Shining a Light on Ohio Utility Data

Oliver Kroner, City of Cincinnati

CLIMATE CHANGE IN CINCINNATI

HEAT

PESTS

HEALTH

STORMS

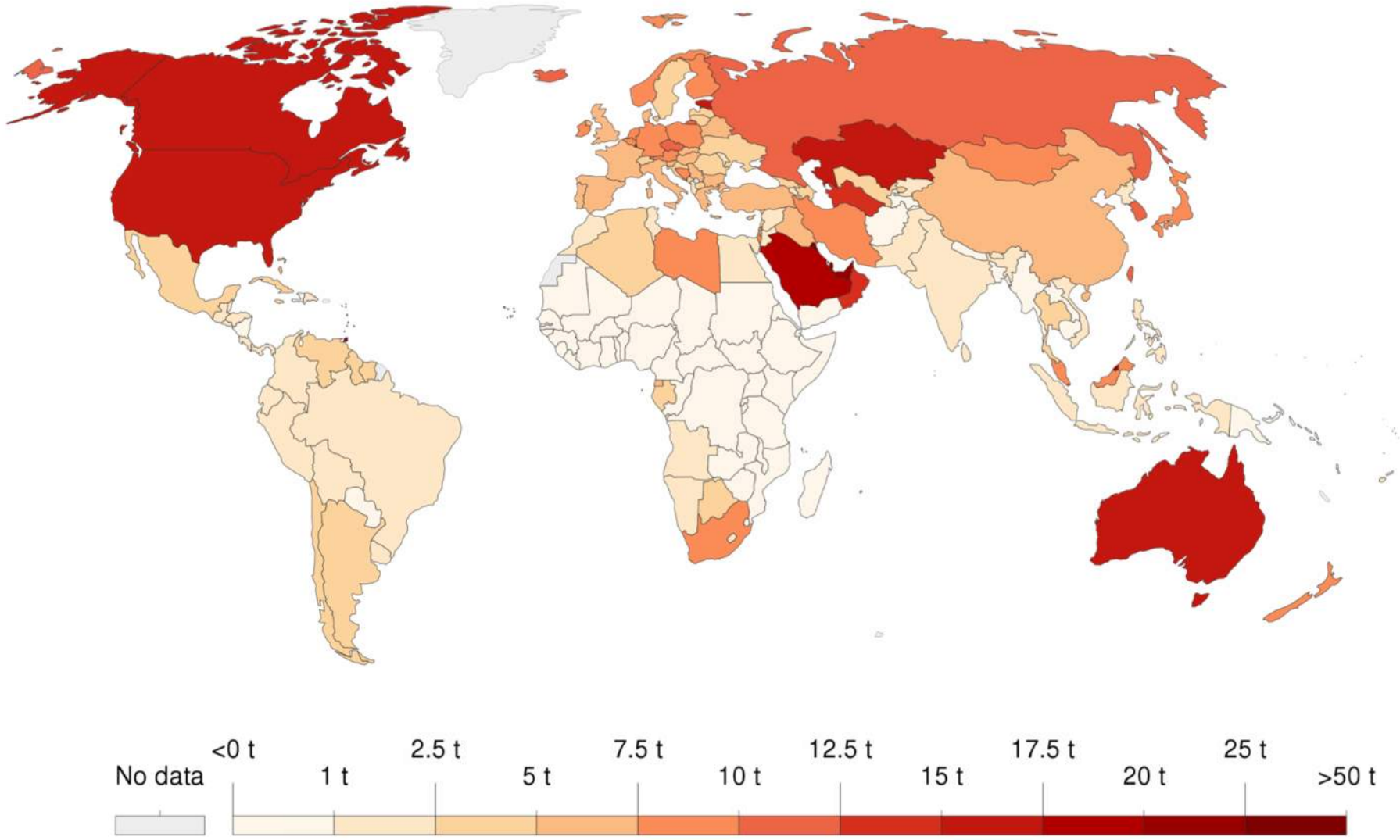
LANDSLIDES

SEWER BACKUPS

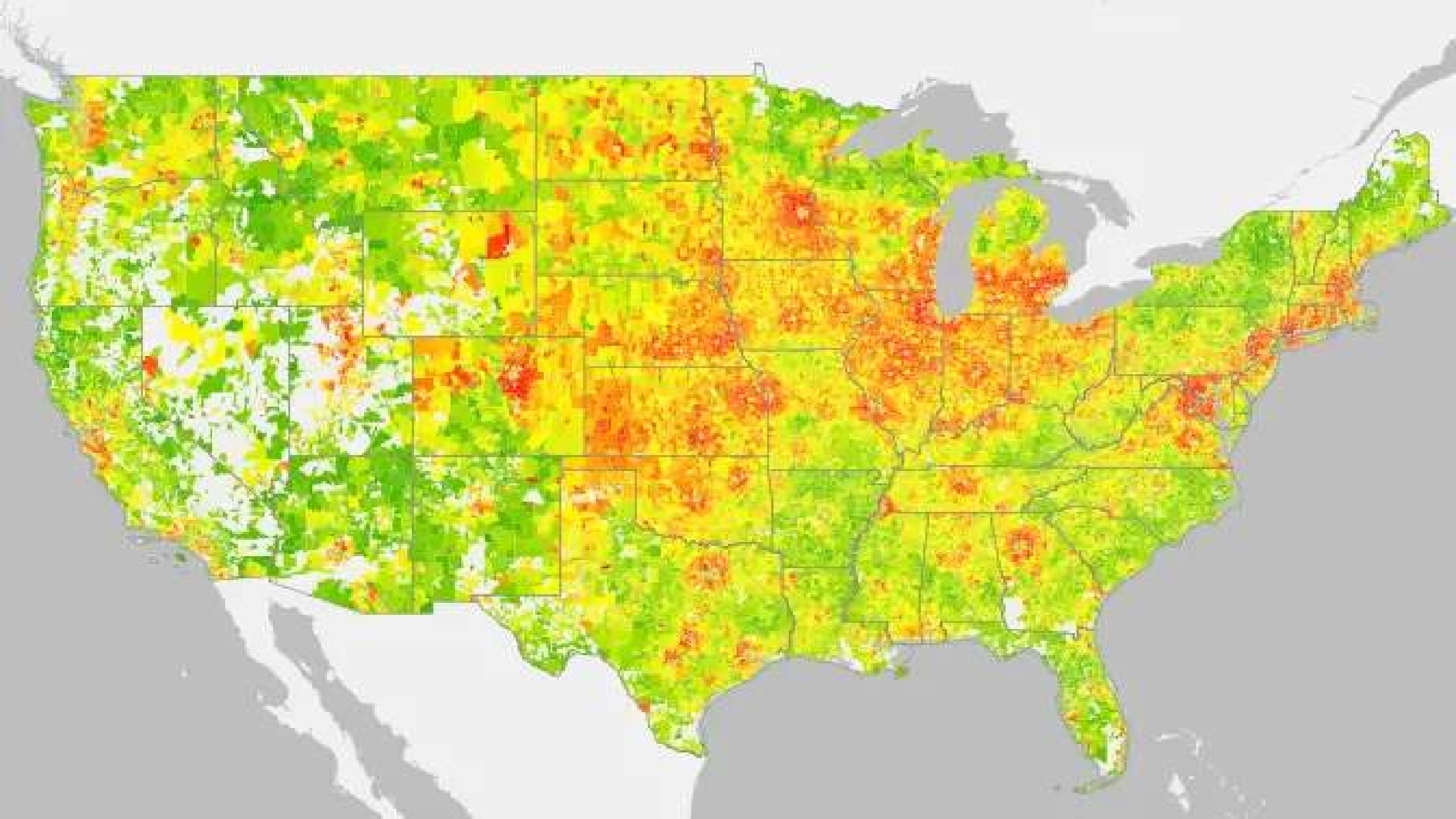
CO_2 emissions per capita, 2017

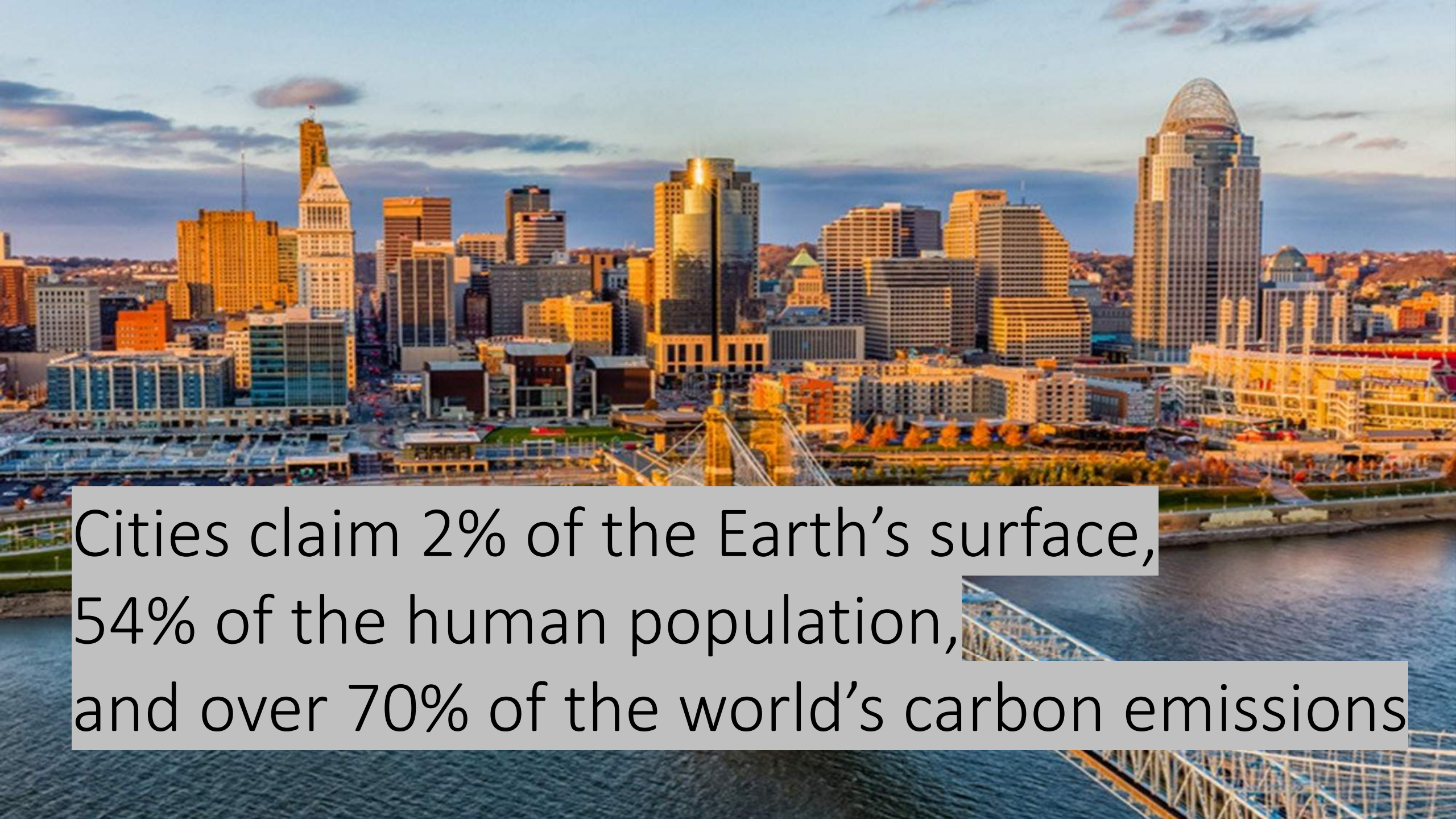
Average carbon dioxide (CO_2) emissions per capita measured in tonnes per year.

Our World in Data



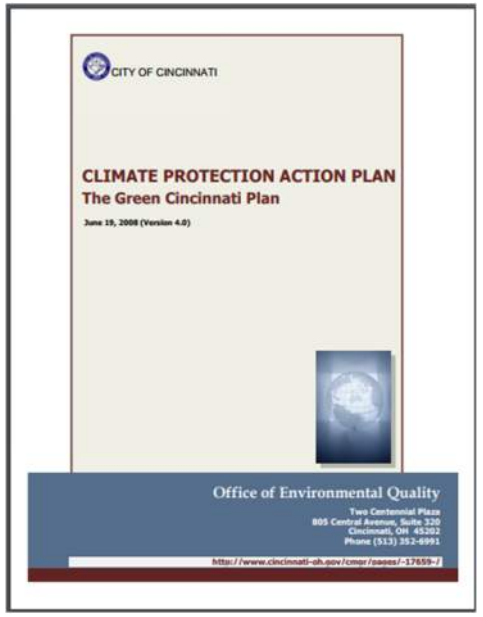
Source: OWID based on CDIAC; Global Carbon Project; Gapminder & UN





Cities claim 2% of the Earth’s surface,
54% of the human population,
and over 70% of the world’s carbon emissions

2018 GREEN CINCINNATI PLAN UPDATE



2008

2013

2018

- **Mayor's motion July 2017 called for updated plan, including:**
  - **Carbon reduction goal:** 80x50 – 80% emissions reductions by 2050
  - **Renewable Energy:** 100% by 2035
  - **Steering Committee of organizational leaders** to guide process

Community Vision

Green Umbrella Idea Bank

Extreme Weather Task Force

Task Teams

University Analysis

Steering Committee

2018 Green Cincinnati Plan

Public Input

GREEN CINCINNATI PLAN

BUILT ENVIRONMENT

EDUCATION & OUTREACH

ENERGY

FOOD

NATURAL SYSTEMS

RESILIENCE

TRANSPORTATION

WASTE

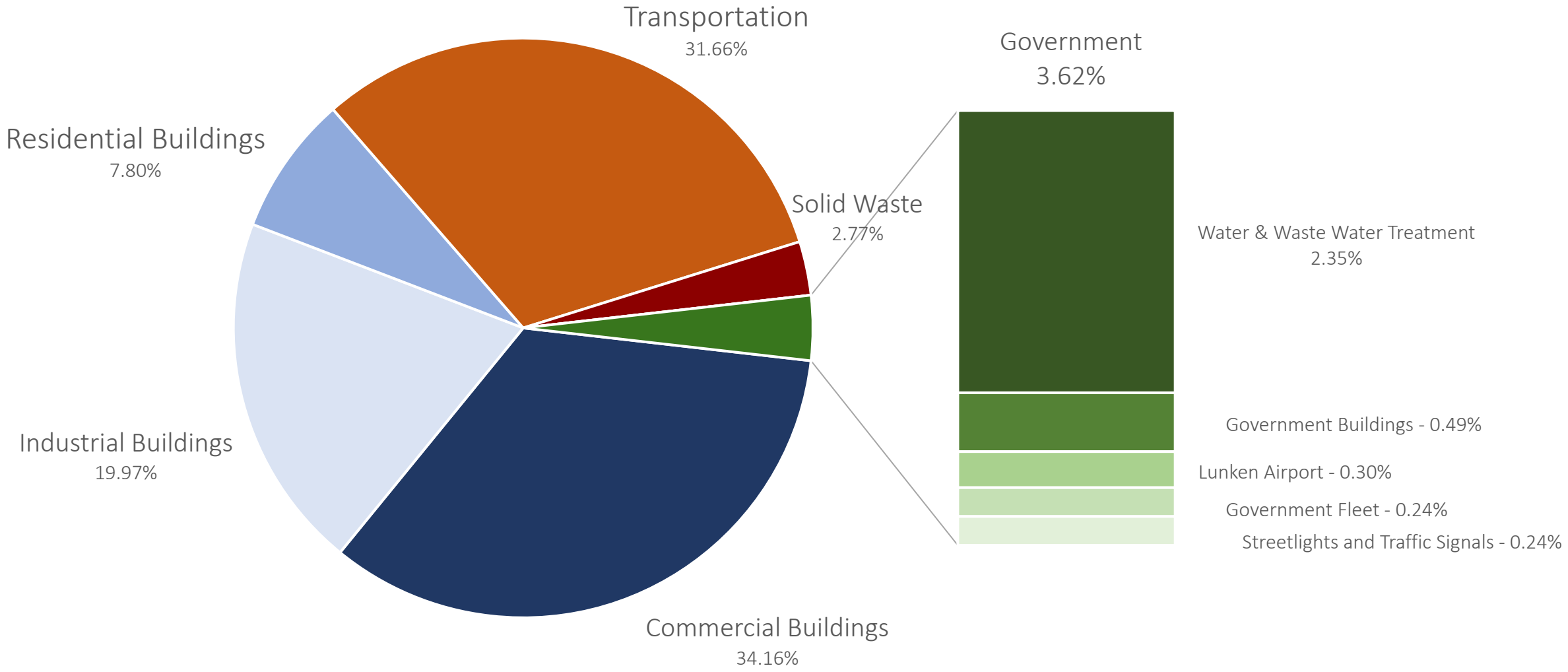
80 Strategies to reduce carbon emissions 80% by 2050.

Sustainability. Equity. Resilience.

Cincinnati Carbon Profile

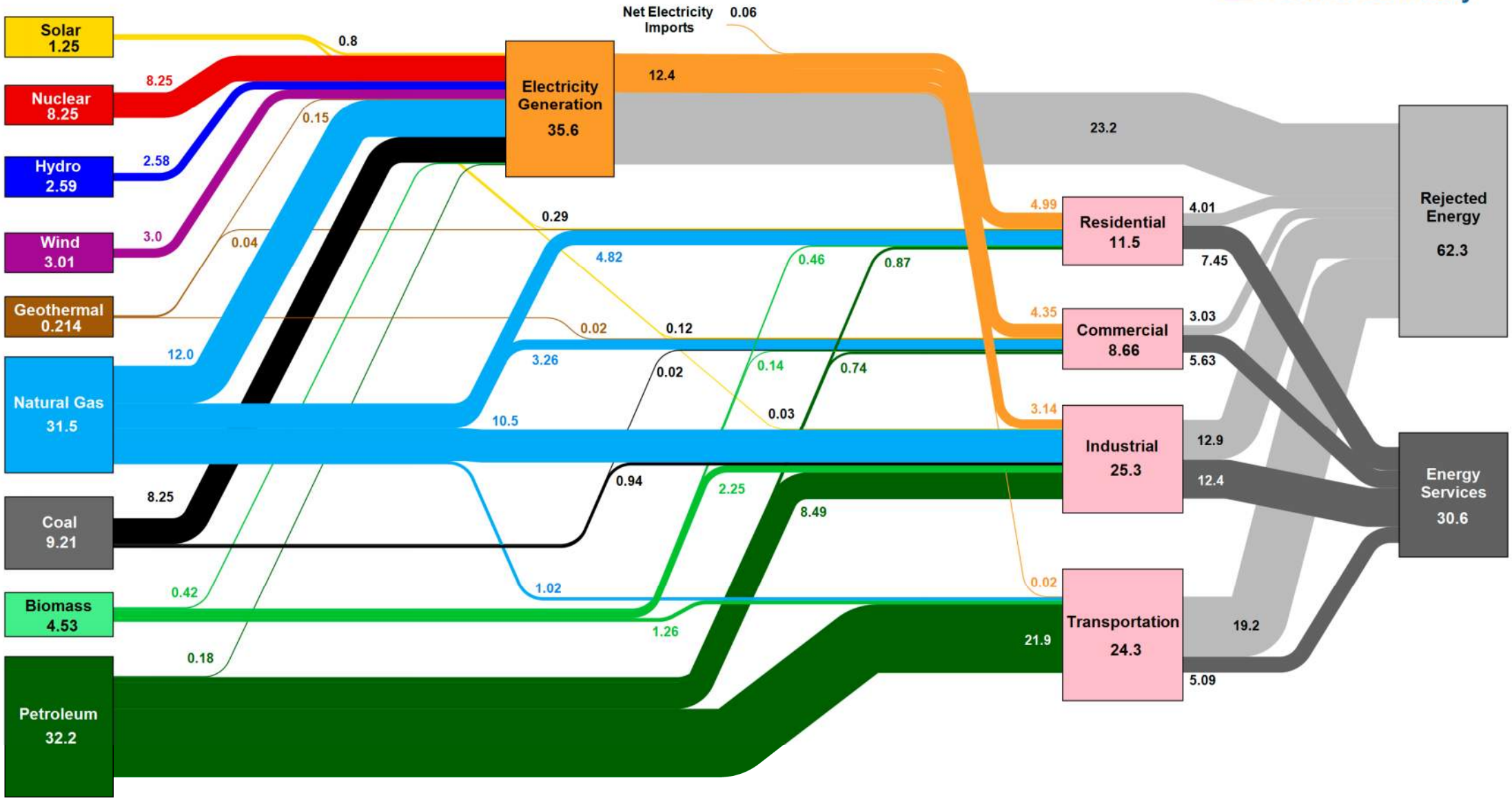
7.6M

metric tons of carbon
emitted in Cincinnati in 2015



Estimated U.S. Energy Consumption in 2020: 92.9 Quads

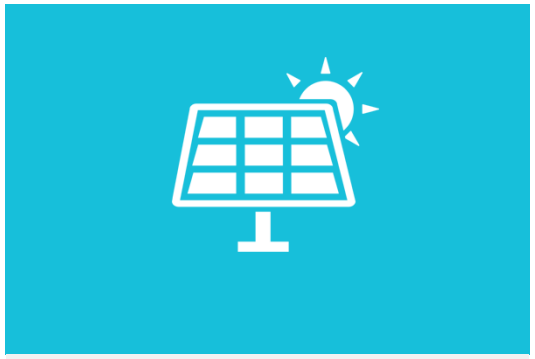
Lawrence Livermore National Laboratory



Source: LLNL March, 2021. Data is based on DOE/EIA MER (2020). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 21% for the transportation sector and 49% for the industrial sector, which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

CINCINNATI'S CLIMATE CHANGE GOALS

As part of the Green Cincinnati Plan, we will….



Transition the city to 100% renewable energy.

Improve energy efficiency of building stock.

Increase public transit, biking, and walking

Electrify transportation

100% Green Energy for the City

- 100 Megawatt solar farm under construction (Power Purchase Agreement)
- Energy Aggregation Program - Green energy delivered to ~80,000 homes and biz
- ~10% savings from conventional utility rate
- Workforce development program to grow solar sector employment

LEED Incentives

- 12-15 Year Property Tax abatement for LEED certified construction and renovation
- Over 1,600 LEED Certified Projects in Cincinnati
- More than 27M square feet of LEED certified projects

CINCINNATI

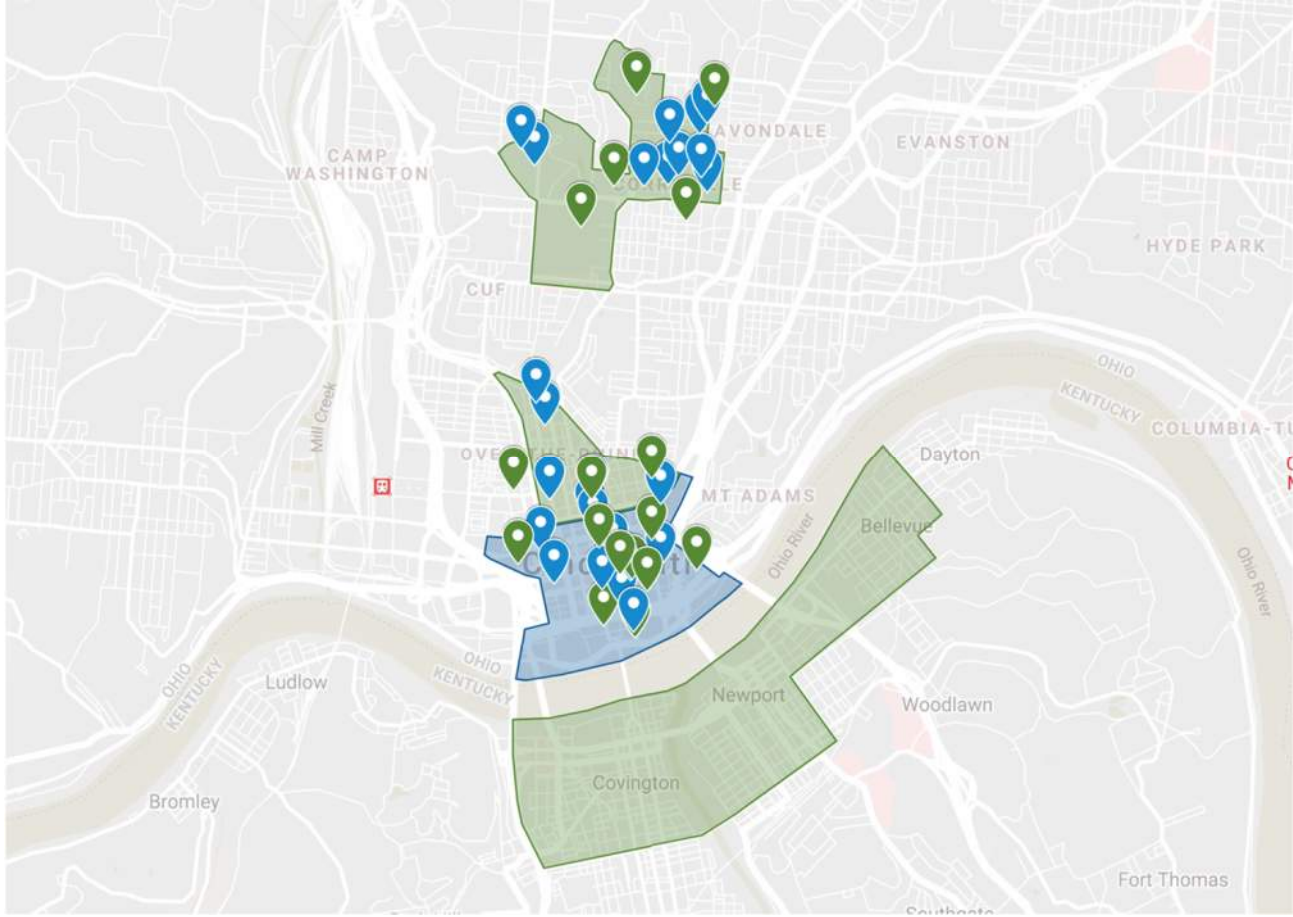
2030

DISTRICT®

Cincinnati 2030

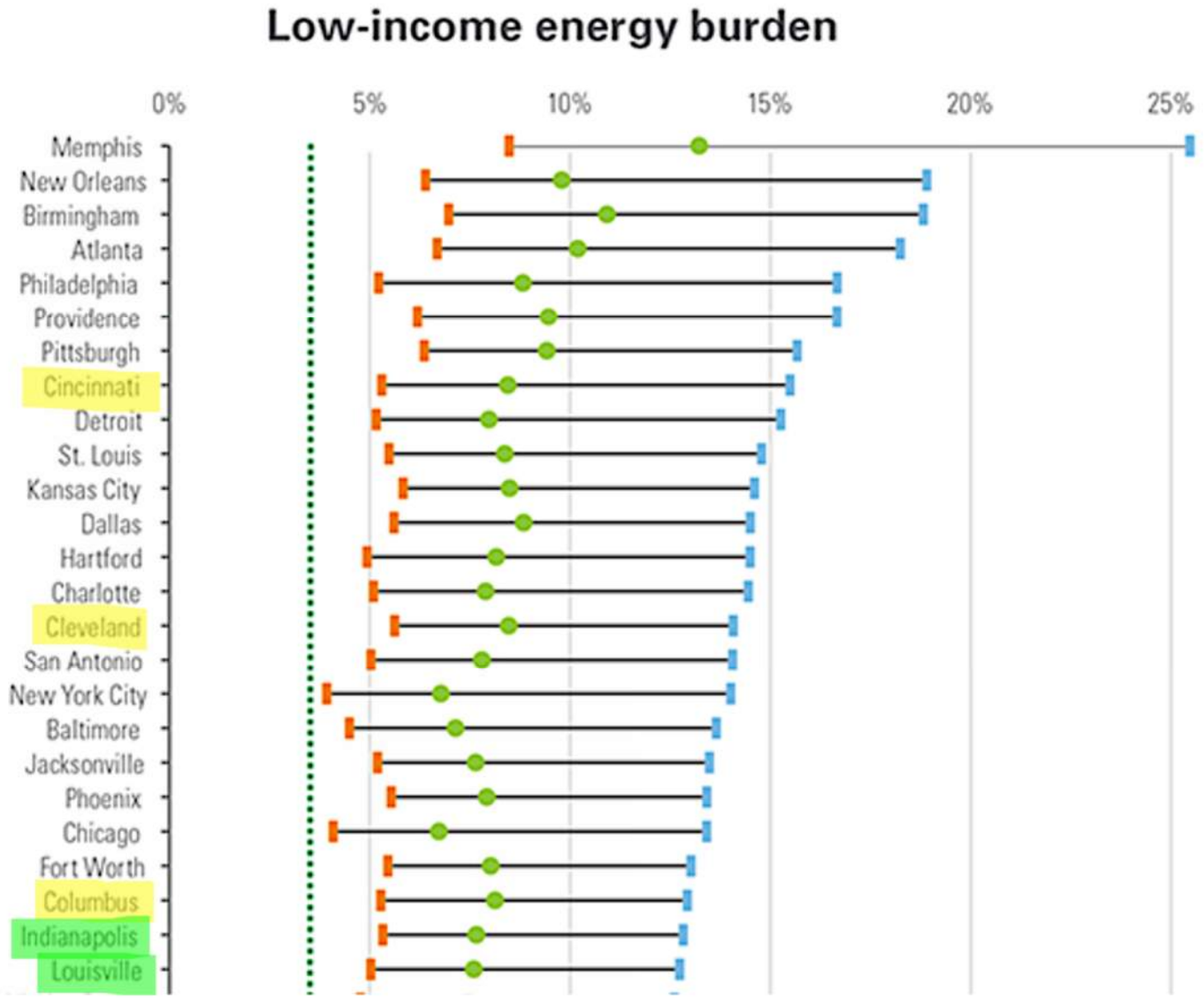
2030 District: A national model for urban sustainability - are made up of property owners who make a collective commitment to reduce their buildings' energy use, water consumption and transportation emissions by 50% by the year 2030.

www.2030districts.org



Residential Energy Burden

Percentage of household income spent on utility costs



ACEEE
American Council for an Energy-Efficient Economy

WarmUp Cincy

Energy Efficiency for Low-Income Apartment Buildings

American Cities Climate Challenge

WarmUp Cincy programs for income-eligible multifamily buildings

- **Incentives For Property Owners**
  - RFP for whole building energy efficiency overhaul up to $200K
  - Matching grants up to $5K per address for measures to reduce tenant bills
- **Programs for Tenants**
  - Free energy audit and basic retrofit including appliances, lights, air-sealing, etc
  - Energy efficiency training that qualifies for utility bill credits
- **Innovation RFP (coming 2022)**
  - Give you best idea to deliver energy efficiency improvements for $250K

Understanding Cincinnati's multifamily housing stock: An analysis to improve access to energy efficiency for low-income households

Amanda Webb and David Moore

2020

Table 3: Building type by number of buildings and square footage – all buildings

Building type	Number of Buildings	% of Total	Number of Units*	% of Total	Square Footage	% of Total
Commercial	6,088	7%	-	-	107,514,114	32%
Industrial	1,660	2%	-	-	35,746,143	11%
Residential	81,165	91%	-	-	187,594,279	57%
Single family	63,984	72%	63,984	48%	105,145,158	32%
Two family	8,657	9%	17,314	13%	19,550,739	6%
Three family	1,632	2%	4,896	4%	5,045,950	2%
Multifamily	6,892	8%	45,923	35%	57,852,432	17%
Total	88,913		132,117		330,854,536	

*SMDA data on number of units is missing for 1,281 properties in the county assessor

Zooming in at the census track level

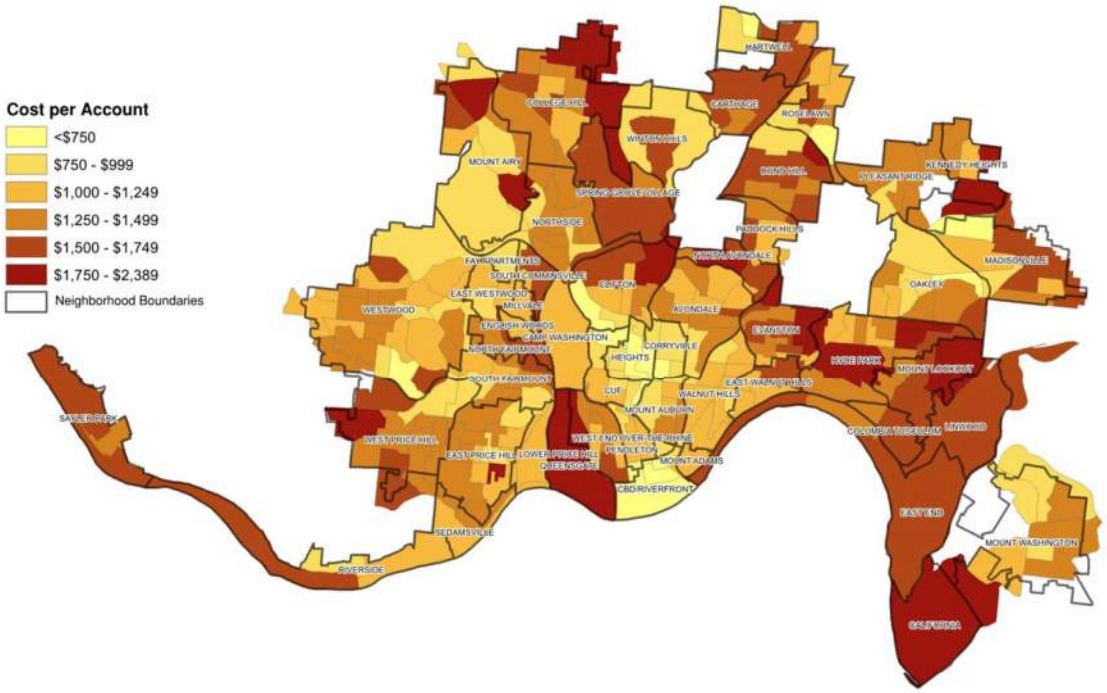
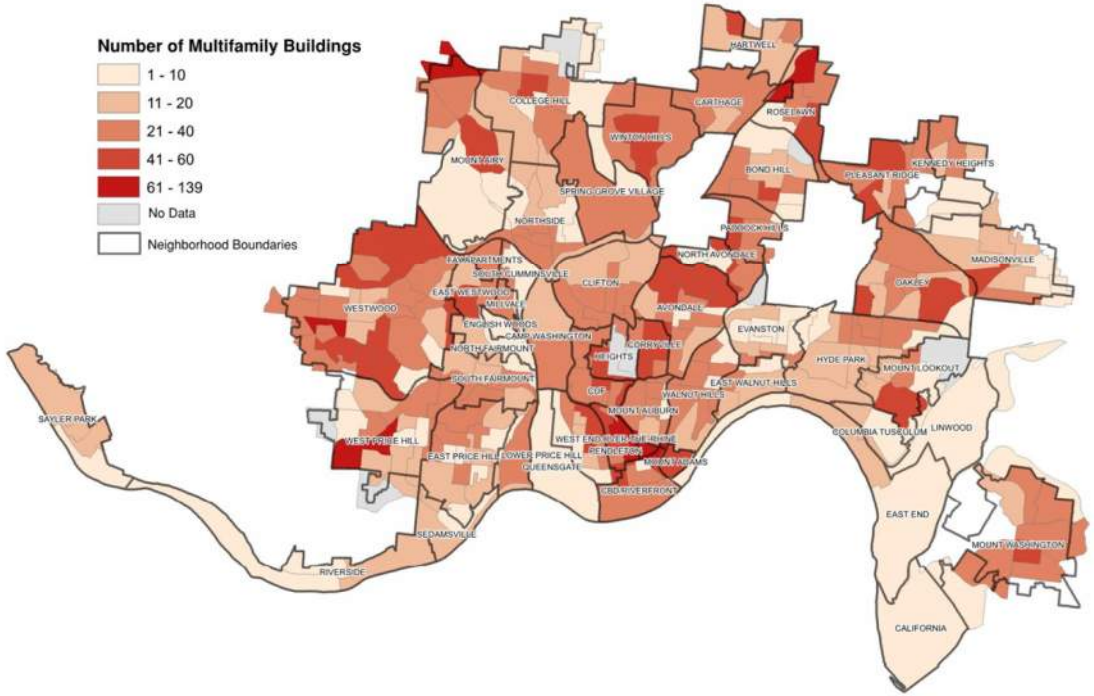
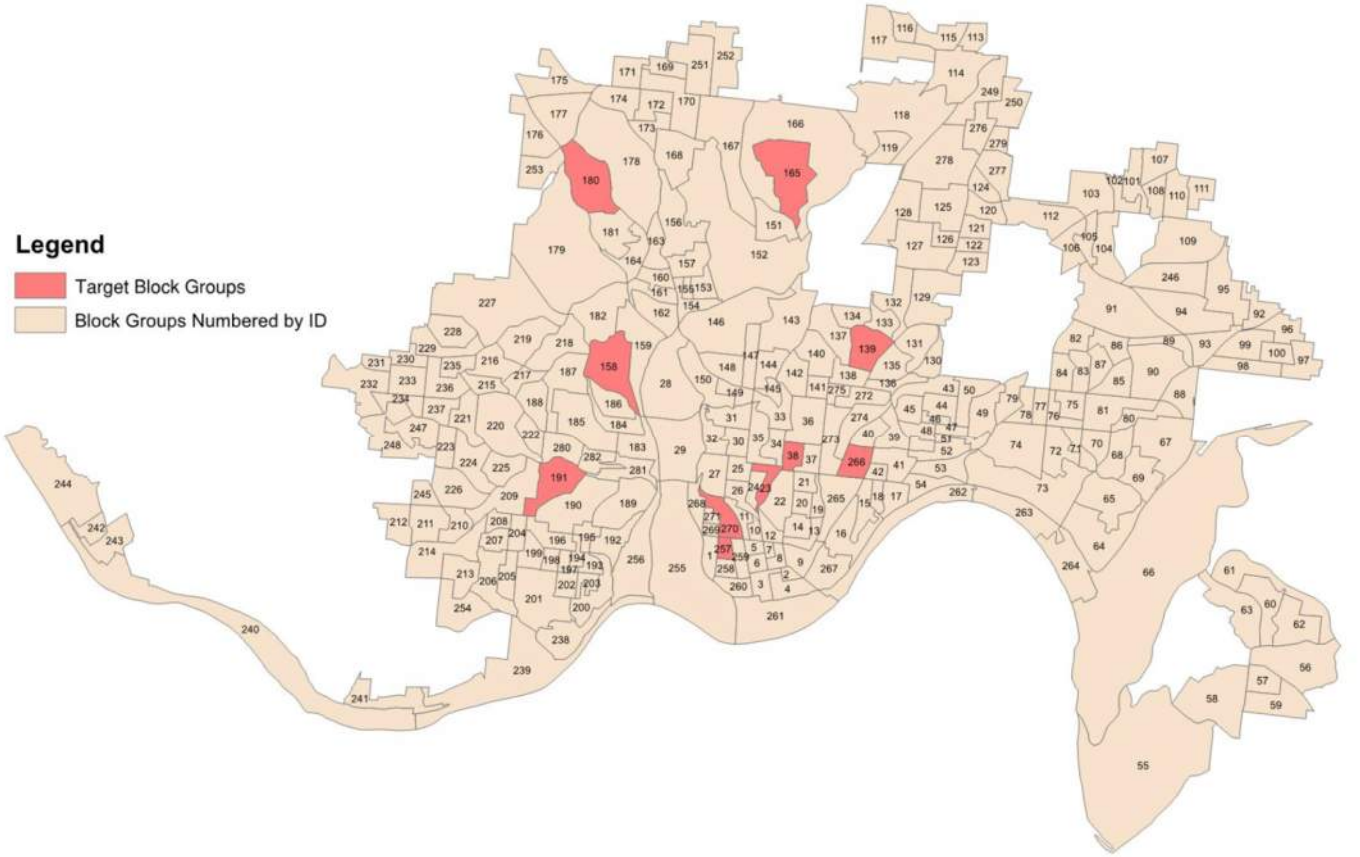


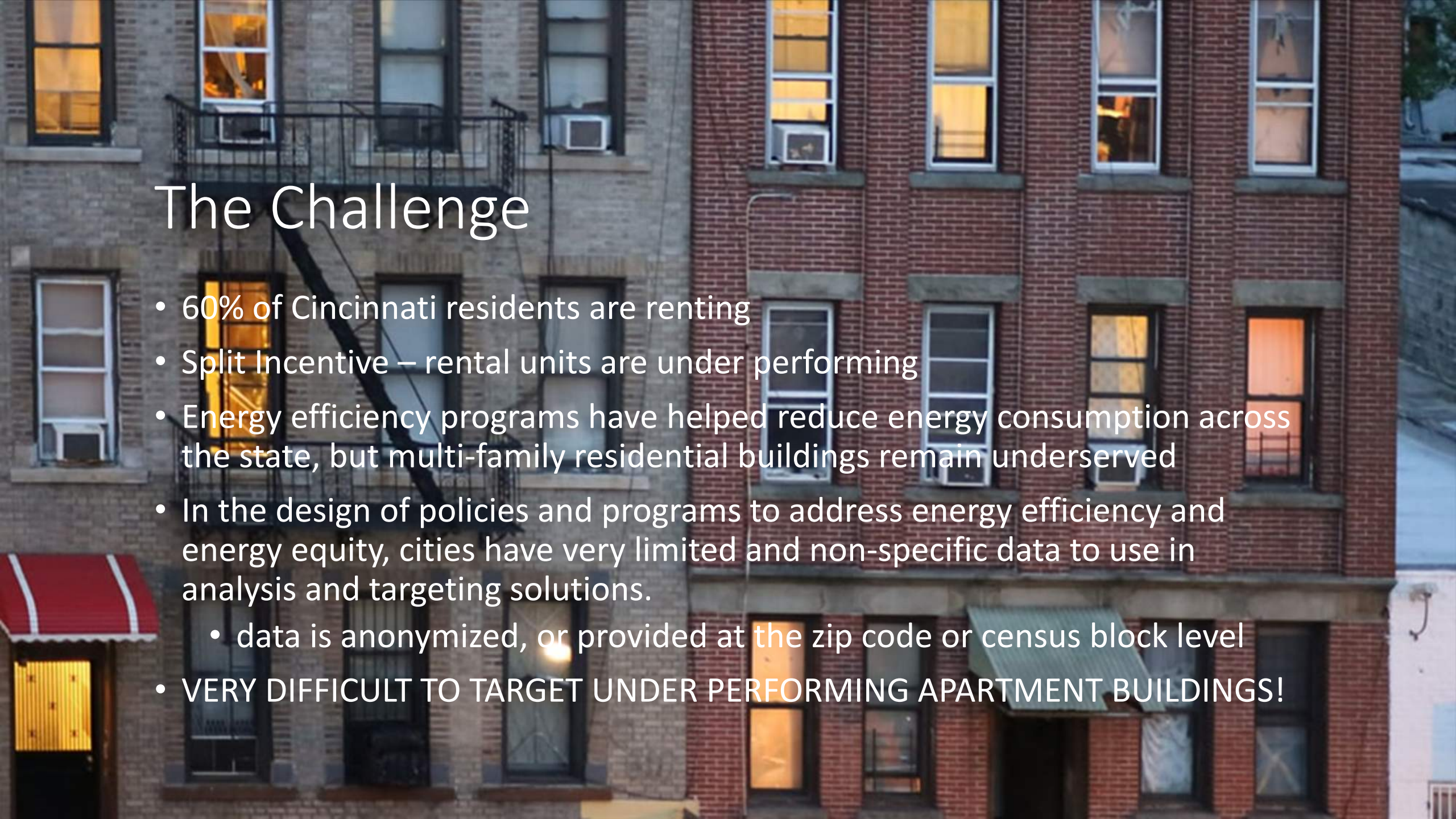
Figure 12: Map of total energy expenditures per account

Figure 1: Number of multifamily buildings by neighborhood and building type



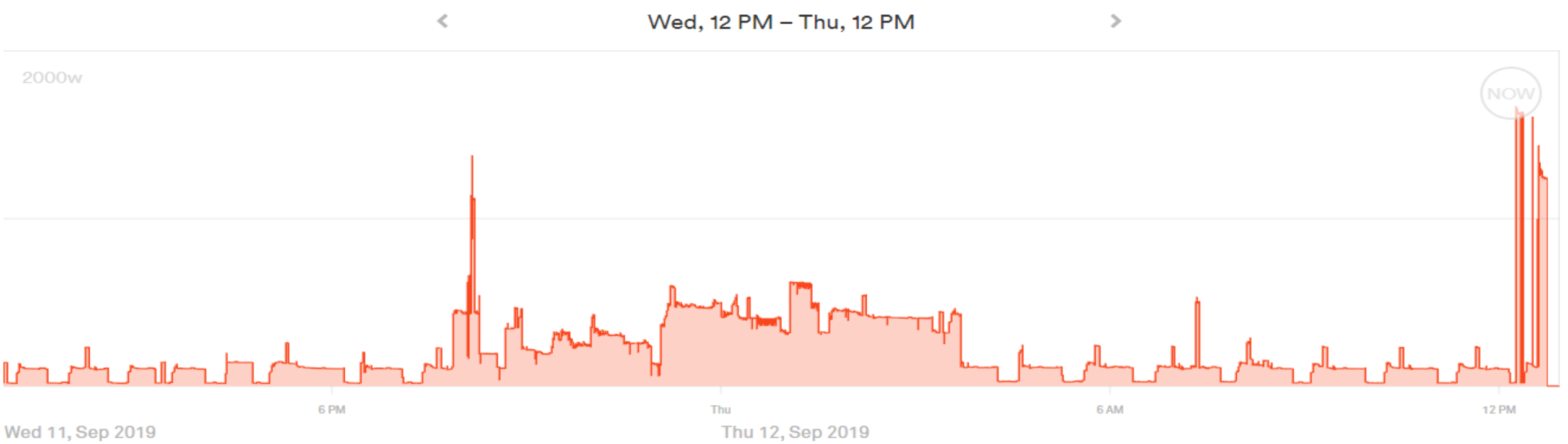
Target programs the hot spots





The Challenge

- 60% of Cincinnati residents are renting
- Split Incentive – rental units are under performing
- Energy efficiency programs have helped reduce energy consumption across the state, but multi-family residential buildings remain underserved
- In the design of policies and programs to address energy efficiency and energy equity, cities have very limited and non-specific data to use in analysis and targeting solutions.
  - data is anonymized, or provided at the zip code or census block level
- VERY DIFFICULT TO TARGET UNDER PERFORMING APARTMENT BUILDINGS!



Proposed Solution: Shine a Light on the Data

Ohio utility law allows for the creation of Competitive Retail Energy Service (CRES) Providers.

- What consumption patterns do we see in energy burdened households? How do these correlate with building typology, location, ownership, etc?
- Which households are using electric heat?
- Which households have air conditioning, which do not?
- Which households have gas connections that are hardly used?

This information would allow cities to:

- Identify specific outlier households using an outsized amount of energy.
- Understand clusters and benchmark energy consumption
- Identify specific technology solutions that have the most significant impact.
- Measure/Track/Verify progress on energy and climate programs

It’s happening!

ENERGY FOUNDATION
building a new energy future

go sustainable energy

Smart Cities - Additional Opportunities

- Energy Benchmarking
- Load shifting
- Electrification
- Coalition of Ohio cities working on energy policy

RESULTS FROM CITIES WITH BENCHMARKING ORDINANCES

CHICAGO

Energy consumption

↓5.2%

from 2014 to 2018

$15.1

MILLION

bill savings/year

MINNEAPOLIS

Energy consumption

↓3.4%

from 2014 to 2016

$21

MILLION

bill savings/year

DENVER

Energy consumption

↓4.5%

from 2017 to 2018

$13.5

MILLION

bill savings/year

NEW YORK

Energy consumption

↓10%

from 2010 to 2015

SEATTLE

Energy consumption

↓3%

from 2014 to 2015

SAN FRANCISCO

Energy consumption

↓7.9%

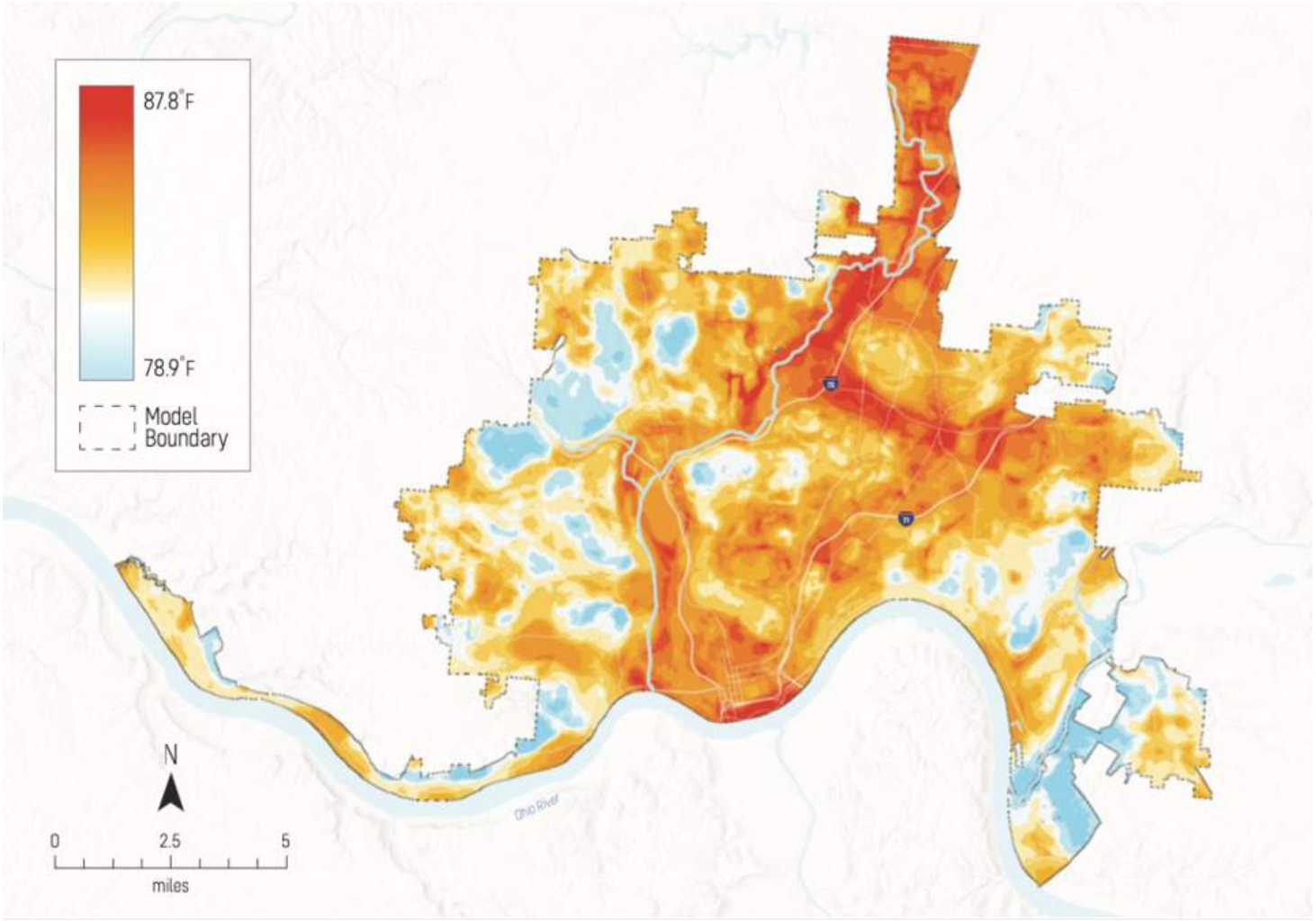
from 2010 to 2014

HEAT RESILIENCE STRATEGIES

Which buildings have air conditioning?

Which do not?

What cooling strategies can the City offer in Urban Heat Islands



BUILDING ELECTRIFICATION

90% of buildings must be electrified by 2050 to meet emissions targets.

Coalition of Ohio Cities

- Spur action at the state level
- Benchmark city programs- what is working? What is not?
- Leverage wins of other cities

GreenCincinnatiPlan.org

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