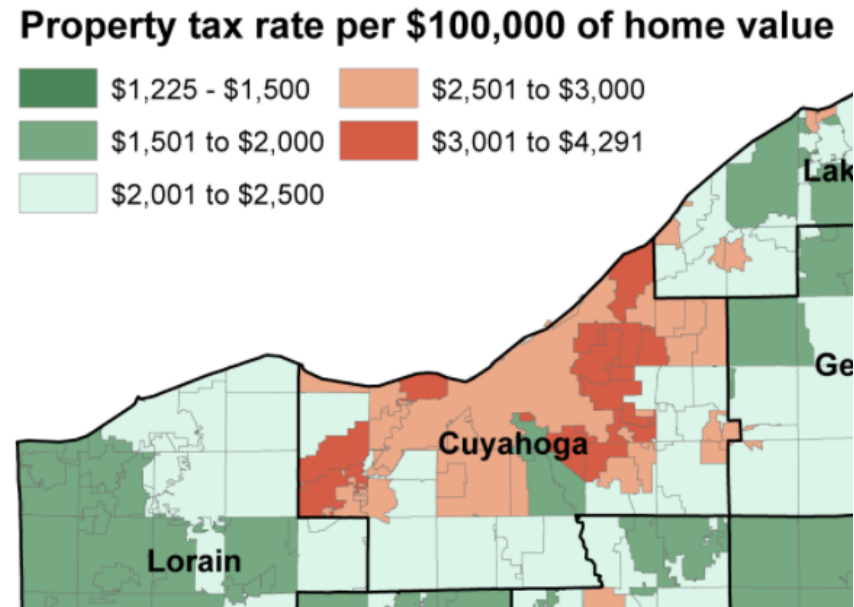
- ❖ **Residential Only**
- ❖ Single & Multi-Family
- ❖ Remodeling & New Construction
- ❖ Affordable & Market Rate

Green Building Compliance Pathways:

- ❖ Enterprise Green Communities (EGC) Certification (Affordable Housing) or Compliance
- ❖ LEED Silver OR National Green Building Standard (NGBS) Silver
- ❖ Passive House or Living Building Challenge
- ❖ Multiple criteria such as design, location, site improvements, water, energy and such.

Benefits

- ❖ Green Certification
- ❖ 15 year Tax Abatement (New Construction)
- ❖ \$200,000 home = \$75-\$120k savings



Green Buildings Standard Handbook

Table 1: Eligible Rating Systems by Building Type

<i>Building Category*</i>	<i>New Construction</i>	<i>Substantial Rehab</i>	<i>Moderate Rehab</i>
Single Family and Multifamily Low-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
Single Family and Multifamily Low-Rise (Market Rate)**	B: EGC compliant & energy req'ts C: LEED Silver D: NGBS Silver	B: EGC compliant & energy req'ts C: LEED Silver D: NGBS Silver	B: EGC compliant & energy req'ts 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 (Market Rate)**	B: EGC compliant & energy req'ts C: LEED Silver D: NGBS Silver	B: EGC compliant & energy req'ts C: LEED Silver D: NGBS Silver	B: EGC compliant & energy req'ts D: NGBS Silver

*The definitions in each rating system determine if a multifamily building is classified as low-rise, mid-rise, or high-rise. Use Enterprise Green Communities definitions to determine affordable vs. market rate.

** See Appendices for EGC Compliance and energy efficiency requirements

As noted above, regardless of compliance path selected, all projects must meet the mandatory requirements set forth in Criterion 2, Location + Neighborhood Fabric, of the 2015 Enterprise Green Communities Criteria.

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)

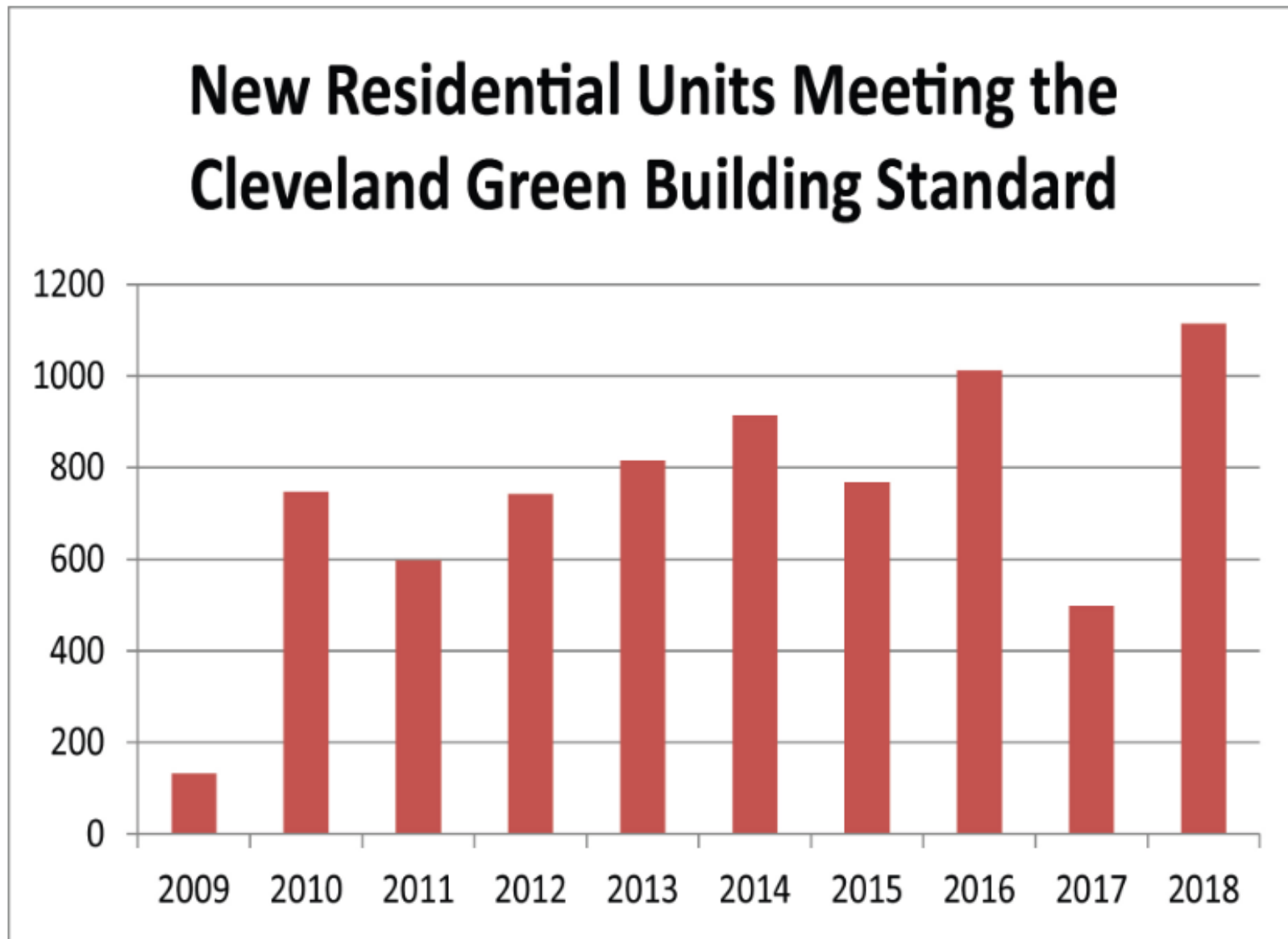
Key Factors

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

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

Metrics – Tax Abatement Program



HERS Data set – 1+2 Family

Database for Analysis

- HERS Software Version: REM/Rate V 14.6
- New Construction (2014 – 2016)
- Home types: Single Family, Duplex
- Number of homes:
 - City of Cleveland: 348
 - ~ 81 % of all building permits (Census)
- Average size: * Sq. Ft. (Conditioned)
 - City of Cleveland: 2,036

How is Cleveland doing?

Compliance with Tax Abatement Program

- 161 new 1+2 family were approved
 - 155 of them used Energy Star
 - Efficient insulation, windows, mechanical equipment, lighting, well sealed homes and ducts
- **According to HERS data, lots more homes could have met Energy Star**
- Avg. HERS Score = 63

Energy Star vs. Non Energy Star

What are key differences?

Averages by Component	Single Family*		Duplex*	
	ES V. 3	Non ES	ES V. 3	Non ES
# Homes	87	55	68	138
HERS Score	58	62	61	67
Conditioned Area	2724	3437	1613	1253
AGW Cavity (U-Factor/R Eq.)	.065/15	.072/14	.059/17	.065/15
Ceiling (R-Value)	37	39	40	50
Window (U-Factor)	.29	.31	.28	.30
Air Leakage (ACH50)	3	3	4.5	5.3
Duct Leakage (%)	1.09	1.6	2.18	Cond.
AC Efficiency (SEER)	13	13	15	13
Heating Efficiency (AFUE)	94	94	95	85

*Data from HERS Analysis

Conclusions

ES vs Non ES

- Components in single family home similar between ES vs Non ES
 - ES has tighter envelope + ducts, better windows, foundation & wall insulation
- Duplex vast difference between ES vs Non
 - ES Duplex more efficient components all around

Conclusions

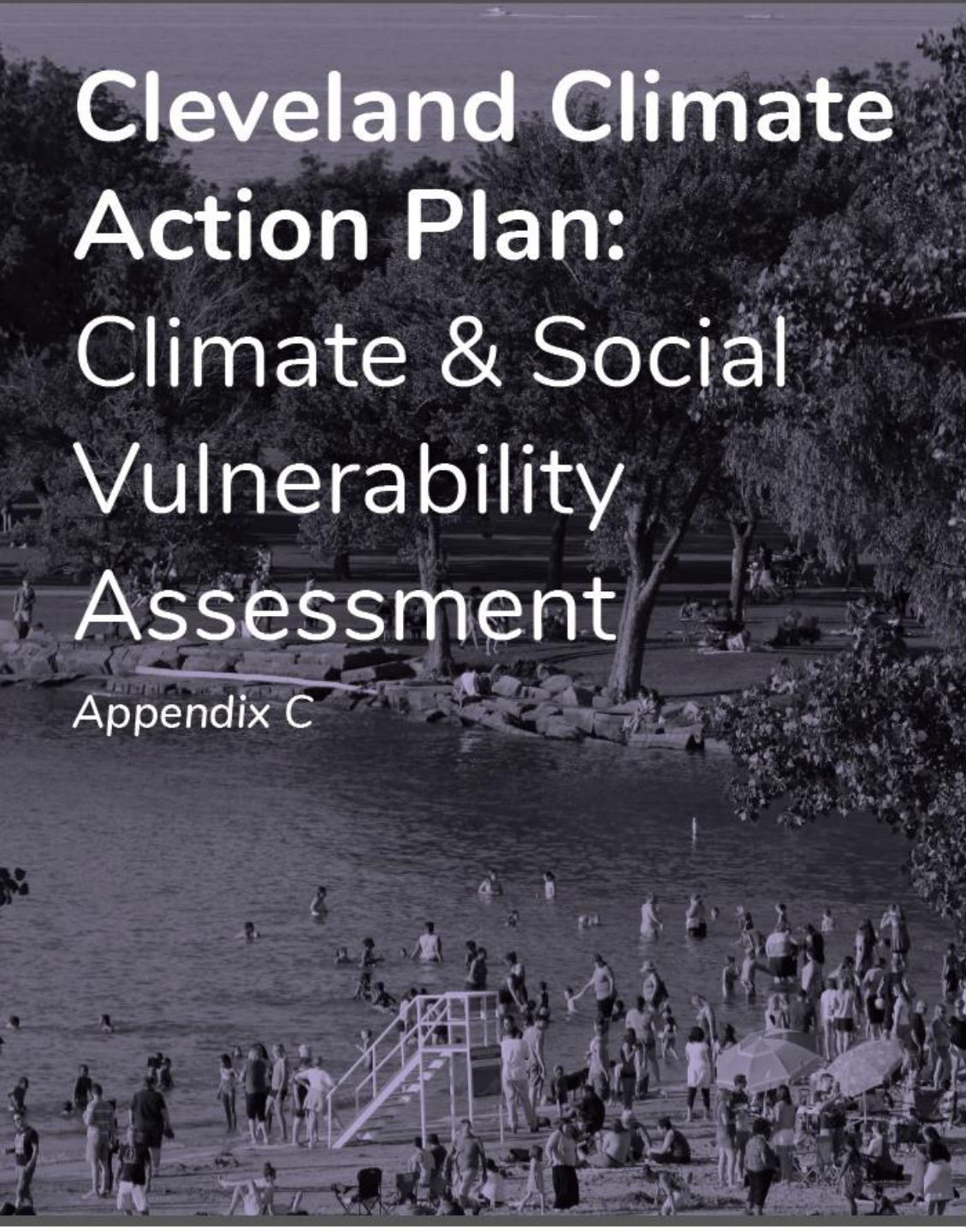
Potential Updates to Green Standard

- Ohio has adopted 2018 IECC for residential codes effective July 2019, among other compliance pathways.
- Still uses Energy Star 3.0
- Most builders can meet ES v. 3 and 3.1
- Presents opportunities to update Cleveland's tax incentive program
 - - Incorporate Energy Star 3.1
 - Incorporate DOE ZERH – create path for new homes to be zero energy

Conclusions

Marketing Program

- Builders can meet efficiency requirements
- Given significant tax savings for homeowners, why isn't every new home complying?
- Incentive is for homebuyers (for owner-occupied homes) and developers (multi-family, landlords)
- Provide training and marketing techniques to builders to sell program benefits



Cleveland Climate Action Plan: Climate & Social Vulnerability Assessment

Appendix C

- Process for identifying and assessing vulnerabilities
- Climate change and projected changes for mid & end-century
- Current socio-economic indicators of vulnerable population groups and where they reside
- Cumulative impacts of previous chapters and strategic linkages w/ ongoing efforts in City
- Other important factors and vulnerabilities
- Opportunities to promote climate adaptation

Equity

- Tax Abatement Policy Working Group: Economic and Fiscal Analysis of the program, with policy recommendations – early 2020
- Lead Safe Home Legislation/Program: Potential for more weatherization and Solar interventions
- Community: CHN Housing Partners – Weatherization Programs



A screenshot of the CHN Housing Partners website. The header includes the logo and navigation links: About, Housing & Community Services, Real Estate & Partner Services, and Donate. The main content area features two primary calls to action. On the left, a box titled "Free Products & Services" lists: Home Insulation, New Refrigerator, New Freezer, Hot Water Tank, Furnace, Major Plumbing Repairs, Lighting, and Carbon Monoxide Detector. Below this is a green box asking "Furnace or hot water not working?" and providing contact information for an emergency program running from October 15 to April 15. On the right, a section titled "Apply Now for Home Weatherization and More!" includes a photo of a technician working on a furnace and a testimonial from a resident named Midred. At the bottom right, there is a link for "For Weatherization, Energy Efficient Appliances & More:".

SUSTAINABLE CLEVELAND MUNICIPAL ACTION PLAN

EXECUTIVE SUMMARY

October 2013



CITY OF CLEVELAND
Mayor Frank G. Jackson



5 Focus Areas - 25 Actions

**Sustainable Municipal Building
Policy - Combines
Health/Comfort, Energy
Efficiency and Resilience**

Goals:

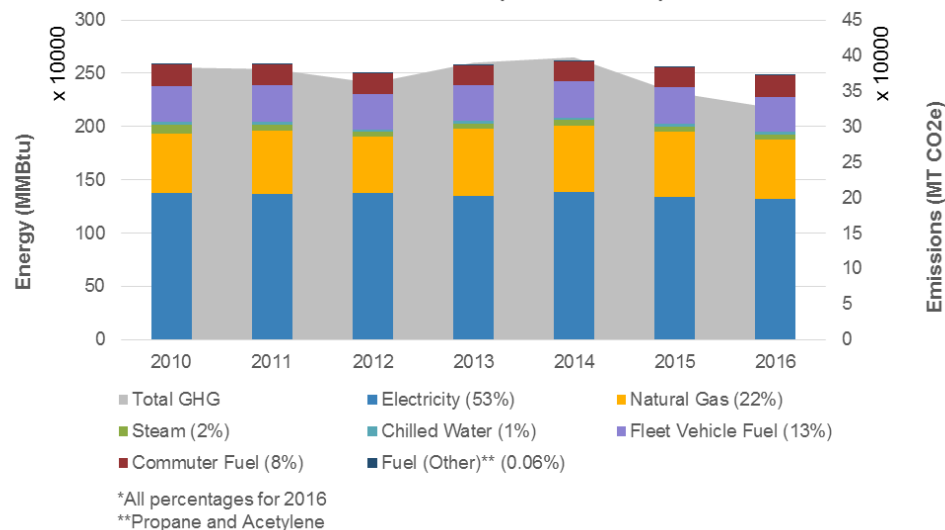
**20% GHG reductions by 2020 over 2010
Baseline Year**

45% reductions by 2030

Progress:

23% reductions (2017)

**Cleveland Municipal Energy Consumption and
GHG Emissions (2010 - 2016)**



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...

New Construction Facilities

*Collinwood Recreation Center
(2011) – LEED Gold Certified*



*New City of Cleveland Kennel (March 2019)
Goal: LEED Silver (v3)*



*3rd District Police Headquarters (2015) – Built
to LEED Silver standards*



*New Fire Station #36 (2016)
Built to LEED Silver standards*



Thank you!

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Sustainable Cleveland

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