CENTRAL INDIANA
ENVIRONMENTAL ACTION PLAN

CIRDA
CENTRAL INDIANA REGIONAL DEVELOPMENT AUTHORITY

PRIORITY CLIMATE ACTION PLAN

Indianapolis-Carmel-Anderson Metropolitan Statistical Area

FEBRUARY 2024

PREPARED FOR
Central Indiana Regional Development Authority

PREPARED BY
Environmental Resources Management

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Acknowledgements

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CIRDA BOARD

Consolidated City of Indianapolis, City of Carmel, City of Fishers, City of Noblesville, Town of McCordsville, Town of Speedway, City of Beech Grove, Town of Zionsville, City of Lawrence, City of Anderson, City of Westfield, City of Elwood, Town of Plainfield, Town of Avon, Town of Bargersville, City of Greenwood, City of Franklin, Town of Cumberland, City of Martinsville, Hamilton County, Town of Pittsboro, Town of Whiteland, Town of Danville, and City of Lebanon.

Contents

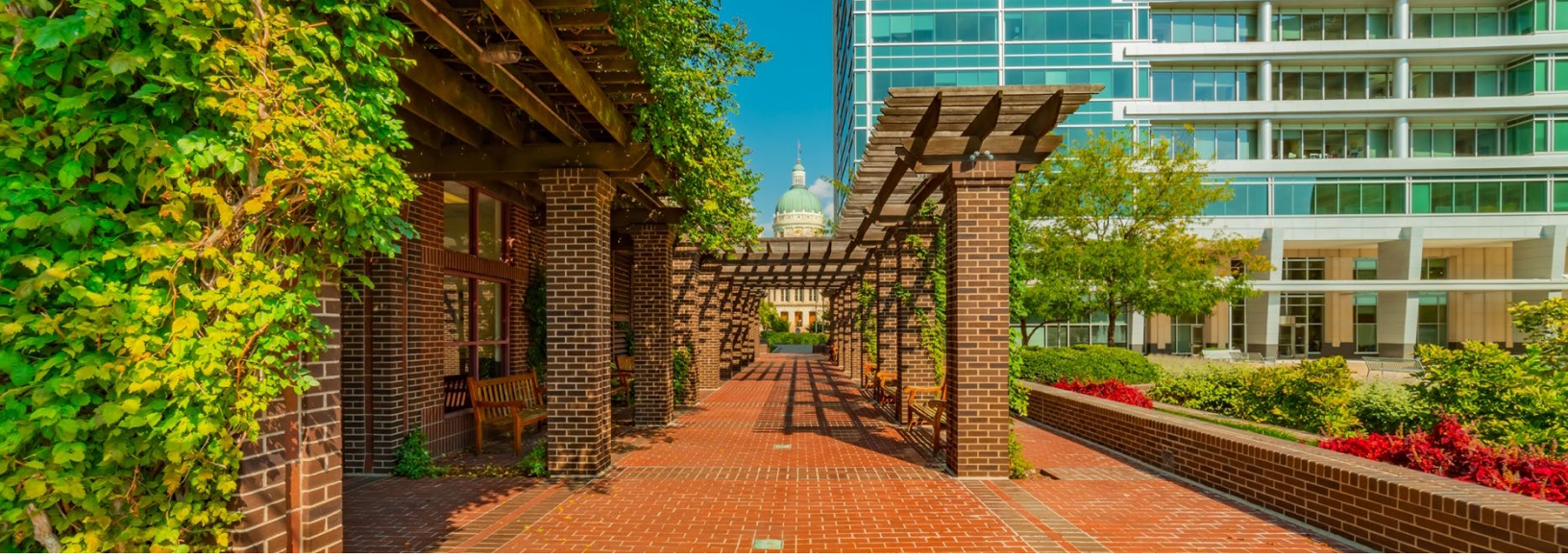
List of Figures

List of Tables

Acronyms and Abbreviations

Acronyms	Description
CCAP	Comprehensive Climate Action Plan
CEJST	Climate and Economic Justice Screening Tool
CFO	Confirmed feeding operation
CH_4	Methane
CIRDA	Central Indiana Regional Development Authority
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CPRG	Climate Pollution Reduction Grants
EIA	US Energy Information Administration
EJScreen	Environmental Justice Screening and Mapping Tool
EOY	End of year
EPA	US Environmental Protection Agency
ERM	Environmental Resources Management, Inc.
EV	Electric vehicle
FLIGHT	Facility Level Information on Greenhouse Gases Tool
GHG	Greenhouse gas
GHG Inventory	Greenhouse gas inventory
HFC	Hydrofluorocarbons
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IMPO	Indianapolis Metropolitan Planning Organization

INDOT	Indiana Department of Transportation
IU	Indiana University
kW	Kilowatt
kWh	Kilowatt-hours
LIDAC	Low-income and disadvantaged communities
MMBtu	One million British thermal units
MSA	Metropolitan statistical areas
MT	Metric tons
MW	Megawatt
MWh	Megawatt-hours
N_2O	Nitrous oxide
OED	Office of Energy Development
PCAP	Priority Climate Action Plan
PFC	Perfluorochemicals
PM	Particulate matter
PUD	Planned unit development
PV	Photovoltaics
RNG	Renewable natural gas
SLOPE	National Renewable Energy Laboratory's State and Local Planning for Energy
USDA	US Department of Agriculture
VMT	Vehicle miles traveled
WWTP	Wastewater treatment plant



1. Introduction

Central Indiana Regional Development Authority (CIRDA) was awarded a $1 million planning grant from the U.S. Environmental Protection Agency (EPA) to develop regional plans for Central Indiana focused on strategies to reduce greenhouse gas (GHG) emissions and other harmful air pollution. The grant is part of EPA's Climate Pollution Reduction Grants (CPRG) program.[1]

CLIMATE POLLUTION REDUCTION GRANT OVERVIEW

The CPRG program provides $5 billion in grants to states, local governments, tribes, and territories to develop and implement ambitious plans for reducing GHG emissions and other harmful air pollution. CPRG is authorized under Section 60114 of the Inflation Reduction Act,[2] and consists of two phases: Phase 1 provides $250 million for noncompetitive planning grants, and Phase 2 provides approximately $4.6 billion for competitive implementation grants.

Phase 1 of the CPRG program provides flexible support to states, local governments, tribes, and territories for climate planning. Planning grant recipients must design climate action plans that incorporate a variety of measures to reduce GHG emissions from across their economies in the following key sectors: electricity generation, industry, transportation, buildings, agriculture, natural and working lands, and waste management. All planning grantees must submit the following deliverables to EPA:

- Priority Climate Action Plan (PCAP) – A PCAP is a narrative report that includes a focused list of near-term, high-priority, and implementation-ready measures to reduce GHG pollution and an analysis of GHG emissions reductions. PCAPs for states and metropolitan statistical areas

[1] U.S. Environmental Protection Agency (EPA). 2023. "Climate Pollution Reduction Grants." Modified 5 February 2024. Retrieved from: https://www.epa.gov/inflation-reduction-act/climate-pollution-reduction-grants

[2] U.S. Congress. 2022. *H.R.5376 - Inflation Reduction Act of 2022*. Online posting. Modified 16 August 2022. Retrieved from: https://www.congress.gov/bill/117th-congress/house-bill/5376/text

(MSAs) are due to EPA on 1 March 2024, and on 1 April 2024 for tribes, tribal consortia, and territories.

- Comprehensive Climate Action Plan (CCAP) – A CCAP is a narrative report that provides an overview of the grantees' significant GHG sources/sinks and sectors, establishes near-term and long-term GHG emission reduction goals, and provides strategies and identifies measures that address the highest priority sectors to help the grantees meet those goals. CCAPs for states and MSAs are due to EPA 2 years after the planning grant award, or approximately mid-2025, and CCAPs for tribes, tribal consortia, and territories are due at the close of the grant period.
- Status Report – A Status Report should include the implementation status of the quantified GHG reduction measures included in the CCAP; any relevant updated analyses or projections supporting CCAP implementation; and next steps and future budget/staffing needs to continue CCAP implementation. Status Reports are due to EPA at the end of the 4-year grant period (approximately mid-2027) for state and MSA grantees.

Phase 2 of the CPRG program provides $4.6 billion in competitive grants to support the implementation of measures identified in the PCAP developed with Phase 1 planning grant funding. This funding is open to entities that received planning grants, as well as eligible entities that did not directly receive a planning grant that are applying for funds to implement measures included in an applicable PCAP. Applications for Phase 2 implementation grants are due to the EPA on 1 April 2024, for states and MSAs.

EPA's key objectives for the CPRG program include the following:

- Tackle damaging climate pollution while supporting the creation of good jobs and lowering energy costs for families.
- Accelerate work to address environmental injustice and empower community-driven solutions in overburdened neighborhoods.
- Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school.

PRIORITY CLIMATE ACTION PLAN OVERVIEW

PURPOSE

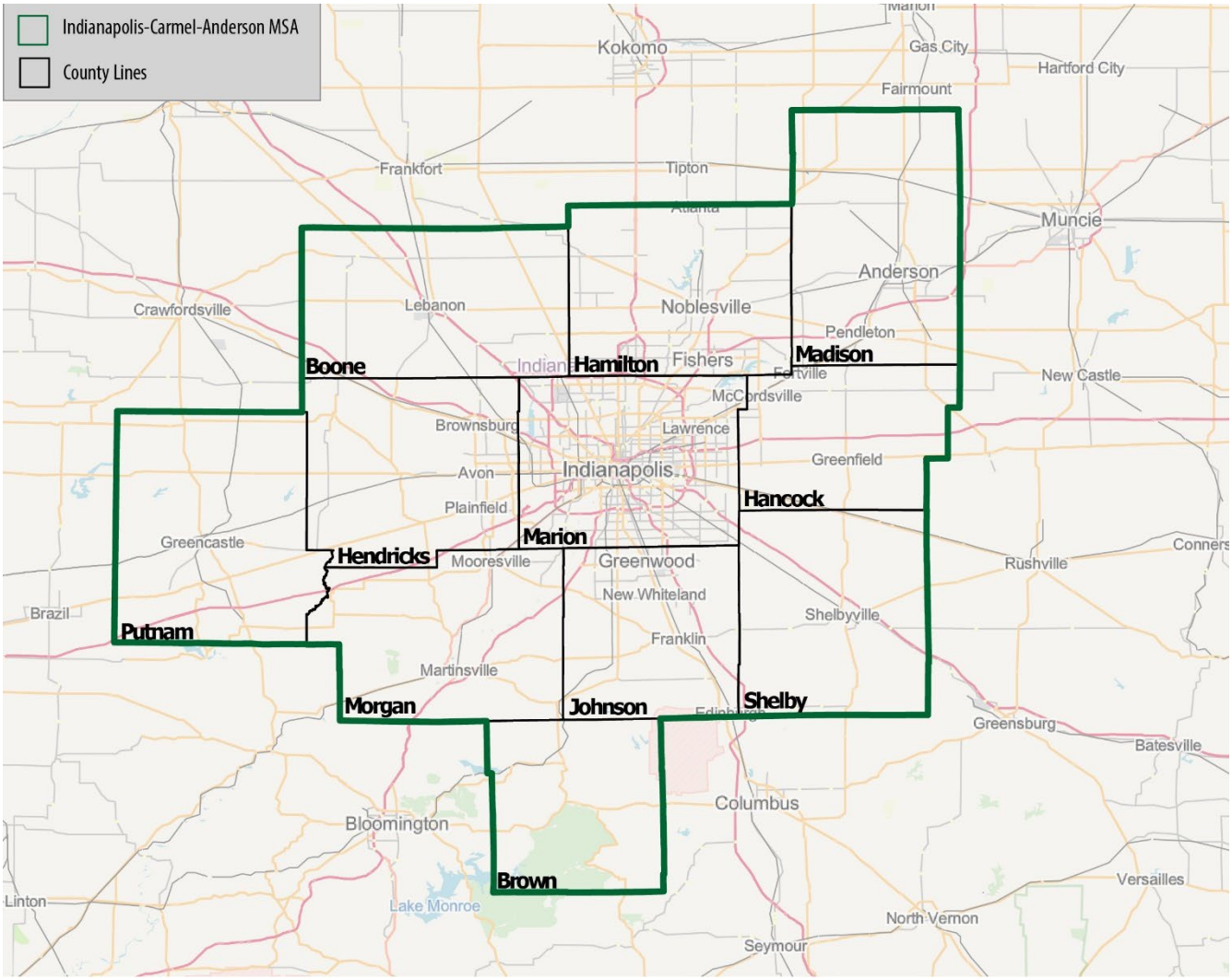
The PCAP was developed to improve the Central Indiana region's understanding of current and future GHG emissions, identify priority strategies to reduce emissions and the potential other benefits of those strategies, and engage a variety of stakeholders in an emissions reduction planning process. This regional plan is reflective of the unique and varied needs of stakeholders across the Indianapolis-Carmel-Anderson MSA.

SCOPE

The Indianapolis-Carmel-Anderson MSA consists of 11 counties (Boone, Brown, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan, Putnam, and Shelby) with a population of over

2.1 million people (see Figure 1).[3] The largest municipalities in the MSA region include: Anderson, Carmel, Fishers, Indianapolis, Lawrence, Noblesville, Plainfield, Westfield, and Zionsville, with Indianapolis representing 41 percent of the region's population.[4]

Figure 1. Indianapolis-Carmel-Anderson Metropolitan Statistical Area



[3]U.S. Census Bureau. 2022. *American Community Survey 1-year estimates*. Accessed January 2024. Retrieved from: https://censusreporter.org/profiles/31000US26900-indianapolis-carmel-anderson-in-metro-area/

[4] STATS Indiana. 2023. "Indianapolis-Carmel-Anderson, IN Metro Area". Accessed January 2024. Retrieved from: http://www.stats.indiana.edu/profiles/profiles.asp?scope_choice=b&county_changer2=Rmetro:26900

Residents across the MSA identify as 76 percent White, 16.6 percent Black (alone), 7.6 percent Hispanic, 4.2 percent Asian (alone), 2.6 percent as two or more race groups.[5] Per capita annual income averaged $68,719 in 2022, with two-thirds of residents living in owner-occupied housing and one-third of residents living in rental housing in the region.[6] The distribution of environmental and structural burdens varies greatly for different communities across the region. Categories of burdens include air quality, climate change, energy, environmental hazards, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.[7]

Over one-third of the census tracts in the MSA are considered low-income and disadvantaged communities (LIDAC).[8] See Appendix A for the list of census tracts in the MSA identified as LIDAC. This regional plan relies on EPA's definition, which identifies LIDAC communities as any community that meets at least one of the following characteristics: identified as disadvantaged by the Climate and Economic Justice Screening Tool (CEJST); any census block group that is at or above the 90th percentile for any of EPA's Environmental Justice Screening and Mapping Tool's (EJScreen) Supplemental Indexes when compared to the nation or state; and/or any geographic area within Tribal lands as included in EJScreen.[9]

CENTRAL INDIANA REGIONAL DEVELOPMENT AUTHORITY

Comprised of municipal executives, including mayors, town council presidents, or county commissioners, from 24 Central Indiana communities, CIRDA was established as an integrative regional entity to align the public sector on key initiatives and drive economic development and grant opportunities within Central Indiana. CIRDA works collaboratively with communities across the region to support efforts that enhance quality of life and sustainability, boost support for local businesses and innovation, and ensure Central Indiana is an attractive place where all residents benefit from growing economic opportunity and equitable development in the coming decades. Monthly CIRDA board member meetings are an opportunity to build consensus on key issues affecting the region's growth, including opportunities to address climate change. CIRDA relies on the professional staff of member communities, who are well-versed in administering federal grants; CIRDA administered $21 million in

[5] STATS Indiana. 2023. "Indianapolis-Carmel-Anderson, IN Metro Area". Accessed January 2024. Retrieved from: http://www.stats.indiana.edu/profiles/profiles.asp?scope_choice=b&county_changer2=Rmetro:26900
[6] STATS Indiana. 2023. "Indianapolis-Carmel-Anderson, IN Metro Area". Accessed January 2024. Retrieved from: http://www.stats.indiana.edu/profiles/profiles.asp?scope_choice=b&county_changer2=Rmetro:26900
[7] 560 out of 1446 Census tracts in the MSA qualify as LIDAC; U.S. EPA. 2024. "Socioeconomic Indicators." Modified 4 January 2024. Retrieved from: https://www.epa.gov/ejscreen/ejscreen-map-descriptions#soci
[8] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen
[9] U.S. Environmental Protection Agency (EPA). 2023. "Climate Pollution Reduction Grants: Low Income/Disadvantaged Communities (LIDAC) Benefits Analysis." Accessed January 2023. Retrieved from: https://www.epa.gov/system/files/documents/2023-08/Low%20Income%20%20Disadvantaged%20Communities%20Benefits%20Analysis.pdf

federal funds during the last 2 years,[10] while CIRDA's members have administered nine federal grants totaling more than $770 million.[11]

With funding from EPA's CPRG Phase 1 planning grant, CIRDA is leading the development of the Central Indiana Environmental Action Plan, inclusive of both the short-term PCAP and the long-term CCAP, that reflects input from stakeholders across the region and positions Central Indiana as a leader in public health, innovation, and economic opportunities. This regional plan is focused on strategies to reduce GHG emissions across the Indianapolis-Carmel-Anderson MSA and meets EPA's PCAP requirements. CIRDA represents more than 80 percent of the population in the Central Indiana MSA and approximately a quarter of the state's population. While many municipalities in the region have engaged in climate action planning and comprehensive community planning within the past decade, including the City of Indianapolis' recent plan *Thrive Indianapolis*,[12] this is the first time a plan has been developed representing the interests and priorities of the entire Central Indiana region. See Appendix B for a list of climate action plans developed for municipalities and businesses across the region.[13]

CENTRAL INDIANA REGIONAL CONTEXT

Central Indiana is a job center and an economic hub for the state. This regional plan seeks to reduce GHG emissions and improve public health while creating vibrant places that attract and retain high caliber talent to the region and to the state. By engaging a diverse set of public, private, and nonprofit stakeholders, this plan is reflective of regional priorities and leverages opportunities for GHG reductions across a range of sectors, including energy, buildings, transportation, industry, open space, agriculture, and waste sectors.

Over the last 50 years, the region has transformed from an agrarian and manufacturing-based economy to a hub for logistics, software development, advanced manufacturing, and medical technology. With a total gross domestic product of $156 billion, Central Indiana represents over one-third of the gross domestic product for the entire state of Indiana.[14] While Central Indiana is the economic hub of the state, the region is still rebuilding after experiencing the realities of deindustrialization, including blight and the economic deterioration of its urban areas. As a post-industrial region, brownfields remain pervasive throughout Central Indiana[15] leaving the region's LIDAC residents exposed to the negative effects of poor air and water quality, lack of green space, and

[10] CIRDA administered a $1 million EPA planning grant and $20 million of American Rescue Plan Act (APRA) funds through the state's Regional Economic Acceleration and Development Initiative (READI) program.
[11] CIRDA members' grants administered include Hamilton County ($134,000,000); Greenwood ($3,300,000); Bargersville ($1,000,000); Indianapolis ($610,471,575); Martinsville ($7,013,791); Beech Grove ($5,950,000); Speedway ($2,230,000); Fishers ($1,245,574); and Plainfield ($5,700,000).
[12] Indianapolis Office of Sustainability. 2018. "Thrive Indianapolis." Accessed January 2024. Retrieved from: https://www.thriveindianapolis.com/
[13] See Quality Assurance Project Plan "Appendix D" located within this report's Appendix B.
[14] U.S. Bureau of Economic Analysis. 2023. "Total Real Gross Domestic Product for Indianapolis-Carmel-Anderson, IN (MSA)" Accessed January 2024. Retrieved from: Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/series/RGMP26900
[15] IndianaMap GIO. 2024. "Brownfields: Summary." Modified 11 February 2024. Accessed February 2024. Retrieved from: https://www.indianamap.org/datasets/INMap::brownfields-1/explore?location=39.809543%2C-86.101988%2C10.81

urban heat islands.[16] As the crossroads of America, Indiana is also home to more pass-through highways than any state in the U.S. and it is the fifth busiest state for commercial freight traffic.[17] Heavy commercial transportation uses contribute to the Indianapolis metro area's ranking as the 10th worst metropolitan area (out of 200 metro areas) for annual particulate matter (PM) pollution,[18] a key contributor to respiratory and cardiovascular health harms.[19] There remains significant opportunity to revitalize the region and address the growing impacts of climate change.

This regional plan includes priority GHG reduction measures developed to meet the needs that residents have voiced throughout the planning process, including creating more green space to support recreation, enabling clean energy adoption, and improving transportation options. These are actions that impact every community across the MSA. The priority GHG reduction measures seek to improve air quality and public health, particularly for LIDAC residents, while creating economic opportunities for all jurisdictions across the region, inclusive of both urban centers and rural communities. The following priority GHG reduction measures focus on building capacity for sustained action on climate change mitigation and providing the necessary infrastructure to begin prioritizing GHG reduction actions in Central Indiana:

GHG Reduction Measure #1: CIRDA Regional Building and Asset Modernization Program – This regional program seeks to fund clean energy and energy efficiency upgrades to buildings and infrastructure across Central Indiana. The program will support upgrades to modernize and reduce GHG emissions from a variety of projects, including public building clean energy retrofits, industrial energy efficiency and solar installations, wastewater treatment improvements, and increased mobility options including various forms of public transportation, micromobility efforts, ride sharing, and electric vehicle charging. Eligible applicants will include public, non-profit, and private entities. The program will provide low- to no-matching grants and establish a revolving loan fund to support long-term financial sustainability. Seven pilot projects have already been identified as potential recipients of program funding, including: City of Indianapolis Solar Upgrades, McCordsville Town Hall Energy Efficiency Updates, Energy Insights Program, Rolls Royce HVAC Optimization and Submetering, Rolls Royce Photovoltaics (PV) Solar, Crispus Attucks High School Energy Efficiency Renovations, and Indianapolis Arts Center Upgrades. In addition, several projects have been identified that would be ready for funding year two of the program and beyond. These projects focus on clean energy

[16] Indiana University Environmental Resilience Institute. 2024. "Extreme Heat in Indiana." Accessed February 2024. Retrieved from: https://eri.iu.edu/tools-and-resources/fact-sheets/extreme-heat-in-indiana.html
[17] Indiana Department of Transportation. 2023. "Next Level Indiana." Accessed February 2024. Retrieved from: https://www.in.gov/indot/maintenance-operations/next-level-preservation/next-level-indiana/
[18] American Lung Association State of the Air. 2023. "Indianapolis-Carmel-Muncie, IN." Accessed February 2024. Retrieved from: https://www.lung.org/research/sota/city-rankings/msas/indianapolis-carmel-muncie-in
[19] U.S. Environmental Protection Agency (EPA). 2023. "Particulate Matter (PM) Pollution: Health and Environmental Effects of Particulate Matter." Accessed February 2024. Retrieved from: https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm

upgrades at historic public buildings, supporting public transportation, and installing energy efficiency upgrades to a wastewater treatment facility.

GHG Reduction Measure #2: CIRDA Regional Open Space Revitalization and Connectivity Program – This regional program will target the reclamation and revitalization of degraded lands throughout Central Indiana. It will support environmental and wetlands remediation, land enhancement, trail development, and urban afforestation to reduce GHG emissions, while simultaneously improving the quality of place, recreation, and public health for the region's disadvantaged communities. The program may also support limited economic development when the use benefits the local community, such as providing housing or job opportunities. The program will provide low- to no-matching grants and establish a revolving loan fund to support long-term financial sustainability. Eligible applicants will include public, non-profit, and private entities. Five pilot projects have already been identified as potential recipients of program funding, including: City of Indianapolis Brownfield Julietta Landfill, Nickel Plate Pedestrian Bridge, Grassy Creek Trail, Conner Prairie Reforestation, and Conner Prairie Wetland Enhancement and Fertilizer Education Program. In addition, several projects have been identified that would be ready for funding in year two of the program and beyond. These projects focus on brownfield revitalization, afforestation, and trail development to revitalize critical parts of the region and support LIDAC residents.

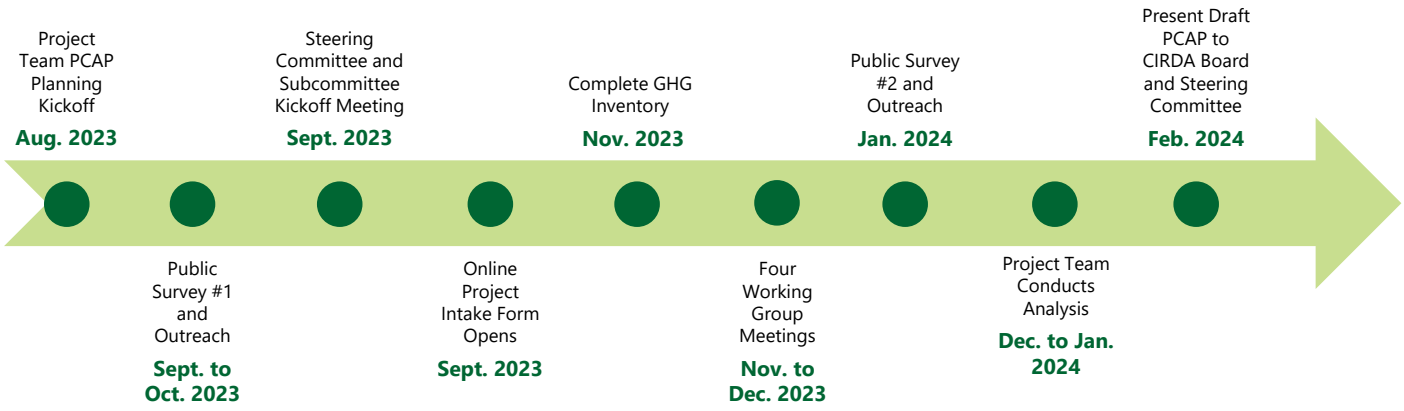
GHG Reduction Measure #3: Indianapolis Area Renewable Energy and Waste Reduction Operation – The Indianapolis Motor Speedway, in partnership with the American Dairy Association Indiana, Inc. and Newtrient, will create a food waste collection program across the City of Indianapolis. Leftover food waste collected from events, restaurants, and grocery stores will be transported to an anaerobic digester on a local dairy farm, where it will create renewable natural gas (RNG), which will then power local businesses and fleets in the Central Indiana area. Animal waste from the selected farm will also be put in the digester, reducing nitrous oxide emissions from fertilizer application. This project will reduce a significant amount of food waste disposed in landfills resulting from events and tourism throughout the city and be a replicable model for other communities.

These three priority GHG reduction measures comprise a variety of actions to reduce GHG emissions in the region, while also positively impacting quality of place, public health, and economic development. The following sections describe the approach CIRDA and its partners undertook to develop this regional plan, the results of the regional GHG inventory, descriptions of the priority GHG reduction measures, an assessment of the potential benefits to LIDAC residents, an evaluation of implementation authority and other available funding sources, and an overview of next steps in the CPRG program and the regional planning process.

2. Approach to PCAP Development

The regional planning process included multiple overlapping efforts conducted from August 2023 to February 2024 to ensure the regional plan meets EPA's criteria and is reflective of the community priorities. The approach to developing the PCAP included extensive stakeholder outreach, assessing LIDAC benefits, developing a regional GHG inventory, prioritizing and quantifying GHG reduction measures, and identifying implementation authority, as described in the following subsections. Figure 2 depicts the timeline and key milestones reached throughout the PCAP development process.

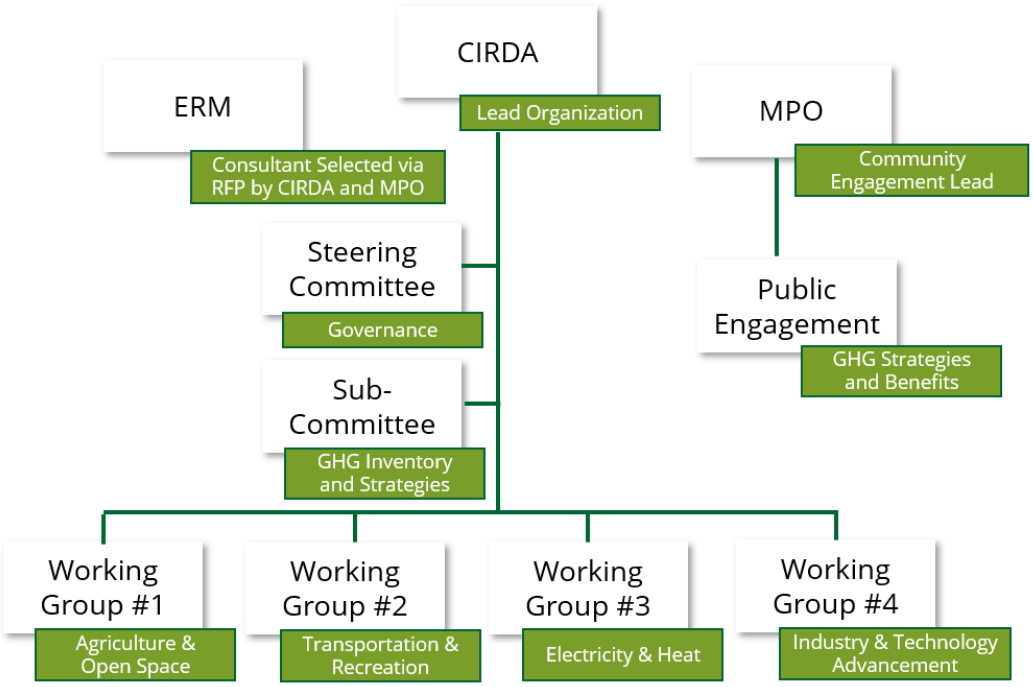
Figure 2. PCAP Development Timeline



STAKEHOLDER ENGAGEMENT

CIRDA led the development of this regional plan by engaging a diverse set of public, private, and non-profit stakeholders throughout Central Indiana. This extensive stakeholder engagement process was integral to the development of the regional plan and formed the foundation for identifying shared priorities that meet EPA's PCAP criteria and support the region's goals. Figure 3 provides an overview of the stakeholder engagement approach to develop the regional plan.

Figure 3. Stakeholder Engagement Approach



PROJECT TEAM

Comprised of the municipal executives from 24 Central Indiana communities, CIRDA is the lead grantee for the regional planning process. CIRDA is working in collaboration with the Indianapolis Metropolitan Planning Organization (IMPO), the lead partner spearheading community engagement. Representatives from CIRDA, including the City of Fishers and the City of Indianapolis, served on the Project Team alongside IMPO and Environmental Resources Management, Inc. (ERM). ERM is the consulting firm selected to manage CPRG deliverables on behalf of CIRDA and the region.

The Project Team launched the regional planning process in August 2023, including engaging in extensive stakeholder outreach, developing a regional GHG inventory, prioritizing and quantifying GHG reduction measures, assessing LIDAC benefits, and identifying implementation authority, as described in the following subsections. During monthly Board meetings conducted throughout the planning process, CIRDA staff delivered progress updates and received direction and feedback from CIRDA members, composed of 24 municipal executives from across the region. The Project Team engaged a diverse

The Project Team **engaged a diverse set of public, private, and non-profit stakeholders** across the region to inform and shape GHG reduction measures in the regional plan, from start to finish.

set of public, private, and non-profit stakeholders across the region to inform and shape the regional plan, from start to finish.

COMMUNITY ENGAGEMENT AND LIDAC BENEFITS

Community engagement played a central role in the regional planning process. IMPO led the development of two public surveys and attended 15 in-person events and four virtual meetings from September 2023 through February 2024. Engagement centered on both gathering input from communities and reporting updates for the planning process.

LIDAC residents were identified at the start of the planning process using EPA's EJScreen[20] and associated data layers.[21] IMPO prioritized outreach and engagement to LIDAC residents, including attending community events in LIDAC areas, deploying "street teams" to engage LIDAC residents in their neighborhoods, targeting boosted advertising in two LIDAC areas, and promoting the survey in Spanish through La Voz Magazine. Both public surveys were available in multiple languages to maximize opportunities for input. Public participation across both public surveys totaled 645 responses, with 208 responses from LIDAC residents across the MSA. See Section 5 for a detailed review of public survey responses and engagement events attended.

The Project Team deployed a project webpage on CIRDA's Central Indiana Environmental Action Plan website to house information related to outreach opportunities, contact information, and plan progress.[22] A handout was distributed during public outreach events to provide an overview of the planning process and share opportunities to engage and stay informed. See Appendix C for the handout. In fall 2023, the first round of the public survey and engagement events was focused on gathering public preferences for benefits and strategies to reduce GHG emissions and notifying the public of the regional planning effort. In winter 2024, the second round of the public survey and engagement events was focused on educating the public on the results of the regional GHG inventory and draft priority GHG reduction measures, and on gathering additional input for an updated list of benefits. IMPO promoted opportunities for the public to engage in the regional planning process via in-person, digital, and print campaigns. In addition to in-person events and virtual meetings, IMPO disseminated three paid social media advertising campaigns, two public notices in local newspapers, one advertisement in Spanish and English in La Voz magazine, and numerous newsletters and social media posts across CIRDA and partner organizations' membership platforms. For a list of engagement events, see Section 5.

[20] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

[21] The Project Team used the "Justice 40 (CEJST)" and the "EPA IRA Disadvantaged Communities" data layers to determine census tracts throughout the MSA that are considered low-income and disadvantaged communities.

[22] Central Indiana Regional Development Authority (CIRDA). 2023. "Central Indiana Environmental Action Plan." Accessed January 2024. Retrieved from: https://centralindianarda.org/epa-grant

The results of the public surveys were shared across all stakeholder groups convened by the Project Team and incorporated into the planning process. Stakeholder groups consisted of the Steering Committee, Subcommittee, and four sector-specific Working Groups.

STEERING COMMITTEE

The Steering Committee was developed to oversee the execution of the CPRG grant and drive intergovernmental and interagency coordination. Co-chaired by CIRDA and IMPO, Steering Committee members included representatives from municipalities across the MSA.

Throughout the regional planning process, the Steering Committee was responsible for providing input on the development of plan deliverables, including the regional GHG inventory, GHG priority actions, and public surveys. Members attended four meetings from September 2023 to February 2024, including a formal kickoff meeting to introduce the CPRG opportunity and planning process, and give an opportunity for members to engage. All the meetings included virtual participation. The Project Team also engaged in one-on-one discussions with Steering Committee members during the planning process to delve deeper into specific ideas for implementation-ready GHG reduction measures that were submitted to the Project Team.

SUBCOMMITTEE

The Subcommittee was formed to work under the direction and guidance of the Steering Committee and Project Team to support the development of key planning deliverables. Members consisted of state agency and academic representatives, including the Indiana Department of Environmental Management (IDEM), Indiana Department of Transportation (INDOT), Indiana Office of Energy Development (OED), Indiana State Department of Agriculture, and Indiana University (IU). The role of the Subcommittee throughout the regional planning process was to support the development of the GHG inventory by providing data and regional insights. Subcommittee members attended three meetings from September 2023 to November 2023, including the formal kickoff meeting with the Steering Committee and Project Team. Members were also invited to provide input on the GHG reduction measures, with some crossover in participation with the sector-specific Working Groups.

WORKING GROUPS

The Working Groups were formed to support the development of priority GHG reduction measures and potential community benefits reflective of the sectors with the greatest GHG emissions across the region. The Project Team invited a diverse set of stakeholders to participate the in four Working Groups. Each Working Group consisted of 14 to 18 sector-specific subject matter experts from private companies, community organizations, academia, and government agencies. The Working Group included participants from the following entities:

1. Agriculture & Open Space – Waste Management, Hamilton County Tourism, Elanco, IDEM, Friends of the White River, AgriNovus, Indianapolis Zoo, Central Indiana Land Trust, Nina Pullman Charitable Trust, City of Indianapolis, and IU Health

2. Transportation & Recreation - IMPO, INDOT, IndyGo, Hoosier Environmental Council, AES Indiana, Greater Indiana Clean Cities, City of Carmel, Indianapolis Cultural Trail, City of Indianapolis, City of Fishers, Penske Entertainment, Purdue University, and IU Environmental Resilience Institute

3. Electricity & Heat - Indiana OED, AES Indiana, Duke Energy, Hoosier Environmental Council, Citizens Energy Group, ULI Indiana, Solar United Neighbors, Citizen Action Coalition, American Institute of Architects Indiana Chapter, IU Environmental Resilience Institute, IU Health, City of Fishers, and City of Indianapolis

4. Industrial & Technology Advancement - Eli Lilly, Baker Tilly, Heritage Group, Andretti Autosport, Rolls Royce, Hoosier Environmental Council, Citizens Action Coalition, Aspire Johnson County, Earth Charter Indiana, Indy Chamber, IU Health, and Purdue University

Members in each Working Group participated in two meetings from November 2023 to December 2023, with both in-person and virtual participation. The Project Team convened a total of eight meetings across all the Working Groups. Members were asked to consider the types of GHG reduction strategies they have had success deploying; promising GHG reduction strategies for the region to consider; and potential community and sector-specific benefits resulting from identified GHG reduction strategies. Members also provided input on development of the regional GHG inventory and reviewed results from the first public survey.

GREENHOUSE GAS INVENTORY

The Indianapolis-Carmel-Anderson MSA GHG inventory with baseline year of 2022 was calculated at the county level for each of the eleven counties (Boone, Brown, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan, Putnam, and Shelby Counties), and analyzed as a single MSA regional inventory. The identification and prioritization of GHG reduction measures included in this regional plan were informed by the GHG inventory results, feedback from community outreach and stakeholder groups, and existing local climate action plans.

REVIEW OF EXISTING DATA SOURCES

The Project Team relied on a mix of data sources to develop the Indianapolis-Carmel-Anderson MSA GHG inventory. Several stakeholders that participated in the Steering Committee and Subcommittee Meetings also provided data. Additional data and information included county-level values from verified and reliable national online databases. Local community and climate plans were also reviewed to identify any current GHG reduction methodologies used within the MSA. Once completed, the MSA's regional inventory was compared to the Indianapolis GHG inventory as well as to EPA's Indiana state-wide GHG inventory to ensure reasonableness and consistency of the results.

All data sources utilized in this GHG inventory are summarized in Table 1. A comprehensive list of all community and climate plans are in Appendix B.[23]

[23] See Quality Assurance Project Plan in Appendix B.

Table 1. GHG Inventory Data Sources

Category	Data Source
Stationary Combustion	NREL SLOPE – Natural gas consumption by county EPA FLIGHT – Industrial fuel consumption (excl. natural gas) by county US Census Bureau – Number of households by fuel use & county EIA – CE4.6.LP.ST Annual household site propane, CE4.6.FO.ST Annual household site fuel oil or kerosene Citizens Energy – Marion County natural gas consumption
Mobile Combustion	Indiana Department of Transportation Indiana Office of Energy Development
Solid Waste/Landfills	Indiana Department of Environmental Management EPA FLIGHT – Landfill operations
Electricity Use	NREL SLOPE – Electricity consumption by county AES Electricity – Marion County electricity consumption
Wastewater	Indiana Department of Environmental Management EPA FLIGHT – Wastewater treatment plant operations
Agriculture	US Geological Survey – Fertilizer consumption data
Urban Forestry	Tree Equity Score – Urban tree cover (%) by county US Census Bureau – Urban area by county
State Parks & Forests	Yellowwood State Forest & Brown County State Park – Websites Indiana Department of Natural Resources – Park histories
Additional GHG Sources	EPA FLIGHT – Industrial operations Indianapolis Airport Authority – Indianapolis airports & helipad

GHG INVENTORY METHODS AND PROTOCOLS

The MSA's GHG inventory follows the Greenhouse Gas Protocol's Global Protocol for Community-Scale Greenhouse Gas Emission Inventories.[24] The Project Team developed the inventory using EPA's Local GHG Inventory Tool[25] to calculate GHG emissions from stationary combustion, mobile combustion, electricity use, solid waste from landfills, wastewater, exported waste, agriculture practices, urban

[24] Fong, W.K, M. Sotos, M. Doust, S. Schultz, A. Marques, and C. Deng-Beck. 2022. *Global Protocol for Community-Scale Greenhouse Gas Inventories, An Accounting and Reporting Standard for Cities, Version 1.1.* Online posting. GHG Protocol. Accessed January 2024. Retrieved from: https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

[25] U.S. Environmental Protection Agency (EPA). 2024. "Local Greenhouse Gas Inventory Tool." Modified 5 February 2024. Retrieved from: https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool

forestry, and imported water across the MSA. This inventory also relied on the US Department of Agriculture's (USDA) COMET-Farm tool to calculate carbon sequestration from state and county parks located within the MSA.[26] The Project team selected a base year of 2022 for this inventory given it is the year most representative of the current environment for which adequate data are available.

The Project Team conducted three Steering Committee and Subcommittee meetings with representatives from municipalities, along with state agencies and academic institutions across the MSA, to help inform the development of the GHG inventory. Members were tasked with providing county-level data by sector to assist the Project Team with developing the GHG inventory. Additionally, members of both the Steering Committee and Subcommittees reviewed the GHG inventory and provided feedback. The Project Team also conducted meetings with a set of four sector-specific Working Groups, comprised of subject matter experts representing different sectors in the GHG inventory, who provided additional information to inform the GHG inventory.

Detailed methodology and quality assurance procedures for preparation of the inventory are contained in Appendix B. Refer to Section 3 for a more detailed description of the methodology.

IDENTIFYING AND PRIORITIZING GHG REDUCTION MEASURES

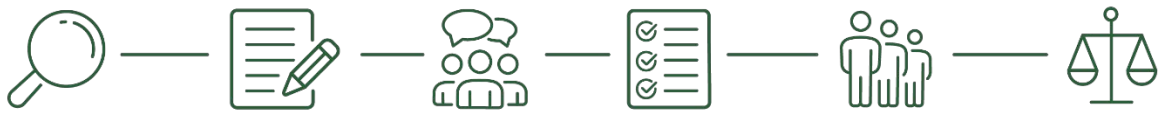
The Project Team designed a process for identifying and prioritizing GHG reduction measures that integrated extensive research with stakeholder feedback and a thorough analysis to shape the final priority list. Figure 4 describes the process conducted to develop the priority list of GHG reduction measures for the regional plan.

Figure 4. Process to Develop the Priority List of GHG Reduction Measures

Extensive Research
Reviewed 45 local govt plans, 19 utility and business plans across region, best practices and EPA examples.

Public Feedback
Received public survey input on a consolidated version of initial list to assess priorities.

Stakeholder Groups
Received project intake form submissions, and Working Groups shared sector-specific challenges and priorities.



Initial List
Created initial list with a range of potential GHG reduction measures across all sectors to consider for the region.

Updated List
Created updated list based on public feedback and review of policy barriers to implementation-ready EPA critieria.

Analysis
Aligned priorities with intake submissions, and assessed measures based on EPA's criteria (GHG reductions, LIDAC, authority, funding).

[26] U.S. Department of Agriculture (USDA). 2024. "COMET Farm, Whole Farm and Ranch Carbon and Greenhouse Gas Accounting System." Modified 30 January 2024. Retrieved from: https://comet-farm.com/Home

REVIEW OF EXISTING PLANS AND BEST PRACTICES

The Project Team conducted a thorough review of existing and planned GHG mitigation efforts within the region. The Project Team reviewed 45 local government climate and community development plans and 19 utility and business sustainability plans within Central Indiana.[27] Most of the plans were developed within the last 4 years. Additional research included reviewing the existing policy landscape in the region and state, considering best practice strategies to reduce GHG emissions from other municipalities, and reviewing EPA's list of example GHG measures across sectors.[28] The Project Team then compiled all the research into an initial list that included the range of potential GHG reduction measures across all sectors to consider for the region. This initial list categorized the potential GHG reduction measures according to sector, and characterized by the number of plans that included the measure, and the regions wherein the measure was explored.

INTEGRATING STAKEHOLDER FEEDBACK

A consolidated version of the initial list of potential GHG reduction measures was disseminated as part of the first public survey conducted from 14 September to 13 October 2023. See Section 5 for a detailed overview of the survey results, LIDAC responses, and outreach performed. The community feedback informed the process that the Project Team then undertook to refine the initial list based on public priorities and existing local and state policy constraints. Policy constraints were considered early on given EPA's "implementation-ready" PCAP criteria, which meant that GHG reduction measures that would encounter policy barriers would not be considered competitive when seeking CPRG Phase 2 implementation funds for the GHG reduction measures identified in the PCAP.

The process to refine the initial list of potential GHG reduction measures resulted in an updated list, that was presented to members of the four sector-specific Working Groups for feedback, discussion, and refinement based on their subject matter expertise. See Appendix D for the updated list of potential GHG reduction measures that were discussed during each Working Group meeting. The Working Group members described their experiences, challenges, and recommendations with the updated list of GHG reduction measures, based on their experiences in the specific sectors.

The Project Team then reviewed all the feedback received from the Working Groups, as well as the projects submitted as part of an online project intake form[29] that was established in September 2023. The project intake form was accessible on the CIRDA's project website[30] and shared across all stakeholder group meetings. The Project Team encouraged stakeholders to submit any and all ideas.

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[27] Refer to Appendix B for a list of the plans reviewed.

[28] U.S. Environmental Protection Agency (EPA). 2024. *Climate Pollution Reduction Grants Program: Implementation Grants General Competition, Notice of Funding Opportunity Amendment No. 3.* Published 16 January 2024. Retrieved from: https://www.epa.gov/system/files/documents/2024-01/cprg-general-competition-correction.pdf

[29] Refer to Appendix E for the project intake form.

[30] Central Indiana Regional Development Authority (CIRDA). 2023. "Central Indiana Environmental Action Plan." Accessed January 2024. Retrieved from: https://centralindianarda.org/epa-grant

CIRDA held monthly board meetings with municipal executive members from across the region that included discussions on the progress of regional planning and encouraged submissions through the online project intake form. In addition, CIRDA disseminated monthly newsletter updates to all regional members with a link to the project intake form and detailed updates on plan progress and opportunities to engage. From November 2023 to January 2024, the Project Team engaged in many one-on-one discussions with the entities who submitted projects through the project intake form to better understand the submission and see if there was a way to gather the required information in time for the PCAP.

ALIGNING PRIORITIES WITH EPA REQUIREMENTS

Once there was a critical mass of submissions received, the Project Team reviewed the submissions to see where there was alignment with the priorities emphasized during the stakeholder group meetings and myriad forms of public input received. This alignment resulted in a final draft list of GHG reduction measures. The Project Team then performed a series of analyses on a set of 28 specific GHG reduction measures that comprised the final draft list to determine whether and to what extent they would meet EPA's requirements outlined for the PCAP. The analysis included quantifying the estimated GHG reduction potential (from 2025-2030 and from 2025-2050), assessing the potential direct and indirect benefits to LIDAC residents, reviewing authority to implement, and researching additional available funding opportunities at the federal, state, and local levels.

Project Team **performed a series of analyses on 28 specific GHG reduction measures** to determine whether and to what extent they would meet EPA's PCAP requirements. Criteria included estimated GHG emissions reductions, potential LIDAC benefits, authority to implement, and availability of other funding.

IMPO disseminated a second public survey from 1 January to 14 January 2024, using Google Forms and performed outreach through six engagement events from December to February 2024 to gather additional community input. The second public survey and outreach were focused on educating the public on the results of the regional GHG inventory and draft priority GHG reduction measures, and gathering additional input for an updated list of benefits. See Section 5 for a detailed overview of survey results, LIDAC responses, and outreach performed.

The results of the analysis indicated which GHG reduction measures were able to meet EPA's requirements for the PCAP. CIRDA communicated progress on the analysis to board members and the Project Team held a Steering Committee meeting in February 2024 to share the results of the analysis and the second public survey. The priority list of measures was then finalized to include in this PCAP. The priority GHG reduction measures align with the major priorities identified during community engagement and feedback from stakeholder groups, and reflect the project submissions received.

QUANTIFYING EMISSIONS FROM GHG REDUCTION MEASURES

This regional plan identifies three priority GHG reduction measures and accompanying pilot projects that are implementation-ready:

- **GHG Reduction Measure #1: CIRDA Regional Building and Asset Modernization Program**
- **GHG Reduction Measure #2: CIRDA Regional Open Space Revitalization and Connectivity Program**

- **GHG Reduction Measure #3: Indianapolis Area Renewable Energy and Waste Reduction Operation**

The following subsections briefly describe the quantification behind the GHG emissions estimates for each of the above GHG reduction measures, which capture a variety of specific projects and actions to reduce GHG emissions. Refer to Section 4 for specific GHG reduction estimates.

GHG REDUCTION MEASURE #1 – CIRDA REGIONAL BUILDING AND ASSET MODERNIZATION PROGRAM

The CIRDA Regional Building and Asset Modernization Program has seven implementation-ready pilot projects. The available pilot project specifications were used to estimate GHG reductions for each pilot project. Program funding would also be available for additional projects; thus, additional example projects were also included to estimate the full potential GHG benefits of deploying all available program funds toward the pilot projects and beyond. This program aims to support GHG reductions through the following initiatives: public building and industrial clean energy improvements, solar PV installations, and increased mobility options such as various forms of public transportation, public electric vehicle (EV) charging, and micromobility such as car and bike sharing.

Table 2 provides details on the types of projects that would be eligible to receive funding from the program, the associated GHG reduction actions, and includes a brief description of the methodology used to quantify the GHG emissions reductions for that type of action.

Table 2. GHG Reduction Projects for the CIRDA Regional Building and Asset Modernization Program

Project Type	Project Name	GHG Reduction Initiatives Quantified
Implementation-Ready Pilot Projects	City of Indianapolis Solar Upgrades	Install 2.2 megawatts (MW) of solar across 10 public buildings in Indianapolis, resulting in zero-emission power that will offset emissions of Indiana's projected electricity grid mix.
	McCordsville Town Hall Energy Efficiency Updates	Replace current HVAC system with new, more efficient one, reducing building energy (electric) consumption.
	Energy Insights Program	Administer energy audits to 100 manufacturing facilities that result in natural gas and electricity efficiency improvements in operations.
	Rolls Royce HVAC Optimization & Submetering	Upgrade HVAC system, make corrections in ventilation rates, and install and integrate submeters to reduce natural gas and electricity consumption at the facility.
	Rolls Royce Solar PV	Install 10.5 megawatt (MW) of solar on-site, resulting in zero-emission power that will offset emissions of Indiana's projected electricity grid mix currently supporting operations.

Project Type	Project Name	GHG Reduction Initiatives Quantified
	Crispus Attucks High School Energy Efficiency Renovations	Replace current HVAC system with new, ENERGY STAR certified one, as well as window replacement, both to reduce building energy (natural gas) consumption. Install LED lighting to reduce energy (electricity) consumption.
	Indianapolis Arts Center Upgrades	Replace current HVAC system with new, more efficient one, reducing building energy (natural gas) consumption. Install 169 kilowatt (kW) of solar, resulting in zero-emission power that will offset emissions of Indiana's projected electricity grid mix.
Example Projects	Increased Mobility Options, Public EV Chargers, and Public Transportation	Install micromobility options, such as ride sharing programs or bikeshare stations resulting in zero-emissions transportation, avoiding single occupancy internal combustion engine vehicle use and associated tailpipe and carbon dioxide (CO_2) emissions. Support EV chargers and thereby avoid single occupancy internal combustion engine vehicle use to reduce associated tailpipe and CO_2 emissions. Deploy various means of public transportation to decrease diesel usage, expand routes, and avoid single occupancy internal combustion engine vehicle use to reduce associated tailpipe and CO_2 emissions.

GHG REDUCTION MEASURE #2 – CIRDA REGIONAL OPEN SPACE REVITALIZATION AND CONNECTIVITY PROGRAM

The CIRDA Regional Open Space Revitalization and Connectivity Program has five specific pilot projects that are ready to be deployed. The available pilot project specifications were used to estimate GHG reductions for each pilot project. Program funding would also be available for projects beyond these initial pilot projects, thus additional example projects were also included to estimate the full potential GHG reduction benefits of deploying all available program funds toward the pilot projects and beyond. This program aims to support GHG reductions through the following initiatives: expanding walking trails access, converting sites to wetlands, remediating brownfield sites and converting the sites to forests and using for solar PV installations, and general reforestation and tree planting.

Table 3 provides details on the types of projects that would be eligible to receive funding from the program, details the associated GHG reduction actions, and includes a brief description of the methodology used to quantify the GHG emissions reductions for that type of action.

Table 3. GHG Reduction Projects for the CIRDA Regional Open Space Revitalization and Connectivity Program

Project Type	Project Name	GHG Reduction Actions Quantified
Implementation-Ready Pilot Projects	City of Indianapolis Brownfield Julietta Landfill	Install 10 MW of solar on currently unused brownfield site, resulting in zero-emission power that will offset emissions of Indiana's projected electricity grid mix.
	Nickel Plate Pedestrian Bridge	New pedestrian bridge to improve walking access to parks, schools, and the community, avoiding single occupancy internal combustion engine vehicle use and associated tailpipe emissions.
	Grassy Creek Trail	New trails to improve walking access to transit, schools, and the community, avoiding single occupancy internal combustion engine vehicle use and associated tailpipe emissions. Tree planting resulting in carbon storage.
	Connor Prairie Reforestation	Tree planting resulting in carbon storage.
	Connor Prairie Wetland Enhancement and Fertilizer Education Program	Convert currently unused land to wetlands, resulting in carbon storage.
Example Project	Brownfield Site Revitalization	Tree planting on currently unused brownfield sites, resulting in carbon storage.

GHG REDUCTION MEASURE #3 – INDIANAPOLIS AREA RENEWABLE ENERGY AND WASTE REDUCTION OPERATION

The Indianapolis Area Renewable Energy and Waste Reduction Operation would establish a medium-scale anaerobic digester RNG production project powered by food waste from communities and large-scale events throughout the City of Indianapolis and from the animal waste from a dairy farm within the region.

Sources of GHG emissions were quantified based on the increased transport distance to deliver food waste and animal waste to the RNG production facility. Emissions were also quantified to account for the change in the utilization of food waste, as some food waste would be diverted from compost operations and therefore no longer store carbon dioxide (CO_2).

Initiatives resulting in GHG emissions reductions were quantified for diverting animal waste that would otherwise have been used for fertilizer application (thereby resulting in emissions leaked into atmosphere). Further, the Project Team's GHG quantification considered the ultimate use of RNG

produced, which was assumed to be a zero-emitting biogenic fuel resource offsetting combustion of fossil natural gas.

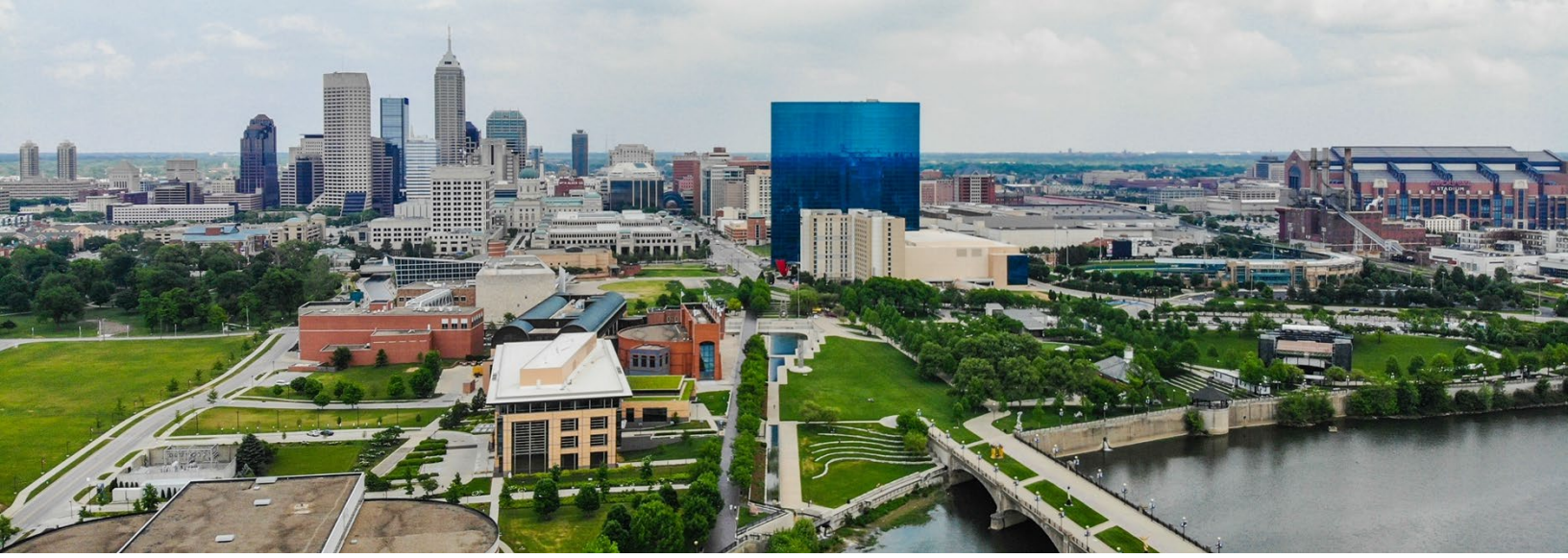
The net balance of the above sources and reductions results in GHG emissions reductions for this measure. The analysis does not include potential emissions from processes and energy consumption relating to the RNG production itself; however, if this energy demand is fulfilled with some of the RNG produced or renewables, there may be no emissions.

IDENTIFYING IMPLEMENTATION AUTHORITY

Implementation authority for the priority GHG reduction measures was reviewed for projects located on public lands. A review of municipal statutory and regulatory text relevant to the implementing entities and locations included extracting key words from the measure descriptions. The Project Team reviewed state and county-wide ordinances if no municipal text relevant to the project was found.

CIRDA has full authority to implement the Regional Building and Asset Modernization Program and the Regional Open Space Revitalization and Connectivity Program, within which all pilot projects are associated. Certain pilot projects detailed within this PCAP require further information and/or permits to be obtained. The Indianapolis Motor Speedway, in partnership with the American Dairy Association Indiana, Inc. and Newtrient, have the authority to implement the Indianapolis Area Renewable Energy and Waste Reduction Operation, upon securing a permit. Since CIRDA's members have governing authority over permitting, permits will likely be issued in a timely manner.

Refer to Section 6 for a detailed review of implementation authority for each GHG reduction measure, along with the relevant sources.



3. Greenhouse Gas Inventory

SCOPE

The Project Team used the EPA Local GHG Inventory Tool[31] that includes Scope 1, Scope 2, and Scope 3 emissions. Scope 1 emissions included stationary combustion, mobile combustion, landfills, and wastewater emissions within the region. Scope 2 emissions included electricity consumption. Scope 3 emissions included imported water, agricultural and land management, urban forestry, and waste disposed outside the MSA. Additional emissions sources were also included in the GHG inventory and can fall into Scope 1, 2, or 3 depending on the source.

As mentioned in Section 1, CIRDA encompasses the entire Indianapolis-Carmel-Anderson MSA, which includes eleven counties in central Indiana. For this GHG inventory, emissions were calculated at a county- and MSA-level. Data was collected at a county level for the emission sources and then aggregated for the MSA, using a baseline year of 2022. The following data review section discusses how data was collected for each emission source.

DATA REVIEW

Data sources for this GHG Inventory are summarized by emissions source category as defined in EPA's Local GHG Inventory Tool.[32] References for data sources used in this GHG Inventory are summarized in the Quality Assurance Project Plan, located in Appendix B.

STATIONARY COMBUSTION

Stationary combustion emissions were evaluated for residential, commercial/institutional, and industrial consumption of natural gas; residential and industrial consumption of propane and distillate fuel oil; and large-scale industrial consumption of kerosene and jet fuel. The Project Team gathered

[31] U.S. Environmental Protection Agency (EPA). 2024. "Local Greenhouse Gas Inventory Tool." Modified 5 February 2024. Retrieved from: https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool
[32] Ibid.

data specifying the fuel type and amount for these emissions sources. Natural gas consumption from power plants was not included in the stationary combustion section of this inventory to avoid double counting of emissions in the electricity consumption section of the inventory, as advised in the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (6.5.2).[33]

Utility suppliers were unable to provide natural gas consumption data, with the exception of Marion County, where Citizens Energy Group supplied data by sector. This inventory utilized the National Renewable Energy Laboratory's State and Local Planning for Energy (SLOPE)[34] sector-based natural gas consumption values at the county level to capture natural gas consumption across the remaining 10 counties within the Indianapolis-Carmel-Anderson MSA. To convert fuel consumption in one million British thermal units (MMBtu) to one thousand standard cubic feet, this inventory utilized conversion factors from the US Energy Information Administration (EIA).[35]

Due to the wide range of suppliers in the MSA and limited timeframe to complete the inventory, fuel providers' usage data was not provided. To capture residential propane and fuel oil consumption, this inventory utilized data from the US Census Bureau for the number of households using fuel oil and propane by county and average fuel oil and propane consumption per household in Indiana and Ohio from EIA. To convert fuel consumption in MMBtu to gallons, the inventory relied on conversion factors from EIA.

The Project Team reviewed EPA's Facility Level Information on Greenhouse Gases Tool (FLIGHT)[36] database for any additional industrial sources that reported stationary fuel combustion data. It is assumed that natural gas consumption at industrial facilities is accounted for in SLOPE data. FLIGHT data on additional fuel types and the amount used for stationary combustion was included in the inventory.

Additional fuel categories consumed across sectors are assumed to be minimal, and therefore would result in insignificant or de minimis emissions for this inventory.

MOBILE COMBUSTION

Mobile combustion emissions were estimated using vehicle type, fuel type, annual fuel consumption, and annual vehicle miles traveled (VMT). INDOT provided 2022 average daily VMT for each of the eleven counties, but did not provide vehicle type, fuel type, or annual fuel consumption. The Indiana

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[33] Fong, W.K, M. Sotos, M. Doust, S. Schultz, A. Marques, and C. Deng-Beck. 2022. *Global Protocol for Community-Scale Greenhouse Gas Inventories, An Accounting and Reporting Standard for Cities, Version 1.1.* Online posting. GHG Protocol. Accessed January 2024. Retrieved from: https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

[34] National Renewable Energy Laboratory (NREL). 2024. "SLOPE: State and Local Planning for Energy." Accessed January 2024. Retrieved from: https://maps.nrel.gov/slope

35 U.S. Energy Information Administration (EIA). 2023. "Units and calculators explained, Energy conversion calculators." Modified 16 June 2023. Retrieved from: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

[36] U.S. Environmental Protection Agency (EPA). 2023. "Facility Level Information on Greenhouse Gases Tool." Modified 18 August 2023. Retrieved from: https://ghgdata.epa.gov/ghgp/main.do?site_preference=normal

Vehicle Fuel Dashboard, created by the Indiana OED,[37] is a public resource that lists the number of vehicle registrations for each county by vehicle type and fuel type. Data for each of the MSA's 11 counties was pulled for 2022 from the Vehicle Fuel Dashboard to determine the percentage of each vehicle and fuel type in each county. VMT for each county was allocated to each vehicle type and each fuel type based on percentages calculated from the registration data. Fuel consumption for each vehicle type was then calculated using the allocated VMT and the average miles per gallon included in the EPA Local GHG Inventory Tool for each vehicle and fuel type.

The EPA Local GHG Inventory Tool also included the ability to enter emissions from aircraft into mobile combustion if data is available on the type and amount of fuel used by aircraft. While collecting data, the City of Indianapolis provided total GHG emissions estimates for three airports; however, data on fuel type and fuel usage by aircraft was unavailable. Therefore, emissions associated with the airports were included in the additional emissions sources section of the tool; not included under mobile combustion.

SOLID WASTE AND WASTE PRODUCTION

The inventory estimates GHG emissions for two types of waste disposal: solid waste disposal, which included landfills within the inventory boundary; and waste production, which included waste generated within the inventory boundary, but disposed of outside the inventory boundary.

For the solid waste disposal, IDEM provided a list of the current and closed landfill sites within the state of Indiana and their locations. Based on this list, it was determined that there are three active landfills and one closed landfill within the MSA. For each open landfill, the landfill gas collected, fraction of methane in the landfill gas, and the methane collection efficiency were taken from the 2022 EPA FLIGHT reports[38] for those facilities and used to estimate GHG emissions from the landfills. For the closed landfill, the GHG emissions were taken directly from the 2022 EPA FLIGHT report and entered into the EPA Local GHG Inventory Tool.

For waste production, IDEM provided 2022 data for each county that included the amount of waste sent to all waste vendors and what each waste vendor does with the waste (landfilled, other treatment, or recycled). This data was reviewed and separated by final disposal location. Any waste that had a final disposal location within the MSA was excluded from waste production, to ensure emissions associated with that waste were not double counted. For the remaining waste amounts that have a final disposal location outside the MSA, the waste production amount was calculated by totaling the waste across all vendors for each treatment type (landfilled, other treatment, or recycled). These totals

[37] Indiana Office of Energy Development. 2024. "Indiana Vehicle Fuel Dashboard." Accessed January 2024. Retrieved from: https://www.in.gov/oed/resources-and-information-center/vehicle-fuel-dashboard/

[38] U.S. Environmental Protection Agency (EPA). 2023. "Facility Level Information on Greenhouse Gases Tool." Modified 18 August 2023. Retrieved from: https://ghgdata.epa.gov/ghgp/main.do?site_preference=normal

were entered into EPA's Waste Reduction Model[39] to estimate GHG emissions from the waste disposal outside the MSA.

WASTEWATER AND IMPORTED WATER

The inventory estimated GHG emissions resulting from wastewater treatment using population served, type of treatment used for the wastewater treatment plant (WWTP), and number of septic systems. IDEM provided a list of all WWTPs in each county within the MSA, as well as a list of treatment type (aerobic or nonaerobic) at each WWTP. This list also included the population served where available for each public WWTP. The list was reviewed to separate the number of populations served by each treatment type (aerobic or nonaerobic). Where population served data was not available for private WWTPs, a ratio between population served and flow through the WWTP was calculated using the available data for that county and used to estimate population served. The IDEM WWTP list did not provide information on whether denitrification was used at the WWTPs, so to be conservative, it was assumed that no WWTP within the MSA used denitrification.

The Indiana Department of Health, as well as the individual counties' departments of health, were contacted to determine whether they had an estimate on the number of septic systems in each county. None of these contacts were able to provide information about the number of septic systems; as such, the number of septic systems was estimated based on subtracting the population served by WWTP in each county by the total population of the county.

GHG emissions estimates for imported water were based on the amount of water imported from outside the MSA and used within the region. Local governments at the county and municipality level provided data on the amount of imported water used by their respective county and municipality, as the local water utilities were not able to provide this data. A review of the provided data indicated that all responses showed that either no imported water was used by these communities, or the water was imported from another county within the MSA. Based on this information, it was determined that there are no GHG emissions associated with imported water for the Indianapolis-Carmel-Anderson MSA.

ELECTRICITY CONSUMPTION

The EPA Local GHG Inventory Tool required sector-based data on the amount of electricity purchased. Due to time constraints, utility suppliers for the region were unable to provide electric consumption data for any county with the exception of Marion County, where AES Indiana provided data by sector. To capture electricity consumption across the remaining counties, this inventory utilized SLOPE electricity consumption estimates (2022) for residential, commercial/institutional, and industrial sectors.[40] The inventory used EPA emissions factor values for the ReliabilityFirst Corporation West

[39] U.S. Environmental Protection Agency (EPA). 2023. "Waste Reduction Model (WARM)." Modified 26 December 2023. Retrieved from: https://www.epa.gov/warm

[40] National Renewable Energy Laboratory (NREL). 2024. "SLOPE: State and Local Planning for Energy." Accessed January 2024. Retrieved from: https://maps.nrel.gov/slope

(RFCW) eGRID subregion.[41] SLOPE data was provided in MMBtu and converted to kilowatt-hours (kWh) using a standard conversion from EIA.

AGRICULTURE AND LAND MANAGEMENT

The inventory estimated GHG emissions from fertilizer application practices using fertilizer consumption data provided in a report by the US Geological Survey.[42] The report was published in 2021, but the latest data provided in this report is from 2017. It was assumed that the change in fertilizer consumption from 2017 to 2022 was negligible, therefore total nitrogen from manure and commercial fertilizer usage estimated for 2017 was deemed reasonable to also use for the inventory. This data source was selected because Indiana does not collect real-time data on fertilizer consumption at a county level. This report was determined to provide the most accurate depiction of fertilizer consumption within the MSA.

The inventory did not estimate emissions sources and sinks from other cropland management practices and animal agriculture because they were determined to be insignificant in comparison to fertilizer usage within the MSA.

URBAN FORESTRY

The inventory estimated annual GHG sequestration potential from urban forestry and state parks. To evaluate GHG emissions from urban forestry, this inventory utilized percent urban tree cover values from Tree Equity Score county reports and total urban area from the US Census Bureau's Urban and Rural Geographic Areas analyses for the eleven MSA counties. US Census Bureau data is from the year 2020, but it is assumed to have negligible difference to 2022. According to the US Census Bureau, Brown County does not include any urban area, so it was excluded from the urban forestry analysis.

ADDITIONAL EMISSIONS SOURCES

The EPA Local GHG Inventory Tool has an additional emissions sources section to provide GHG emissions estimates for sources that do not fit into any of the other GHG emissions sources within the tool. EPA FLIGHT[43] was reviewed for all counties within the MSA and any industrial sources that were determined to not be included in the other emissions sources were listed here, including industrial emissions sources such as steel production and cement production, among others. Stationary fuel combustion emissions from these industrial sources were not included in additional emissions sources,

[41] U.S. Environmental Protection Agency (EPA). 2024. "Emissions & Generation Resource Integrated Database (eGRID)." Modified 30 January 2024. Retrieved from: https://www.epa.gov/egrid

[42] Falcone, J.A. 2021. *Estimates of County-Level Nitrogen and Phosphorous from Fertilizer and Manure from 1950 through 2017 in the Conterminous United States*. Online Posting. United States Geological Survey. Accessed January 2024. Retrieved from: https://pubs.usgs.gov/publication/ofr20201153

[43] U.S. Environmental Protection Agency (EPA). 2023. "Facility Level Information on Greenhouse Gases Tool." Modified 18 August 2023. Retrieved from: https://ghgdata.epa.gov/ghgp/main.do?site_preference=normal

as natural gas emissions for industry were covered by data collected from SLOPE[44] and other fuel emissions from FLIGHT are included in the stationary combustion section of this inventory.

Additionally, local municipalities were also contacted to provide any data they had on additional emissions sources. The City of Indianapolis provided GHG emissions estimates from three airports, including Indianapolis International Airport, located within Marion County. Although airport emissions would typically be considered mobile combustion, only the final GHG emissions estimates were provided by the airports, so the data was entered into additional sources as there was not enough information to include in mobile combustion.

To calculate GHG emission reductions from Yellowwood State Forest and Brown County State Park, the inventory utilized information on each park's respective website to determine the approximate size of each forested area, predominant tree type, past land cover and management, forest age, and current management activity. COMET-Farm was used to calculate annual emissions reduction potential of each park, which utilizes emissions factors and values from USDA database.[45]

ACCOUNTING METHOD

The inventory uses the Greenhouse Gas Protocol's Global Protocol for Community-Scale Greenhouse Gas Emission Inventories.[46]

The Project Team used EPA's Local Greenhouse Gas community-wide inventory module to calculate a baseline GHG inventory across the MSA's eleven counties. This spreadsheet tool enables communities to evaluate GHG emissions from their largest emissions sources, including, stationary combustion, mobile combustion, solid waste, wastewater, electricity consumption and generation, imported water, exported waste, agriculture and land management, urban forestry, and additional emission sources. The tool is programmed with default emission factors, global warming potentials, and system assumptions approved by the EPA.

This inventory also utilized COMET-Farm to evaluate the carbon sequestration potential of Yellowwood State Forest and Brown County State Park.[47] COMET-Farm is a conservation planning tool built by the USDA Natural Resources Conservation Service and Colorado State University to evaluate GHG emissions from different agriculture and forestry land management practices. The analysis from this tool used location-specific spatial data on climate and soil conditions for Central Indiana. Additionally, this tool allows the user to detail historical land management practices and the age and type of the

[44] National Renewable Energy Laboratory (NREL). 2024. "SLOPE: State and Local Planning for Energy." Accessed January 2024. Retrieved from: https://maps.nrel.gov/slope

[45] U.S. Department of Agriculture (USDA). 2024. "COMET Farm, Whole Farm and Ranch Carbon and Greenhouse Gas Accounting System." Modified 30 January 2024. Retrieved from: https://comet-farm.com/Home

[46] Fong, W.K, M. Sotos, M. Doust, S. Schultz, A. Marques, and C. Deng-Beck. 2022. *Global Protocol for Community-Scale Greenhouse Gas Inventories, An Accounting and Reporting Standard for Cities, Version 1.1.* Online posting. GHG Protocol. Accessed January 2024. Retrieved from: https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

[47] U.S. Department of Agriculture (USDA). 2024. "COMET Farm, Whole Farm and Ranch Carbon and Greenhouse Gas Accounting System." Modified 30 January 2024. Retrieved from: https://comet-farm.com/Home

forest, which improves the accuracy of the estimated carbon sequestration potential for the inventory.

GHG EMISSIONS RESULTS

GHG emissions estimates were reported in metric tons (MT) of carbon dioxide equivalent (CO_2e) and include estimated values for the following GHGs: CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorochemicals (PFCs), and sulfur hexafluoride (SF_6). GHG emissions were estimated for the following sectors: industry, transportation, commercial and residential buildings, agriculture, natural and working lands, and waste and materials management. Further analysis has broken down emissions by residential, commercial, and industrial sectors.

Each sector included within this analysis is composed of the following emissions sources and sinks:

Industry: Stationary combustion, electricity use, and industrial emissions from FLIGHT not covered by stationary combustion or electricity.

Transportation: Mobile combustion, including vehicles and airplanes.

Commercial & Residential Buildings: Stationary combustion and electricity use.

Agriculture: Fertilizer practices.

Natural & Working Lands: Urban forestry and large parks.

Waste & Materials Management: Solid waste, waste generated and treated outside the MSA, and wastewater treatment.

Table 4 summarizes GHG emission results by sector and gas, as well as total net GHG emissions across the Indianapolis-Carmel-Anderson MSA.

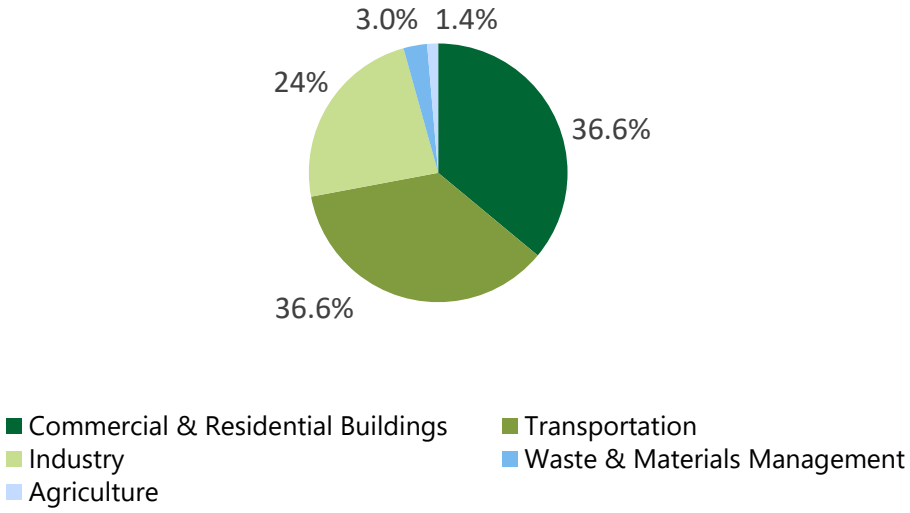
Table 4. GHG Emissions by Sector and Gas (MT CO_2e)

	CO2	CH4	N2O	HFCs	PFCs	SF6	Total
Industry	7,791,829	30,863	28,235	-	-	251,256	8,102,183
Transportation	11,978,553	120,119	280,151	-	-	-	12,378,822
Commercial and Residential Buildings	12,306,812	30,911	31,612	-	-	-	12,369,335
Agriculture	-	-	481,251	-	-	-	481,251
Natural and Working Lands	(580,821)	-	-	-	-	-	(580,821)
Waste and Materials Management	-	956,520	70,838	-	-	-	1,027,358
Total Emissions (Net)	**31,496,373**	**1,138,414**	**892,087**	**-**	**-**	**251,256**	**33,778,130**

EMISSIONS BY SECTOR

Total net GHG emissions in the Indianapolis-Carmel-Anderson MSA totaled 33,778,130 MT CO_2e, with most emissions from commercial and residential buildings (36.6%), transportation (36.6%), and industry (24%) sectors as shown in Figure 5.[48]

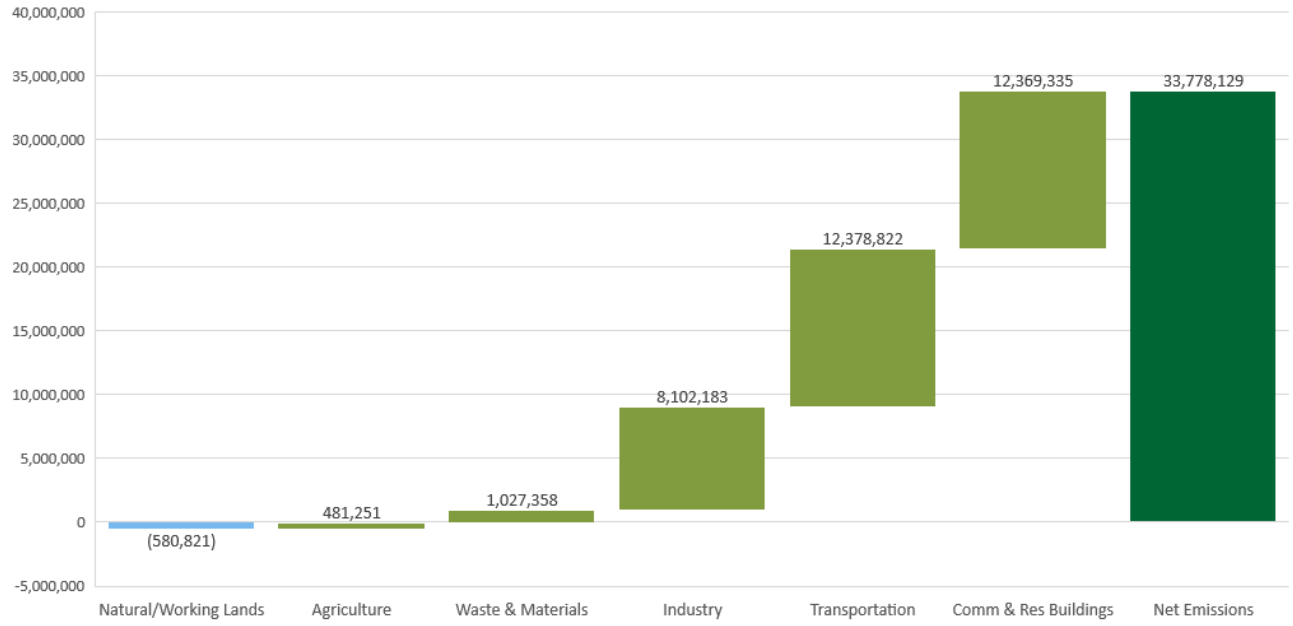
Figure 5. Relative GHG Emissions by Sector



[48] This inventory assumes all power generated within the region is consumed within the region. Emissions from power generation are accounted for within electricity use for commercial & residential buildings and industry. Per GHG Protocol guidelines for community-scale GHG inventories, this inventory reports both power generation and electricity use emissions separately to avoid double counting.

As depicted in Figure 6, gross GHG emissions across all sectors totaled 34,358,951 MT CO_2e. GHG emissions sequestered from natural and working land carbon sinks totaled 580,821 MT CO2e.

Figure 6. Total Net GHG Emissions (MT CO_2e)



Most residential emissions were from transportation, followed by electricity use in buildings. The main sources of emissions across the commercial and industrial sectors was electricity use, followed by stationary combustion. A detailed analysis of the composition of residential, commercial, and industrial sector emissions is summarized in Figure 5.

EMISSIONS BY GAS

Across the Indianapolis-Carmel-Anderson MSA, the sectors with the highest CO_2 emissions included industry, transportation, and commercial and residential buildings, due to electricity use and fossil fuel consumption. The sector with the highest methane emissions was waste and materials management due to landfills and wastewater treatment facilities. The sectors with the highest nitrous oxide emissions included agriculture, due to fertilizer application practices, and transportation, due to gasoline and diesel combustion. Refer to Table 5 for further analysis of sub-sector emissions.

Table 5. GHG Emissions by Sub-Sector (MT CO_2e)

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
Stationary Combustion	5,945,199	14,615	3,263	-	-	-	5,963,077
Mobile Combustion	11,668,129	119,802	279,903	-	-	-	12,067,834
Electricity (Location Based)	12,605,017	32,051	44,702	-	-	-	12,681,770
Solid Waste	-	299,190	-	-	-	-	299,190
Wastewater Treatment	-	325,010	70,838	-	-	-	395,848
Water	-	-	-	-	-	-	-
Ag. & Land Management	-	-	481,251	-	-	-	481,251
Urban Forestry & Large Parks	(580,821)	-	-	-	-	-	(580,821)
Exported Waste	-	332,320	-	-	-	-	332,320
Other	1,858,849	15,425	12,130	-	-	251,256	2,137,661
Total Emissions (Gross)	**32,077,195**	**1,138,413**	**892,087**	**-**	**-**	**251,256**	**34,358,951**
Total Emissions (Net)	**31,496,373**	**1,138,413**	**892,087**	**-**	**-**	**251,256**	**33,778,130**

ENERGY CONSUMPTION

Across all sectors, fuel consumption and electricity use contributed to the largest amount of GHG emissions within the Indianapolis-Carmel-Anderson MSA. The residential sector consumed the most electricity and energy of all sectors. Total energy consumption was 277,709,372 MMBtu, and total electricity consumption was 26,563,861 megawatt-hours (MWh). A detailed analysis of energy and electricity consumption by sector is shown in Figure 7.

Figure 7. Energy and Electricity Consumption

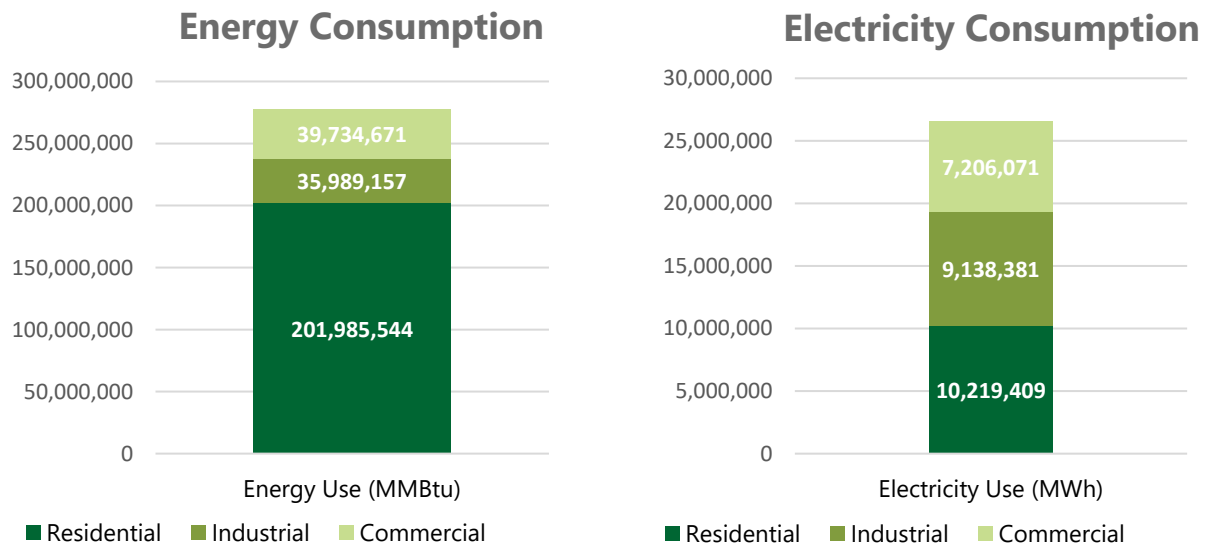


Table 6 provides details on total emissions from electricity use separated by those resulting from electricity generated within the Indianapolis-Carmel-Anderson MSA and electricity imported from outside the MSA. Total emissions resulting from electricity generation within the MSA were 3,365,556 MT CO_2e.

Table 6. Energy Usage and Generation GHG Emissions (MT CO_2e)

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
Imported Electricity Usage	9,242,882	30,490	42,842	-	-	-	9,316,214
Electricity Generation in MSA	3,362,135	1,561	1,860	-	-	-	3,365,556
Electricity Total Emissions	**12,605,017**	**32,051**	**44,702**	-	-	-	**12,681,770**

4. GHG Reduction Measures

This regional plan includes priority GHG reduction measures developed to meet the needs that residents have voiced throughout the planning process. Reflecting the sectors identified in the region's GHG inventory that had the greatest GHG emissions, the following priority GHG reduction measures include promising and replicable opportunities for GHG emission reductions across the region. Each of the measures address the top benefits identified by communities throughout the planning process, including improved air quality, public health, transportation opportunities, green space, and waste management, while creating economic opportunities for all jurisdictions across the region, inclusive of both urban centers and rural communities. See Section 5 for a detailed assessment of benefits to LIDAC residents. The following priority GHG reduction measures seek to build capacity for sustained action on climate change mitigation:

- **GHG Reduction Measure #1: CIRDA Regional Building and Asset Modernization Program**
- **GHG Reduction Measure #2: CIRDA Regional Open Space Revitalization and Connectivity Program**
- **GHG Reduction Measure #3: Indianapolis Area Renewable Energy and Waste Reduction Operation**

These three GHG reduction measures comprise a variety of actions to reduce GHG emissions in the region, while also positively impacting quality of place, public health, and economic development. The following subsections describe each measure and accompanying pilot projects in greater detail.

GHG REDUCTION MEASURE #1 – CIRDA REGIONAL BUILDING AND ASSET MODERNIZATION PROGRAM

4.1	GHG Reduction Measure #1: **CIRDA Regional Building and Asset Modernization Program**
Description	CIRDA's Regional Building and Asset Modernization Program seeks to fund clean energy and energy efficiency upgrades to buildings and infrastructure throughout Central Indiana. The program will support upgrades to modernize and reduce GHG emissions from a variety of projects, including public building clean energy retrofits, industrial energy efficiency and solar installations, and wastewater treatment improvements, and increase mobility options including various forms of public transportation, micromobility efforts, ride sharing, and electric vehicle charging. Seven pilot projects have already been identified as potential recipients of program funding. Eligible applicants will include public, non-profit, and private entities. The program will provide low- to no-matching grants and establish a revolving loan fund to support long term financial sustainability.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 338,246 Cumulative emissions saved 2025-2050 (MT CO_2e): 2,654,504
Implementing Entity	Central Indiana Regional Development Authority
Implementation Authority Milestones	Central Indiana Regional Development Authority has the authority to implement, no other actions necessary.
Implementation Schedule	Q3 2024-Q4 2024: Program preparation; CIRDA will begin finalization for any outstanding program terms and identifying contracts with personnel and consultants to administer each program. Q4 2024-Q4 2026: Pilot projects funding and implementation; submitted pilot projects must be initiated by Q2 of 2025 (assuming funding awarded by end of year [EOY] 2024). Q3 2025-Q4 2026: Tranche 2 funding and distribution; following initiation of pilot projects, program will begin efforts around Tranche 2 funding and associated projects. Q1 2027-Q3 2028: Tranche 3 funding and distribution; following Tranche 2 project commencement, both programs will initiate a Tranche 3 funding of projects; CIRDA would target EOY 2028 to have all funding distributed to projects throughout the region.
Geographic Location	Indianapolis-Carmel-Anderson MSA

Funding Sources	The revolving nature of the loans for this program will provide sustainability of the program fund. There is potential for other funding sources and appropriations for these funds, but those have not yet been identified.
Metrics to Track Progress	Uptake of funds by eligible applicants (i.e., amount of funds awarded); representative uptake of funds across the region; total resulting emissions reductions; percent of LIDAC communities benefited; community and eligible applicant engagement; applicant outreach and communication; number of project submissions; tons of CO_2e reduced. Additional awarded project metrics: Public building upgrades – total reduction in energy consumption; percent reduction of electric grid load; Public EV charging – number of EV charging structures installed that are in line with INDOT State EV Network Plan; Public transportation, ride sharing, micromobility – number of vehicle miles traveled reduced; Industrial efficiency – total reduction in energy consumption; percent reduction of electric grid load; and Industrial solar – installed capacity; energy consumed by building or community.
Sector	Energy & Buildings, Transportation, Industry
Associated Pilot Projects (described below)	City of Indianapolis Solar Upgrades; McCordsville Town Hall Energy Efficiency Updates; Energy Insights Program; Rolls Royce HVAC Optimization and Submetering; Rolls Royce PV Solar; Crispus Attucks High School Energy Efficiency Renovations; and Indianapolis Arts Center Upgrades. In addition, several projects have been identified that will be ready for funding in year two of the program and beyond. These projects focus on clean energy upgrades at historic public buildings, supporting public transit infrastructure, and installing energy efficiency upgrades to a wastewater treatment facility.

PILOT PROJECT #1 – CITY OF INDIANAPOLIS SOLAR UPGRADES

4.1.1	Regional Building and Asset Modernization Program - Pilot Project #1: **City of Indianapolis Solar Upgrades**
Description	The City of Indianapolis's sustainability and resilience plan, *Thrive Indianapolis*, outlines an action item for the city to transition 25% of municipal energy usage to renewable sources, while creating a pathway towards 100% renewable energy use by 2028. To reach this goal, the City's municipal portfolio was analyzed for the potential of hosting renewable energy. Ten buildings from the City's municipal portfolio have been identified as prime candidates for installing solar, either on the rooftop or in the parking lot with a carport, representing more than 3,000 kW of potential solar.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 6,185 Cumulative emissions saved 2025-2050 (MT CO_2e): 21,434
Implementing Entity	City of Indianapolis
Implementation Authority Milestones	City of Indianapolis has authority to implement, upon completion of the following milestones: Permit obtained from the Department of Business and Neighborhood Services.
Implementation Schedule	Dependent upon funding. Q4 2024: Design Phase Q1 2025: Construction
Geographic Location	City of Indianapolis
Funding Sources	Additional source of funding includes solar tax credit through Inflation Reduction Act, estimated to cover 30 percent of the cost of the solar install, plus 10 percent for domestic content adder.
Metrics to Track Progress	Tracking of electricity production of solar arrays and energy savings through utility bills.
Sector	Energy & Buildings

PILOT PROJECT #2 – MCCORDSVILLE TOWN HALL ENERGY EFFICIENCY UPDATES

4.1.2	Regional Building and Asset Modernization Program - Pilot Project #2: **McCordsville Town Hall Energy Efficiency Updates**
Description	The Town of McCordsville's Town Hall building has an HVAC system that was designed with 10 residential sized heat pumps. These heat pumps are assisted with nine above ceiling, electric air handlers. The system is inefficient from a maintenance standpoint, as well as maintaining temperature across the building. This project will enable the Town of McCordsville to install a more energy efficient, commercially scaled HVAC system for the Town Hall building. The Town will be renovating interior spaces in 2024/2025, and this project would align with the renovation project.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 48 Cumulative emissions saved 2025-2050 (MT CO_2e): 167
Implementing Entity	Town of McCordsville
Implementation Authority Milestones	Town of McCordsville has the authority to implement, no other actions necessary.
Implementation Schedule	Q4 2024 or Q1 2025 installation, dependent on funding
Geographic Location	6280 W 800 N, McCordsville, IN 46055
Metrics to Track Progress	Building energy usage (kWh), and utility bills
Sector	Energy & Buildings

PILOT PROJECT #3 – ENERGY INSIGHTS PROGRAM

4.1.3	Regional Building and Asset Modernization Program - Pilot Project #3: **Energy Insights Program**
Description	Energy Insights is a program started by Energy Systems Network in the State of Indiana and funded by the Indiana Economic Development Corporation to expose manufacturers to energy savings opportunities using an energy monitoring starter kit. The program was piloted at three sites in 2021, and then scaled to an additional 22 manufacturing sites in 2022-2023. After feedback from the initial cohort, the program offering was improved for a second round of deployments beginning in November 2023 covering 75 additional manufacturers. Energy Insights will expand the program to fund the deployment of 100 additional Energy Insights Start kits in the Central Indiana MSA counties, adapt the product to focus further on GHG emissions and renewable energy integration, expand the program impacts by including natural gas monitoring and reporting, and widen the applicability of the program to include larger manufacturers and logistics facilities. This expansion will allow Energy Systems Network to deliver greater GHG reductions throughout Central Indiana, while maintaining the core goal of creating customized energy data reporting to drive actionable, energy-saving insights.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 71,110 Cumulative emissions saved 2025-2050 (MT CO_2e): 132,598
Implementing Entity	Energy Systems Network
Implementation Authority Milestones	N/A - The project will be implemented on private land by a non-profit organization.
Implementation Schedule	Q3 2024: Engage with new integrators to expand program, auditors to include in program, utilities to integrate data, gas utilities to design data collection system, and pilot companies; design and deploy behind-the-meter renewable dashboards, GHG reporting dashboards, and natural gas dashboards; adopt three key energy models to base template; execute pilot projects and iterate on dashboards; build program marketing collateral base; revise program rules, reporting and processes as required; revise and expand training materials as required; and plan and market relaunch event. Q4 2024 – Q4 2025: Market, educate, evaluate, and report, by month.
Geographic Location	Indianapolis-Carmel-Anderson MSA

Funding Sources	Existing program funded by the Indiana Economic Development Corporation; program is seeking additional funding to expand reach
Metrics to Track Progress	Leading metrics: potential participants engaged; participants enrolled; projects installed; kWh reduced/project/year; and GHG emissions reduced/project/year. Lagging (real) metrics at a program level: projects completed and reported; GHG emissions reduced/year; and kWh reduced/year.
Sector	Energy & Buildings, Industry

PILOT PROJECT #4 – ROLLS ROYCE HVAC OPTIMIZATION AND SUBMETERING

4.1.4	Regional Building and Asset Modernization Program - Pilot Project #4: **Rolls Royce HVAC Optimization and Submetering**
Description	Rolls Royce will implement HVAC energy optimizations, ventilation rate corrections, and the installation and integration of submeters. The project will result in improved indoor air quality, improved system control capability, and reduced energy used for space conditioning and fans.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 3,806 Cumulative emissions saved 2025-2050 (MT CO_2e): 16,027
Implementing Entity	Rolls Royce
Implementation Authority Milestones	N/A – The project will be implemented on private land by a private company.
Implementation Schedule	Overall duration: 10 months Project kickoff – final scope and baselines reviewed and approved (1 month) Procurement – contracts executed (0.5 month) Programming and documentation development (1 month) Installation of programming changes, new hardware, testing and commissioning (6 months) Measurement and validation period (1.5 months)
Geographic Location	Rolls Royce Indianapolis Operations Center, 2001 S. Tibbs Avenue, Indianapolis, IN 46241
Metrics to Track Progress	Energy savings (kWh), and GHG emission reductions (CO_2e); air unit scheduling and optimum start/stop; OA optimization/economizer control; AHU static pressure reset; VAV occupancy setback controls; and SAT reset.
Sector	Energy & Buildings, Industry

PILOT PROJECT #5 – ROLLS ROYCE PV SOLAR

4.1.5	Regional Building and Asset Modernization Program - Pilot Project #5: **Rolls Royce PV Solar**
Description	Rolls-Royce solicited a third-party proposal for a turnkey PV solar system in which the third-party energy developer builds the system and Rolls-Royce purchases and owns it outright. This project will help Rolls Royce to maximize on-site renewable energy generation by installing 10.5 MW within 40 acres of land, establish a public-private partnership, and help to achieve zero GHG emissions throughout their operations and facilities by 2030. The PV solar system will result in reduced GHG reductions, improved air quality and public health, and job opportunities for the region.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 41,264 Cumulative emissions saved 2025-2050 (MT CO_2e): 118,902
Implementing Entity	Rolls Royce
Implementation Authority Milestones	N/A – The project will be implemented on private land by a private company.
Implementation Schedule	Overall duration: 10 months Project kickoff – final scope and baselines reviewed and approved (1 month) Procurement – contracts executed (0.5 month) Programming and documentation development (1 month) Installation of programming changes, new hardware, testing and commissioning (6 months) Measurement and validation period (1.5 months)
Geographic Location	Rolls-Royce Indianapolis Operations Center, 2001 S. Tibbs Ave, Indianapolis, IN 46241
Metrics to Track Progress	GHG emissions reductions (CO_2e); Clockworks (diagnostics tool) will be used to track trends and verify that equipment is operating as intended and fulfilling the reduction and savings strategies; and FEMP guidelines will be used to evaluate PV solar system trends & output against the baseline data (kWh).
Sector	Energy & Buildings, Industry

PILOT PROJECT #6 – CRISPUS ATTUCKS HIGH SCHOOL ENERGY EFFICIENCY RENOVATIONS

4.1.6	Regional Building and Asset Modernization Program - Pilot Project #6: **Crispus Attucks High School Energy Efficiency Renovations**
Description	This unique collaboration between IU Health, the largest, comprehensive healthcare system in the state, and Crispus Attucks High School, one of the largest public school districts in the state, will provide GHG reductions for the campus. IU Health will partner with Crispus Attucks High School to install energy efficiency upgrades in campus buildings. The project will include installing LED lighting, HVAC controls, boiler and chiller replacement, and window replacements.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 180 Cumulative emissions saved 2025-2050 (MT CO_2e): 704
Implementing Entity	IU Health
Implementation Authority Milestones	IU Health has memorandum of understanding in place reflecting that IU Health Foundation is leading the fundraising for the innovation. Funds will flow through the IU Health Foundation to the Indianapolis Public School foundation and then to Indianapolis Public School to fund the renovation. Indianapolis Public School Board School Commissioners has the authority to implement, no other actions necessary.
Implementation Schedule	Design phase: fall 2024 – spring 2025 Construction phase: summer 2025 – fall 2026
Geographic Location	1140 Doctor M.L.K. Jr St, Indianapolis, IN 46202
Metrics to Track Progress	GHG emission reductions; utilize online schedule and budget platform for tracking (Smartsheets); budget variance reporting; and milestone deadline tracking.
Sector	Energy & Buildings

PILOT PROJECT #7 – INDIANAPOLIS ARTS CENTER UPGRADES

4.1.7	Regional Building and Asset Modernization Program – Pilot Project #7: **Indianapolis Arts Center Upgrades**
Description	The Indianapolis Art Center is an independent creative space, offering access to six public art galleries and 17 university–quality studios with art education classes in 13 mediums for artists of all ages and skill levels. The Center includes Marilyn K. Glick School of Art as well as the adjoining 9.5-acre ARTSPARK outdoor space. This independent space for the arts will integrate energy efficiency measures to decrease GHG emissions from the overall building energy footprint through the following upgrades: window and door replacements, and HVAC and control system upgrades. In addition, this project will install a 169-kW solar PV system to supply clean power for the Center.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 513 Cumulative emissions saved 2025-2050 (MT CO_2e): 1,823
Implementing Entity	Indianapolis Arts Center
Implementation Authority Milestones	Indianapolis Arts Center has authority to implement, upon completion of the following milestones: Approval granted from the Department of Parks and Recreation and the Department of Public Works; Two permits from the Division of Construction and Business Services for energy efficiency upgrades, and reforestation; and Compliance with Active Indiana Initiative through the INDOT program.
Implementation Schedule	Building Renovations: 12 months, including permitting
Geographic Location	820 E 67th St, Indianapolis, IN 46220
Funding Sources	Some additional funds raised through gifts and pledges.
Metrics to Track Progress	Building energy usage and reductions (kWh); and it is expected there will be an immediate 50 percent reduction in electricity usage.
Sector	Energy & Buildings, Open Space

GHG REDUCTION MEASURE #2 – CIRDA REGIONAL OPEN SPACE REVITALIZATION AND CONNECTIVITY PROGRAM

4.2	GHG Reduction Measure #2: **CIRDA Regional Open Space Revitalization and Connectivity Program**
Description	CIRDA's Regional Open Space Revitalization and Connectivity Program will target the reclamation and revitalization of degraded lands throughout Central Indiana. It will support environmental and wetlands remediation, land enhancement, trail development, and urban afforestation to reduce GHG emissions, while simultaneously improving the quality of place, recreation, and public health in the region's disadvantaged communities. The program may also support limited economic development when the use benefits the local community, such as providing housing or job opportunities. The program will provide low- to no-matching grants and establish a revolving loan fund to support long term financial sustainability. Eligible applicants will include public, non-profit, and private entities. Five pilot projects have already been identified as potential recipients of program funding.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 89,056 Cumulative emissions saved 2025-2050 (MT CO_2e): 444,147
Implementing Entity	Central Indiana Regional Development Authority
Implementation Authority Milestones	Central Indiana Regional Development Authority has the authority to implement, no other actions necessary.
Implementation Schedule	Q3 2024-Q4 2024: Program preparation; CIRDA will begin finalization for any outstanding program terms and identifying contracts with personnel and consultants to administer each program. Q4 2024-Q4 2026: Pilot projects funding and implementation; submitted pilot projects must be initiated by Q2 of 2025 (assuming funding awarded by EOY 2024). Q3 2025-Q4 2026: Tranche 2 funding and distribution; following initiation of pilot projects, program will begin efforts around Tranche 2 funding and associated projects. Q1 2027-Q3 2028: Tranche 3 funding and distribution; following Tranche 2 project commencement, both programs will initiate a Tranche 3 funding of projects; CIRDA would target EOY 2028 to have all funding distributed to projects throughout the region.
Geographic Location	Indianapolis-Carmel-Anderson MSA
Funding Sources	The revolving nature of the loans for this program will provide sustainable funding. There is not additional funding planned currently, however the

	goal would be to target philanthropic dollars in the region (e.g., Lilly Endowment) or appropriations from Indiana State Legislature.
Metrics to Track Progress	Uptake of funds by eligible applicants (i.e., amount of funds awarded); representative uptake of funds across the region; total resulting emissions reductions; percent of LIDAC communities benefited; community and eligible applicant engagement; applicant outreach and communication; number of project submissions; and tons of CO_2e reduced or sequestered. Additional awarded project metrics: Brownfields – acres of useable green/open space created; number of properties or acres developed for renewable energy; Trail connectivity – number of vehicle travelers converted to alternative modes (i.e., walking, biking); number of residents connected to trail or alternative modes of transportation; Wetland – total acres of wetlands restored or created; CO_2 sequestration rate of wetlands; watershed health; soil erosion mitigation effectiveness; and Urban forestry – percent increase in urban canopy across the region; health of urban forest to include set survival rate of urban forestry projects and associated trees.
Sector	Open Space/Land Management, Transportation
Associated Pilot Projects (described below)	City of Indianapolis Brownfield Julietta Landfill; Nickel Plate Pedestrian Bridge; Grassy Creek Trail; Conner Prairie Reforestation; and Conner Prairie Wetland Enhancement and Fertilizer Education Program. In addition, several projects have been identified that will be ready for funding in year two of the program and beyond. These projects focus on brownfield revitalization, afforestation, and trail development to revitalize critical parts of the region and support LIDAC residents.

PILOT PROJECT #1 – CITY OF INDIANAPOLIS BROWNFIELD JULIETTA LANDFILL

4.2.1	Regional Open Space Revitalization and Connectivity Program – Pilot Project #1: **City of Indianapolis Brownfield Julietta Landfill**
Description	Indianapolis Office of Sustainability and Indy Parks and Recreation seek to convert the closed Julietta Landfill brownfield into 10 MW of community solar – the first-of-its-kind in the State of Indiana. Additionally, this project could reinforce the brownfield site cap to address issues of erosion and potential contamination of pollutants. A regional energy company has expressed an interest in developing a pilot community solar project, serving as a demonstration project for the entire state.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 64,666 Cumulative emissions saved 2025-2050 (MT CO_2e): 186,337
Implementing Entity	City of Indianapolis
Implementing Authority Milestones	City of Indianapolis has authority to implement, upon completion of the following milestones: Permit from the Division of Construction and Business Services
Implementation Schedule	City-state-utility working session on landfill solar planning – Q1 2024 RFP released for solar developers – Q3 2024 Solar developer selection/negotiation/under contract – Q1 2025 Final site plan developed and approved – Q2-Q3 2025 Start of construction – Q4 2025 Construction complete – Q1 2027
Geographic Location	10751 Brookville Road, Indianapolis, IN 46239
Metrics to Track Progress	GHG emission reductions; and solar MW installed capacity
Sector	Energy & Buildings, Open Space

PILOT PROJECT #2 – NICKEL PLATE PEDESTRIAN BRIDGE

4.2.2	Regional Open Space Revitalization and Connectivity Program — Pilot Project #2: **Nickel Plate Pedestrian Bridge**
Description	The Nickel Plate Pedestrian Bridge will connect the Nickel Plate Trail across 82nd Street, one of the busiest arterial roads in Central Indiana. The Nickel Plate Trail is an essential and missing link to a regional multi-modal network providing connections to regional landmarks such as Fort Benjamin Harrison State Park, Conner Prairie, the White River Greenway, downtown Indianapolis, Fishers, and Noblesville. This pedestrian bridge will play a significant role in the community by providing a safe, non-motorized mobility option for all ages and abilities while reducing GHG emissions from transportation.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 55 Cumulative emissions saved 2025-2050 (MT CO_2e): 280
Implementing Entity	City of Indianapolis
Implementing Authority Milestones	The City of Indianapolis has authority to implement upon completion of the following milestones: Permits and rights-of-way obtained from the Indianapolis Department of Public Works.
Implementation Schedule	Bid for construction: Spring 2025 Construction complete: Winter 2025-2026
Geographic Location	City of Indianapolis – 82nd Street between Craig Street and Bash Street
Metrics to Track Progress	Annual reductions in GHG emissions using CMAQ emissions calculator
Sector	Open Space, Transportation

PILOT PROJECT #3 – GRASSY CREEK TRAIL

4.2.3	Regional Open Space Revitalization and Connectivity Program – Pilot Project #3: **Grassy Creek Trail**
Description	This project will develop 3.8 miles of new greenway and trail and include restoration and reforestation of habitat along the trail, avoiding emissions from transportation and resulting in CO_2 storage. The Grassy Creek Greenway dissects the far east side of Indianapolis. Starting on the north side and connecting to the IndyGo Purple BRT Line, the Grassy Creek Greenway would travel through the largest wetland habitat (330-acre regional City Park) in the city, connecting thousands of low-income minority residents to regional parks, BRT transit lines, and the Pennsy Trail. These connections continue into the regional area and into downtown, connecting Indy's nearly 80 miles of trails and greenways to the Central Indiana regional trail system via the Monon, B&O, and the Pennsy.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 516 Cumulative emissions saved 2025-2050 (MT CO_2e): 2,817
Implementing Entity	City of Indianapolis
Implementing Authority Milestones	The City of Indianapolis obtained approval from the Department of Public Works for the design of trail. The City has the authority to implement, upon completion of the following milestones: Obtain approval from DPW and the Division of Construction and Business Services within the Department of Business and Neighborhood Services for construction of trail; and Obtain additional rights-of-way, for creek crossings and partial acquisitions.
Implementation Schedule	Begin planting/habitat restoration: Winter 2024-2025 Obtain permits for greenway: Spring 2025 Bid/start greenway construction: Summer/Fall 2025 Construction of greenway complete: Spring/Summer 2026
Geographic Location	City of Indianapolis – along Grassy creek, through Lappin Way to connect the Pennsy Trail to Grassy Creek Park
Metrics to Track Progress	Utilize standard capital project timelines and deliverables for the greenway; metrics for habitat and park expansion based on a one to three year establishment of the vegetation materials and reporting based on Indiana Department of Natural Resources (IDNR) bi-annual metrices for mitigation reporting.
Sector	Open Space, Transportation

PILOT PROJECT #4 – CONNER PRAIRIE REFORESTATION

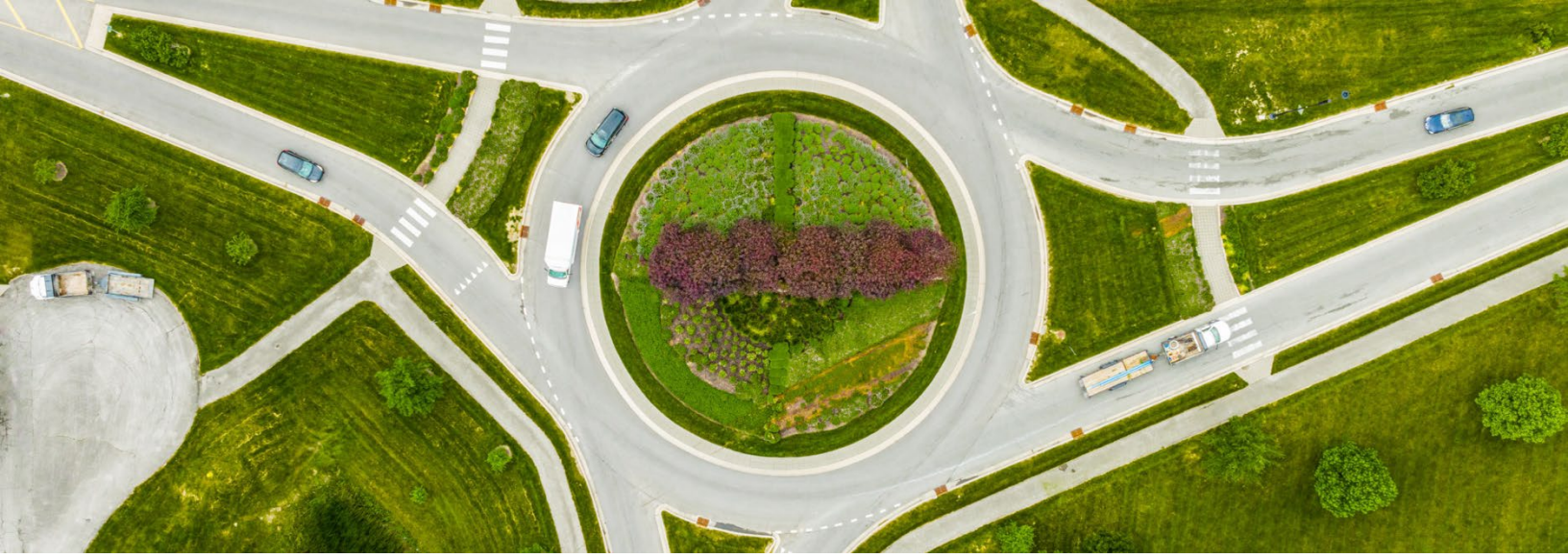
4.2.4	Regional Open Space Revitalization and Connectivity Program – Pilot Project #4: **Connor Prairie Reforestation**
Description	This project will reforest parts of Connor Prairie, one of the most visited outdoor museums in the country, to cover approximately 140 acres of land on both the Historic Campus (Fishers side) and the Conservation Campus (Carmel side). This reforestation will result in approximately 135 trees per acre (which includes planting 170 trees and assuming a 25 percent mortality rate), for a total of 18,900 new trees.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 840 Cumulative emissions saved 2025-2050 (MT CO_2e): 4,200
Implementing Entity	Conner Prairie
Implementing Authority Milestones	Conner Prairie has authority to implement, upon completion of the following milestones: Consult with Carmel Urban Forestry Program or seek approval from Carmel Urban Forester; Permit from Hamilton County Surveyor; Approval by Hamilton County Drainage Board; and Continue monitoring and auditing per Planned Unit Development (PUD).
Implementation Schedule	All planting will be coordinated with municipalities urban forester; installations to be performed as recommended by forestry expert to promote successful transplants: Carmel plantings: Area A (2025); Area B (2025); Area C (2026); Area D (2025) Fishers plantings: Area 1 (2026); Area 2 (2026); Area 3 Oxbow Trail area (2024); Area 3 River Mitigation (2025)
Geographic Location	Indianapolis – along Grassy creek, through Lappin Way to connect the Pennsy Trail to Grassy Creek Park
Metrics to Track Progress	Use EPA GHG Equivalencies Calculator to estimate CO_2 sequestration related to tree planting in an urban environment; and outline a program to monitor survival and health of the planted trees as the metric of air quality.
Sector	Open Space/Land Management

PILOT PROJECT #5 – CONNER PRAIRIE WETLAND ENHANCEMENT AND FERTILIZER EDUCATION PROGRAM

4.2.5	Regional Open Space Revitalization and Connectivity Program – Pilot Project #5: **Connor Prairie Wetland Enhancement and Fertilizer Education Program**
Description	This project involves wetlands installation to remove nitrates and phosphates from the water throughout Conner Prairie, one of the most visited outdoor museums in the country and Indiana's first Smithsonian affiliate. Conner Prairie will work with agricultural partners to minimize runoff that comes from farms. Agricultural runoff into the river creates algae blooms which affect water quality and can affect air quality. Creating nearly 80 acres of wetlands across both the Carmel and Fishers sides of the Connor Prairie campus helps to store CO_2 and provides an opportunity to sustainably filter water before it continues making its way down the White River.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 108 Cumulative emissions saved 2025-2050 (MT CO_2e): 542
Implementing Entity	Conner Prairie
Implementing Authority Milestones	Conner Prairie has authority to implement, upon completion of the following milestones: General construction permit from City of Fishers Planning and Zoning Department; Permits from Hamilton County Drainage Board for construction in regulated drainage easements; Permits from IDNR for construction in floodways.
Implementation Schedule	Carmel: Area A (2025); Area B (2025); Area C (2026); Area D (2025) Fishers: Area 1 (2026); Area 2 (2026); Area 3 Oxbow Trail area (2024); Area 3 River Mitigation (2025)
Geographic Location	13400 Allisonville Rd, Fishers, IN 46038, Hamilton County
Metrics to Track Progress	Use EPA guidance on wetland restoration; acres of wetlands rehabilitated; improvement on function/condition indicators; net change in water quality, flood control; and habitat access to recreation in underserved communities.
Sector	Open Space/Land Management

GHG REDUCTION MEASURE #3 – INDIANAPOLIS AREA RENEWABLE ENERGY AND WASTE REDUCTION OPERATION

4.3	GHG Reduction Measure #3: **Indianapolis Area Renewable Energy and Waste Reduction Operation**
Description	The Indianapolis Motor Speedway, in partnership with the American Dairy Association Indiana, Inc. and Newtrient will partner to create a food waste collection program across the City of Indianapolis. Leftover food waste collected from events, restaurants, and grocery stores will be transported to an anaerobic digester on a local dairy farm, where it will create RNG, which will then power local businesses and fleets in the Central Indiana area. Animal waste from the selected farm will also be put in the digester, reducing N_2O emissions from fertilizer application. This project will reduce a significant amount of food waste disposed in landfills resulting from events and tourism throughout the city and be a replicable model for other communities.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 25,440 Cumulative emissions saved 2025-2050 (MT CO_2e): 127,199
Implementing Entity	Indianapolis Motor Speedway, American Dairy Association Indiana, Inc., and Newtrient
Implementation Authority Milestones	Indianapolis Motor Speedway, American Dairy Association Indiana, Inc. and Newtrient have authority to implement, upon completion of the following milestones: Approval from the IDEM Office of Land Quality Satellite Manure Storage Structures; and Permit from Department of Environmental Management (IDEM).
Implementation Schedule	2025-2027; Once funding is identified, it will take approximately 18 months for engineering, permitting, and contractual agreement execution. Once administrative work is complete, it will take 6-9 months from groundbreaking on the farm to becoming completely operational, accepting food waste, animal feedstock, and producing renewable energy.
Geographic Location	City of Indianapolis for waste collection; and farm located in either Lewisville, IN or Greensburg, IN
Metrics to Track Progress	Food waste diversion (MT, pounds); GHG emissions (CO_2e); energy produced (kWh); and additional community benefits
Sector	Waste, Electricity, Agriculture



5. Low-Income and Disadvantaged Communities Benefits

While designing the approach to community engagement, the Project Team considered LIDAC residents at each stage of decision making, with the goal of lowering barriers to participate in public surveys and provide input throughout the planning process. The Project Team integrated the following strategies to support meaningful engagement with LIDAC residents:

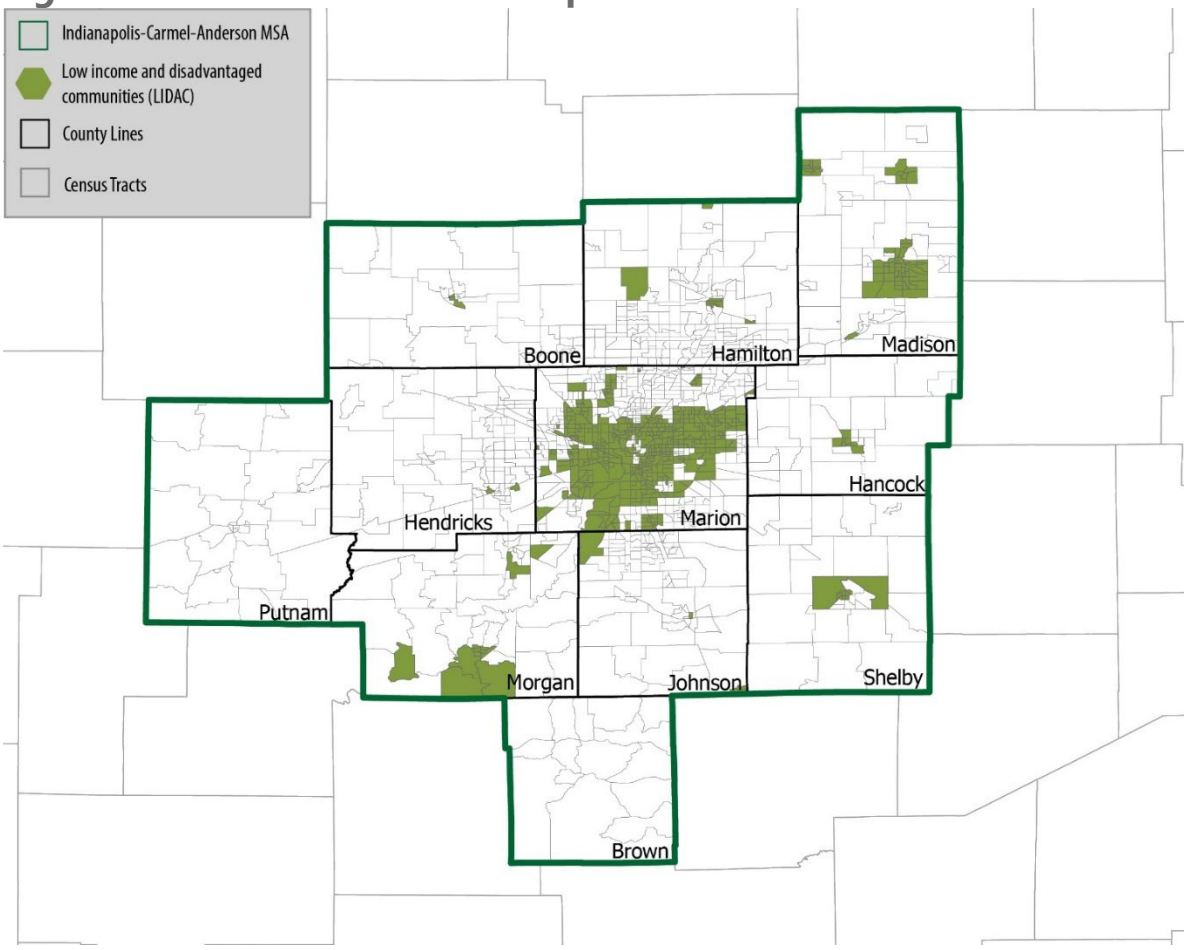
- Selecting in-person engagement events both within LIDAC areas and at existing events (farmers' markets, community festivals, etc.) to reduce travel and time burdens on participants;
- Offering the first public survey on iPads to include participants that may lack at-home broadband access and reduce time commitment of participants;
- Translating the first public survey into Spanish (the second-most common language spoken in Central Indiana);
- Offering translation services for the first public survey in the language requested (French, Creole, and Hakha Chin);
- Hosting two virtual public meetings in January completely virtually to lower transportation barriers;
- Translating a one-page handout (see Appendix C) with a standing link to the project website and information about the project into Spanish; and
- Using location-based targeted social media advertising for the first public survey.

The following subsections describe the process used for identifying LIDAC areas, engaging LIDAC residents throughout the planning process, integrating feedback, and assessing the LIDAC benefits for each GHG reduction measure.

IDENTIFIED LIDAC IN CENTRAL INDIANA

As detailed in Figure 8, over one-third of the census tracts in the MSA are considered low-income and disadvantaged communities (LIDAC).[49] Appendix A lists the specific census tracts in the MSA identified as LIDAC. This regional plan relies on EPA's LIDAC definition, which identifies LIDAC as any community that meets at least one of the following characteristics: identified as disadvantaged by CEJST; any census block group that is at or above the 90th percentile for any of EJScreen's Supplemental Indexes when compared to the nation or state; and/or any geographic area within Tribal lands as included in EJScreen.[50]

Figure 8. LIDAC Areas in Indianapolis-Carmel-Anderson MSA



[49] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

[50] U.S. Environmental Protection Agency (EPA). 2023. "Climate Pollution Reduction Grants: Low Income/Disadvantaged Communities (LIDAC) Benefits Analysis." Accessed January 2023. Retrieved from: https://www.epa.gov/system/files/documents/2023-08/Low%20Income%20%20Disadvantaged%20Communities%20Benefits%20Analysis.pdf

LIDAC ZIP CODE ANALYSIS

Once the locations of LIDAC census tracts were identified throughout the region, the Project Team created a method for determining which zip codes can be considered as representing LIDAC residents to characterize survey responses with zip codes as the address identifier. Using the shapefile provided by EPA that included the census tracts identified as LIDAC according to EPA's definitions,[51] the LIDAC tracts were then joined with zip codes using GIS. This joining resulted in a table of zip codes with corresponding census tracts and their classification as LIDAC or not LIDAC. IMPO then exported this table and calculated the percentage of a zip code that was covered by LIDAC or not LIDAC tracts. Zip codes with 50 percent or more LIDAC census tracts were considered LIDAC zip codes.

Both public surveys included a question asking for respondents' zip codes. IMPO first identified which responses were given by respondents that lived in zip codes considered LIDAC. For responses that did not provide zip codes, a determination was made based on whether the response was given at an event that took place in a LIDAC area. The MetroQuest platform, used for the first public survey, offers a campaign ID function to assign specific links to specific outreach such as events or social media boosting. IMPO hosted targeted in-person outreach (via canvassing or street teams) and digital campaigns (targeted paid advertising of the public survey) to reach identified LIDAC residents. Each effort had a separate campaign ID. Survey responses given at these specific outreach efforts were considered representative of LIDAC areas. For the first public survey, out of 476 total responses, 413 respondents provided zip codes. Of these 413 respondents, 134 zip codes were considered LIDAC residents. For the second public survey, out of 169 total responses, 40 responses were considered LIDAC residents.

EXISTING CLIMATE RISKS, IMPACTS, AND VULNERABILITIES AMONG LIDAC

LIDAC residents in Central Indiana are exceptionally vulnerable to several climate risks and impacts compared to residents across the rest of the region. Indiana is particularly vulnerable to increased flood risk and exposure to extreme temperatures. Over the next 30 years, climate change is projected to increase average temperatures in Indiana about 5 to 6 degrees Fahrenheit. The frequency, duration, and intensity of heat waves are expected to rise, affecting communities most vulnerable, including low-income communities, communities of color, residents who lack air conditioning or are experiencing homelessness, and outdoor workers.[52] In the Midwest, low-income individuals are 10 percent more likely to live in areas with the highest projected labor hour losses for weather-

[51] U.S. Environmental Protection Agency (EPA). 2023. "CPRG Tools and Technical Assistance – Low Income and Disadvantaged Communities Resources." Modified 28 September 2023. Retrieved from: https://www.epa.gov/inflation-reduction-act/cprg-tools-and-technical-assistance-low income-and disadvantaged#:~:text=The%20underlying%20data%20for%20this%20layer%20is%20available%20for%20download%20here%3A%20https%3A//gaftp.epa.gov/EPA_IRA_Public/

[52] Indiana University Environmental Resilience Institute. 2024. "Extreme Heat in Indiana. Accessed February 2024. Retrieved from: https://eri.iu.edu/tools-and-resources/fact-sheets/extreme-heat-in-indiana.html

exposed workers due to extreme temperatures.[53] Additionally, minorities and individuals without a high school diploma in the Midwest are eight to 10 percent more likely to currently live in areas with the highest projected inland flooding damages.[54]

Within Central Indiana, there are several tracts identified as disadvantaged in EPA's CJEST where the risk of flooding is above the 70th percentile across the state. Main regions of concern include multiple census tracts in Marion, Morgan, Shelby, and Madison Counties.[55] Additionally, several LIDAC tracts within Marion County are subject to air pollution above the 80th national percentile, particularly $PM_{2.5}$.[56] Measures to mitigate GHG emissions can lead to reductions in criteria pollution including $PM_{2.5}$, resulting in local improvements to public health.

MEANINGFUL ENGAGEMENT

The Project Team considered LIDAC residents at each stage of decision making, with the goal of lowering barriers to participate in public surveys and incorporating input throughout the planning process. IMPO engaged the public with distributing two different public surveys, attending in-person and virtual engagement events, and holding two virtual public meetings. In fall 2023, the first round of the public survey and engagement events was focused on gathering public preferences for benefits and strategies to reduce GHG emissions, and notifying the public of the regional planning effort. In winter 2024, the second round of the public survey and engagement events was focused on educating the public on the results of the regional GHG inventory and draft priority GHG reduction measures, and gathering additional input for an updated list of benefits.

The Project Team considered LIDAC residents at each stage of decision making, with the goal of **lowering barriers to participate in public surveys and provide incorporating input throughout the planning process**. IMPO distributed **two public surveys** and attended **15 in-person events** and **four virtual meetings** to gather input and report out updates for the planning process.

Both surveys were promoted at engagement events, with digital campaigns on social media and newsletters, and with social media advertising. IMPO prioritized outreach and engagement to LIDAC residents, including attending community events in LIDAC areas and deploying street teams to engage LIDAC residents in their neighborhoods. Both public surveys were also available in multiple languages to maximize opportunities for input. The results of the public

[53] U.S. Environmental Protection Agency (EPA). 2021. *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts.* Accessed January 2024. Retrieved from: https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf

[54] U.S. Environmental Protection Agency (EPA). 2021. *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts.* Accessed January 2024. Retrieved from: https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf

[55] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

[56] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

surveys were then shared across all stakeholder groups convened by the Project Team and incorporated into the planning process.

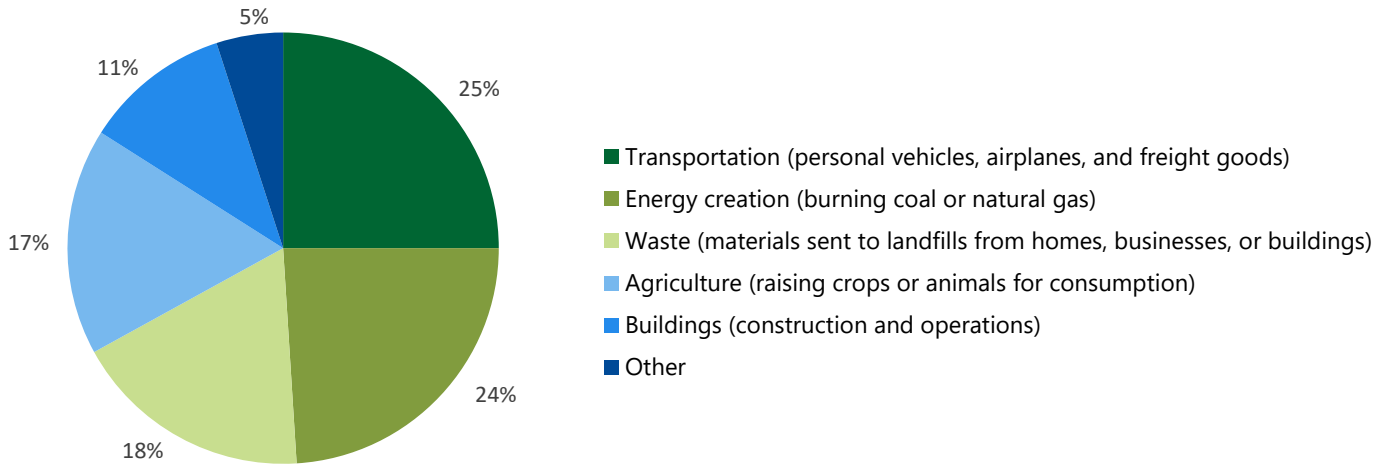
PUBLIC SURVEY #1

IMPO deployed the first public survey via the MetroQuest platform. The survey was open from 14 September to 13 October 2023, and available in English and Spanish. See Appendix F for the English and Spanish versions of the first public survey. Members of the public could request the survey be provided in Hakha Chin, French, and Creole (request button was translated to each language) via the project website (there were no requests). There were 476 total responses to the first public survey, with 168 from LIDAC respondents. Promotion of the first public survey included 11 in-person engagement events, boosted social media advertising, and publication in newsletters and social media by planning partners and the Project Team.

IMPO deployed the first public survey early in the planning process to gather public preferences for an initial list of benefits and potential GHG reduction measures to reduce GHG emissions, along with notifying the public of the regional planning effort. The survey consisted of six questions. The following results represent responses from LIDAC residents. The broader community echoed the preferences of LIDAC residents (with 1-2 percent difference) for five of the six questions. Figures 9-13 display the LIDAC responses received for five of the survey's six questions. Table 5 includes results of sixth survey question (an open-ended text box asking respondents to identify the single most important action local government can take to reduce GHG emissions) from both the public and LIDAC communities with differences highlighted.

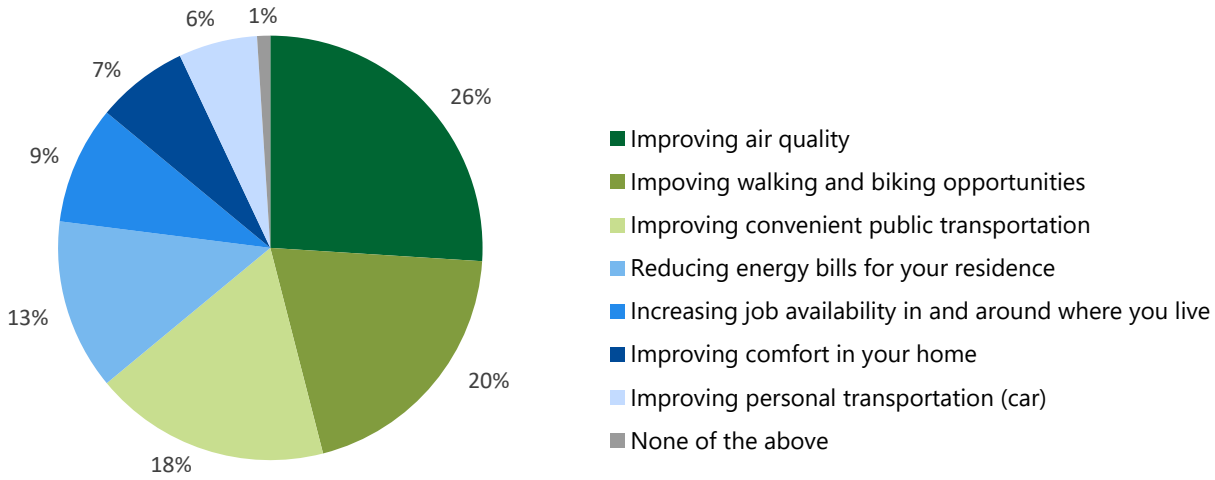
When asked about what comes to mind with GHG emissions, a majority of LIDAC respondents noted transportation and energy creation, followed by waste, as shown in Figure 9. LIDAC respondents tracked closely with the results from all respondents, who noted transportation and energy creation, followed by agriculture.

Figure 9. Public Survey #1 – LIDAC Responses for "What comes to mind when you think of GHG emissions?"



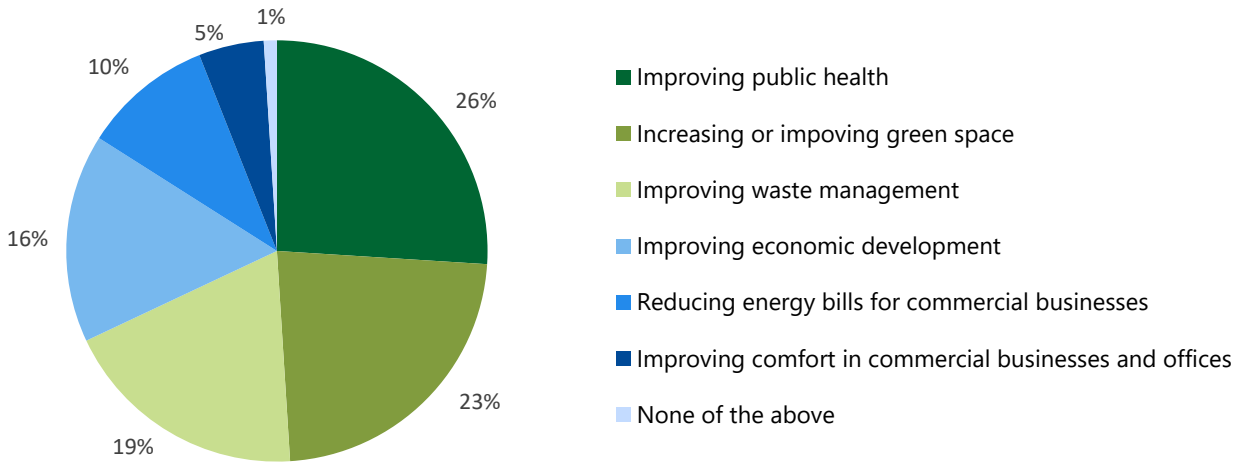
When asked about the most important benefits of reducing GHG emissions to the individual, LIDAC respondents' top selections included improving air quality and improving walking and biking opportunities, followed by improving convenient public transit, as shown in Figure 10. LIDAC respondents reflected the results from all respondents, who noted improving air quality and improving walking and biking opportunities, followed by improving convenient public transit as the top benefits.

Figure 10. Public Survey #1 – LIDAC Responses for "Choose the benefits that are most important to you"



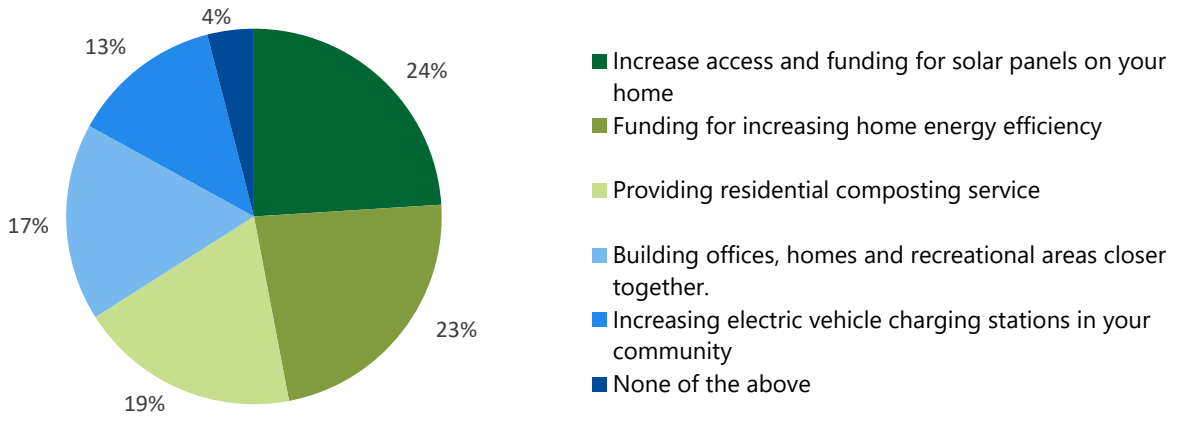
When asked about the most important benefits of reducing GHG emissions to the community and businesses, LIDAC respondents' top selections included improving public health and increasing or improving green space, followed by improving waste management, as shown in Figure 11. LIDAC respondents reflected the results from all respondents, with the same top three selections for benefits most important to the community and businesses.

Figure 11. Public Survey #1 – LIDAC Responses for "Choose the benefits that are most important to your community and businesses"



When asked about the most important actions to reduce GHG emissions to the individual, LIDAC respondents' top selections included increasing access to funding for residential solar panels and funding for increasing residential energy efficiency, followed by residential composting, as shown in Figure 12. LIDAC respondents reflected the results from all respondents, with the same top three selections for the actions most important to the individual.

Figure 12. Public Survey #1 – LIDAC Responses for "Choose the actions that are most important to you"



When asked about the most important action to reduce GHG emissions to the community and businesses, LIDAC respondents' top selections included additional greenspace, increasing public transit, additional walking and biking paths, and funding for a transition to renewable energy, as shown in Figure 13. LIDAC respondents reflected the results from all respondents, with the same top four selections for the actions most important to the individual.

Figure 13. Public Survey #1 – LIDAC Responses for "Choose the actions that are most Important to your community and businesses"

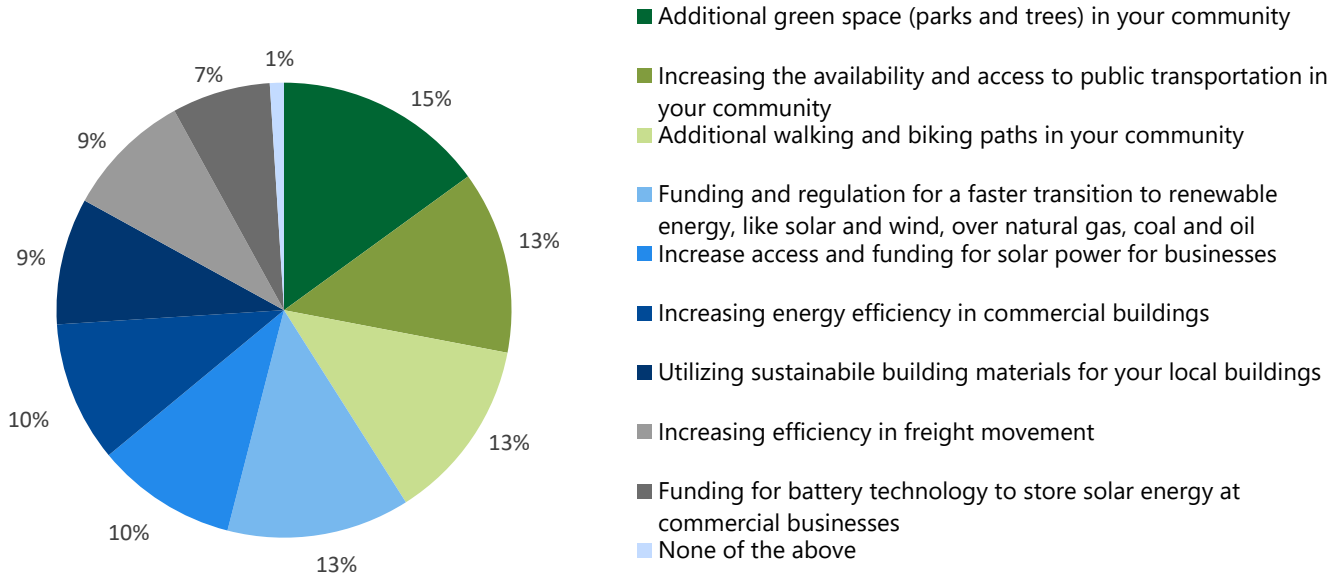


Table 7 displays the results of the final open-ended question of the first public survey: "What is the single most important action your local government should take to improve environmental sustainability." Responses were summarized based on the overall action, according to all responses across the whole region and responses from LIDAC residents. For both sets of responses, renewable energy, improved public transit, green space, pedestrian infrastructure, and bike infrastructure were the top results. However, a key difference between the region and LIDAC communities was public transit and bike infrastructure were prioritized over renewable energy and greenspace.

Table 7. Public Survey #1 – LIDAC Responses for "What is the single most important action local government can take to reduce GHG emissions?"

All Responses			LIDAC Responses	
Action	**Tally**	**Spanish**	**Action**	**Tally**
Renewable energy	78		**Improve public transit**	35
Improve public transit	72	1	**Protected bike lanes/bike infrastructure**	24
Add/preserve green space, natural habitats, wetlands	63		**Renewable energy**	23
Protected bike lanes/bike infrastructure	39		**Pedestrian infrastructure**	22
Pedestrian infrastructure	38		Reduce use of fossil fuels (power, energy, transportation)	14
Make better land use decisions (build densely, connect with active transportation/public transit)	37		Increase recycling (homes and businesses)	13
Increase recycling (homes and businesses)	34		Reduce Waste (composting, littering, trash, pesticides)	13
Reduce use of fossil fuels (power, energy, transportation)	30	1	**Add/preserve green space, natural habitats, wetlands**	10
Reduce Waste (composting, littering, trash, pesticides)	28		Make better land use decisions (build densely, connect with active transportation/public transit)	8
Nothing/pro-maintain or increasing emissions	22		Reduce reliance on automobiles/single occupancy travel	7
Increase education	16		Improve air quality	7

All Responses			LIDAC Responses	
Action	**Tally**	**Spanish**	**Action**	**Tally**
Reduce reliance on automobiles/single occupancy travel	13		Environmental Justice, community focus	5
Improve air quality	14		Increase green infrastructure (stormwater management, increase trees and native plants, etc. - general and commercial development)	5
Improve energy efficiency	12		Establish/enforce sustainable building requirements (commercial)	5
Environmental Justice, community focus	12		Nothing/pro-maintain or increasing emissions	3
Increase green infrastructure (stormwater management, increase trees and native plants, etc. - general and commercial development)	8		Improve energy efficiency	3
Establish/enforce sustainable building requirements (commercial)	11		Improve water quality	3
Improve water quality	7		Housing	3
Housing	8		Increase education	2
Urban local agriculture	6		Implement policies instead of talking about policies	2
Implement policies instead of talking about policies	2		Urban local agriculture	1
Jobs	2		Uphold IDEM and EPA regulations	1
Uphold IDEM and EPA regulations	2		Invest in sustainability	1
Complete streets	2		Develop climate plans	1
Invest in sustainability	1		Improve streets	1
Improved materials used	1		Education on construction timelines	1

All Responses			LIDAC Responses	
Action	**Tally**	**Spanish**	**Action**	**Tally**
Aquifer monitoring	1		Promotion and incentives for sustainability	1
Make sustainable option the cheapest	1		Care more and work harder	1
Noise quality	1		Integrate climate action goals into each department	1

PUBLIC SURVEY #2

IMPO disseminated a second public survey from 1 January to 14 January 2024, consisting of three questions (along with respondents' zip code) using Google Forms. See Appendix G for a copy of the second public survey. There were 169 total responses to the second public survey, with 40 from LIDAC respondents. Members of the public could translate the form into another language using the built-in Google translate feature. The second public survey was focused on educating the public on the draft priority GHG reduction measures and gathering additional input for an updated list of benefits to inform priorities for the planning process. The second public survey and accompanying engagement events were the first opportunity for members of the public to view the list of draft priority GHG reduction measures. Promotion of the second public survey included six engagement events, boosted social media advertising, issuance of public notices in two newspapers, and publication in newsletters and social media by IMPO and several planning partners.

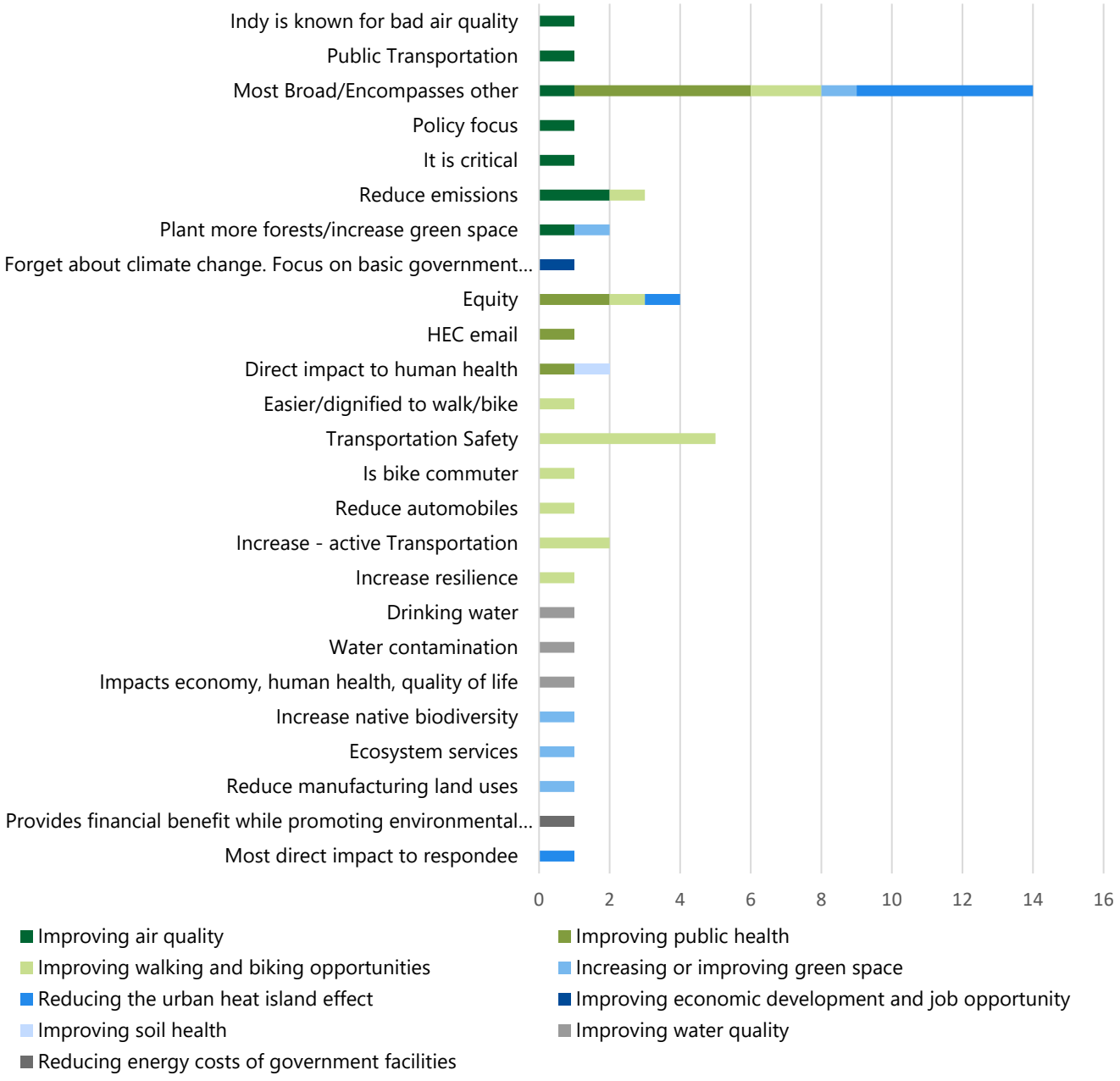
The second public survey asked respondents about the most valuable benefit from a provided list, why they selected that benefit, if there were any missing benefits, and requested zip code. While respondents were asked about benefits, some feedback focused on the draft priority GHG reduction measures. Verbal feedback from the public engagement meetings centered around the exclusion of public transit, residential solar, and residential energy efficiency from the draft priority GHG reduction measures list and planning process questions such as decision making authority. The following results represent responses from LIDAC residents. Table 8 displays LIDAC responses to the question 1, in relation to responses received from all residents. When considering the most valuable benefits, improving walking and biking opportunities was the most common response from LIDAC residents, while the most common response across the whole region was improving air quality. Figures 14-15 display the LIDAC responses received for questions 2-3.

Table 8. Public Survey #2 – LIDAC and All Responses for Question 1: "Which of these benefits would be most valuable to you (select one)?"

Which of these benefits would be most valuable to you?	All Results		LIDAC	
	Count	%	Count	%
Improving walking and biking opportunities	22	13.0%	11	27.5%
Improving public health	23	13.6%	7	17.5%
Reducing the urban heat island effect	16	9.5%	6	15.0%
Improving air quality	34	20.1%	4	10.0%
Improving water quality	29	17.2%	4	10.0%
Increasing or improving green space	22	13.0%	4	10.0%
Improving soil health	14	8.3%	2	5.0%
Reducing energy costs of government facilities	5	3.0%	1	2.5%
Improving economic development and job opportunity	4	2.4%	1	2.5%
Total	169		40	

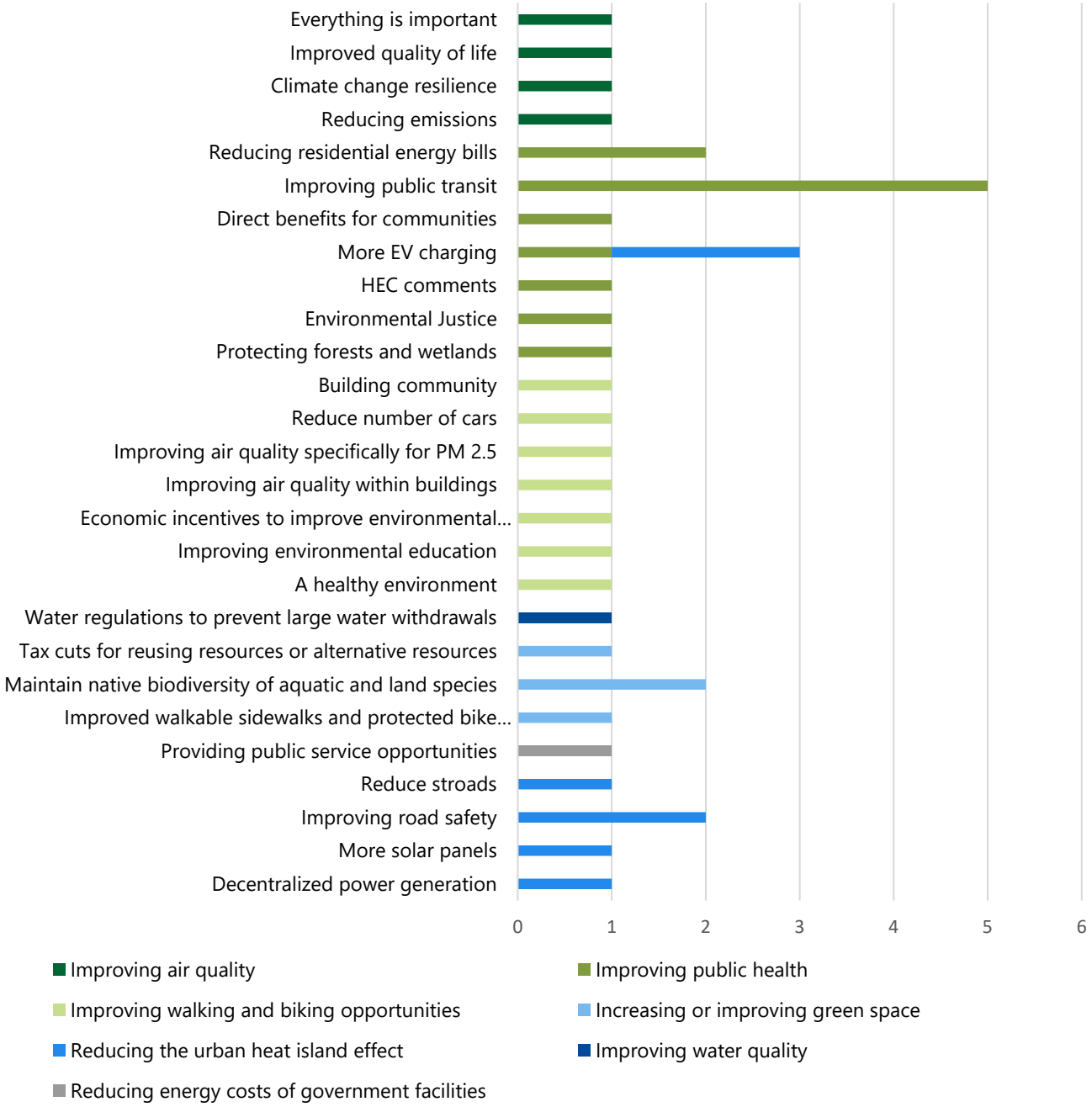
When asked why respondents selected the benefit in question 1 (Table 8), LIDAC respondents gave a variety of responses with the most common responses noting that their selection had the most connections to other benefits listed, followed by transportation safety and equity, as shown in Figure 14. The top response from respondents across the region noted the same top response as LIDAC, that their selection had the most connections to other benefits listed.

Figure 14. Public Survey #2 – LIDAC Reponses for Question 2: "Why did you choose the answer you did?"



When asked if there were any missing benefits, LIDAC respondents noted a variety of benefits, as shown in Figure 15. Improving public transit and more EV charging received slightly more responses than other reasons.

Figure 15. Public Survey #2 – LIDAC Responses for Question 3: "Are there any benefits that are missing from this list?"



See Appendix H for a display of responses to question 2 and question 3 for respondents across the whole region.

PUBLIC ENGAGEMENT EVENTS

IMPO attended 15 in-person events and four virtual meetings from September 2023 to February 2024. Engagement centered on both gathering input from communities and reporting out updates for the planning process. Figure 16 displays the in-person engagement events attended (blue stars), along with the designated LIDAC areas (in green) across the MSA. IMPO promoted opportunities for the public to engage in the regional planning process via in-person, digital, and print campaigns. In addition to attended in-person events and virtual meetings, IMPO disseminated three paid social media advertising campaigns, two public notices in local newspapers, one advertisement in Spanish and English in La Voz magazine, and numerous newsletters and social media posts across CIRDA and partner organizations' membership platforms. A handout was also disseminated during public outreach events to provide an overview of the planning process and share opportunities to engage and stay informed. See Appendix C for the handout.

Table 9 identifies in-person and virtual public engagement events where IMPO engaged the public organized by date. All events were in-person unless otherwise noted. "Street teams" were in-person engagements with IMPO staff stationed in pedestrian areas in the public right-of-way, in places such as outdoor shopping malls, main streets, and libraries, with the first public survey pre-loaded on iPads.

Figure 16. Public Engagement In-person Events Attended

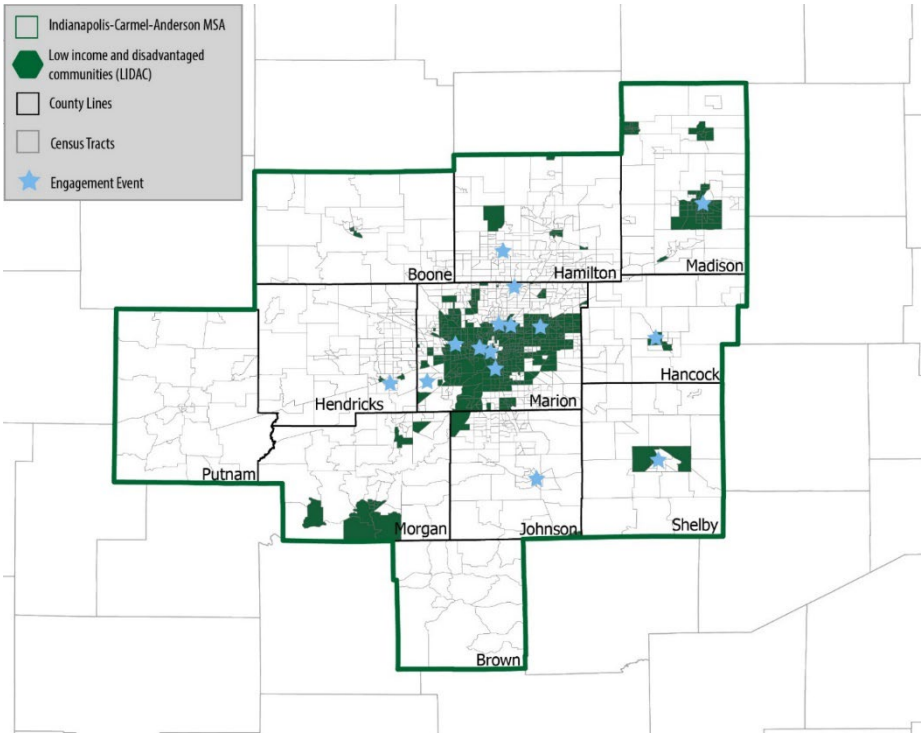


Table 9. Public Engagement Events and Outreach

Event	Date and Time	Location	Audience	Content
Garfield Park Farmers' Market	16 September 2023 8-1pm	2345 Pagoda Dr. Indianapolis	LIDAC area	Promoting public survey #1
Partners for Pollution Prevention and Trade Show	20 September 2023 8:30-4:30pm	3645 River Crossing Parkway Indianapolis	Sustainability professionals	Promoting public survey #1
Car Free Day Indy	22 September 2023 6:30-9am and 11-1pm	1 Monument Circle Indianapolis	General public	Promoting public survey #1
Indiana Latino Expo	23 September 2023 8-4pm	1202 E. 38th St. Indianapolis	LIDAC area	Promoting public survey #1
Anderson Farmers' Market	30 September 2023 7-1pm	1102 Central Ave. Anderson	LIDAC area	Promoting public survey #1
Facebook Advertising	2-6 October 2023	35-mile radius from Monument Circle Indianapolis	General public	Promoting public survey #1
Street Team Greenfield Public Library	5 October 2023 3-6pm	900 McKenzie Rd. Greenfield	LIDAC area	Promoting public survey #1
Shelbyville First Friday	6 October 2023 5-7pm	25 Public Sq. Shelbyville	LIDAC area	Promoting public survey #1
Street Team Franklin	7 October 2023 3-6pm	25 N. Main St. Franklin	LIDAC area	Promoting public survey #1
Street Team Carmel	8 October 2023 3-6pm	14390 Clay Terrace Blvd Carmel	General public	Promoting public survey #1

Event	Date and Time	Location	Audience	Content
Street Team Plainfield Public Library	10 October 2023 3-6pm	1120 Stafford Rd Plainfield	General public	Promoting public survey #1
Facebook Advertising	7-8 October 2023	2-mile radius around 6019 E. 30th St. Indianapolis	LIDAC area	Promoting public survey #1
Facebook Advertising	7-8 October 2023	2-mile radius around 3316 Madison Ave. Anderson	LIDAC area	Promoting public survey #1
Street Team Speedway	12 October 2023 4:30-7:30pm	1255 N. Main St. Speedway	LIDAC area	Promoting public survey #1
Far East Side Community Council Meeting	28 November 2023 6pm	Virtual	LIDAC area	Promoting public survey #2 and public meetings
Indiana Environmental Conference	7 December 2023 8-4pm	2544 Executive Drive, Indianapolis	Sustainability Professionals	Promoting public survey #2 and public meetings
United Northeast Community Development Corporation	13 December 2023	3908 Meadows Drive, Indianapolis	LIDAC Area	Promoting public survey #2 and public meetings
Central IN Drinking Water Collaborative	14 December 2023 2-4pm	Virtual	Sustainability Professionals	Promoting public survey #2 and public meetings
Indy Star Public Notices Section	29 December 2023	Public Notices Section	General Public	Promoting public survey #2 and public meetings
Indianapolis Recorder	29 December 2023	Public Notices Section	LIDAC population	Promoting public survey #2 and public meetings

Event	Date and Time	Location	Audience	Content
Facebook Advertising	3-5 January; 6-7 January 2024	35-mile radius from Monument Circle Indianapolis	General Public	Promoting public survey #2 and public meetings
IMPO Virtual Public Meeting #1	8 January 2024 1pm	Virtual	General Public	Promoting public survey #2
IMPO Virtual Public Meeting #2	9 January 2024 6pm	Virtual	General Public	Promoting public survey #2
La Voz Magazine (Presented in Spanish)	9 January 2024	Magazine issue	LIDAC population	Promoting public survey #2 and public meetings
La Voz Magazine (Presented in Spanish)	1-14 January 2024	Magazine ebsite	LIDAC population	Promoting public survey #2 and public meetings
La Voz Magazine (Presented in Spanish)	9 January 2024	Magazine social media	LIDAC population	Promoting public survey #2 and public meetings
Indiana Sustainability and Resilience Conference	9 February 2024	420 University Blvd. Indianapolis	General Public; Sustainability Professionals	Providing an update on the planning process
Far Eastside Community Council	February		LIDAC Area	Providing an update on the planning process

In addition to public engagement events, the Project Team leveraged existing partnerships, newsletters, social media, and municipal/county representatives to publicize the planning effort and promote engagement opportunities through the following activities:

- CIRDA newsletters (distributed monthly to municipalities and counties throughout the MSA);
- IMPO newsletters (distributed bi-weekly to 35 cities, towns, and counties in the MPS);
- IMPO social media;
- Website promotion representing three partner organizations serving the region and the state;
- Social media content including LinkedIn, Facebook, Instagram, and X (Twitter) representing four partner organizations and municipalities and counties; and
- Newsletters representing three partner organizations.

INCORPORATING PUBLIC INPUT

The Project Team designed the public outreach strategy to ensure that feedback, particularly that of LIDAC residents, could be meaningfully incorporated into the regional plan development stages. The Project Team developed an approach that relied on public survey feedback and targeted engagement events to construct the GHG reduction measures and benefits, while simultaneously focusing on educating the public on the planning process and communicating progress updates.

The first public survey was an opportunity for the public to shape the course of the planning process from the start. The survey included a consolidated version of the initial list of potential GHG reduction measures to gather feedback on preferences. The community feedback informed the process that the Project Team then undertook to narrow down the initial list based on public priorities and existing local and state policy constraints. Policy constraints were considered early on given EPA's "implementation-ready" PCAP criteria, which meant that GHG reduction measures that would encounter policy barriers would not be considered competitive when seeking CPRG Phase 2 implementation funds for the GHG reduction measures identified in the PCAP. These policy constraints proved to be a barrier in communicating with the public that the planning process was both open to all ideas for GHG reduction measures and simultaneously limited by EPA PCAP requirements.

The Working Groups were formed with members from community-based organizations in each sector-specific Working Group to ensure that community priorities were integrated throughout the stakeholder group process. After narrowing down the initial list of potential GHG reduction measures created, the Project Team presented an updated list to Working Group members for feedback, discussion, and refinement based on their subject matter expertise. See Appendix D for the updated list of potential GHG reduction measures that were discussed during each Working Group meeting. Members from community-based organizations described specific benefits, along with challenges and priorities for the public regarding clean energy, transportation access, open space, and industrial pollution considerations, among others.

The second public survey was an opportunity to share the progress on the final draft list of GHG reduction strategies, while gathering additional information on preferences for benefits that communities want to see represented in the PCAP. Respondents for the second public survey used the survey as a time to give feedback on the draft priority GHG reduction measures list, in addition to

answering questions about benefits preferences. In response to public feedback, the Project Team adjusted the final priority GHG reduction measures list to account for various forms of public transportation. Planning for the CCAP will allow for more time and ability to consider broader ideas for GHG reduction measures, and give more opportunities for the public to shape a comprehensive regional plan.

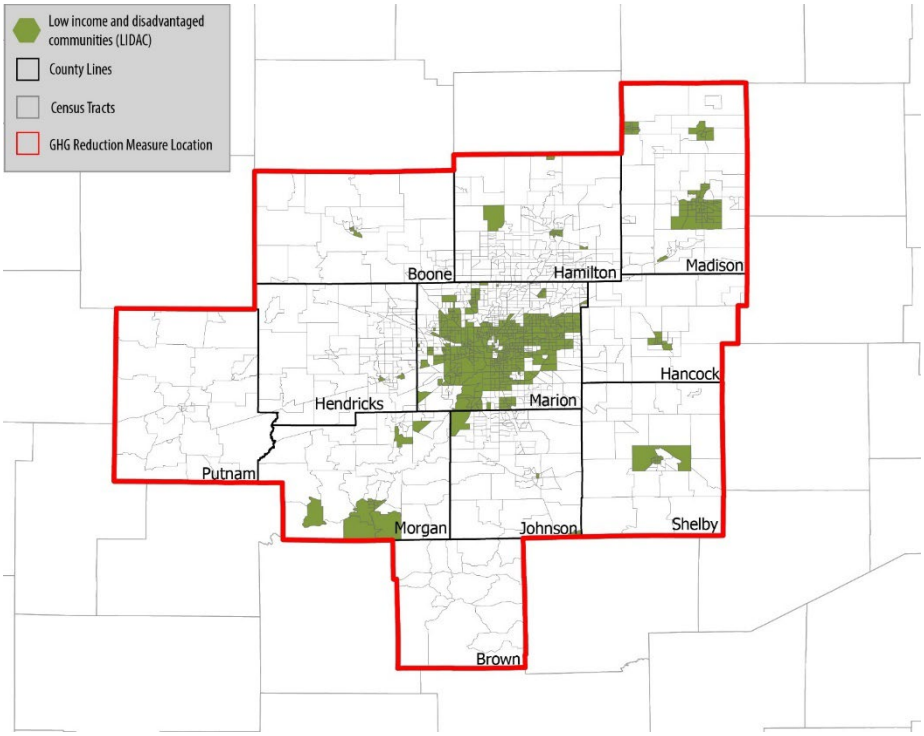
POTENTIAL LIDAC BENEFITS FROM GHG REDUCTION MEASURES

The Project Team relied on public input, particularly targeting LIDAC residents, to inform the GHG reduction measures and potential community benefits developed for the PCAP. Each of the following priority GHG reduction measures address the top benefits identified by communities throughout the planning process, including improved air quality, public health, transportation opportunities, green space, and waste management, while creating economic opportunities for all jurisdictions across the region, inclusive of both urban centers and rural communities. Each GHG reduction measure, along with accompanying pilot projects, assesses the affected LIDAC areas and potential direct and indirect benefits that could flow to LIDAC residents.

GHG REDUCTION MEASURE #1 – CIRDA REGIONAL BUILDING AND ASSET MODERNIZATION PROGRAM

CIRDA's Regional Building and Asset Modernization Program will fund public, non-profit, and private applicants throughout the entire MSA, affecting 560 LIDAC census tracts. Figure 17 depicts the reach of the program for LIDAC residents across the MSA, as noted by the red boarder line.

Figure 17. LIDAC Tracts Associated GHG Reduction Measure #1 – CIRDA Regional Building and Asset Modernization Program

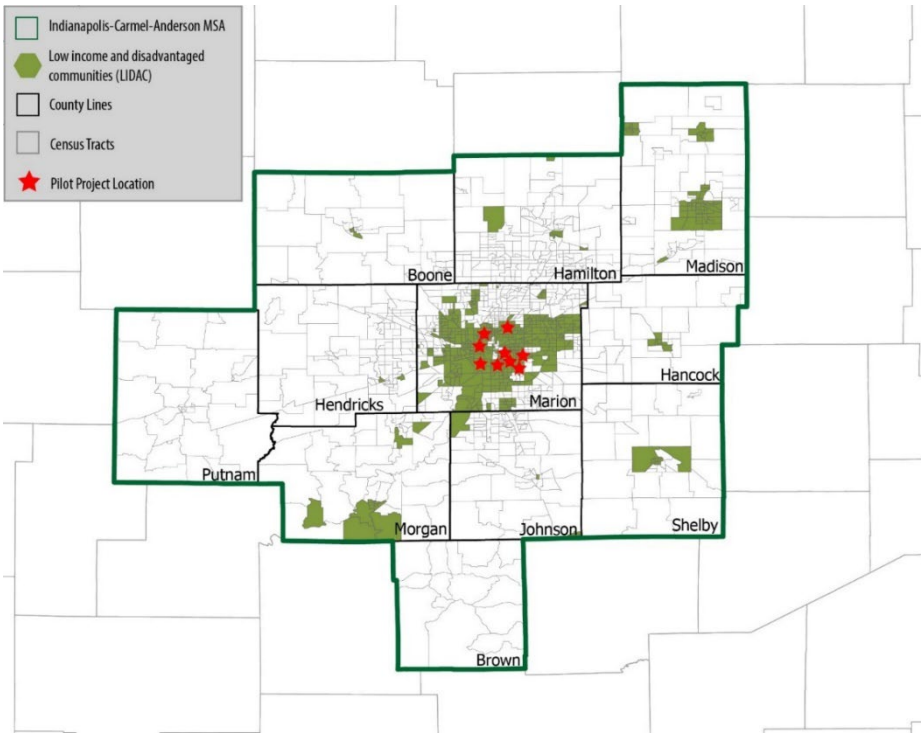


The program seeks to fund a variety of clean energy and energy efficiency upgrades to buildings and infrastructure located in or near LIDAC areas. In addition to substantial GHG emissions reductions resulting from a variety of funded projects through the program, including public building clean energy retrofits, various forms of public transportation, micromobility efforts, ride sharing, electric vehicle charging, industrial energy efficiency and solar installations, wastewater treatment improvements, these projects will also have a direct impact on LIDAC residents' quality of life. Direct benefits to LIDAC residents from the program include improved air quality and public health, due to the reduced criteria pollution as a result of transportation and clean energy improvements. Increased access to convenient public transportation and mobility options and improved comfort are also direct benefits from the program. The projects funded by the program will boost economic development and job availability across the region, including for LIDAC residents, as jobs opportunities become available to support project installations. Depending on the location of specific projects funded through the program, LIDAC residents will see indirect benefits because of reduced criteria pollution occurring in nearby communities from reduced energy use, installation of solar PV systems, or transportation efforts. A key benefit LIDAC residents noted in public survey feedback included clean energy upgrades to residential buildings. While that benefit is not included in this program, there are direct benefits that LIDAC residents will experience due to the location of public and private buildings, industrial facilities, and major highways intersecting with LIDAC areas throughout the region.

Pilot Project #1 – City of Indianapolis Solar Upgrades

The City of Indianapolis will install solar PV systems on 10 buildings across the City's portfolio, representing more than 3,000 kW of solar power. The buildings are all located in LIDAC census tracts experiencing a host of burdens, including energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development burdens.[57] Figure 18 depicts the locations of the 10 facilities throughout the City of Indianapolis, as noted by the red stars. This project will result in significant GHG reductions due to the emissions profile of the power on the grid it will be displacing. Direct benefits to LIDAC residents from the project will include improved air quality and public health, due to reduced air pollution resulting from the solar installations. LIDAC residents may also experience job opportunities for the installation across each building, and experience indirect benefits from reduced energy bills. The expanded capacity of the solar installation can contribute to reducing energy bills for residents and businesses by offsetting the need for traditional energy sources and subsequently lowering electricity cost. In some cases, surplus energy can be fed back into the grid, potentially offering financial benefits or credits to communities connected to the system.

Figure 18. LIDAC Tracts Associated with Pilot Project #1 – City of Indianapolis Solar Upgrades

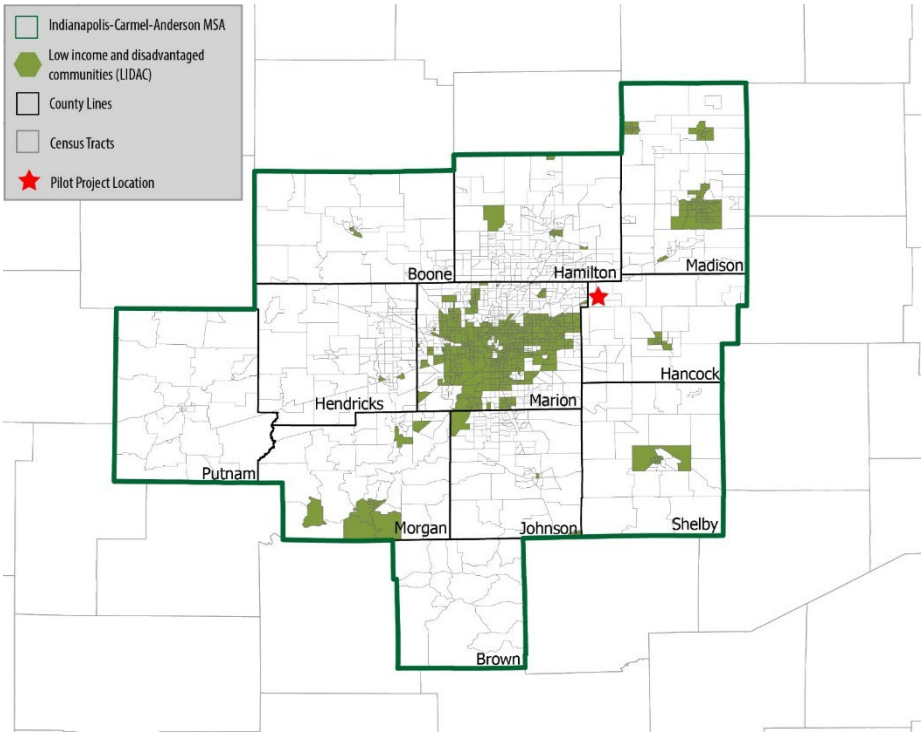


[57] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #2 – McCordsville Town Hall Energy Efficiency Updates

The Town of McCordsville will install an efficient HVAC system to the Town Hall building, resulting in reduced energy usage. While the building is not located in or next to a LIDAC census tract, LIDAC residents can experience indirect benefits from the project related to improved air quality and public health, due to reduced criteria pollution resulting from the reduction in energy use, along with improved building comfort. Figure 19 depicts the locations of the building, as noted by the red star.

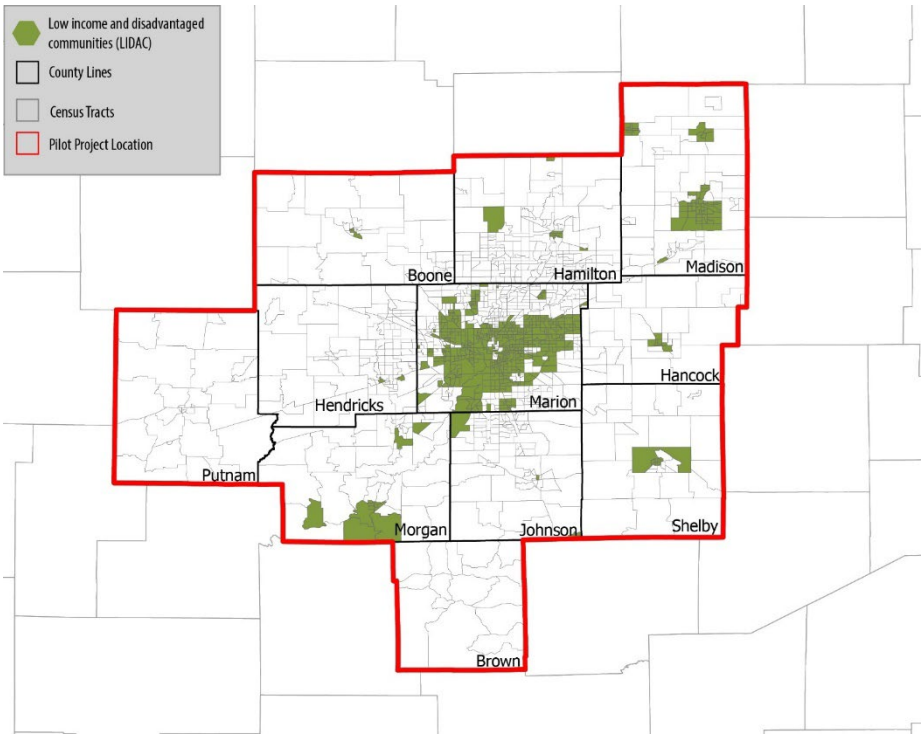
Figure 19. LIDAC Tracts Associated with Pilot Project #2 – McCordsville Town Hall Energy Efficiency Updates



Pilot Project #3 – Energy Insights Program

The Energy Insights Program will fund industrial efficiency upgrades throughout the entire MSA, affecting 560 LIDAC census tracts. Figure 20 depicts the reach of the program for LIDAC residents throughout the MSA, as noted by the red boarder line. Of the 100 manufacturing facilities this program intends to reach, those facilities located at or near LIDAC areas will result in direct benefits to LIDAC residents. In addition to substantial reduced GHG emissions resulting from reduced energy use at manufacturing facilities, direct benefits to LIDAC residents from the project include improved air quality and public health, due to reduced criteria pollution resulting from the reduced energy usage. LIDAC residents may also experience job opportunities for the installations across each building.

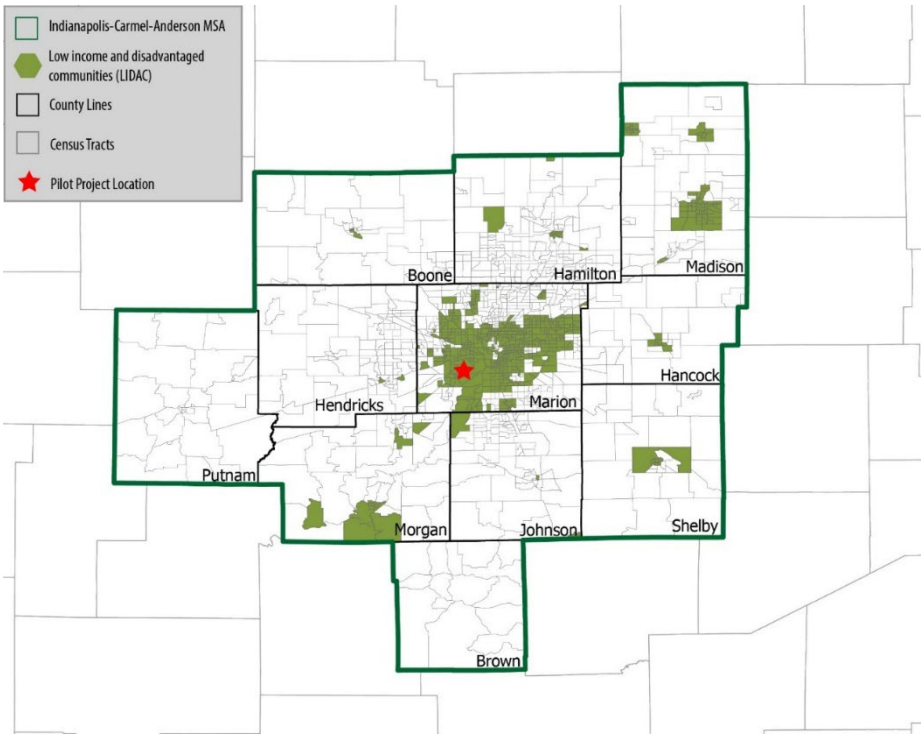
Figure 20. LIDAC Tracts Associated with Pilot Project #3 – Energy Insights Program



Pilot Project #4 – Rolls Royce HVAC Optimization and Submetering

Rolls Royce will install HVAC efficiency upgrades to a facility located in a LIDAC census tract experiencing a host of burdens related to health, housing, legacy pollution, water, and wastewater.[58] Figure 21 depicts the location of the facility in Indianapolis, as noted by the red star. This project will result in GHG reductions due to the emissions profile of the power on the grid it will be displacing. Direct benefits to LIDAC residents from the project will include improved air quality and public health, due to reduced criteria pollution resulting from the efficiency improvements. LIDAC residents may also experience job opportunities for the installation.

Figure 21. LIDAC Tracts Associated with Pilot Project #4 – Rolls Royce HVAC Optimization and Submetering

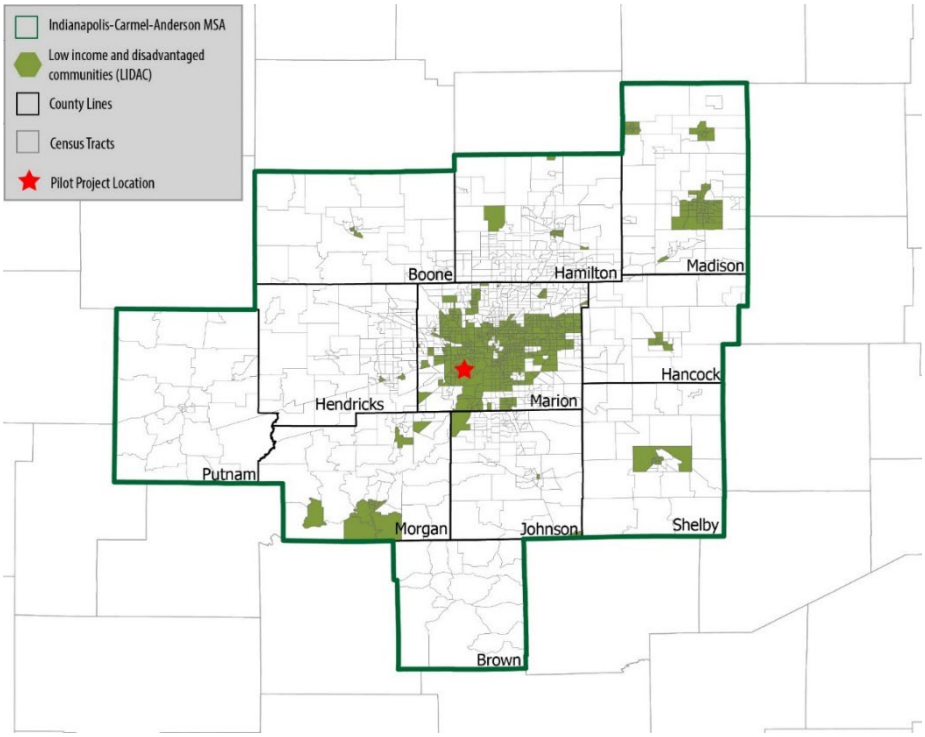


[58] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #5 – Rolls Royce PV Solar

Rolls Royce will maximize on-site renewable energy generation by installing 10.5 MW to a facility located in a LIDAC census tract experiencing a host of burdens related to health, housing, legacy pollution, water and wastewater.[59] Figure 22 depicts the location of the facility in Indianapolis, as noted by the red star. This project will result in significant GHG reductions due to the emissions profile of the power on the grid it will be displacing. Direct benefits to LIDAC residents from the project will include improved air quality and public health, due to reduced criteria pollution resulting from the solar installations. LIDAC residents may also experience job opportunities for the installation across each building, and experience indirect benefits from reduced energy bills. The expanded capacity of the solar installation can contribute to reducing energy bills for residents and businesses by generating clean renewable energy. This energy can be harnessed for local consumption offsetting the need for traditional energy sources and subsequently lowering electricity cost. In some cases, surplus energy can be fed back into the grid potentially offering financial benefits or credits to communities connected to the system.

Figure 22. LIDAC Tracts Associated with Pilot Project #5 – Rolls Royce PV Solar

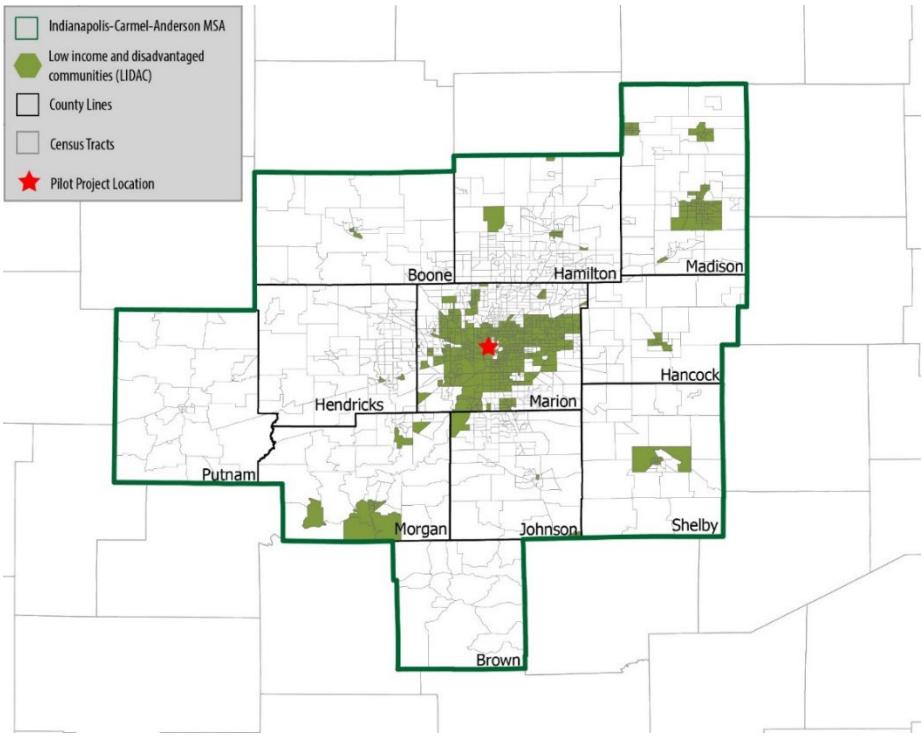


[59] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #6 – Crispus Attucks High School Energy Efficiency Renovations

IU Health will partner with Crispus Attucks High School, one of the largest public-school districts in the state, to provide funding for energy efficiency renovations at campus buildings. While the building is not located in a LIDAC census tract, it is located near a LIDAC census tract experiencing burdens related to energy, health, housing, legacy pollution, workforce development burdens.[60] Figure 23 depicts the location of the facility in Indianapolis, as indicated by the red star. This project will result in GHG reductions due to the emissions profile of the power on the grid it will be displacing due to the energy efficiency upgrades. Direct benefits to LIDAC residents from the project will include improved building comfort, due to residents from nearby LIDAC census tracts attending the school. LIDAC residents may also experience indirect benefits including improved air quality and public health, due to reduced criteria pollution resulting from the efficiency improvements, and experience job opportunities to support installation.

Figure 23. LIDAC Tracts Associated with Pilot Project #6 – Crispus Attucks High School Energy Efficiency Renovations

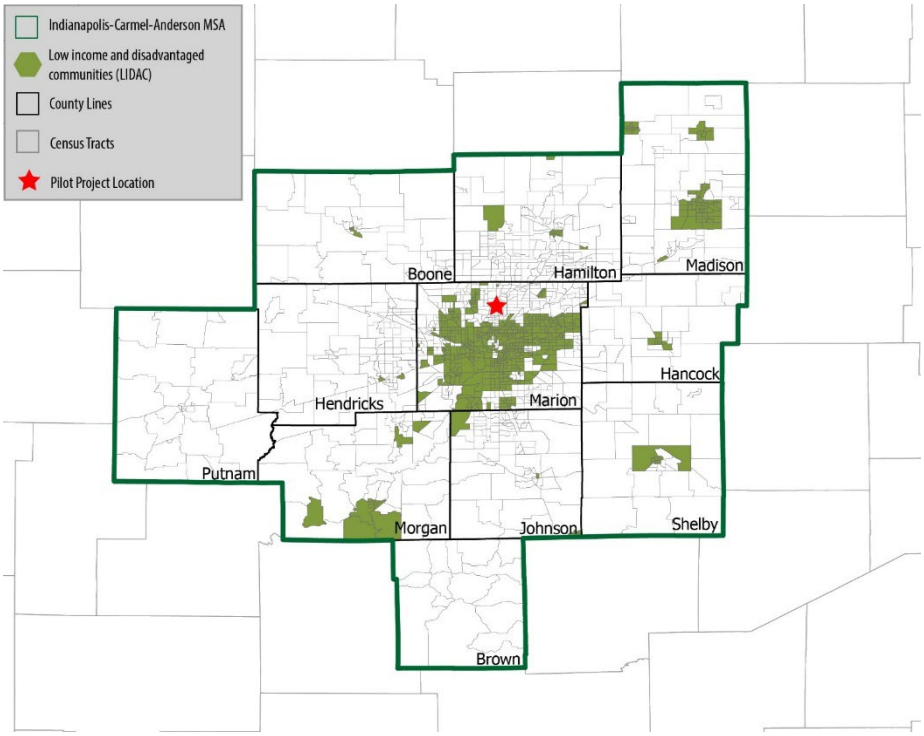


[60] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #7 – Indianapolis Arts Center Upgrades

The Indianapolis Art Center will integrate energy efficiency measures and install a 169-kW solar PV system to decrease GHG emissions from the overall building energy footprint The Center includes Marilyn K. Glick School of Art, with art education classes for artists of all ages and skill levels, as well as the adjoining 9.5-acre ARTSPARK outdoor space. While the building is not located in or next to a LIDAC census tract, LIDAC residents will experience direct benefits in the form of improved building comfort when visiting the Center, and indirect benefits from the project related to improved air quality and public health, due to reduced criteria pollution resulting from the reduction in energy use and renewable energy installation. Figure 24 depicts the locations of the building, as noted by the red star. Community outreach programs at the Center also provide art education to those who may not otherwise have access, including over 1,500 youth and seniors in LIDAC areas and veterans.

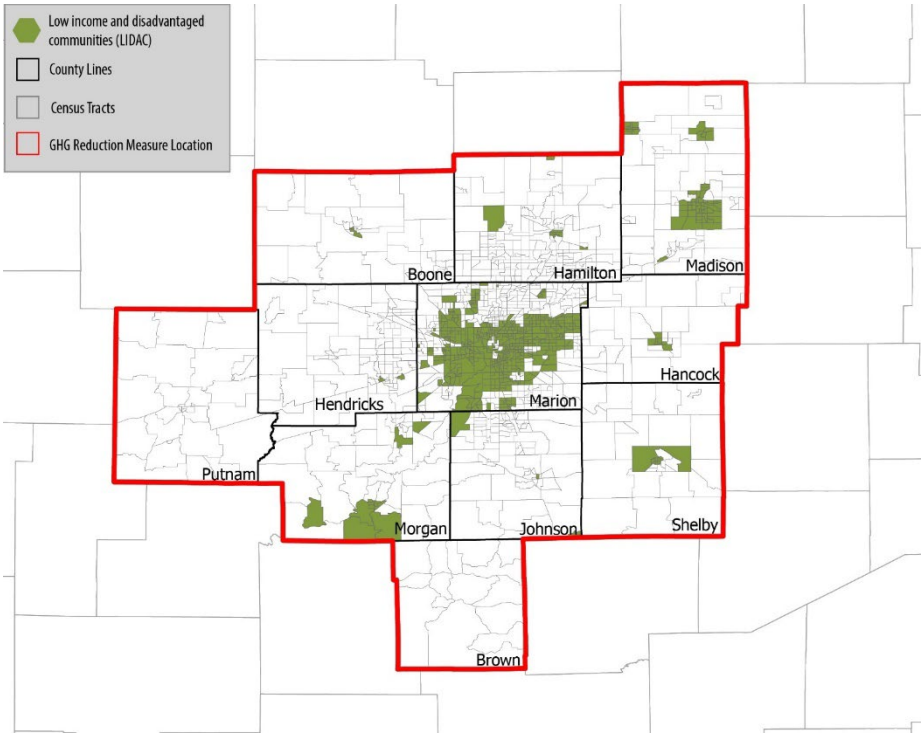
Figure 24. LIDAC Tracts Associated with Pilot Project #7 – Indianapolis Arts Center Upgrades



GHG REDUCTION MEASURE #2 – CIRDA REGIONAL OPEN SPACE REVITALIZATION AND CONNECTIVITY PROGRAM

CIRDA's Regional Open Space Revitalization and Connectivity Program will fund public, non-profit, and private applicants throughout the entire MSA, affecting 560 LIDAC census tracts. Figure 25 depicts the reach of the program for LIDAC residents across the MSA, as noted by the red boarder line. The program seeks to fund a variety of projects targeting the reclamation and revitalization of degraded lands located in or near LIDAC areas. The program will support environmental and wetlands remediation, land enhancement, trail development, and urban afforestation to reduce GHG emissions, while simultaneously improving the quality of place, recreation, and public health in the region's disadvantaged communities. The program may also support limited economic development when the use benefits the local community, such as providing housing or job opportunities. Direct benefits to LIDAC residents from the program will include improved green space and walking and biking opportunities, two benefits that received consistent support from LIDAC respondents of the two public surveys. Reducing urban heat islands through added green space and improved soil health and water quality are also direct benefits from the program. Depending on the location of specific projects funded through the program, LIDAC residents will see indirect benefits as a result of reduced criteria pollution occurring in nearby communities from the installation of solar PV systems on brownfields. The projects funded by the program will also boost economic development and job availability across the region, including for LIDAC residents, as jobs opportunities become available to support project infrastructure improvements.

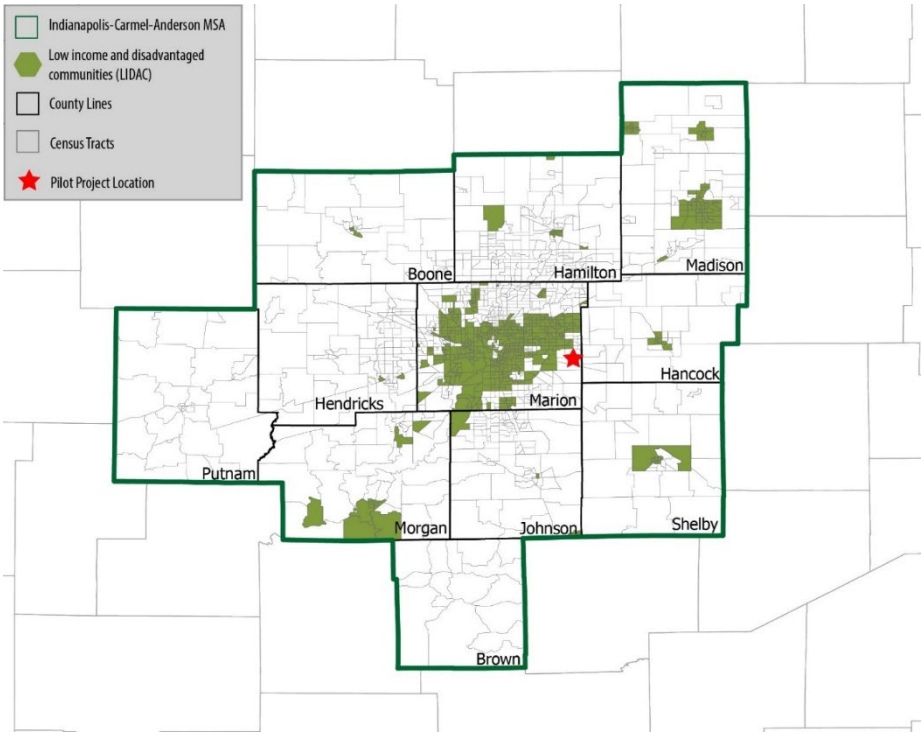
Figure 25. LIDAC Tracts Associated with GHG Reduction Measure #2 – CIRDA Open Space Revitalization and Connectivity Program



Pilot Project #1 – City of Indianapolis Brownfield Julietta Landfill

Indianapolis Office of Sustainability and Indy Parks and Recreation will convert the closed Julietta Landfill brownfield into 10 MW of community solar, serving as a demonstration project for the entire state. The location the brownfield site is not in a LIDAC census tract, however it is located near LIDAC census tracts with residents experiencing health, legacy pollution, water and wastewater, housing, and workforce development burdens.[61] Figure 26 depicts the locations of the site, as indicated by the red star. This project will result in significant GHG reductions due to the emissions profile of the power on the grid it will be displacing. Direct benefits to LIDAC residents includer the opportunity to partake in community solar, lowering electricity costs for residents and offering financial benefits to communities connected to the system. Indirect benefits to LIDAC residents from the project include improved air quality and public health, due to reduced criteria pollution resulting from the solar installation. LIDAC residents may also experience job opportunities with the solar installation, and experience indirect benefits from reduced energy bills.

Figure 26. LIDAC Tracts Associated with Pilot Project #1 – City of Indianapolis Brownfield Julietta Landfill

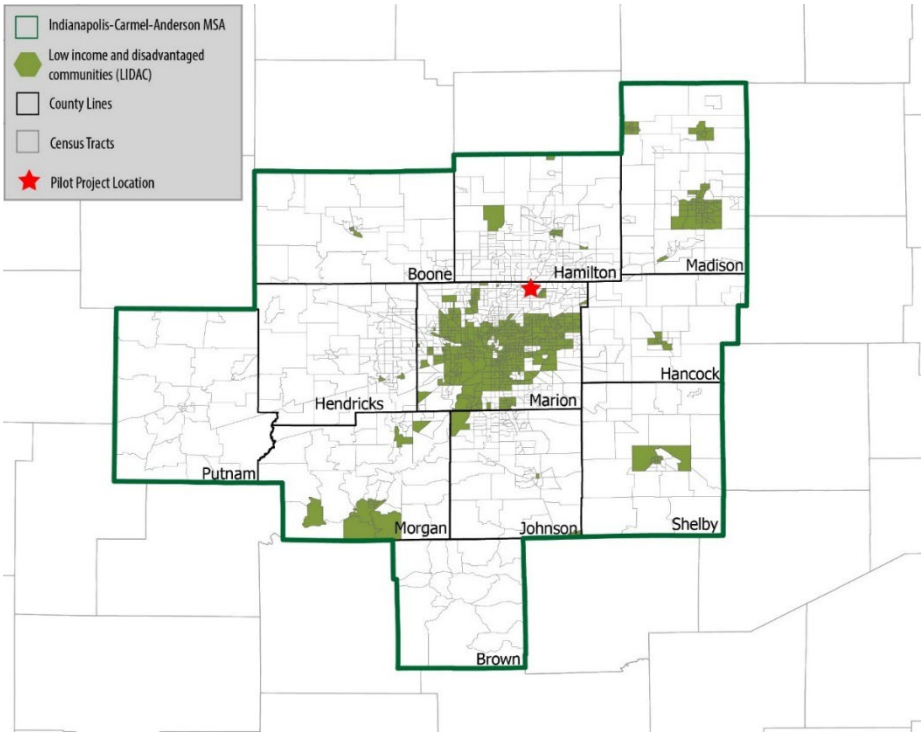


[61] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #2 – Nickel Plate Pedestrian Bridge

The Nickel Plate Pedestrian Bridge will connect the Nickel Plate Trail across 82nd Street, one of the busiest arterial roads in Central Indiana, and provide a safe, non-motorized mobility option for all ages and abilities while reducing GHG emissions from transportation. While the location of the bridge is not located in a LIDAC census tract, it is located near a LIDAC census tract experiencing transportation-related burdens.[62] Figure 27 depicts the locations of the site, as noted by the red star. Direct benefits to LIDAC residents from the project will include improved walking and biking opportunities, as the bridge can serve nearby LIDAC residents. LIDAC residents will also experience indirect benefits including improved air quality and public health, due to reduced criteria pollution from transportation. LIDAC residents may also experience some job opportunities for the installation of the bridge.

Figure 27. LIDAC Tracts Associated with Pilot Project #2 – Nickel Plate Pedestrian Bridge

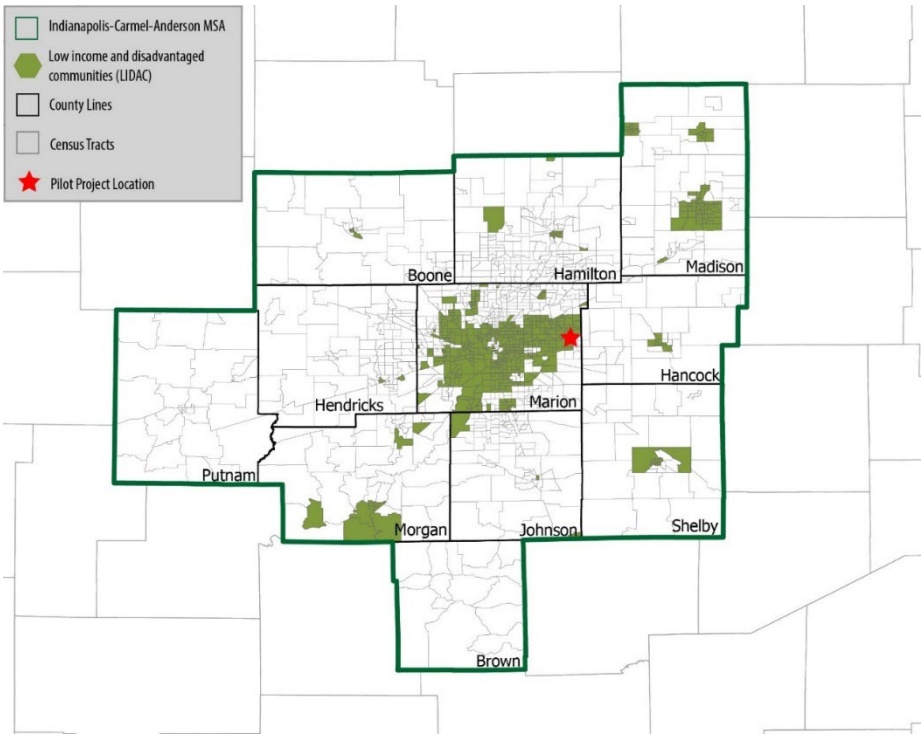


[62] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #3 – Grassy Creek Trail

The Grassy Creek Greenway will develop 3.8 miles of new greenway and trail and include restoration and reforestation of habitat along the trail. The trail runs through LIDAC census tracts experiencing a host of burdens related to energy, health, housing, workforce development, and transportation burdens.[63] Figure 28 depicts the location of the trail in the City of Indianapolis, as noted by the red star. In addition to avoiding GHG emissions from transportation, this project will in an opportunity for CO_2 storage through the restoration of the habitat along the trail. Direct benefits to LIDAC residents from the project will include improved walking and biking opportunities, as the trail will run directly through LIDAC areas, and improved air quality and public health due to reduced criteria pollution from transportation. LIDAC residents may also experience some job opportunities for the installation of the bridge.

Figure 28. LIDAC Tracts Associated with Pilot Project #3 – Grassy Creek Trail

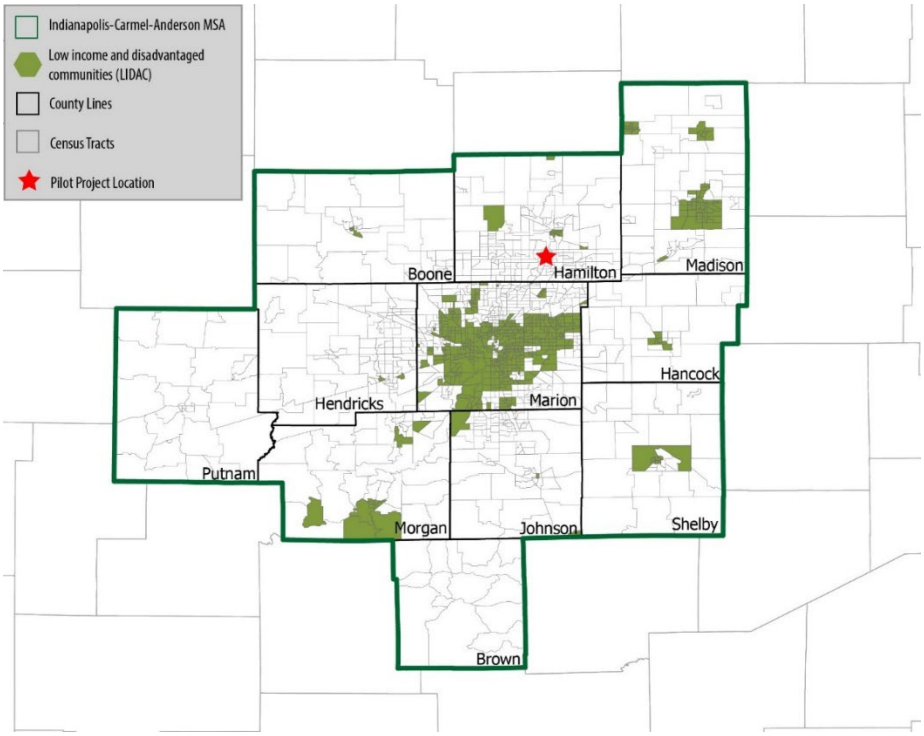


[63] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #4 – Conner Prairie Reforestation

The Conner Prairie Reforestation project will reforest parts of Connor Prairie, one of the most visited outdoor museums in the country, to cover approximately 140 acres of land on both the Historic Campus (Fishers side) and the Conservation Campus (Carmel side). This reforestation will result in approximately 18,900 new trees. While the location of the Conner Prairie is not in a LIDAC census tract, it is located near a LIDAC census tract experiencing health, and water and wastewater-related burdens.[64] Figure 29 depicts the locations of the site, as noted by the red star. Marion County residents routinely visit Conner Prairie, including students from Indianapolis Public Schools who visit annually. LIDAC residents who visit Conner Prairie will experience direct benefits from improved green space and reducing urban heat islands. This project is located on the White River and will affect the health of the river downstream, which impacts a variety of LIDAC areas along the river.

Figure 29. LIDAC Tracts Associated with Pilot Project #4 – Conner Prairie Reforestation

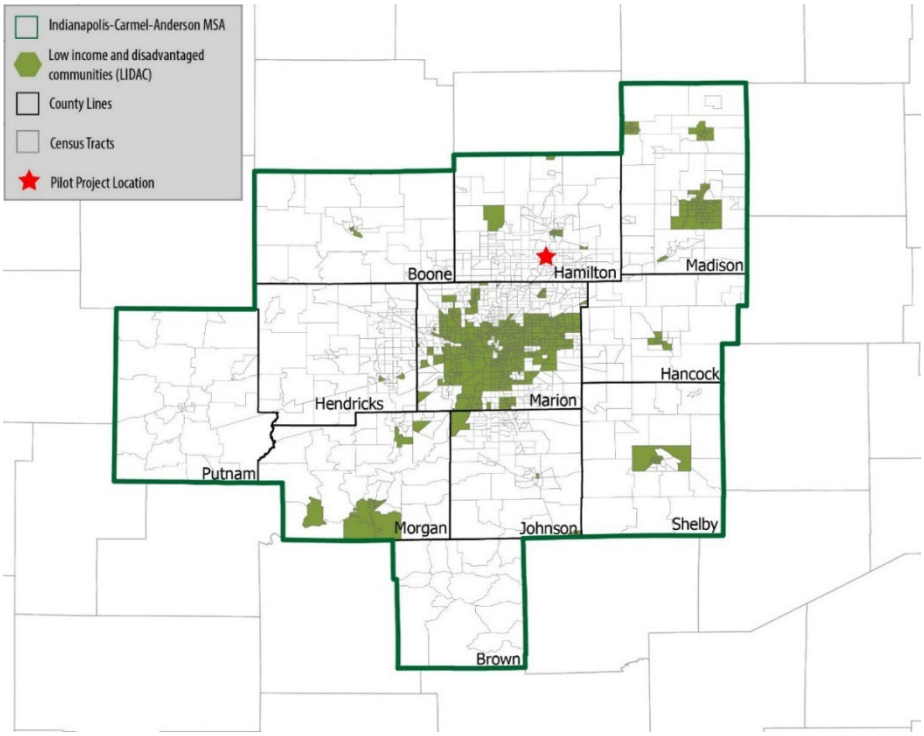


[64] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

Pilot Project #5 – Conner Prairie Wetland Enhancement and Fertilizer Education Program

This project involves creating nearly 80 acres of wetlands across both the Carmel and Fishers sides of the Connor Prairie campus, one of the most visited outdoor museums in the country and Indiana's first Smithsonian affiliate. While the location of the Conner Prairie is not in a LIDAC census tract, it is located near a LIDAC census tract experiencing health, and water and wastewater-related burdens.[65] Figure 30 depicts the locations of the site, as indicated by the red star. Marion County residents routinely visit Conner Prairie, including students from Indianapolis Public Schools who visit annually. LIDAC residents who visit Conner Prairie will experience direct benefits from improved green space and reducing urban heat islands. Creating wetlands will help to store CO_2 and provides an opportunity to sustainably filter water before it continues making its way down the White River, improving water quality downstream, which impacts a variety of LIDAC areas along the river.

Figure 30. LIDAC Tracts Associated with Pilot Project #5 – Conner Prairie Wetland Enhancement and Fertilizer Education Program

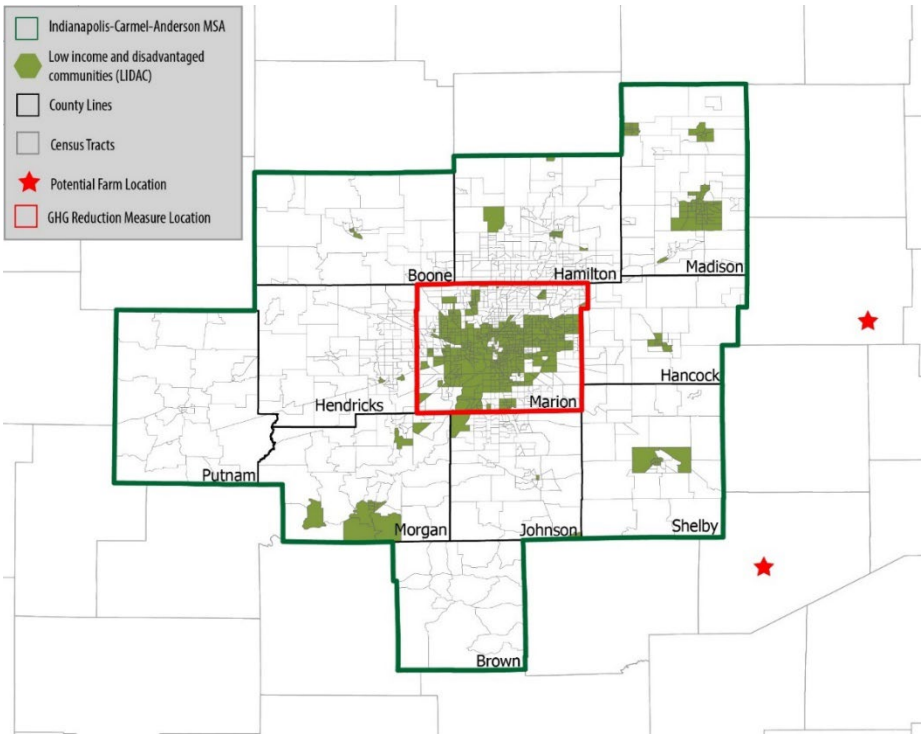


[65] U.S. Environmental Protection Agency (EPA). 2024. "EJScreen: Environmental Justice Screening and Mapping Tool." Modified 24 January 2024. Retrieved from: https://www.epa.gov/ejscreen

GHG REDUCTION MEASURE #3 – INDIANAPOLIS AREA RENEWABLE ENERGY AND WASTE REDUCATION PROGRAM

The Indianapolis Motor Speedway, in partnership with the American Dairy Association Indiana, Inc. and Newtrient will partner to create a food waste collection program from events, restaurants, and grocery stores across the City of Indianapolis. The waste will be transported to an anaerobic digester on a local dairy farm, where it will create RNG, which will then power local businesses and fleets in the Central Indiana area. The project will impact LIDAC census tracts across the City of Indianapolis, as depicted in Figure 31, noted by the red boarder line. The location of the farm with the anerobic digestor will either be in a LIDAC census tract in Greensburg, IN, or near a LIDAC census tract in Lewisville, IN, both locations are noted by the red stars in Figure 31. This project will directly benefit LIDAC residents by reducing a significant amount of food waste disposed in landfills resulting from events and tourism throughout the city and be a replicable model for other communities. LIDAC residents may also experience job opportunities with the development and operation of the project across the city. Depending on the location of the farm, LIDAC residents may experience direct benefits from reduced animal waste and reduced N_2O emissions from fertilizer application. Indirect benefits include improved air quality due to reduced pollution from RNG created from the digester to power local businesses and fleets.

Figure 31. LIDAC Tracts Associated with GHG Reduction Measure #3 – Indianapolis Area Renewable Energy and Waste Reduction Operation



6. Review of Authority to Implement

This section provides an overview of the process to verify implementation authority in municipal and state code for the priority GHG reduction measures. The Project Team conducted a review of existing statutory or regulatory authority to implement for each of the 15 GHG reduction measures outlined within Section 4.

When conducting the analysis for GHG reduction measures located on public lands, the Project Team started with the implementing entity and the location of the proposed measure to examine the type of statutory and regulatory text for review. For example, the Conner Prairie Wetland Enhancement and Fertilizer Education Program is to be implemented within the land use jurisdictions of Carmel, IN and Fishers, IN, so the Project Team searched for statutory language within the Carmel and Fishers municipal codes. For each project, the relevant text was examined to determine whether it contained language that would authorize the implementing entity to proceed with implementing the specific GHG reduction measure. Keywords within the GHG reduction measure description guided and streamlined the research; for instance, research for a project with the aim of reducing waste led the Project Team to search city or state guidelines on waste handling and management. The statutory text outlined the requirements (i.e., permits, approvals, etc.) necessary for each GHG reduction measure to obtain the authority to implement the measure in the specified jurisdiction.

This section describes the necessary permitting and approval steps for each GHG reduction measure. If no municipal regulatory or statutory text contained relevant implementation authority language, county and state ordinances were reviewed. GHG reduction measures with verified implementation authority have completed all mandatory approval steps, whereas the remainder require some additional milestones (e.g., permits) to be obtained for implementation.

GHG REDUCTION MEASURE #1 – CIRDA REGIONAL BUILDING AND ASSET MODERNIZATION PROGRAM

CIRDA is authorized under Indiana Code § 36-7.7-3-2(1) and (2) to implement the Regional Building and Asset Modernization Program. CIRDA is a separate body corporate and politic that is empowered to, among other purposes, (a) acquire, construct equip, own and finance project and facilities to or for

the benefit of eligible political subdivisions[66]; and (b) fund and develop, among others, economic development projects, regional trail or greenway projects, and any other capital infrastructure project that enhances the region with the goal of attracting people or business.

PILOT PROJECT #1 – CITY OF INDIANAPOLIS SOLAR UPGRADES

The City of Indianapolis is authorized under Section 536-201 of Indianapolis municipal code[67] to install solar panels on the proposed municipal buildings, which it owns, or in carports in the buildings' parking lots. To do so, it must obtain written permit from the Department of Business and Neighborhood Services.

PILOT PROJECT #2 – MCCORDSVILLE TOWN HALL ENERGY EFFICIENCY UPDATES

The Town of McCordsville is authorized under the Town's Permit Guide to Planning and Building Development to implement energy efficiency measures to the Town Hall building, as the Town is not required to obtain a permit per section (a)[68] of the guide.

PILOT PROJECT #3 – ENERGY INSIGHTS PROGRAM

Energy Systems Network, in its capacity as a non-profit organization, is authorized to implement the Energy Insights Program designed to support and incentivize implementation of energy efficiency measures in industry.

PILOT PROJECT #4 – ROLLS ROYCE HVAC OPTIMIZATION AND SUBMETERING

Rolls Royce is authorized in its capacity as a private company to implement this project incentivizing the implementation of energy efficiency measures like HVAC optimization and submetering within industry.

PILOT PROJECT #5 – ROLLS ROYCE PV SOLAR

Rolls Royce is authorized in its capacity as a private company to implement this project incentivizing the implementation of measures like solar PV installations within industry.

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[66] Statutes define "eligible political subdivisions" as a county, municipality, airport authority, commuter transportation district, regional transportation district and public transportation corporation. Ind. Code § 36-7.7-2-7.

[67] City of Indianapolis. 2002. *Revised Code of the Consolidated City and County, Indianapolis, Marion County, Indiana, Title III, Chapter 536, Article II, Section 536-201.* Accessed January 2024. Retrieved from: https://library.municode.com/in/indianapolis_-_marion_county/codes/code_of_ordinances?nodeId=TITIIIPUHEWE_CH536BUCO_ARTIIBUPEDESU_S536-201WHBUPEREEN

[68] Town of McCordsville, Planning & Building Department. 2023. *Town of McCordsville Permit Guide.* Accessed January 2024. Retrieved from: https://www.mccordsville.org/egov/documents/1547832992_3378.pdf

PILOT PROJECT #6 – CRISPUS ATTUCKS HIGH SCHOOL ENERGY EFFICIENCY RENOVATIONS

Indianapolis Public School Board of School Commissioners is authorized under Section 20-25-4-2 (a)(2)[69] of the Indianapolis Public School Board Statute, Code Regulations to implement efficiency measures within the Crispus Attucks High School to aid in reducing the building footprint and energy usage. IU Health, the project submitting entity, has a memorandum of understanding in place denoting IU Health Foundation as leading and fundraising for the initiative, funding the Indianapolis Public Schools Foundation to then fund the renovations.

PILOT PROJECT #7 – INDIANAPOLIS ARTS CENTER UPGRADES

Indianapolis Arts Center must obtain a permit from the Division of Construction and Business Services for the energy efficiency measures and solar installation to abate building energy use-related emissions, per Chapter 536 Building and Construction, Article 2, Section 536-205(a).[70]

GHG REDUCTION MEASURE #2 – CIRDA REGIONAL OPEN SPACE REVITALIZATION AND CONNECTIVITY PROGRAM

CIRDA is authorized under Indiana Code § 36-7.7-3-2(1) and (2) to implement the Regional Open Space Revitalization and Connectivity Program. CIRDA is a separate body corporate and politic that is empowered to, among other purposes, (a) acquire, construct equip, own and finance project and facilities to or for the benefit of eligible political subdivisions[71]; and (b) fund and develop, among others, economic development projects, regional trail or greenway projects, and any other capital infrastructure project that enhances the region with the goal of attracting people or business.

PILOT PROJECT #1 – CITY OF INDIANAPOLIS BROWNFIELD JULIETTA LANDFILL

The City of Indianapolis must acquire a building permit from the Division of Construction and Business Services per section 536-205 of Chapter 536 Buildings and Construction Article 2 Building Permits and Design and Supervision[72] of the Indianapolis – Marion County, Indiana Code of Ordinances to obtain implementation authority for the City's development of Julietta Landfill Brightfield.

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[69] State of Indiana. 2005. *Indiana Code, Title 20, Article 25, Section 20-25-4-2 – Contracts involving more than $75,000; bidding for supplies and materials.* Accessed January 2024. Retrieved from: https://casetext.com/statute/indiana-code/title-20-education/article-25-indianapolis-public-schools/chapter-4-general-administrative-provisions/section-20-25-4-2-contracts-involving-more-than-75000-bidding-for-supplies-and-materials

[70] City of Indianapolis. 2002. *Revised Code of the Consolidated City and County, Indianapolis, Marion County, Indiana, Title III, Chapter 536, Article II, Section 536-205.* Accessed January 2024. Retrieved from: https://library.municode.com/in/indianapolis_-_marion_county/codes/code_of_ordinances?nodeId=TITIIIPUHEWE_CH536BUCO_ARTIIBUPEDESU_S536-205BUPEOBWRAP

[71] Statutes define "eligible political subdivisions" as a county, municipality, airport authority, commuter transportation district, regional transportation district and public transportation corporation. Ind. Code § 36-7.7-2-7.

[72] City of Indianapolis. 2002. *Revised Code of the Consolidated City and County, Indianapolis, Marion County, Indiana, Title III, Chapter 536, Article II, Section 536-201.* Accessed January 2024. Retrieved from: https://library.municode.com/in/indianapolis_-_marion_county/codes/code_of_ordinances?nodeId=TITIIIPUHEWE_CH536BUCO_ARTIIBUPEDESU

Obtaining permits for the transformation of existing vacant brownfield lands previously zoned and utilized as a landfill site will aid in offsetting emissions of Indiana's projected electricity grid mix through the development of a 10 MW solar farm, consistent to the powers provided to the City of Indianapolis through the State of Indiana. Through the City of Indianapolis' sustainable development orders in Chapter 742 – Districts, Article I Primary Districts, Section 742-108 pat 13 (iii)[73] of the city's ordinances, the city may obtain an increase to allowable impervious surface covering for the development and scope at hand.

PILOT PROJECT #2 – NICKEL PLATE PEDESTRIAN BRIDGE

According to the jurisdictional approval document contained within the Next Level Trails application submitted by the City of Fishers,[74] Fishers, Noblesville, and Indianapolis have full authority to convert certain portions of the land within the proposed Nickel Plate Trail route into a trail path. On 6 December 2019, the owners of the Nickel Plate Railroad (Fishers, Noblesville, and Hamilton County) and the Hoosier Heritage Port Authority (HHPA) signed a license agreement[75] pursuant to the National Trails System Act dictating that the City of Indianapolis Department of Public Works has the right to alter land within the proposed route to generate multiple modes of transportation and recreation. Allowable alterations include road and highway grade crossings (public or private), and the City of Indianapolis must obtain from the Indianapolis Department of Public Works the necessary permits and rights-of-way to construct the Nickel Plate Pedestrian Bridge.

PILOT PROJECT #3 – GRASSY CREEK TRAIL

In the third quarter of 2021, the City-County Council approved a fiscal ordinance[76] authorizing $25 million to fund the design and/or construction of nine trail and greenway projects, one of which is the Grassy Creek Trail.[77] To construct the Grassy Creek Trail, the City of Indianapolis must obtain permits from the Department of Public Works and the Division of Construction and Business Services within the Department of Business and Neighborhood Services, alongside partial land acquisitions.

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[73] City of Indianapolis. 2002. *Revised Code of the Consolidated City and County, Indianapolis, Marion County, Indiana, Title III, Chapter 742, Article I, Section 742-108.* Accessed January 2024. Retrieved from: https://library.municode.com/in/indianapolis_-_marion_county/codes/code_of_ordinances?nodeId=TITIIIPUHEWE_CH742DI_ARTIPRDI_S742-108DEPLDI

[74] City of Fishers. 2019. *The Nickel Plate Trail: Next Level Trails Application Submitted by the City of Fishers.* Accessed January 2024. Retrieved from: http://www.playfishers.com/DocumentCenter/View/1226/NLT-Grant---Fishers---110119

[75] Office of the Recorder of Marion County. 2019. *License Agreement by and Among the Hoosier Heritage Port Authority and the City of Indianapolis, Acting by and through its Department of Public Works (in its Individual Capacity as a Trail Sponsor) to Operate a Certain Portion of the Nickel Plate Trail Pursuant to the National Trail System Act*. Accessed January 2024.

[76] City-County Council of the City of Indianapolis and of Marion County, IN. 2021. *City-County Fiscal Ordinance No. 21, 2021, Proposal No. 290, 2021*. Accessed January 2024.

[77] City of Indianapolis. 2023. "Circle City Forward: Phase 3 (Trails & Greenways)." Accessed January 2024. Retrieved from: https://www.indy.gov/activity/circle-city-forward-phase-3

PILOT PROJECT #4 – CONNER PRAIRIE REFORESTATION

Conner Prairie Museum is authorized under Ordinance No. Z-683-23[78] to plant trees west of the White River as part of the Conner Prairie PUD. The Conner Prairie Museum will consult with the Carmel Urban Forestry Program or seek approval from the Carmel Urban Forester for the tree species it wishes to plant. Under the PUD, Conner Prairie must continue maintenance and auditing of landscaping following the tree planting. Lastly, pursuant to Ordinance No. 09-11-23-A,[79] because certain parts of the proposed planting area are regulated drainage easements, Conner Prairie will apply for a Non-Enforcement Permit from the Hamilton County Surveyor and subsequent approval by the Hamilton County Drainage Board.

PILOT PROJECT #5 – CONNER PRAIRIE WETLAND ENHANCEMENT AND FERTILIZER EDUCATION PROGRAM

Conner Prairie Museum is authorized under Ordinance No. Z-683-23[80] to install wetlands in Carmel and work with farmers to reduce agricultural runoff. Next, Conner Prairie Museum will obtain a permit from the City of Fishers Planning and Zoning Department to install wetlands on the Fishers side of Conner Prairie Museum, pursuant to the City of Fishers municipal code.[81] It must also obtain permits for construction in floodways on the Fishers side from the Indiana Department of Natural Resources (IDNR), pursuant to Indianapolis municipal code Section 740-901.[82] Finally, for those areas identified as "streams," Conner Prairie Museum must obtain permits for access to regulated drainage easements within the proposed project areas on the Fishers side. It can do so through the Hamilton County Drainage Board, pursuant to the Hamilton County Code of Ordinances, Section 36-9-27-1(a).[83]

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[78] City of Carmel. 2023. *Ordinance Z-683-23, Conner Prairie Innovation District: Planned Unit Development District.* Accessed January 2024. Retrieved from: https://cocdocs.carmel.in.gov/WebLink/DocView.aspx?id=2268297&dbid=0&repo=CityofCarmel

[79] Board of Commissioners of Hamilton County. 2023. *Ordinance No. 09-11-23-A: An Ordinance of the Board of Commissioners of Hamilton County Restricting the Placement of other Structures within Regulated Drainage Easements.* Accessed January 2024.

[80] City of Carmel. 2023. *Ordinance Z-683-23, Conner Prairie Innovation District: Planned Unit Development District.* Accessed January 2024. Retrieved from: https://cocdocs.carmel.in.gov/WebLink/DocView.aspx?id=2268297&dbid=0&repo=CityofCarmel.

[81] City of Fishers. 2021. Unified Development Ordinance Sec. 10.1.1B, "Common Review Procedures." Accessed February 2024, Retrieved from: https://online.encodeplus.com/regs/fishers-in/doc-viewer.aspx#secid-289

[82] City of Indianapolis. *Municipal Code, Chapter 740, Article IX, Section 704-901, "Permit application and review procedures."* Accessed February 2024. Retrieved from: https://library.municode.com/in/indianapolis_-_marion_county/codes/code_of_ordinances?nodeId=TITIIIPUHEWE_CH740GEPR_ARTIXFLDEPE

[83] Hamilton County. 2012. *Code of Ordinances: Title 36, Article 9, Chapter 27, Section 1, "Access to regulated drains; permits," subsection (a).* Accessed February 2024. Retrieved from: https://library.municode.com/in/hamilton_county/codes/code_of_ordinances?nodeId=COOR_TIT36LOGO_ART9TRPUWO_CH27CODRBO

GHG REDUCTION MEASURE #3 – INDIANAPOLIS AREA RENEWABLE ENERGY AND WASTE REDUCTION OPERATION

The Indianapolis Area Renewable Energy and Waste Reduction Operation has authority to implement pursuant to Indiana Code 13-18-10.5 Section 1[84] and section IAC 329 11.5-1-2.[85] To design and operate the waste reduction and renewable energy production system, the implementing entities of Indianapolis Motor Speedway, American Dairy Association, and Newtrient must jointly obtain approval from the IDEM Office of Land Quality Satellite Manure Storage Structures. Additionally, IDEM requires a confirmed feeding operation (CFO) permit[86] for anyone who plans to operate or start construction/expansion of a CFO or a concentrated animal feeding operation to submit a permit application and receive a CFO permit, obtaining either a CFO permit or National Pollutant Discharge Elimination System Concentrated Animal Feeding Operation Individual Permit.

[84] State of Indiana. 2005. *Indiana Code, Title 13, Article 18, Chapter 10.5 Satellite Manure Storage Structures.* Accessed January 2024. Retrieved from: https://statecodesfiles.justia.com/indiana/2015/title-13/article-18/chapter-10.5/chapter-10.5.pdf

[85] State of Indiana. 2013. *Indiana Administrative Code, Section 329 IAC 11.5-1-2 – Applicability.* Accessed January 2024. Retrieved from: https://casetext.com/regulation/indiana-administrative-code/title-329-solid-waste-management-division/article-115-biomass-anaerobic-digestion-facilities-and-biomass-gasification-facilities/rule-329-iac-115-1-general-provisions/section-329-iac-115-1-2-applicability

[86] Code of Federal Regulations. 2012. *40 CFR § 122.23 – Concentrated animal feeding operations (applicable to State NPDES programs, see § 123.25).* Accessed January 2024. Retrieved from: https://www.law.cornell.edu/cfr/text/40/122.23#:~:text=Once%20an%20animal%20feeding%20operation,animals%2C%20regardless%20of%20the%20type

7. Intersection with Other Available Funding

Many of the priority GHG reduction measures included in this PCAP expand upon or complement existing programs. The Project Team explored federal and non-federal funding sources to determine whether these sources could fund each priority GHG reduction measure and whether such funding is sufficient to fully implement the measure. Ultimately, CIRDA determined that the programs and pilot projects are not possible without EPA funding. This section describes the process for identifying other available funding opportunities.

APPROACH

The Project Team researched existing funding opportunities at the federal, state, and local level, as well as from key non-profit and private organizations that could potentially support the priority GHG reduction measures. Each GHG reduction measure was organized by specific actions (e.g., installing solar PV systems to public buildings) to determine applicable funding opportunities for each action within a given GHG reduction measure. For each GHG reduction measure, the implementing entity was identified to ensure that entity would be eligible for any additional funding opportunities found through the research.

The Project Team reviewed available private and state-level funding opportunities and researched available federal opportunities by identifying grants, loan programs, tax incentives, and rebates applicable to the GHG reduction measures through a review of the Bipartisan Infrastructure Law Guidebook[87] and Inflation Reduction Act Guidebook.[88] A review of Grants.gov website also provided a list of all relevant current (as of January 2024) and upcoming federal funding sources. Next, the Project Team identified additional relevant funding opportunities available from a set of applicable federal agencies, including those from the US Department of Energy, EPA, US Department of Transportation,

[87] The White House. 2023. *A Guidebook to the Bipartisan Infrastructure Law.* Accessed January 2024. Retrieved from: https://www.whitehouse.gov/build/guidebook/

[88] The White House. 2023. *Inflation Reduction Act Guidebook.* Accessed January 2024. Retrieved from: https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/

US Department of Housing and Urban Development, USDA, and US Department of Treasury. In addition, state level funding opportunities were reviewed from IDNR, Indiana OED, and the Indiana Office of Community & Rural Affairs. Available funding opportunities from local agencies, along with relevant nonprofit organizations, were also reviewed through their respective websites. This research culminated in an initial list of potential funding opportunities for each GHG reduction measure.

Further analysis on the initial list of potential funding opportunities was conducted to determine the implementing organization's eligibility for the funding opportunities and the likelihood of success. Those closing before 1 February 2024, were excluded. The analysis included a review of the notices of funding opportunity in detail, application restrictions and definitions for eligible applicants, and program expectations and desired outcomes. Opportunities that did not meet basic restrictions, eligibility requirements, expectations, or outcomes were removed from consideration. Those opportunities remaining comprised the revised list of funding opportunities.

8. Next Steps

This PCAP is the first deliverable under the CPRG planning grant awarded to CIRDA. CIRDA and its partners will continue planning and conducting stakeholder engagement to meet the region's goals of reducing emissions; investing in sustainable infrastructure, technologies, and practices; building the region's economy; and enhancing the quality of life for residents across the region.

COMPREHENSIVE CLIMATE ACTION PLAN

In spring 2024, the Project Team will begin the planning process for the CCAP to develop equitable and sustainable economic development strategies that reduce emissions across all sectors for Central Indiana. The Project Team will build off the stakeholder engagement accomplished for the PCAP and conduct an extensive outreach process to gather input and feedback on a comprehensive set of GHG reduction measures. The CCAP will include near- and long-term emissions projections, a suite of GHG reduction measures, a robust analysis of measure benefits, plans to leverage federal funding, and a workforce planning analysis.

STATUS REPORT

In 2027, CIRDA will publish a Status Report that details implementation progress for measures included in the PCAP and CCAP, any relevant updates to PCAP and CCAP analyses, and next steps and future budget and staffing needs to continue implementation of CCAP measures.

If you have questions about this PCAP or suggestions for the upcoming CCAP and Status Report, contact CIRDA at info@centralindianarda.org.

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Appendix A LIDAC Census Tracts in Indianapolis-Carmel-Anderson MSA

LIDAC CENSUS TRACTS IN INDIANAPOLIS-CARMEL-ANDERSON MSA

180118104002	180973302102	180973507002	180973604012
180118104003	180973302103	180973508001	180973604013
180118105002	180973302111	180973508002	180973604014
180571101011	180973302112	180973509001	180973604015
180571102011	180973302113	180973509002	180973604021
180571104012	180973302114	180973510001	180973604022
180571107001	180973302123	180973510002	180973604061
180571107002	180973305001	180973510003	180973604062
180571107003	180973305002	180973512001	180973604063
180594104011	180973305003	180973512002	180973604071
180594104021	180973305004	180973512003	180973604072
180594104022	180973305005	180973515001	180973605021
180594104023	180973305006	180973515002	180973605022
180594104024	180973306001	180973515003	180973605023
180594105002	180973306002	180973516002	180973605024
180594106002	180973306003	180973517001	180973605025
180632106072	180973306004	180973517002	180973606011
180632109003	180973306005	180973517003	180973606012
180816106082	180973307011	180973519001	180973606013
180816110002	180973307012	180973519002	180973606014
180816113001	180973307021	180973519003	180973606021
180816113002	180973307022	180973521001	180973606022
180816113003	180973307023	180973521002	180973606023
180816113004	180973308031	180973521003	180973606024
180950003001	180973308032	180973523001	180973608001
180950003002	180973308033	180973523002	180973608002
180950003003	180973308041	180973524001	180973608003
180950004001	180973308042	180973524002	180973609001
180950004002	180973308051	180973524003	180973609002
180950005001	180973308052	180973525001	180973609003
180950005002	180973308053	180973525002	180973609004
180950005003	180973308061	180973525003	180973609005
180950008001	180973308062	180973526001	180973612001
180950008002	180973308063	180973526002	180973612002
180950009001	180973309001	180973526003	180973612003
180950009002	180973309002	180973526004	180973613001
180950010001	180973309003	180973527001	180973613002
180950010002	180973309004	180973527002	180973613003
180950011001	180973310001	180973527003	180973614011
180950011002	180973310002	180973528001	180973614012
180950011003	180973310003	180973533002	180973614013
180950012001	180973310004	180973535001	180973614023
180950012002	180973310005	180973535002	180973702011
180950012003	180973401021	180973536001	180973702012

180950014001	180973401022	180973536002	180973702013
180950014002	180973401023	180973536003	180973702031
180950014003	180973401024	180973542011	180973702032
180950014004	180973401081	180973542012	180973702041
180950015003	180973401082	180973542024	180973702042
180950017001	180973401083	180973544002	180973702043
180950017002	180973401122	180973545001	180973703032
180950017003	180973401132	180973545002	180973801011
180950018011	180973401155	180973545003	180973801012
180950018012	180973402011	180973547001	180973801013
180950018021	180973402012	180973547002	180973801014
180950019011	180973402021	180973548001	180973801021
180950019012	180973402022	180973548002	180973801022
180950019013	180973402023	180973549001	180973801031
180950019021	180973402024	180973549002	180973801032
180950019022	180973403011	180973550001	180973801033
180950020001	180973403012	180973550002	180973801034
180950020002	180973403021	180973550003	180973801035
180950020003	180973403022	180973551001	180973802001
180950102001	180973403023	180973551002	180973802002
180950102002	180973404001	180973551003	180973802003
180950102003	180973404002	180973553001	180973803011
180950102004	180973404003	180973553002	180973803012
180950102005	180973405001	180973554001	180973803021
180950102006	180973405002	180973554002	180973803022
180950103001	180973405003	180973554003	180973803023
180950103002	180973405004	180973555001	180973803024
180950103003	180973406001	180973555002	180973804021
180950106001	180973406002	180973555003	180973804022
180950106002	180973406003	180973555004	180973804023
180950106003	180973406004	180973556001	180973804034
180950106004	180973406005	180973556002	180973805011
180950106005	180973407001	180973557001	180973805012
180950106006	180973407002	180973557002	180973805021
180950116001	180973407003	180973557003	180973805022
180950119001	180973408001	180973559001	180973805023
180950119002	180973408002	180973559002	180973806001
180950120001	180973409041	180973559003	180973806002
180950120002	180973411001	180973564001	180973806003
180950120003	180973411002	180973564002	180973807001
180973102011	180973411003	180973564003	180973807002
180973102031	180973412001	180973569001	180973807003
180973102042	180973412002	180973569002	180973807004
180973103051	180973412003	180973569003	180973808001
180973103052	180973416001	180973570001	180973808002
180973103053	180973416002	180973570002	180973808003
180973103054	180973416003	180973570003	180973809013
180973103055	180973417011	180973570004	180973810031

180973103061	180973417012	180973571001	180973810032
180973103062	180973417013	180973571002	180973810033
180973103063	180973417021	180973571003	180973810041
180973103064	180973417022	180973572001	180973810042
180973103082	180973419031	180973572002	180973810043
180973103091	180973419032	180973572003	180973812031
180973103092	180973419033	180973572004	180973812032
180973103093	180973419034	180973573001	180973812041
180973103111	180973419041	180973573002	180973812042
180973103121	180973420001	180973574001	180973812052
180973103122	180973421011	180973574002	180973812053
180973103123	180973421012	180973574003	180973812071
180973103124	180973421013	180973574004	180973901021
180973201061	180973422001	180973575001	180973901022
180973201081	180973422002	180973575002	180973901023
180973201082	180973422003	180973575003	180973905001
180973201083	180973423001	180973575004	180973905002
180973202062	180973423002	180973576011	180973905003
180973209021	180973423003	180973576012	180973907001
180973209022	180973423004	180973576013	180973907002
180973209023	180973424001	180973576021	180973907003
180973209031	180973425001	180973578001	180973908022
180973209032	180973425002	180973578002	180973909004
180973209033	180973425003	180973579001	180973910011
180973209034	180973425004	180973579002	180973910021
180973210011	180973425005	180973579003	180973910022
180973210012	180973426001	180973579004	181095101023
180973210022	180973426002	180973580001	181095102025
180973216002	180973426003	180973580002	181095107011
180973219004	180973426004	180973581001	181095107012
180973220001	180973426005	180973581002	181095107013
180973220002	180973501001	180973601011	181095108001
180973220003	180973501002	180973601012	181095108002
180973225001	180973503001	180973601021	181095108003
180973225002	180973503002	180973601022	181095109001
180973226011	180973503003	180973601023	181095109002
180973226012	180973504001	180973602011	181095109003
180973226013	180973504002	180973602012	181095110022
180973226021	180973504003	180973602013	181457104001
180973226022	180973505001	180973602021	181457104002
180973227003	180973505002	180973602022	181457106011
180973301031	180973505003	180973602023	181457106012
180973301061	180973506001	180973603011	181457106013
180973301062	180973506002	180973603012	181457106014
180973301063	180973506003	180973603013	181457106021
180973301064	180973506004	180973603021	181457106022
180973301065	180973506005	180973603022	181457106023
180973302101	180973507001	18097304011	

Appendix B CIRDA Quality Assurance Project Plan

Climate Pollution Reduction Grants Program:

CIRDA Quality Assurance Project Plan

United States Environmental Protection Agency

Office of Air and Radiation

August 31, 2023

1. Project Management (Group A)

1.1. Title and Approval Page

Quality Assurance Project Plan for
Indianapolis-Carmel-Anderson

Prepared by:
Central Indiana Regional Development Authority (CIRDA)

3 Municipal Drive
Fishers, Hamilton County, Indiana, 46038

Prepared for:
US EPA Region 5
77 W. Jackson Blvd
Chicago, IL 60604

08/31/2023

APPROVALS:

Jennifer Messer, CIRDA Executive Director Date: 10/4/2023

Jennifer Messer

Jordin Alexander, City of Fishers Chief of Staff Date: 10/4/2023

Jordin Alexander

USEPA Region 5 Grants Project Officer: Date: 10/4/2023

USEPA Region 5 Quality Assurance Manager: Date: 10/4/2023

Victor Schultz

QAPP Revision History

Revision No.	Description	Author	Date
0	Original Version	Megan Vukusich, City of Fishers	08/31/2023
1	Revised Version	Jordin Alexander, City of Fishers	10/3/2023
2	Revised Version 2	Jordin Alexander, City of Fishers	10/4/2023

1.2. Table of Contents[1]

[1] For grantees who are not familiar with using MS Word's TOC functions, please review the video at https://www.youtube.com/watch?v=0cN-JX6HP7c. Accessed on 6/23/2023.

List of Tables

List of Exhibits

Abbreviations

CAA	Clean Air Act
CFR	Code of Federal Regulations
CCAP	Comprehensive Climate Action Plan
CIRDA	Central Indiana Regional Development Authority
CPRG	Climate Pollution Reduction Grant
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resources Management
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 CFR Part 98)
ICR	Information Collection Request
NEI	EPA's National Emissions Inventory

OAR	EPA Office of Air and Radiation
PCAP	Priority Climate Action Plan
PM	Project Manager
PO	EPA Project Officer for Grant
POP	Period of Performance
POR	EPA Project Officer's Representative
PWP	Project Work Plan
QA	Quality Assurance
QAM	Quality Assurance Manager
QAMD	Quality Assurance Manager Delegate
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCC	Quality Control Coordinator
LGGIT	Community - GHG Inventory Tool (provided by the EPA)
TL	Task Leader

1.3. Distribution List

This section presents the primary staff who will be working on the project. These staff will be identifying existing[2] data resources for evaluation and potential use under the project or serving in project-specific roles for implementing the Quality Assurance Project Plan (QAPP). The listing in **Table 1.1** includes staff responsible for implementing independent internal quality management steps and staff serving in external oversight roles.

This QAPP and, as applicable, all major deliverables relying on existing data will be distributed to the staff presented in **Table 1.1.** Additionally, this QAPP will be provided to any unlisted staff who are assigned to perform work under this project. A secured copy of this QAPP will be maintained in the project files under https://theermgroup.sharepoint.com/sites/701435CPRGCentralIndianaClimateActionPlan.

Table 1.1 QAPP Distribution List

Name	Organization	Role
Carter Cranberg	US EPA, Region 5	EPA Project Officer (PO)
Victor Schultz	US EPA, Region 5	EPA Quality Assurance Manager or Delegate
Jennifer Messer	CIRDA Executive Director	Project Manager
Jordin Alexander	City of Fishers Chief of Staff	Quality Assurance Manager
Cassandra Kubes	Environmental Resources Management (ERM)	Grantee Task Leader
Jenna Vanderbosch	Environmental Resources Management (ERM)	Grantee Task Leader
Emma Ardington	Environmental Resources Management (ERM)	Grantee Task Leader
Michael Conrardy	Environmental Resources Management (ERM)	Grantee Task Leader

1.4. Project/Task Organization

The primary personnel responsible for implementation of this project are the CIRDA Project Manager (PM), Quality Assurance Manager (QAM), and Task Leaders (TLs). Their duties are outlined briefly in this section. The project QAM is independent of the unit generating the data.

[2] The term "existing data" is defined by the EPA's *Environmental Information Quality Policy* (CIO 2105.3) as "… data that have been collected, derived, stored, or reported in the past or by other parties (for a different purpose and/or using different methods and quality criteria). Sometimes referred to as data from other sources." The term "secondary data" may also be used to describe "existing data" in historical EPA quality-related documents.

Jennifer Messer is the CIRDA PM and will provide senior-level oversight as needed. The PM is responsible for CIRDA's technical and financial performance as well as maintaining communications with the EPA to ensure mutual understanding of grant requirements, EPA expectations, and conformity with EPA quality procedures; managing oversight and conduct of project activities including allocation of resources to specific tasks; ensuring that quality procedures are incorporated into all aspects of the project; developing, conducting, and/or overseeing QA plans as necessary; ensuring that any corrective actions are implemented; operating project activities within the documented and approved Quality Assurance Project Plan; and ensuring that all products delivered to the EPA are of specified type, quantity, and quality.

The CIRDA PM will assign a TL for each technical task with instructions to complete a baseline emissions inventory for the sector(s) under the task, to develop options for potential emissions reductions with estimated reductions per option, to develop uncertainty estimates for each reduction estimate, and to develop an analysis focused on low-income and disadvantaged communities and benefits. **Table 1.1** presents the TLs for each technical task. Each TL is responsible for the day-to-day technical activities under their assigned task, including planning, reporting, and controlling of technical and financial resources allocated to the task by the PM. Accordingly, each TL is primarily responsible for implementing the Quality Program and this QAPP on task-level assignments.

Additionally, CIRDA has engaged Environmental Resources Management (ERM) to assist with the development of each technical task. ERM will work with CIRDA to collect the necessary data for each technical task and be under the supervision of the CIRDA PM and TLs.

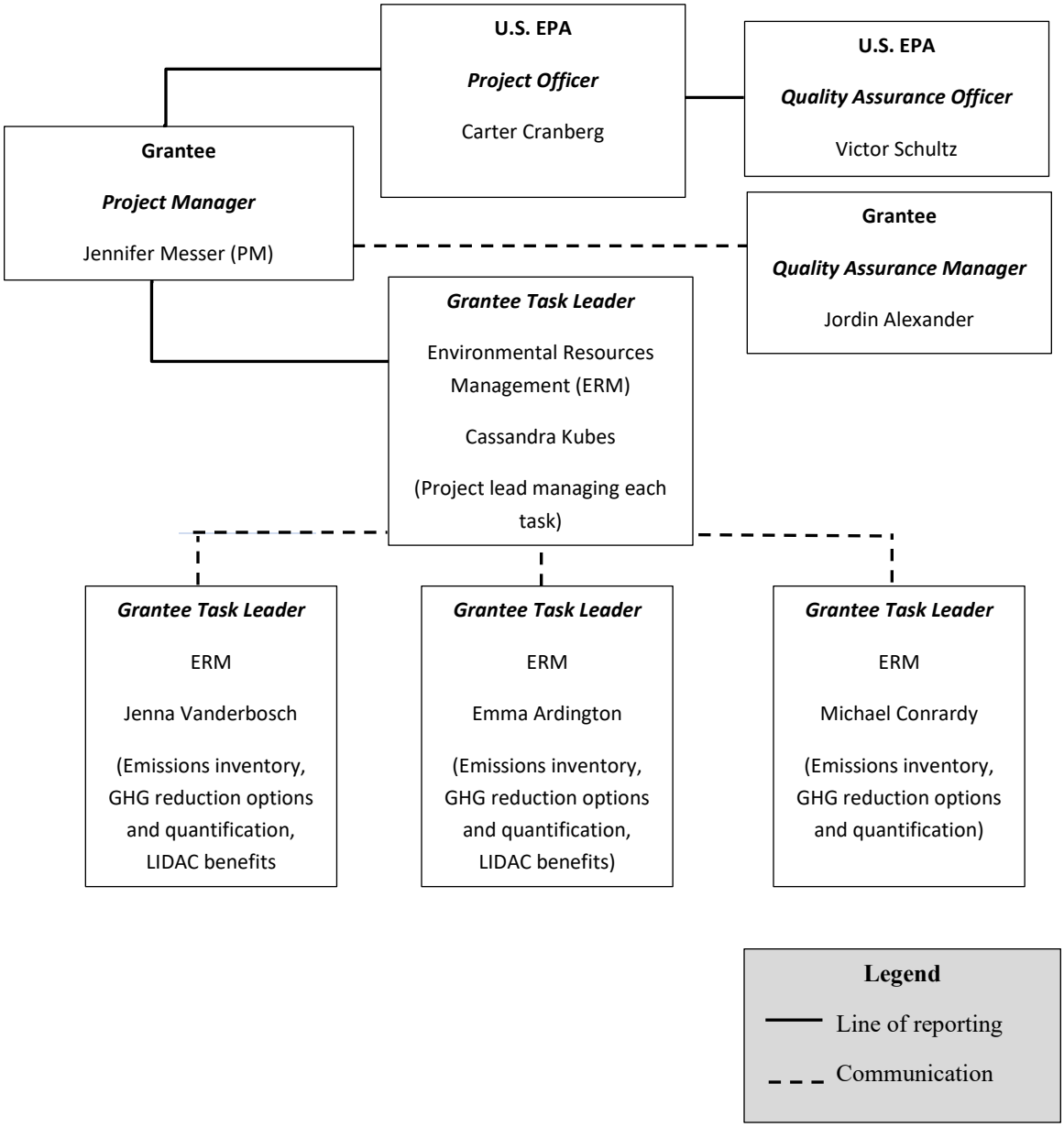
Task-level management system. For each of the major deliverables under each task, the assigned TL will review all QA-related plans and reports and is responsible for transmitting them to the QA Manager (or delegate) for review and approval. Each TL is responsible for ensuring that quality procedures are implemented at the task level and for maintaining the official, approved, task-level QAPP content. Each TL will discuss any concerns about quality or any proposed revisions to task-level QAPP content with the QA Manager (or delegate) to identify, resolve, or preclude problems or to amend task-level plans, if necessary. In addition, each TL will work with the CIRDA PM and the QA Manager to identify and implement quality improvements. The CIRDA PM is responsible for ensuring the consistency of similar or related QA measures across tasks, and the TLs are responsible for overseeing task-level work performed by technical staff and providing assurance that all required QA/QC procedures are being implemented.

Project-level management system. Tasks are expected to proceed concurrently, in parallel. The PM will maintain close communications with each TL and ensure any difficulties encountered or proposed changes at the task level are reviewed for implications on other similar or related tasks. The PM is also responsible for communicating progress or difficulties encountered (across all tasks) to the EPA PO or POR, who provides the EPA's primary oversight function for this project at EPA OAR/ Region 5 and is responsible for review and approval of this QAPP and any future revisions. The PM (with support from TLs and assigned CIRDA technical staff) will be responsible for consulting with the EPA PO or POR, on planning, scheduling, and implementing the QA/QC for all project deliverables and obtaining required EPA approvals.

The QA Manager, Jordin Alexander, is responsible for overseeing the quality system, monitoring and facilitating QA activities on tasks, and generally helping the CIRDA PM and TLs understand and comply with EPA QA requirements. She will not be involved in data collection or analyses. At the request of the CIRDA PM, Ms. Alexander is responsible for conducting periodic independent audits of this project's QA program, Ms. Alexander will produce written documentation of the audit results and recommendations.

In addition, QC functions will be carried out by other technical staff and will be carefully monitored by the PM, who will work with the QA Manager to oversee this plan and implement quality improvements. For work done under this project, technical staff may include persons with expertise in the local residential, commercial, and industrial activities. Technical staff may also include persons with expertise in air pollution engineering, technical reviewers, database specialists, quality auditors, and technical editors. The PM will ensure that technical staff do not review work in a QA capacity for which they were a primary or contributing author. **Exhibit 1** presents the organizational chart for the project.

Exhibit 1. Project Organization[3]



[3] Under the EPA's QAPP standard (CIO 2105-S-02.0, section 3) the organization chart must also identify any contractor relationships relevant to environmental data operations.

1.5. Problem Definition / Background

Under this project, CIRDA will identify, evaluate, and utilize existing data resources[4] to develop a local inventory of the major sources of greenhouse gas (GHG) emissions within Indianapolis-Carmel-Anderson and use that inventory data to develop a climate action plan. This QAPP focuses on the handling of environmental information under sector-specific tasks by technical staff charged with completing the following tasks in a future planning project implemented in accordance with this QAPP:

1. Develop a comprehensive GHG inventory for the largest sources within each sector,
2. Develop options for reducing emissions within each sector,
3. Develop estimates or ranges of estimates for reductions achievable under each option,
4. Develop uncertainty analyses for each option's emissions reduction estimate,
5. Develop an analysis focused on low-income and disadvantaged communities and benefits, and
6. Present these analyses and options in technical reports consistent with the deliverables required under the CPRG planning grants.

The GHG inventory may utilize the EPA's Local – GHG Inventory Tool (LGGIT),[5] facility-specific GHG data published by the EPA in the Facility Level Information on Greenhouse gases Tool (FLIGHT),[6] data reported to the EPA's Greenhouse Gas Reporting Program (GHGRP),[7] EPA's National Emissions Inventory (NEI),[8] DOE's State and Local Planning for Energy (SLOPE) Platform,[9] the Global Protocol for Community-Scale (GPC) Greenhouse Gas Inventories,[10] the Local Government Operations (LGO) Protocol,[11] and/or 3rd party data or tools, together with any independent, sector-specific estimates prepared by CIRDA. The FLIGHT and GHGRP datasets can be downloaded and filtered by state, city, county, and/or zip code. Any independent local or MSA estimates or ratios (e.g., electricity usage per customer by customer class) will be compared to corresponding federal, state, or local estimates for validation, as available. Significant differences between primary estimates and validation estimates will be evaluated and discussed in the inventory report with the underlying data and methodologies used for the estimates. As applicable, the local inventory will include the following sources and gases (divided into the Residential, Commercial/Institutional, Industrial, and Energy Generation sectors):

LGGIT Source Categories	***Greenhouse Gases (across all sectors)***
1. Mobile Combustion 2. Stationary Combustion 3. Electricity Consumption 4. Solid Waste 5. Urban Forestry 6. Agriculture & Land Management 7. Water Use	carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases (F-gases) including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)

[4] EPA, *Environmental Information Quality Policy*, CIO 2105.3, 03/07/2023 (p. 8) provides common examples of environmental information used to support the EPA's mission at https://www.epa.gov/system/files/documents/2023-04/environmental_information_quality_policy.pdf.

[5] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool

[6] Facility Level Information on Greenhouse gases Tool (FLIGHT) at https://ghgdata.epa.gov/

[7] https://www.epa.gov/ghgreporting/data-sets

[8] https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-ne

[9] https://www.energy.gov/scep/slsc/state-and-local-planning-energy-slope-platform

[10] https://ghgprotocol.org/ghg-protocol-cities

[11] https://ww2.arb.ca.gov/sites/default/files/classic/cc/protocols/lgo_protocol_v1_1_2010-05-03.pdf

8. Waste Generation
9. Wastewater Treatment

The EPA LGGIT has two modules: the Local Government Operations Module is specific to municipal governments and evaluating GHG emissions by their departments, and the Community Module, which could also include local government information. The LGGIT User Guides state the two modules are companion tools, and any totals estimated in the Government Operations Module can be included in the Community Module. For example, a county could use the Community Module and incorporate data from the Government Operations Modules completed by the cities within the county. Grantees using both modules should conduct a quality check to ensure that emissions do not get double-counted.

1.5.1. Rationale for Selection of Sectors

For each sector included in the local inventory, **Table 1.2** briefly describes why the sector was considered for inclusion in the inventory and the relative significance of the sector in terms of the magnitude of air emissions from existing inventories, the associated geographic distribution of the sources, and recent trends in readily available activity data for the source category.

Table 1.2 Rationale for Sector Selection

Sectors Considered for Inclusion in Inventory	**Rationale for Considering for Inclusion in GHG Inventory**
Mobile combustion	Transportation activities accounted for 20 percent of total Indiana greenhouse gas emissions in 2020. From 1990 to 2020, transportation CO_2 emissions from fossil fuel combustion increased by 19 percent. Transportation activities occur in all communities.
Electricity consumption	The electric power sector was the largest source (25 percent) of total Indiana greenhouse gas emissions in 2020. Power generation and/or consumption occurs among all communities.
Urban forestry[12]	This sector includes fluxes of carbon from activities such as converting forests to agricultural use and practices that remove CO_2 from the atmosphere and store it in long-term carbon sinks like forests. In 2020, the net CO_2 removed from the atmosphere by natural and working lands was 3% of total Indiana greenhouse gas emissions. Between 1990 and 2020, total carbon sequestration in this sector decreased by 12%, primarily due to a decrease in the rate of net carbon accumulation in forests, as well as an increase in CO_2 emissions from urbanization.
Agriculture & land management	Agriculture accounted for about 8 percent of Indiana greenhouse gas emissions in 2020, and agricultural soil management was the largest source of N_2O emissions. Enteric fermentation was the largest source of CH_4 emissions.

[12] Under international GHG inventory protocols this category is called “Land use, land-use change, and forestry.”

Stationary combustion (including for commercial and residential heating)	In 2020, the commercial and residential sectors accounted for 5 percent each of total Indiana greenhouse gas emissions, respectively. Emissions from the commercial and residential sectors have decreased since 1990. Total residential and commercial greenhouse gas emissions, including direct and indirect emissions, in 2020 have decreased by 4% since 1990. In 2021, an increase in heating degree days (0.5 percent) increased energy demand for heating in the residential and commercial sectors, while a 1.8 percent decrease in cooling degree days compared to 2020 reduced demand for air conditioning in the residential and commercial sectors.
Solid waste and waste generation	This sector includes landfills, composting, and anaerobic digestion. Landfills were the third largest source of anthropogenic methane emissions in 2021, and landfills accounted for 1.9 percent of total Indiana greenhouse gas emissions.
Wastewater treatment	Wastewater treatment, both domestic and industrial, was the third largest anthropogenic source of N_2O emissions in 2021, accounting for 5.2 percent of national N_2O emissions and 0.3 percent of total U.S. greenhouse gas emissions. Emissions from wastewater treatment increased by 6.1 MMT CO_2e (41.6 percent) since 1990 as a result of growing U.S. population and protein consumption. There are approximately 68 permitted municipal wastewater treatment plants within CIRDA's jurisdiction.
Water	This sector includes indirect emissions associated with the electricity used to deliver water to local communities.

1.5.2. Decisions to be Made

The EPA's recommended tool for local GHG inventories (the LGGIT) covers categories of GHG emissions by source category (e.g., mobile combustion, stationary combustion, electricity consumption, solid waste, etc.). The LGGIT provides many default values to facilitate developing local estimates using methods consistent with the Global Protocol for Community-Scale GHG Emissions.[13] There are four primary decisions to be made under each task of this project for each source category, and each Task Leader will be charged with the following decisions:

1. Determine (for each major activity) if the LGGIT estimate, a different federal estimate or tool, or a non-federal estimate should be used for the local GHG baseline estimate.
2. Determine the best options for reducing emissions of air pollution and achieving the following Congressional objectives under the Inflation Reduction Act:
    a. Reduce climate pollution while supporting creation of good jobs and lowering energy costs for families.
    b. Accelerate work addressing environmental injustice and empowering community driven solutions in overburdened neighborhoods.
    c. Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school.
3. Develop an estimate or a range of estimates for reductions achievable and benefits to low-income and disadvantaged communities under each option.
4. Estimate the uncertainty of the emissions reduction estimate(s) or ranges under each option.

1.5.3. Actions to be Taken, Action Limits, and Expected Outcomes

[13] https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

Initially, local estimates will be derived using the LGGIT tool for each source category. Subsequently, the community may elect to supplement estimates derived using the LGGIT with estimates for each source category from existing local inventories, existing local activity data, or from other EPA or state resources. Calculated estimates derived from local activity data will be compared to federal datasets and/or downscaled state estimates for validation. The rationale for including any emissions estimates that show significant discrepancies from state or federal estimates will be documented in the community's GHG inventory report along with the underlying data and calculation methodology.

When identifying the best options for reducing air pollution, each TL will consider the activities affecting the largest numbers of families, business establishments, recreation areas, and schools. Options may include potential reductions in task-level activities impacting residential, commercial, and school districts near the largest sources of air pollution. CIRDA expects the options for sector-specific emissions reduction projects will be developed for further consideration by management and policymakers.

1.5.4. Reason for Project

The baseline GHG inventory and options analyses developed under this local community project will be utilized by CIRDA for planning purposes to support Indianapolis-Carmel-Anderson's development of the following three CPRG planning deliverables:

- Indianapolis-Carmel-Anderson's **Priority Climate Action Plan** (PCAP), which is due March 1, 2024. This plan will include near-term, implementation-ready, priority GHG reduction measures and is a prerequisite for any implementation grant.
- Indianapolis-Carmel-Anderson's **Comprehensive Climate Action Plan** (CCAP), which is due in 2025 (later for tribes and territories). This plan will review all sectors that are significant GHG sources or sinks, and include both near- and long-term GHG emission reduction goals and strategies.
- Indianapolis-Carmel-Anderson's **Status Report** on progress towards goal, which is due in 2027 (not applicable to tribes or territories). This progress report will include updated analyses, plans, and next steps for key metrics.

This QAPP describes in detail the necessary QA and QC requirements and technical activities that will be implemented to ensure the baseline GHG inventory and the sector-specific emissions reduction options are reliable for the PCAP and CCAP. As necessary, revisions to the QA and QC requirements defined in this QAPP will be updated later and for the 2027 Status Report.

1.5.5. Relevant Clean Air Act Mandates and Authorizations

The inventory produced under this project will support the deliverables required under EPA's Climate Pollution Reduction Planning Grants. The inventory will be used to evaluate opportunities for reducing GHG emissions from all major-emitting sources including both mobile source categories and stationary source categories. This project will include the fundamental research necessary to evaluate and plan new programs (and amendments to existing Clean Air Act [CAA] programs) for reducing emissions from fossil fuel combustion activities. Many activities in the GHG inventory (and subsequent emissions reductions options analyses) include major sources of criteria and toxic pollutants. Accordingly, the purpose of this project (to evaluate and plan for reductions in GHG emissions, including reductions from usage or production of fossil fuels) is also consistent with the following statutory mandates and authorizations under Clean Air Act Title I:

- ***§ 7403. Research, investigation, training, and other activities***
  (a) Research and development program for prevention and control of air pollution

The Administrator shall establish a national research and development program for the prevention and control of air pollution ….

(1) conduct, and promote the coordination and acceleration of, research, investigations … and studies related to the causes … extent, prevention, and control of air pollution;

(2) encourage, cooperate with, and render technical services and provide financial assistance to air pollution control agencies and other appropriate public or private agencies, institutions, and organizations, and individuals in the conduct of such activities ….

(b) Authorized activities of Administrator in establishing research and development program
In carrying out the provisions of [paragraph (a)] the Administrator is authorized to–

(1) collect and make available, through publications and other appropriate means, the results of and other information, including appropriate recommendations by him in connection therewith, pertaining to such research and other activities;….

(2) make grants to air pollution control agencies … for purposes … in subsection (a)(1) ….

- ***§ 7404. Research related to fuels and vehicles***
  (a) Research programs; grants; ….
  The Administrator shall give special emphasis to research and development into new and improved methods, having industry-wide application, for the prevention and control of air pollution and control of air pollution resulting from the combustion of fuels… he shall–

  (1) conduct and accelerate research programs directed toward development of improved , cost-effective techniques for–

  (A) control of combustion byproducts of fuels, ….

  (B) improving efficiency of fuels combustion so as to decrease atmospheric emissions ….

- ***§ 7405. Grants for support of air pollution planning and control programs***
  (a) Amounts; limitations; assurances of plan development capability.
  (1)(A) The Administrator may make grants to air pollution control agencies … in an amount up to three-fifths of the cost of implementing programs for the prevention and control of air pollution …. For the purpose of this section, "implementing" means any activity related to the planning, developing, establishing, carrying out, improving, or maintaining of such programs….

  (C) With respect to any air quality control region or portion thereof for which there is an applicable implementation plan under section 7410 … grants under subparagraph (A) may be made only to air pollution control agencies which have substantial responsibilities for carrying out such applicable implementation plan.

1.5.6. Information Provided by the EPA under § 7403(b)(1)

Under authority of CAA § 7403(b)(1) the EPA has provided the following resources to ensure reliable air emissions inventories are produced to support plans for reducing emissions.

- Agency-wide Quality Program Documents
- Quality Assurance-specific Directives
  - CIO 2105.3 – Environmental Information Quality Policy, April 10, 2023
  - CIO 2105-P-01.3 – Environmental Information Quality Procedure, March 7, 2023
  - CIO 2105-S-02.0 – EPA's Environmental Information QA Project Plan (QAPP) Standard
  - EPA Regional Sites for Quality Management Plans and Guidance:
    - Region 1
    - Region 2
    - Region 3
    - Region 4
    - Region 5
    - Region 6
    - Region 7
    - Region 8
    - Region 9
    - Region 10

- QA Guidance
  - EPA QA/G-4 – *Guidance on Systematic Planning Using Data Quality Objectives Process*
  - EPA QA/G-5 – *Guidance for Quality Assurance Project Plans*

CIRDA will utilize these resources, as applicable, to ensure evaluation of existing data and utilization of those data are consistent with the EPA's relevant directives and guidance.

1.6. Project / Task Description

A schedule of deliverables for the technical tasks (Tasks 1-5) for the GHG inventory is presented in **Tables 2.1** through **2.5.** The work to be performed under this project involves preparing a local GHG emissions inventory for Indianapolis-Carmel-Anderson and developing options and benefits analyses for reducing emissions within each sector. The organization of the work is based on the use of the EPA's Local – GHG Inventory Tool (LGGIT)[14] and may include other tools as described herein under the following sector-specific tasks:

Task 1: Local inventory of mobile combustion GHG emissions and development of options analysis.

Task 2: Local inventory of electric power consumption (indirect) GHG emissions and development of options analysis.

Task 3: Local inventory of solid waste GHG emissions and development of options analysis.

Task 4: Local inventory of GHG emissions from other sectors and development of options analysis.

- 4.1 Stationary combustion
- 4.2 Agriculture and land management
- 4.4 Waste generation
- 4.5 Water
- 4.6 Wastewater treatment

Task 5: Local inventory of urban forestry resources and development of options analysis.

For each sector-specific task, **Tables 2.1–2.5** provide planned activities and a schedule of deliverables for use in preparing a GHG inventory. The EPA's LGGIT, other resources, and answers to frequently asked questions are also located on the Local GHG Inventory Tool Page Greenhouse Gas Data and Resources webpage.[15] The LGGIT User's Guides provide a summary of required data inputs for each module (Table 1 of each LGGIT User's Guide). Exhibit 2 details the geographic scope of the project, covering 11 counties in the Indianapolis-Carmel-Anderson MSA.

[14] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool .
[15] Ibid.

Exhibit 2. Project Geographic Scope

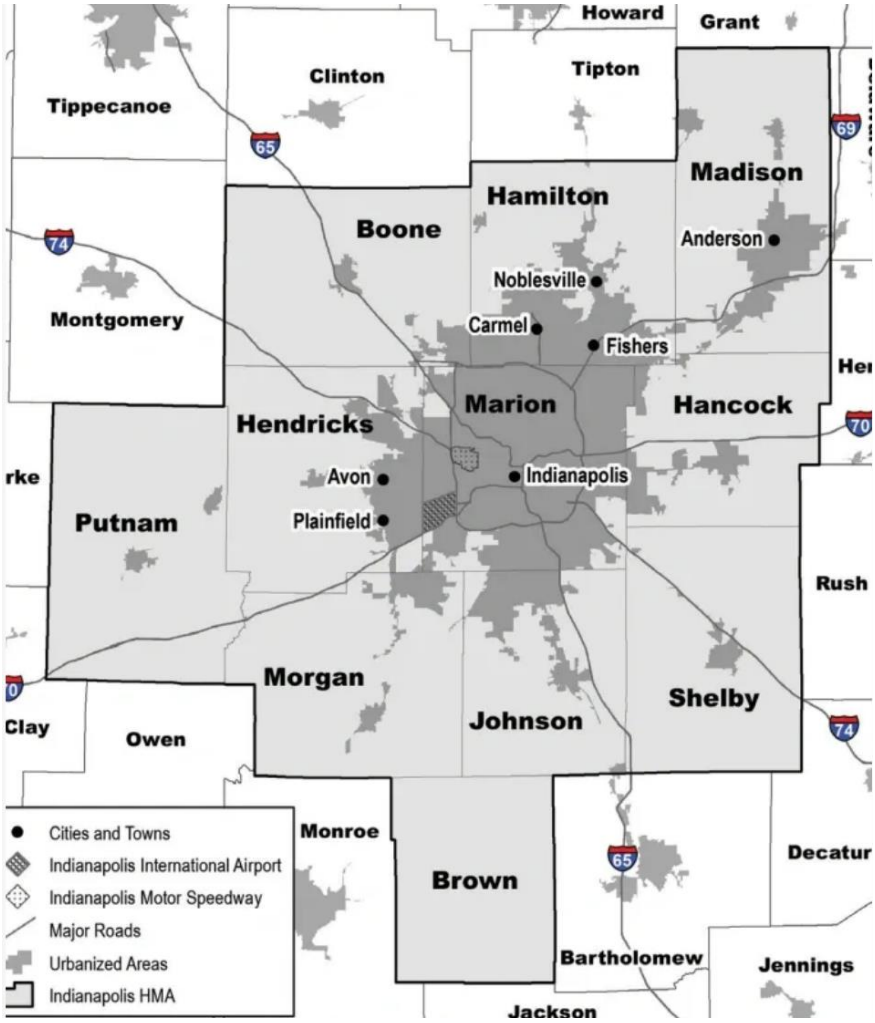


Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
1. The PM or TL will assign staff to download the EPA's Local – GHG Inventory Tool (LGGIT) at https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool and use that tool to estimate emissions from mobile combustion sources. 2. Staff will read the [Introduction] worksheet and the [Read Me] worksheet to become familiar with the organization of the tool and the tool's terminology. Staff will become familiar with Rows 42 through 59 of the [Read Me] sheet that reflect a brief summary of the steps necessary to complete the calculations for each sector. Additionally, staff can reference the LGGIT User's Guide for the Community Module that is included within the downloaded zip file.	Initiate work within 15 days of QAPP approval by EPA. Complete by Dec. 2023

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	**Schedule**
Task 1. Mobile Combustion (Transportation)	
3. Staff will complete the four (4) initial setup steps on the [Control Sheet]. 4. Staff will review Chapter 7 - Transportation in the GPC GHG Emissions Inventories, and/or Chapter 7 - Vehicle Fleet in the LGO Protocol. Staff will obtain from a state or local motor vehicle agency, the most recent listing of vehicles registered at addresses located in the local community or MSA including (as available) year-manufactured, make, model, body style, fuel, and description. 5. In the LGGIT: Community Module [community_ghg_inventorytool.xlsm], staff will use the [Mobile-Entry] sheet to load the community's or MSA's population of fossil-fueled motor vehicles. Staff will prepare an aggregated listing (i.e., listing of sets of vehicles with counts by vehicle type, model, year, and fuel) for all of registered vehicles and an estimate of the average fuel consumed for each set of similar vehicles. 6. The PM, TL, or QAM will assign a staff member who did not support steps 1-5 of this task to complete a QC review. Staff will independently review the original source data for all inputs and supporting calculations used to populate the [Mobile-Detail Calcs] sheet. Staff will also complete an independent review of all inputs to the LGGIT and complete independent calculations for at least 2 types of vehicles (as directed by the PM or TL) on the [Mobile-Detail Calcs] sheet. The assigned QC staff member will also be directed to compare the LGGIT-based estimate to the estimate published in the EPA's National Emissions Inventory (NEI) and available using the *Data Queries* tool at https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries. This NEI query tool provides national, state, county, and tribal emissions estimates for mobile sources. 7. In the GHG inventory report or in a separate report based on the GHG inventory, CIRDA will include a listing of options for emissions reductions from this sector that may include one or more of the following components or other components (that are not listed below) that assigned staff may identify during preparation of the inventory in the future during implementation of this task: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate.	.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity to major transportation corridors. 8. The below listing of data sources and tools may be used to evaluate and analyze GHG emissions reduction options for this sector: a. EPA's Motor Vehicle Emission Simulator (MOVES) b. EPA's Avoided Emissions and Generation Tool (AVERT) c. EPA's Travel Efficiency Assessment Method (TEAM) d. U.S National Blueprint for Transportation Decarbonization e. EPA's Green Vehicle Guide f. EPA's Automotive Trends Report g. FuelEconomy.gov h. EPA's Diesel Emission Quantifier i. EPA's Diesel Retrofit and Replacement Guidance j. EPA's Smart Growth k. Additional resources are summarized in **Appendix D**.	

Table 2.2 Technical Task Descriptions for Subtask 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
1. The PM or TL will assign a staff member to use the EPA's LGGIT tool [community_ghg_inventorytool.xlsm] and to verify that the four (4) initial steps required on the [Control Sheet] have been completed. 2. Staff will review Chapter 6.5 - Calculating Emissions from Grid-Supplied Energy Consumption in the GPC GHG Emissions Inventories, and/or Chapter 6.2 - Electricity Use in the LGO Protocol.	Initiate work within 15 days of QAPP approval by EPA.

Table 2.2 Technical Task Descriptions for Subtask 2.

<table>
<tr><th>Tasks and Deliverables</th><th>Schedule</th></tr>
<tr><td colspan="2">Task 2. Electric Power Consumption</td></tr>
<tr><td>
3. Staff will obtain total electricity consumption data for the community or MSA from one or more of the following local, state, or federal resources to be used for the baseline estimate or QC validation of the baseline estimate:
a. Summaries of metered consumption obtained from the local electric utilities that serve the community or MSA by customer class.
b. EIA Form 861 data published by the DOE and available at https://www.eia.gov/electricity/data/eia861/.
c. The State and Local Planning for Energy (SLOPE) model datasets available at https://maps.nrel.gov/slope/about. Note these data are published as electricity usage in the units of MMBtu/year for the entire county. Estimates are provided for residential, commercial, and institutional customer classes. These data will be converted to kilowatt-hours per year prior to entry into the LGGIT tool. The projections available in this tool (for future years) may also be used for estimating emissions reductions associated with options listed for the electric utility sector.
4. Staff will use the [Electricity-Entry] sheet of the EPA's LGGIT tool. Staff will read the explanation of the Data Entry & Calculations starting in cell A3. Staff will enter the data for each chosen entity. These entities may be of any scale as chosen by the grantee (e.g., the entire community by sector; individual building, such as a commercial or institutional facility; or a set of similar facilities (e.g., a group of similar residential units). For groups of similar units, when entering the Unit Description in cell C10 of the [Electricity-Entry] sheet, staff will include in the description the number of units that were included when the electricity purchased (kWh) value was summed or otherwise calculated for entry into cell C16. Staff will document in the inventory each calculation with associated units of measure for each record added on the [Electricity-Entry] sheet in a manner similar to the following example:
<table>
<tr><th>A</th><th>B</th><th>C</th><th></th><th>D</th></tr>
<tr><td>Count of Units in Set</td><td>Set Description</td><td>Avg. Annual kWh Used (per Unit)</td><td></td><td>Annual Usage (All Units)</td></tr>
<tr><td>1000</td><td>Single-family home</td><td>750 kWh
(Single-family home) (1 Year)</td><td>=</td><td>750,000 kWh
Year</td></tr>
</table>
Staff will document the source of the MW-hr usage per customer entered in column C.
5. Staff will determine if EIA Form 861 at https://www.eia.gov/electricity/data/eia861/ includes one of the following types of data that may be useful for estimating or validating the usage per customer entered in column C of step 2:
</td><td>Complete by Dec. 2023</td></tr>
</table>

Table 2.2 Technical Task Descriptions for Subtask 2.

Tasks and Deliverables	**Schedule**
Task 2. Electric Power Consumption	

a. The community's or MSA's total electricity usage. (See ***Attachment 1*** for some of the service territories included under EIA Form 861),

b. The service territory or territories that include the community or MSA. (See the EIA Form 861 file entitled [Service_Territory_2020.xlsx] for a listing of the utilities that serve each county in the United States,

c. A service territory adjacent to the community or MSA with similar usage patterns that may be comparable to the community's or MSA's estimate, or

d. Make a determination that there are no data under EIA Form 861 that are relevant to estimating or validating local usage per customer in column C of step 2.

6. If the community locates EIA 861 electricity data relevant to estimating or validating local usage, staff may include in the inventory the following values from EIA Form 861 to reflect electricity usage per customer most similar to local usage:

EIA 861 Column Name	**EIA Form 861 Value**
Year of Data	
Utility Name	
Utility Number	
State	
BA Code	
Residential Sales (MW-hrs)	
Residential Customers	
Commercial Sales (MW-hrs)	
Commercial Customers	
Industrial Sales (MW-hrs)	
Industrial Customers	
Transportation Sales (MW-hrs)	
Transportation Customers	

7. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that may include the following components:

a. The specific source categories and activities affected by the proposed option.

Table 2.2 Technical Task Descriptions for Subtask 2.

Tasks and Deliverables	**Schedule**
Task 2. Electric Power Consumption	
b. Quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. Quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. Quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment). f. Description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. 8. The below listing of data sources and tools maybe used to evaluate and analyze GHG emissions reduction options for this sector: a. EPA's Avoided Emissions and Generation Tool (AVERT) b. EPA's Energy and Environment Guide to Action (GTA) c. EPA's RE-Powering America's Land Initiative d. EPA's Energy Savings and Impacts Scenario Tool (ESIST) e. EPA's Guidebook for Energy Efficiency Evaluation, Measurement, and Verification f. ENERGY STAR for Policymakers g. ENERGY STAR Residential New Construction h. ENERGY STAR Home Upgrade i. ENERGY STAR Industrial Energy Management j. EPA's Building Performance Standards k. EPA's Clean Energy Finance Guide l. Additional resources are summarized in **Appendix D**.	

Table 2.3 Technical Task Descriptions for Subtask 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste (Landfills)	
1. The PM or TL will assign technical staff to develop estimates for this source using the LGGIT's [Solid Waste_Control] and [Solid Waste-Entry] worksheets. (The [Solid Waste-Entry] worksheet only provides locations to enter data after the [Solid Waste-Control] worksheet is populated.) 2. Staff will review Chapter 8 - Waste in the GPC GHG Emissions Inventories, and/or Chapter 9 - Solid Waste Facilities in the LGO Protocol. 3. On the LGGIT's [Solid Waste_Control] worksheet, staff will enter the total number of landfills in the community, the landfill name, whether or not the landfill has a landfill gas (LFG) collection system, and if the LFG collection system is partial or comprehensive (definitions are provided). 4. On the [Solid Waste_Entry] sheet, staff will enter the following data per landfill type: a. For landfills without a LFG collection system, staff will obtain and enter the annual quantities of waste deposited into the landfill for the life of the landfill, and the opening and closing years of the landfill. The instructions then provide the option to click on a link that takes you to the LGO Protocol Landfill Emissions Tool, where this data is entered. b. For landfills with a comprehensive LFG collection system, staff will obtain and enter the annual amount of landfill gas collected. c. For landfills with a partial LFG collection system, staff will obtain and enter the annual amount of landfill gas collected and the ratio of uncollected surface area over the collected surface area. 5. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that may include the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment).	Initiate work within 15 days of QAPP approval by EPA. Complete by Dec. 2023

Table 2.3 Technical Task Descriptions for Subtask 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste (Landfills)	
f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. 6. The below listing of data sources and tools maybe used to evaluate and analyze GHG emissions reduction options for this sector: a. EPA's Waste Reduction Model (WARM) b. Landfill Methane Outreach Program (LMOP) c. Sustainable Materials Management d. Sustainable Management of Food e. Additional resources are summarized in **Appendix D**.	

Table 2.4 Technical Task Descriptions for Subtask 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
1. The PM or TL will assign the primary technical staff member(s) to use the EPA's LGGIT tool and the following worksheets to develop the primary estimates for other sectors. **Other Sources** / **LGGIT Worksheet(s)** Stationary combustion / [Stationary-Entry] [Stationary-Data] [Stationary-Calcs] Agriculture & land management / [Agriculture & Land Management] Water / [Water] Wastewater treatment / [Wastewater-Control] [Wastewater-Entry] [Wastewater-Calcs] Waste generation (disposal external to community's geopolitical boundary) / [Waste Production] 2. Staff will review Chapter 6.3 - Calculating Stationary Fuel Combustion Emissions in the GPC GHG Emissions Inventories.	Initiate work within 15 days of QAPP approval by EPA. Complete by Dec. 2023

Table 2.4 Technical Task Descriptions for Subtask 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
3. Staff will obtain total fuel consumption data for the community or MSA from one or more of the following local, state, or federal resources to be used for the baseline estimate or QC validation of the baseline estimate: a. Summaries of metered consumption obtained from the local utilities or fuel providers that serve the community or MSA by sub-sector. b. A representative sample set of real consumption data from surveys. c. EPA's Greenhouse Gas Reporting Program (GHGRP) for large stationary sources of GHGs. d. Regional or national fuel consumption data scaled down using population or other indicators. 4. On the LGGIT's [Stationary-Entry] worksheet, staff will enter the stationary combustion source ID, unit description, facility type (if applicable), and sector for each entity that has data, along with the fuel type and fuel use. 5. Staff will review Chapter 10.5 - Calculating Emissions from Aggregate Sources and Non-CO_2 Emissions Sources on Land in the GPC GHG Emissions Inventories. 6. Staff will obtain fertilizer consumption data for each of the following sectors: Residential, Commercial/Institutional, Industrial, and Energy Generation. Values to be collected for each sector include the amount of synthetic (N), organic, and manure fertilizer applied in short tons. 7. On the LGGIT's [Agriculture & Land Management] worksheet, staff will enter fertilizer consumption data as described above. 8. Staff will determine if the community consumes imported water. Staff will obtain values for imported water use (gal) and the percentage of imported water. 9. On the LGGIT's [Water] worksheet, staff will enter imported water consumption data as described above. 10. The PM or TL will assign technical staff to develop estimates for this source using the LGGIT's [Wastewater-Control] and [Wastewater-Entry] worksheets. 11. Staff will review Chapter 8.6 - Calculating Emissions from Wastewater Treatment in the GPC GHG Emissions Inventories, and/or Chapter 10 – Wastewater Treatment Facilities in the LGO Protocol. 12. On the LGGIT's [Wastewater-Control] worksheet, staff will answer ten questions about the community's wastewater treatment system. 13. On the [Wastewater-Entry] sheet, staff will enter the population served by the following types of wastewater treatment systems: Denitrification/Nitrification, Aerobic, and Septic. Staff will also enter site-specific data collected for total nitrogen discharged (kg N/day). 14. The PM, TL, or QAM will assign a staff member who did not support steps 1-5 of this task to complete a QC review. Staff will independently review the original source data for all inputs and supporting calculations used to populate the [Wastewater - Calcs] worksheet. 15. Staff will review Chapter 8 - Waste in the GPC GHG Emissions Inventories, and/or	

Table 2.4 Technical Task Descriptions for Subtask 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
Chapter 9 - Solid Waste Facilities in the LGO Protocol. 16. For any Waste Production that is generated within the borders of the community but landfilled elsewhere, Staff will obtain the waste production data for the community that includes material type, specific material, sector, and amount of waste material recycled, landfilled, combusted, composted, and anaerobically digested from the waste vendors. 17. The waste data will be entered into EPA's Waste Reduction Model (WARM) on the [Analysis Inputs] tab to generate Scope 3 Solid Waste Emissions. 18. On the LGGIT's [Waste Production] tab, staff will enter the calculated emissions from WARM, as well as the total amount of waste that comes from each sector. 19. After the primary LGGIT calculations are complete, the PM, TL or QAM will assign a QC staff member to complete the following steps: a. Review the original source(s) of data for all inputs to the LGGIT tool. b. Validate that values from original source(s) were correctly entered into the primary LGGIT tool. c. Populate a blank version of the LGGIT tool with the inputs in a QC version. d. Compare the outputs of the primary version of the LGGIT versus the QC version of the LGGIT. e. Compare source listing LGGIT's [Summary-Emissions] sheet to previous inventories published by community or by neighboring or similar communities to determine if any major sources of GHGs were omitted from the inventory. f. Document findings and submit findings to the PM, TL and QAM for resolution. g. Document steps taken to resolve any findings. 20. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that may include the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment).	

Table 2.4 Technical Task Descriptions for Subtask 4.

Tasks and Deliverables	**Schedule**
Task 4. Inventory of GHG Emissions for Other Sources	
f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. 21. The below listing of data sources and tools may be used to evaluate and analyze GHG emissions reduction options for this sector: a. EPA's Agriculture Air Quality Conservation Guide b. Agricultural and Land Use National Greenhouse Gas Inventory (AUL) c. EPA and USDA's AgSTAR d. Anderson Water Quality Reports e. Energy Efficiency for Water Utilities f. Additional resources are summarized in **Appendix D**.	

Table 2.5 Technical Task Descriptions for Subtask 5.

Tasks and Deliverables	**Schedule**
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
1. The PM or TL will assign technical staff to develop estimates for this sector using the LGGIT's [Urban_Forestry] worksheet. 2. In order to estimate the areas of land with similar percentages of tree cover, staff will use a web-based mapping application to develop a listing of tree-covered tracts of land (i.e., polygons) with the following attributes: a. Identifier describing area (e.g., Area 1 between Crooked Creek and boundary). b. Sector (residential, commercial/institutional, industrial, energy generation) c. Total area in square kilometers (km^2). d. Percentage of area with tree cover based on local estimate. 3. For each sector, staff will calculate weighted percentage tree cover using **Equation 1.** **Equation 1** for weighted percentage of tree cover for a sector: $$\frac{\sum_{i=1}^{i=30}(km^2\ of\ area\ i)(\%\ tree\ cover\ of\ area\ i)}{\sum_{i=1}^{i=30}(km^2\ i)}$$ Where: i = 1 to 30 — Designates 30 tree covered areas in a sector on local lands. km^2 of area i — The measured area (in square kilometers) of area i. % tree cover of area i — The estimated percentage of tree cover for area i. $\sum_{i=1}^{i=30}(km^2\ i)$ — The denominator is the total combined area of all 30 areas within the sector. 4. For each sector on the LGGIT's [Urban Forestry] worksheet staff will enter total area for the sector in column C rows 11 through 14 and enter weighted % tree cover in Column D. 5. For the two sectors with the largest areas of tree cover, the QAM will assign a QC staff member who did not support steps 1 through 4, to develop independent estimates and to complete the following QC steps: a. Review the original source(s) of data for all inputs to the primary LGGIT tool. b. Validate correct entry of values from original source(s) into the primary LGGIT. c. Populate a blank version of the LGGIT tool with the inputs in a QC version. d. Compare the primary outputs of the LGGIT versus the QC version of the LGGIT. e. Compare the listing of resources by sector on the LGGIT's [Summary-Emissions] sheet to previous inventories published by the locality or by neighboring or similar localities to identify any major discrepancies. f. Document findings and submit findings to the PM, TL, and QAM for resolution. g. Document steps taken to resolve any findings.	Initiate work within 15 days of QAPP approval by EPA. Complete by Dec. 2023

Table 2.5 Technical Task Descriptions for Subtask 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
6. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that may include the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced or mitigated (such as by adsorption of PM2.5 on leaf surfaces) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment). e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities in close proximity to sources of nuisance dust (e.g., dirt roads used for mining operations). f. The number of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected by options that include planting of trees or other vegetation. 7. The below listing of data sources and tools may be used to evaluate and analyze GHG emissions reduction options for this sector: a. Pendleton Tree Management Plan b. Indiana Green City Mapper c. Tree Equity Score d. Whitestown Parks and Recreation Master Plan e. Additional local resources are summarized in **Appendix D**.	

1.7. Quality Objectives / Criteria

The primary objectives for this project are to develop reliable inventories for each of the GHG-emitting sectors in Indianapolis-Carmel-Anderson and to identify options for reducing emissions from those sectors. Accordingly, all quality objectives and criteria are aligned with these objectives. The quality system used for this project is the joint responsibility of the CIRDA PM, Task Leaders, and QA Manager. As discussed in Section 1.4, an organizationally independent QA Manager will maintain oversight of all required measures in this QAPP. QC functions will be carried out by technical staff and will be carefully monitored by the responsible Task Leaders, who will work with the QA Manager to identify and implement quality improvements. All activities under this project will conform to this QAPP.

1.7.1. Data Quality, Management, and Analyses

For this project, CIRDA will use a variety of QC techniques and criteria to ensure the quality of data and analyses. Data of known and documented quality are essential components for the success of the project, as these data will be used to inform the decision-making process for the PCAP and CCAP as

discussed in Section 1.5.4. The table in **Appendix A** lists by task the specific QC techniques and criteria that are part of this QAPP.

The data quality objectives and criteria for this project are accuracy, precision, bias, completeness, representativeness, and comparability. *Accuracy* is a measure of the overall agreement of a measurement to a known value. It includes a combination of random error (precision) and systematic error (bias). *Precision* is a measure of how reproducible a measurement is or how close a calculated estimate is to the actual value. *Bias* is a systematic error in the method of measurement or calculation. If the calculated value is consistently high or consistently low, the value is said to be biased. Our goal is to ensure that information and data generated and collected are as accurate, precise, and unbiased as possible within project constraints. It is not anticipated that this project will include primary data collection. Generally, existing data and tools provided by the EPA and other qualified sources will be used for project tasks. A subject matter specialist familiar with technical reporting standards (such as a permit writer or compliance engineer with knowledge of the community's facilities operating in the sector) will be used to QA all data utilized for developing the local GHG inventory. CIRDA will verify the accuracy of all data by checking for logical consistency among datasets. All existing environmental data shall meet the applicable criteria defined in CFR and associated guidance, such as the validation templates provided in the *EPA QA Handbook Volume II*.

Uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific project activity being evaluated.

When available, data originally gathered using published methods whose applicability, sensitivity, accuracy, and precision have been fully assessed, such as EPA reference methods, will be preferred and considered to be of acceptable quality. Project decisions may be adversely impacted if, for example, existing data were used in a manner inconsistent with the originator's purpose. Metadata can be described as the amount and quality of information known about one or more facets of the data or a dataset. It can be used to summarize basic information about the data (e.g., how, why, and when the existing data were collected), which can make working with specific data or datasets easier and provides the user with more confidence. Metadata are valuable when evaluating existing data, as well as when planning for collection primary data that may be required in the future. However, the effort needed to locate and obtain original source materials can be costly. Accordingly, a graded approach to planning will be applied and ongoing discussions with the EPA will be held to determine what magnitude and rigor of QA effort are appropriate and affordable for the project.

For the data analysis completed under this project, analytical methods will be reviewed to ensure the approach is appropriate and calculations are accurate. Spreadsheets will be used to store data and complete necessary analyses. Design of spreadsheets will be configured for the intended use. All data and methodologies specific to each analysis will be defined and documented. Tables and fields will be clearly and unambiguously named. Spreadsheets will be checked to ensure algorithms call data correctly and units of measure are internally consistent. Hand-entered or electronically transferred data will be checked to ensure the data are accurately transcribed and transferred.

The draft inventory will be evaluated for GHG-emitting-sector and geographic completeness. CIRDA will utilize the framework of sectors in the EPA's LGGIT tool, previous local inventories, or

previous inventories completed by similar communities to ensure that the inventory prepared under this project includes all major GHG-emitting sectors. To ensure the inventory is geographically complete, the draft inventory will also be submitted for review by CIRDA staff within the community who are familiar with all activities subject to local or federal standards issued under Title I of the CAA to ensure that all major-emitting, local activities are included in the inventory.

Representativeness is a qualitative term that expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. CIRDA will use the most complete and accurate information available to compile representative data for the community's GHG-emitting activities.

Data comparability is a qualitative term that expresses the measure of confidence that one dataset can be compared to another and can be combined for the decision(s) to be made. CIRDA will compare datasets when available from different sources to check for the quality of the data. This QA step will also ensure that any highly correlated datasets or indicators are identified. Supporting data, such as information on reference methods used and complete test reports, are important to ensure the comparability of emissions data.

1.7.2. Document Preparation

All documents produced under this project will undergo internal QC review, as well as technical review and an editorial review, prior to submission to the EPA PO. QC will be performed by an engineer, scientist, or economist, as appropriate, with sufficient knowledge. The technical reviewer will review the document for accuracy and integrity of the technical methodologies, analyses, and conclusions.

An editorial review of all final documents will be performed. Editors will verify clarity, spelling, and grammatical correctness, and ensure documents are free of typographical errors. Editors will verify that references are cited correctly. This will include a comparison against the original documents.

The *QC Documentation Form* (**Appendix B**) will be used to track the approval process. The form must be completed and signed for all document deliverables. The signatures required include those of the TL and technical and editorial reviewers. Completion of this form certifies that technical review, editorial review, and all required QC procedures have been completed to the satisfaction of the TL and QAM or QCC. Copies of these signed forms will be maintained in the project files.

1.8. Special Training / Certifications

All CIRDA staff assigned to work on this project shall have appropriate technical and QA training to properly perform their assignments. CIRDA staff serving in the QAM role under this project will have completed a training course on QA/QC activities similar to the course available at https://www.epa.gov/quality/training-courses-quality-assurance-and-quality-control-activities. The PM and all TLs under this project will have completed an online training course on air emissions inventories on the Air Knowledge website at https://airknowledge.gov/EMIS-SI.html.

If training is required for new staff or for particular segments of the GHG inventory, the PM in coordination with the associated TL will identify available training resources for the inventory segment and incorporate the required training into the project schedule.

1.9. Documents and Records

CIRDA will document in electronic form (and/or hard copy) QC activities for this project. The TL is responsible for ensuring that copies of all completed QC forms, along with other QA records (including this QAPP), will be maintained in the project files. Project files will be retained by CIRDA for 5 years after completion of the PCAP. The types of documentation that will be prepared for this project include:

- Planning documentation (e.g., QAPP)
- Implementation documentation (i.e., Review/Approval Forms and QC records)
- Assessment documentation (i.e., audit reports and independent calculations).

Detailed documentation of QC activities for a specific task or subtask will be maintained using the *QC Documentation Form* shown in **Appendix B**. This form will document the completion of the QC techniques planned for use on this project as listed in the table in **Appendix A**. One or more completed versions of these forms, as necessary, will be maintained in the project files. The types of documents and activities for which QC will be conducted and documented may include raw data, data from other sources such as data bases or literature, data entry into the LGGIT tool, calculations necessary to transform raw data into forms required for LGGIT entry, and comparisons of primary estimates with QC estimates.

Technical reviews will be used along with other technical assessments (i.e., QC checks) and QA audits to corroborate the scientific defensibility of any data analyses. A technical review (i.e., internal senior review) is a documented critical review of a specific technical work product. It is conducted by subject matter experts who are collectively equivalent (or senior) in technical expertise to those who performed the work. Given the nature of the deliverables under this project, a technical review is an in-depth assessment of the assumptions, calculations, extrapolations, alternative interpretations, and conclusions in technical work products. Technical review of proposed methods and associated data will be documented in the *QC Documentation Form* shown in **Appendix B**. The form will include the reviewer's charge, comments, and corrective actions taken.

Additionally, CIRDA has developed and instituted document control mechanisms for the review, revision, and distribution of QAPPs. Each QAPP has a signed approval form, title page, table of contents, and an EPA-approved document control format (see header at top of the page). The distribution list for this QAPP was presented in **Table 1.1**. During the course of the project, any revision to the QAPP will be circulated to everyone on the distribution list, as well as to any additional staff supporting this project. Any revision to the QAPP will be documented in a QAPP addendum, approved by the same signatories to this QAPP, and circulated to everyone on the distribution list by the CIRDA PM.

At this time, CIRDA does not know if the project will collect or handle personally identifiable information (PII) subject to the Privacy Act of 1974. However, if during the course of this project technical staff determine that PII is required to support project objectives, CIRDA will meet all requirements of the Privacy Act of 1974. **Appendix C** indicates the status of our determination regarding applicability of the Privacy Act of 1974 under this project.

2. Existing Data Acquisition and Management Protocols (Group B)

2.1. Sampling Process Design

2.1.1. Need and Intended Use of Data Used

As indicated in **Tables 2.1 – 2.5**, a wide range of data for a diverse set of GHG-emitting activities is necessary to prepare a local inventory and develop GHG emissions reduction options. Existing data resources may include sector-specific or facility-specific GHG emissions estimates, emissions factors, or activity data for use with emissions factors. The experimental design for this inventory project relies on the EPA's LGGIT tool together with independent estimates prepared by CIRDA assigned QC staff. Existing data resources will be utilized to develop GHG emissions estimates that are comparable to the LGGIT estimates. Existing data sources include previously completed inventories, the Indiana Metropolitan Planning Organization, regional academic partners, and additional state and national resources and tools. Refer to **Appendix D** for a full detailed list of all data resources. Subsequently, estimates for each source category will be compared to available federal or state data by assigned QC staff.

2.1.2. Identification of Data Sources and Acquisition

In addition to those resources stated in Tables 2.1 – 2.5, the following data sources will be evaluated for use under each task to develop estimates for the major-emitting sectors in Indianapolis-Carmel-Anderson or for use in validation of estimates:

- Task 1:
  - Vehicle registration data from the Indiana Bureau of Motor Vehicles.
  - State or federal averages on vehicle miles traveled and miles per gallon from the U.S. Department of Transportation.
  - National Emissions Inventory (NEI) county-level estimates for mobile sources.
- Task 2:
  - U.S. Department of Energy's (DOE's) SLOPE Platform which reports county-level electricity usage in million British thermal units.
  - DOE's EIA Form 861 which reports sub-county-level usage in MWh and customer counts as reported by the different distribution utilities operating within each county.
  - Electricity consumption by customer class obtained directly from AES Indiana, Duke Energy, and Indiana Michigan Power.
- Task 3:
  - Number of community landfills and information on landfill gas (LFG) collection systems, as applicable, from Waste Management and Republic Services.
  - Landfill emissions data reported to the EPA's GHGRP.
- Task 4:
  - Data published by the EPA under the Greenhouse Gas Reporting Program for fossil fuel consumption by customer class from CenterPoint Energy, Citizens Energy and other local fuel providers.
  - County-level natural gas consumption data from DOE's SLOPE Platform;
  - Wastewater management data from Citizens Energy Group and the Indiana Utility Regulatory Commission Utilities.
- Task 5:
  - Area calculations from web-based map applications.
  - Tree cover estimates from local surveys or forestry databases.

2.2. Quality Control

All data operations conducted for this project will involve existing, non-direct measurement data. All data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use. In addition to reviewing and assessing the data collected, all data entered into spreadsheets and all calculations completed for analyses will be reviewed by a senior technical QC reviewer. The QC reviewer will evaluate the approach to ensure the methods are appropriate and have been applied correctly to the analysis. The QC reviewer will also confirm all data were entered correctly and that calculations are complete and accurate. Calculations will be checked by repeating each calculation, independently, and comparing the results of the two calculations. Any data entry and calculation errors will be identified and corrected. Data tables prepared for the draft and final reports will be checked against the spreadsheets used to store the data and complete the analysis.

Where calculations are required to assess the data/datasets, QC calculations will be performed using computer spreadsheets and calculators to reduce typographical or translation errors–mathematical/ statistical calculations are performed using spreadsheets or software programs with predefined formulas and functions. CIRDA will ensure that any manipulations performed on the data/dataset were done correctly. Such calculations could involve statistical checks to look for data outliers. One approach, for example, that may be used to identify outliers or unusual data points is sorting a datasheet for one or more data variables. This approach is a simple but effective way to highlight unusually high or low values. Graphing data using boxplots, histograms, and scatterplots is another method that may be used to identify gaps in the data (missing data), outliers, or unusual data points. Another approach that may be used is the use of Z-scores, which can quantify the unusualness of an observation when data follow a normal distribution. A Z-score for a particular value indicates the number of standard deviations above and below the mean that the value falls. For example, a Z-score of 2 indicates that an observation is two standard deviations above the average while a Z-score of -2 indicates the value is two standard deviations below the mean. A Z-score of zero represents a value that equals the mean. As appropriate, we will also use hypothesis tests to find outliers, or an interquartile range (IQR) to calculate boundaries for what constitutes minor and major outliers. The methods used will be driven by the scale and type of data. CIRDA will determine outlier detection methods to be used based on the initial review of the data. Identified outliers will be highlighted to the PM, TL, QAM, or delegate with options for treatment.

2.3. Non-direct Measurements for GHG Inventory and Options Identification

All data operations conducted on this project will involve existing, non-direct measurement data. All existing data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use.

Consistent with the EPA's QA requirements, this QAPP describes the procedures that will be used to ensure the selection of appropriate data and information to support the goals and objectives of this project. Specific elements addressed by this QAPP include:

- Identifying the sources of existing data,
- Presenting the hierarchy for data selection,
- Describing the review process and data quality criteria,
- Discussing quality checks and procedures should errors be identified, and
- Explaining how data will be managed, analyzed, and interpreted.

Data presented in the GHG inventory will be traced to its source (e.g., database input and output). Key resources include data collected by the EPA (e.g., GHGRP data), and data from EPA-approved data sources (e.g., Department of Energy and other federal data sources). These sources may include primary

literature (i.e., peer-reviewed journal articles and reports) or databases. We may also use approved existing sources (e.g., handbooks, databases). Original sources for all information and data contained in the document will be included in a list of references with appropriate citations. When peer-reviewed literature or EPA-approved data sources cannot be used, we will document any significant limitations to the data sources used.

We will document information regarding each dataset and our rationale/selection criteria for selecting the data sources used in the inventory. The TL will be responsible for overseeing and confirming the selection of the data for the project tasks.

Table 3.1 provides a hierarchy for data quality when identifying and reviewing available sources of data and information. When evaluating data resources, efforts will be made to identify and select data sources that most closely conform to the highest ranked criteria. Data quality metrics and documentation may not be provided by each source, and as necessary, we may consult with subject matter experts from permitted facilities or trade associations operating in Indianapolis-Carmel-Anderson to qualify data for use to meet project objectives.

Any available data quality information will be reviewed by CIRDA and project advisors to ensure that the data represent full-scale designs and commercial processes, and that they are applicable to economic and regulatory conditions in the United States. CIRDA will document data sources used and any significant limitations of utilized data or information to ensure that the data are appropriate for their intended use. An internal technical reviewer will review the approach for selecting and compiling data; the review will include examination of the data sources and the intended use of the data. The specific QC techniques used will depend on the technical activity or analysis to which they are applied. The CIRDA TL is responsible for verifying the usability of data and related information.

Table 3.1 Existing Data Quality Ranking Hierarchy

Quality Rank	**Source Type**
Highest	Federal, state, and local government agencies
Second	Consultant reports for state and local government agencies
Third	NGO studies; peer-reviewed journal articles; trade journal articles; conference proceedings
Fourth	Conference proceedings and other trade literature: non-peer-reviewed
Fifth	Individual estimates (e.g., via personal communication with vendors)

CIRDA will work with EPA to ensure that all data used for the project are appropriate for their intended use. The main criteria that will be used in the selection of the data are the vintage and quality of the data (based on peer review). The quality of the data will consider the credibility of the source, and the QA documentation provided by the data source. Senior technical staff will also evaluate the availability of alternative datasets, suitability of the selected data for the intended purpose, and agreement with LGGIT estimates.

CIRDA will use the Secondary Data Quality Ranking Hierarchy when identifying and reviewing available sources of data and information. The source types in **Table 3.1** appear in the order in which they are likely to meet the data quality criteria. For example, federal government data are more likely to be

from a credible source, thoroughly reviewed, suitable, available, and representative, and any exceptions to these data criteria are likely to be noted in the government data, providing transparency. Data from individuals are expected to be less reliable, not peer reviewed, and may not be suitable or representative of local activities.

If it is determined that data meeting the fourth (i.e., conference proceedings and other trade literature: non peer-reviewed) or fifth (i.e., individual estimates such as personal communications with vendors) level compose the best or only available data source, the TL will include in the inventory a description of these data with associated limitations for review and approval by the PM and QAM.

These measures of data quality will be used to judge if the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will include in the inventory a discussion for review and approval by the PM and QAM explaining how emissions estimates that relied on such data compare to LGGIT estimates.

We will also consider, for example, the age (i.e., date of the source dataset) and the representativeness of the data and will include in the inventory report for review and approval by the PM and QAM any quality concerns or uncertainties introduced with use of these data, such as data gaps or inconsistencies with other sources. Any data source utilized that is older than 10 years will specifically be flagged in the inventory report.

Representativeness will be evaluated by determining that the emissions or activity data are descriptive of conditions in the United States, that the data are current, and that the data are descriptive of similar processes within Indianapolis-Carmel-Anderson. Any incomplete datasets will be identified, and deficiencies will be evaluated to determine if data are missing or confusing and if they meet secondary-use quality objectives.

Key screening criteria will be used to screen the sources identified. The CIRDA TL will provide oversight to the screening process to ensure sources collected are the most relevant and meet quality requirements. Available data and information from the selected sources will be compiled and relevant summary information will be extracted out of the information sources to develop the required output for each of the project tasks.

2.3.1. Criteria for Accepting Existing Data for Intended Use

The criteria for determining if the data are acceptable for use in developing the local inventory will be based on a comparison of the primary emissions estimates to independent emissions estimate produced using the EPA's LGGIT or other reliable sources of activity data. While some differences between the primary calculations and independent calculations are expected, differences of more than 5 percent total emissions for the entire inventory must be accompanied by an explanation subject to approval by the PM and QAM prior to using the estimate in the community's inventory.

2.3.2. Criteria for Options Identification

Review of activities under each task and identification of options for emissions reductions to be considered by policymakers will be based on the following criteria:

1. Quantity of reductions in emissions of climate pollution under the option.
2. Number of jobs likely to be created by the option.
3. Environmental justice benefits of the project including the number of people living in overburdened neighborhoods that will benefit from the option.
4. Quantity of reductions in criteria and toxic air pollutants that can be achieved by option.
5. Number of people living, working, recreating, and going to school in the area(s) benefiting from the option.

2.4. Data Management

Data management procedures include file storage and file transfer. All project and data files will be stored on CIRDA project servers. Files will be organized and maintained by the TL in folders by project, task, and function, including a system of file labeling to ensure version control. Any files containing confidential business information will be stored on secure computers. The TL will make sure that staff are trained and adhere to the project file organization and version control labeling to ensure that files are placed in consistent locations. All files will be backed up each night to avoid loss of data. Data are stored in various formats that correspond to the software being used. As necessary, data will be transferred using various techniques, including email, File Transfer Protocol, or shared drives. Typically, records will be archived once the project is completed. Record retention times will be based on contractual and statutory requirements or will follow CIRDA practices for storing materials of up to 5 years after the end of the period of performance (POP). Multiple project staff are granted access rights to the archived file system for each project. Records may be retrieved from archived file system by the TL, PM, or other project staff with access during the records retention period. As soon as allowed by applicable regulations or the grant agreement, records will be destroyed according to CIRDA policies and procedures. For any sensitive information that is gathered under the project, CIRDA's policy is consistent with EPA–recommended methods of destruction, which include degaussing, reformatting, or secure deletion of electronic records; physical destruction of electronic media; recycling; shredding; incineration; and pulping. Should the grant specify some other manner of disposition (e.g., transfer to the client), CIRDA will comply with that directive. As noted above, CIRDA has developed a file naming convention/ nomenclature for electronic file tracking and record keeping. Foremost, all files must be given a short but descriptive name. For those records and files gathered or provided to CIRDA, the filename may include the identification of "original" in its filename.

Similarly, files that have undergone a review by an independent, qualified person will include, at the end of the filename, the initials of the reviewer or the suffix "rev" (in lieu of initials) if more than one reviewer reviewed the file, along with the date reviewed and version number, as a way to track which staff person(s) reviewed the file and when. Filenames of draft versions will follow an incremental, decimal numbering system. More specifically, each successive draft of a document is numbered sequentially from version 0.1, 0.2, 0.3… until a final version is complete. Final versions will be indicated by whole numbers (e.g., version 1.0). Final versions of documents that undergo revisions will be labeled version X.1 for the first set of revisions. While the document is under review, subsequent draft versions will increase incrementally (e.g., 1.2, 1.3, 1.4) until a revised final version is complete (e.g., version 2.0).

In the event data retrieval is requested and to prevent loss of data, all draft and final file versions will be retained electronically—that is, superseded versions will not be deleted.

Note that changes made to deliverables will be documented using the software's *track changes* feature, which allows a user to track and view all changes that are made to the document version. All deliverable reviews will be documented in a QC Documentation Form (see **Appendix B**) for the project. This form will be maintained in the project files.

For this project, it is not anticipated that any special hardware or software will be used. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work (described in **Tables 2.1 – 2.5)** for this project.

3. Assessment and Oversight (Group C)

CIRDA is committed to preparing a comprehensive and reliable inventory of GHG emissions for Indianapolis-Carmel-Anderson. Under this project our senior management team has dedicated the necessary resources to ensure we deliver an inventory that can be relied upon for future policy decisions. Accordingly, under this project, we will concurrently implement existing quality management systems that CIRDA has previously utilized for submissions to the EPA under Title I of the Act where task-level deliverables will be subjected to required, regular reviews (e.g., quarterly) to ensure that technical, financial, and schedule requirements of this project are consistent with the EPA PO's and QAM's expectations for handling and producing deliverables that reflect high-quality environment data. This section discusses Elements C1 (assessments and response actions) and C2 (reporting) applicable to this project.

3.1. Assessments and Response Actions

The QA program includes periodic review of data files and draft deliverables. The essential steps in the QA program are as follows:

1. Identify and define the problem
2. Assign responsibility for investigating the problem
3. Investigate and determine the cause of the problem
4. Assign and accept responsibility for implementing appropriate corrective actions
5. Establish the effectiveness of and implement the corrective action
6. Verify that the corrective action has eliminated the problem.

The TL will provide day-to-day oversight of the quality system. Periodic project file reviews will be carried out by the QA Manager, at least once per year to verify that required records, documentation, and technical review information are maintained in the files. The QAM will ensure that problems found during the review are brought to the attention of the TL and are corrected immediately. All nonconforming data will be noted, and corrective measures to bring nonconforming data into conformance will be recorded.

The TLs and QA Manager are responsible for determining if the quality system established for the project is appropriate and functioning in a manner that ensures the integrity of all work products. All technical staff have roles and will participate in the corrective action process. Corrective actions for errors found during QC checks will be determined by the TL and, if necessary, with direction from the QA Manager or PM, as appropriate. The originator of the work will make the corrections and will note on the QC form that the errors were corrected. A reviewer or TL, not involved in the creation of the work, will review the corrections to ensure the errors were corrected. Any problems noted during audits will be reviewed and corrected by the QA Manager and discussed with the TL as needed. Depending on the severity of the deficiency, the TL may consult the QA Manager and stop work until the cited deficiency is resolved. Deficiencies identified and their resolution will be documented in monthly project reports, as applicable. The QA Manager and TL will comply and respond to all internal and EPA audits on the project, as needed. The QA Manager will produce a report outlining any corrective actions taken.

3.2. Reports to Management

The periodic progress reports (to the EPA PO) required in the grant agreement will be reviewed by the PM and the PM's manager Jennifer Messer, CIRDA Executive Director, to ensure the project is meeting milestones and that the resources committed to the project are sufficient to meet project objectives. These periodic progress reports will describe the status of the project, accomplishments during the reporting period, activities planned for the next period, and any special problems or events including any QA/QC issues. Reports to the EPA will be drafted by the TL or other project staff familiar with project activities during the reporting period.

Any QC issues impacting the quality of a deliverable, the project budget, or schedule will be identified and promptly discussed with the assigned TL and the PM or QAM as appropriate. All significant findings will be included in monthly reports with the methods used to resolve the specific QC issue or the recommendations for resolution for consideration by the EPA's PO or designee.

Based on the technical work completed during the reporting period, progress reports will be reviewed internally by an independent, qualified technical person (equivalent or senior to the TL), prior to submitting to the PM. The PM will conduct a final review of the report before transmitting the progress report to the EPA PO, and the PM's manager will be cc'd on all progress reports

4. Data Validation and Usability (Group D)

4.1. Data Review, Verification, Validation

All work conducted under this project will be subject to technical and editorial review. When existing data for the same GHG-emitting activity are available from multiple sources, the background information documents will be reviewed for all sources to determine the dataset that is the most representative of local operations. Additionally, the inventory report will include the vintage of the existing data resource and preference will be given to the most recent dataset that is representative of similar GHG-emitting local activities. Reviews will be conducted by an independent, qualified person—or a person not directly involved in the production of the deliverable. The term "validation" refers to whether the data meet the QAPP-defined user requirements while the term "verification" refers to whether conclusions can be correctly drawn from the data. The quality of data used and generated for the project will be reviewed and verified at multiple levels by the project team. This review will be conducted by the CIRDA TL or a senior technical reviewer with specific, applicable expertise. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all units of measure will be checked for consistency. Any potential issues identified through this review process will be evaluated and, if necessary, data will be corrected, and analysis will be revised as necessary, using corrected data. These corrections will be documented in project records. These measures of data quality will be used to judge whether the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will document these findings in the inventory along with corrective actions or use of alternative data sources.

4.2. Verification and Validation Methods

As a standard operating procedure, all data (retrieved and generated) will be verified and validated through a review of data files by an independent, qualified technical staff member (i.e., someone other than the document originator), and ultimately, the CIRDA TL. A checklist of QC activities for deliverables under this project is provided as **Appendix A**. Forms for documenting QC activities and review of deliverables are included in **Appendix B**. Documentation of calculations will be included in spreadsheet work products and in supporting memoranda, as appropriate.

The TL is responsible for day-to-day technical activities of tasks, including planning, data gathering, documentation, reporting, and controlling technical and financial resources. The TL is the primary person responsible for quality of work on tasks under this project and will approve all-related plans and reports. These reports will be transmitted by the TL to the QAM for final review and approval.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Reviews of analyses will include a thorough evaluation of content and calculated values. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all measurement units will be checked for consistency. Any potential issues identified through this review process will be evaluated, errors corrected, and analysis repeated using the corrected data. All corrections will be documented in project records.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Typical data verification reviews can include checks of the following:

- Data sources are clearly documented,
- Calculations are appropriately documented,
- All relevant assumptions are clearly documented,

- Conclusions are relevant and supported by results,
- Text is well-written and easy to understand.

The documented review process will be stored with deliverables for the project. For the narrative describing the methodologies used for the inventory, all comments on drafts will be clearly and concisely summarized including a description of how substantive issues raised by commenters were resolved.

As discussed in Section 1.7, QC objectives include verification that data in database tables are stored and transferred correctly, algorithms call data correctly, units are internally consistent, and reports pull the required data. These data management issues will be addressed as part of the QC checks of data acquisition and document preparation.

For this project, it is not anticipated that any special data validation software will be required. However, where calculations are required to assess the data/datasets, calculations will be performed using computer spreadsheets (like Excel spreadsheets with predefined functions, or formulas) and calculators to reduce typographical or translation errors. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work as described in Section 1.6 for this project.

4.3. Reconciliation with User Requirements

All data (retrieved and generated) and deliverables in this project will be analyzed and reconciled with project data quality requirements. To ensure deliverables meet user requirements, the TL or senior technical lead will review all data and deliverables throughout the project to ensure that the data, methodologies, and tools used meet data quality objectives, are clearly conveyed, and represent sound and established science.

CIRDA will review each project with the EPA at the planning stage to ensure the approach is fundamentally sound and will meet the project objectives. The TL or senior technical lead will evaluate data continuously during the life term of the project to ensure they are of sufficient quality and quantity to meet the project goals. Prior to submission of draft and final products, the TL or senior technical lead will make a final assessment to determine if the objectives have been fulfilled in a technically sound manner. Assumptions made in preparing project analyses will be clearly specified in the inventory.

As discussed in Section 1.7.1, uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific inventory activity being evaluated.

5. References

EPA, Chief Information Officer's Policy Directive on Information Technology / Information Management available at EPA IT/IM Directive: Environmental Information Quality Policy, Directive # CIO 2105.3

EPA, *Chief Information Officer's Policy Directive on Information Technology / Information Management: Quality Assurance Project Plan (QAPP) Standard*, Directive # CIO 2105-S-02.0. Available at https://www.epa.gov/irmpoli8/quality-assurance-project-plan-qapp-standard. Accessed on 7/24/2023.

EPA, EPA-454/B-17-001, *Quality Assurance Handbook for Air Pollution Measurement Systems, Ambient Air Quality Monitoring Program, Volume II*. Available at https://www3.epa.gov/ttnamti1/files/ambient/pm25/qa/Final%20Handbook%20Document%201_17.pdf. Accessed on 6/23/2023.

EPA, Fact Sheet: Areas where differences between state GHG inventories and the EPA's Inventory of U.S. GHG Emissions and Sinks by State: 1990-2020 estimates may occur. Available at https://www.epa.gov/system/files/documents/2022-03/fact-sheet-differences-epa-and-offical-state-ghgi.pdf. Accessed on 6/23/2023.

EPA, US GHG Inventory by State. Available at https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals. Accessed on 6/23/2023.

EPA, GHG Reporting Program Facility-level Local Information. Available at https://ghgdata.epa.gov/ghgp/main.do. Accessed on 7/18/2023.

EPA, Data reported to EPA's Greenhouse Gas Reporting Program (GHGRP) at https://www.epa.gov/ghgreporting/data-sets

EPA, National Inventory at https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021

EPA, Publications, Tools, and Data for State, Local, and Tribal Governments at https://www.epa.gov/statelocalenergy/publications-tools-and-data-state-local-and-tribal-governments. Accessed on 7/27/2023.

EPA, Fuel heating values and CO2 emission factors at eCFR :: 40 CFR Part 98 -- Mandatory Greenhouse Gas Reporting

EPA, Global warming potentials at https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-A?toc=1

USDA, Forest Service at https://www.fs.usda.gov/research/treesearch/62418

US DOT, Federal Highway Administration Transportation Statistics at https://www.fhwa.dot.gov/policyinformation/statistics/2021/vm1.cfm

Appendix A: Example Check Lists of Quality Control Activities for Deliverables

Tasks and Deliverables	Quality Control Procedures
Task 1. Mobile Combustion (Transportation)	
Local inventory of GHG emissions from mobile sources with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Comparison of local estimate of average miles travelled per year and average miles per gallon (by vehicle type) versus state and national averages.

Vehicle Type	Local Avg Miles/yr	QC Avg Miles/yr	MPY Statistics*	Local Avg Miles/gal	QC Avg Miles/gal	MPG Statistics
Passenger Car (Gasoline)			Signed Bias ±X.XX% Variance Y.YY%		24.1	Signed Bias ±X.XX% Variance Y.YY%
Passenger Truck (Gasoline)					18.5	
Heavy-duty (Gasoline)					10.1	
Motorcycle (Gasoline)					50	
Passenger Car (Diesel)					32.4	
Passenger Truck (Diesel)					22.1	
Heavy-duty (Diesel)					13.0	

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the LGGIT value taken as the audit value.

2. For any values used in local inventory that differ from the state average MPY or the national average MPG by more than <X>%, the community will provide an explanation of why local factors may differ from state or national averages.

3. Ensure the GWPs used for the local estimate and the LGGIT estimate are on the same basis. The LGGIT tool uses AR5 GWP (e.g., methane GWP = 28).

4. Review by TL or senior technical reviewer—analytical methods / results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate.

5. Editor review—verify or remediate draft deliverables to ensure clear, error-free writing.

Tasks and Deliverables	Quality Control Procedures
Task 2. Electric Power Consumption	
Local inventory of GHG emissions from electric power consumption with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Compare (a) the local estimate in inventory *versus* (b) data from SLOPE[16], state averages, or other data resources available from DOE such as Form EIA 861 data. Use a table similar to the table below to assess precision and bias of the local estimates versus estimates derived from SLOPE, state averages, or representative EIA 861 data, if available:

Power Consuming Sector	Initial Local Estimate (Metric Tons CO_2e)	QC Estimate based on <selected data source> (Metric Tons CO_2e)	Statistics*
Residential			Signed Bias ±X.XX% Variance Y.YY%
Commercial			
Industrial			
Transportation			
Other			

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

2. SLOPE data are provided in million British thermal units (MMBtu's) of electricity usage, EIA 861 usage data are provided in megawatt-hours (MWh), but the LGGIT inputs for electricity usage must be in kilowatt-hours (kWh). When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison.
3. Ensure the GWPs used for the local estimate and the independent estimate are on the same basis.
4. Technical review of methods, calculations, and underlying datasets—data are appropriate for intended use, data are complete and representative and current, data sources documented, analytical methods are appropriate, and calculations are accurate.
5. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate)
6. Editor review—writing is clear, free of grammatical and typographical errors.

[16] National Renewable Energy Laboratory. "[Data Set Title (e.g., Battery Storage Capital Costs)]," *State and Local Planning for Energy*, accessed 7/22/2023, https://maps.nrel.gov/slope.

Tasks and Deliverables	Quality Control Procedures
Task 3. Solid Waste (Landfills)	
Local inventory of GHG emissions from landfills with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Comparison of (a) independent local inventory *versus* (b) landfill data from FLIGHT. Use a table similar to the table below to assess precision and bias of the local inventory versus QC estimates:

Solid Waste (Landfills)	Initial Local Estimate (Metric Tons CO_2e)	FLIGHT Data (Metric Tons CO_2e)	Statistics* for Area Comparisons
North Elm Landfill			Signed Bias ±X.XX% Variance Y.YY%
East Hill Landfill			
Landfill No. 1 (closed)			
…			

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

2. When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison.
3. Ensure the GWPs used for the local estimate and independent estimate are on the same basis.
4. Ensure data are appropriate for intended use, data are complete and representative and current, data sources are documented, analytical methods are appropriate, and calculations are accurate. Include any QC findings and reconciliation.
5. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate)
6. Editor review—writing is clear, free of grammatical and typing errors.

<table>
<tr><th>Tasks and Deliverables</th><th>Quality Control Procedures</th></tr>
<tr><td colspan="2">Task 4. GHG Emissions for Other Sources</td></tr>
<tr><td>Local inventory of GHG emissions from the community's other sources with documentation of the following QC activities:

(1) narrative report describing data sources and QC measures for data acquisition steps,

(2) description of methodology and QC measures for validated proper implementation of methodology, and

(3) documentation of QAPP implementation.

(4) listing of emissions reductions options are present with documentation of rationale for each option.</td><td>1. Comparison of (a) local emissions estimates in inventory versus (b) available federal or state estimates for the same source categories (e.g. SLOPE, FLIGHT, etc.).
2. For any values used in local inventory that are inconsistent with federal or state values, the table below will be utilized to assess precision and bias of the local inventory versus the federal or state estimates:

<table>
<tr><th>Other Sectors</th><th>Initial Local Estimate (Metric Tons CO_2e)</th><th>QC Estimate (Metric Tons CO_2e)</th><th>Statistics*</th></tr>
<tr><td>Stationary combustion</td><td></td><td></td><td rowspan="6">Signed Bias ±X.XX%

Variance Y.YY%</td></tr>
<tr><td>Agriculture & land management</td><td></td><td></td></tr>
<tr><td>Waste generation</td><td></td><td></td></tr>
<tr><td>Water</td><td></td><td></td></tr>
<tr><td>Wastewater treatment</td><td></td><td></td></tr>
<tr><td>Other</td><td></td><td></td></tr>
</table>
* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

3. When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison.
4. Ensure the GWPs used for the local estimate and independent estimate are on the same basis.
5. Technical review of methods, calculations, and underlying datasets—data are appropriate for intended use, data are complete and representative and current, data sources documented, analytical methods are appropriate, and calculations are accurate.
6. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of detail appropriate.
7. Editor review: writing is clear, free of grammatical and typographical errors.</td></tr>
</table>

Appendix B: Example QC Documentation Form

<Grantee Org.>

Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverable meets the criteria for scientific defensibility, technical, and editorial accuracy, and presentation clarity as outlined in the Quality Assurance (QA) Project Plan, QA Narrative, Quality Management Plan, and/or according to direction from the EPA PO.

Client:	EPA Region <X>
Grant Number:	<enter grant number>
EPA Project Officer:	<enter EPA PO>
Project Number:	<enter internal Project ID>
Project Name:	<enter internal project name>
Grantee Org. Project Manager	<enter grantee's project manager>

QA Form Details

Item Number	File Name (Copy the name of the File Reviewed)	Deliverable Description	Date Sent to Client	Deliverable (Draft)	Deliverable (Final)	Document Originator	QA Review Information (Review Type)	(Reviewer Name)	(Date Review was Performed)	(Brief Summary of Review Findings and Other Notes)	QA Review Information (Have all Findings Been Resolved)	(Originator Signature)	(Reviewer Signature)	(File Location) *Copy Long Folder Path Name*
01				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
02				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
03				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
04				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			

Appendix C: Compliance with Requirements Under the Privacy Act of 1974

Important Note about Personally Identifiable Information (PII)

The Privacy Act of 1974 (5 U.S.C. § 552a) mandates how federal agencies maintain records about individuals. Per OMB Circular A-130, Personally Identifiable Information (PII) is "information that can be used to distinguish or trace an individual's identity, either alone or when combined with other information that is linked or linkable to a specific individual."

EPA systems/applications that collect PII must comply with EPA's Privacy Policy and procedures to guard against unauthorized disclosure or misuse of PII in all forms. For more information click here. If PII are collected, then the QAPP will describe how the PII are managed and controlled.

Personally identifiable information (PII):

Please verify one of the following two options by checking the corresponding box:

1. This project **will not** collect Personally Identifiable Information (PII) ☐:
2. This project **will** collect Personally Identifiable Information (PII): ☐

This QAPP will comply with 5 U.S.C. § 552a and EPA's Privacy Policy.

Personally identifiable information (PII) and the requirements for safeguarding this information are described for EPA grantees within the EPA Privacy Policy (CIO 2151, current version). PII is defined as any information about an individual's identity, including personal information which is linked or linkable to an individual (e.g., name, date of birth, address). The Privacy Act of 1974 (5 U.S.C. § 552a) sets forth requirements for federal agencies when they collect, maintain, or disseminate Privacy Act information.

Appendix D: Full Detailed List of Data Sources

Resource Category	Data Source	Description
Climate Action Plan	Carmel Climate Action Plan	City GHG emissions, climate strategies and indicators
	Thrive Indianapolis	City GHG emissions, climate strategies and actions
	Zionsville Climate Action Plan	City GHG emissions, climate strategies
Greenhouse Gas Inventory	ERI 2019 Resilience Cohort Results Summary	
	Greencastle - 2018	Total, by sector, and per capita CO2e
	Fishers – 2015 & 2018	Total, by sector, and per capita CO2e
	Indianapolis – 2010, 2013, 2016	Total and by sector CO2e
	Carmel - 2015 & 2018	Total, by sector, and per capita CO2e
Community Plans	Noblesville Comprehensive Plan	Environmental concerns
	Anderson Consolidated Plan 2020-2024	Strategies for natural hazard risk mitigation associated with climate change
	Friends of White River Strategic Growth Plan	Environmental justice and watershed restoration programs
	Anderson Brownfield Redevelopment Program	Plan to address abandoned properties formerly occupied with hazardous substance or pollutant
	White River Strategic Alliance Plan	Regional plan to ensure water resource protection
	Westfield Stormwater Master Plan	Roadmap for city to address future drainage, flooding and water quality issues
	Marion Country Multi Hazard Mitigation Plan	Climate change hazard mitigation plans
	Maximize Markleville 2035 Comprehensive Plan	Not yet published, but plan to reference
	Anderson Metropolitan Region 2050 Metropolitan	Framework for transportation investment decisions in metropolitan areas
	MCCOG Unified Planning Work Program	Emissions reductions and climate change action items
	Indiana's Climate and Energy Future	Roadmap for renewable energy and natural climate solutions deployment

Resource Category	Data Source	Description
	Town of Lapel Comprehensive Plan	Plan to reduce emissions, sustainable stormwater management, climate change assessment
	Frankton Comprehensive Plan	Sustainability-focused goals
	Southport Downtown Revitalization Plan	Sustainability-focused principles for planning
	2011 Whiteland Comprehensive Plan	Language related to Sustainable Development Goals
	Pendleton Tree Management Plan	Urban forestry data
	Pittsboro Comprehensive Plan	Sustainable land use goals
	Putnam Country Comprehensive Plan	Land use, environmental protection, renewable energy support
	Mooresville Comprehensive Plan	Environmental protection action steps
	Sheridan Comprehensive Plan	Goals for flood impact reduction
	Elevate Elwood Comprehensive Plan	Sustainable land use objectives, sustainable building objectives, recycling services expansion plan
	Cumberland Park System Master Plan	Park sustainability evaluation
	Cumberland Comprehensive Plan	Encouragement of New Urbanist growth principles
	Cicero / Jackson Township Comprehensive Plan	Emissions reduction strategy
	Whitestown Parks and Recreation Master Plan	Climate-change aligned park solution strategies
	Whitestown Comprehensive Plan	Goals to reduce emissions from transportation
	Lebanon Comprehensive Plan	Development goals that reduce emissions
	Anderson Comprehensive Plan	Goals to protect climate and air quality
	Hancock County Comprehensive Plan	Climate resilience strategies, consideration to develop a CAP, effects of climate change on agriculture
	2018-2022 Strategic Plan Brownsburg	Environmental sustainability strategies

Resource Category	Data Source	Description
	Brownsburg Comprehensive Plan	Sustainable development strategies
	Forward Madison County Comprehensive Plan	Environmental sustainability strategies
	Fishers 2040 Comprehensive Plan	Environmental working group and action steps
	Carmel Comprehensive Plan	Environmental sustainability strategies
	Hamilton County Comprehensive Plan	Climate change impacts and mitigation strategy
	Greenspace Assessment for Marion County	Report of greenspace indices and socioeconomic variables
	Hendricks County Muli-hazard Mitigation Plan	Climate risks, mitigation goals and practices
	Hamilton County Multi-Hazard Mitigation Plan	Climate impacts and mitigation strategies
	Indianapolis Public Schools Better Buildings Initiative	Sustainable building strategies
	Johnson County Multi-Hazard Mitigation Plan	Climate-related risks and mitigation strategies
	Marion County Multi-Hazard Mitigation Plan	Climate change impacts, risks, and mitigation strategies
	Indianapolis MPO Comprehensive Economic Development Strategy	Climate change risks, mitigation strategies
State and National Tools/Resources	Indiana Green City Mapper	Spatial database of urban green infrastructure (trees and the tree canopy, stormwater features, food gardens, parks, greenways and trails), socioeconomic data (e.g. social vulnerability index) and climate change-related data (e.g. temperature, flood zones, hard surfaces)
	Indiana Climate Change Impacts Assessment	Climate, Health, Forest Ecosystems, urban green space, agriculture, aquatic ecosystems, tourism &
	Hoosier Resilience Index	Climate change, importance of adaptation and mitigation, and that preparedness is necessary, feasible, and unique to each community
	Indiana State Climate Maps	Counties impacted by climate change

Resource Category	Data Source	Description
	Resilience Analysis and Planning Tool	Community resilience indicators, census demographic data, infrastructure data, weather data, hazards, risks
	Climate Mapping for Resilience and Adaptation	Current climate-related hazards
	Climate Explorer	Climate change predictions by county
	Risk, Resilience, Vulnerability Indices	CDC Social Vulnerability Index (SVI), Social Vulnerability Index for the United States (SoVI®), FEMA Community Resilience Index (FEMA CRI), Baseline Resilience Indicators for Communities (BRIC), National Risk Index (NRI)
	National Risk Index	Natural hazard risk data
	Future Heat Events	Future heat events and social vulnerability data
	Community Resilience Estimates	Metric for how at-risk every neighborhood in the United States is to the impacts of disasters
	Environmental Justice Index	Ranks the cumulative impacts of environmental injustice on health for every census tract
	SAVI	Central Indiana environmental data, Indiana Environment Profile
	Climate Action and Urban Sustainability (CURB) tool	World Bank tool to help develop climate action plan
	GLIMPSE	Multi-sector, long term environmental and energy planning
	Non-CO2 Greenhouse Gas Emission Projections & Mitigation Report and Mitigation Assessment Model	Estimates and projections of non-CO2 GHGs from anthropogenic sources
	Climate and Economic Justice Screening Tool (CEJST)	
	EPA's Environmental Justice Screening and Mapping Tool (EJScreen)	

Resource Category	Data Source	Description
	CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)	
	Indiana Brownfields Program Site List	Sites at which the Indiana Brownfields Program has considered or provided financial, legal or technical assistance upon request
	EPA Facility Level Information on Greenhouse Gases Tool (FLIGHT)	
	EPA Inventories of US Greenhouse Gas Emissions and Sinks by State	
	EPA Motor Vehicle Emission Simulator	EPA emissions modeling system
	Indy Chamber Regional Talent Gap and Skills Analysis	
	Hamilton County Housing Study	
	IFA Central Indiana Water Study	
	Tree Equity Score	
	USDOT Vulnerability Assessment Scoring Tool (VAST)	
	Indiana Map building footprints	
	Indiana DNR county-level floodplain mapping	Floodplain data by county

Resource Category	Data Source	Description
	Indiana Floodplain Information Portal (INIFIP)	
	White River Alliance	Indiana Water Roadmap Land Cover
	State of Indiana Climate Maps	
	State of IN Hazard Mitigation Plan - IN Dept of Homeland Security	
	Indiana Infrastructure Report Card – Army Corps of Engineers	
	Hazardous Waste Spill Reporting – Federal Motor Carrier Safety Administration	
	White River Report Card	indicator-based report card of health of White Reiver and surrounding communities
	HepGIS Title VI Tool	equity analysis for any 2 streets
	Justice40 Tracts	Assesses and identifies communities that are disadvantaged according to Justice40 Initiative criteria
	First Street Foundation Flood Predictions	
	US DOT Notice of Funding Opportunity Page	
	FHWA - Climate Change Adaptation Case Studies	
	NOAA - Billion Dollar Weather and Climate Disasters	

Resource Category	Data Source	Description
	US DOT Federal Tools to Determine Disadvantaged populations	
Company Reports	Duke Energy 2022 Climate Report	Net-zero strategies, GHG emissions (Scope 1-3)
	Duke Energy Annual Report	Climate action goals and commitments
	Heritage 2022 Sustainability Report	Data for waste and wastewater in service area
	Toyoda Iron Works Environmental Report 2022	In Japanese, but discusses impacts
	Cummins Planet 2050	Environmental strategies
	Cummins Sustainability Progress Reports	Environmental data
	Eli & Lily ESG Report	Data and strategy
	Corteva Sustainability and ESG Report	Data and strategy
	Elanco ESG Report	Data and strategy
	OpenLane ESG Initiatives	Strategy
	SMC Sustainability Report	Data and strategy
	Rolls Royce Leading the Transition to Net Zero Carbon	Strategy
	CNO Financial Group	Environmental strategy
	Simon Group Sustainability Report	Data for malls in Edinburgh, Greenwood, Noblesville, Indianapolis
	Eskenazi Health	Sustainability information on website

Resource Category	Data Source	Description
	KYB	Sustainability information on website
	OMR Automotive Environment Health & Safety	Sustainability information on website
	Indiana Michigan Power	
	AES Indiana	
Metropolitan Planning Organization	Indiana Bureau of Motor Vehicles	Vehicle types and fuel consumption
	Travel Demand Model	Modeled automobile and freight data
	Streetlight data	Traffic count data for vehicles and multi-modal
	Department of Transportation	Lane miles by assets, traffic data, carbon reduction spreadsheet, railroads, railroad system, and railroad crossing (2021 Freight Plan Update)
	ESRI's Community Analyst	Population, housing, poverty, employment, transportation data
	CIRTA Routes	
	Environmental Justice Areas	
	MIBOR	Community housing preference survey
	Routes	IndyGo, Access Johnson County
	Parks	GIS file of parks
	Census Data	2020 population

Resource Category	Data Source	Description
	Central Indiana Ride Guide	Bicycle facilities data
	Pedestrian Plan	Pedestrian network / facilities
	Building Footprints	
	National Bridge Inventory	
	InfoUSA	Schools
	Housing Value	Average rent and home value
	Freight Dashboard	Freight network, truck counts, gaps/improvements
	Labor Force, Jobs	
	Housing Units	Owner, renter, units
	Highway Performance Monitoring System	Vehicle miles traveled
	Dept of Natural Resources	Point location of dams, full shape of landfills, cemeteries, water wells, floodplains
	All roads and streets	
	Transportation and Energy Contingency Plan for the UA	
Water and Wastewater Utilities	Indiana Utility Regulatory Commission agencies	
Local Solid Waste Management Authorities	Waste Management Republic Services	

Resource Category	Data Source	Description
Additional Resources	Purdue University	
	Indiana University	
	Project 46 Southern Indiana Regional Climate Alliance	
	Hoosier Environmental Council Climate Action	

Appendix C Central Indiana Environmental Action Plan Handout

CENTRAL INDIANA
ENVIRONMENTAL ACTION PLAN

Central Indiana is planning for a more sustainable future by adopting strategies that limit greenhouse gas (GHG) emissions, while positioning the region as a leader in public health, job creation, and advanced industry.

Central Indiana Regional Development Authority (CIRDA) was awarded $1 million from the U.S. Environmental Protection Agency (EPA) to develop a regional plan for reducing GHG emissions and other harmful air pollution. The regional plan must include priority actions to reduce GHG emissions in Central Indiana. After the regional plan is complete in March 2024, CIRDA will compete for $4.6 billion in EPA grants to fund priority actions and associated projects.

CIRDA will develop the regional plan by engaging a diverse set of public, private, and nonprofit stakeholders throughout Central Indiana.

COMMUNITY PARTICIPATION

A significant focus of creating the regional plan is community input.
We want to hear what matters most to you. To get involved:

TAKE THE COMMUNITY SURVEY
(scan QR code)

FOLLOW PLAN PROGRESS AND SHARE FEEDBACK

PARTICIPATE IN OUR COMMUNITY MEETINGS

SIGN UP FOR NEWSLETTER UPDATES

VISIT CIRDA'S WEBSITE FOR MORE INFORMATION:
www.centralindianarda.org/epa-grant

TIMELINE

OCTOBER 2023
Develop GHG Inventory

NOVEMBER 2023
Develop Priority GHG Actions

FEBRUARY 2024
Complete Regional Plan

MARCH 2024
Submit Project Funding Proposals

VISION

Central Indiana is a job center and an economic hub for the state. Our regional plan will aim to generate high-quality and high-wage job opportunities, increase the region's per capita income, improve the health of our communities, and create vibrant places that attract and retain high caliber talent to the region and state while reducing greenhouse gas emissions. The regional plan will focus on identifying opportunities for GHG reductions in the power, transportation, industrial, and agriculture sectors.

CONTACT CIRDA

Created by Indiana state law, CIRDA is comprised of municipalities throughout Central Indiana and represents more than 80 percent of the population in the Central Indiana metropolitan statistical area. CIRDA works collaboratively to align the public sector on key issues and promote investment to help drive economic development and grant opportunities within Central Indiana. Contact **info@centralindianaRDA.org** with questions or for more information on how to get involved with the regional plan.

Appendix D Updated List of GHG Reduction Measures Discussed across Each Sector-specific Working Group Meeting

UPDATED LIST OF GHG REDUCTION MEASURES DISCUSSED ACROSS EACH SECTOR-SPECIFIC WORKING GROUP MEETING

AGRICULTURE & OPEN SPACE WORKING GROUP #1 MEETING

- **Anaerobic Digesters** - Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel
- **Electric Equipment** - Incentive programs to fund electric agricultural equipment technologies
- **Fertilizer Techniques** - Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application
- **Renewable Energy** - Develop an incentive program for farmers to build renewable energy systems on farms
- **Protect Wetlands** - Promote carbon sequestration through a program to protect wetlands through preservation and restoration
- **Afforestation and Green Infrastructure** - Programs to support urban afforestation and green infrastructure programs and projects
- **Land Restoration** - Programs to restore degraded lands (e.g., brownfields, mine reclamation) and forested lands to enhance carbon sequestration
- **Waste Reduction and Diversion** - Programs and incentives to reduce or divert waste (including food waste, e-waste, and/or yard waste) through improved production practices, improved collection services, and increased reuse or recycling rates
- **Composting** - Programs to expand composting infrastructure to reduce GHG emissions and increase beneficial use of organic waste

TRANSPORTATION AND RECREATION WORKING GROUP #2 MEETING

- **Electric Vehicles and Charging -** Programs to increase the share of electric light-, medium-, and heavy-duty electric vehicle charging infrastructure
- **Mobility Infrastructure** - New or expanded transportation infrastructure projects to facilitate micro-mobility, car sharing, bicycle, and pedestrian modes
- **Mode Shift Incentives** - Encourage mode shift from private vehicles to walking, biking, and public transportation (e.g., complete streets, bike share programs, bike storage facilities, low-speed electric bicycle subsidies, public transit subsidies)
- **Parks and Greenways -** Identify underserved neighborhoods and strategies to acquire land and develop new neighborhood parks and greenways in established residential area
- **Afforestation and Green Infrastructure** - Programs to support urban afforestation and green infrastructure projects
- **Protect Wetlands** - Promote carbon sequestration through a program to protect wetlands through preservation and restoration

- **Land Restoration** - Programs to restore degraded lands (e.g., brownfields, mine reclamation) and forested lands to enhance carbon sequestration

ELECTRICITY AND HEAT WORKING GROUP #3 MEETING

- **Weatherization -** Identify and eliminate barriers to engagement in weatherization programs and other efficiency programs focused on low-income households.
- **Clean Energy Loans** - Establish low-interest loans for energy efficiency and renewable energy improvements in new and existing buildings, sustained by a revolving loan fund from a combination of financing sources.
- **Demand Response** - Programs to support smart-grid and/or behind-the-meter technologies to reduce power losses, reduce peak demand, and enable consumer participation in distributed generation.
- **Renewable and Storage Incentives -** Targeted incentives for installation of renewable energy and energy storage systems on commercial and residential buildings, such as net metering, tax credits, rebates, and streamlined interconnection standards
- **Community-Scale Renewables** - Develop distributed or community-scale renewable energy generation, microgrids, or vehicle-to-grid infrastructure in disadvantaged communities, including remote and rural regions
- **Energy Efficiency** - Incentive program for installation of end-use energy efficiency measures in existing government-owned, commercial, and residential buildings
- **Municipal Renewable and Storage Installations -** Installation of renewable energy and energy storage systems on municipal facilities
- **Building Electrification** - Programs to promote electrification of government-owned, commercial, and residential buildings
- **EV Charging** - Programs and policies to accelerate the incorporation of efficient electric technologies and electric vehicle charging at new single-family, multi-unit, or affordable residential buildings and commercial buildings, including building codes related to electric vehicle charging

INDUSTRY AND TECHNOLOGY ADVANCEMENT WORKING GROUP #4 MEETING

- **Low-Embodied Carbon -** Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel
- **Energy Efficiency -** Programs to support or incentivize implementation of energy efficiency measures in industry, including:
    - Energy audits
    - Strategic energy management
    - Equipment upgrades
    - Waste heat utilization

- **Low/No Carbon Fuels** - Programs to support or incentivize low/no carbon fuels in industrial energy use and industrial processes
- **Electrification** - Programs to support electrification (e.g. process heat) in industrial energy use and processes

Appendix E Project Intake Form

EPA Grant- Project Intake Form

Submitting Entity

CIRDA is collecting ideas for greenhouse gas (GHG) reduction strategies and/ or projects as a part of the Climate Pollution Reduction Grant opportunity to start gathering input on what types of potential GHG reduction opportunities might be of interest to your community.

Please share information regarding the entity submitting a proposed GHG reduction strategy or project.

Entity Name

Address

Entity Website

Entity Contact First Name

Entity Contact Last Name

Entity Contact Email

Entity Contact Phone

Project Information

Please provide information regarding your proposed GHG reduction strategy or project idea, including the County and City information.

Please upload any relevant attachments related to the strategy or project for additional information.

Projects will be considered by the steering committee based on alignment with the action plan and adherence with the following criteria noted by the EPA.

- Ability to produce GHG emission reductions
- Potential benefits to low-income and disadvantaged communities
- Does the authority to implement the project exist?

Click here for potential eligible projects, per the EPA's Phase 2 NOFO.

Strategy/ Project Description

Strategy/ Project Location (City)

Select or enter value

Strategy/ Project Location (County)

Select or enter value

Estimated Total Investment (if known)

Describe the public engagement efforts completed:

File Upload

Please include any relevant documents or presentation materials that help tell the story of your GHG reduction strategy or project.

Drag and drop files here or browse files

Send me a copy of my responses

Submit

Appendix F Public Survey #1 (English and Spanish)

A survey about Central Indiana Environmental Action Plan

Central Indiana Environmental Action Plan

The goal of this activity is Help us prepare the region for environmental changes

Click here to learn more about this project: https://centralindianarda.org/epa-grant

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The title of this activity is Central Indiana Environmental Action Plan

Please take a moment to share your priorities to prepare Central Indiana for impacts from a changing environment.

The image of a path with trees on either side of it

We expect this survey to take no more than 5 minutes. We appreciate your participation.

CENTRAL INDIANA
ENVIRONMENTAL ACTION PLAN

The image of logo, company name

Introduction

Reducing greenhouse gas emissions benefits air quality, improves physical health, and creates local jobs. This survey is to help understand the benefits and actions that are important to you and your community.

Introduction

The goal of this activity is What does greenhouse gas mean to you?

The title of this activity is Introduction

What do you think of when you hear greenhouse gas emissions?

Thank you for your input!

The title of this section is Introduction

Introduction

When you think about greenhouse gas (GHG) emissions what comes to mind?

- [ ] Click here for Transportation (personal vehicles, airplanes, and freight goods)
- [ ] Click here for Energy creation (burning coal or natural gas)
- [ ] Click here for Agriculture (raising crops or animals for consumption)
- [ ] Click here for Buildings (construction and operations)
- [ ] Click here for Waste (materials sent to landfills from homes, businesses, or buildings)
- [ ] Click here for Other

If you chose "other" please describe:

Write down comment below:

What is your zip code?

Write down comment below:

General Comment

Write down comment below:

Benefits

The goal of this activity is Please select benefits.

The title of this activity is Benefits

What is most beneficial to you from reducing greenhouse gas emissions?

Please answer the survey questions.

The title of this section is Benefits to You

Benefits to You

Chose the items that are most important to you.

- [ ] Click here for Improving air quality
- [ ] Click here for Reducing energy bills for your residence
- [ ] Click here for Improving comfort in your home
- [ ] Click here for Increasing job availability in and around where you live
- [ ] Click here for Improving convenient public transportation
- [ ] Click here for Improving personal transportation (car)
- [ ] Click here for Improving walking and biking opportunities
- [ ] Click here for None of the above

The title of this section is Benefits to Your Community

Benefits to Your Community

Chose the items that are most important to your community and businesses

- [ ] Click here for Improving public health
- [ ] Click here for Increasing or improving green space
- [ ] Click here for Improving economic development
- [ ] Click here for Improving waste management
- [ ] Click here for Improving comfort in commercial businesses and offices
- [ ] Click here for Reducing energy bills for commercial businesses
- [ ] Click here for None of the above

General Comment

Write down comment below:

Actions

The goal of this activity is Please select actions.

The title of this activity is Actions

What actions from your local government would be most valuable to you and your community?

Please answer the survey questions.

The title of this section is Actions for You

Actions for You

Choose the actions that are most important to you

- [ ] Click here for Increase access and funding for solar panels on your home
- [ ] Click here for Providing residential composting service
- [ ] Click here for Building offices, homes and recreational areas closer together
- [ ] Click here for Funding for increasing home energy efficiency
- [ ] Click here for Increasing electric vehicle charging stations in your community
- [ ] Click here for None of the above

The title of this section is Actions for Your Community

Actions for Your Community

Choose the actions that are most important to your community and businesses

- [ ] Click here for Increase access and funding for solar power for businesses
- [ ] Click here for Utilizing sustainable building materials for your local buildings
- [ ] Click here for Additional green space (parks and trees) in your community
- [ ] Click here for Increasing the availability and access to public transportation in your community
- [ ] Click here for Additional walking and biking paths in your community
- [ ] Click here for Increasing energy efficiency in commercial buildings
- [ ] Click here for Funding and regulation for a faster transition to renewable energy, like solar and wind, over natural gas, coal and oil
- [ ] Click here for Funding for battery technology to store solar energy at commercial businesses
- [ ] Click here for Increasing efficiency in freight movement
- [ ] Click here for None of the above

General Comment

Write down comment below:

Wrap Up

The goal of this activity is Thank you for your input!

Final Questions (Optional)

What is the most important action your local government should take to improve the environmental sustainability in your city and community?

Write down comment below:

Thank You!

To stay up-to-date on this project, sign up to receive alerts at https://centralindianarda.org/epa-grant

General Comment

Write down comment below:

The title of this activity is Wrap Up

You're almost done! Please answer one more optional question!

Thank you for your input to improve Central Indiana's environment!

Our Partners:

CIRDA
CENTRAL INDIANA REGIONAL DEVELOPMENT AUTHORITY

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The image of diagram

Thanks for participating!

You can now close this browser.

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A survey about Central Indiana Environmental Action Plan (Spanish)

Click here to learn more about this project: https://centralindianarda.org/epa-grant

Plan de acción ambiental de Indiana central

The goal of this activity is Ayúdanos a preparar la región para los cambios ambientales.

The title of this activity is Plan de acción ambiental de Indiana central

Tómese un momento para compartir sus prioridades para preparar a Indiana Central para los impactos de un entorno cambiante.

The image of a path with trees on either side of it

Esperamos que esta encuesta no demore más de 5 minutos. Agradecemos su participación.

CENTRAL INDIANA
ENVIRONMENTAL ACTION PLAN

The image of logo, company name

Introducción

La reducción de las emisiones de gases de efecto invernadero beneficia la calidad del aire, mejora la salud física y crea empleos locales. Esta encuesta tiene como objetivo ayudar a comprender los beneficios y acciones que son importantes para usted y su comunidad.

Introducción

The goal of this activity is ¿Qué significan para usted los gases de efecto invernadero?

The title of this activity is Introducción

¿En qué piensas cuando escuchas las emisiones de gases de efecto invernadero?

¡Gracias por su aporte!

The title of this section is Introducción

Introducción

Cuando piensas en las emisiones de gases de efecto invernadero (GEI), ¿qué te viene a la mente?

- [ ] Click here for Transporte (vehículos personales, aviones y mercancías)
- [ ] Click here for Creación de energía (quema de carbón o gas natural)
- [ ] Click here for Agricultura (cultivo de cultivos o animales para consumo)
- [ ] Click here for Edificios (construcción y operaciones)
- [ ] Click here for Residuos (materiales enviados a vertederos desde hogares y edificios)
- [ ] Click here for Otro

Si elige "otro", describa:

Write down comment below:

¿Cuál es su código postal?

Write down comment below:

Comentario general

Write down comment below:

Beneficios

The goal of this activity is Por favor seleccione beneficios.

The title of this activity is Beneficios

¿Qué es lo más beneficioso para usted al reducir las emisiones de gases de efecto invernadero?

Por favor conteste las preguntas de la encuesta.

The title of this section is Beneficios para usted

Beneficios para usted

Elija los elementos que sean más importantes para usted.

- [ ] Click here for Mejorar la calidad del aire
- [ ] Click here for Reducir las facturas de energía de su residencia
- [ ] Click here for Mejorar la comodidad en su hogar
- [ ] Click here for Aumentar la disponibilidad de empleo en su lugar de residencia y sus alrededores
- [ ] Click here for Mejorar el transporte público conveniente
- [ ] Click here for Mejorar el transporte personal (automóvil)
- [ ] Click here for Mejorar las oportunidades para caminar y andar en bicicleta
- [ ] Click here for Ninguna de las anteriores

The title of this section is Beneficios para su comunidad

Beneficios para su comunidad

Elija los elementos que sean más importantes para su comunidad y sus empresas.

- [ ] Click here for Mejorar la salud pública
- [ ] Click here for Aumentar o mejorar los espacios verdes
- [ ] Click here for Mejorar el desarrollo económico
- [ ] Click here for Mejorar la gestión de residuos
- [ ] Click here for Mejorar la comodidad en negocios y oficinas comerciales
- [ ] Click here for Reducir las facturas de energía para negocios comerciales
- [ ] Click here for Ninguna de las anteriores

Comentario general

Write down comment below:

Comportamiento

The goal of this activity is Por favor seleccione acciones.

The title of this activity is Comportamiento

¿Qué acciones de su gobierno local serían más valiosas para usted y su comunidad?

Por favor conteste las preguntas de la encuesta.

The title of this section is Acciones para ti

Acciones para ti

Elige las acciones que sean más importantes para ti

- [ ] Click here for Aumentar el acceso y la financiación para paneles solares en su hogar
- [ ] Click here for Brindar servicio de compostaje residencial
- [ ] Click here for Construir oficinas, hogares y áreas recreativas más juntas
- [ ] Click here for Financiamiento para aumentar la eficiencia energética del hogar
- [ ] Click here for Aumentar las estaciones de carga de vehículos eléctricos en su comunidad
- [ ] Click here for Ninguna de las anteriores

The title of this section is Acciones para su comunidad

Acciones para su comunidad

Elija las acciones que sean más importantes para su comunidad y sus empresas

- [ ] Click here for Aumentar el acceso y la financiación de la energía solar para las empresas
- [ ] Click here for Utilizar materiales de construcción sostenibles para sus edificios locales
- [ ] Click here for Espacios verdes adicionales (parques y árboles) en su comunidad
- [ ] Click here for Aumentar la disponibilidad y el acceso al transporte público en su comunidad
- [ ] Click here for Senderos adicionales para caminar y andar en bicicleta en su comunidad
- [ ] Click here for Aumento de la eficiencia energética en edificios comerciales
- [ ] Click here for Financiamiento y regulación para una transición más rápida a la energía renovable, como la solar y la eólica, en lugar del gas natural, el carbón y el petróleo
- [ ] Click here for Financiamiento para tecnología de baterías para almacenar energía solar en negocios comerciales
- [ ] Click here for Aumento de la eficiencia en el movimiento de carga
- [ ] Click here for Ninguno de los anteriores

Comentario general

Write down comment below:

Envolver

The goal of this activity is ¡Gracias por su aporte!

Preguntas finales (opcional)

¿Cuál es la acción más importante que debería tomar su gobierno local para mejorar la sostenibilidad ambiental en su ciudad y comunidad?

Write down comment below:

¡Gracias!

Para mantenerse actualizado sobre este proyecto, regístrese para recibir alertas en https://centralindianarda.org/epa-grant

Comentario general

Write down comment below:

The title of this activity is Envolver

¡Ya casi terminas! ¡Por favor responda una pregunta opcional más!

¡Gracias por sus aportes para mejorar el medio ambiente de Indiana Central!

Nuestros compañeros:

CIRDA
CENTRAL INDIANA REGIONAL DEVELOPMENT AUTHORITY

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¡Gracias por participar!

Ahora puede cerrar este navegador.

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Appendix G Public Survey #2

CENTRAL INDIANA

ENVIRONMENTAL ACTION PLAN

Draft Prioritized Greenhouse Gas Reduction Strategies and Benefits

Introduction

Central Indiana Regional Development Authority (CIRDA) was awarded $1 million from the U.S. Environmental Protection Agency (EPA) to develop a regional plan for reducing greenhouse gas (GHG) emissions and other harmful air pollution. The regional plan focuses on the 11-county Central Indiana metro area while the State's plan focuses statewide.

CIRDA has worked to engage the public to develop an high-priority, implementation-ready Priority Climate Action Plan (PCAP), positioning the region to compete for project and program funding. Following the completion of the PCAP, CIRDA will begin engagement on a longer term Comprehensive Climate Action Plan.

* Indicates required question

Background

After an initial public survey in September and a review of existing climate action plans and proposed projects around the region, the planning team convened a steering committee and sector-specific working groups to evaluate and narrow the list of strategies to identify high-priority, implementation-ready projects and programs to reduce greenhouse gas (GHG) emissions.

The following is updated list of strategies for Central Indiana and associated benefits that are both implementation-ready and conform with federal program criteria for the Priority Climate Action Plan.

Updated Draft Priority GHG Reduction Strategies:

- Restoring degraded lands and reforestation to store carbon
- Repurposing industrial sites for renewable energy
- Increasing transportation infrastructure for walkers and bikers
- Increasing the number of parks and greenways
- Increasing energy efficiency of government buildings and properties
- Increasing the use of renewable energy to power government buildings and properties
- Electric vehicle charging infrastructure of government-owned buildings and vehicles
- Electrifying government buildings and properties
- Increasing energy efficiency of industrial businesses

Which of these benefits would be most valuable to you? *

- ○ Reducing the urban heat island effect
- ○ Improving soil health
- ○ Improving water quality
- ○ Improving air quality
- ○ Improving public health
- ○ Increasing or improving green space
- ○ Improving walking and biking opportunities
- ○ Reducing energy costs of government facilities
- ○ Improving economic development and job opportunity
- ○ Improving comfort in buildings

Why did you choose the answer you did?

Your answer

Are there benefits to you or the community that are missing from this list?

Your answer

What is your zip code?

Your answer

Submit Clear form

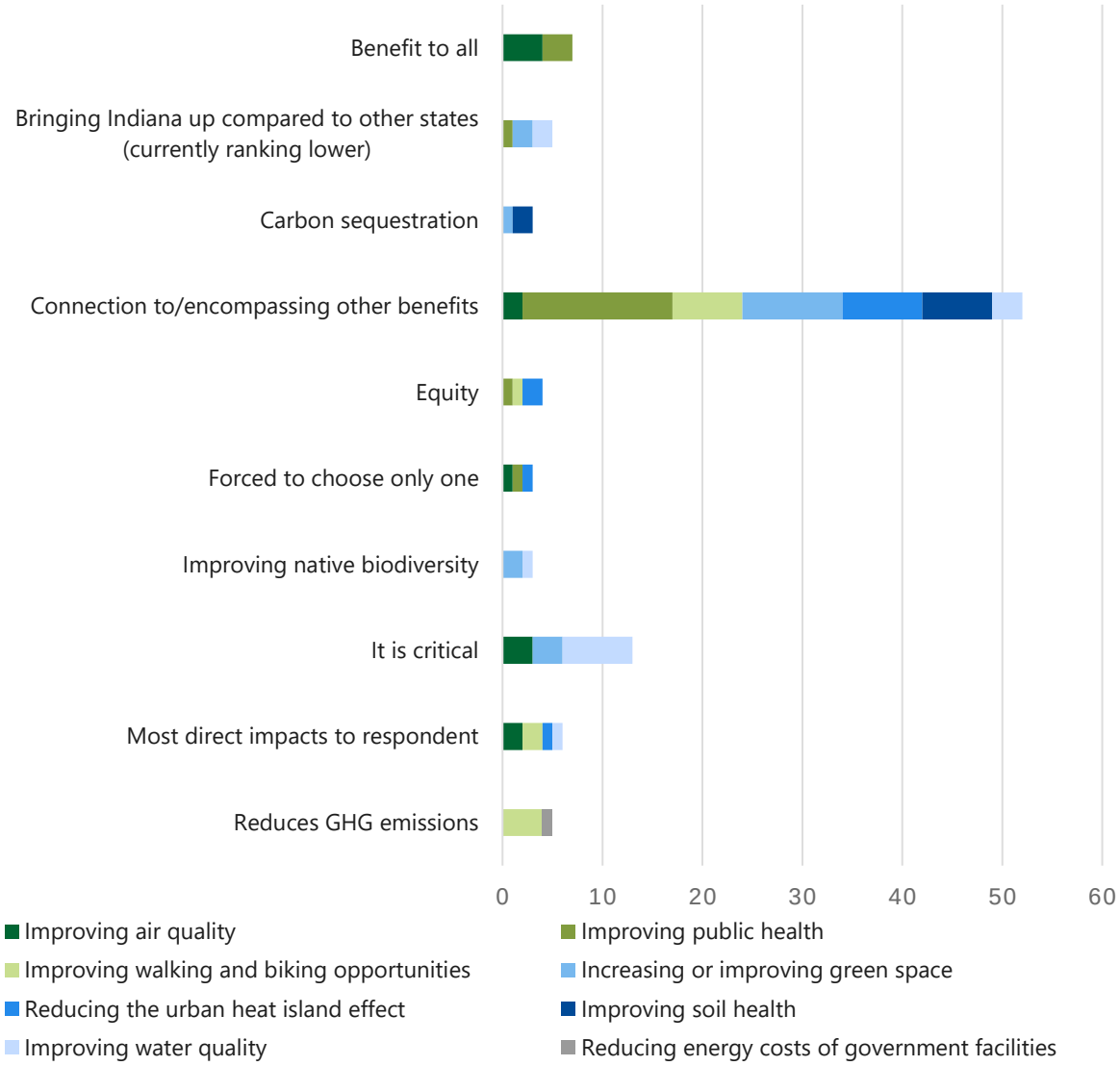
Never submit passwords through Google Forms.

Appendix H Public Survey #2 Results

PUBLIC SURVEY #2 RESULTS

Repeated responses for the second public survey question 2 are responses from across the whole region that were submitted for multiple benefits in question 1. Example: multiple participants identified "increasing native biodiversity" for why they selected the benefit of "improving and increasing green space" and "improving water quality."

Figure 1. Public Survey #2 – All Responses for Question 2: "Why did you choose the answer you did?" Region Repeated Responses



Non-repeated responses for question 2 are responses from across the whole region that were submitted as justification but only appeared for justification for one benefit, displayed in Table 1. Example: Six respondents noted they selected "improving air quality" because "they have asthma or respiratory problems or know someone with respiratory issues," but this justification was not repeated for other benefits like "increasing or improving green space."

Table 1. Public Survey #2 – All Responses for Question 2: "Why did you choose the answer you did?" Region Non-Repeated Responses

Which of these benefits would be most valuable to you?	Why	Tally
Improving air quality	Have/know someone with asthma/breathing issues/Canadian smoke	6
Improving air quality	Air quality will improve my health	3
Improving air quality	Improve green spaces	3
Improving air quality	Indianapolis is known for poor air quality	3
Improving air quality	Climate change starts in air	2
Improving air quality	80% of greenhouse gases are produced by industry in NWI	1
Improving air quality	Agriculture emissions, open burning, and outdoor wood boilers currently present an underestimated/underappreciated contribution to Green House Gas Emissions while degrading Indiana rural living conditions. Current open burning and OWB laws can be enforced, but are not. Minimal funding to IDEM to educate local fire departments to enforce current law can have immediate impact. Well-known measures can be taken to prevent agricultural livestock emissions.	1
Improving air quality	Climate change is caused by air gasses	1
Improving air quality	Hard to do that personally	1
Improving air quality	More policy focused than personal responsibility focused.	1
Improving air quality	Most cost effective	1

Which of these benefits would be most valuable to you?	Why	Tally
Improving air quality	PM 2.5 is big and overlooked	1
Improving air quality	Removing sources of air pollution also reduces other forms of pollution	1
Improving air quality	Urban canopies, green spaces, and protecting and restoring our wetlands and woodlands, capture carbon, improve air quality, and increase our ability to adapt to climate change effects including extreme heat and flooding.	1
Improving economic development and job opportunity	Forget about climate change. Focus on basic government services	1
Improving economic development and job opportunity	Jobs	1
Improving economic development and job opportunity	This part of the climate change solution would help more individuals get on the band wagon and be able to afford cleaner environmental practices and would make more citizens aware of this planet's needs, which are necessary to their lives as well as to the big picture.	
Improving economic development and job opportunity	It makes economic sense for Indiana to invest in renewable energy industries.	1
Improving public health	Benefit to society when community members are well mentally, physically, financially	1
Improving public health	A healthy environment	1
Improving public health	Bringing Indiana up compared to other states (currently ranking lower)	1

Which of these benefits would be most valuable to you?	Why	Tally
Improving public health	Connection to contaminate water and health of water resources	1
Improving public health	Connection to urban heat	1
Improving public health	Focus on costs only won't be successful	1
Improving public health	HEC email	1
Improving public health	I value most	1
Improving public health	Improving environmental education	1
Improving public health	Reduce storm runoff (sustainable land use)	1
Improving public health	Reduce use of fossil fuels	1
Improving public health	Unseen benefit	3
Improving soil health	We are what we eat and food eats soil	2
Improving soil health	Health of the planet	2
Improving soil health	Needed transformation of agricultural system	2
Improving soil health	Reducing impacts of climate change	2
Improving soil health	Regenerative farming	2
Improving soil health	Soil is the foundation of the earth	1
Improving soil health	Electricity must be made somewhere	1

Which of these benefits would be most valuable to you?	Why	Tally
Improving soil health	Impacts of pesticide and herbicide use	3
Improving walking and biking opportunities	Reduce number of cars	2
Improving walking and biking opportunities	Domino effect of community benefit	2
Improving walking and biking opportunities	Need more walking and biking opportunities	3
Improving walking and biking opportunities	Recreational opportunities	2
Improving walking and biking opportunities	Safer to walk/bike	5
Improving walking and biking opportunities	Active transportation	1
Improving walking and biking opportunities	Build resilience	1
Improving walking and biking opportunities	Community engagement opportunities	1
Improving walking and biking opportunities	Easier/dignified to walk/bike	1
Improving walking and biking opportunities	Improve air quality	1
Improving walking and biking opportunities	Improve mental wellbeing	1

Which of these benefits would be most valuable to you?	Why	Tally
Improving walking and biking opportunities	Infrastructure's direct impact on safety of walk/bike/driver	1
Improving walking and biking opportunities	Public transit	3
Improving water quality	Can cause severe health impacts	3
Improving water quality	Contaminated water	2
Improving water quality	Bringing Indiana up compared to other states (currently ranking lower)	2
Improving water quality	Concern over LEAP Innovation District impact on water supply	1
Improving water quality	Because most of the other items on this list are money wasting scams!!	1
Improving water quality	Everything is important except economic development, job opportunity, comfort in buildings	1
Improving water quality	Health hazard	1
Improving water quality	I use well water and am affected by farmland runoff into creeks	1
Improving water quality	Impacts to quality of life	1
Improving water quality	Improvement of green spaces	1
Improving water quality	Many actors involved in water quality	1
Improving water quality	Preservation of wetlands/other green spaces	1
Improving water quality	Water smells like chlorine	1
Improving water quality	water tastes awful	1

Which of these benefits would be most valuable to you?	Why	Tally
Improving water quality	Waterways provide poor drinking water	1
Improving water quality	White River is asset and should be cleaned up	3
Improving water quality	Lapel, Indiana Water and Sewage is in crisis	1
Increasing or improving green space	Land lost to development (industrial and manufacturing)	2
Increasing or improving green space	Bringing Indiana up compared to other states (currently ranking lower)	2
Increasing or improving green space	Critical for future survival	2
Increasing or improving green space	Need more greenspace	1
Increasing or improving green space	Concern over decreasing green space	1
Increasing or improving green space	Dissatisfied with the current habitat destruction	2
Increasing or improving green space	I am working to change landscaping practices	1
Increasing or improving green space	I live in a God-awful subdivision with few trees and where retention ponds count as green space.	1
Increasing or improving green space	I live in Hoosier National Forest and concern over potential logging	1
Increasing or improving green space	Reduce impacts from climate change	1

Which of these benefits would be most valuable to you?	Why	Tally
Increasing or improving green space	Water quality, walkability, and Greenspace are top of my list.	1
Reducing energy costs of government facilities	Include both energy efficiency, renewable energy, and electrification.	1
Reducing energy costs of government facilities	Demonstrate to elected officials the benefits	1
Reducing energy costs of government facilities	Fossil fuels are the cause of global warming	1
Reducing energy costs of government facilities	Include efficiency, renewable energy, electrification	1
Reducing energy costs of government facilities	Next largest contributors to GHG emissions are buildings	1
Reducing energy costs of government facilities	Provides financial benefit while promoting environmental principals.	1
Reducing energy costs of government facilities	Reduce use of natural resources	1
Reducing energy costs of government facilities	Reduces energy costs for citizens	2
Reducing the urban heat island effect	Utility costs/air conditioning/stress on water supplies	1
Reducing the urban heat island effect	Creates negative feedback loop (energy consumption, poor health, low productivity, violence)	1

Which of these benefits would be most valuable to you?	Why	Tally
Reducing the urban heat island effect	I chose one that would include tree canopy, transportation options, and development decisions.	1
Reducing the urban heat island effect	Impact of climate change	1
Reducing the urban heat island effect	Need more urban forests	1

Non-repeated responses for question 3 are responses from across the whole region that were submitted as justification but only appeared for justification for one benefit, displayed in Table 2.

Table 2. Public Survey #2 – All Responses for Question 3: "Are there any benefits that are missing from this list?" Region Non-Repeated Responses

Which of these benefits would be most valuable to you?	Are there benefits to you or the community that are missing from this list?	Tally
Improving walking and biking opportunities	A healthy environment	1
Improving water quality	Add multiple responses and grade them	1
Improving soil health	Better recycling programs (labeling, education, municipal support)	1
Improving public health	Broad band access	1
Improving air quality	Brownfield remediation	1
Improving public health	Change allocation of state highway construction funding from linear miles	1
Improving air quality	Cleaner agriculture practices	1

Which of these benefits would be most valuable to you?	Are there benefits to you or the community that are missing from this list?	Tally
Improving walking and biking opportunities	Conversion of parking to housing	1
Increasing or improving green space	Creating more third places	1
Reducing the urban heat island effect	Decentralized power generation	1
Improving public health	Decreasing residential energy consumption/utility bills	2
Increasing or improving green space	Dedicated bike lanes	1
Improving walking and biking opportunities	Develop positive, energy efficient reuse of vacant lots & buildings	1
Improving public health	Direct community benefits	1
Improving walking and biking opportunities	Economic incentives to improve environmental sustainability	1
Improving public health	Endless improvements	1
Improving air quality	Environmental health	1
Improving public health	Environmental justice	1
Improving air quality	Fewer highways/freeways	1
Increasing or improving green space	Hard to choose	1
Improving public health	HECs comments https://www.hecweb.org/wp-content/uploads/2024/01/HEC-Regional-CPRG-Comments-FINAL.pdf	1
Improving soil health	High quality sustainable food	1

Which of these benefits would be most valuable to you?	Are there benefits to you or the community that are missing from this list?	Tally
Improving water quality	Homeowner planting practices	1
Improving water quality	Honesty in government	1
Improving air quality	I don't like the way you word some of your choices. Reducing energy costs for government buildings could mean a lot of things we should not do, like using more coal when I am totally against that. That makes it hard to answer this question	1
Improving walking and biking opportunities	Improve air quality within buildings	1
Improving air quality	Improve crop yields	1
Reducing the urban heat island effect	Improve safety	1
Improving economic development and job opportunity	Improved mental health from green spaces	1
Improving walking and biking opportunities	Improvement along creation, use, disposal pipeline	1
Improving walking and biking opportunities	Improving air quality specifically for PM2.5	1
Improving soil health	Improving environmental education	3
Improving walking and biking opportunities	Improved public transit	2
Improving walking and biking opportunities	Increase safety on public transit	1
Improving air quality	Increase support for solar for homeowners	1

Which of these benefits would be most valuable to you?	Are there benefits to you or the community that are missing from this list?	Tally
Improving soil health	Improve safety	1
Increasing or improving green space	Increasing green urban cores	1
Improving walking and biking opportunities	Increasing greenspaces for air quality	1
Reducing the urban heat island effect	Increasing native biodiversity	2
Increasing or improving green space	Increasing walkability/bike ability	2
Improving air quality	It depends on how macro or micro you want to be with your targeted benefits combined with common sense and rate of return ratios.	1
Improving economic development and job opportunity	Improving Indiana's laws, policies, and incentives to be more favorable to renewable energy.	1
Increasing or improving green space	Moratorium on clearing old growth forest	1
Reducing the urban heat island effect	More solar	1
Increasing or improving green space	Preserve existing forest	1
Improving water quality	Preserving existing ecosystem/ecosystem services	3
Improving air quality	Preserving wetlands and prairielands	1
Reducing energy costs of government facilities	Preventing crossing the "tipping point"	1
Improving air quality	Promote hydrogen to replace batteries	1

Which of these benefits would be most valuable to you?	Are there benefits to you or the community that are missing from this list?	Tally
Improving public health	Protect forests and wetlands	1
Reducing the urban heat island effect	Protecting the environment	1
Improving water quality	Protection for farmers from solar farms	1
Improving water quality	Protection of water supply	1
Reducing energy costs of government facilities	Provide public service opportunities	1
Improving water quality	Public pool in Zionsville	1
Improving air quality	Reduce confined animal feedlot operations (CAFO)	2
Improving air quality	Reduce energy costs for residents	2
Improving air quality	Reduce energy costs for residents and businesses (not just government)	1
Improving walking and biking opportunities	Reduce number of cars	2
Reducing the urban heat island effect	Reduce street roads	1
Improving air quality	Reduce transportation costs	1
Reducing energy costs of government facilities	Reducing economic impact of disasters worsened by climate change	1
Improving soil health	Reducing energy costs to renters and owners through municipality owned renewables	1
Improving walking and biking opportunities	Reducing residential energy bills	1

Which of these benefits would be most valuable to you?	Are there benefits to you or the community that are missing from this list?	Tally
Improving water quality	Reduction of corporate control of natural resources	1
Improving water quality	Remove invasive species	1
Improving public health	Residential energy efficiency	1
Improving water quality	Respecting the environment	1
Increasing or improving green space	Restoring wetlands	1
Reducing energy costs of government facilities	Saving money	1
Reducing energy costs of government facilities	Supporting organizations working climate	1
Improving public health	Tax breaks and retail bill credit for residential solar	1
Increasing or improving green space	Tax cuts for reusing resources or alternative resources	1
Improving water quality	Understanding existing GHG from the area. While all of these actionable items are great to lower GHG, where can we find existing data on GHG for local businesses or government officials? There are tools available to meet and track GHG and ESG goals, but a proper RFP would be required for implementation. Our population should be aware of GHG polluters, which creates public accountability, and generates jobs/innovation to remain relevant beyond the next couple of quarterly earnings reports. Oberlin, OH has a great model. Salesforce Net Zero Cloud is a robust (albeit non-inexpensive) holistic and automated tool that can assist with understanding out current emissions. Happy to chat more about options.	1
Improving air quality	Using forests as a sink for carbon	1
Improving water quality	Water regulations to prevent large water withdrawals	1

Which of these benefits would be most valuable to you?	Are there benefits to you or the community that are missing from this list?	Tally
Improving air quality	As stated above, under the heading of air pollution, education to fire departments on current open burning and OWB law can have immediate impact to air quality with no need for additional legislation or extravagant expense. Small, but well-known measures to reduce agriculture livestock emissions, i.e. lids on lagoons and filters on exhaust fans, will also leverage immediate impact to rural, disadvantaged communities. Remedies are relatively inexpensive (may be funded by the Federal grants) and can have a major impact to attract new work at home jobs to underserved rural communities. Such occupations are enabled by the current Federal grants to provide internet access to rural homes. Work at home jobs present lower air quality and GHG emission impacts when accounting for eliminated commuting. Additional impact is to enhance Indiana's reputation as a work-friendly state.	1
Increasing or improving green space	I disagree with the focus on electrification. If you look at the cleanliness and abundance of natural gas as well as its reliability the focus on solar and wind as main energy sources does not bode well for attracting new business and residence development. Solar requires a lot of space to be a major source of energy as well as government subsidies to make it feasible financially. (Environmental destruction elsewhere to provide for rare earth materials for battery storage is counterproductive to your goal for the environment). Likewise, wind is unreliable and requires transmission lines and storage ability. Water quality, air quality, soil quality, water capture, human health (both physical and emotional) can all be accomplished through more and better green space for public use.	1