Cincinnati Climate Equity Indicators Report 2021

adaptation international

University of CINCINNATI

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GROUNDWORK Ohio River Valley
CHANGING PLACES CHANGING LIVES

Green Umbrella
REGIONAL SUSTAINABILITY ALLIANCE

Green Cincinnati
BUILDING A SUSTAINABLE AND EQUITABLE CITY

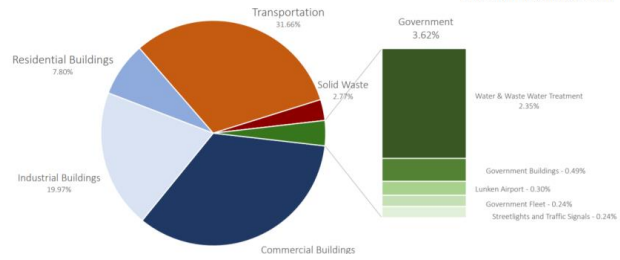Climate Equity Indicators Report Partners

3
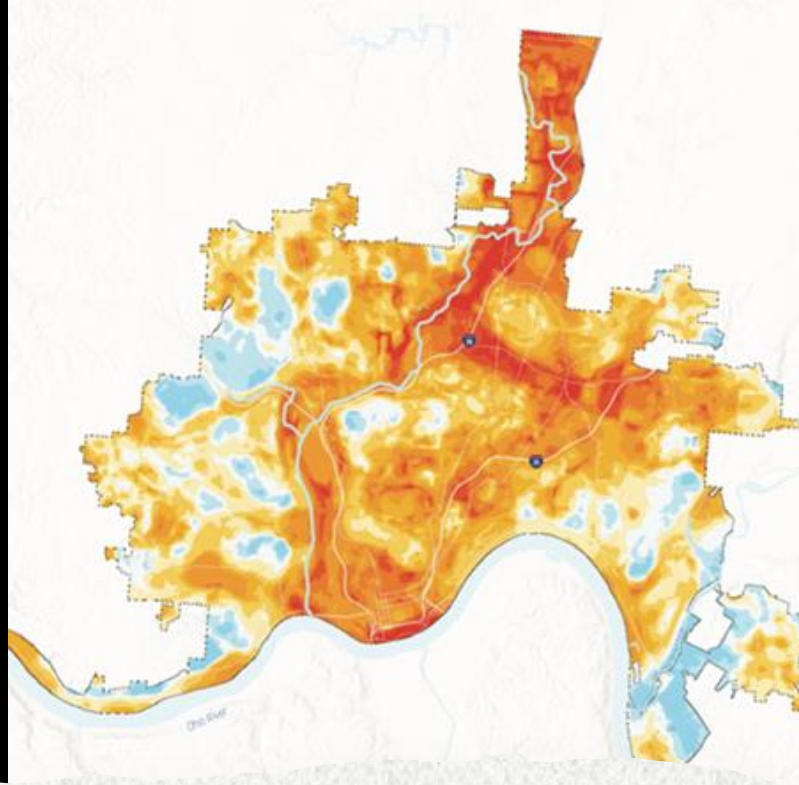
Climate Change in Cincinnati:
Centering Equity & Justice

Background

Cincinnati Carbon Profile

7.6M
metric tons of carbon emitted in Cincinnati in 2015

Transportation 31.66%
Residential Buildings 7.80%
Government 3.62%
Solid Waste 2.37%
Water & Waste Water Treatment 2.35%
Industrial Buildings 19.97%
Commercial Buildings
Government Buildings - 0.49%
Lunken Airport - 0.30%
Government Fleet - 0.24%
Streetlights and Traffic Signals - 0.24%

Bloomberg Philanthropies

American Cities Climate Challenge
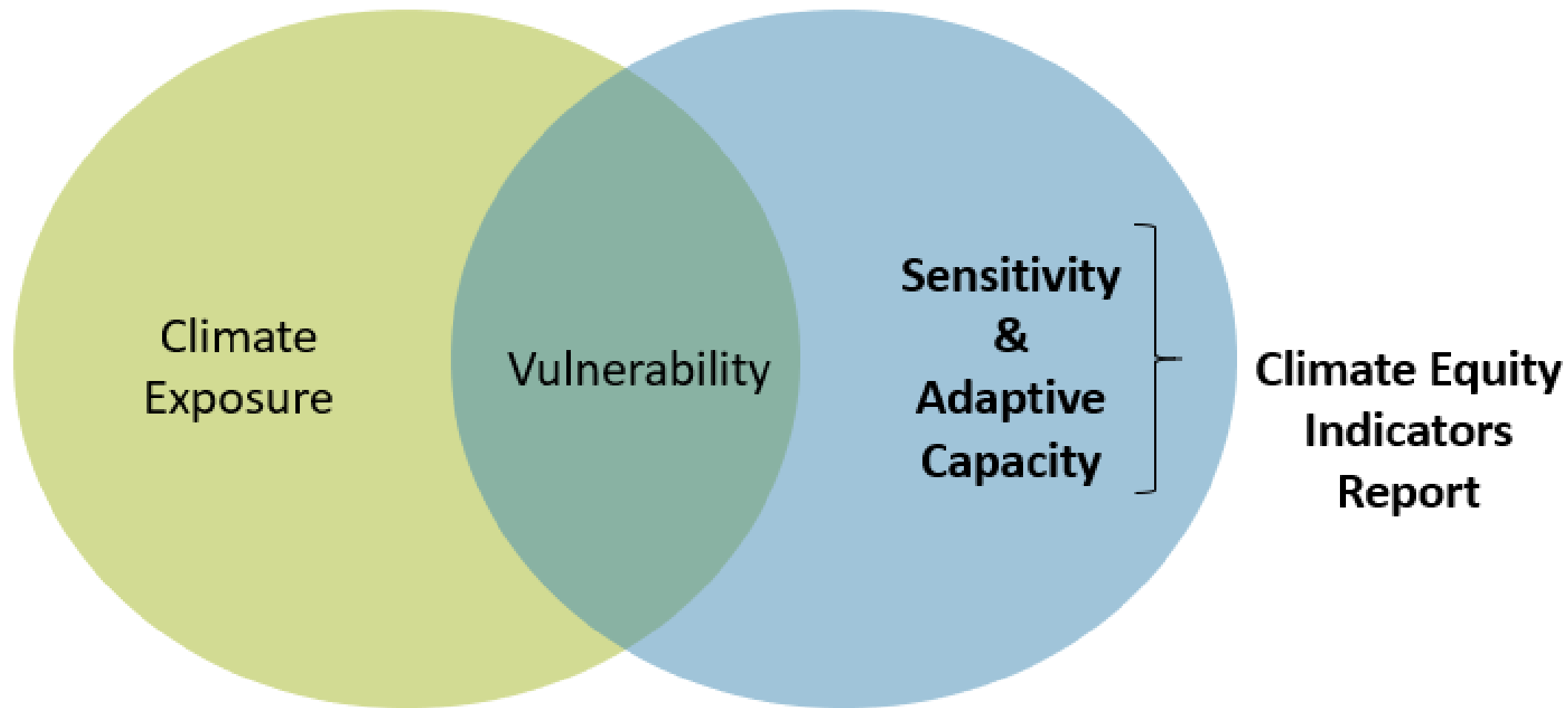

KAPWA CONSULTING
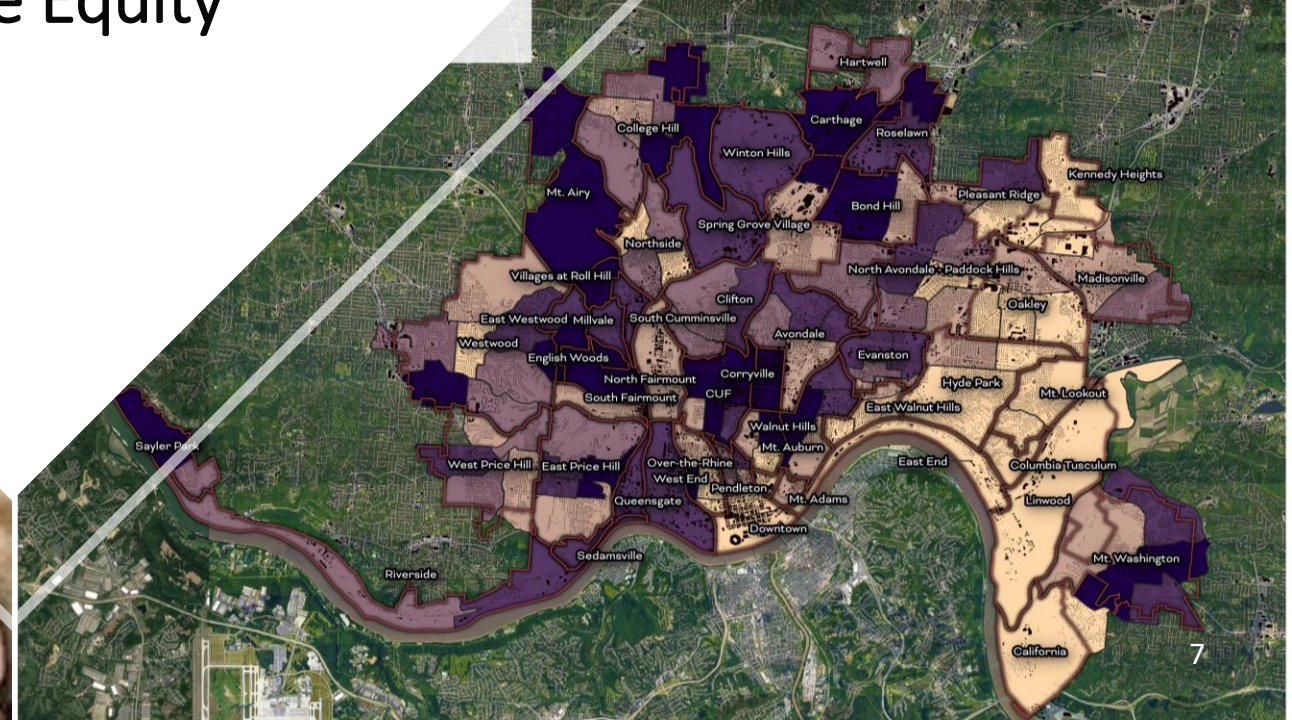EQUITY SUSTAINABILITY COMMUNITY

Figure 1: The relationship between Climate Exposure, Sensitivity, Adaptive Capacity, and Vulnerability

Climate Equity

Article

Effects of Urban Landscape and Sociodemographic Characteristics on Heat-Related Health Using Emergency Medical Service Incide

Kanghyun Lee [1,*] and Robert D. Brown [2]

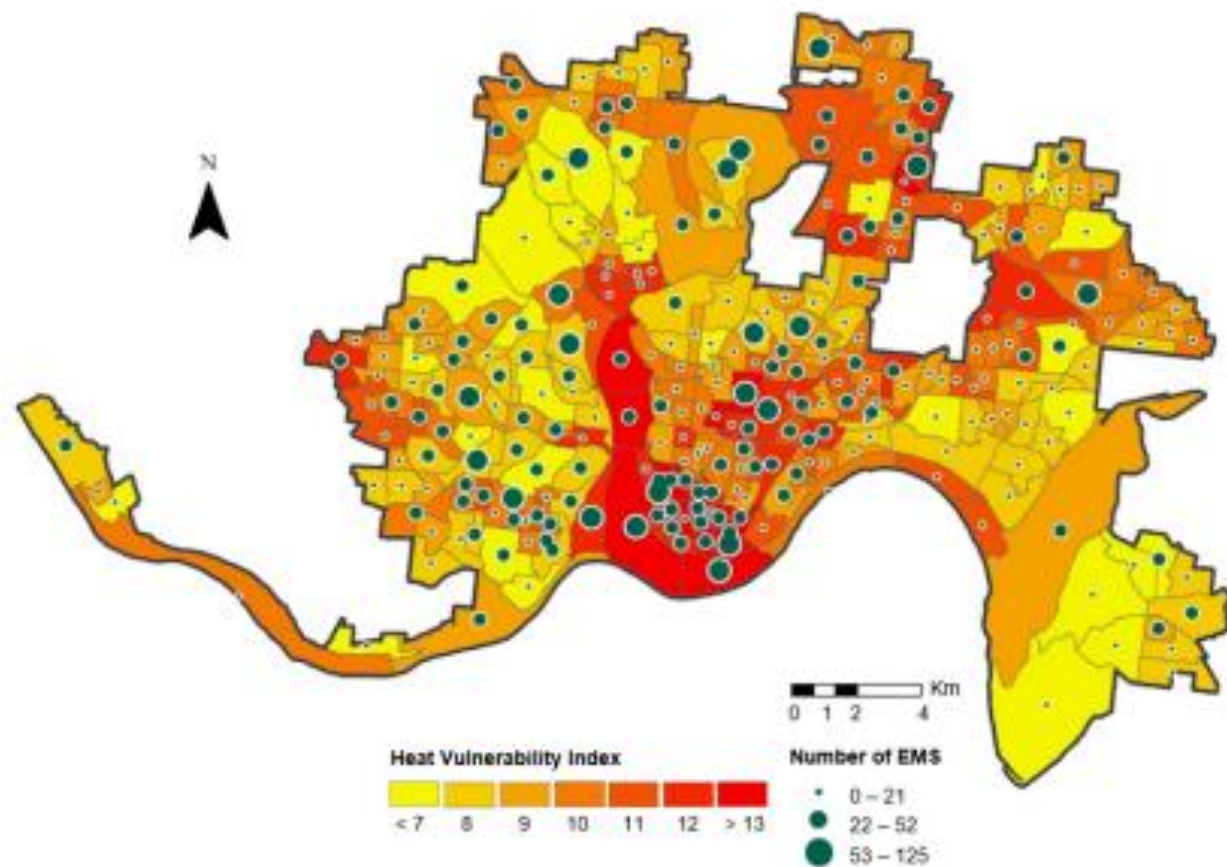**Figure 3.** Heat vulnerability map and spatial distribution of heat-related EMS incidents for census block groups.

Neighborhood Focus

Methods & Indicator Overview

Equity Indicator
Description & Categorization
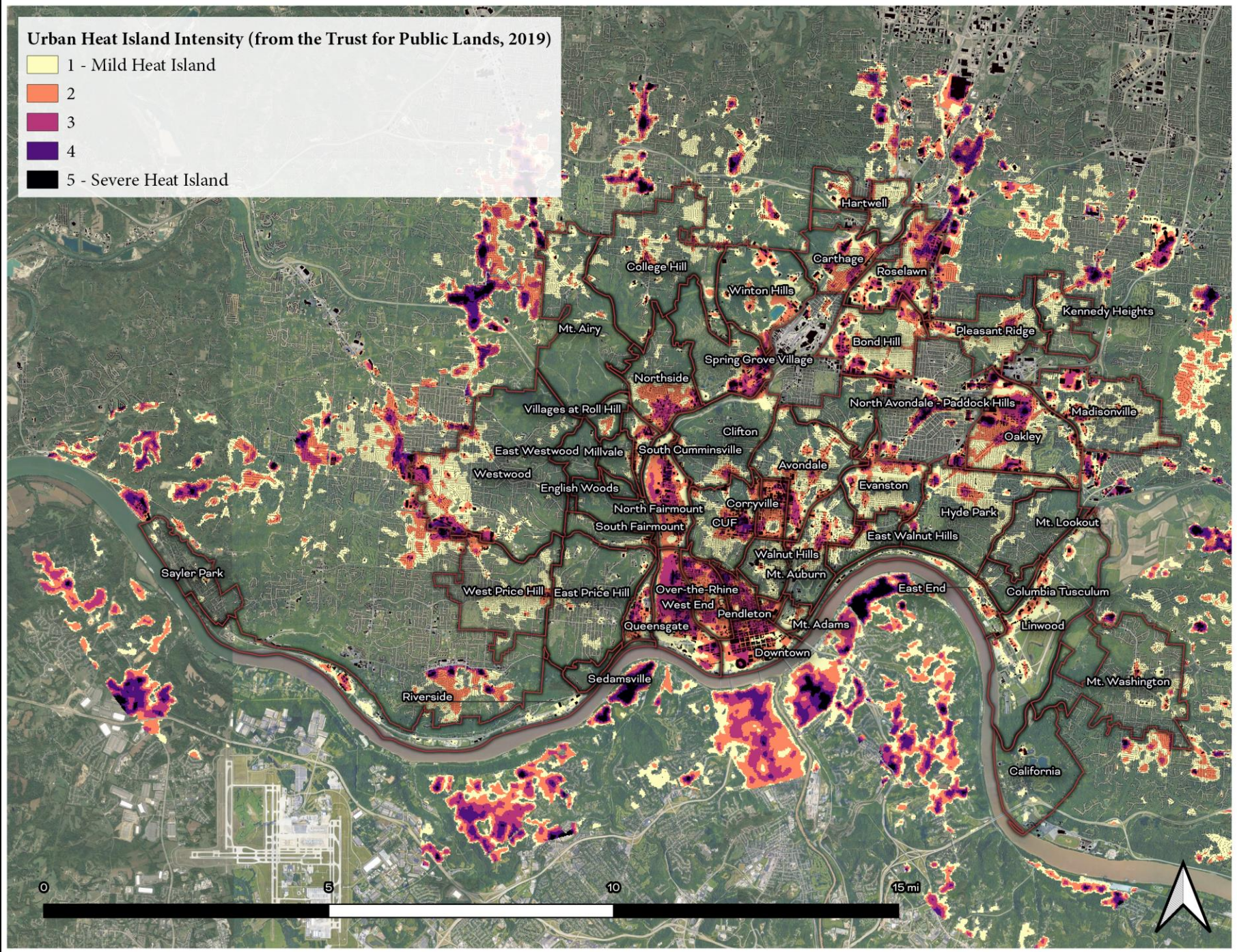
Methods and Indicator Overview

52 sociodemographic, geospatial, and institutional indicators generated from a wide array of datasets, across **6** key categories
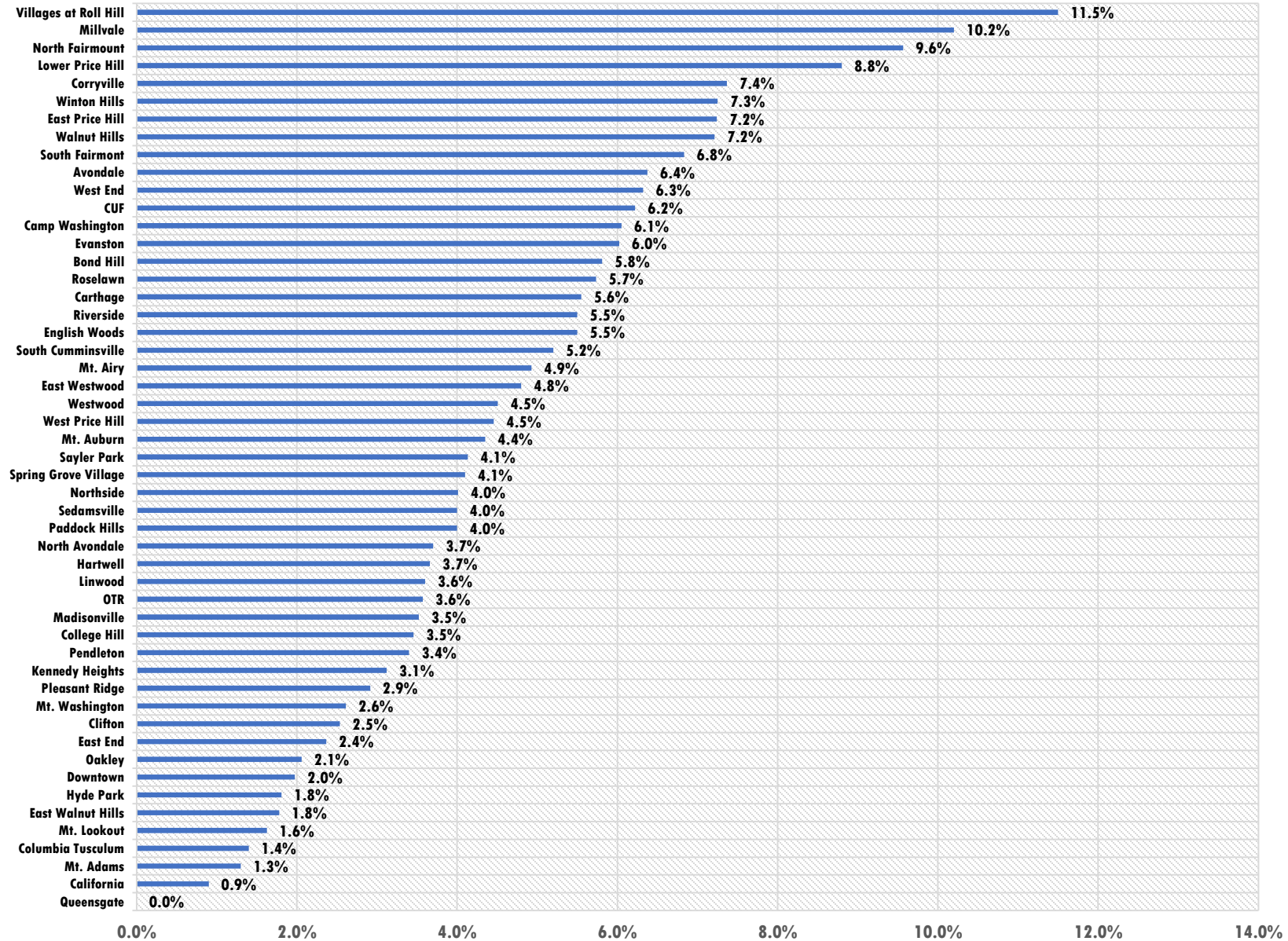
Citywide Equity Indicators:

Maps & Neighborhood Rankings

Methods & Indicator Overview

Urban Heat Island Intensity (from the Trust for Public Lands, 2019)

1 - Mild Heat Island
2
3
4
5 - Severe Heat Island

14

Energy Burden
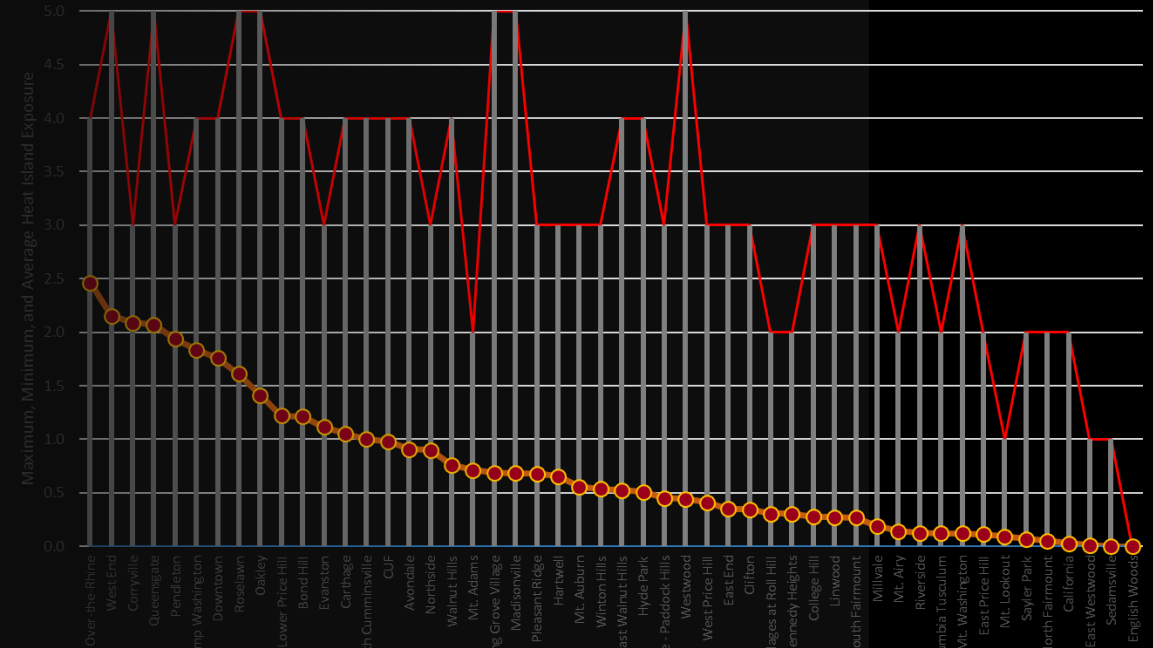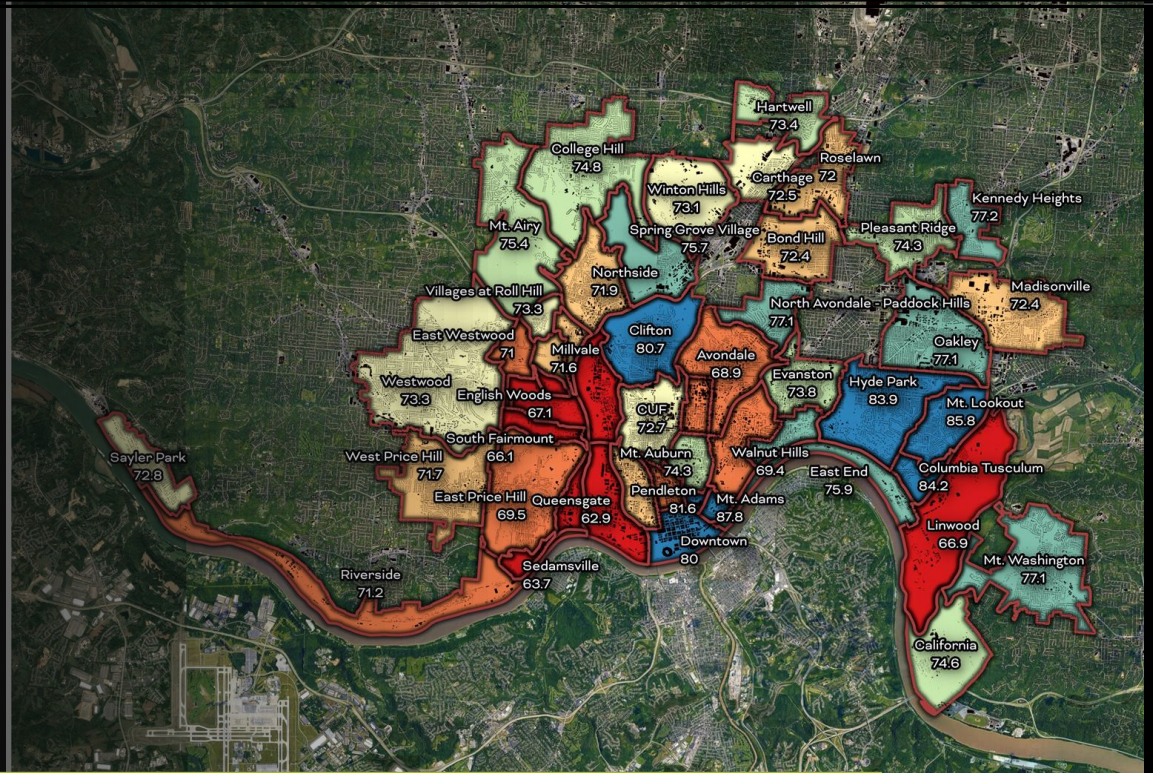## % of Household Income Spent on Energy Each Month

Neighborhood	Energy Burden
Villages at Roll Hill	11.5%
Millvale	10.2%
North Fairmount	9.6%
Lower Price Hill	8.8%
Corryville	7.4%
Winton Hills	7.3%
East Price Hill	7.2%
Walnut Hills	7.2%
South Fairmont	6.8%
Avondale	6.4%
West End	6.3%
CUF	6.2%
Camp Washington	6.1%
Evanston	6.0%
Bond Hill	5.8%
Roselawn	5.7%
Carthage	5.6%
Riverside	5.5%
English Woods	5.5%
South Cumminsville	5.2%
Mt. Airy	4.9%
East Westwood	4.8%
Westwood	4.5%
West Price Hill	4.5%
Mt. Auburn	4.4%
Sayler Park	4.1%
Spring Grove Village	4.1%
Northside	4.0%
Sedamsville	4.0%
Paddock Hills	4.0%
North Avondale	3.7%
Hartwell	3.7%
Linwood	3.6%
OTR	3.6%
Madisonville	3.5%
College Hill	3.5%
Pendleton	3.4%
Kennedy Heights	3.1%
Pleasant Ridge	2.9%
Mt. Washington	2.6%
Clifton	2.5%
East End	2.4%
Oakley	2.1%
Downtown	2.0%
Hyde Park	1.8%
East Walnut Hills	1.8%
Mt. Lookout	1.6%
Columbia Tusculum	1.4%
Mt. Adams	1.3%
California	0.9%
Queensgate	0.0%

Neighborhood Profiles:
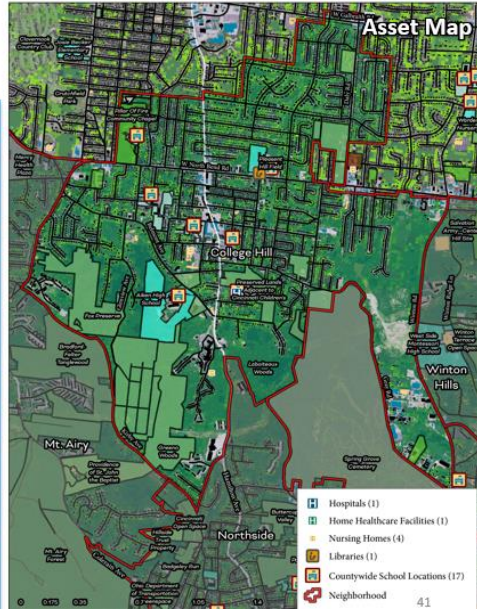
Asset Maps & Equity
Indicators by Neighborhood

Methods & Indicator Overview

College Hill
Cincinnati Neighborhood Profile

College Hill is a predominantly Black neighborhood (62.7%) with around ~16,150 residents. It has active community councils (College Hill Community Council), a community development corporation (College Hill Urban Redevelopment Council), and the College Hill Neighborhood Business District Urban Renewal Plan. The average life expectancy for the neighborhood is 74.8 (ranking 18th of all communities assessed). College Hill has a relatively average prevalence of diabetes (15.8%), kidney disease (3.6%), and heart disease (15.8%) of all communities assessed, but "high" levels of cancer (6.8%). The neighborhood has ~33.7% tree canopy cover (ranked 13th of all communities assessed), and is ranked 14th of all communities assessed for percent of land in parks and greenspaces (19.5%). College Hill has "low to excellent" access to public transit and "below average" walkability. It has "low" exposure to air toxins that cause cancers and respiratory hazards, "moderate" exposure to traffic and potential lead paint, and "very high" exposure to PM2.5 levels and ozone concentrations. In addition, it has "moderate" exposure to potentially toxic industrial sites and hazardous waste treatment and disposal sites, but "very high" exposure to Superfund sites. College Hill ranks 16th of all communities assessed for persons living in poverty (18.2%) and 17th for number of SNAP recipient households (14.7%).

Asset Map

Legend:
- Hospitals (1)
- Home Healthcare Facilities (1)
- Nursing Homes (4)
- Libraries (1)
- Countywide School Locations (17)
- Neighborhood

41

College Hill
Cincinnati Neighborhood Profile

Low Adaptive Capacity — High Adaptive Capacity
High Sensitivity — Low Sensitivity

People

Indicator	Rank	%	# of Persons
Population	-	-	16,139
Persons over 65	42	17.5%	2,823
Persons 17 and Under	26	23.0%	3,704
Children Living w/ Grandparents	31	1.7%	268
Race/Ethnicity:			
Black	-	62.7%	10,122
white	-	32.9%	5,307
Asian	-	0.4%	72
Other	-	4.0%	638
Latinx	-	1.6%	265
Persons 5 and Older in Households w/ Limited English	22	0.3%	50

Health

Indicator	Rank	Value	
Life Expectancy	18	74.8 years	-
Disease Prevalence Estimates:	Rank of % w/Condition	% with Condition	Persons with Condition
Asthma	17	10.6%	1,710
Cancer	43	6.8%	1,098
Diabetes	28	15.8%	2,556
Heart Disease	28	8.1%	1,303
High Blood Pressure	32	39.7%	6,415
Kidney Disease	28	3.6%	578
Obesity	19	36.9%	5,951
Lack of Health Insurance	18	10.2%	1,646
Persons w/ Independent Living Difficulty	20	2.5%	404

Ecosystems and Infrastructure

Indicator	Rank	Value
Tree Canopy Coverage	13	33.7%
Greenness of Land Surface	7	69.6%
Percent Land in Parks and Greenspaces	14	19.5%
Heat Island Exposure	16	0.28
Walkability	-	Below Average to Most Walkable
Persons w/ Low-Income and Low Food Access	21	21.5%
Transit Accessibility	-	Low to Excellent
Daytime Population vs. Resident Population	11	51.2%
Commuters Leaving Each Day	-	7,531
Commuters Using Public		

College Hill: Annual Income by Gender

Income bracket	Gender	%
$100,000 or more	Female	3.83 %
	Male	5.43 %
$75,000 to $99,999	Female	4.52 %
	Male	5.28 %
$35,000 - $74,999	Female	32.44 %
	Male	32.58 %
$15,000 - $34,999	Female	34.89 %
	Male	32.58 %
$7,500 - $15,000	Female	11.64 %
	Male	8.62 %
$1 (or loss) - $7,500	Female	12.68 %
	Male	15.51 %
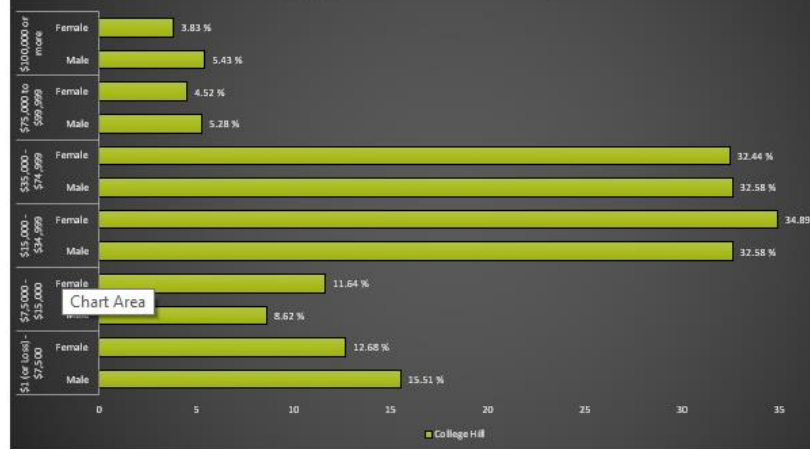
■ College Hill

College Hill Notable Indicators

Average Life Expectancy	Exposure to National Priority List Sites	% of Residents Living in Poverty
74.8 (ranked 18th for all communities assessed)	Very High	18.2% (ranked 16th highest for all communities)

College Hill
Cincinnati Neighborhood Profile

Low Adaptive Capacity — High Adaptive Capacity
High Sensitivity — Low Sensitivity

Socio-Economic Indicators

Indicator	Rank	%	#
Persons Living in Poverty	16	18.2%	2,936
SNAP Recipient Households	17	14.7%	1,057
Educational Attainment:			
Less than High School	-	5.9%	-
HS or Equivalent	-	21.0%	-
Some College	-	15.4%	-
Associate's Degree	-	6.3%	-
Bachelor's Degree or Higher	-	19.3%	-
Educational Attainment Index	20	0.43	-
Extreme Housing Burdens:			
Renter-Occupied Housing (as % of All Housing Units)	7	42.9%	3,087
Renters Spending 30% of Income or More on Rent + Utilities	12	20.3%	1,464
Renters Spending 50% of Income or More on Rent + Utilities	15	9.6%	692
Homeowners Spending 30% of Income or More on Mortgage + Utilities	30	20.7%	853
Average Energy Costs (as % of Income)	15	3.5%	-
Persons without Vehicle Access	18	6.8%	1,090

Built Environmental Hazards

Indicator	Relative Exposure Level	Value
Traffic Exposure	Moderate	-
Potential Lead Paint Exposure (Houses Built pre-1960)	Moderate	58.55%
Cancer Risk from Air Pollution	Low	-
Respiratory Disease Risk from Air Pollution	Low	-
Proximity to Water Pollution Sources	Low	-
PM2.5 Levels in Air, µg/m3	Very High	9.81
Ozone Concentration, ppb	Very High	46.73
Diesel Particulate in Air, µg/m3	Low	0.64
Proximity to Superfund Sites	Very High	-
Proximity to Potentially Toxic Industrial Activity	Moderate	-
Proximity to Hazardous Waste Treatment and Disposal Facilities	Moderate	-

Neighborhood Planning

Indicator	Description
Community Councils	College Hill Community Council
Community Development Corporations	College Hill Urban Redevelopment Council (CHURC)
Community Plans	College Hill Neighborhood Business District Urban Renewal Plan (2002)

17

Neighborhood Profile Diagram
Cincinnati Neighborhood Profile

Low Adaptive Capacity   *High Adaptive Capacity*

High Sensitivity   *Low Sensitivity*

Equity Indicator Categories

Color Interpretation Key
(the greener the better)

Rank out of Cincinnati's 52 Neighborhoods
(#1 is best)

Color-coded boxes indicate Neighborhood-Level Sensitivity or Adaptive Capacity

Climate Equity Indicators

People

Indicator	Rank	%	# of Persons
Population	-	-	14,224
Persons over 65	11	8.2%	1,160
Persons 17 and Under	41	29.6%	4,211
Children Living w/ Grandparents	28	1.6%	225
Race/Ethnicity:			
Black	-	35.5%	5,050
white	-	42.3%	6,022
Asian	-	1.0%	139
Other	-	21.2%	3,013
Latinx	-	10.7%	1,523
Persons 5 and Older in Households w/ Limited English Ability	47	5.5%	788

Health

Indicator	Rank	Value	
Life Expectancy	40	69.5 years	-

Disease Prevalence Estimates:	Rank of % w/Condition	% with Condition	Persons with Condition
Asthma	35	13.6%	1,940
Cancer	19	5.3%	760
Diabetes	29	16.4%	2,327
High Blood Pressure	31	38.1%	5,420
Heart Disease	34	8.9%	1,271
Kidney Disease	29	3.7%	530
Obesity	33	45.2%	6,432
Lack of Health Insurance	41	18.2%	2,585
Persons w/ Independent Living Difficulty	33	3.7%	528
Persons Living w/ Disability	38	17.4%	2,480

Ecosystems and Infrastructure

Indicator	Rank	Value
Tree Canopy Coverage	17	52.0%
Greenness of Land Surface	21	57.3%
Percent Land in Parks and Greenspaces	27	14.9%
Heat Island Exposure	8	0.12
Walkability	-	Below Average to Most Walkable
Persons w/ Low-Income and Low Food Access	13	7.2%
Transit Accessibility	-	Low to Excellent
Daytime Population vs. Resident Population	13	57.4%
Commuters Leaving Each Day	-	5,469
Commuters Using Public Transit	34	11.9%

Values in boxes represent totals, percentages, scores, and/or rankings for each indicator.*

*For additional information on indicator measurement and data sources, see Appendix A.

18

Bond Hill

Low Adaptive Capacity   *High Adaptive Capacity*

Cincinnati Neighborhood Profile

High Sensitivity   *Low Sensitivity*

People

Indicator	Rank	%	# of Persons
Population	-	-	6,826
Persons over 65	48	22.9%	1,562
Persons 17 and Under	25	22.9%	1,561
Children Living w/ Grandparents	43	3.1%	214
Race/Ethnicity:			
Black	-	96.3%	6,572
white	-	5.6%	384
Asian	-	0.5%	37
Other	-	0.0%	-
Latinx	-	0.6%	41
Persons 5 and Older in Households w/ Limited English Ability	21	0.3%	20

Health

Indicator	Rank	Value	
Life Expectancy	31	72.4 years	-
Disease Prevalence Estimates:	Rank of % w/Condition	% with Condition	Persons with Condition
Asthma	33	13.0%	884
Cancer	44	6.8%	467
Diabetes	46	23.7%	1,616
Heart Disease	37	9.9%	676
High Blood Pressure	48	51.3%	3,501
Kidney Disease	44	4.9%	337
Obesity	37	47.4%	3,237
Lack of Health Insurance	29	13.9%	951
Persons w/ Independent Living Difficulty	43	4.9%	334
Persons Living w/ Disability	42	19.0%	1,294

Ecosystems and Infrastructure

Indicator	Rank	Value
Tree Canopy Coverage	42	6.1%
Greenness of Land Surface	28	52.0%
Percent Land in Parks and Greenspaces	24	15.5%
Impervious Surface	35	48%
Heat Island Exposure	40	1.21
Walkability	-	Above Average
Persons w/ Low-Income and Low Food Access	18	13.8%
Transit Accessibility	-	Good to Excellent
Daytime Population vs. Resident Population	30	104.1%
Commuters Leaving Each Day	-	2,777
Commuters Using Public Transit	31	10.9%

Bond Hill

Cincinnati Neighborhood Profile

Low Adaptive Capacity　　　　　　　　　　　*High Adaptive Capacity*

High Sensitivity　　　　　　　　　　　*Low Sensitivity*

Socio-Economic Indicators

Indicator	Rank	%	#
Persons Living in Poverty	19	18.9%	1,293
SNAP Recipient Households	23	19.5%	620
Educational Attainment:			
Less than High School	-	8.8%	-
HS or Equivalent	-	24.8%	-
Some College	-	19.7%	-
Associate's Degree	-	9.3%	-
Bachelor's Degree or Higher	-	11.6%	-
Educational Attainment Index	21	0.43	-
Extreme Housing Burdens:			
Renter-Occupied Housing (as % of All Housing Units)	10	45.6%	1,452
Renters Spending 30% of Income or More on Rent + Utilities	15	21.6%	688
Renters Spending 50% of Income or More on Rent + Utilities	17	10.1%	320
Homeowners Spending 30% of Income or More on Mortgage + Utilities	46	32.6%	564
Average Energy Costs (as % of Income)	36	5.8%	-
Persons without Vehicle Access	24	7.6%	522

Built Environmental Hazards

Indicator	Relative Exposure Level	Value
Traffic Exposure	Very High	-
Potential Lead Paint Exposure (Houses Built pre-1960)	High	64.83%
Cancer Risk from Air Pollution	Very High	-
Respiratory Disease Risk from Air Pollution	Very High	-
Proximity to Water Pollution Sources	High	-
PM2.5 Levels in Air, µg/m3	Extreme	9.81
Ozone Concentration, ppb	Extreme	46.90
Diesel Particulate in Air, µg/m3	High	0.87
Proximity to Superfund Sites	Extreme	-
Proximity to Potentially Toxic Industrial Activity	Extreme	-
Proximity to Hazardous Waste Treatment and Disposal Facilities	Extreme	-

Neighborhood Planning

Indicator	Description
Community Councils	Bond Hill Community Council
Community Development Corporations	Bond Hill CURC
Community Plans	Bond Hill / Roselawn Community Plan (2016)

California

Cincinnati Neighborhood Profile

Low Adaptive Capacity .... *High Adaptive Capacity*

High Sensitivity .... *Low Sensitivity*

People

Indicator	Rank	%	# of Persons
Population	-	-	1,057
Persons over 65	44	18.4%	194
Persons 17 and Under	29	23.8%	252
Children Living w/ Grandparents	27	1.5%	16
Race/Ethnicity:			
Black	-	0.8%	8
white	-	87.0%	920
Asian	-	2.0%	21
Other	-	10.2%	108
Latinx	-	1.4%	15
Persons 5 and Older in Households w/ Limited English Ability	1	0.0%	-

Health

Indicator	Rank	Value	
Life Expectancy	19	74.6 years	-

Disease Prevalence Estimates:	Rank of % w/Condition	% with Condition	Persons with Condition
Asthma	6	8.6%	91
Cancer	46	7.4%	78
Diabetes	9	9.4%	99
Heart Disease	13	5.9%	63
High Blood Pressure	13	30.3%	320
Kidney Disease	8	2.2%	24
Obesity	6	28.5%	301
Lack of Health Insurance	5	5.6%	60
Persons w/ Independent Living Difficulty	12	1.8%	19
Persons Living w/ Disability	4	6.4%	68

Ecosystems and Infrastructure

Indicator	Rank	Value
Tree Canopy Coverage	8	42.6%
Greenness of Land Surface	12	66.4%
Percent Land in Parks and Greenspaces	4	42.2%
Impervious Surface	1	11%
Heat Island Exposure	4	0.02
Walkability	-	Least Walkable to Below Average
Persons w/ Low-Income and Low Food Access	16	9.9%
Transit Accessibility	-	Poor
Daytime Population vs. Resident Population	6	-56.5%
Commuters Leaving Each Day	-	466
Commuters Using Public Transit	1	0.0%

California

Cincinnati Neighborhood Profile

Socio-Economic Indicators

Indicator	Rank	%	#
Persons Living in Poverty	1	0.0%	0
SNAP Recipient Households	1	0.0%	0
Educational Attainment:			
Less than High School	-	3.8%	-
HS or Equivalent	-	16.0%	-
Some College	-	9.6%	-
Associate's Degree	-	3.1%	-
Bachelor's Degree or Higher	-	32.8%	-
Educational Attainment Index	16	0.48	-
Extreme Housing Burdens:			
Renter-Occupied Housing (as % of All Housing Units)	1	14.5%	54
Renters Spending 30% of Income or More on Rent + Utilities	1	1.6%	6
Renters Spending 50% of Income or More on Rent + Utilities	1	0.0%	-
Homeowners Spending 30% of Income or More on Mortgage + Utilities	10	14.1%	45
Average Energy Costs (as % of Income)	1	0.9%	-
Persons without Vehicle Access	1	0.6%	6

Built Environmental Hazards

Indicator	Relative Exposure Level	Value
Traffic Exposure	Moderate	-
Potential Lead Paint Exposure (Houses Built pre-1960)	Low	34.19%
Cancer Risk from Air Pollution	Low	-
Respiratory Disease Risk from Air Pollution	Low	-
Proximity to Water Pollution Sources	Extreme	-
PM2.5 Levels in Air, µg/m3	Low	9.47
Ozone Concentration, ppb	Low	46.37
Diesel Particulate in Air, µg/m3	Low	0.73
Proximity to Superfund Sites	Moderate	-
Proximity to Potentially Toxic Industrial Activity	Moderate	-
Proximity to Hazardous Waste Treatment and Disposal Facilities	Low	-

Neighborhood Planning

Indicator	Description
Community Councils	California Community Council; California Heritage Foundation
Community Development Corporations	California Development Corporation
Community Plans	California Land Use Development Plan (1978)

Conclusion

Centering equity is critical to effective climate planning in Cincinnati
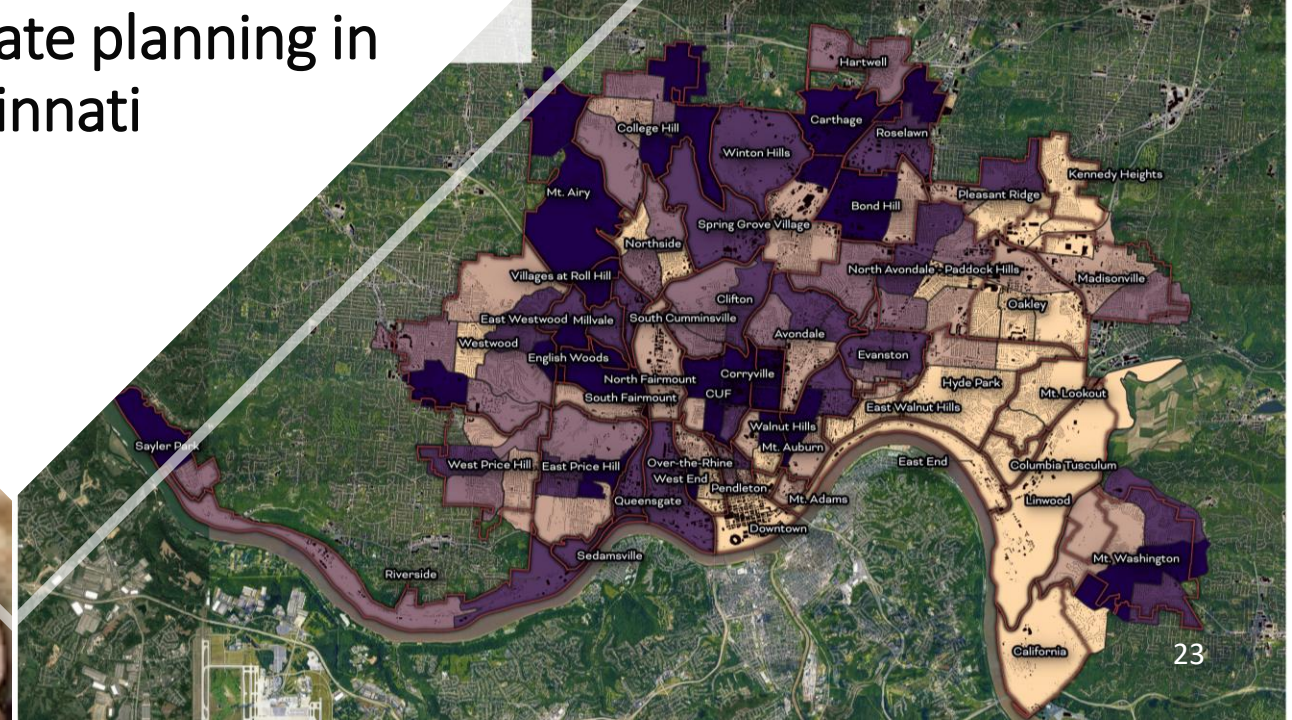
Climate Equity Indicators Report
Acknowledgements

Appendix A: Equity Indicator Information

Definition, Measurement, Rationale, and Data Sources

Indicator Information

Indicator	Definition	Unit	Rationale for Inclusion	Source
Population	The total permanent resident human population of a neighborhood as derived from U.S. Census tracts or block groups, where applicable.	# of Persons	Human beings are the unit of reference whose relative adaptive capacity or sensitivity to climate-driven hazards and systemic inequities is assessed in this report and aggregated at the neighborhood level.	U.S Census Bureau American Community Survey 5-year Estimates (2014-2018) Found in: • Centers for Disease Control Social Vulnerability Index (Census Tracts) • Environmental Protection Agency Environmental Justice Screening Tool (Census Blocks)
Persons over 65	The total permanent resident population of human beings whose age is over 65 years.	# of Persons; % of Total Population	Although the effects of aging vary markedly between individuals, individuals over age 65 are generally considered to be more vulnerable to the effects of extreme heat, flood events, and environmental pollution, and are more likely to have physical disabilities necessitating additional measures during disaster events.	U.S Census Bureau American Community Survey 5-year Estimates (2014-2018) Found in: • Centers for Disease Control Social Vulnerability Index (Census Tracts), "E_AGE65"
Persons 17 and Under	The total permanent resident population of human beings whose age is 17 years or fewer.	# of Persons; % of Total Population	Children face significantly higher sensitivity to environmental and anthropogenic hazards, and often lack the skills, tools, and social license to respond adequately to disaster events and processes of long-term change. During disaster events, special considerations must be taken to ensure children's physical and mental health is protected to avoid long-term impacts.	U.S Census Bureau American Community Survey 5 year Estimates (2014-2018) Found in: • Centers for Disease Control Social Vulnerability Index (Census Tracts), "E_AGE17"
Children Living w/ Grandparents	The population of children living in households whose head of household is their grandparent.	# of Persons; % of Total Population	Included as a metric of how many children may live in the same household as elderly persons. This does not include multi-generational households where the child's parents are head of household, but does reflect cases where the combined sensitivities of both elderly persons and children may compound each other.	U.S. Census Bureau American Community Survey 5-year Estimates (2015-2019) • "B10001_001E", accessed via the ESRI Demographics Feature Service Directory

Indicator Information

Indicator	Definition	Unit	Rationale for Inclusion	Source
Life Expectancy	The number of years of life that an average human being can expect based on the neighborhood in which they were born as determined from Ohio Department of Health, Cincinnati Health Department, and U.S. Census Bureau mortality data by Cincinnati Insights for the period of 2007-2015.	Years	The ultimate metric of human health and well-being is the time during which they are alive. Cincinnati's life expectancy is 76.1 years overall for the period from 2007-2015, with females living on average 80.8 years and males living on average 75.1 years. However, substantial and severe disparities exist between racial groups and neighborhoods as a reflection of the dramatically divergent experience of life and collective insults to survival that occur within neighborhoods and across individuals. In the longest-lived neighborhoods, individuals can expect up to 87.8 years of life (Mt. Adams), putting it on par with the longest-lived nations in the world. In neighborhoods with the lowest life expectancy, (e.g. Lower Price Hill, Queensgate, Sedamsville) individuals average only 63-64 years of life, putting them on par with developing countries without meaningful civic, health, electrical, or water delivery infrastructure. Climate-driven hazards and disaster events will likely further exacerbate these inequities and patterns of excessively premature mortality.	City of Cincinnati and Cincy Insights Life Expectancy Dashboard (2007-2015 Data)
Asthma	The number of human beings likely to have asthma or equivalent respiratory diseases, as estimated by the *CDC PLACES: Local Data for Better Health* Program.	# of Persons w/ Condition; % of Total Population	Individuals with asthma may experience increased negative impacts from poor air quality associated with continental scale wildfires occurences caused by climate change, local air pollution hazards, and other phenomena that result in poor air quality. Moreover, asthma prevalence is among the most readily identifiable indicators of historical and on-going poor air quality, which may in turn reflect the inadequacy of programs and policies related to pollution control. In Cincinnati, asthma prevalence estimates range from 7.6% to 18.5%, and average 11.3% overall across neighborhoods. For comparison, the national asthma prevalence rate is estimated to be roughly 8%.	Centers for Disease Control PLACES: Local Data for Better Health Program • "casthma_cr", in PLACES: Census Tract Data (GIS Friendly Format), 2020 release dataset.