CENTRALINA
REGIONAL COUNCIL

PRIORITY CLIMATE ACTION PLAN

Charlotte-Concord-Gastonia NC/SC Metropolitan Statistical Area (CLT MSA)

Lead Agency: Centralina Regional Council

Date: March 1, 2024

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The measures contained herein should be construed as broadly available to any entity in the CLT MSA eligible for receiving funding under the EPA's Climate Pollution Reduction Implementation Grants (CPRG) and other funding streams, as applicable.

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Acronyms and Abbreviations

Acronym or Abbreviation	Definition
AADT	Annual Average Daily Traffic
AVERT	AVoided Emissions and geneRation Tool
BAU	Business As Usual
CAPCOA	California Air Pollution Control Officers Association
CBECS	Commercial Buildings Energy Consumption Survey
CBO	Community-Based Organization
CCAP	Comprehensive Climate Action Plan
CEJST	Council on Environmental Quality's Climate and Economic Justice Screening
Centralina	Centralina Regional Council
CFWR	Composting and Food Waste Reduction
CH_4	Methane
CLT MSA	Charlotte-Concord-Gastonia NC/SC Metropolitan Statistical Area
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CPRG	Climate Pollution Reduction Implementation
CRC	Centralina Regional Council
CRISI	Consolidated Rail Infrastructure and Safety Improvements
DEI	Diversity, Equity, and Inclusion
DOE	United States Department of Energy
eGRID	Emissions & Generation Resource Integrated Database
EIA	United States Energy Information Administration
EJScreen	Environmental Justice Screening and Mapping Tool
EO	Executive Order
EV	Electric Vehicle
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GHG	Greenhouse Gas
GRIP	Grid Resilience and Innovation Partnership
GRRP	Green and Resilient Retrofit Program
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HUD	United States Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
ICLEI	International Council for Local Environmental Initiatives
IEA	International Energy Agency
IIJA	Infrastructure Investment Jobs Act
IPCC	Intergovernmental Panel on Climate Change

Acronym or Abbreviation	Definition
IRA	Inflation Reduction Act
kW	Kilowatt
LB	Pound
LEAD	Local Energy Action Program
LED	Light-Emitting Diode
LIDAC	Low Income / Disadvantaged Community
LWCF	Land and Water Conservation Fund
MMBtu	Metric Million British Thermal Unit
MPG	Miles Per Gallon
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
$MTCO_2e$	Metric Tons of Carbon Dioxide Equivalent
MW	Megawatt
MWh	Megawatt-hour
N_2O	Nitrous Oxide
NC	North Carolina
NCDEQ	North Carolina Department of Environmental Quality
NCDOT	North Carolina Department of Transportation
NEI	National Emissions Inventory
NOFA	Notices Of Funding Availability
NOx	Nitrogen Oxides
NPL	National Priorities List
NREL	National Renewable Energy Laboratory
PARD	Parks And Recreation Development
PARTF	Parks And Recreation Trust Fund
PCAP	Priority Climate Action Plan
PM	Particulate Matter
PM_{10}	Particulate Matter, less than 10 microns
$PM_{2.5}$	Fine Particulate Matter, less than 2.5 microns
QAPP	Quality Assurance Project Plan
RMP	Risk Management Plan
RPO	Rural Planning Organization
RPT	Parks, Recreation, and Tourism
SC	South Carolina
SCDOT	South Carolina Department of Transportation
SMART	Strengthening Mobility and Revolutionizing Transportation
SO_2	Sulfur Dioxide
Sq ft	Square Feet
TDM	Transportation Demand Management
TPO	Transportation Planning Organization

Acronym or Abbreviation	Definition
UCF	Urban and Community Forestry
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WARM	Waste Reduction Model
ZEV	Zero-Emission Vehicles

1.0 Introduction

The Charlotte-Concord-Gastonia North Carolina/South Carolina Metropolitan Statistical Area (CLT MSA) received Climate Pollution Reduction Grant funding to produce this priority climate action plan (PCAP) to support investment in policies, practices, and technologies that reduce greenhouse gas (GHG) emissions, create high-quality jobs, spur economic growth, and enhance the quality of life for communities within the CLT MSA.

This PCAP is in alignment with NC Executive Order (EO) 246[1], which establishes science-based goals of 50% reduction in GHG emissions below 2005 levels by 2030 and net-zero emissions by 2050. EO 246 builds on EO 80[2], affirming North Carolina's commitment to addressing climate change, and EOs 143[3] and 268[4] establishing the Andrea Harris Social, Economic, Environmental and Health Equity Task Force to address long-term disparities in health and wellness outcomes in underserved communities.

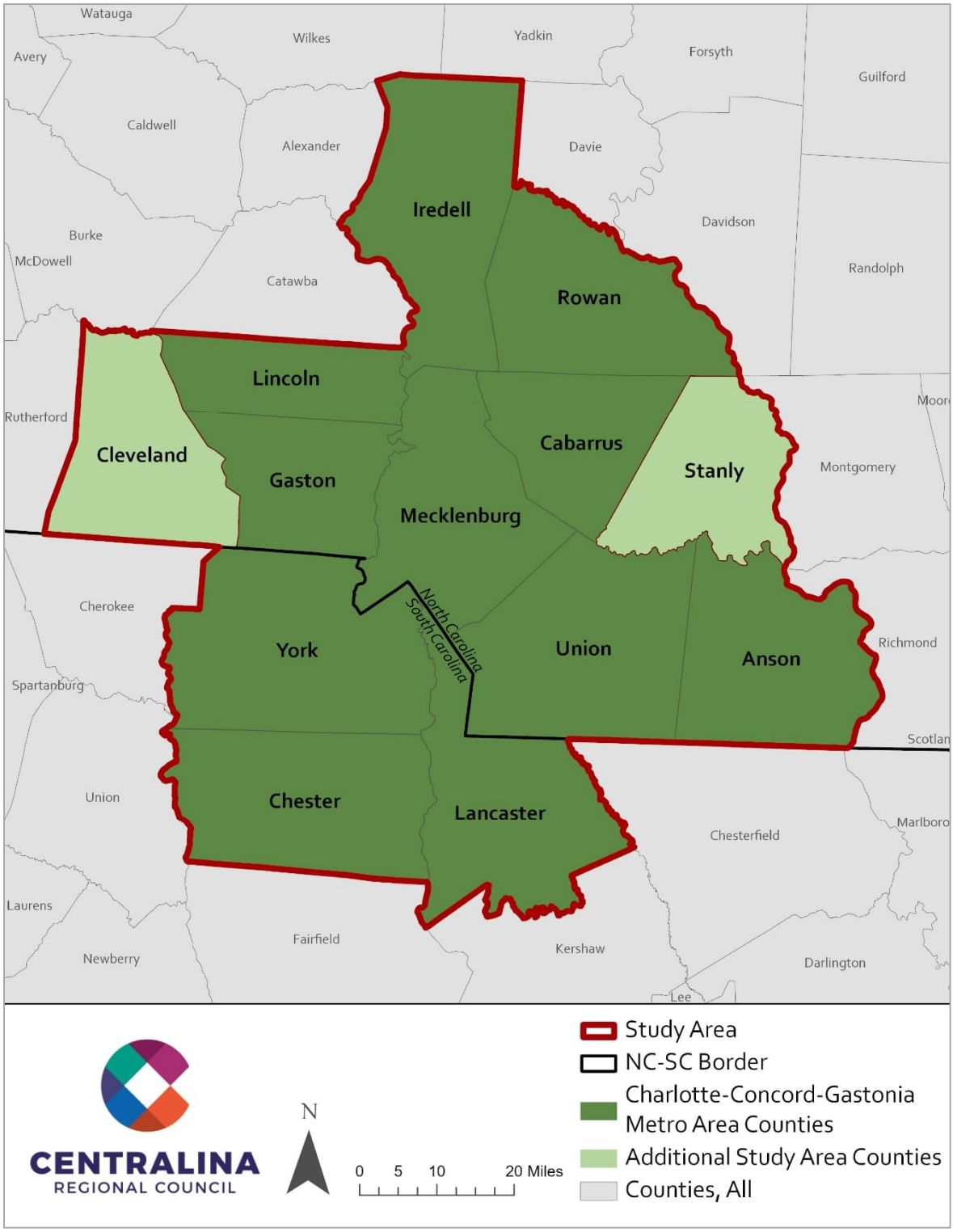
Centralina Regional Council (Centralina) has led the efforts to coordinate the various local government entities within the CLT MSA in development of this PCAP. Centralina's purpose is to provide collaboration for leaders and entities across the region to share information and build solutions to advance the regions goals.[5] Centralina provides a variety of support services to the region, including planning, grants and intergovernmental coordination, transportation and mobility, and business and workforce development, among others.

The CLT MSA climate action planning study area covered by this PCAP includes Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, and Union counties in North Carolina (NC), and Chester, Lancaster, and York counties in South Carolina (SC) (see Figure 1). Cleveland and Stanly counties are not part of the CLT MSA but are included in this planning effort to create consistency with transportation planning organization geographies.

All of these counties (including Cleveland and Stanly) are collectively referred to as the ***CLT MSA study area*** for purposes of this PCAP, as shown in Figure 1.

[1] https://governor.nc.gov/executive-order-no-246/open
[2] https://governor.nc.gov/documents/files/executive-order-no-80-north-carolinas-commitment-address-climate-change-and-transition-clean-energy/open
[3] https://governor.nc.gov/documents/files/eo143-addressing-disproportionate-impact-covid-19/open
[4] https://governor.nc.gov/executive-order-no-268/open
[5] https://centralina.org/

Figure 1. CLT MSA Climate Action Planning Study Area



This PCAP is organized into the following sections:

1. Introduction
2. Greenhouse Gas Emissions Inventory
3. Co-Pollutant Emissions Inventory
4. Stakeholder Engagement and Outreach
5. Priority Measures Identification and Analysis
   - GHG Emission Reduction Estimates
   - Review of Implementation Authority
   - Implementation Schedule and Milestones
   - Geographic Scope
   - Metrics for Tracking Progress
   - Benefits Analysis
   - Low-Income and Disadvantaged Communities (LIDAC) Benefits Analysis
   - Intersection with Other Funding Availability
6. Conclusion

Detailed quality assurance procedures for preparation of this PCAP are provided within the Quality Assurance Project Plan (QAPP) included in Appendix A.

Note that some of the optional aspects of the PCAP are not included in this document, and will be incorporated, as required, into the Comprehensive Climate Action Plan (CCAP). These components include the GHG Emissions Projections, GHG Reduction Targets, and Workforce Planning Analysis.

2.0 Greenhouse Gas (GHG) Emissions Inventory

Centralina staff led the effort to develop a simplified GHG emissions inventory of major emission sources within the CLT MSA study area. The GHG inventory was conducted at the study area level for purposes of this PCAP using ICLEI's ClearPath tool and includes primary emissions sources for calendar year 2018. The inventory accounts for carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions for each primary emissions source. The 100-year global warming potential (GWP) values found in the Intergovernmental Panel on Climate Change (IPCC) Annual Report 5 were used to convert the amount of GHGs to metric tons of carbon dioxide equivalent ($MTCO_2e$). The simplified GHG emissions inventory are a required deliverable for the PCAP.

The inventory emissions sectors, emissions sources, activity data sources, emissions factor sources, and methodology notes are presented in Table 1.

Table 1. GHG Inventory Data and Methodology Overview

Emissions Sector	Emission Sources	Activity Data Source	Emissions Factor Source	Methodology Notes
Stationary Energy	Residential, commercial, and industrial electricity, natural gas, propane, fuel oil, kerosene, wood, gasoline, and coal	US Energy Information Administration (EIA) 2018	Electricity: US EPA eGRID 2018 All Other Emission Sources: ClearPath (sourced from EPA)	EIA 2018 North and South Carolina state-level activity data in one million British thermal units (MMBtu), downscaled using ICLEI's Stationary Energy Downscaling Estimates tool. The ratio of households was used for residential energy and population for commercial and industrial energy.
On-road Transportation	On-road gasoline and diesel	North Carolina Department of Transportation (NCDOT) 2018 and South Carolina Department of Transportation (SCDOT) 2022	ClearPath National Defaults 2018 (sourced from EPA)	The three counties in SCDOT could only provide 2022 vehicle miles traveled (VMT) data. 2018 VMT data is used for North Carolina counties. Vehicle mix and fuel type was determined using ICLEI's national default recommendations.
Aviation	Commercial aircraft and general aviation aircraft	EPA's 2017 National Emissions Inventory (NEI)	Direct entry of pre-calculated emissions	NEI aircraft emissions were directly entered into ClearPath. 2017 emissions are used as a proxy for 2018 emissions (NEI is only every three years).
Locomotive Travel	Locomotive diesel, gas, and propane	2017 NEI	Direct entry of pre-calculated emissions	NEI locomotive emissions were directly entered into ClearPath. 2017 emissions are used as a proxy for 2018 emissions (NEI is only every three years).
Landfilled Waste	All waste landfilled within the MSA (including imported waste), and waste generated in the MSA and exported to landfills	NC County Waste Disposal Report FY 2017-18; 2018 SC Solid Waste Management Annual Report	ClearPath (sourced from USEPA Waste Reduction Model (WARM)	ICLEI recommendation of 100% mixed municipal solid waste was used for waste characterization. Assumed "Typical" landfill gas collection for all landfills due to unavailable landfill-specific data.

Table 2 and Figure 2 show the GHG emissions inventory results per sector for the 2018 base year. The Stationary Energy sector (including Industrial, Residential, and Commercial energy) generated the largest portion (50%) of the CLT MSA study area's total inventoried emissions. This is followed by the Transportation sector at 44%, making these two sectors 94% of total emissions in 2018.

Table 2. CLT MSA Study Area Base Year (2018) GHG Emissions

Sector	$MTCO_2e$	% of Total Inventoried Emissions
Stationary Energy	**19,156,664**	**50%**
Industrial	7,005,110	18%
Residential	6,396,297	17%
Commercial	5,755,257	15%
Transportation	**17,048,071**	**44%**
On-road	16,322,486	43%
Aviation	724,728	2%
Locomotive	857	<1%
Solid Waste	**2,109,049**	**6%**
Landfilled Waste	2,109,049	6%
Total	**38,313,784**	**100%**

Figure 2. CLT MSA Study Area 2018 CO_2e Emissions Contributions by Sector

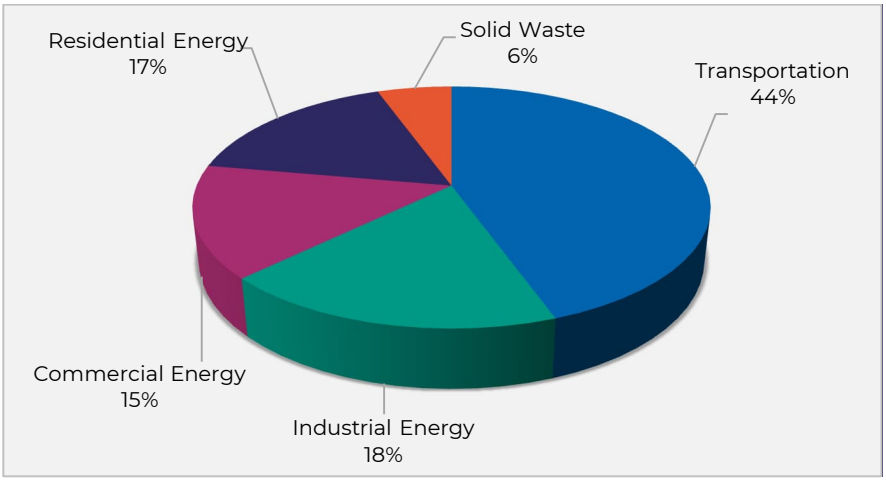


Table 3 details the GHG emissions by sector and activity type inventoried. Most of the GHG emissions in the transportation sector were generated by on-road vehicles. Electricity was the primary contributor to emissions in each of the energy sub-sectors (industrial, commercial, residential), followed by natural gas. Electricity is primarily used for cooling, heating, lighting, and powering appliances, and associated emissions are from the combustion of fossil fuels used to generate electricity (roughly 54% of the region's electricity was generated from fossil fuels in 2018).[6] Natural

[6] https://www.epa.gov/egrid/historical-egrid-data

gas is primarily used for space and water heating, cooking, and other industrial processes. These sectors and activities generate most of the region's emissions and represent an important opportunity to reduce GHGs through PCAP measure implementation.

Table 3. CLT MSA Study Area Base Year (2018) GHG Emissions

Sector and Activity Type	MT CO_2e	% of Total Inventoried Emissions
Transportation	**17,048,071**	**44%**
On-road Gasoline	11,773,284	31%
On-road Diesel	4,549,202	12%
Aviation Fuel	724,728	2%
Locomotive Fuel	857	<0.01%
Industrial Energy	**7,005,110**	**18%**
Electricity	2,836,185	7%
Natural Gas	1,859,300	5%
Mixed	1,253,711	3%
Distillate Fuel #2	430,551	1%
Coal	298,633	1%
Gasoline	124,252	<1%
Propane	141,960	<1%
Wood	47,032	<1%
Residual Fuel Oil #5	13,486	<1%
Residential Energy	**6,396,297**	**17%**
Electricity	5,080,643	13%
Natural Gas	951,993	2%
Propane	259,606	1%
Distillate Fuel #2	69,832	<1%
Wood	22,199	<1%
Kerosene	12,023	<1%
Commercial Energy	**5,755,257**	**15%**
Electricity	4,379,612	11%
Natural Gas	829,021	2%
Gasoline	230,698	1%
Distillate Fuel #2	145,337	<1%
Propane	120,947	<1%
Coal	43,509	<1%
Wood	4,973	<1%
Residual Oil #5	1,159	<1%
Solid Waste	**2,109,049**	**6%**
Landfilled Waste – In Jurisdiction	1,971,228	5%
Landfilled Waste – Out-of-Jurisdiction	137,821	<1%
Total	**38,313,784**	**100%**

3.0 Co-Pollutant Emissions Inventory

Centralina utilized extracted county-level criteria pollutant and hazardous air pollutant (HAP) emissions data from EPA's 2017 National Emissions Inventory (NEI) to create a 2017 base inventory by county for the sectors consistent with those included in the GHG Inventory and targeted by the priority measures included in this PCAP.[7] Although the 2020 NEI is the most current data available prior to the PCAP submission deadline, the 2017 NEI data aligns more closely with the GHG inventory base year, especially considering that 2020 was affected significantly by the COVID-19 pandemic.

Table 4 details the results of the co-pollutant inventory for nitrogen oxides (NOx), particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), and HAP data by sector, county, and pollutant.

Mecklenburg County has the highest co-pollutant emissions in the transportation sector, while Anson County has the least. This is consistent with county population size based on the 2022 American Community Survey, in which Mecklenburg County is the most populated county in the CLT MSA study area while Anson County is the least. This correlation is also reflected in the residential energy sector. Commercial energy had the least co-pollutants of the three energy sectors. Of the three energy sectors (excluding generation), industrial had the highest NO_x and SO_2, but residential energy contributed the most PM_{10}/$PM_{2.5}$, CO, VOC, and HAPs. York County had the highest co-pollutants in the waste sector, possibly because York County has four Class 2 Landfills, which only allow for disposal of construction- and demolition-type debris[8].

Table 4. 2017 CLT MSA Study Area Co-Pollutant Emissions Inventory

Sector(s)/County	NO_x (tons)	SO_2 (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO (tons)	VOC (tons)	HAP (tons)
Transportation	**37,937**	**614**	**2,914**	**1,625**	**276,975**	**20,597**	**5,960**
Anson, NC	650	3	30	20	3,167	253	73
Cabarrus, NC	2,599	24	205	112	18,423	1,403	404
Chester, SC	1,501	6	79	47	6,768	546	153
Cleveland, NC	1,777	12	91	58	11,680	898	255
Gaston, NC	2,870	24	195	104	20,345	1,561	446
Iredell, NC	2,917	25	202	109	19,022	1,389	396
Lancaster, SC	1,397	7	83	54	9,477	866	250
Lincoln, NC	1,287	10	69	44	8,761	757	216
Mecklenburg, NC	12,873	425	1,287	671	109,473	7,155	2,103
Rowan, NC	2,625	19	153	88	16,140	1,324	378
Stanly, NC	1,038	9	59	38	7,303	670	193
Union, NC	2,815	24	233	140	21,616	1,706	500
York, SC	3,588	26	228	140	24,800	2,069	595
Commercial Energy	**889**	**7**	**45**	**36**	**736**	**71**	**13**
Anson, NC	13	1	7	4	24	1	1.3
Cabarrus, NC	69	0	2	1	52	3	0.4

[7] https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data, accessed on 2/10/2024.
[8] Permitted Solid Waste Management Facilities (sc.gov)

Table 4. 2017 CLT MSA Study Area Co-Pollutant Emissions Inventory

Sector(s)/County	NO_x (tons)	SO_2 (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO (tons)	VOC (tons)	HAP (tons)
Chester, SC	4	0	0	0	4	0	0.0
Cleveland, NC	29	0	1	1	24	1	0.2
Gaston, NC	76	0	7	7	59	7	2.4
Iredell, NC	56	0	3	3	45	24	5.5
Lancaster, SC	15	1	2	2	13	1	0.0
Lincoln, NC	14	0	0	0	11	1	0.1
Mecklenburg, NC	449	2	3	3	349	24	0.3
Rowan, NC	39	0	3	2	33	2	0.6
Stanly, NC	16	0	0	0	12	1	0.1
Union, NC	52	1	10	7	58	3	1.8
York, SC	57	2	7	6	52	3	0.1
Industrial Energy	**2,793**	**520**	**1,262**	**1,115**	**3,961**	**287**	**164**
Anson, NC	50	0	6	5	32	12	3
Cabarrus, NC	75	0	2	2	46	32	4
Chester, SC	167	20	109	96	427	27	14
Cleveland, NC	48	0	2	2	36	8	1
Gaston, NC	109	1	2	2	91	6	1
Iredell, NC	572	60	42	37	337	92	57
Lancaster, SC	62	5	102	89	132	4	2
Lincoln, NC	25	0	1	1	21	1	0
Mecklenburg, NC	237	5	2	2	263	14	1
Rowan, NC	263	11	52	52	100	16	4
Stanly, NC	90	173	1	0	49	1	3
Union, NC	81	2	2	2	61	4	0
York, SC	1,014	243	939	825	2,366	70	73
Residential Energy	**1,592**	**69**	**1,678**	**1,671**	**12,957**	**1,949**	**366**
Anson, NC	19	2	36	35	280	42	8
Cabarrus, NC	125	7	155	153	1,173	174	33
Chester, SC	20	1	23	23	176	27	5
Cleveland, NC	47	5	112	112	860	130	24
Gaston, NC	134	7	159	158	1,219	182	35
Iredell, NC	88	7	156	156	1,194	181	34
Lancaster, SC	59	1	48	47	368	56	10
Lincoln, NC	35	4	88	88	675	103	19
Mecklenburg, NC	672	14	400	399	3,162	477	90
Rowan, NC	69	6	125	125	957	145	27
Stanly, NC	34	5	83	83	634	96	18
Union, NC	146	6	188	187	1,436	214	41
York, SC	144	4	105	105	823	122	23

Table 4. 2017 CLT MSA Study Area Co-Pollutant Emissions Inventory

Sector(s)/County	NO_x (tons)	SO_2 (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO (tons)	VOC (tons)	HAP (tons)
Electric Generation[9]	**2,275**	**387**	**199**	**182**	**1,250**	**87**	**75**
Anson, NC	111	10	5	5	99	11	1
Cabarrus, NC	86	1	17	17	70	10	5
Chester, SC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cleveland, NC	141	3	40	40	42	9	5
Gaston, NC	1,651	356	66	49	615	24	28
Iredell, NC	32	1	6	6	135	4	21
Lancaster, SC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lincoln, NC	15	1	1	1	5	0	0
Mecklenburg, NC	4	0	0	0	3	1	0
Rowan, NC	199	9	63	63	273	26	16
Stanly, NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Union, NC	36	6	1	1	8	2	0
York, SC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Solid Waste	**270**	**89**	**1,372**	**1,249**	**7,695**	**1,016**	**191**
Anson, NC	7	1	15	14	63	7	6
Cabarrus, NC	26	14	75	68	524	82	18
Chester, SC	10	2	53	48	203	16	9
Cleveland, NC	6	1	37	33	120	15	15
Gaston, NC	17	5	101	92	429	132	16
Iredell, NC	19	5	95	86	461	44	14
Lancaster, SC	44	15	229	208	1,483	127	19
Lincoln, NC	9	3	53	48	258	22	10
Mecklenburg, NC	5	1	32	30	72	233	9
Rowan, NC	15	3	90	82	281	39	23
Stanly, NC	5	1	29	27	110	11	5
Union, NC	18	5	102	93	458	39	15
York, SC	89	33	461	420	3,233	249	29
Grand Total	**45,756**	**1,686**	**7,470**	**5,878**	**303,574**	**24,007**	**6,768**

[9] Electric generation data not available from the NEI for SC counties (Chester, Lancaster, and York) and one NC county (Stanly).

4.0 Community and Stakeholder Engagement and Outreach

Centralina conducted extensive intergovernmental coordination and community outreach in the development of this PCAP. This section describes the framework Centralina used to support robust and meaningful engagement strategies to ensure comprehensive stakeholder representation and overcome obstacles to engagement, including linguistic, cultural, institutional, geographic, and other barriers. This section provides a summary of Centralina's Public and Stakeholder Engagement Plan (dated January 19, 2024) included in Appendix B.

General Engagement Principles

Stakeholder engagement is a core component of the planning process. The CLT MSA study area stakeholder engagement plan follows the following principles:

- A Focus on Stakeholder Education
- Inclusivity
- Early and On-going Engagement
- Access to Information
- Flexibility in Processes

Engagement Objectives

The CLT MSA study area stakeholder engagement process includes several approaches to provide stakeholders with multiple opportunities to influence the plan outcomes. The objectives of the implemented stakeholder engagement process are to:

- Build a foundational understanding of:
    - the purpose of climate action planning,
    - the objectives of the regional climate action plans,
    - basic principles of greenhouse gas emissions,
    - effective reduction strategies and co-benefits, and
    - practical steps that local governments can take to reduce GHG emissions.
- Create a ***coalition of technical expertise*** around climate planning, resilience, and sector-based strategies (or "Technical Advisory Committee").
- Create a ***coalition of equity advisors and stakeholders*** (or "Equity Advisors Committee").
- Gain ***inputs from a diverse set of stakeholders***, with a focus on LIDACs, to identify key sectors and measures for reducing GHG emissions.
- Develop a ***shared*** understanding of ***regional priorities***.
- Set the stage for implementation grant proposals.
- Set the stage for ***successful implementation*** of the regional PCAP and CCAP.

Engagement has been phased to occur at key milestones in the development of the PCAP and the CCAP. Results from the phased stakeholder engagement process are used to inform the plans and the creation of communication products and outreach to specific stakeholders.

Engagement Audiences

To create robust engagement for the PCAP and CCAP, the engagement strategy incorporates multiple methods, groups, and opportunities, including the creation of a Technical Advisory Committee and Equity Advisors Committee, and public engagement through existing advocacy and social networks. Engagement with the general public focuses on the interests, opportunities and challenges facing LIDACs. Advisors, stakeholders, and partners are included based on sector-specific needs and strategies and the GHG reduction measures identified through the planning process.

To achieve engagement goals, engagement activities are focused on core audiences in the CLT MSA study area. Key audiences include local governments and LIDACs. Additional audiences include sector specific stakeholders and the general public. Collaborating partners and new and existing partnerships involved in advancing engagement are outlined below.

Key Collaborating Partners – Building on Existing Relationships

The key collaborating partners throughout the PCAP and CCAP are various stakeholders that fall under the four categories—Impacted, Invested, Interested, and Influential:

Table 5. Key Collaborating Partners

Category	Description	Importance
Impacted	Stakeholders that stand to be directly affected (either positively or negatively) by an effort or the actions of the PCAP/CCAP.	Stakeholders in this category will be easier to engage once reached.
Invested	Stakeholders that are indirectly affected (either positively or negatively) by an effort or the actions of the PCAP/CCAP.	Messaging will be important for stakeholders in this group.
Interested	Stakeholders who do not stand to feel the direct effects of PCAP/CCAP actions but are interested in the goals the actions will accomplish. Interest can be connected to economics, health, safety, or social change.	Messaging will be important for stakeholders in this group, as their interest may seem further removed from their daily lives.
Influential	Stakeholders who may fall under one of the previously defined categories and wield a significant amount of influence within their community/region.	Stakeholders in this group will be able to assist in regional outreach.

As the project progresses, the project team has and will continue to identify stakeholders and community members in the aforementioned categories, and appropriately tailor communications and activities to best reach each category of stakeholder.

The list below provides a high-level overview of the types of stakeholders that Centralina anticipates will remain involved in the planning process for the PCAP and CCAP (see Phase II – Creating the PCAP for greater detail regarding the types of stakeholders engaged).

- Local and tribal government representatives (elected officials)
- Residents / public citizens
- Low Income / Disadvantaged Communities (LIDAC)
    - Equity Advisors Committee - Stakeholders representing organizations whose mission aligns with interests and needs of LIDAC populations who will provide guidance on plans at key milestones and support outreach for these populations. Stakeholders may have special interests in healthcare, housing, education, workforce, childcare, mobility, community services, etc. A list of individuals serving as Equity Advisors can be found in Centralina's Public and Stakeholder Engagement Plan included in Appendix B.
- City/county managers, planning directors, transportation directors, sustainability officers or other designees/staff of local governments
- Cross-sector engagement

    - Technical Advisory Committee - The Technical Advisory Committee will play an instrumental role in each phase of engagement for the PCAP and CCAP. This group is a coalition of technical experts from transportation, transit, energy, land use, waste, water, sustainable materials, and other environmental sectors, as well as representatives from nonprofits, higher education, and business community. A list of individuals serving on the Technical Advisory Committee can be found in Centralina's Public and Stakeholder Engagement Plan included in Appendix B.

- Other stakeholders including those associated with non-profit and advocacy organizations, higher education, business sector, etc.

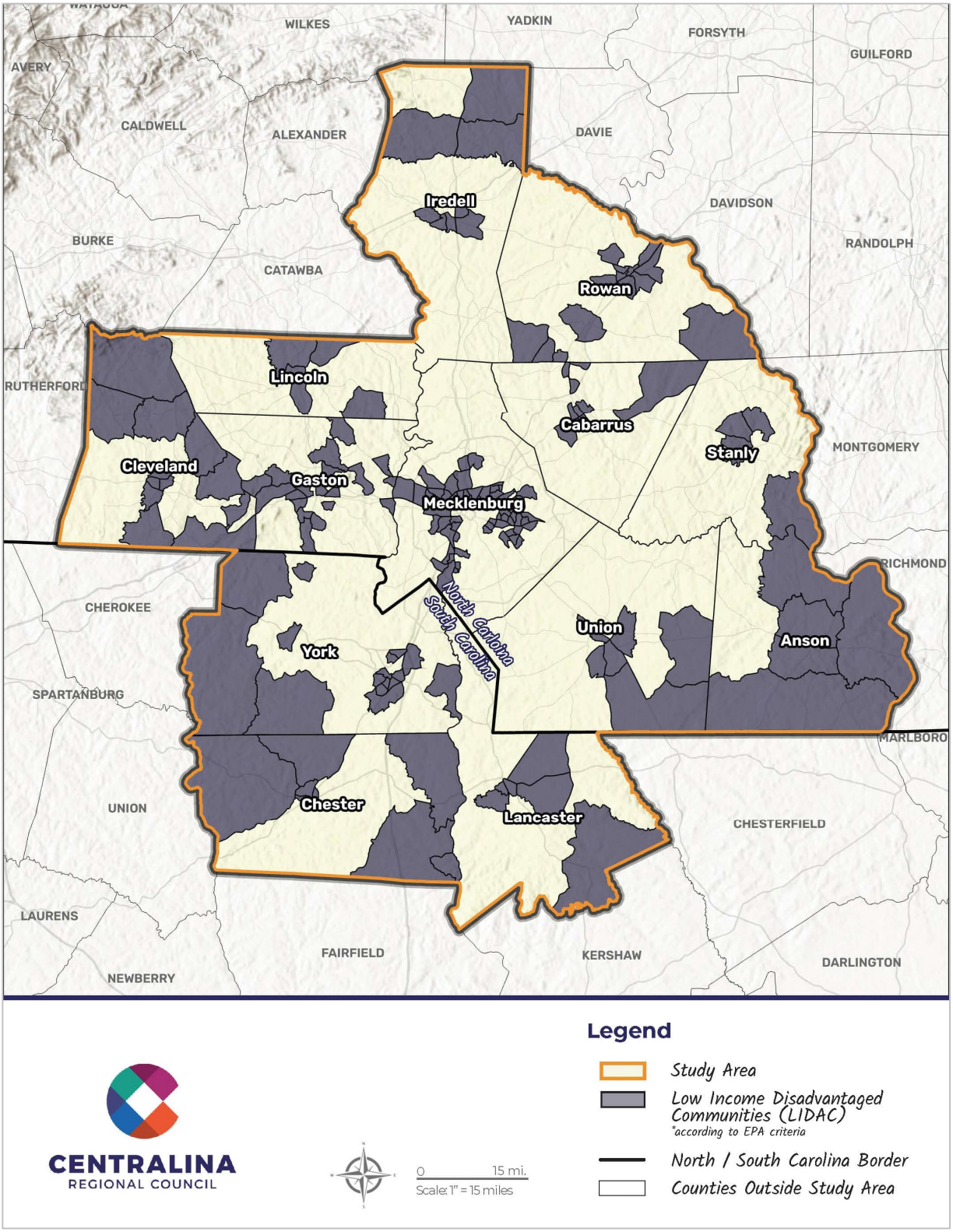
A complete list of stakeholders is included in Appendix A.

Identifying and Engaging with LIDACs

LIDACs were identified following USEPA guidance using the White House Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST). CEJST was used to identify disadvantaged census tracts.

According to the 2022 U.S. Census Bureau, the national per capita income is $41,261. Every county in the CLT MSA study area, except for Mecklenburg, is below this national standard, indicating that a sizable portion of the population of the area faces economic challenges. In 11 of the 13 counties, 10% of the population identifies as a person with disabilities, highlighting potential challenges in terms of accessibility and support services. The results of CEJST identified 176 disadvantaged census tracts in the CLT MSA study area, shown on the map in Figure 3.

Figure 3. CLT MSA Study Area LIDACs



In addition to using CEJST to identify disadvantaged census tracts, Centralina used USEPA's EJScreen to identify the census block groups within the CLT MSA study area that have supplemental indexes at or above the 90th percentile, and the associated demographic data of those census block groups. Based on the results of the CEJST and EJScreen analysis, the following socioeconomic topics were identified as important considerations for engaging with LIDACs to be addressed in the public and stakeholder engagement plan and implemented engagement efforts.

English Language Proficiency

Every county has a portion of their population that does not speak English as a primary language. Spanish is the primary language after English spoken in the region. This highlights the linguistic diversity throughout the region and the need for language-specific programs to enhance communication, education, and community engagement.

Pollution

Elevated levels of air pollutants, including ozone, diesel PM, and air toxics, and water quality concerns related to wastewater discharge, hazardous waste, and underground storage tanks are common issues across several counties in the CLT MSA study area. These can have direct and indirect impacts on the health of the residents in the region such as respiratory issues, cancer risk, lead exposure or other waterborne diseases. Mitigating these pollutants through the PCAP and CCAP actions will contribute to improving respiratory health and overall well-being for county residents.

Transportation

Each county in the region contains at least one census block group where at least 50 households within the block group do not have a car. Mecklenburg County is the only county that has a light rail system within the City of Charlotte, so in-person public meetings in Charlotte should occur close to rail stops. Cities and counties throughout the region have fixed route transit systems, demand response and/or paratransit service that require a reservation in advance. The locations of fixed-route stops and service areas for demand response and paratransit service is a consideration for in-person public engagement in locations where those services operate.

Climate and Community Resilience

Agriculture loss is particularly a concern for Anson, Iredell, Lincoln, and Rowan counties, as these counties contain census tracts above 90th percentile for Expected Agricultural Loss (economic loss to agricultural value resulting from natural hazards each year)[10]. Workforce development is a shared concern, especially in Mecklenburg, Lancaster, Rowan, Anson, Gaston, Cabarrus, and Cleveland counties, considering they contain census tracts above the 90th percentile for workforce development indicators, such as poverty, unemployment, and high school education. Housing cost and lack of indoor plumbing impact residents in one or more census tracks within Mecklenburg, Stanly, Cabarrus, and York Counties.

Indigenous Populations

Tribal consultation and engagement with Catawba leaders in York County is essential given the Catawba lands of the CLT MSA study area. The intersection of economic, environmental, health and social concerns display the complex landscape in the region. Climate solutions developed with the PCAP and CCAP should be inclusive, culturally appropriate, and align with the values and priorities of the affected communities.

[10] FEMA's National Risk Index

PCAP Engagement Activities

Phase I – PCAP Education and Outreach

The Phase I – PCAP engagement activities occurred between April and December 2023. The objectives, strategies, and results of those activities are summarized in this section.

Objectives

- Inform stakeholders about the Climate Pollution Reduction Grant process, its importance, impacts and how to get involved.
- Grow the network of technical stakeholders and build equity advisor contacts that will provide inputs at project milestones.
- Create local government and stakeholder knowledge around plan purpose, opportunities to engage and implementation funding opportunities.

In order to meet the objectives for Phase I, Centralina conducted the following activities:

- Engagement with stakeholders as part of regularly occurring regional meetings, including but not limited to:
    - Centralina Regional Council Board of Delegates
    - Charlotte Regional Alliance for Transportation
    - Catawba Regional Council of Governments (CRCOG)
    - Centralina Mobility Management
    - Transportation Planning Organization (TPO) meetings
    - Centralina Regional Managers Group Meetings
    - Centralina Economic Development District Board
    - Regional Sustainability Managers Lunch and Learn
    - Regional Environmental Non-Governmental Organizations Collaborative
- Hosted a Centralina Learns virtual meeting to educate on climate planning, the CPRG grant, opportunities to be involved in the plan, etc.
- Engaged the Technical Advisory Committee on plan topics
- Hosted a Local Needs, Future Resiliency, and Stakeholder Summit

Technical Advisory Committee

During this phase of engagement, the Technical Advisory Committee convened three times to provide preliminary insight and guidance for CPRG activities. Each meeting included the following topics, in addition to time for collecting feedback and answering questions from attendees.

- Meeting #1 – April 27, 2023:
    - Overview of CPRG and updates from the Regional Managers Meeting
    - Introduced opportunities and challenges
    - Obtained insight into messaging and communication approaches.
- Meeting #2 – May 12, 2023:
    - Confirmed and added additional input from the first meeting,
    - Collected insights into members' preferred outcomes
    - Gathered input on a regional approach
- Meeting #3 – September 5, 2023:
    - Provided Project updates since and an overview of the Climate Action Planning process

Regional Summit #1 - Local Needs, Future Resiliency Stakeholder Summit

On December 8, 2023, Centralina held a stakeholder summit in order to deepen stakeholders understanding of Climate Action Planning, gather diverse stakeholder inputs, build a shared vision for regional priorities, and lay the groundwork for effective implementation. The agenda includes an overview of the CPRG program and timeline for the PCAP and CCAP followed by a panel discussion with panelists from NC Board of Transportation, the City of Charlotte's Sustainability and Resiliency Office, and the City of Gastonia's Diversity, Equity, and Inclusion department. The panel discussion will provide additional information on transportation alternatives in the region, local government policies and climate action, and successful strategies for engaging diverse communities. Following the panel discussion, attendees will split into small groups to discuss projects in their communities that align with the PCAP, local government actions that could relate to the PCAP, and stakeholders that should be involved in the project.

Incorporation of Feedback

Input and feedback is being incorporated into subsequent stages of the Project as follows:

- Provides a baseline and informs the approach to the Stakeholder Focus Group Meetings
- Contribute to the formation of a comprehensive Stakeholder List
- Identify ongoing sustainability efforts and potential actions for inclusion in the PCAP and CCAP throughout the region
- Complete preliminary prioritization of project categories

Phase II – Creating the PCAP

The input collected during Phase II directly influenced the development of the PCAP. The objectives and strategies for Phase II engagement for the PCAP are detailed below:

Objectives

- Seek widespread input into identification of high priority PCAP measures and develop criteria for measures based on stakeholder feedback
- Develop implementation grant application(s) with iterative inputs from stakeholders
- Educate stakeholders on the implementation grant application process and its coordination with PCAP
- Create Equity Advisors Committee to support plan development and engagement strategies for low income and disadvantaged communities.

In order to meet the objectives in Phase II, the following activities occurred:

Equity Advisors Committee

The Equity Advisors Committee was established in early 2024, and convened once during Phase II of PCAP engagement on February 7, 2024. The primary purpose of the Equity Advisors Committee meeting was to gather input and receive guidance on the following plan components:

- Socioeconomic analysis
- LIDAC preliminary benefits analysis (Task 3.1 C in the scope of work)
- Evaluation criteria for GHG reduction measures
- Ensuring equitable regional approach by developing priority GHG reduction measures that target/maximize benefits (and minimize disbenefits) to LIDACs

Additionally, Centralina looked to the Equity Advisors Committee to encourage participation in the survey and future engagement events by LIDACs.

Input gathered from the Equity Advisors Committee creates an opportunity for the project team to meaningfully engage LIDACs or to adapt ongoing engagement strategies to better reach LIDACs. The Equity Advisors Committee feedback will shape the structure of outreach to LIDAC communities during the development of the CCAP.

Focus Groups

These virtual meetings, hosted on Microsoft Teams or Zoom, focused on sharing data and developing a detailed understanding of the priorities and concerns of various stakeholder groups. Mentimeter was used to collect targeted feedback on the emissions sectors, project categories, and priority GHG reduction measures. Centralina hosted 10 Focus Group meetings, including eight (8) to cover the thirteen (13) counties in the CLT MSA study area (some meetings included stakeholders from multiple counties) with participation from city/county managers, planning directors, transportation directors, sustainability officers or other designees/staff of local governments. The remaining two (2) Focus Groups had a regional focus and were open to all other stakeholder categories, including:

- Tribal Entities
- Agriculture
- Business Community
- DEI (Diversity, Equity, + Inclusion)
- Higher Education
- Manufacturing
- Nonprofit
- Transportation (Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), transit agencies, bike advocates, etc.)
- Utilities (Waste Management, Energy + Gas)
- Waste

The goal of Focus Group meetings was to rank and prioritize Centralina Project Categories and EPA sectors, understand past/current planning and implementation efforts within the various sectors, and identify sector-specific actions within the region and counties. The Focus Groups included the following elements:

- Summary of progress to date from the Local Needs, Future Resiliency Stakeholder Summit with CRC's proposed project categories
- Overview of EPA's sectors and ranking/prioritization exercise to understand which sectors/categories are most important to the region
    - Ranking/prioritization exercises of EPA sectors, Centralina project categories, and sector-specific actions
- Summary of actions identified through the plan review and first Local Needs, Future Resiliency Stakeholder Summit
    - Prioritize the actions or categories of actions for each sector as well as cross-cutting actions
    - Identify actions that are currently underway
    - Identify project partners for various actions
- Present evaluation criteria for selecting actions to be included in the PCAP and obtain feedback
- Communicate goals/requirements of the Implementation Grant and explain the relationship between the PCAP, Implementation Grant, and the CCAP

The input gathered from Focus Groups directly aided in the identification of actions and measures included in this PCAP. Feedback helped to identify high priority and ready-to-implement actions. Feedback on the methodology and approach to evaluating/selecting GHG reduction measures for inclusion in the PCAP was sought and incorporated where appropriate.

StoryMap and Survey

A StoryMap, available at https://storymaps.arcgis.com/stories/a1df73d3859943ecab143cafaa98fcfe, was developed to serve as a key educational and informational tool over the course of the PCAP and CCAP planning process. During Phase II of PCAP engagement, the StoryMap included a link to a public survey (Microsoft Forms) to understand the public's priorities for sustainability and GHG emissions reductions and identify potential priority measures and implementation ready projects for the PCAP. The survey, available at https://tinyurl.com/centralina-cprg-projects, has been open since mid-January and will continue to be open throughout the CCAP project to allow opportunities for citizens to provide feedback on the plan development.

Survey results informed the priorities of the PCAP and GHG reduction measures included in the PCAP.

Social Media

The project team utilized social media to share information from communities throughout the region. During Phase II of PCAP engagement, the first social media push was the "Local Needs, Future Resiliency" (5 Days) campaign, which will introduce the importance of climate planning, explain CPRG, and inform the public about actions they can take to reduce their carbon footprint that are relevant and informative. The final day encouraged people to participate in future engagement activities. The goal of this campaign was to raise awareness of and inspire participation in future CPRG engagement activities, specifically the PCAP survey, so that the resulting PCAP and CCAP reflect the priorities of all residents of the Charlotte MSA region.

Phase III – Strategy Insights

The objectives and strategies for Phase III engagement for the PCAP are detailed below.

Objectives

- Seek feedback on the draft PCAP including measures and action plans, co-benefits, and potential GHG reductions
- Seek feedback on a draft regional coalition implementation grant

In order to meet the objectives in Phase III, the following activities occurred:

- Held regional engagement event to seek inputs on draft PCAP
- Prepared Technical Advisory Committee, Equity Advisors Committee, and other stakeholders on CCAP components, timeline, and engagement opportunities

Technical Advisory Committee

The Technical Advisory Committee convened once during Phase II on February 13, 2024. The agenda included providing Project updates and an overview of the PCAP approach and contents, such as a discussion of coordination with statewide and other regional PCAPs and presenting preliminary GHG inventory results and benefits. The members of the Technical Advisory Committee provided input on plan components, including but not limited to:

- Evaluation criteria for GHG reduction measures
- Benefits analysis
- Priority GHG reduction measure implementation elements

Insight gleaned from the meeting with the Technical Advisory Committee helped the project team to refine priority GHG reduction measures based on the technical expertise of members of the committee.

Regional Summit #2 - Local Needs, Future Resiliency Stakeholder Summit

A Regional Stakeholder Summit occurred on February 21, 2024, during Phase II of PCAP engagement. The objectives of this session included:

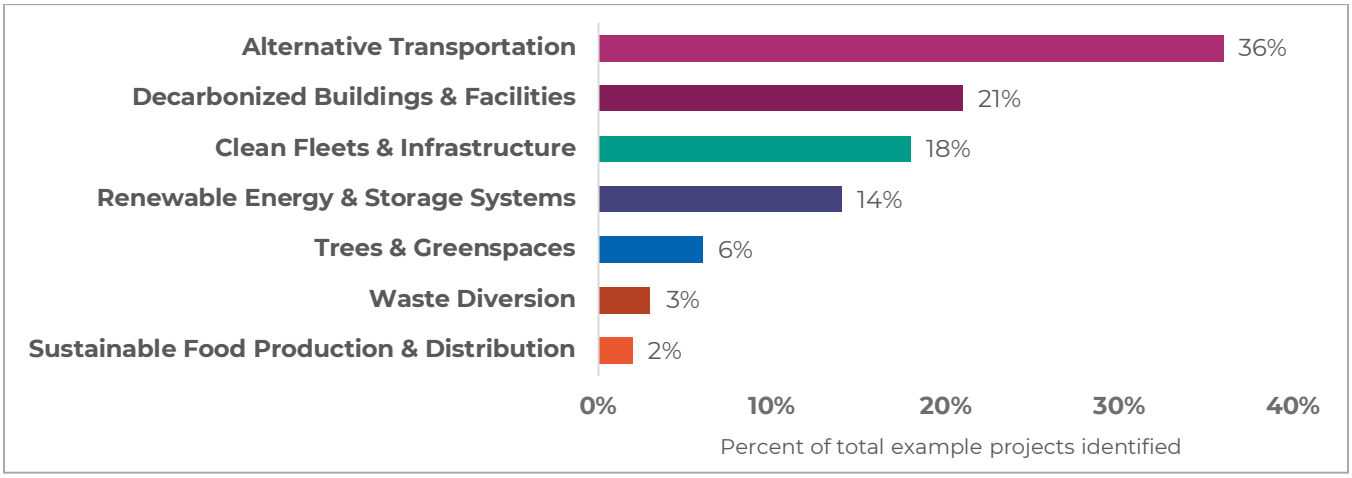
- Engaging a broad set of interested stakeholders reflective of multiple sectors, geographies, economic and demographic realities.
- Sharing results of public and stakeholder engagement during Phase II.
- Summarizing the priority GHG reduction measures included in the PCAP and other components of the PCAP, such as the GHG inventory results, LIDAC analysis, benefits analysis, workforce development analysis, authority to implement, and intersection with other funding sources.
- Educating on implementation grant criteria and the PCAP's connection to the Implementation Grant.

Centralina hosted this session in person, including a virtual attendance option to maximize participation. Centralina summarized January's engagement activities and gathered feedback from the group.

5.0 Identification and Evaluation of Priority Measures

Through engagement activities lead by Centralina, stakeholders within the region identified more than 100 examples of implementation-ready project ideas within the CLT MSA study area, all of which are listed in the table in Appendix C. To capture all of these opportunities within the PCAP, all projects have been categorized into seven (7) priority PCAP measures as shown in Figure 5 . These seven measures have been identified as “priority measures” for the purposes of pursuing funding through CPRG implementation grants.

Figure 4. CLT MSA Projects by Priority Measure



The selected priority measures included in this PCAP can answer ‘yes’ to the following criteria questions:

- Is the statutory/regulatory authority to implement the measure with the local government/regional council?
- Is the measure “implementation ready?”
    - The planning and design work for the policy, program, or project is complete enough that a full scope of work and budget can be included in a CPRG implementation grant application and GHG reductions realized between 2025-2030.
    - The measure can be operational in the near term, meaning that all funds will be expended, and the project completed, within the five-year performance period for the CPRG implementation grants.
- Does the measure reduce emissions (GHG and co-pollutant) from a priority emission source (i.e., activities which contribute the most to emissions in the region)?
- Do the emission sources affected by the measure likely include those within the following sectors: electricity generation, transportation, residential/commercial/industrial energy consumption.
- Does the measure reduce emissions (GHG and co-pollutant) for low-income and disadvantaged communities (LIDAC)?
- Is the action absent of “fatal flaws” (e.g., lack of community or regional support of the action, undefined statutory/regulatory authorities or timelines), which would in themselves significantly inhibit implementation of the action?

Figure 5 below lists these priority measures, and the general types of implementation-ready projects identified within each priority measure. Appendix C includes the full list of the specific projects identified, all of which fall within one of the established priority measures.

Figure 5. CLT MSA Study Area Priority Measures and Project Types

Priority Measure #1: Alternative Transportation

- Reduce single-occupancy VMT and promote alternative transportation, such as transit, walking, or biking, and take actions toward reforming local land use policies to support these activites in the long-term.
- Example regional projects include:
  - New and expanded greenways and other active transprotation infrastructure
  - Implement travel demand management (TDM) programs
  - Expand options for bicycle and pedestrian travel

Priority Measure #2: Decarbonized Buildings & Facilities

- Modernize building technologies and systems that reduce GHG emissions associated with construction, operation, and maintenance of buildings and facilities.
- Example regional projects include:
  - Improve existing building and facilitiy energy efficiency
  - Promote energy efficient design and construction
  - Weatherize historic and old buildings
  - Implement energy audits
  - Undertake efficient lighting conversions

Priority Measure #3: Clean Fleets & Infrastructure

- Transition fossil fuel vehicles to electric and other alternative fuel and clean vehicle technologies, and create the infrastructure to support the operation of these vehicles, reduce congestion, and improve the efficiency and safety of the region's transportation system.
- Example regional projects include:
  - Expand clean vehicle and technology infrastructure (e.g., EV charging, signal preemption, connected vehicles opportunities in congested areas, investments in mobility hubs and intelligent transportation systems, etc.)
  - Promote switching to fuel efficienct and zero-emissions vehicles (ZEVs)

Priority Measure #4: Renewable Energy & Storage Systems

- Promote the use of renewable energy and the appropriate energy storage technologies.
- Example regional projects include:
  - Install local renewable energy systems such as solar and geothermal
  - Capture and use biogas

Priority Measure #5: Trees & Greenspaces

- Increase the amount of trees and greenspaces to sequester GHG emissions and provide important community benefits, and reform local land use policies to support these activites.
- Example regional projects include:
  - Preserve and increase tree canopies and greenways

Priority Measure #6: Waste Diversion

- Redirect waste away from landfills and incineration by way of waste reduction, recycling, and composting.
- Example regional projects include:
  - Create and expand composting programs
  - Improve recycling programs
  - Promote a circular economy and reduce industrial/manufacturing waste

Priority Measure #7: Sustainable Food Production & Distribution

- Incorporate local food sourcing, more efficient supply chains, and sustainable food production practices that increase.
- Example regional projects include:
  - Expand school farms and agricultural parks
  - Establish farmers markets
  - Create opportunities for local growers to connect with anchor institutions (e.g., higher education, medical facilities, jails, etc.) to create more reliable local demand for growers and reduce VMT associated with the agricultural sector as well as increase the local fresh food supply in the region

This PCAP provides the following details for each priority measure:

- GHG emissions reduction estimates,
- Review of implementation authority,
- Implementation schedule and milestones,
- Geographic scope,
- Metrics for tracking progress,
- Benefits analysis,
- LIDAC benefits analysis, and
- Intersection with other funding availability.

GHG Emissions Reduction Estimates

Each priority measure includes many different projects. For example, the Alternative Transportation measure includes expanding sidewalks, trails, and bike lanes as well as creating micromobility and travel demand management programs. As most projects will be implemented by different entities and will have varying implementation assumptions, exact GHG reductions for each project are not yet estimated. As such, an annual GHG reduction intensity metric was developed for each measure for 2025, 2030, and 2050 according to various assumptions summarized in the following table**Error! Reference source not found.**.

Table 6. CLT MSA Study Area GHG Reduction Intensity Metrics

Priority Measure	Annual GHG Reduction Intensity Metric				Assumptions for Metric Development
	2025	2030	2050	Unit	
Alternative Transportation	3.279	3.001	2.090	$MTCO_2e$/10,000 VMT reduced from gasoline passenger vehicles	– Switch to a zero-emissions mode of transport – Gasoline passenger MPG decreases over time (ICLEI projection)
Decarbonized Buildings & Facilities	1.2559	0.5008	0.3081	$MTCO_2e$/home energy efficiency retrofit/year	– 20% energy savings (ICLEI assumption) – Energy use/home from state EIA data – Energy use per commercial sq ft based on EIA Commercial Buildings Energy Consumption Survey (CBECS) data for the South Region – Energy use per home or commercial square foot is constant over time
	0.0024	0.0012	0.0010	$MTCO_2e$/ commercial sq ft energy efficiency retrofit/year	
Clean Fleets & Infrastructure	2.368	3.077	2.294	$MTCO_2e$/EV replacing gasoline passenger vehicle/year	– Gasoline passenger miles per gallon (MPG) decreases and bus diesel MPG is constant over time (ICLEI projection) – EV fuel economy is constant over time – VMT/year assumptions from US Department of Energy (DOE) – The projected electricity emissions factor substantially declines between 2025-2030 (ICLEI/National Renewable Energy Laboratory [NREL])[11]
	8.758	47.349	57.200	$MTCO_2e$/electric bus replacing diesel bus/year	
Renewable Energy & Storage Systems	0.5420	0.1421	0.0400	$MTCO_2e$/kW solar installed/year	– 1,402 kWh AC/kW DC installed – 20 watts per square foot of solar
	0.0108	0.0028	0.0008	$MTCO_2e$/square foot of solar installed/year	
Trees & Greenspaces	0.011	0.010	0.020	$MTCO_2e$/tree planted/year	– Identified region-specific tree species with high sequestration potentials and used the average sequestration rate of those species – Used USDA iTrees tools
	0.011	0.048	0.507	Cumulative $MTCO_2e$ from 2025 to target year/tree planted	
Waste Diversion	1.646	1.646	1.646	$MTCO_2e$/short ton food waste diverted from landfill/year	– Organic waste emissions factors do not change over time
Sustainable Food Production & Distribution	Included elsewhere				– Metrics can be used from the Decarbonized Buildings & Facilities, Alternative Transportation, and Waste

[11] https://docs.google.com/spreadsheets/d/1egE_7c0KpH0MMJGPdzo-VhQIttXYdXcWp_WuR9Lbd74/edit#gid=1301209923

Table 6. CLT MSA Study Area GHG Reduction Intensity Metrics

Priority Measure	Annual GHG Reduction Intensity Metric				Assumptions for Metric Development
	2025	2030	2050	Unit	
					Diversion measures to calculate reductions from this measure

The reduction metrics provided above can be applied to the scope of the individual proposed projects to quantify project specific GHG reductions. For example, if a sidewalk extension project was projected to decrease 10,000 passenger VMT per year by 2030, the Alternative Transportation 2030 GHG reduction intensity metric of 0.00030 $MTCO_2e$ reduced/VMT reduced/year could be used to calculate a total of 3 $MTCO_2e$ reduced/year in 2030 due to project implementation. **Table 7**The following table illustrates examples of how these calculations could be done for specific project types under each measure.

Table 7. Example Total Reduction Estimations Using Intensity Metrics

Priority Measure	Example GHG Reduction Intensity Metric	Example Total Reduction Estimation
Alternative Transportation	3.279 $MTCO_2e$/VMT reduced from gasoline passenger vehicles in 2030	A greenway expansion project is estimated to reduce 20,000 VMT per year by 2030. In 2030, this project will reduce 6.56 $MTCO_2e$/year [(3.279 $MTCO_2e$/10,000 VMT reduced from gasoline passenger vehicles/year in 2030)*2 = 6.56 $MTCO_2e$ reduced/year in 2030].
Decarbonized Buildings & Facilities	0.5008 $MTCO_2e$/home energy efficiency retrofit/year in 2030	A residential energy efficiency retrofit program is expected to retrofit 50 homes by 2030. In 2030, this project will reduce 25 $MTCO_2e$/year [(0.5008 $MTCO_2e$/home energy efficiency retrofit/year in 2030)*(50 homes) = 25 $MTCO_2e$ reduced/year in 2030].
Clean Fleets & Infrastructure	3.077 $MTCO_2e$/EV replacing gasoline passenger vehicle/year	A local government EV fleet program is expected to replace 30 gasoline fleet vehicles with EVs by 2030. In 2030, this project will reduce 92 $MTCO_2e$/year [(3.077 $MTCO_2e$/EV replacing gasoline passenger vehicle/year in 2030)*(30 vehicles) = 92 $MTCO_2e$ reduced/year in 2030].
Renewable Energy & Storage Systems	0.1421 $MTCO_2e$/kW solar installed/year in 2030	A residential solar program is expected to install roughly 300 kW of solar on households by 2030. In 2030, this project will reduce 43 $MTCO_2e$/year [(0.1421 $MTCO_2e$/kW solar installed/year in 2030)*(300 kW) = 43 $MTCO_2e$ reduced/year in 2030].
Trees & Greenspaces	0.010 $MTCO_2e$/tree planted/year in 2030	A tree planting program is expected to plant 100 new trees by 2030. In 2030, this project will reduce 1 $MTCO_2e$/year [(0.010 $MTCO_2e$/tree planted/year in 2030)*(100 trees) = 1 $MTCO_2e$ reduced/year in 2030].
Waste Diversion	1.646 $MTCO_2e$/short ton food waste diverted from landfill/year in 2030	A composting program is expected to divert 30 short tons of food waste per year by 2030. In 2030, this project will reduce 18 $MTCO_2e$/year [(1.646 $MTCO_2e$/short ton food scraps diverted from landfill/year in 2030)*(30 short tons food waste) = 18 $MTCO_2e$ reduced/year in 2030].

Table 7. Example Total Reduction Estimations Using Intensity Metrics

Priority Measure	Example GHG Reduction Intensity Metric	Example Total Reduction Estimation
Sustainable Food Production & Distribution	Included elsewhere	Metrics can be used from the Decarbonized Buildings & Facilities, Alternative Transportation, and Waste Diversion measures to calculate reductions from this measure.

Additionally, to better understand relative contribution of each measure to overall GHG reductions, each measure's maximum contribution to sector-specific emissions reductions and MSA-wide emissions reductions was estimated based on the assumptions provided in the table below.

Table 8. Maximum Sector-specific and CLT MSA Emissions Reductions

Priority Measures	Maximum % GHG Reduction in Emissions Sector	Maximum % GHG Reduction in CLT MSA Emissions*	Assumptions and Sources
Alternative Transportation	Active Transportation: 8% reduction in on-road transportation emissions**	3%	Community VMT reduction from neighborhood design strategies is capped at 8% while community VMT reduction from transit strategies is capped at 15% (CAPCOA Handbook)[12]
	Transit: 15% reduction in on-road transportation emissions**	6%	
Decarbonized Buildings & Facilities	95% reduction in building emissions	47%	Building emissions reductions are capped at 95% in a net zero scenario (IEA)[13]
Clean Fleets & Infrastructure	90% reduction in transportation emissions**	38%	Transportation emissions reductions are capped at 90% in a net zero scenario (IEA)[14]
Renewable Energy & Storage Systems	100% reduction in electricity emissions	32%	100% electricity energy sources can be converted to clean energy sources[15]
Trees & Greenspaces	Not quantified	Not quantified	Agriculture, forestry, and other land use emissions were not included in the GHG inventory, so maximum % reductions are not quantified here
Waste Diversion	100% reduction in waste emissions	6%	100% of organic waste can be diverted from landfill
Sustainable Food Production & Distribution	Not quantified	Not quantified	GHG reductions are included in the Decarbonized Buildings & Facilities, Alternative Transportation, and Waste Diversion measures

[12] https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pd f
[13] https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf
[14] https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf
[15] https://www.nrel.gov/analysis/100-percent-clean-electricity-by-2035-study.html

Table 8. Maximum Sector-specific and CLT MSA Emissions Reductions

Priority Measures	Maximum % GHG Reduction in Emissions Sector	Maximum % GHG Reduction in CLT MSA Emissions*	Assumptions and Sources

**Based on sector contributions in the 2018 GHG inventory. The maximum percent reductions for each measure will change over time as each sector's percent contribution to total emissions will also change. As these are the maximum reductions each measure could individually have on total emissions, these percentages cannot be added as they total over 100%.*

*** These are the maximum reductions each measure could individually have on the transportation sector, so these percentages cannot be combined as they total over 100%.*

Review of Implementation Authority

Centralina has reviewed existing statutory and regulatory authority to implement each priority measure continued in this PCAP. The table below provides the general status of the types of implementation authorities identified for each priority measure.

Table 9. Implementation Authority by Priority Measure

Priority Measure	Implementing Authority
Alternative Transportation	Public agencies within the CLT MSA study area have existing authority to implement alternative transportation projects within its jurisdiction. Public agencies (e.g., cities, counties, MPOs, councils of government) and transit agencies have existing authority to implement changes to transit service within their service area. Local governments within the CLT MSA have the authority to implement land use policy changes (through land use planning and zoning ordinances) to support the long-term success of alternative transportation projects, investments, and behaviors.
Decarbonized Buildings & Facilities	Public agencies within the CLT MSA study area have existing authority to address building energy efficiency and decarbonization.
Clean Fleets & Infrastructure	Public agencies within the CLT MSA study area have the authority to implement clean vehicle infrastructure installation and incentive projects within its jurisdiction. Public entities within the CLT MSA study area have existing authority to implement fleet conversion projects for their vehicle fleets.
Renewable Energy & Storage Systems	Public agencies, utilities, residents, and other stakeholders have existing authority to pursue renewable energy and storage systems on land and buildings which they own. Each local government within the CLT MSA study area has the authority to implement renewable energy and storage systems on their property.
Trees & Greenspaces	Public agencies, utilities, residents, and other stakeholders have existing authority to implement tree and greenspace projects on land which they own.
Waste Diversion	Public agencies within the CLT MSA study area have existing authority to implement waste management projects within their respective jurisdictions, including through franchise waste hauler agreements as applicable.
Sustainable Food Production & Distribution	Public agencies, utilities, residents, and other stakeholders have existing authority to pursue sustainable food projects on land which they own. Each local government within the CLT MSA study area has the authority to implement sustainable food projects on their property.

Implementation Schedule and Milestones

Each GHG reduction measure includes several different project types. As many of the project types under each measure share similar schedules and milestones, the table below shows the suggested implementation schedule and milestones for the types of projects under each measure.

Table 10. Suggested Implementation Schedule and Milestones by Priority Measure

Priority Measure	Suggested Implementation Schedule and Milestones
Alternative Transportation	**Infrastructure Construction:** Year 1: Complete design/engineering of the project to include permitting and construction documents. Establish pre- and post-program evaluation measures. Put project out to bid and secure construction contractor. Year 1-2: Begin construction. Year 3: Complete construction. Open infrastructure to the public. **New Program:** Year 1: Complete program plan and identify communities to participate. Establish pre- and post-program evaluation measures. Year 1-2: Launch pilot program for specific communities. Year 3: Expand program regionally and launch marketing, education and outreach activities.
Decarbonized Buildings & Facilities	**New Building Construction or Retrofit:** Year 1: Complete design/engineering of the project to include permitting and construction/retrofit documents. Establish pre- and post-program evaluation measures. Put project out to bid and secure contractor. Year 1-2: Begin construction/retrofit. Year 3-4: Complete construction/retrofit. **Existing Program:** Year 1: Create program expansion plan and announce program expansion. Establish pre- and post-program evaluation measures. Years 2-3: Implement energy audits. Years 3-5: Implement energy efficiency measures. **New Program:** Year 1: Complete program plan and identify communities to participate. Establish pre- and post-program evaluation measures. Year 1-2: Launch pilot program for specific communities. Year 3: Expand program regionally and launch marketing, education and outreach activities.
Clean Fleets & Infrastructure	**ZEVs and Infrastructure Program:** Year 1: Complete fleet transition plan/infrastructure plan. Establish pre- and post-program evaluation measures. Put project out to bid and secure contractors. Year 1-2: Implement any electrical infrastructure upgrades (e.g., transformers, panels, etc.). Begin to install ZEV-supportive infrastructure and purchase ZEVs. Year 3-5: Continue to purchase and use ZEVs (dependent on fleet turnover and regional vehicle availability for purchase).

Table 10. Suggested Implementation Schedule and Milestones by Priority Measure

Priority Measure	Suggested Implementation Schedule and Milestones
Renewable Energy & Storage Systems	**System Construction:** Year 1: Complete design/engineering of the project to include permitting and construction documents. Establish pre- and post-program evaluation measures. Put project out to bid and secure construction contractor. Year 1-2: Begin construction. Year 3: Complete construction and bring systems online. **New Program:** Year 1: Complete program plan and identify communities to participate. Establish pre- and post-program evaluation measures. Year 1-2: Launch pilot program for specific communities. Year 3: Expand program regionally and launch marketing, education and outreach activities.
Trees & Greenspaces	**New Program:** Year 1: Complete program plan and establish pre- and post-program evaluation measures. Year 1-2: Launch pilot program for specific communities. Year 3: Expand program regionally and launch marketing, education and outreach activities.
Waste Diversion	**New Program:** Year 1: Complete program plan and establish pre- and post-program evaluation measures. Year 1-2: Launch pilot program for specific communities. Year 3: Expand program regionally and launch marketing, education and outreach activities.
Sustainable Food Production & Distribution	**New Program:** Year 1: Meet with partners to identify project implementation locations and establish pre- and post-program evaluation measures. Year 1-2: Launch pilot program for specific communities. Year 3: Expand program regionally and launch marketing, education, and outreach activities.

Geographic Scope

The priority measures and associated example projects identified are all within the geographic scope of the CLT MSA study area. In the example projects list provided in Appendix C, the columns 'primary location' and 'location details' identify the geographic scope of each project.

Projects included in this list may be set to occur at a specific physical address, the city/town level, county level, or in some cases are region-wide projects.

Metrics for Tracking Progress

Suggested metrics for tracking progress for each measure are listed in the table below.

Table 11. Suggested Metrics for Tracking Progress by Priority Measure

Priority Measure	Suggested Metrics
Alternative Transportation	– VMT reduction – Length of trails, sidewalks, or bike lanes installed – Percent active transportation and transit mode share – Number of rideshare/carshare users/bicycle rentals – Number of automobile-pedestrian crashes – Annual average daily traffic (AADT) before and after project implementation – Number of communities, including LIDACs, served by alternative transportation and/or connecting to activity centers and mobility hubs – Reductions in transit transfers, travel time, fare charges – Transit ridership by service (e.g., bus) and number of new transit riders – Change in number of transit passenger trips per capita – Bus travel time versus bus idling time – Percent of residents within a 10-minute walk (0.5 mile) of high frequency transit – Number of jobs within bikeshed/walkshed/first-last mile of new facility – Residential density within bikeshed/walkshed/first-last mile of new facility – Walk Score rating – Increase in policy/codes incorporating land use reforms which support alternative transportation
Decarbonized Buildings & Facilities	– Number of energy audits completed – Number of buildings or households audited or retrofitted – Average energy savings and average cost savings per retrofit – Energy use intensity (e.g., electricity use/ building sq ft, natural gas use/dwelling, etc.) – Number of fossil fuel equipment types transitioned to electric – Number of LEDs, appliances, or similar upgrades installed
Clean Fleets & Infrastructure	– Number or percent of public fleet vehicles electrified or transitioned to alternative fuels – Percent increase in EV and plug-in hybrid electric vehicle registrations in the region – Percent of total VMT from EVs, ZEVs, or alternative fuel vehicles – Number of EVs purchased per year – Number and type of maintenance equipment converted – Number of publicly accessible EV chargers installed – Number of public EV charger users or number of unique visits – Charger uptime (e.g., % of days charger is operational) – Output of charging infrastructure and estimated vehicle miles traveled – Number of communities, including LIDACs, served by electric/hybrid buses – Gallons of fuel use avoided
Renewable Energy & Storage Systems	– kW/MW renewable energy installed / kWh/MWh renewable electricity generated – Percentage of total electricity use generated by renewable sources – Percentage of solar-viable public buildings with solar systems – Number of residential units with renewable installations – Number of renewable energy permits granted per year, cumulatively – Quantity of biogas captured
Trees & Greenspaces	– Number of trees planted (by species) – Acres of natural space developed/enhanced – Percent tree canopy coverage
Waste Diversion	– Amount of food waste and recyclables diverted (pounds, tons) – Number of customers served by composting program
Sustainable Food Production & Distribution	– Number of farms, agricultural parks, farmers markets, or food hubs developed – Number of people served and number of businesses participating – Number of new jobs/businesses related to sustainable food production and distribution – VMT reductions from transporting food

Benefits Analysis

The implementation of the measures included in this PCAP are anticipated to have a broad range of benefits. This section details the anticipated quantitative co-pollutant reductions associated with implementation of the priority measures identified in this PCAP as well as a qualitative review of potential benefits and disbenefits related to regional air quality, public health and wellness, economy, and climate resilience and environmental impacts.

Quantitative Co-Pollutant Benefits Analysis

Co-pollutant emissions reductions estimates are quantified similarly to the GHG emissions reductions. Considering each priority measure includes many different projects which will be implemented by various entities, emissions reductions for each project are not yet estimated. Like the GHG emission reduction estimates, co-pollutant emission reductions intensities were developed for each priority measure for 2025, 2030, and 2050. These emission reduction intensities are presented in the table below, along with the assumptions used to develop the intensity metrics.

Table 12. CLT MSA Study Area Co-Pollutant Reduction Intensity Metrics

Priority Measure/ Pollutant	Co-Pollutant Emission Reduction Intensity Metric				Assumptions for Metric Development
	2025	2030	2050	Unit	
Alternative Transportation					
NOx	0.00023	0.00010	0.00004	Lbs emissions/ VMT reduced from gasoline passenger vehicles/year	– Grams/mile emission factors from Bureau of Transportation Statistics: "Estimated US Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel"; Table 4-43, section "Gasoline - Light Duty Vehicles", converted to lb/mile (lb/VMT) – Hydrocarbon (HC) used as a conversative proxy for VOC – Assume 2050 factors decreased from 2030 at the same rate as between 2025 and 2030
SO_2	Data not available to calculate.				
PM_{10}	Data not available to calculate.				
$PM_{2.5}$	0.000004	0.000004	0.000004		
CO	0.0078	0.0063	0.0051		
VOC	0.00069	0.00051	0.00038		
HAP	Data not available to calculate.				
Decarbonized Buildings & Facilities					
Residential					
NOx	0.00084	0.00065	0.00052	Tons emissions/ home energy efficiency retrofit/year	– Emissions avoided per MWh are from USEPA's AVoided Emissions and geneRation Tool (AVERT), using Carolinas regional values for distributed PV – 20% energy savings (from ICLEI) – Energy use per household based on state EIA data – Energy use per household square foot is constant over time
SO_2	0.00035	0.00023	0.00016		
PM_{10}	Data not available to calculate.				
$PM_{2.5}$	0.00047	0.00049	0.00050		
CO	Data not available to calculate.				
VOC	0.00045	0.00048	0.00052		
HAP	Data not available to calculate.				
Commercial					
NOx	0.0487	0.0482	0.0478	Lbs emissions/ commercial sq ft energy efficiency retrofit/year	– Electricity and fuel use per commercial square foot based on EIA CBECS data for the South Region – Energy use per commercial square foot is constant over time
SO_2	0.0020	0.0017	0.0014		
PM_{10}	0.0022	0.0023	0.0023		
$PM_{2.5}$	0.0022	0.0023	0.0023		
CO	0.0074	0.0074	0.0074		
VOC	0.0027	0.0028	0.0029		

Table 12. CLT MSA Study Area Co-Pollutant Reduction Intensity Metrics

Priority Measure/ Pollutant	Co-Pollutant Emission Reduction Intensity Metric				Assumptions for Metric Development
	2025	2030	2050	Unit	
HAP	Data not available to calculate.				– Emissions avoided per MWh are from USEPA's AVoided Emissions and geneRation Tool (AVERT), using Carolinas regional values for distributed PV – Fuel combustion emissions factors are from USEPA's AP-42: Compilation of Air Emissions Factors from Stationary Sources – $PM_{2.5}$ is set equal to PM_{10} as a conservative estimate
Clean Fleets & Infrastructure					
Passenger Vehicles					
NOx	0.005	0.003	0.002	Tons emissions/ EV replacing gasoline/diesel passenger vehicle/year	– Grams/mile emission factors from Bureau of Transportation Statistics: "Estimated US Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel"; Table 4-43, section "Gasoline - Light Duty Vehicles", converted to lb/mile (lb/VMT). – Hydrocarbon (HC) used as a conversative proxy for VOC – Assume 2050 factors decreased from 2030 at the same rate as between 2025 and 2030 – VMT/year assumptions from DOE
SO_2	Data not available to calculate.				
PM_{10}	Data not available to calculate.				
$PM_{2.5}$	0.00010	0.00006	0.00004		
CO	0.042	0.032	0.025		
VOC	0.0036	0.0028	0.0021		
HAP	Data not available to calculate.				
Transit Buses					
NOx	0.196	0.133	0.091	Tons emissions/ electric bus replacing diesel bus/year	– Grams/mile emission factors from Bureau of Transportation Statistics: "Estimated US Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel"; Table 4-43, section "Buses" – Hydrocarbon (HC) used as a conversative proxy for VOC – Assume 2050 factors decreased from 2030 at the same rate as between 2025 and 2030 – VMT/year assumptions from DOE
SO_2	Data not available to calculate.				
PM_{10}	Data not available to calculate.				
$PM_{2.5}$	0.00467	0.00226	0.00110		
CO	0.093	0.082	0.072		
VOC	0.0131	0.0093	0.0066		
HAP	Data not available to calculate.				
Renewable Energy & Storage Systems					
Energy Basis					
NOx	0.42	0.28	0.18	Lb Emissions/ MWh solar installed/year	– Emissions avoided per MWh are from USEPA's AVoided Emissions and geneRation Tool (AVERT), using Carolinas regional values for distributed PV. – 2025, 2030 and 2050 rates are based on the percent difference between 2018 and 2022 rates.
SO_2	0.26	0.17	0.11		
PM_{10}	Data not available to calculate.				
$PM_{2.5}$	0.13	0.14	0.16		
CO	Data not available to calculate.				
VOC	0.08	0.10	0.13		
HAP	Data not available to calculate.				

Table 12. CLT MSA Study Area Co-Pollutant Reduction Intensity Metrics

Priority Measure/ Pollutant	Co-Pollutant Emission Reduction Intensity Metric				Assumptions for Metric Development
	2025	2030	2050	Unit	
Area Basis					
NOx	0.012	0.008	0.005	Lb Emissions/ square foot of solar installed/year	– 1,402 kWh AC/kW DC installed – 20 watts/square foot of solar
SO_2	0.007	0.005	0.003		
PM_{10}	Data not available to calculate.				
$PM_{2.5}$	0.004	0.004	0.004		
CO	Data not available to calculate.				
VOC	0.002	0.003	0.004		
HAP	Data not available to calculate.				
Trees & Greenspaces					
NOx	7.119	7.119	7.119	Lb/acre tree canopy/year	– Used USDA iTrees tools. Note that certain locations are available via this tool; used the area of Charlotte, NC, York, SC, Gastonia, NC, and Lincolnton, NC as a sampling. – Air pollution removal by trees per acre assumed not to change overtime.
SO_2	1.523	1.523	1.523		
PM_{10}	Data not available to calculate.				
$PM_{2.5}$	2.712	2.712	2.712		
CO	1.425	1.425	1.425		
VOC	Data not available to calculate.				
HAP	Data not available to calculate.				
Waste Diversion					
Co-pollutant emissions in landfill gas include VOCs in trace amounts. For landfills in which landfill gas is combusted, there may be other co-pollutant emissions from combustion, but these are expected to be negligible and as such, are not quantified.					
Sustainable Food Production & Distribution					
Included elsewhere					– Metrics can be used from the Decarbonized Buildings & Facilities, Alternative Transportation, and Waste Diversion measures to calculate reductions from this measure

Qualitative Co-Pollutant Benefits Analysis

Using the quantitative results of the co-pollutant emissions changes from implementation of the priority measures, each priority measure was evaluated qualitatively for benefits and disbenefits as a result of the anticipated emissions changes. This evaluation focused on the effects on regional air quality, public health and wellness, economy, and climate resilience and environment. The table below summarizes this qualitative analysis for each priority measure.

Table 13. CLT MSA Study Area Qualitative Co-Pollutant Benefits Analysis

**Black text denotes benefits, while red text denotes disbenefits*

Priority Measure	Air Quality	Public Health & Wellbeing	Economy	Climate Resilience & Environment
Alternative Transportation	Reduces local air pollutants from fossil fuel combustion in passenger vehicles.	Encourages physical activity which may address health issues associated with sedentary lifestyles, such as obesity and cardiovascular disease. Decreases traffic congestion and noise. Decreases stress for commuters and improves mental health through access to the outdoors.	Reduces fuel costs for individuals and business, freeing up financial resources for other economic purposes. Infrastructure invest creates jobs, and access to jobs.	Lessens reliance on fuel imported from outside the community, as it does not require fuel or electricity.
Decarbonized Buildings & Facilities	Switching to electric-powered appliances reduces indoor air pollutants created by gas appliances.	Adding insulation and weatherization increases access to heat and cooling.	May decrease costs when switching from natural gas to electricity, as electricity prices are not expected to increase as rapidly as natural gas. High upfront costs, meaning that renters and low-income populations that have little control of appliances and building renovations may be disadvantaged.	Lessens reliance on natural gas and non-renewable resources.

Priority Measure	Air Quality	Public Health & Wellbeing	Economy	Climate Resilience & Environment
Clean Fleets & Infrastructure	Reduces local air pollutants from fossil fuel combustion in fleets. Could increase demand for electricity (EVs), which would increase air pollutants where electricity is generated.	Idle time reduction projects reduce noise pollution and reduce respiratory issues such as asthma.	Reduces fuel costs for individuals and business, freeing up financial resources for other economic purposes. Infrastructure investments create jobs and access to jobs.	Lessens reliance on natural gas and non-renewable resources.
Renewable Energy & Storage Systems	Reduces air pollution from energy production.	Expanded energy access for remote or isolated communities.	Increases energy independence, which combats energy price fluctuations and increases cost predictability. Infrastructure investments create jobs and access to jobs. High upfront cost and possible geographic limitations. Storage system options are currently limited and/or still in development, as well as costly.	Lessens the reliance of energy from the grid or non-renewable resources. Increases energy independence.
Trees & Greenspaces	Passive cooling can reduce residential energy use and urban heat, both of which have air pollution impacts, Some vegetative barriers can assist with pollution dispersion by directing air pollution upward.	Provides shade and pleasant surroundings for outdoor activities, which promotes physical and mental health.	Could promote tourism, which has economic benefits.	Preserves natural spaces that lessen climate impacts such as flooding. Preserves biodiversity and habitats for native and migrating species.

Priority Measure	Air Quality	Public Health & Wellbeing	Economy	Climate Resilience & Environment
Waste Diversion	Reduce odor and smoke created by landfills.	Reduces water and soil pollution from landfill leaks that can affect public health of communities in close proximity to landfills.	Conserving landfill space, which expand the lifespan of landfills, reducing cost. New recycling and composting streams/programs create jobs. There is a cost to participate in some recycling and composting programs.	Recycling reduces the demand for raw materials, which promotes a circular economy. Composting revitalizes soils.
Sustainable Food Production & Distribution	Reduces local air pollutants from fossil fuel combustion to transport food.	Increases access to fresher food. Reduces harmful impacts from fertilizer and pest run-off or animal waste spills.	Reduces cost of transportation for the distribution of food.	Lessens the reliance on imported food, increasing food security. Improves soil fertility and lessens erosion.

Low-Income and Disadvantaged Communities Benefits Analysis

As part of the process of identifying priority measures for this PCAP, a socioeconomic analysis was conducted to identify the LIDACs in the CLT MSA study area, associated LIDAC demographics, environmental justice indicators, and environmental and economic concerns for the LIDAC populations. The LIDAC analysis was a required deliverable for the PCAP.

Identified Census Tracts with CEJST

The CEJST identifies census tracts that are disadvantaged using burden indications in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. A total of 176 census tracts were identified that meet or exceed the threshold for one or more of the CEJST burden indicators throughout the 13 counties. Appendix D lists the specific census tract IDs affected by each priority measure.

Table 14. CEJST Indicators and Affected Census Tracts in Study Area

CEJST Indicators	Description	Number of Census Tracts
Climate Change	Census tracts are disadvantaged if they are: – at or above the 90th percentile for expected agriculture loss rate OR expected building loss rate OR expected population loss rate OR projected flood risk OR projected wildfire risk; – AND are at or above the 65th percentile for low income.	24
Energy	Census tracts are disadvantaged if they are: – at or above the 90th percentile for energy cost OR PM2.5 in the air; – AND are at or above the 65th percentile for low income.	13
Health	Census tracts are disadvantaged if they are: – at or above the 90th percentile for asthma OR diabetes OR heart disease OR low life expectancy; – AND are at or above the 65th percentile for low income.	79

CEJST Indicators	Description	Number of Census Tracts
Housing	Census tracts are disadvantaged if they are: – Experienced historic underinvestment OR are at or above the 90th percentile for housing cost OR lack of green space OR lack of indoor plumbing OR lead paint; – AND are at or above the 65th percentile for low income.	48
Legacy Pollution	Census tracts are disadvantaged if they are: – Have at least one abandoned mine land OR Formerly Used Defense Sites OR are at or above the 90th percentile for proximity to hazardous waste facilities OR proximity to Superfund sites (National Priorities List (NPL)) OR proximity to Risk Management Plan (RMP) facilities; – AND are at or above the 65th percentile for low income.	44
Transportation	Census tracts are disadvantaged if they are: – at or above the 90th percentile for diesel particulate matter exposure OR transportation barriers OR traffic proximity and volume; – AND are at or above the 65th percentile for low income.	48
Water and Wastewater	Census tracts are disadvantaged if they are: – at or above the 90th percentile for underground storage tanks and releases OR wastewater discharge; – AND are at or above the 65th percentile for low income.	35
Workforce Development	Census tracts are disadvantaged if they are: – at or above the 90th percentile for linguistic isolation OR low median income OR poverty OR unemployment; – AND more than 10% of people ages 25 years or older whose high school education is less than a high school diploma.	86

The comprehensive results of socioeconomic analysis of the census tracts identified are summarized by county in Appendix E.

LIDAC Benefits Analysis Discussion

The implementation of the priority measures included in this PCAP are anticipated to provide significant benefits to LIDACs. These potential benefits associated with implementation of the priority measures have been evaluated and are summarized in the following table, along with consideration of potential disbenefits and associated mitigation options and considerations.

Table 15. LIDAC Benefits Analysis Results

Priority Measure	Benefits	Disbenefits and Mitigation
Alternative Transportation	– Replacing personal vehicle trips with alternative transportation modes can reduce noise and air pollution from fuel combustion. – Adding alternative transportation options such as trails, shared-use paths, bike lanes, and sidewalks improve access to community destinations for zero vehicle household and other transportation disadvantaged populationss. – Encouraging biking and walking as alternative modes of transportation can reduce personal vehicle use (reducing emissions and vehicle costs). – Expanding and improving alternative transportation infrastructure can improve connectivity by offering low-cost modes of transportation and first/last-mile access to public transit service. – Expanding and improving alternative transportation infrastructure can increase access to jobs, increasing labor force participation and opportunities available to LIDAC communities. – Use of alternative transportation options like trails, walking, and biking may increase health benefits.	– Alternative transportation infrastructure could add value to neighborhoods, leading to gentrification and displacement of communities. *When evaluating the value of adding active transportation infrastructure to a community, implementing agencies should consider actions that do not attract investment in a way that is harmful to the established community.* – To realize the benefits from bike and pedestrian infrastructure, a significant portion of the community needs to have bike access and feel comfortable and safe riding a bike, such as access to a helmet (e.g., NCDOT has a program to distribute bike helmets), and through appropriate countermeasures at crosswalks. *Implementing agencies should investigate the feasibility of a resale/ donation program to increase access to bicycles in LIDAC communities, as well as a community education program to promote bike safety and comfort.*
Decarbonized Buildings & Facilities	– More energy efficient buildings mean spaces can be more easily cooled and heated to healthy temperatures which increases resilience to extreme heat and extreme cold. – Increasing energy efficiency in buildings can lower energy costs and reduce the financial burden for low-income tenants. – Transitioning from fossil fuel equipment to electric alternatives can improve indoor air quality for homes and businesses. – Increasing the building energy efficiency of multi-unit apartment buildings can improve the quality of life and lower energy costs for residents. – Decarbonizing buildings could create opportunities for new jobs in transitioning to electric alternatives of equipment.	– Regional workers may not have the industry skills necessary for new green jobs and there may be regional job losses resulting from the workforce transition. *Implementing agencies can investigate and work to implement green job training programs for residents. For example, the STEPS4GROWTH program[16] is statewide program in NC that can be leveraged to work with employers to train students and adults to fill well-paying jobs in energy efficiency, renewable energy, clean vehicles, and grid & resiliency.*

[16] https://ncbce.org/steps4growth/

Table 15. LIDAC Benefits Analysis Results

Priority Measure	Benefits	Disbenefits and Mitigation
Clean Fleets & Infrastructure	– Installing charging infrastructure will aid in the transition of local government fleets within the CLT MSA study area and can encourage residents to purchase an electric vehicle by reducing range anxiety. – Reducing or removing the combustion of fossil fuels in vehicles and equipment improves noise and air pollution, particularly for communities near busy roadways. – Switching from diesel transit vehicles to electric transit vehicles can improve air quality in communities, particularly those directly along bus transit routes. – Job opportunities can be generated for the maintenance of electric vehicles and the installation and maintenance of charging stations.	– Regional workers may not have the industry skills necessary for new green jobs and there may be regional job losses resulting from the workforce transition. *Implementing agencies can investigate and work to implement green job training programs for residents.* – At-home charging stations have a high up-front cost and is primarily available to homeowners, as opposed to renters. The availability of charging infrastructure may be disproportionate across the region. *Implementing agencies should install public charging infrastructure within LIDACs and investigate incentives and grant programs for at-home charging stations and multi-unit residential charging opportunities.*
Renewable Energy & Storage Systems	– Lower energy costs mean homes, workplaces, and community spaces can be cooled/heated to healthy temperatures, reducing health risks, particularly for vulnerable populations. – Replacing existing sources of energy that generate particulate matter emissions will improve air quality and public health in the CLT MSA study area. – An increase in renewable energy generation will allow more residents to fuel their electric vehicle with emissions-free electricity. – The creation of new green jobs for renewable energy system manufacturing, installation, and maintenance. – Energy costs can be reduced by installing renewable energy systems at homes and businesses. This can help alleviate financial burdens on low-income residents. – Community installations can reduce cost to renters and low-income residents with little upfront installation costs.	– Renewable energy, such as solar, has a high up-front cost that may not be feasible for individual residents in low-income areas, and for residents who do not own property and do not live where community solar is available. *Implementing agencies can investigate grants and funding opportunities that could make solar more feasible in the community and invest in renewable energy projects that would directly benefit the community.* – Regional workers may not have the industry skills necessary for new green jobs and there may be regional job losses resulting from the workforce transition. *Implementing agencies can investigate and work to implement green job training programs for residents.*

Table 15. LIDAC Benefits Analysis Results

Priority Measure	Benefits	Disbenefits and Mitigation
Trees & Greenspaces	– Increased water infiltration through trees and vegetation can reduce flood risk and reduce stormwater runoff. – Increased tree canopy reduces the urban heat island effect and creates cool, shady areas that provide relief during extreme heat. – Through carbon sequestration, trees and vegetation in greenspaces can absorb air pollution and improve the air quality and health of residents. – Greenspaces promote outdoor physical activities/exercise which can improve cardiovascular and mental health. – Trees along walkways and by transit stops provide shade and coverage that can increase walking, biking, and riding public transit. – Water quality can be improved from vegetation naturally removing some pollutants. – Job opportunities can be generated to plant and maintain the new trees and greenspaces.	– The addition of trees and greenspaces may add value to the neighborhoods that can lead to gentrification and the displacement of communities. *When evaluating the value of adding natural spaces and trees to a community, implementing agencies should consider actions that do not attract investment in a way that is not beneficial to the established community.* – Trees and greenspaces developed by government agencies may increase local budgets for maintenance. *Implementing agencies should consider impacts to the budget before implementing this measure and consider existing volunteer and non-profit environmental groups that could aid in maintenance.*
Waste Diversion	– Diverting decomposing organic matter from landfills can improve air quality. – Reducing food waste can reduce household food costs and increase local food security. – Improved and expanded recycling programs divert waste away from landfills, which reduces the demand for landfill space. – New jobs can be created in composting, recycling, and collection services.	– Starting a compost collection service could increase transportation emissions from diesel collection vehicles. *Implementing agencies should investigate sharing vehicles across jurisdictions and electric vehicles where available and feasible.*
Sustainable Food Production & Distribution	– Sustainable agriculture practices build a greater resilience against agriculture loss. – Sustainable production and distribution can reduce food waste. – Local food production and distribution can improve access to fresh, nutritious food. – Emissions from freight trucks can be reduced from local food production and distribution lowering the necessary distance to travel. – Projects such as a farmers' markets can generate new jobs in the community.	– Shifting agriculture practices may have a high upfront cost for farmers and distributers. *Implementing agencies should investigate incentives and subsidies to make the transition viable for local agriculture partners.*

Planned and Ongoing Engagement with LIDACs

The next phase of this project will continue to engage community members and residents across the study area, with a special emphasis on those in LIDACs to ensure equitable insight on community priorities. The primary purpose of this engagement will be to promote the region's priority measures and gather feedback on implementing the priority measures, including needs, preferences, priorities, and barriers for community members and residents. Engagement activities will include hosting community workshops, townhall meetings, and focus groups, as well as distributing community surveys, social media postings, and website updates.

These planned engagement activities are intended to help foster collaboration, build community support, and drive collective action towards achieving climate, equity, and sustainability goals for LIDACs across the 13-county region. By involving representatives, stakeholders and residents in the planning, decision-making, and implementation processes, communities can work towards implementing initiatives that are inclusive, responsive to local needs, and rooted in community values and priorities.

Intersection with Other Funding Availability

Many of the priority measures included in this PCAP expand upon or complement existing programs. Centralina requires a strategic approach to successfully plan and implement priority measures identified in this PCAP. This section reviews key considerations for Centralina based on its current administrative capacity and potential partnerships with local governments, including cities, counties, and nonprofit organizations.

The funding and financing matrix, which accompanies this PCAP, identifies 31 federal grant programs and 21 state programs from North Carolina and South Carolina, and outlines:

- Funding opportunity type, administering organization, and description
- Where funds originate from the Infrastructure Investment Jobs Act (IIJA) or Inflation Reduction Act (IRA), two landmark pieces of legislation that provide significant funds
- Local match requirements
- Potential award sizes
- Eligible applicants
- Funded activities, between planning or implementation
- Applicability to Centralina's PCAP measures
- When notices of funding availability (NOFA) are expected and/or issued

The following section summarizes findings from the funding and financing matrix, highlighting a subset of federal and state grant programs that are deemed most relevant to the seven priority PCAP measures. The full suite of all funds reviewed are included within the accompanying matrix.

It is important to note that some grant programs may be applied to multiple measures as indicated in the accompanying matrix. The subsequent sections outline funding opportunities by measure, even though several grant programs are cross-cutting and may apply to multiple measures. A few grant programs, not included below, may be applied to programs for all measures, including the Environmental Protection Agency's (EPA) Environmental Justice Government-to-Government Program.

Funding Opportunities by Measure

Alternative Transportation

This measure prioritizes a series of transportation infrastructure improvements that are smaller than traditional rail or surface transportation projects. These include the addition of bicycle and pedestrian lanes, the development of greenways, and other road system improvement projects. To fund the planning and implementation of these programs, a series of federal programs (from the US Department of Transportation) and North Carolina and South Carolina state programs have been identified in Table 16.

Larger-scale transportation grants are included in the accompanying matrix but may not be considered priorities for the purpose of the PCAP due to their significant administrative requirements and focus on rail or highway transportation infrastructure. These grants are referenced below for their applicability to bicycle and pedestrian infrastructure projects that are often incorporated into higher profile transportation projects:

- US DOT's Consolidated Rail Infrastructure and Safety Improvements (CRISI)
- UD DOT's Multimodal Project Discretionary Grant
- Federal Transit Administration's (FTA) Urbanized Area Formula Grants

Table 16. Grant Programs for Alternative Transportation

Program Name	Administering Organization	Description
Active Transportation Infrastructure Investment Program (ATIIP)	Federal Highway Administration (FHWA)	Provides funding to enable communities to plan and construct connected active transportation systems, including bicycle and pedestrian infrastructure and greenways.
Carbon Reduction Program	FHWA	Provides funding for projects designed to reduce transportation emissions from on-road highway sources. This includes the development of public transportation facilities, pedestrian facilities, bicycle facilities, and shared or pooled vehicle trips.
Congestion Mitigation and Air Quality (CMAQ) Improvement Program	FHWA	Provides funding to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act
Rebuilding American Infrastructure with Sustainability & Equity (RAISE) Grant Program	US Department of Transportation (USDOT)	Provides funding to complete critical freight and passenger transportation infrastructure projects with significant local or regional impact.
Reconnecting Communities and Neighborhoods Grant Program	USDOT	Provides funding to help reconnect neighborhoods divided by infrastructure, mitigate negative impacts of transportation facilities or construction projects on communities, and support equitable transportation planning. This program makes community planning grants, capital construction grants, and technical assistance available to eligible receiving entities.
Thriving Communities Program	USDOT	Provides funding to enable disadvantaged and under-resourced communities to advance a pipeline of transformative infrastructure projects that will increase mobility, reduce pollution, and expand affordable transportation options, connecting communities to the essential opportunities and resources that will help them thrive.
Great Trails State Plan	North Carolina Department of Transportation (NCDOT)	Provides funding for the planning and implementation of trails, greenways, multi-use paths, rail-trails, and side paths.
Recreational Trails Program	North Carolina State Parks	Provides funding for the development of trail projects that provide connectivity, public access, and parking. This includes shovel-ready trail and park projects.
Recreational Trails Program	South Carolina Department of Parks, Recreation and Tourism (PRT)	Provides funding for the development of recreational trails and trailhead facilities that are open to the public.

Clean Fleets and Infrastructure

Potential programs and projects within the Clean Fleets and Infrastructure measure, with its focus on local government fleet electrification and expanded electric vehicle charging capacity, are eligible for a series of IRA and IIJA grant programs summarized in Table 17. Some programs listed under the Decarbonized Buildings and Facilities and Renewable Energy and Storage Systems measures may also be used to fund vehicle electrification projects, including the Greenhouse Gas Reduction Fund (listed under Decarbonized Buildings and Facilities due to its focus on electrification of built structures).

Table 17. Grant Programs for Clean Fleets and Infrastructure

Program Name	Administering Organization	Description
Clean Heavy-Duty Vehicle Program	USEPA	Provides funding to replace higher emission heavy-duty vehicles with zero-emission vehicles, support zero-emission vehicle infrastructure, and to train and develop workers.
Clean School Bus Grant Program	USEPA	Provides funding to replace existing school buses with zero-emission and low-emission models to reduce harmful emissions from older, higher emission buses.
Diesel Emissions Reduction Act (DERA) Funding	USEPA	Provides grants and rebates that protect human health and improve air quality by reducing harmful emissions from diesel engines.
Charging and Fueling Infrastructure Discretionary Grant Program	Federal Highway Administration (FHWA)	Provides funding to strategically deploy publicly accessible electric vehicle charging infrastructure and other alternative fueling infrastructure, consisting of two tracks: (1) corridor charging to deploy electric vehicle charging, and (2) community charging to install electric vehicle charging and alternative fuel.
Congestion Mitigation and Air Quality (CMAQ) Improvement Program	FHWA	Provides funding to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act
National Electric Vehicle Infrastructure (NEVI) Formula Program	FHWA	Provides funding to states to manage through approved state NEVI plans, to strategically deploy electric vehicle (EV) charging infrastructure and to establish an interconnected network to facilitate data collection, access, and reliability.
Grants for Buses and Bus Facilities Program	Federal Transit Administration (FTA)	Provides funding to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities, including technological changes or innovations to modify low or no emission vehicles or facilities.
Low or No Emission Vehicle Program	FTA	Provides funding for the purchase or lease of zero-emission and low-emission transit buses as well as acquisition, construction, and leasing of required supporting facilities.
Ride or Drive Electric Program	Joint Office of Energy and Transportation	Provides funding to advance the goal of building a national network of EV chargers for all Americans by supporting the EV charging reliability, resiliency, equity, and workforce development.
Strengthening Mobility and Revolutionizing Transportation (SMART) Program	USDOT	Provides funding to eligible public sector agencies to conduct demonstration projects focused on advanced smart community technologies and systems to improve transportation efficiency and safety.

Table 17. Grant Programs for Clean Fleets and Infrastructure

Program Name	Administering Organization	Description
Technology Integration (TI) Program	USDOE	Provides funding for projects that will advance deployment of technologies critical to achieving net-zero greenhouse gas emissions in the transportation sector.
Voluntary Airport Low Emissions Program (VALE)	Federal Aviation Administration (FAA)	Provides funding for low emission vehicles, refueling and recharging stations, gate electrification, and other airport air quality improvements.

Decarbonized Buildings & Facilities

The DOE, in addition to the US Department of Housing and Urban Development (HUD), have made several grant programs available under the IRA and IIJA related to building energy efficient local government buildings and infrastructure. These opportunities are summarized in Table 18.

Table 18. Grant Programs for Decarbonized Buildings & Facilities

Program Name	Administering Organization	Description
Greenhouse Gas Reduction Fund: Solar for All Competition	USEPA	Provides funding to expand the number of low-income and disadvantaged communities that are primed for investment in residential and community solar.
High Energy Cost Grants Program	US Department of Agriculture (USDA)	Provides funding to power providers to lower energy costs for families and individuals in areas with extremely high per-household energy costs (275 percent of the national average or higher).
Assistance for Adoption of Building Energy Codes	DOE	Provides funding to states and local governments with the authority to adopt building codes and standards to lead the way with innovative approaches to decarbonization that may impact the entirety of the commercial and residential building stocks.
Building Codes Implementation for Efficiency and Resilience	DOE	Provides funding to enable sustained, cost-effective implementation of updated building energy codes to save customers money on their energy bills. Funds enable states and regional partnerships to provide training and materials to builders, contractors, architects, and other design and construction professionals.
Green and Resilient Retrofit Program (GRRP)	HUD	Provides funding for projects that improve energy or water efficiency, enhance indoor air quality or sustainability, implement the use of zero-emission electricity generation, low-emission building materials or processes, energy storage, building electrification strategies in eligible HUD-assisted multifamily properties. This program consists of three subprograms: Elements, Leading Edge, and Comprehensive programs.

Renewable Energy & Storage Systems

Similar to the Decarbonized Buildings and Facilities measures, DOE programs provide the majority of funding related to geothermal projects, solar panel installation, and other storage projects for the Renewable Energy and Storage Systems measure, as summarized in Table 19.

Table 19. Grant Programs for Renewable Energy & Storage Systems

Program Name	Administering Organization	Description
Rural Energy for America Program	USDA	Provides funding to agricultural producers and rural small businesses for renewable energy systems or to make energy efficiency improvements. Agricultural producers may also apply for new energy efficient equipment and new system loans for agricultural production and processing.
Communities Local Energy Action Program (LEAP)	DOE	Provides funding to facilitate sustained community-wide economic and environmental benefits primarily through DOE's clean energy deployment work, with a focus on low-income energy-burdened communities that are also experiencing either direct environmental justice impacts or direct economic impacts from a shift away from historical reliance on fossil fuels.
Grid Resilience and Innovation Partnerships (GRIP) Program: Grid Innovation Program	DOE	Provides funding to deploy projects that use innovative approaches to transmission, storage, and distribution infrastructure to enhance grid resilience and reliability. Projects include interregional transmission projects, investments that accelerate interconnection of clean energy generation, and utilization of distribution grid assets to provide backup power and reduce transmission requirements.
Grid Resilience and Innovation Partnerships (GRIP) Program: Smart Grid Grants	DOE	Provides funding to increase the flexibility, efficiency, and reliability of the electric power system, with particular focus on increasing capacity of the transmission system, preventing faults that may lead to wildfires or other system disturbances, integrating renewable energy at the transmission and distribution levels, and facilitating the integration of increasing electrified vehicles, buildings, and other grid-edge devices.
Battery Manufacturing and Recycling Grants	DOE	Provides funding to strengthen and secure manufacturing and energy supply chains needed to modernize the nation's energy infrastructure and support a clean and equitable energy transition. This includes the construction and retrofitting of new commercial-scale facilities.
Battery Materials Processing Grants	DOE	Provides funding to strengthen and secure manufacturing and energy supply chains needed to modernize the nation's energy infrastructure and support a clean and equitable energy transition. This includes the construction and retrofitting of new commercial-scale facilities.
Carbon Utilization Program	DOE	Provides funding for state and local governments to procure and use products derived from captured carbon oxides. This includes commercial or industrial products that (1) use or are derived from anthropogenic carbon oxides; or (2) demonstrate significant net reductions in lifecycle greenhouse gas emissions compared to incumbent technologies, processes, and products.

Sustainable Food Production & Distribution

The Sustainable Food Production and Distribution measure focuses on local government-operated community farming and urban agricultural parks and is eligible for a series of federal and state programs, including two highlighted in Table 20.

Table 20. Grant Programs for Sustainable Food Production & Distribution

Program Name	Administering Organization	Description
Composting and Food Waste Reduction (CFWR) Cooperative Agreements	USDA	Provides funding to assist local governments with projects that develop and test strategies for planning and implementing compost plans and food waste reduction plans. This includes projects that increase access to compost for agricultural producers, improve soil quality and encourages innovative, scalable waste management plans that reduce and divert food waste from landfills.
Agricultural Plan Grant Program	North Carolina Department of Agriculture and Consumer Services	Provides funding to counties for the development of voluntary agricultural districts, farmland protection plans, and cost of community services studies to evaluate agricultural projects on working and open lands.

Trees and Greenspaces

The Trees and Greenspaces measure focuses on tree plantings and urban forestry projects, which may be included within larger scale transportation projects (see Alternative Transportation section). It is important to note that some grant programs listed under the Alternative Transportation measure are also applicable to the Trees and Greenspaces measure as they fund the planning and implementation of greenways and park facilities, along with bicycle and pedestrian infrastructure. Table 21 summarizes the federal and state grant programs focused on urban forestry and park conservation and development.

Table 21. Grant Programs for Trees and Greenspaces

Program Name	Administering Organization	Description
Greening America's Communities Program	USEPA	Provides technical assistance to help cities develop an implementable vision of environmentally friendly neighborhoods that incorporate innovative green infrastructure and other sustainable design strategies. Eligible projects include the implementation of changes to local codes and ordinances to better support sustainable growth and green infrastructure.
Urban and Community Forestry (UCF) Program	USDA	Provides funding to deliver nature-based solutions to ensure a resilient and equitable tree canopy and expand green spaces.
North Carolina Land and Water Fund (NCLWF)	North Carolina Department of Natural and Cultural Resources	Provides funding for the planning and construction of trails, greenways, and open space.
North Carolina Land and Water Conservation Fund (LWCF)	North Carolina Division of Parks and Recreation	Provides funding for the protection of natural habitat and preservation of natural and cultural resources, which includes expansion of access to trails, greenways, and open spaces.

Table 21. Grant Programs for Trees and Greenspaces

Program Name	Administering Organization	Description
North Carolina Parks and Recreation Trust Fund (PARTF)	North Carolina Division of Parks and Recreation	Provides funding to counties and cities looking to acquire land for parks and build recreational facilities for use by the public. This includes projects that protect natural and scenic resources or renovate older park facilities.
Park and Recreation Development (PARD) Fund	South Carolina Department of Parks, Recreation and Tourism (PRT)	Provides funding to each county to expand recreational opportunities, including the development of new public recreation facilities or the enhancement and renovation of existing facilities.
Environmental Enhancement Grant Program	State of North Carolina Attorney General's Office	Provides funding to improve and protect North Carolina's natural resources via restoration or permanent conservation of land, wetland restoration, stormwater remediation, and stream stabilization, in addition to environmental education and research initiatives. Sunsets in 2025.

Waste Diversion

The Waste Diversion measure focuses on expanding recycling and composting programs. When considered in tandem with the Sustainable Food Production and Distribution measure, these initiatives may be eligible for larger-scale USDA and EPA grant programs, such as the examples listed in Table 22.

Table 22. Grant Programs for Waste Diversion Measure

Program Name	Administering Organization	Description
Solid Waste Infrastructure for Recycling Grant Program	USEPA	Provides funding for management pathways of source reduction, reuse, sending materials to material recovery facilities, composting, industrial uses, and feeding animals. This includes innovative solutions or programs that provide or increase access to prevention, reuse, and recycling in areas that currently do not have access.
Solid Waste Management Grants	USEPA	Provides funding for management pathways of source reduction, reuse, sending materials to material recovery facilities, composting, industrial uses, and feeding animals. This includes innovative solutions or programs that provide or increase access to prevention, reuse, and recycling in areas that currently do not have access.
Water and Waste Disposal Loan and Grant Program	USDA	Provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas.
Food Waste Reduction Grant	North Carolina Department of Environmental Quality (NCDEQ)	Provides funding to help local governments and nonprofit organizations reduce the amount of wasted food being disposed of in landfills.

Community Waste Reduction and Recycling Grant Program	NCDEQ	Provides funding to assist local governments with the implementation, expansion, and improvement of waste reduction and recycling programs in North Carolina. This includes the implementation or expansion of curbside recycling programs and household hazardous waste collection programs, among other programs.

Next Steps

In the near term, Centralina and its partners will prioritize funding opportunities by:

- **Assessing climate measures based on project feasibility and administrative capacity.** Centralina and its partners should determine which measures will require environmental review, technical analysis, and/or partnerships and permitting. This includes assessing alignment with climate targets and goals at the state, regional and city levels. It is critical to identify project sponsors (e.g., county and city governments or local agencies), in addition to local partners, including community-based organizations and nonprofit organizations). Once partnerships are established, consider where the required processes for project implementation can be streamlined, including environmental review and permitting, to appropriately manage risk and demonstrate project readiness for more competitive discretionary funding. This will allow Centralina and its partners to strategically prioritize measures based on the region's short-term and long-term climate goals and match them to funding opportunities aligned with those goals.
- **Identifying partnership opportunities to plan, fund, and implement climate measures**. Other local and regional public agencies that have similar GHG emission reductions goals, such as the 13-member county governments and municipal governments, are ideal candidates for partnerships. In addition to government agencies, partnerships with community-based organizations (CBO) and educational institutions can provide alternative funding sources that may not otherwise be accessible (e.g., research grants). Strategic partnerships will reduce redundancies and increase the competitive edge on grant applications.
- **Engaging the community through nonprofits, CBOs, and various community stakeholders.** Centralina and its partners can gain community buy-in on climate-related projects and conduct extensive engagement activities for climate measures early on, with a focus on disadvantaged communities. Equitable stakeholder engagement will provide insight into community priorities that inform funding opportunity evaluation, resulting in a funding application that is responsive to community needs and funding program criteria for public engagement. Community engagement and partnerships will also strengthen efforts to secure letters of support for grant applications, secure grant funding, and promote long-term success in climate action measure implementation.
- **Preparing for formula grants and recurring competitive grants proactively**. Centralina and its partners can work on project narratives, community engagement strategies, and other relevant requirements in advance of recurring grant funding deadlines. While several grant program deadlines have recently passed (as of March 1, 2024), many of these programs are recurring through multi-year IRA and IIJA funding.

6.0 Conclusion

This PCAP is the first deliverable under the CPRG planning grant awarded to the CLT MSA study area. The CLT MSA and its partners will continue to plan, engage, and act to reduce emissions; invest in sustainable infrastructure, technologies, and practices; build the local economy; and enhance the quality of life for the CLT MSA study area. In 2025, the CLT MSA will publish a comprehensive climate action plan (CCAP) for the study area that establishes equitable and sustainable economic development strategies that reduce emissions across all sectors. The CCAP will include near- and long-term emissions projections, a suite of emission reduction measures, a robust analysis of measure benefits, plans to leverage federal funding, and a workforce planning analysis. In 2027, the CLT MSA will publish a status report that details implementation progress for measures included in the PCAP and CCAP and any relevant updates to PCAP and CCAP analyses. The status report will also include next steps and future budget and staffing needs to continue implementation of CCAP measures.

Appendix A

Quality Assurance Project Plan

Climate Pollution Reduction Grants Program:

Charlotte-Concord-Gastonia NC/SC MSA

Quality Assurance Project Plan

Prepared by Centralina Regional Council

January 2, 2024

1. Project Management (Group A)

1.1. Title and Approval Page

Quality Assurance Project Plan for
Charlotte-Concord-Gastonia NC/SC MSA Climate Pollution Reduction Plan

Grant Number: 02D55423

Prepared by:
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10735 David Taylor Drive
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Prepared for:
US EPA Region 4
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January 2, 2024

APPROVALS:

Centralina Regional Council Project Manager: Michelle Nance Michelle Nance Michelle Nance (Jan 2, 2024 16:11 EST)	Date:	January 2, 2024
Project Quality Assurance Manager: Megan Green Megan Green	Date:	January 2, 2024
USEPA Region 4 Grants Project Officer: Katherine Evans HEIDI LESANE Digitally signed by HEIDI LESANE Date: 2024.01.09 16:30:37 -05'00'	Date:	Month, Day, 2024
USEPA Region 4 Quality Assurance Manager: Stephanie McCarthy DANIEL GARVER Digitally signed by DANIEL GARVER Date: 2024.01.10 08:59:17 -05'00'	Date:	Month, Day, 2024

QAPP Revision History

Revision No.	Description	Author	Date
0	Original Version		1/2/2024

1.2. Table of Contents

List of Tables

List of Exhibits

Abbreviations

CAA	Clean Air Act
Centralina	Centralina Regional Council
CFR	Code of Federal Regulations
CCAP	Comprehensive Climate Action Plan
CGGIT	Community Greenhouse Gas Inventory Tool
CPRG	Climate Pollution Reduction Grant
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 CFR Part 98)
ICR	Information Collection Request
LGGIT	Local GHG Inventory Tool (provided by the EPA)
NEI	EPA's National Emissions Inventory
NC	North Carolina
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
SC	South Carolina
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[1] 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 in Centralina's SharePoint and be shared as needed.

Table 1.1 QAPP Distribution List

Name	Organization	Role
Katherine Evans	US EPA, Region 4	EPA Administrative Project Officer (PO)
Heidi Lesane	US EPA, Region 4	EPA Technical Project Officer
Stephanie McCarthy	US EPA, Region 4	EPA Quality Assurance Manager or Delegate
Michelle Nance	Centralina	CPRG Project Manager
Megan Green	Mecklenburg County	QAPP Project Manager/ Quality Assurance Manager

1.4. Project/Task Organization

The primary personnel responsible for implementation of this project are the Centralina Regional Council's Project Manager (PM), Quality Assurance Manager (QAM), and Task Leaders (TLs)[2]. Their duties are outlined briefly in this section. The project QAM is independent of the unit generating the data.

Michelle Nance is the Centralina Regional Council PM and will provide senior-level oversight as needed. The PM is responsible for MAPC'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

[1] 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.
[2]Note, throughout this document "MAPC" refers to both MAPC staff and the technical consultant that MAPC contracts with to perform quantitative analyses related to the CRPG program.

approved Quality Assurance Project Plan; and ensuring that all products delivered to the EPA are of specified type, quantity, and quality.

The Centralina Regional Council 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, and to develop uncertainty estimates for each reduction estimate. **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.

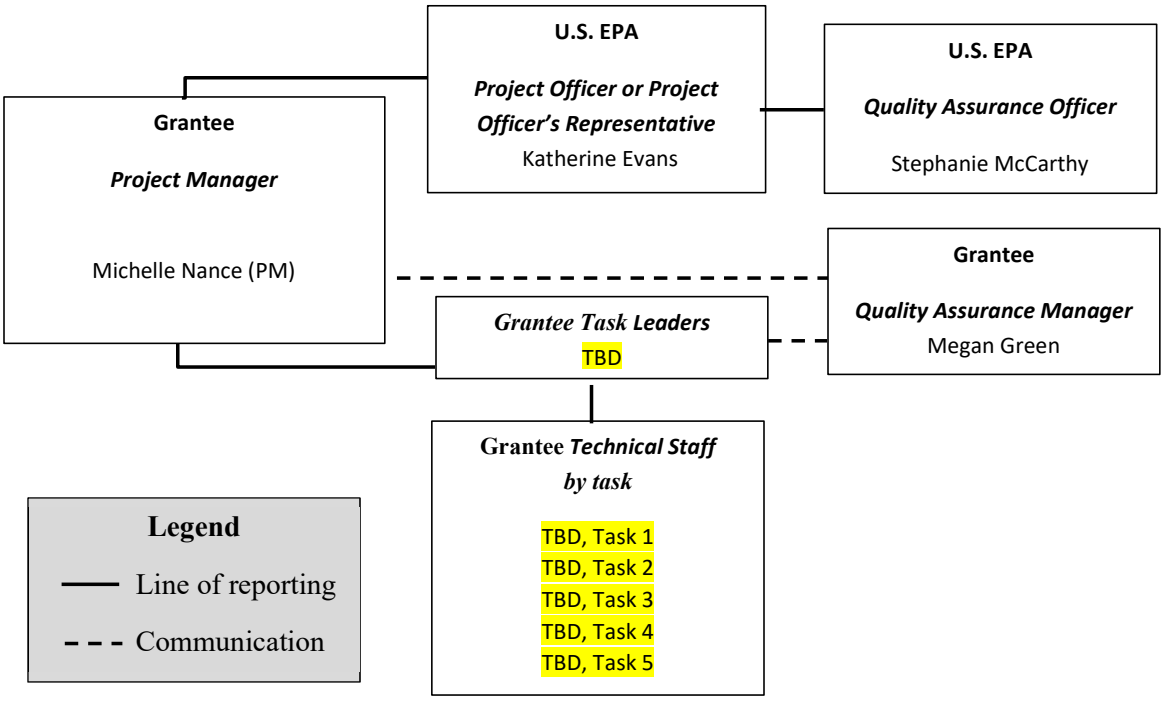
Task-level management system. For each of the major deliverables under each task, the assigned TL will review all QA-related plans and reports and is responsible for transmitting them to the QA Manager (or delegate) for review and approval. Each TL is responsible for ensuring that quality procedures 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 Centralina Regional Council PM and the QA Manager to identify and implement quality improvements. The Centralina Regional Council 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/EPA Region 4 and is responsible for review and approval of this QAPP and any future revisions. The PM (with support from TLs and assigned Centralina Regional Council 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 is responsible for overseeing the quality system, monitoring and facilitating QA activities on tasks, and generally helping the Centralina Regional Council PM and TLs understand and comply with EPA QA requirements. They will not be involved in data collection or analyses for the CPRG, which will primarily be the task of the technical consultant. At the request of the Centralina Regional Council PM, the QA Manager is responsible for conducting periodic independent audits of this project's QA program and 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]



1.5. Problem Definition / Background

Under this project, Centralina Regional Council will identify, evaluate, and utilize existing data resources[4] to develop a regional inventory of the major sources of greenhouse gas (GHG) emissions within the Charlotte-Concord-Gastonia, NC/SC Metropolitan Statistical Area (MSA) 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 subtasks 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, and
5. Present these analyses and options in technical reports consistent with the deliverables required under the CPRG planning grants.

Centralina plans to utilize the ICLEI's ClearPath Tool for the GHG inventory development. The inventory estimates may be compared to corresponding federal estimates (as available) for validation. 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 inventory will include the following sources and gases:

[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.

[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.

Source Categories

1. Energy
2. Transportation
3. Solid Waste
4. Water and Wastewater

Greenhouse Gases

carbon dioxide equivalent (CO_2e), which is carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) times their respective Global Warming Potential Values

Greenhouse Gas	**Global Warming Potential**
Carbon Dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous Oxide (N_2O)	265

This inventory uses the approach and methods provided by the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Community Protocol) and the Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions (LGO Protocol) to quantify regional emission estimates.

1.5.1. Rationale for Selection of Sectors

For each sector included in the local inventory, **Table 1.2** briefly describes why the sector is included 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 Included in Inventory	**Rationale for Including in GHG Inventory**
Energy	The electric power sector accounted for 25 percent of total U.S. greenhouse gas emissions in 2021. Power generation and/or consumption occurs among all communities. The industrial sector accounted for 24 percent of U.S. greenhouse gas emissions in 2021. Since 1990, industrial sector emissions have declined by 11 percent. In 2021, total energy use in the industrial sector increased by 2 percent due to an increase in total industrial production and manufacturing output. In 2021, the commercial and residential sectors accounted for 7 and 6 percent of total U.S. greenhouse gas emissions, respectively. Emissions from the commercial and residential sectors have increased since 1990. Total residential and commercial greenhouse gas emissions, including direct and indirect emissions, in 2021 have increased by 2 percent since 1990.
Transportation	Transportation activities were the largest source (29 percent) of total U.S. greenhouse gas emissions in 2021. From 1990 to 2021, transportation CO_2 emissions from fossil fuel combustion increased by 19 percent. Transportation activities occur in all communities.
Solid Waste, Water, and Wastewater	Landfills were the third largest source of anthropogenic methane emissions in 2021, and landfills accounted for 1.9 percent of total U.S. greenhouse gas emissions. Water sector includes indirect emissions associated with the electricity used to treat surface water sources and to deliver water to local communities. 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.

1.5.2. Decisions to be Made

The ICLEI's ClearPath tool (along with models such as EPA's MOVES) covers GHG emissions by various categories (such as energy, transportation, solid waste, water, and wastewater etc.). This inventory uses the approach and methods provided by the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions[5] (Community Protocol) and the Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions (LGO Protocol) to quantify regional emission estimates.

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

Centralina project team will have decisions to be made under each task of this project:

1. Determine if ICLEI's ClearPath tool estimate, or a different federal/state estimate or tool should be used for the regional GHG baseline estimate.
2. Determine the best options for reducing emissions of air pollution and achieving the following objectives[6] under the Inflation Reduction Act:
    a. Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school.
    b. Reduce climate pollution, create good jobs, and lower energy costs for families.
    c. Accelerate work addressing environmental injustice and empowering community driven solutions in overburdened neighborhoods.
3. Develop an estimate or a range of estimates for reductions achievable 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

Initially, estimates will be derived using the ICLEI's ClearPath tool. Calculated estimates derived from 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 GHG inventory report along with the underlying data and calculation methodology.

When identifying the best options for reducing air pollution, 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 nonattainment areas and impacting residential, commercial, and school districts near the largest sources of air pollution. Centralina expects each task to produce a few options for sector-specific emissions reduction projects 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 Centralina for planning purposes to support the Charlotte-Concord-Gastonia, NC/SC MSA development of the following three CPRG planning deliverables:

- Charlotte-Concord-Gastonia, NC/SC MSA'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.
- Charlotte-Concord-Gastonia, NC/SC MSA'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.

[6] https://www.epa.gov/inflation-reduction-act/climate-pollution-reduction-grants#CPRGProgramGuidance

- Charlotte-Concord-Gastonia, NC/SC MSA'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 in 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*

Centralina 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 GHG inventory QAPPs is presented in **Tables 2.1** through **2.5.** The work to be performed under this project involves preparing a regional GHG emissions inventory for the Charlotte-Concord-Gastonia NC/SC MSA. The organization of the work is based on the use of ICLEI's ClearPath tool[7] under the following sector-specific tasks:

Task 1: Local inventory of transportation GHG emissions.

Task 2: Local inventory of grid electricity (indirect) GHG emissions.

Task 3: Local inventory of solid waste GHG emissions.

[7] ICLEI (icleiusa.org)

Task 4: Local inventory of GHG emissions from other sectors.

4.1 Stationary fuel
4.2 Water and Wastewater
4.3 Other

Task 5: Local inventory of AFOLU GHG emissions.

ClearPath is a greenhouse gas inventorying tool provided by ICLEI to ICLEI member communities. The tool performs both local government operations or community-wide inventories. The tool works by taking activity data (e.g. vehicle miles traveled) or usage data (e.g. gallons of diesel consumed), and uses emissions factors from national databases to calculate emissions. Additionally, ClearPath will accept calculated or modeled emissions data. For this project, staff will use the community-wide track of the ClearPath tool. Staff will complete ten separate inventories in ClearPath; one for each of the four counties in the region, and one for the four-county region as a whole, for calendar years 2019 and 2021. Unless indicated, staff will obtain county-level data for each county, then sum that data for the regional inventory. For each sector-specific task, **Tables 2.1–2.5** provide planned activities and a schedule of deliverables for use by communities preparing GHG inventories.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Transportation	
1. In ClearPath, staff will enter "VMT and MPG" for Calculation Method, select the appropriate fuel, enter the VMT for that fuel type, and enter the percent of each vehicle class as associated into calculator "On Road Transportation (USCP Required)". Staff will repeat for each fuel type. 2. In ClearPath, staff will confirm that default values in ClearPath's factor sets for vehicle class fuel efficiencies match data collected in step 5. 3. In ClearPath, staff will use the "Rail Transportation (USCP Recommended)" calculator. Staff will select "Yes" for "Were emissions calculated externally from ClearPath?", and enter fuel type, CO2, CH4, and N2O emissions as appropriate for each county. 4. Staff will request annual fuel flowage data, separated by fuel type, from staff at each B, C, and D class airport in the region. 5. Staff will obtain fuel emissions factors for appropriate years from the EPA's Emissions Factors Hub at https://www.epa.gov/climateleadership/ghg-emission-factors-hub. 6. In ClearPath, staff will enter the fuel type and fuel loading into the "Aviation Travel (USCP Recommended)" calculator. 7. In ClearPath, staff will use the "Water Transportation (USCP Recommended)" calculator. Staff will select "Yes" for "Were emissions calculated externally from ClearPath?", and enter fuel type, CO2, CH4, and N2O emissions as appropriate. 8. In ClearPath, staff will use the "Emissions from Off Road Vehicles (USCP Recommended)" calculator. Staff will select "Yes" for "Were emissions calculated	Within 120 days of QAPP approval by EPA.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Transportation	
externally from ClearPath?", and enter equipment type, sector type, fuel type, data source and CO2, CH4, and N2O emissions as appropriate.	

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
1. In ClearPath, staff will create a grid electricity factor set for using the utility-supplied emissions factors or regional data from the EPA eGRID database 2. In ClearPath, under the Residential Energy tab, staff will select the utility-specific factor set, then enter the amount of residential electricity used into the "Electricity Used" box. 3. In ClearPath, under the Commercial Energy tab, staff will select the utility-specific factor set. Staff will subtract water and wastewater electricity usage calculated as part of Task 4 from utility-reported commercial energy usage, then enter the remaining amount of commercial electricity used into the "Electricity Used" box. 4. In ClearPath, under the Industrial Energy tab, staff will select the utility-specific factor set, then enter the amount of industrial electricity used into the "Electricity Used" box.	Within 120 days of QAPP approval by EPA.

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste	
1. For landfilled waste, staff will select "no" for "Were emissions calculated externally from ClearPath", select the "Typical" "Landfill Methane Collection Scenario", "National Average" for "Landfill Moisture Content", and "Mixed MSW" for "Waste Type to Calculate Emissions For", then enter the total tonnage of waste into "Total Waste Generated" in the "Landfilled Waste (USCP Required, Preferred, Where Applicable)" calculator 2. For incinerated waste, staff will select "Calculation Using SW.2.2a" as "Input Method", and enter the total tonnage of waste into "Total Waste Generated"	Within 120 days of QAPP approval by EPA.

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste	
3. For emissions taken from FLIGHT, staff will select "Yes" for "Were emissions calculated externally from ClearPath?" and enter the amount of reported methane in box "CH4 Released (for Previously Calculated records)" in the Landfilled Waste (USCP Required, Preferred, Where Applicable)" calculator.	

Table 2.4 Technical Task Descriptions for Task 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 ICLEI ClearPath tool, the IPCC 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forest and Other Land Use (available at https://www.ipcc-nggip.iges.or.jp/public/2019rf/vol4.html), the USDA National Agricultural Statistics Service Quick Stats (available at https://quickstats.nass.usda.gov/), U.S. Census data, data from the U.S. Energy Information Administration (https://www.eia.gov/), data from the EPA's Facility Level Information on GreenHouse gases Tool (FLIGHT; available at https://ghgdata.epa.gov/ghgp/main.do) and data from local governments and utilities to develop the primary estimates for other sectors.	Within 120 days of QAPP approval by EPA.

Other Sources	ClearPath Sector
Stationary Fuel	Residential Energy Commercial Energy Industrial Energy Process & Fugitive Emissions
AFOLU	AFOLU
Water and Wastewater	Water & Wastewater
Other point sources included in FLIGHT but not included elsewhere in the inventory	Varies

1. After the primary ClearPath calculations are complete, the PM, TL or QAM will assign a QC staff member to complete the following steps:
    - Review the original source(s) of data for all inputs to the ClearPath tool.
    - Validate that values from original source(s) were correctly entered into the primary ClearPath tool.
    - Compare source listing 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.

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
○ Document findings and submit findings to the PM, TL and QAM for resolution. ○ Document steps taken to resolve any findings.	

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
1. Staff will use the ClearPath AFOLU calculator "Emissions and Removals from Forests (USCP Recommended"; staff will select the appropriate category, and input the appropriate value into "Net Annual Carbon Flux for Category (Metric Tons CO2)" for each of the following items from LEARN report table 1, column "Emissions(tCO2e/yr)": a. Forest Disturbances b. Forest to Settlement c. Forest to Grassland d. Forest to other non-forest lands 2. Staff will use the ClearPath AFOLU calculator "Emissions and Removals from Forests (USCP Recommended)"; staff will select the appropriate category, and input the appropriate value into "Net Annual Carbon Flux for Category (Metric Tons CO2)" for each of the following items from LEARN report table 1, column "Emissions(tCO2e/yr)": a. Trees outside of forests 3. 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 ClearPath tool. b. Validate correct entry of values from original source(s) into the primary ClearPath tool. c. Document findings and submit findings to the PM, TL, and QAM for resolution. d. Document steps taken to resolve any findings.	Within 180 days of QAPP approval by EPA.

1.7. Quality Objectives / Criteria

The primary objectives for this project are to develop reliable inventories for each of the GHG-emitting sectors in the Charlotte-Concord-Gastonia, NC/SC MSA 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 Centralina 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, Centralina 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 the 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. Centralina 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. Centralina will utilize the framework of sectors in ICLEI's ClearPath 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 Centralina 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. Centralina 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. Centralina 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 Centralina staff assigned to work on this project shall have appropriate technical and QA training to properly perform their assignments. Centralina 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

Centralina will document in electronic form 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 Centralina for at least five years after the completion of the CCAP. 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 and ICLEI ClearPath, calculations necessary to transform raw data into forms required for LGGIT and ICLEI ClearPath 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, Centralina 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 Centralina PM.

At this time, Centralina does believe the project will collect or handle personally identifiable information (PII) subject to 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. 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 ICLEI's ClearPath tool and the USCP. Existing data resources (including but not limited to data from previously completed inventories) will be utilized to develop GHG emissions estimates that are comparable to previous estimates. 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

The following data sources will be evaluated for use under each task to develop estimates for the major-emitting sectors in Charlotte-Concord-Gastonia, NC/SC MSA or for use in validation of estimates:

- Task 1:
    - Vehicle registration data from the North Carolina Registry of Motor Vehicles and South Carolina Division 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 the utilities that serve the municipalities in the MSA.
- Task 3:
    - Number of community landfills and information on landfill gas (LFG) collection systems, as applicable, from the North Carolina Department of Environmental Quality and the South Carolina Department of Health and Environmental Control.
    - 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 the utilities that serve the municipalities in the MSA.
    - County-level natural gas consumption data from DOE's SLOPE Platform;
    - Wastewater management data from local water utility(ies).
- 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. Centralina 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. Centralina 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), data from EPA-approved data sources (e.g., Department of Energy and other federal data sources), and data from North Carolina and South Carolina state and local agencies. 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 the Charlotte-Concord-Gastonia, NC/SC MSA to qualify data for use to meet project objectives.

Any available data quality information will be reviewed by Centralina 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. Centralina 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 Centralina 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)

Centralina 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.

Centralina 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 the Centralina. 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 Centralina 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 from 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 the following:

- Data Source – Was the data originated by a credible source that is generally accepted as the experts or authority in the relevant field?

- Transparency – Are the data collection, cleaning, and calculation methods and assumptions clearly documented?
- Data Completeness – Is the data reasonably complete? If the data isn't complete, are there explanations for why, and can reasonable assumptions be made to fill in data gaps?

All data sources will be reviewed by experts and/or staff familiar with each data type to ensure the data aligns with expectations and are within reasonable ranges.

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 Centralina 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 Centralina practices for storing materials of at least five 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 Centralina policies and procedures. For any sensitive information that is gathered under the project, Centralina'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), Centralina will comply with that directive. As noted above, Centralina 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 Centralina, 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, to track which staff

person(s) reviewed the file and when. The 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)

Centralina is committed to preparing a comprehensive and reliable inventory of GHG emissions for the Charlotte-Concord-Gastonia, NC/SC MSA. 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 Centralina 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 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 Centralina 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 Centralina 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.

Centralina 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

MAPC, Community Greenhouse Gas Inventories at https://www.mapc.org/resource-library/community-ghg-inventory-resources/. Accessed on 8/07.2023.

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.	<table><tr><td>Transportation Sources</td><td>Regional Estimate</td><td>State or Federal Estimate for QC</td><td>Statistics*</td></tr><tr><td>On-road</td><td></td><td></td><td></td></tr><tr><td>Off-road/Non-road</td><td></td><td></td><td></td></tr><tr><td>Aviation</td><td></td><td></td><td></td></tr><tr><td>Rail</td><td></td><td></td><td></td></tr><tr><td>Water/Pleasure Craft</td><td></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 LGGIT value taken as the audit value. 1. Comparison of regional estimate of emissions from transportation sources versus available state and/or national estimates. 2. For any values used in regional inventory that differ significantly from the state or the national estimates, the explanation will be provided as to why regional factors/estimates may differ from state or national values. 3. 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. 4. Editor review – writing is clear, free of grammatical and typographical errors.

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.

Energy Sources	Regional Estimate	State or Federal Estimate for QC	Statistics*
Residential			
Commercial			
Industrial			

* 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.

1. Comparison of regional estimate of emissions from energy sources versus available state and/or national estimates.
2. For any values used in regional inventory that differ significantly from the state or the national estimates, the explanation will be provided as to why regional factors/estimates may differ from state or national values.
3. 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.
4. Editor review – writing is clear, free of grammatical and typographical errors.

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.

Sources	Regional Estimate	State or Federal Estimate for QC	Statistics*
Solid Waste			
Water			
Wastewater			

* 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.

1. Comparison of regional estimate of emissions from solid waste, water, and wastewater sources versus available state and/or national estimates.
2. For any values used in regional inventory that differ significantly from the state or the national estimates, the explanation will be provided as to why regional factors/estimates may differ from state or national values.
3. 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.
4. Editor review – writing is clear, free of grammatical and typographical errors.

Task 4. GHG Emissions for Other Sources

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.

1. Comparison of (a) local emissions estimates in inventory *versus* (b) available federal or state estimates for the same source categories (e.g. ClearPath, 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:

Other Sectors	Regional Estimate	State or Federal Estimate for QC	Statistics*
Stationary combustion			
Agriculture & land management			
Waste generation			
Water			
Wastewater treatment			
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.

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.

Appendix B. Example QC Documentation Form

Centralina Regional Council
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 clarify 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 4
Grant Number: 02D55423
EPA Project Officer: Katherine Evans
Project Name: Charlotte-Concord-Gastonia, NC/SC MSA
Grantee Org. Project Manager: Michelle Nance

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)	QA Review Information (Reviewer Name)	QA Review Information (Date Review was Performed)	QA Review Information (Brief Summary of Review Findings and Other Notes)	QA Review Information (Have all Findings Been Resolved?)	QA Review Information (Originator Signature)	QA Review Information (Reviewer Signature)	QA Review Information (File Location) *Copy Long Folder Path Name*
01				☐	☐		***Technical***				☐ Yes			
02				☐	☐		***Technical***				☐ Yes			
03				☐	☐		***Technical***				☐ Yes			
04				☐	☐		***Technical***				☐ Yes			
05				☐	☐		***Technical***				☐ Yes			
06				☐	☐		***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.

QAPP_NC-SC MSA

Final Audit Report 2024-01-02

Created:	2024-01-02
By:	Megan Upchurch (mupchurch@centralina.org)
Status:	Signed
Transaction ID:	CBJCHBCAABAAwdn53qesh7HUedc3Sf0NExKFYGJG01Sx

"QAPP_NC-SC MSA" History

Document created by Megan Upchurch (mupchurch@centralina.org)
2024-01-02 - 7:16:23 PM GMT

Document emailed to michelle nance (mnance@centralina.org) for signature
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Email viewed by michelle nance (mnance@centralina.org)
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Signer michelle nance (mnance@centralina.org) entered name at signing as Michelle Nance
2024-01-02 - 9:11:29 PM GMT

Document e-signed by Michelle Nance (mnance@centralina.org)
Signature Date: 2024-01-02 - 9:11:31 PM GMT - Time Source: server

Document emailed to megan.green@mecklenburgcountync.gov for signature
2024-01-02 - 9:11:32 PM GMT

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Signer megan.green@mecklenburgcountync.gov entered name at signing as Megan Green
2024-01-02 - 9:30:54 PM GMT

Document e-signed by Megan Green (megan.green@mecklenburgcountync.gov)
Signature Date: 2024-01-02 - 9:30:56 PM GMT - Time Source: server

Agreement completed.
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Appendix B

Stakeholder and Community Engagement Plan

CENTRALINA
REGIONAL COUNCIL

Climate Pollution Reduction Grant

Public and Stakeholder Engagement Plan

Priority Climate Action Plan (PCAP)

Comprehensive Climate Action Plan (CCAP)

Charlotte-Concord-Gastonia NC/SC Metropolitan Statistical Area (CLT MSA)

Lead Agency: Centralina Regional Council
Prepared by: McAdams
EPA Grant Number: 02D55423
Report Date: January 19, 2024

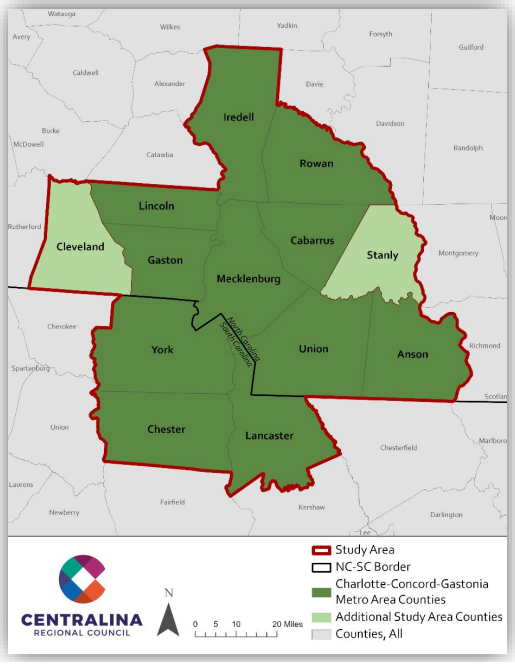
Contents

Introduction & Background

The Charlotte-Concord-Gastonia NC/SC Metropolitan Statistical Area (CLT MSA) received funding through the Environmental Protection Agency (EPA) Climate Pollution Reduction Grant (CPRG) program to develop its first regional climate action plan. The climate action planning will provide a framework for educating leaders across the region on this important topic and will create a body of technical and equity stakeholders, increasing our region's capacity to address environmental challenges. The planning process and resulting plan will create opportunities for cooperative action, and later investments, to reduce GHG emissions and increase energy efficiencies in multiple sectors across the study area.

Charlotte-Concord-Gastonia NC/SC MSA

Climate Action Planning Project Area



The Charlotte-Concord-Gastonia NC/SC Metropolitan Statistical Area (CLT MSA) Priority Climate Action Plan (PCAP) and Comprehensive Climate Action Plan (CCAP) will include Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, and Union counties in North Carolina (NC) and Chester, Lancaster, and York counties in South Carolina (SC). Cleveland and Stanly counties were added to create consistency with transportation planning organization geographies.

Plan Purpose

The purpose of the Public and Stakeholder Engagement Plan is to outline the engagement that will take place to develop the required deliverables outlined in the EPA grant number - 02D55423 (the Project). The Public and Stakeholder Engagement Plan is a living document and will be updated as the project progresses. The Public and Stakeholder Engagement Plan will be used to ensure regular information-sharing and iterative feedback opportunities to continuously incorporate community and stakeholder input. The engagement plan will also consider differences in stakeholder needs and preferences, such as different languages, visual and written materials, in-person and virtual events, and compensation for time.

Through stakeholder engagement we expect to increase understanding of the economic, environmental, health and transportation benefits made possible through selected measures and increase regional, community-based, and individual resiliency.

General Engagement Principles

Stakeholder engagement is a core component of the planning process; the CLT MSA stakeholder engagement plan follows the following principles:

- ***A Focus on Stakeholder Education:*** Providing educational resources on the importance of the topic, opportunities for impact, strategies for addressing challenges, best practices, and peer learning.
- ***Inclusivity:*** Inviting participation by members of populations traditionally under-represented in decision-making processes due to demographic, geographic or economic circumstances.
- ***Early and On-going Engagement:*** Engaging stakeholders early enough in the project to have impact on direction and work effort and receiving feedback at major project milestones.
- ***Access to Information:*** Providing supporting material for topics on which engagement is sought in an accessible format for participants.
- ***Flexibility in Processes:*** Openness to modifying engagement processes and approaches and adapting to changing project and participant needs.

Engagement Objectives

The CLT MSA stakeholder engagement process will include several approaches to provide stakeholders with multiple opportunities to influence the plan outcomes. The objectives of the stakeholder engagement process are to:

- Build a foundational understanding of
    - the purpose of climate action planning,
    - the objectives of the regional action plans,
    - basic principles of greenhouse emissions
    - effective reduction strategies and co-benefits, and
    - practical steps that local governments can take to reduce GHG emissions.
- Create a ***coalition of technical expertise*** around climate planning, resilience, and sector-based strategies (or “Technical Advisory Committee”).
- Create a ***coalition of equity advisors and stakeholders*** (or “Equity Advisors Committee”).
- Gain ***inputs from a diverse set of stakeholders***, with a focus on low-income, disadvantaged communities (LIDACs), to identify key sectors and measures for reducing GHG emissions.
- Develop a ***shared*** understanding of ***regional priorities***.
- Set the stage for implementation grant proposals.
- Set the stage for ***successful implementation*** of the regional action plans.

Engagement will be phased to occur at key milestones in the creation of the Preliminary Climate Action Plan and the Comprehensive Climate Action Plan. Results from the phased stakeholder engagement process will be used to create the plans but will also be used to inform the creation of communication products and outreach to specific stakeholders.

Engagement Audiences

To create robust engagement for the PCAP and CCAP, the engagement strategy outlined in this Plan incorporates multiple methods, groups, and opportunities, including the creation of a Technical Advisory Committee and Equity Advisors Committee, and engagement through existing networks. This plan also anticipates engagement with the general public with a focus on the interests, opportunities and challenges facing LIDACs. Advisors, stakeholders, and partners will be included based on sector-specific needs and strategies and the GHG reduction measures identified through the planning process.

There are two primary audiences that this plan seeks to engage throughout the climate action planning process:

Stakeholders: This includes persons and organizations who have a more direct role in the decision-making process as sponsors or parties to GHG reduction measures included in the PCAP, regional coalition implementation grant, and/or CCAP.

Public: This includes all members of the Charlotte-Concord-Gastonia metropolitan area who would be affected by/benefit from the GHG reduction measures included in the PCAP, regional coalition implementation grant, and/or CCAP. Engaging all members of the region, with an emphasis on reaching LIDACs, is aligned with EPA guidance and requirements for the CPRG program.

To achieve engagement goals, engagement activities will be planned for core audiences in the Charlotte MSA. Key audiences for this initiative include local governments and low-income and disadvantaged communities. Additional audiences include sector specific stakeholders and the general public. Collaborating partners and new and existing partnerships that will be involved in advancing engagement are outlined below.

Key Collaborating Partners – Building on Existing Relationships

The key collaborating partners throughout the PCAP and CCAP are various stakeholders that fall under the four categories—Impacted, Invested, Interested, and Influential:

Category	Description	Importance
Impacted	Stakeholders that stand to be directly affected (either positively or negatively) by an effort or the actions of the PCAP/CCAP.	Stakeholders in this category will be easier to engage once reached.
Invested	Stakeholders that are indirectly affected (either positively or negatively) by an effort or the actions of the PCAP/CCAP.	Messaging will be important for stakeholders in this group.
Interested	Stakeholders who do not stand to feel the direct effects of PCAP/CCAP actions but are interested in the goals the actions will accomplish. Interest can be connected to economics, health, safety, or social change.	Messaging will be important for stakeholders in this group, as their interest may seem further removed from their daily lives.

Influential	Stakeholders who may fall under one of the previously defined categories and wield a significant amount of influence within their community/region.	Stakeholders in this group will be able to assist in regional outreach.

As the project progresses, the project team will identify stakeholders and community members that fall under the aforementioned categories. The project team will appropriately tailor communication strategies and activities to best reach each category of stakeholder.

This section provides a high-level overview of the stakeholders that CRC anticipates will remain involved in the planning process for the PCAP and CCAP. A complete list of stakeholders is included in Appendix A.

Local and Tribal Governments

- Centralina Regional Council, Board of Delegates
- Catawba Regional Council of Governments Board
- Centralina Regional City/County Managers and Administrators, Planning Directors, Sustainability Officers, Diversity, Equity, and Inclusion Officers
- NCDOA Indian Affairs, Metrolina Native American Association
- Catawba Indian Nation (Federally Recognized)

Low Income / Disadvantaged Community (LIDAC) Engagement

- Equity Advisors Committee - Stakeholders representing organizations whose mission aligns with interests and needs of low-income and disadvantaged community populations who will provide guidance on plans at key milestones and support outreach for LIDAC populations. Stakeholders may have special interests in healthcare, housing, education, workforce, childcare, mobility, community services, etc.
- A list of individuals serving as Equity Advisors Committee can be found in Appendix A.

Cross-Sector Engagement

- Technical Advisory Committee - The Technical Advisory Committee will play an instrumental role in each phase of engagement for the PCAP and CCAP. This group is a coalition of technical experts from transportation, transit, energy, land use, and environment sectors as well as representatives from nonprofits, higher education, and business community.
- A list of individuals serving on the Technical Advisory Committee can be found in Appendix A.

Transportation Sector

- Transportation Planning Organizations
- Transit organizations

    - Fixed-route transit providers
    - Human services transit providers
- Bike and pedestrian organizations
- Transportation and transit organization
- Public and private sector stakeholders focused on micro-mobility, micro-transit, zero emission vehicle transitions, electric vehicles, and associated Infrastructure, etc.

Energy Efficient Building Sector

- Local government facilities engineers, managers
- Public and private sector stakeholders focused on energy efficient buildings, systems, materials, etc.

Waste, Water and Sustainable Materials Management Sector

- Local government solid waste officials
- Public and private sector stakeholders focused on waste management, methane capture from landfills and waste diversion, recycling, re-use, reduction and material diversion, composting and bio-digestion, use of organic waste, wastewater treatment, plastics production, use, and reuse and installation of renewable energy and energy efficiency measures.

Socioeconomic Analysis

The Centralina Region includes a total of 13 counties (10 in North Carolina, 3 in South Carolina). This section summarizes the regional socio-economic analysis of the region, which evaluated Low-Income and Disadvantaged Communities (LIDAC) within each county. USEPA's EJScreen was used to identify demographic data and census block groups that have supplemental indexes at or above the 90th percentile for each county. The White House Council on Environmental Quality's Climate and Economic Justice Screening (CEJST) was used to identify disadvantaged census tracts.

According to the 2022 U.S. Census Bureau, the national per capita income is $ $41,261 (US Census Bureau, 2023). Every county in Centralina, except for Mecklenburg, are below this national standard, indicating that a sizable portion of the population within Centralina faces economic challenges. In 11 of the 13 counties, 10% of the population identifies as a person with disabilities, highlighting potential challenges in terms of accessibility and support services. The results of CEJST identified 176 disadvantaged census tracts in CentralinaUS EPA, 2021) (US EPA, 2021).

Defining and Identifying Low-Income / Disadvantaged Communities (LIDAC)

The EPA considers LIDAC as the following:

- Any census tract that is considered disadvantaged in CEJST
- Any census block group that is at or above 90th percentile for EJScreen's supplemental indexes when compared to the US or the State

- Any geographic area within tribal lands as included in EJScreen

CEJST is a mapping and screening tool that provides a nationally consistent dataset and approach for combining environmental and demographic socioeconomic indicators White House CEQ, 2023). CEJST uses datasets that are indicators of burdens in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. The tool uses this information to identify census tracts that are experiencing these burdens and/or underserved. Each burden is ranked using percentage thresholds or yes/no indicators and based on this methodology, communities are considered disadvantaged: if they are in census tracts that meet the thresholds for at least one of the tool's categories of burden, or if they are on land within the boundaries of Federally Recognized Tribes (White House CEQ, 2023).

EJScreen is the EPA's mapping and screening tool that provides a nationally consistent dataset and approach for combining environmental and demographic socioeconomic indicators for a selected study area. To calculate the supplemental index, EJScreen uses a formula to combine a single environmental factor with the supplemental demographic indicator (which averages five socioeconomic factors: low income, unemployment, limited English, less than high school education, and low life expectancy) US EPA, 2023). Census block groups that are at or above the 90th percentile within each county are areas with environmental and socioeconomic concern.

EJScreen and CEJST County Summaries

Anson County, NC

EJScreen identifies Anson County residents as 47% low income and 56% people of color. $23,070 is the per capita income and 18% identify as persons with disabilities. 95% have English as their primary language spoken at home, with Spanish being the primary language of the other 5% of the population. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Ozone, Diesel Pm, Air Toxics Cancer Risk, Air Toxics Respiratory, Traffic Proximity, Lead Paint and Underground Storage Tanks. In the CEJST, all the census tracts identified as disadvantaged had climate concerns regarding expected agricultural and/or building loss. Energy costs burdens on households and diabetes were flagged in over half of disadvantaged census tracts in Anson County.

Cabarrus County, NC

EJScreen identifies Cabarrus County residents as 24% low income and 37% people of color. $35, 275 is the per capita income and 11% identify as persons with disabilities. 87% of county residents speak English in the home with 8% speaking Spanish and 2% speaking in Indo-European languages. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel Pm, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases To Air, Traffic Proximity, Lead Paint, Superfund Proximity, Risk Management Program (RMP) Facility Proximity, and Underground Storage Tanks. Majority of the census block groups identified are around the town of Concord. In the CEJST, workforce development is a concern in the majority of disadvantaged census tracts in Cabarrus

County, near the town of Kannapolis and northeast of Mount Pleasant. Additionally, proximity to RMP facilities and Superfund sites are pollution concerns near the city of Concord.

Cleveland County, NC

EJScreen identifies Cleveland County residents as 42% low income and 28% people of color. $24,505 is the per capita income and 16% identify as persons with disabilities. 95% of residents speak English at home while 3% speak Spanish and 2% speak Asian-Pacific Island languages. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. The Town of Shelby has a high number of census block groups with Diesel PM concerns and Hazardous Waste Proximity near Kings Mountain. In the CEJST, transportation barriers and wastewater (underground storage tanks and wastewater discharges) are the major concerns in the County's disadvantaged census tracts.

Gaston County, NC

EJScreen identifies Gaston County residents as 33% low income and 30% people of color. $30,607 is the per capita income and 16% identify as persons with disabilities. 92% of residents speak English at home while 6% speak Spanish and 2% speak Indo-European Island languages. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks and Wastewater Discharge. One census block group was above the 90th percentile for all supplemental indexes, in Northwest Gastonia (west of N. Chester Street, off interstate 85). West of the Catawba River and North of the town of Belmont were numerous census block groups with Hazardous Waste and Wastewater discharge concerns. In the CEJST, health categories such as heart disease and low life expectancy (13/19 census tracts), and proximity to RMP and Superfund sites (12/19 of the census tracts) were in majority of disadvantaged census tracts.

Iredell County, NC

EJScreen identifies Iredell County residents as 26% low income and 25% people of color. $37,667 is the per capita income and 12% identify as persons with disabilities. 90% of residents speak English at home while 6% speak Spanish, 2% speak Indo-European Island languages and 1% speak Asian-Pacific languages. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Underground Storage Tanks, and Wastewater Discharge. In the City of Statesville, near Bagnal Blvd, is a census block group that has all supplemental indexes above the 90th percentile. From the CEJST, the primary climate

concern is expected agricultural loss. RMP and Superfund proximity is a pollution concern primarily south of City of Statesville.

Lincoln County, NC

EJScreen identifies Lincoln County residents as 29% low income and 16% people of color. $35,929 is the per capita income and 15% identify as persons with disabilities. 92% of residents speak English at home while 8% speak Spanish. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, RMP Facility, Underground Storage Tanks, and Wastewater Discharge. Majority of the census block groups were identified near the Town of Lincolnton. In all of the census tract identified as disadvantaged from the CEJST, expected agricultural loss was the sole climate concern.

Mecklenburg County, NC

EJScreen identifies Mecklenburg County residents as 26% low income and 54% people of color. $43,919 is the per capita income and 8% identify as persons with disabilities. 80% of residents speak English at home while 12% speak Spanish, 5% Asian, 2% Indo-European or Pacific Island languages, 1% French or Haitian, and 1% Arabic. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. One census block group is above the 90th percentile for all supplemental indexes; located off S Tryon Street in the Reamount and Brookhill Rd area. 51 out of 63 census tracts in the CEJST identify workforce development as a burden. Underground storage tanks, formerly used defense sites, housing costs and history of underinvestment were pollution and housing concerns near midtown of the City of Charlotte, off Interstate 77. Traffic volume and proximity and asthma are additional burdens that are flagged throughout Mecklenburg County.

Rowan County, NC

EJScreen identifies Rowan County residents as 39% low income and 29% people of color. $27,964 is the per capita income and 17% identify as persons with disabilities. 92% of residents speak English at home while 8% speak Spanish. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. One census block group is above the 90th percentile for all supplemental indexes in the City of Salisbury; located east of Main Street and north of Alexander Blvd S. The Towns of Lexington and China Grove had several census block groups of concern with wastewater discharge primarily located near Town of Denton. In the CEJST, expected agriculture loss and workforce development are the primary concerns for the area.

Stanly County, NC

EJScreen identifies Stanly County residents as 31% low income and 20% people of color. $27,964 is the per capita income and 17% identify as persons with disabilities. 94% of residents speak English at home while 6% speak Spanish. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, RMP Facility Proximity, Underground Storage Tanks, and Wastewater Discharge. Majority of identified census block groups were around City of Albemarle. Lack of indoor plumbing was the primary housing concern identified in the CEJST in half the census tracts.

Union County, NC

EJScreen identifies Union County residents as 22% low income and 29% people of color. $40,270 is the per capita income and 9% identify as persons with disabilities. 85% of residents speak English at home while 9% speak Spanish, 1% Russian, Polish or Slavic, 2% Indo-European, and 1% Asian or Pacific Island languages. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. Census block groups were identified around the City of Monroe and Towns of Marshville and Wingate. In the CEJST, transportation barriers are identified in half of the disadvantaged census tracts.

Chester County, SC

EJScreen identifies Chester County residents as 44% low income and 42% people of color. $24,399 is the per capita income and 17% identify as persons with disabilities. 97% of residents speak English at home while 3% speak Spanish. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Ozone, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Lead Paint, RMP Facility Proximity, Underground Storage Tanks. and Wastewater Discharge. Wastewater discharge is primarily near Great Falls. Many of the census block groups were identified throughout the county, near the City of Chester and Town of Airlee. The primary health indicators identified in the CEJST were low life expectancy, heart disease and diabetes. Transportation barriers were another major indicator from the CEJST for Chester County.

Lancaster County, SC

EJScreen identifies Lancaster County residents as 30% low income and 30% people of color. $35, 974 is the per capita income and 14% identify as persons with disabilities. 93% of residents speak English at home while 5% speak Spanish and 1% Indo-European language. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Ozone, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility, Hazardous Waste, Underground Storage Tanks, and

Wastewater Discharge. Toxic Release to Air were primarily located near Kershaw Camden Highway, North of Heath Springs. RMP Facility Proximity and Wastewater Discharge, were solely near Town of Kershaw, off Gold Mine Highway. Workforce development and transportation burdens account for half of the burdens indicated in the disadvantaged census tracts from the CEJST.

York County, SC

EJScreen identifies York County residents as 24% low income and 31% people of color. $37,804 is the per capita income and 11% identify as persons with disabilities. 92% of residents speak English at home while 5% speak Spanish, and 3% Asian or Pacific Island languages. EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity. RMP Facility Proximity, Hazardous Waste, and Underground Storage Tanks. Near Rock Hill, Delphia and York are majority of the census block groups that have high Ozone exposure. Air Toxic Cancer Risk is primarily near Rock Hill. In the CEJST, transportation burdens, energy costs, wastewater discharge, and asthma are burdens throughout York County in disadvantaged census tracts. York County has a census tract (census tract 45091061202) where 9% of the lands are of the Catawba Tribe.

Zero-Car Households

The Smart Location Database created by the EPA is a national geographic repository designed to measure location efficiency, summarizing attributes such as destination accessibility, transit service, neighborhood design and demographics in census block groups across the nation (US EPA, 2021) . Smart Location was used to highlight census block groups that had at least 50 or more households within the county's block group that had zero cars in the household. Below are the areas within each county that contain multiple census block groups meeting this threshold.

Anson County, NC

Town of Morven, Polkton and McFarlan – places alongside US-74 and 742

Cabarrus County, NC

Kannapolis (highest) and Mount Gilead

Cleveland County, NC

Fallston, Kings Mountain, US-180 and 226 (highest) and south of US-74

Gaston County, NC

Dallas and Belmont

Iredell County, NC

Off US-64 near the Rowan County border, Mount Mourne, and Southwest of Mooresville

Lincoln County, NC

Highest concentration around US-155 and north of US-150, west of Denver and Triangle

Mecklenburg County, NC
Pineville, east of Charlotte, Hickory Grove, east and west of Charlotte, north of 85 towards Paw Creek

Rowan County, NC
South of US-152, Franklin and Granite Quarry

Stanly County, NC
East of US-52 between Richfield and Badin

Union County, NC
Fairfield, intersection of north of US-84 and south of US-74

Chester County, SC
Concentrated around US-121 and US-97

Lancaster County, SC
Lancaster, Heath Springs, and Van Wyck

York County, SC
Leslie, Catawba, census block south of the Catawba River, east Rock Hill, Hickory Grove, communities at the intersection of US-49 and 321.

Discussion and Recommendations

English Language Proficiency
Every county has a portion of their population that does not speak English as a primary language, highlighting the linguistic diversity throughout the region and the need for language-specific programs to enhance communication, education, and community engagement.[1]

Recommendation:

- Based on the analysis results, and using the Languages Summary Table in Appendix A, consider translating materials to Spanish, Korean, Arabic, Chinese, and Russian / Slavic for distribution to the public for the engagement activities described in Engagement Activities.

Pollution
Elevated levels of air pollutants, including ozone, diesel PM, and air toxics, and water quality concerns related to wastewater discharge, hazardous waste, and underground storage tanks are identified as common issues across several counties. These can have direct and indirect impacts on the health of the residents in Centralina such as respiratory issues, cancer risk, lead exposure or other waterborne diseases. Mitigating these pollutants through the PCAP and CCAP actions will contribute to improving respiratory health and overall well-being for county residents.

[1] Spanish is the primary language beyond English spoken in Centralina.

Recommendation:

- Highlight this messaging during engagement given the existing polluted conditions across Centralina.

Transportation

Each county in Centralina contains at least one census block group where at least 50 households within the block group do not have a car. Mecklenburg County is the only county that has a metro rail system within the City of Charlotte so in-person public meetings should occur close by the rail stops. Gaston County has a bus system while other counties, such as Cabarrus and Union, have county-supported transportation systems that require a reservation in advance.

Recommendation:

- Offer hybrid versions of engagement activities, including virtual options, so that those without access to transportation are able to participate.
- Coordinate with counties that offer transportation services to centralized places with strong broadband capabilities such as the library, community colleges or local government building for in-person options.
- Education and programming that aim to alleviate transportation barriers would particularly benefit members in Chester, Union, York, Gaston, and Cleveland County.

Climate and Community Resilience

Agriculture loss is particularly a concern for Anson, Iredell, Lincoln, and Rowan counties, as these counties contain census tracts above 90th percentile for Expected Agricultural Loss (economic loss to agricultural value resulting from natural hazards each year)2. Workforce development is a shared concern, especially in Mecklenburg, Lancaster, Rowan, Anson, Gaston, Cabarrus, and Cleveland counties, which contain census tracts above the 90th percentile for Workforce Development indicators, such as poverty, unemployment, and high school education. Housing cost and lack of indoor plumbing impact residents Mecklenburg, Stanly, Cabarrus, and York County members significantly.

Recommendation:

- Climate resilience strategies and adaptation plans should specifically address agriculture loss as it directly impacts communities in Anson, Iredell, Lincoln, and Rowan County.
- There is a need for targeted workforce development programs, especially in Mecklenburg, Lancaster, Rowan, Anson, Gaston, Cabarrus, and Cleveland counties, to enhance skills, clean job opportunities, and economic mobility for residents.
- Targeted programming which promotes affordable housing and infrastructure improvements would benefit residents in Mecklenburg, Stanly, Cabarrus, and York counties.

Indigenous Populations

Tribal consultation and engagement with Catawba leaders in York County is essential given the Catawba lands of Centralina. The intersection of economic, environmental, health

[2] FEMA's National Risk Index

and social concerns display the complex landscape in the region. Climate solutions developed with the PCAP and CCAP should be inclusive, culturally appropriate, and align with the values and priorities of the affected communities.

Recommendation:

- Conduct direct engagement with Catawba leaders to acknowledge and prioritize Tribal sovereignty and historical land stewardship in development of the PCAP and CCAP.

General Recommendations

- Develop a marketing campaign with printed materials and using social media that addresses Pollution, Transportation, and Climate and Community Resilience topics. The messaging should be simple and clear, and indicate where to find additional information.
- Translate material into different languages based on location.
- Provide virtual focus group options. These meetings should be by invitation only and target specific groups of people (e.g., neighborhood associations, non-profits, etc.), and be limited to up to approximately 15 participants.
- Present these materials at neighborhood events such as flea or farmers' markets or similar, that attract residents belonging to LIDAC communities.
- Present these materials at State and County Fairs. The Fairs attract a diverse group of people and are an excellent venue to collect input.

See Excel Attachment 1: Expanded Data by County (EJScreen) and Census Tract (CEJST) for detailed information on LIDACs in the study area.

Engagement Activities

This section describes the proposed public and stakeholder engagement activities for the PCAP and CCAP. First, this section describes the tools/strategies that appear across the PCAP and CPAP phases (social media, a StoryMap, and the website), followed by details of the objectives, activities, and value associated with phase-specific engagement activities.

Ongoing Activities

OBJECTIVES:

- Develop education and communication materials for a diverse set of stakeholders across the MSA.

Preparation of Educational Materials

In order to keep stakeholders and the general public informed about the plans the following activities will occur throughout the planning process.

- Project fact sheets that will be created to advertise engagement opportunities applicable to the project phase and distributed through established communication platforms outlined below.
- Project updates will be distributed using the Centralina Regional Council newsletter, *Central Lines,* Clean Fuels Coalition on social media platforms.

- Educational materials will also be provided to collaborative partners to share with their audiences.
- These materials may also be advertised and shared through Social Media and a central webpage for the project.

Technical Advisory Committee

The Technical Advisory Committee (see **Cross-Sector Engagement**) will be convened throughout the Project. Descriptions of Technical Advisory Committee activities are detailed under each phase of engagement.

Equity Advisors Committee

The Equity Advisors Committee (see **Low Income / Disadvantaged Community (LIDAC) Engagement**) will convene throughout the project. Descriptions of Equity Advisors Committee activities are detailed under each phase of engagement.

Social Media

Over the course of the engagement efforts for the PCAP and CCAP, CRC will use Facebook, Instagram, LinkedIn, and X social media platforms for sharing information and encouraging participation.

The sub-awardees for the CPRG grant will be tagged in every social media post in their respective phase of the project (Mecklenburg County Air Quality, Catawba Regional Council of Governments, and UNCC EPIC). Relevant stakeholders for different posts/campaigns will also be tagged, and all stakeholders will be encouraged to share/repost content for the PCAP and CCAP.

The following hashtags will be used throughout the Project: #CPRGforCRC and #thinkglobalactlocal.

Each phase of the Project will utilize social media in different ways to meet the objectives and needs of that phase, as described in the subsection for each phase.

Regional Stakeholder Summit

Throughout the course of engagement efforts for the PCAP and CCAP, CRC will host Regional Stakeholder Summits. These events will be structured similarly to the Local Needs, Future Resiliency Stakeholder summit, (see **Local Needs, Future Resiliency Stakeholder Summit**). They will serve to disseminate information and to convene stakeholders throughout the region to encourage productive and meaningful discussions. Descriptions of the specific goals for the Regional Stakeholder Summits proposed for future phases of PCAP and CCAP engagement are detailed under the relevant phases in this document.

StoryMap

An ArcGIS Online (AGOL) StoryMap will serve as a key informational tool over the course of the PCAP and CCAP planning process. A StoryMap is a tool that utilizes geography and multimedia tools to tell an interactive story. This tool will provide a platform for compelling storytelling, public education, and information sharing with a unified message, expressing

the importance of the CPRG efforts to the region and encouraging individuals to participate in activities in each phase of the Project. The consultant team (McAdams) will host the StoryMap. This tool will provide users with a foundational understanding of CPRG efforts with the PCAP and CCAP and will be updated throughout the Project. The Storymap will embed or link to a mechanism to provide open ended comments throughout all phases of the Project and can embed public surveys using Microsoft Forms into the StoryMap.

Website

Project information will be hosted on the Centralina Regional Council website (www.centralina.org) and updated as needed to address project needs. Project information will include: an overview of the grant awarded in 2023, a timeline of activities, and materials as they are created to summarize the progress. The StoryMap will be featured on the website as well. Project website link: https://centralina.org/regional-collaboration/climate/

PCAP Engagement Activities

Phase I – PCAP Education and Outreach

The Phase I – PCAP engagement activities occurred between April and December 2023. The objectives, strategies, and results of those activities are summarized in this section.

OBJECTIVES:

Inform stakeholders about the Climate Pollution Reduction Grant process, its importance, impacts and how to get involved.

- Grow the network of technical stakeholders and build equity advisor contacts that will provide inputs at project milestones.
- Create local government and stakeholder knowledge around plan purpose, opportunities to engage and implementation funding opportunities.

In order to meet the objectives for Phase I, the following activities will occur:

- Engage with stakeholders as part of regularly occurring regional meetings, including but not limited to:
    - Centralina Board of Delegates
    - Charlotte Regional Alliance for Transportation
    - Centralina Mobility Management
    - Regional Joint Transportation Planning Organization (TPO) meeting
    - Regional Managers' Meetings
    - Centralina Economic Development District Board
- Hold a regional virtual meeting to educate on climate planning, the CPRG grant, opportunities to be involved in the plan, etc.
- Grow the Technical Advisory Committee and engage on plan topics.
- Identify applicable stakeholders and create a group of Equity Advisors Committee to support plan development and engagement strategies for low income and disadvantaged communities.

Technical Advisory Committee

Over the course of 2023, the Technical Advisory Committee will convene three times to provide preliminary insight and guidance for CPRG activities.

- Meeting #1 – April 27, 2023:
  - Provide an overview of CPRG and updates from the Regional Managers Meeting
  - Introduce opportunities and challenges
  - Obtain insight into messaging and communication approaches.
- Meeting #2 – May 12, 2023:
  - Confirm and added additional input from the first meeting,
  - Collect insights into members' preferred outcomes
  - Gather input on a regional approach.
- Meeting #3 – September 5, 2023:
  - Provide Project updates since and an overview of the Climate Action Planning process.

Local Needs, Future Resiliency Stakeholder Summit

On December 8, 2023, CRC will hold a stakeholder summit in order to deepen stakeholders understanding of Climate Action Planning, gather diverse stakeholder inputs, build a shared vision for regional priorities, and lay the groundwork for effective implementation. The agenda includes an overview of the CPRG program and timeline for the PCAP and CCAP followed by a panel discussion with panelists from NC Board of Transportation, the City of Charlotte's Sustainability and Resiliency Office, and the City of Gastonia's Diversity, Equity, and Inclusion department. The panel discussion will provide additional information on transportation alternatives in the region, local government policies and climate action, and successful strategies for engaging diverse communities. Following the panel discussion, attendees will split into small groups to discuss projects in their communities that align with the PCAP, local government actions that could relate to the PCAP, and stakeholders that should be involved in the project.

Incorporation of Feedback

Input and feedback will be incorporated into subsequent stages of the Project as follows:

- Provides a baseline and informs the approach to the Stakeholder Focus Group Meetings
- Contribute to the formation of a comprehensive Stakeholder List
- Identify ongoing sustainability efforts and potential actions for inclusion in the PCAP and CCAP throughout the region
- Preliminary prioritization of project categories

Phase II – Creating the PCAP

The input collected during Phase II will directly influence the development of the PCAP. The objectives and strategies for Phase II engagement for the PCAP are detailed below:

<u>OBJECTIVES:</u>

- Seek widespread input into identification of high priority PCAP measures and develop criteria for measures based on stakeholder feedback
- Develop implementation grant with iterative inputs from stakeholders
- Educate stakeholders on implementation grant process and its coordination with PCAP
- Create Equity Advisors Committee

In order to meet the objectives in Phase II, the following activities will occur:

Equity Advisors Committee

The Equity Advisors Committee will convene once during Phase II of PCAP engagement. The primary purpose of the Equity Advisors Committee meeting will be to gather input and receive guidance on the following plan components:

- Socioeconomic analysis
- LIDAC preliminary benefits analysis (Task 3.1 C in the scope of work)
- Evaluation criteria for GHG reduction measures
- Ensuring equitable regional approach by developing priority GHG reduction measures that target/maximize benefits (and minimize disbenefits) to LIDACs

Additionally, CRC will look to the Equity Advisors Committee to encourage participation in the survey and future engagement events by LIDACs.

Incorporation of Feedback

Input gathered from the Equity Advisors Committee will create an opportunity for the project team to meaningfully engage LIDACs or to adapt ongoing engagement strategies to better reach LIDACs. The Equity Advisors Committee feedback will shape the structure of outreach to LIDAC communities.

Focus Groups

These virtual meetings, hosted on Microsoft Teams or Zoom, will focus on sharing data and developing a detailed understanding of the priorities and concerns of various stakeholder groups. Mentimeter will be used to collect targeted feedback on the emissions sectors, project categories, and priority GHG reduction measures. CRC will organize up to twelve (12) Focus Group meetings. The project team will hold ten (10) total Focus Groups that involve each of the thirteen (13) counties in the CLT MSA with participation from city/county managers, planning directors, transportation directors, sustainability officers or other designees/staff of county and municipal governments. The remaining two (2) Focus Groups will have a more regional focus and be open to all other stakeholder categories, including:

- Tribal Entities
- Agriculture
- Business Community
- DEI (Diversity, Equity, + Inclusion)
- Higher Education
- Manufacturing

- Nonprofit
- Transportation (MPOs, RPOs, transit agencies, bike advocates, etc.)
- Utilities (Waste Management, Energy + Gas)
- Waste

The goal of Focus Group meetings is to rank and prioritize Centralina Project Categories and EPA sectors, understand past/current efforts within the various sectors, and rank and prioritize sector-specific actions within the region and counties. The Focus Groups will include the following elements:

- Summary of progress to date from the Local Needs, Future Resiliency Stakeholder Summit with CRC's proposed project categories
- Overview of EPA's sectors and ranking/prioritization exercise to understand which sectors/categories are most important to the region
    - Ranking/prioritization exercises of EPA sectors, Centralina project categories, and sector-specific actions
- Summary of actions identified through the plan review and Local Needs, Future Resiliency Stakeholder Summit
    - Prioritize the actions or categories of actions for each sector as well as cross-cutting actions
    - Identify actions that are currently underway
    - Identify project partners for various actions
- Present evaluation criteria for selecting actions to be included in the PCAP and obtain feedback
- Communicate goals/requirements of the Implementation Grant and explain the relationship between the PCAP, Implementation Grant, and the CCAP

Concurrent to the execution of the stakeholder focus groups and other engagement activities during Phase II, CRC will engage with agencies such as the Centralina Economic Development Commission, the Charlotte Regional Business Alliance and regional workforce boards to obtain guidance on workforce development activities that may be needed to implement the PCAP priority measures.

Incorporation of Feedback

The input gathered from Focus Groups will aid in the identification of actions and measures to include in the PCAP. Feedback will help to identify actions that are high priority and ready-to-implement. Feedback on the methodology and approach to evaluating/selecting GHG reduction measures for inclusion in the PCAP will be sought and incorporated where appropriate.

StoryMap

A StoryMap will serve as a key educational and informational tool over the course of the PCAP and CCAP planning process. During Phase II of PCAP engagement, the StoryMap will include a link to the public survey (Microsoft Forms). This will be open for at least 2 weeks to allow opportunity for citizens to provide feedback on the plan development.

Incorporation of Feedback

Survey results will inform the priorities of the PCAP and GHG reduction measures included in the PCAP.

Social Media

The project team will utilize social media to share information from communities throughout the region. During Phase II of PCAP engagement, the first social media push will be the "Local Nees, Future Resiliency" (5 Days) campaign, which will introduce the importance of climate planning, explain CPRG, and inform the public about actions they can take to reduce their carbon footprint that are relevant and informative. The final day will encourage people to participate in future engagement activities. The goal of this campaign is to raise awareness of and inspire participation in future CPRG engagement activities, specifically the PCAP survey, so that the resulting PCAP and CCAP reflect the priorities of all residents of the Charlotte MSA region.

Phase III – Strategy Insights

The objectives and strategies for Phase III engagement for the PCAP are detailed below.

OBJECTIVES:

- Seek feedback on the draft PCAP including measures and action plans, co-benefits, workforce analysis, and potential GHG reductions
- Seek feedback on a draft regional coalition implementation grant

In order to meet the objectives in Phase III, the following activities will occur:

- Hold regional engagement event to seek inputs on draft PCAP
- Prepare Technical Advisory Committee, Equity Advisors Committee, and other stakeholders on CCAP components, timeline, and engagement opportunities

Technical Advisory Committee

The Technical Advisory Committee will convene once during Phase II. The members of the Technical Advisory Committee will provide input on plan components, including but not limited to:

- Evaluation criteria for GHG reduction measures
- Benefits analysis
- Priority GHG reduction measure implementation elements

Incorporation of Feedback

Insight gleaned from the meeting with the Technical Advisory Committee will allow the project team to refine priority GHG reduction measures based on the technical expertise of members of the committee.

Regional Stakeholder Summit Session

A Regional Stakeholder Summit will occur in February 2024 during Phase II of PCAP engagement. The objectives of this session are as follows:

- Engage a broad set of interested stakeholders reflective of multiple sectors, geographies, economic and demographic realities.
- Share results of public and stakeholder engagement during Phase II.
- Summarize the priority GHG reduction measures included in the PCAP and other components of the PCAP, such as the GHG inventory results, LIDAC analysis, benefits analysis, workforce development analysis, authority to implement, and intersection with other funding sources.
- Educate on implementation grant criteria and the PCAP's connection to the Implementation Grant.

CRC will host this session in person, providing a virtual attendance option to maximize participation. The team will summarize January's engagement activities and will utilize Mentimeter to gather feedback from the group.

Incorporation of Feedback

Feedback received during the Regional Stakeholder Summit may help confirm implementation grant projects depending on when the event is held. This engagement session will also identify key entities whose involvement will be vital to implementing identified PCAP actions.

Letters of Commitment

To be collected from stakeholders to describe the partners' support for and/or involvement with the project. Will be collected during the preparation of the Implementation Grant application.

CCAP Engagement Activities

This section provides an outline for the engagement activities that the CCAP will cover. It is important to note that specifics regarding CCAP engagement activities will be detailed further in conjunction with the completion of pre-CCAP activities (see Task 4 in the Scope of Work).

Phase IV – Education and Outreach

OBJECTIVES:

Public Engagement Roadshow

The events throughout the region that will allow CRC to meet community members where they are. This will involve a series of open houses and pop-up events throughout the 13-county region with a focus on engaging LIDACs.

Phase V – Creating the Plan

OBJECTIVES:

Milestones

Activity	Platform	Task	Responsible Party	Date
Project Team Meetings	Zoom	- Schedule recurring weekly meeting and create agendas	CRC	Ongoing
		- Provide meeting minutes	McAdams	
PCAP – Phase I				
Technical Advisory Committee	Zoom	- Identify members to participate - Create meeting materials and summarize meetings	CRC	April 28, 2023; May 12, 2023; Sept. 5, 2023
Centralina Learns Training: Climate and Sustainability	Zoom	- Host training - Present climate planning best practices - Introduction to EPA's Climate Pollution Reduction Program	CRC	October 24, 2023
Local Needs, Future Resiliency Stakeholder Summit	Zoom; Mentimeter; In-Person	- Create materials - Host meeting	CRC and HDR	December 8, 2023
Other Opportunities	Zoom; In-Person	- Attend/present at the regional meetings, including: Centralina Board of Delegates; Charlotte Regional Alliance for Transportation; Centralina Mobility Management; Regional Managers' Meeting	CRC	August 9, 2023; November 8, 2023; December 12, 2023; April 19, 2023

Activity	Platform	Task	Responsible Party	Date
PCAP – PHASE II				
Equity Advisors Committee Meetings	Zoom	- Create meeting materials - Take thorough meeting notes	CRC and McAdams	February 2024
Focus Groups	Microsoft Teams	- Up to 15 meetings with various stakeholder groups	McAdams	January 2024
	Mentimeter	- Develop focused questions to gain insight from various groups	McAdams (reviewed/approved by CRC)	
	Word or PDF	- Report back to project team summarizing the input received - One memo summarizing all Focus Groups	McAdams	
StoryMap + Survey	ArcGIS Online and Survey 123	- Develop survey questions to be presented online - Summarize results	McAdams	January 2024
		- Distribute survey and publish StoryMap	CRC	
Social Media	Facebook; Instagram; LinkedIn; X	- Content for 12 Days of Climate Action	McAdams	January – March 2024
		- Publish content, tag other organizations, share on all platforms	CRC	
PCAP – Phase III				
Regional Stakeholder Summit	In-Person; Microsoft Teams/Zoom; Mentimeter	- Develop presentations and materials. - Take thorough notes and share with Technical	McAdams	February 2024

Activity	Platform	Task	Responsible Party	Date
		Advisory Committee and Equity Advisors Committee		
		- Lead discussions during session	CRC	
Technical Advisory Committee Meetings	Zoom	- Create meeting materials - Take thorough meeting notes	McAdams	February 2024
		- Set/host meeting	CRC	
CCAP – Phase IV				
TBD	TBD	- TBD	TBD	TBD
CCAP – Phase V				
TBD	TBD	- TBD	TBD	TBD

Appendix A

Technical Advisory Committee

Name	Organization	Title
Jerrel Leonard	CRTPO	Transit Planner
Robert Cook	CRTPO	Director
Sarah Hazel	City of Charlotte – Office of Sustainability	Sustainability and Resiliency Officer
Alan Toney	Foothills Regional Commission	Director of Community and Economic Development
Lee Snugs	Rocky River RPO	Director
Erin Stanforth	Mecklenburg County	Sustainability and Resiliency Manager
Anna Lu Wilson	Centralina Workforce Development	Community Economic Development Coordinator
Catherine Kummer	CATS	Sustainability and Resiliency Officer
Mike Mazzola	Energy Production & Infrastructure Center	Director
Julie Woosley,	NC State Energy Office	Director
Mike Abraczinskas	NCDEQ Division of Air Quality	Director
Carolyn Keith	Energy Production & Infrastructure Center	Assistant Director
Megan Green	Mecklenburg County	Air Quality Program Manager
Stephen Allen	Catawba Regional Council of Government	Planning Director
Cherie Jzar	City of Gastonia	DEI Coordinator

Equity Advisors Committee

Name	Organization	Title
Anne Little	City of Salisbury	DEI Coordinator
Cherie Jzar	City of Gastonia	DEI Coordinator
Jamie Brown	City of Concord	DEI Strategist
LaShaun Carter	Mecklenburg County	Equity and Inclusion Director
Melissa Gonzalez	Davidson College	DEI Director
Jose Hernandez-Paris	Latin American Coalition	CEO
Nohemy Barrientos	International House	Community Engagement Associate
Tonia Deese	Talking Circles - Metrolina Native American Association	Social Worker
Tiffany Fant	Sol Nation	Executive Director
Apryl Lewis	Sol Nation	Community Engagement Manager
Daphne Pinto	NC Commission of Indian Affairs	Administrative Secretary
Scott Hansen	Catawba Indian Nation	Environmental Services Director
Laney Buckley	Catawba Indian Nation	Community Services Director
Sharika Comfort	West Boulevard Neighborhood Coalition	Executive Director
Barbara Robinson	Catawba Area Agency on Aging	Executive Director
Jeffery Robbins	CleanAIRE NC	Executive Director
Dailyn Sailor	Centralina Regional Council	Community Engagement Coordinator

Katie Kutcher	Centralina Regional Council	Assistant Aging Programs Director
Dianna Ward	Charlotte Joy Rides	Executive Director

Languages Summary Table

County	**Non-English Language Populations Present***
Anson	Spanish 4% and Korean 1%
Cabarrus	Spanish 8% and Indo-European languages 2%
Chester	Spanish 2%
Cleveland	Spanish 3% and Asian-Pacific Island languages 2%
Gaston	Spanish 6% and Indo-European languages 2%
Iredell	Spanish 6% , Indo-European languages 2% and Asian-Pacific Island languages 1%
Lancaster	Spanish 5% and Indo-European languages 1%
Lincoln	Spanish 8%
Mecklenburg	Spanish 12%, 4% Asian or Pacific Island languages, Indo-European languages 2%, Mandarin1% , French 1% and Arabic 1%
Rowan	Spanish 8%
Stanly	Spanish 6%
Union	Spanish 9% , Indo-European languages 2% , Russian / Polish / Slavic 1% Asian and Pacific Island languages 1%
York	Spanish 5% and 3% Asian languages

* Note that the information in this table was obtained from EJScreen, which does not provide a detailed breakdown for certain groups of languages, such as Indo-European, Asian (other than Mandarin), and Asian-Pacific Island.

Appendix C

Priority Measure Example Projects List

Priority Climate Action Plan | March 1, 2024 | Climate Pollution Reduction Grant (CPRG) Program
Charlotte-Concord-Gastonia NC/SC Metropolitan Statistical Area (CLT MSA)
Appendix C: Priority Measure Implementation-Ready Projects List

UNIQUE ID	PROJECT NAME	DESCRIPTION	PCAP PRIORITY MEASURE	PRIMARY EMISSIONS SECTOR	PRIMARY LOCATION (COUNTY)	LOCATION DETAILS	LEAD AGENCY	SUPPORTING AGENCY(IES)
147	Complete the Jack White Trail Extension of the Manchester Greenway	.3 miles at Dave Lyle Blvd/ I-77	Alternative Transportation	Transportation	York	Rock Hill	City of Rock Hill	
148	Implement the Fort Mill Trail Master Plan	Fort Mill is in the process of adopting the Trail Master Plan, featuring 4 priority areas. They don't know how they'll implement funding for the trails yet. They are also doing a feasibility study to look at the Cross Charlotte trail connection into South Carolina, connecting it through Lancaster County to Fort Mill. They are working on York County, Lancaster County, Town of Fort Mill feasibility study to connect to the Cross CLT trail	Alternative Transportation	Transportation	York	Fort Mill Township	Fort Mill Township	
149	Implement Spratt Street Bicycle and Pedestrian Infrastructure Project	Spratt Street- 1 mile of 10' multi-use path and 0.5 miles of sidewalk improvements	Alternative Transportation	Transportation	York	Fort Mill Township	SCDOT	Town of Fort Mill
72	Expand E-Bike program	Expanded E Bike program (Charlotte launched a pilot with affordable housing partners)	Alternative Transportation	Transportation	Mecklenburg	City of Charlotte	City of Charlotte	DreamKey Partners
118	Expand Sugar Creek Greenway	Yorkmont to McDowell Farms Drive (3.3 miles)	Alternative Transportation	Transportation	Mecklenburg			
119	Expand Irwin Creek Greenway 1	Statesville Road to Allen Hills Park (2.2 miles)	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	
160	Expand Grants Creek Greenway (EB-5619)	1.5 miles from Statesville Ave to Kelsey Scott Park	Alternative Transportation	Transportation	Rowan	Salisbury	City of Salisbury	
161	Expand Salisbury Greenway	0.75 miles from Stanback Greenway through Catawba Preserve to Innes Street	Alternative Transportation	Transportation	Rowan	Salisbury	City of Salisbury	
11	Develop a Framework for a Regional TDM Program	A critical plan recommendation from CONNECT Beyond is focused on developing a framework for a regional Transportation Demand Management (TDM) program for the greater Charlotte region. Centralina proposes including the regional TDM program in the region's Priority Climate Action Plan with the goal of reducing vehicle miles traveled (VMT) and greenhouse gases in the region. The TDM program will achieve results through implementing TDM strategies and gaining efficiencies through regional collaboration, expanding programmatic and communication efforts to a wider-range of communities and bringing additional funding for VMT reduction to the region.	Alternative Transportation	Transportation	Region-wide	Centralina Region	Centralina Regional Council	NCDOT, Regional Planning Organizations, Transit Providers
120	Expand McDowell Creek Greenway	Phase III (N/A miles)	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	
1	Implement I-77 N BRT		Alternative Transportation	Transportation	Mecklenburg	Multiple counties	Charlotte Area Transit System	
3	Expand Cross Charlotte Trail	This is a measure provided by Technical Advisory Commitee. Information from CTT indicated 5 individual sections in design/utility relocation but indicated these sections were likely already funded	Alternative Transportation	Transportation	Mecklenburg	City of Charlotte	City of Charlotte	
4	Expand Blue Line Rail Trail	Few key gaps remaining (Rail Trail bridge of I-277, Uptown Link, Cross Charlotte Trail)	Alternative Transportation	Transportation	Mecklenburg	City of Charlotte	City of Charlotte	
121	Expand Briar Creek Greenway	Central Ave to Monroe Rd (1.7 miles)	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	
20	Develop the Charlotte Gateway Station Transit Oriented Development Station	The Charlotte Gateway Station (CGS) will be a comprehensive multi-modal transportation facility in vibrant uptown Charlotte at the intersection of West Trade and Graham Streets. This signature passenger station will provide both long-distance travelers and daily-commuters with greater accessibility to regional connections as well as to Charlotte's thriving employment, entertainment and cultural centers.	Alternative Transportation	Transportation	Mecklenburg	City of Charlotte	City of Charlotte	Envision Charlotte
122	Expand McDowell Creek Greenway	CatawbaAve to Westmoreland Ave 1.6 miles of greenway trail and .7 miles of urban trail	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	
123	Expand Campbell Creek Greenway	Campbell Creek Park to Campbell Creek Greenway (2.5 miles)	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	
124	Expand Irvins Creek Greenway	Lakeview Circle to McAlpine Creek (2.5 miles)	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	
71	Implement LYNX Silver Line	Silver Line, it is moving into the 30% design phase and technical stakeholder phase.	Alternative Transportation	Transportation	Mecklenburg	Multiple counties	Charlotte Area Transit System	
125	Expand Irwin Creek Greenway 2	Clanton to Crestridge (0.9 miles)	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	
129	Expand Irwin Creek Greenway 3	Crestridge to Sugar Creek Greenway	Alternative Transportation	Transportation	Mecklenburg		Mecklenburg County	

UNIQUE ID	PROJECT NAME	DESCRIPTION	PCAP PRIORITY MEASURE	PRIMARY EMISSIONS SECTOR	PRIMARY LOCATION (COUNTY)	LOCATION DETAILS	LEAD AGENCY	SUPPORTING AGENCY(IES)
90	Obtain a bicycle vendor	Parks and Rec department is trying to get a bicycle vendor as a recreation and transportation amenity, hoping it leads to more access and economic development.	Alternative Transportation	Transportation	Iredell	Town of Troutman	Town of Troutman	
53	Implement Cramerton-McAdenville Greenway and Catawba Creek Greenway	The Cramerton-McAdenville Greenway, Abbey Creek Greenway, and Catawba Creek Greenway Phase II are projects that are ready for construction. Greenway projects that are being designed now that are underfunded — Cramerton-McAdenville Greenway along the South Fork River, Catawba Creek Greenway, Phase II, which will provide access to a senior apartment complex as seniors are assumed to be low to moderate income. Gastonia Highland Branch Greenways "missing link" project.	Alternative Transportation	Other/Cross Cutting	Gaston	City of Gastonia	City of Gastonia	Developer for Catawba Creek Villas (Broadcraft Construction)
111	Expand Matthews-Belk Corridor along Riverside Drive in McAdenville	0.5 mile sidewalk/greenway connector along Riverside Drive in McAdenville which is not funded for construction. Small yet critical piece of a much larger vision. This project is part of the Carolina Thread Trail's 23-mile Matthew-Belk South Fork Corridor trail running from Spencer Mountain to Daniel Stowe Botanical Garden.	Alternative Transportation	Transportation	Gaston	McAdenville	Town of McAdenville	McAdenville has been collaborating on the project with the CTT, Town of Cramerton, NCDOT and private partners (Pharr) for years.
115	Expand LSCG	.5 miles of McMullen Creek Connector	Alternative Transportation	Transportation	Mecklenburg	Charlotte		
116	Expand Long Creek Greenway	2.1 miles from I-485 to Oakdale Road	Alternative Transportation	Transportation	Mecklenburg	Charlotte		
117	Expand Mallard Creek Greenway	X miles from Mallard Creek Rd. to David Taylor Drive	Alternative Transportation	Transportation	Mecklenburg	Charlotte		
112	Expand Matthews-Belk Corridor from Poston Park to Spencer Mountain	1.2 miles from Poston Park to Spencer Mountain	Alternative Transportation	Transportation	Gaston	Gaston County	Gaston County	Carolina Thread Trail
109	Expand Carolina Harmony Rail Trail	Phase II southward from Marion St. Note this is for Phase II from Marion St. to Dekalb St. (1.9 miles)	Alternative Transportation	Transportation	Cleveland	Shelby	City of Shelby	NCDOT, CTT, NCGA
110	Expand Narrows Segment of the Stagecoach Greenway	0.75 miles - downtown Lawndale to planned Long Rock Park along the First Broad River	Alternative Transportation	Transportation	Cleveland	Lawndale	Cleveland County Water Commission	
126	Expand Hector Henry Greenway 1	0.35 miles from Poplar Tent Rd upstream along Rocky River	Alternative Transportation	Transportation	Mecklenburg	Concord	Concord	
127	Expand Hector Henry Greenway 2	1 mile along Morehead Road, alternative to Rocky River alignment	Alternative Transportation	Transportation	Mecklenburg	Concord	Concord	
128	Expand Irish Buffalo Creek Greenway	.1 miles - Lincoln Street Crossign	Alternative Transportation	Transportation	Mecklenburg	Concord	Concord	
22	Road system improvement projects	Initial ideas: Road system improvement projects specifically: - Transportation Alternative Programs (TAP) - Congestion Mitigation & Air Quality Improvement programs - Pedestrian and bike paths Table 4.2 in the Plan lists federally funded projects and 4.3 lists non-def funded projects. Table 4.5 lists unfunded needs. Table 9.1 and 9.2 lists bicycle and pedestrian improvements	Alternative Transportation	Transportation	Lancaster	York and Lancaster Counties	RFATS	Local governments, Catawba Indian Nation, SCDOT, legislative reps
10	Create multi modal pathways to connect neighborhoods to the downtown area	Currently the city is seeking federal DOT funding and potential NC Parks and Rec Part F grant funding for approximately 1.7 miles of pathways and street scaping to safely connect downtown to neighborhoods that have been disconnected by streets and growth.The neighborhoods we propose to increase safe access to were physically cut of in the 1970's when Highway 70 (east - west) was installed. The neighborhoods are both in disadvantaged census tracts and have a large population on non-vehicle ownership.	Alternative Transportation	Transportation	Iredell	City of Statesville	City of Statesville	
113	Expand Matthews-Belk Corridor from Old Dye Plant and River Heights	0.5 miles from Old Dye Plant and River Heights	Alternative Transportation	Transportation	Gaston	Lowell	Lowell	Carolina Thread Trail, Gaston County
114	Expand Matthews-Belk Corridor Catawba Cove Segment	Catawba Cove - 2.1 mile segment	Alternative Transportation	Transportation	Gaston	Gaston County	Gaston County	Carolina Thread Trail
162	Expand Riverlink Greenway (Cramerton Section)	End of existing greenway northward toward McAdenville - no funding for .5 miles	Alternative Transportation	Transportation	Gaston	Town of Cramerton	Town of Cramerton	N/A
165	Gastonia Greenway	This project will provide the city with an opportunity to reduce vehicular trips by providing an opportunity to capitalize on the development activity occurring on adjacent properties. In this growing area of the community, this new extension of greenway will provide enhanced greenway access to two new subdivisions, Robinson Oaks and Robinson Mills, to the existing 3 miles of the Avon and Catawba Creeks Greenway, the Warlick Family YMCA, the Southeast Recreation Center, Ferguson Park and Lineberger Park, one of the city's flagship parks. Further, this project will also connect a newly developed senior apartment development to the overall trail system and extend the trail to Gaston Day School Road and the public sidewalks that line this major thoroughfare. This public multi-use trail will be a 10-foot-wide, ADA compliant asphalt trail with a 10-foot-wide cleared area on each side.	Alternative Transportation		Gaston	City of Gastonia	City of Gastonia	
167	Expand Riverlink Greenway (McAdenville Section)	1200 LF of greenway - the missing link in the trail to connect the downtowns of Cramerton and McAdenville. Design is nearly complete (March 1st anticipated) and the project will be ready to construct	Alternative Transportation		Gaston	McAdenville	Town of McAdenville	
173	Sustainability Plan for Local Govenments	Develop individualized sustainability plans for local governments, fast charging stations at public facilities, electrifying local government fleets, Sustainability Plan would identify opportunities. Access to electric charging stations at conveniently located public property.	Alternative Transportation	Transportation		Town of Cornelius	Town of Corneliue	

UNIQUE ID	PROJECT NAME	DESCRIPTION	PCAP PRIORITY MEASURE	PRIMARY EMISSIONS SECTOR	PRIMARY LOCATION (COUNTY)	LOCATION DETAILS	LEAD AGENCY	SUPPORTING AGENCY(IES)
175	Riverhawk Greenway	River Park North	Alternative Transportation	Transportation	Gaston	Mt. Holly	City of Mount Holly	
176	Fort Mill Greenway	Downtown to Catawba River (2.5 miles)	Alternative Transportation	Transportation	York	Fort Mill	Town of Fort Mill	
178	Expand the active transportation network in the Town of Huntersville.	Construct X miles of greenways, sidewalks, bike lanes, and trails within the Town of Huntersville to fill existing gaps in the active transportation network.	Alternative Transportation	Transportation	Mecklenburg	Huntersville	Town of Huntersville	
182	Regional analysis of alternative transportation to meet LiDAC needs	Regional analysis to pinpoint geographies where alternative transportation activities can be most successful in meeting LiDAC needs (primarily) and other populations (generally).	Alternative Transportation		Region-wide			
183	Local land use reform package	Local land use reform package to support success of alternative transportation activities that ensure long-term applicability and success of such measures.	Alternative Transportation		Region-wide			
177	Rowan Cabarrus Community College – Clean Fleet and Infrastructure Measures	Electrification of fleet vehicles and EV facilities	Clean Fleet and Infrastructure	Transportation	Rowan	Rowan Cabarrus Community College Campuses	Rowan County Community College	
179	Downtown Traffic Management Project	ITS / Construction project to improve congestion in downtown Rock Hill associated with train blockages along Dave Lyle Blvd. Project will include ITS phase to assist in detours around train blockages. Construction phase will include improvements for both vehicular and non-vehicular modes of transporation along Wilson Street.	Clean Fleets and Infrastructure	Transportation	York	City of Rock Hill	City of Rock Hill	SCDOT & RFATS
172	New EV Chargers in Matthews	New DC Fast chargers and Level 2 chargers in Matthews - potential locations: public parking lot; on-street parking; and park	Clean Fleets and Infrastructure		Mecklenburg	Town of Matthews	Town of Matthews	
150	Install EFV Level 3 Charging Stations	The City of Monroe and other muncipalities in the region would like to install EV charging stations	Clean Fleets and Infrastructure	Transportation	Union	City of Monroe and others		
96	Install EV chargers in municipal parking lot	Salisbury is renovating the old mall into a County facility. They want to put EV charging stations in the parking lot. They've been looking at the cost to prepare for EV charging. This would require working with the City.	Clean Fleets and Infrastructure	Transportation	Rowan	City of Salisbury	City of Salisbury	
35	Expand Duke Energy Park & Plug Pilot Program	This initiative supports the town's focus on sustainability, and specifically the Sustainability and Natural Assets Strategic Plan Goal. EVs provide a better option with less impact to the environment for those who must travel by car.	Clean Fleets and Infrastructure	Transportation	Mecklenburg	Town of Davidson	Town of Davidson	Duke Energy
74	Purchase electric buses	CATS are trying to transition the fleet, there are currently 20(?). The most important thing for CATS is to have service, so when making purchases, it's difficult to come up for extra money for the cost difference between electric bus vs. hybrid ($1.3 vs. $1 million). They can either buy 10 buses of electric or 12 hybrid buses.	Clean Fleets and Infrastructure	Transportation	Mecklenburg	City of Charlotte	Charlotte Area Transit System	
146	New EV Chargers in the region (Atom Power) - Cornelius	Add chargers near I-77 in Cornelius	Clean Fleets and Infrastructure	Transportation	Region-wide	Centralina Region	Cornelius	
30	Install EV stations	The Town would like to install EV stations at municipal facilities to support municipal fleet electrification and also would like to install EV stations for public use around the Town.	Clean Fleets and Infrastructure	Transportation	Mecklenburg	Davidson	Town of Davidson	
73	Charlotte Municipal EV fleet transition	City of Charlotte is interested in EV street sweepers and associated charging infrastructure along with other fleet vehicles. The City is investing in light duty EVs but where they could use funding support is to fill the gap in public safety facilities.	Clean Fleets and Infrastructure	Transportation	Mecklenburg	City of Charlotte	City of Charlotte	
108	Charlotte Water Municipal EV fleet transition	Charlotte Water has been moving toward electrification of the utility fleet and additional funding would be immensely helpful.	Clean Fleets and Infrastructure	Transportation	Mecklenburg	City of Charlotte	Charlotte Water	
142	Locomotive repower and idle reduction	Partnership with Norfolk Southern	Clean Fleets and Infrastructure	Transportation	Mecklenburg		Mecklenburg County	
143	Purchase Municipal EVs	on-road vehicle electrification 222 vehicles	Clean Fleets and Infrastructure	Transportation	Mecklenburg		Mecklenburg County	
145	Electrify Nonroad Equipment	Electrification of diesel-powered wood chippers at 3 solid waste facilities	Clean Fleets and Infrastructure	Transportation	Mecklenburg		Mecklenburg County	
163	Deploy EV Charging Infrastructure	City wants to deploy additional EV infrastructure in 4 tranches: 1. EV charging hubs on perimeter of city to support equitable developemtn of take home Evs for city employees 2. Curbside EV charging in high density portions of the city 3. EV charging and carshare in proximity to Affordable Housing EV Arcs (Solar powered charging stations) at 20 affordable housing units 4. EV charging infrastructure at all Charlote Water facilities where plans have already been created	Clean Fleets and Infrastructure	Electricity Generation	Mecklenburg	City of Charlotte	City of Charlotte	Centralina Regional Council; Clean Aire, Sol Nation
136	Electrification of Davidson municipal fleet	Town's Climate Action Plan calls for replacement of municipal fleet to Evs	Clean Fleets and Infrastructure	Transportation	Mecklenburg	Davidson	Town of Davidson	

UNIQUE ID	PROJECT NAME	DESCRIPTION	PCAP PRIORITY MEASURE	PRIMARY EMISSIONS SECTOR	PRIMARY LOCATION (COUNTY)	LOCATION DETAILS	LEAD AGENCY	SUPPORTING AGENCY(IES)
164	Implement Belmont Center Microgrid & EV charging Project	In December 2018, Charlotte City Council unanimously adopted the Strategic Energy Action Plan (SEAP) which, amongst other items, strives for City fleet to be fueled by 100% zero-carbon sources by 2030. In support of the SEAP, We have continued to invest in onsite renewable energy, and electric vehicle charging at existing buuldings to power our future fleet. Our current Duke Energy grid mix is not carbon free and so we have to work to offset the carbon-intensive portion of the grid with renewable energy to truly power our fleet with zero carbon energy. Equity is central to our Strategic Energy Action Plan. We have a duty to prioritize underserved communities with sustainable infrastructure which will improve air quality in the community. The Belmont Center is located in a disadvantaged census tract as designated by the federal government's Climate and Economic Justice Screening Tool. This project would also be elligible for the IRA Direct Pay Tax Incentive for local governments.	Clean Fleets and Infrastructure	Electricity Generation	Mecklenburg	City of Charlotte		
140	Electrification of municipal equipment	Town's Climate Action Plan calls for replacement of municipal fleet to Evs	Clean Fleets and Infrastructure	Transportation	Mecklenburg	Davidson	Town of Davidson	
95	Install EV chargers for municipal fleet	The City of Concord's fleet travels over 3 million miles a year. If they had EV charging stations, they could transition. They have costs and locations identified for the desired EV stations, and the city has its own electrical grid and they have a list of the necessary upgrades to support the charging stations. There are current charging stations but they are not near the City of Concord's fleet, so the adding stations would mitigate that. The City has approximately 1000 wheeled assets, they turnover about 60-70 per year. They have identified products like EV vans, pickups, and sedans (light duty category) would be replaced by EVs if there was charging infrastructure.	Clean Fleets and Infrastructure	Transportation	Cabarrus	40 at the Brown Ops Center (where the majority of the fleet is garaged). 20 at our Downtown parking deck (where most of our administrative vehicles are overnighted). 10 other areas around the City (Airport, Parks and Rec Center, other administrative offices)	City of Concord	
174	New EV Chargers in Huntersville (Atom Power)	Install 4-6 EV charging stations at four Parks and Recreation facilities within the Town of Huntersville (28078 ZIP Code) facilities for public use and charging of town/country fleet vehicles in the future. Locations will be at Barry Park (13707 Beatties Ford Rd), North Meck Park (16131 Old Statesville Rd), Bradford Park (17005 Davidson-Concord Rd), and Huntersville Family Fitness & Aquatics (11725 Verhoeff Dr).	Clean Fleets and Infrastructure	Transportation	Mecklenburg	Town of Huntersville	Town of Huntersville	Centralina Regional Council; Atom Power
144	Replace Medic Vehicles	Medic vehicles replaced with hybrid vehicles	Clean Fleets and Infrastructure	Transportation	Mecklenburg			
180	Charlotte Medium and Heavy Duty Zero Emission Fleet Transition	Medium and Heavy duty fleet vehicles pose the biggest obstacle to full zero carbon fleet transition. Grant funds would be used as gap funding for the incremental cost difference of moving to a zero carbon fuel source.	Clean Fleets and Infrastructure	Transportation	Mecklenburg	City of Charlotte	City of Charlotte	
54	Purchase EVs for new microtransit service	Gastonia will be transitioning to microtransit (starting July 1, 2024), and it is not currently in the budget to purchase EVs for that service, but want grant funding to add EVs to the microtransit fleet.	Clean Fleets and Infrastructure	Transportation	Gaston	City of Gastonia	City of Gastonia	
44	Replace Kings Mountain municipal fleet vehicles with EVs	The City looks to replace meter-reading vehicles with EVs. The City doesn't have funding for those four vehicles yet, but they plan to purchase them when funding is identified.	Clean Fleets and Infrastructure	Transportation	Cleveland	City of Kings Mountain	City of Kings Mountain	
100	Expand low income home upgrade program	The City of Salisbury Community Development Corporation works with upgrades for low income homes (as does Rowan County). They have a grant program and there is always a backlog of folks that need assistance.	Decarbonized Buildings and Facilities	Building or Facility Energy	Rowan	City of Salisbury	City of Salisbury	
168	Rowan Cabarrus Community College – Facility Improvements	South Campus Decarbonization and Electrification Project; South Campus Central Energy Concept (microgrid); North Campus Geothermal Conversion; North Campus Decarbonization and Electrification Project; North Campus Microgrid Project; Energy Efficiency Improvements in North Campus Technology Education Complex.	Decarbonized Buildings and Facilities		Rowan	Rowan Cabarrus Community College Campuses	Rowan Cabarrus Community College	
170	LEED Green Associate Training	We can train for Green Building concepts in all locations, starting with those most populated. $2500 per one day training workshop for each group location. It can be offered online for reduced costs but may not be as effective. The rate per person to test for a LEED Green Associate is $200 and group rates could discount this number. Currently we do not have funds to provide this training, we could seek sponsorship in the form of matching funds. There are a number of training organizations in N.C. like Everblue Training (https://everbluetraining.com/about/) that are qualified to do the training as well and the $ would stay in the state. Here is a great example done in Georgia that can be replicated here. Last year (March 25, 2023), USGBC partnered with Sustainable Georgia Futures, a nonpartisan grassroots organization dedicated to creating green economy pathways for people of color, to offer a complimentary LEED Green Associate Training Course. Over 25 fellows attended, and received specialized training from USGBC staff to take (and pass) USGBC's LEED Green Associate professional credential course. After the complimentary workshop, this cohort planned weekly study groups and planned to take the test as a group. SDF helped purchase the test for the cohort. An N.C. example is being conducted in collaboration with Guilford College and Wiser Justice (https://www.guilford.edu/WiserJustice). This program includes LEED Green Associate testing in the NC prison system. Currently, training and testing within two facilities (Piedmont and Anson Correctional Facilities) with cohorts in both facilities. Guilford College which runs the program also has a president who is interested in expanding the program to other correctional facilities and in partnership with other educational institutions. The current contact is Jamaul Redmond <redmondja@guilford.edu> There are several other organizations which you will receive input from with a similar mission to ours. To transform how buildings and communities are designed, built and operated to create thriving, healthy, equitable and resilient places that advance human and environmental well-being. This training could be directed toward communities that want to focus on sustainable solutions. Currently we work with Wiser Justice who has done LEED Green Associate Training and testing in NC prison system. We can work with Steps4Growth to provide curriculum around the Center for Green Schools at the high school level. We can work with HBCU's like Johnson C. Smith for this educational opportunity. We can coordinate with Charlotte Mecklenburg Climate Leaders to gather those interested in their communities. We also collaborate with Sustain Charlotte. County/City employees and public officials also would be good candidates for training. Knowledge is Power! Currently we work with Wiser Justice who has done LEED Green Associate Training and testing in NC prison system. We can work with Steps4Growth to provide curriculum around the Center for Green Schools at the high school level. We can work with HBCU's like Johnson C. Smith for this educational opportunity. We can coordinate with Charlotte Mecklenburg Climate Leaders to gather those interested in their communities. We also collaborate with Sustain Charlotte. County/City employees and public officials also would be good candidates for training. Knowledge is Power!	Decarbonized Buildings and Facilities	Other/Cross Cutting	Region-wide		U.S. Green Building Council Carolinas Community	
8	Aquatic and Fitness Center Improvements	Reducing energy usage in one of facilities that is heaviest energy user among town buildings (88,000sf aquatic and fitness center). Call with Bobby 01/29: HFFA Facility- install renewable energy systems, upgrade energy systems, one of the largest energy users in the Town, high-profile/international facility	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	Huntersville	Town of Huntersville	

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17	Renewable Energy Transition Initiative (RETI)	RETI is a partner with the City of Charlotte on the Smart Homes Kickstart, which is part of the North End Smart District, The kickstart uses technology and equitably works with the community to decrease the energy costs and provide quality of life improvements for the 33 participant households. RETI provides energy education and training to lower their energy burdens in conjunction with smart technology. RETI is working to sustainably decrease the energy costs of families with high energy burdens. RETI's mission is carried out through their outreach, education, and strategic partnerships.	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	City of Charlotte	City of Charlotte	Envision Charlotte
19	Upgrade new and existing government buildings to LEED	The Policy for Sustainable Facilities (PSF) is a plan that will see all new and existing government buildings (over 5000 sq. ft.)upgraded to LEED Certified requirements, with an additional requirement to achieve Energy Star certification by 2026. The implementation of this plan is overseen by the Sustainable Facilities Oversight Team (SFOT)	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	City of Charlotte	City of Charlotte	Envision Charlotte
77	Expand residential deep energy retrofit program	Duke Energy -City of Charlotte Pilot for deep energy retrofits and health and safety work in income qualified households (could expand clean energy technologies in ALL of our home rehab projects). Other communities have incentives for home rehabs and that they would like to replace outdated appliances during home rehabs with additional funding.	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	City of Charlotte	City of Charlotte	Duke Energy
78	Upgrade municipal facilities and create nature centers (see action IDs 115-145 for list of measures)	See action IDs 115-145. 4-5 energy projects—upgrades of facility and the construction of nature centers. The projects are currently approved for capital funding over the next 3-4 Fiscal Years, but budget ordinances aren't set up until a couple weeks before the FY begins. Estimates were based on typical standards for county facilities and do not include geothermal heating/cooling or solar, so those would still need planning and design.	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	Mecklenburg County	Mecklenburg County	
82	Expand PowerDown the Crown (voluntary benchmarking program) to include audits and incentives to implement recommendations for participants	City of Charlotte launched PowerDown the Crown for nonresidential business owners to reduce energy use intensity by 10% by 2030 and share data with the city which would be published on the City's dashboard where municipal benchmarks are. That program with an infusion of funds could be expanded with an incentive for participants to receive energy efficiency audits and to fund the recommendations that come out of those audits.	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	City of Charlotte	City of Charlotte	
130	Renovate Naomi Drenan Recreation Center	Borders LIDAC community	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	750 Beal Street,	Mecklenburg County	
131	Complete the Park Road Park Indoor Pavilion		Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	6220 Park Rd	Mecklenburg County	
132	Build the Ribbonwalk Nature Center	Energy Efficient design & Solar for planned new construction	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	4601 Nevin Rd.	Mecklenburg County	
133	Build the McDowell Nature Center	Energy Efficient design & Solar for planned new construction	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	15222 York Rd	Mecklenburg County	
105	Convert municipal lighting to LED	They are currently converting lighting to LED. They convert where they can, but if they could convert more lighting faster with additional funding, that would be really helpful.	Decarbonized Buildings and Facilities	Building or Facility Energy	Stanly	Stanly County	Stanly County	
81	Expand critical home repair program to include energy efficiency upgrades	The Town has critical home repair where they could add energy efficient upgrades if possible.	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	Town of Davidson	Town of Davidson	Habitat for Humanity, Davidson Housing Coalition, Advanced Energy
151	Complete Energy Audits and Improvements for Charlotte Water Administrative Buildings	Charlotte Water operates 6+ administrative buildings, 5 of which are in need of energy audits, electrical upgrades, generator replacement and/or submetering. Sustainable energy projects are intended to be implemented.	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	City of Charlotte, Huntersville, and Pineville	Charlotte Water	
83	Complete Electrification Study for municipal buildings	Electrification Study for municipal buildings in Charlotte	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	City of Charlotte	City of Charlotte	

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134	Build the Albemarle Road Recreation Center	Energy Efficient design & Solar for planned new construction	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	5027 Idlewild Rd N.	Mecklenburg County	
135	Build the Tuskaseegee Recreation Center	Energy Efficient design & Solar for planned new construction	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	4820 Tuckaseegee Rd	Mecklenburg County	
138	Complete deep energy retrofits	New courthouse; Ivory Baker; Aquatic Center	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg		Mecklenburg County	
91	Build an energy efficient town hall with solar	The Town of Troutman acknowledged that the new town hall is being planned and staff want it to be energy efficient. The Town also wants a sustainable power grid. The current Town Hall building will turn into a standalone police department. Currently, plans are in the design phase but the goal is to use solar as much as possible. There is a recognition that solar can be cost prohibitive though.	Decarbonized Buildings and Facilities	Building or Facility Energy	Iredell	Town of Troutman	Town of Troutman	
92	Transition to municipal LED lighting	County is moving all its facilities over to using LED lighting, but that process is taking years because of the cost and limitations on the budget.	Decarbonized Buildings and Facilities	Building or Facility Energy	Iredell	Iredell County	Iredell County	
152	Create Charlotte Water Sustainability Program and Complete Departmental Energy Assessment	Charlotte Water is interested in energy audits at all operational facilities (15+) across the service area, before proceeding with many identified electrical energy reduction projects. This may include pump efficiencies, water and wastewater treatment plant greehouse gas emmission calculations, Smart Meter installaitons at customer meters, data collection setup, and Capital planning of sustainability intiatives.	Decarbonized Buildings and Facilities	Building or Facility Energy	Mecklenburg	City of Charlotte, Huntersville, and Pineville	Charlotte Water	
57	Improve energy efficiency and weatherization of old mill homes	Cramerton noted that they have a CDBG grant to conduct weatherization of old mill homes. They received over $1 million to conduct weatherization of old mill homes, and if they could supplement that and fully complete the work, they want to make old mill homes energy efficient. They they will be able to do some of everything they wanted to do—which was 5 homes and a school.	Decarbonized Buildings and Facilities	Building or Facility Energy	Gaston	Town of Cramerton	Town of Cramerton	N/A
58	Weatherize Old Homes	City of Gastonia noted that as an entitled city, Gastonia can rehab about 15 homes over two fiscal years, but the challenge is that they still have a significant waitlist, so they want to get homes rehabilitated (weatherized) faster which would also make homes more affordable.	Decarbonized Buildings and Facilities	Building or Facility Energy	Gaston	City of Gastonia	City of Gastonia	Crisis Assistance Ministry-Gastonia;Gaston County DHHS;Habitat for Humanity of Gaston County, Inc, United Way of Gaston County
49	Replace diesel generator with natural gas generator	Cleveland Community College has a diesel generator that has caused problems and serves a 50,000 sq ft allied health and science training facility. There is interest in replacing the generator with a natural gas generator. The engineering plan has been completed. However, the cost of the generator and installation is expected to range about $75,000-$100,000 and the college is not sure where to find those funds.	Decarbonized Buildings and Facilities	Building or Facility Energy	Cleveland	Cleveland Community College	Cleveland Community College	N/A
107	Install an agricultural anaerobic digester	The City of Monroe noted that anaerobic digesters are very large scale. A private entity has one planned near a poultry farm, and there may be a funding gap depending on who is buying the electricity. If the agreements don't work out, there could be a funding gap there.	Renewable Energy and Storage Systems	Electricity Generation	Union	City of Monroe	City of Monroe	
18	Install 10 MW solar panel array on Statesville Landfill property	The City of Charlotte's Statesville Avenue Landfill property operated as a municipal landfill from the 1940's until 1970. The property is now vacant and fenced. The City has been seeking suitable redevelopment options for the property. A Solar Energy Feasibility Study done in 2013 indicates that property could support up to a 10 MW solar panel array on the 60 acres deemed desirable for solar development. May not be the best fit - for remediation + solar installation, minimal GHG Reductions before 2030	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	City of Charlotte	City of Charlotte	Envision Charlotte
80	Install solar on municipal buildings	Town of Davidson has one facility with solar currently and are studying feasibility of other facility upgrades.	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	Town of Davidson	Town of Davidson	Advanced Energy
139	Install solar panels on closed landfill	167 acres of solar installed on closed Holbrooks Landfill	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	Huntersville	Mecklenburg County	
153	Create a Solar Farm	Charlotte Water is interested in constructing a solar farm on City owned property, adjacent to their newest Water Resource Recovery Facility, currently under construction. Stowe RWRRF	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	Charlotte ETJ	Charlotte Water	
154	Biogas Upgrading and Trucking (Mallard)	Biogas Upgrading and Trucking to End User (RNG)	Renewable Energy and Storage Systems	Waste, Water, and Sustainable Materials Management	Mecklenburg	Charlotte ETJ	Charlotte Water	

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155	Create Biogas Pipeline (Irwin)	Gas Pipeline to End User	Renewable Energy and Storage Systems	Waste, Water, and Sustainable Materials Management	Mecklenburg	Charlotte ETJ	Charlotte Water	
156	Increase Biogas Production (McDowell)	Food Waste Receiving Full Scale Trial	Renewable Energy and Storage Systems	Waste, Water, and Sustainable Materials Management	Mecklenburg	Charlotte ETJ	Charlotte Water	
157	Install Solar (Irwin)	Up to 5 acres of Solar	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	Charlotte ETJ	Charlotte Water	
158	Install Solar (Sugar)	Up to 3 acres of Solar	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	Charlotte ETJ	Charlotte Water	
171	Baker Sports parking lot solar canopy project	The Baker Sports parking lot solar canopy project will directly reduce Davidson College's electrical demand on the local grid by about 1MW. It will also offer co-benefits: energy resilience of a portion (approximately 7%) of the College's electrical needs in case of local grid failure; shading of cars and reduced urban heat island effect on an existing parking lot; and integrated EV charging stations that draw directly from renewable energy. Because the project will be sited on an existing parking lot, it avoids the long-term maintenance concerns that often accompany rooftop projects and will not add water quality stressors that can occur from adding impervious surfaces (solar panels) above a vegetated landscape. As a key parking lot for campus events, the installation will be high visibility to the general public and include educational signage that encourages increased adoption of renewable energy technologies by other individuals and organizations. As an anchor organization in the Charlotte region and particularly northern Mecklenburg County, Davidson College is committed to modeling sustainability in campus operations, in addition to delivering on its educational mission and advancing racial justice. Current organizational partnerships with LIDAC communities are both broad and deep across academic, service, research support, and logistical partnerships. Specific to climate-related efforts: the Sustainability Scholars program engages ten community partner orgs annually to deliver an interdisciplinary project and these efforts often focus on environmental justice and climate justice outcomes; regular partnership with West Davidson resident and the Town of Davidson for projects of shared value including food waste composting, alternative transportation planning, air quality monitors, green space improvements, and other emergent needs; and service by the college's Director of Sustainability on the Pottstown (Huntersville) 31-acres committee working with local Black residents in Pottstown to advise the county on desired use of a wooded property in the center of the community; and local convening efforts intentionally include LIDACs. Just as LIDACs are a key constituency in other areas of college-community engagement, they will be part of the outreach, planning support, and logistical benefit arising from this project. More generally, the project will reduce burden on the existing local grid to the benefit of local residents at particular risk during grid blackouts. The project contractor, and likely the EV station subcontractor, are both local businesses (one based in Davidson, one in Huntersville) also committed to local economic development and impact. As an anchor organization in the Charlotte region and particularly northern Mecklenburg County, Davidson College is committed to modeling sustainability in campus operations, in addition to delivering on its educational mission and advancing racial justice. Current organizational partnerships with LIDAC communities are both broad and deep across academic, service, research support, and logistical partnerships. Specific to climate-related efforts: the Sustainability Scholars program engages ten community partner orgs annually to deliver an interdisciplinary project and these efforts often focus on environmental justice and climate justice outcomes; regular partnership with West Davidson resident and the Town of Davidson for projects of shared value including food waste composting, alternative transportation planning, air quality monitors, green space improvements, and other emergent needs; and service by the college's Director of Sustainability on the Pottstown (Huntersville) 31-acres committee working with local Black residents in Pottstown to advise the county on desired use of a wooded property in the center of the community; and local convening efforts intentionally include LIDACs. Just as LIDACs are a key constituency in other areas of college-community engagement, they will be part of the outreach, planning support, and logistical benefit arising from this project. More generally, the project will reduce burden on the existing local grid to the benefit of local residents at particular risk during grid blackouts. The project contractor, and likely the EV station subcontractor, are both local businesses (one based in Davidson, one in Huntersville) also committed to local economic development and impact.	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	Davidson College	Davidson College	
56	Implement solar panel ordinances and installations	Holy Angels, associated with Belmont Abbey, is looking at solar panels and currently Belmont does not have many ordinances for freestanding solar. They determined it would cost upwards of $500,000. The ordinance or solar panels on the canopy itself could be measures.	Renewable Energy and Storage Systems	Electricity Generation	Gaston	City of Belmont	City of Belmont	
99	Constuct geothermal project	Rowan Cabarrus Community College already has a designer selected for the geothermal project and they have funding for design which can be completed and ready for construction by December 2024.	Renewable Energy and Storage Systems	Electricity Generation	Rowan	City of Kannapolis	Rowan Cabarrus Community College	Cabarrus County
9	Install solar on affordable/workforce housing	Solar and battery storage for buildings. Solar would be installed on affordable/workforce housing homes in the community. The town is planning to participate in a solarize campaign if one becomes available in our area.	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg	Town of Davidson	Town of Davidson	Habitat for Humanity, Davidson Housing Coalition
141	Install solar panel on identified buildings	Matthews Sportsplex; David B Waymer Rec Center, Materials Recovery Center; Betty Rae Thomas Rec Center; Valerie C. Woodard Center	Renewable Energy and Storage Systems	Electricity Generation	Mecklenburg		Mecklenburg County	
47	Install RNG Stations	City of Kings Mountain is an ElectriCity, but they also have their own natural gas systems. Carolina Power Partners uses natural gas to make electricity. The City-operated natural gas utility is working with a group that installs RNG stations. Methane gas collected from rural locations is trucked in and added to the pipeline at RNG stations. They are looking to add two different stations.	Renewable Energy and Storage Systems	Electricity Generation	Cleveland	City of Kings Mountain	City of Kings Mountain	
52	Expand program to create RNG from agricultural methane gas	Kings Mountain wants to expand the RNG generation program. They are working with farmers to capture methane gas as well as those who are looking to capture methane gas from landfills in order to maximize opportunities for RNG. Kings Mountain understood that a lot the methane is from cattle farms though Caldwell County has a lot of hog farms. Methane is also from landfills.	Renewable Energy and Storage Systems	Electricity Generation	Cleveland	City of Kings Mountain	City of Kings Mountain	
93	Implement a Farmers Market	Iredell County intends to have a Farmers Market at the fairgrounds and wants to educate the public on farming more, using the regional events center to do that.	Sustainable Food Production and Distribution	Agricultural	Iredell	Iredell County	Iredell County	
67	Expand and enhance school farm	The Gaston County School Board has a 1-acre farm they are trying to expand or implement more automation. They have a Farm to School project where the farm produces lettuce, tomatoes, and more and those products go straight to school lunches. The farm is feeding 30,000 students a week with produce straight from the farm. That project could be ready for implementation in other school districts.	Sustainable Food Production and Distribution	Agricultural	Gaston	City of Gastonia	City of Gastonia	Gaston County School Board

Priority Climate Action Plan | March 1, 2024 | Climate Pollution Reduction Grant (CPRG) Program
Charlotte-Concord-Gastonia NC/SC Metropolitan Statistical Area (CLT MSA)
Appendix C: Priority Measure Implementation-Ready Projects List

UNIQUE ID	PROJECT NAME	DESCRIPTION	PCAP PRIORITY MEASURE	PRIMARY EMISSIONS SECTOR	PRIMARY LOCATION (COUNTY)	LOCATION DETAILS	LEAD AGENCY	SUPPORTING AGENCY(IES)
63	Create the Amay James Urban Ag Park	The Amay James Urban Ag Park is not funded. NC Cooperative Extension and Meck County Park and Recreation are working with McAdams to design the 44 acres in West Charlotte, a historically black neighborhood, off of West Blvd., and they used a $200,000 USDA grant to create a master plan, but there is not funding for executing the project. Will include composting. The entire 44 acre project is still in master plannign stage, is not implementation ready. However a section of it could be and could serve as a scalable pilot project - Focus on conversion of blacktops/basketball courts to farming plots. Allison Anolik has more information.	Sustainable Food Production and Distribution	Agricultural	Mecklenburg	Mecklenburg County	Mecklenburg County	NC Cooperative Extension
42	Use tree data canopy data to identify and prioritize canopy expansion	Assessment identifies recommendations to increase tree canopy efforts to build on (pg. 33-34): 1. Leverage the results of this assessment to promote the urban forest and set canopy goals 2. Use the urban tree canopy data to identify areas to prioritize canopy expansion 3. Update Charlotte's Tree Canopy Action Plan (TCAP) 4. Use TreePlotter to identify areas in need of tree canopy, prioritize planting efforts, and continue to monitor the urban forest	Trees and Greenspaces	Other/Cross Cutting	Mecklenburg	City of Charlotte	Trees Charlotte	City of Charlotte, PlanIt Geo, earth define
70	Partner with Arbor Day Foundation for free tree giveaways	Harrisburg used the Arbor Day Foundation because they do free tree giveaways. The City of Charlotte has a program with Memorial Trees and free tree giveaways every year. It may be possible to partner with the Arbor Day Foundation at a local level.	Trees and Greenspaces	Other/Cross Cutting	Mecklenburg	Town of Harrisburg	Town of Harrisburg	
159	Expand Tree Plantings	Location TBD	Trees and Greenspaces	Other/Cross Cutting	Mecklenburg	Charlotte ETJ	Charlotte Water	
68	Expand the Canopy Care Program, which is for planting trees in low-income communities	City of Gastonia noted that Charlotte got $1 million to establish the Canopy Care program to replace hazardous trees in low-income communities. Unsure if the program funding covers all the tree replacement. Hazardous trees are a danger and pose a financial risk, replacing them can be hard too.	Trees and Greenspaces	Other/Cross Cutting	Gaston	City of Gastonia	City of Gastonia	
166	Urban Forestry Neighborhood Master Plan	The scope of the project is to develop an Urban Forestry Neighborhood Master Plan to provide a framework for the City to effectively manage and maintain the urban and community forest of the York Chester Historic District as a sustainable asset, consistent with the values and needs of the community, while maximizing its ecological, social, health, and economic benefits. The plan will help create a better understanding of the City's tree maintenance needs; provide a template for a city-wide Urban Forestry Master Plan; prioritize tree removal and planting; develop risk management and hazard mitigation strategies; and allow the City to advocate and advance the myriad of benefits that trees provide to the community. It is hoped that the development of a Tree Master Plan for the York Chester Neighborhood will result in the reduction of greenhouse gases through the preservation of the existing tree canopy.	Trees and Greenspaces		Gaston	City of Gastonia	City of Gastonia	
103	Expand tree giveaway program	Currently the We Dig Salisbury event takes place biennially in the Spring. The event consists of 15-20 educational booths, 100-150 free 3-5 gallon trees for those that visit 5 education booths, as well as tree planting and tree planting demonstrations on site. Each year the giveaway takes place in a different area of town. The event has a budget of $2,000 for purchases of trees, raffle items, and supplies. We also receive some sponsorship from local education groups, garden centers, as well as an art gallery. One of the raffle items is a larger size tree (10+ gallon) for planting with assistance from Salisbury's Public Work staff. Expanding the program would mean that we could give away more trees, plant more trees on public property, as well as expand the reach. The West End neighborhood proposed for the 2024 We Dig event has multiple City properties where tree planting demonstrations could take place, (park and recreation sites, a community center, as well as a community garden site). The West End neighborhood has a larger need for more trees to be planted as documented from the recent tree assessment.	Trees and Greenspaces	Other/Cross Cutting	Rowan	City of Salisbury	City of Salisbury	Public Works Department and Planning & Neighborhood Department
60	Preserve tree canopy area in the York Chester Neighborhood	York Chester Neighborhood's push to preserve the tree canopy area. A good portion of the neighborhood is in a disadvantaged community. It's a project that Council approved the RFP to do the project, but the City removed the project from the budget, so it has never been funded. There is clear support from Council, Tree Advisory Commission, and the neighborhood, but the project lacks funding to be implemented.	Trees and Greenspaces	Other/Cross Cutting	Gaston	City of Gastonia	City of Gastonia	
181	Regional Composting Program		Waste Diversion		Region-wide			
64	Implement a recycling program through the Innovation Barn	The Farmers Market representative recommended speaking to Daniel Heaton about the Innovation Barn on Seigle Ave. They have a No. 5 Recycle Program that they are a part of, but they need more funding to implement. The City of Harrisburg representative also seconded the idea of the Innovation Barn with Daniel Keaton and Amy Ossacker. The Innovation Barn helps develop a circular economy, so an infusion of funds there could help them identify more ideas/outlets for cutting down waste.	Waste Diversion	Waste, Water, and Sustainable Materials Management	Mecklenburg	City of Charlotte	City of Charlotte	Envision Charlotte
43	Expand composting program	**Focus Group:** The Town of Davidson noted their partnership with CrownTown Compost. The Town provides composting bins around town and people can bring compost to those bins, and that is a project that can be expanded easily. **Report:** The Town of Davidson recently conducted a food waste pilot project with grant funding from the North Carolina Department of Environmental Quality (NCDEQ). The program is currently serving nearly 200 households, diverting over 525 pounds of food waste per week from the landfill.	Waste Diversion	Waste, Water, and Sustainable Materials Management	Mecklenburg	Town of Davidson	Town of Davidson	CrownTown Compost
102	Create composting drop off program	Concord applied for a grant to fund a site in Cabarrus County that would allow up to 300 households to drop off their food waste and turn it into compost. Hauling is the big cost for the program. That program is implementation ready but was unsuccessful for the grant applied for.	Waste Diversion	Waste, Water, and Sustainable Materials Management	Cabarrus	City of Concord	City of Concord	
169	North Mecklenburg Climate Health and Equity Collaborative	North Mecklenburg Climate Health and Equity Collaborative- Form a collaborative utilizing Stanford Social Innovation Center's Collective Impact Model with town of Davidson serving as a backbone organization. The collaborative would be made up of a number of sector specific sub-collaboratives such as a private sector, nonprofit sector, community based organization sector, government sector and academic sector. From these sub-sector collaborative representatives would be selected to participate in a multi-sector collaborative. The area of focus would be north Mecklenburg County so all sub-sector participants would be required to have a presence within that geographic scope. This collaborative would seek to set Climate Health and Equity priorities for the region and foster the necessary collaboration to address prioritized challenges with realistically implementable solutions. Funding would support salary of a backbone organization coordinator and administrative responsibilities and have funding available for sub-grants to community based organization and nonprofit collaborator projects. Ideally a minimum of 3 years of full funding would seed the collaborative with transition to member and grant funding sources for long term sustainability.	All	Other/Cross Cutting	Mecklenburg	North Mecklenberg	Town of Davidson	

Total Projects Identified = 128

Appendix D

LIDAC Census Tracts Affected by Priority Measures

Priority Measure	County	Affected LIDAC Census Tracts
Alternative Transportation	Anson, NC	37007920400, 37007920500
	Cabarrus, NC	
	Chester, SC	45023020800, 45023020400, 45023020500
	Cleveland, NC	3704595030, 137045950102, 37045950101, 37045950200
	Gaston, NC	37071031500, 37071033400, 37071030205
	Iredell, NC	37097060801, 37097060603
	Lancaster, SC	45057010200, 45057011001, 45057011002
	Lincoln, NC	37109070300
	Mecklenburg, NC	37119004500, 37119001507, 37119005616, 37119001608
	Rowan, NC	37159051801, 37159050904, 37159050800
	Stanly, NC	37167931202
	Union, NC	37179020601, 37179020901, 37179020800
	York, SC	45091061701, 45091061900, 45091061401, 45091060502, 45091061301, 45091061202
Decarbonized Buildings & Facilities	Anson, NC	37007920400, 37007920500, 37007920600, 37007920100
	Cabarrus, NC	
	Chester, SC	
	Cleveland, NC	
	Gaston, NC	
	Iredell, NC	
	Lancaster, SC	
	Lincoln, NC	
	Mecklenburg, NC	37119004800, 37119004900, 37119005200
	Rowan, NC	
	Stanly, NC	
	Union, NC	
	York, SC	
Clean Fleets & Infrastructure	Anson, NC	37007920400
	Cabarrus, NC	37025042101
	Chester, SC	45023020300
	Cleveland, NC	37045950900
	Gaston, NC	37071031500, 37071032000, 37071032100
	Iredell, NC	
	Lancaster, SC	45057010700
	Lincoln, NC	
	Mecklenburg, NC	37119004500, 37119003600, 37119004600, 37119003700, 37119003807, 37119001504, 37119005100, 37119005200, 37119005916, 37119004800, 37119004900, 37119001801

Priority Measure	County	Affected LIDAC Census Tracts
	Rowan, NC	
	Stanly, NC	
	Union, NC	
	York, SC	45091060501, 45091060502, 45091060401
Renewable Energy & Storage Systems	Anson, NC	37007920400, 37007920500, 37007920100
	Cabarrus, NC	
	Chester, SC	45023020100
	Cleveland, NC	
	Gaston, NC	37071031500, 37071032000
	Iredell, NC	37097060200, 37097060300
	Lancaster, SC	45057010700
	Lincoln, NC	
	Mecklenburg, NC	
	Rowan, NC	
	Stanly, NC	
	Union, NC	
	York, SC	45091060501, 45091060502, 45091060401
Trees & Greenspaces	Anson, NC	
	Cabarrus, NC	37025041901
	Chester, SC	37025042300
	Cleveland, NC	37025041902
	Gaston, NC	37025042101
	Iredell, NC	37025042000
	Lancaster, SC	
	Lincoln, NC	
	Mecklenburg, NC	
	Rowan, NC	
	Stanly, NC	
	Union, NC	
	York, SC	
Waste Diversion	Anson, NC	37045951100, 37045951000, 37045950302, 37045950400 37045950602, 37071031102, 37119004500, 37119004200 37119004000, 37119006010, 37119004302, 37119003600 37119003700, 37119003802, 37119003201, 37119003902, 37119003109, 37119004600, 37119004800, 37119004900, 37119005100, 37119005200, 37119005301, 37119001300 37119001910, 37119001914, 37119001701, 37167930300, 45023021000, 45023020900 45057010700, 45057010800 45091060901, 45091060401, 45091060300
	Cabarrus, NC	
	Chester, SC	
	Cleveland, NC	
	Gaston, NC	

Priority Measure	County	Affected LIDAC Census Tracts
	Iredell, NC	
	Lancaster, SC	
	Lincoln, NC	
	Mecklenburg, NC	
	Rowan, NC	
	Stanly, NC	
	Union, NC	
	York, SC	
Sustainable Food Production & Distribution	Anson, NC	37007920200, 37007920400, 37007920500, 37007920600, 37007920100, 37097060400
	Cabarrus, NC	
	Chester, SC	
	Cleveland, NC	
	Gaston, NC	
	Iredell, NC	37097060801, 37097060802, 37097060902, 37097060601, 37097060603
	Lancaster, SC	
	Lincoln, NC	37109070800, 37109070901, 37109070201, 37109070300, 37109071002, 37159050201
	Mecklenburg, NC	
	Rowan, NC	37159051700, 37159051502, 37159051303, 37159051801, 37159050904, 37159050800, 37159051204
	Stanly, NC	
	Union, NC	
	York, SC	

Appendix E

LIDAC Socioeconomic Analysis Results by County

As part of the process of identifying priority measures for this PCAP, a socioeconomic analysis was conducted to identify the LIDACs in the CLT MSA study area and the associated LIDAC demographics, environmental justice indicators, and environmental and economic concerns for the LIDAC populations. The results of this analysis are summarized by county in the following table.

County	Socioeconomic Analysis Results
Anson, NC	– EJScreen identifies residents as 47% low income and 56% people of color. – $23,070 is the per capita income and 18% identify as persons with disabilities. – Spanish is the primary language for 5% of the population. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Traffic Proximity, Lead Paint and Underground Storage Tanks. – In the CEJST, all the census tracts identified as disadvantaged had climate concerns regarding expected agricultural and/or building loss. – Energy costs burdens on households and diabetes were flagged in over half of disadvantaged census tracts in Anson County.
Cabarrus, NC	– EJScreen identifies residents as 24% low income and 37% people of color. – $35, 275 is the per capita income and 11% identify as persons with disabilities. – 8% of the population speak Spanish and 2% speak Indo-European languages. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases To Air, Traffic Proximity, Lead Paint, Superfund Proximity, Risk Management Program (RMP) Facility Proximity, and Underground Storage Tanks. – Majority of the census block groups identified are around the town of Concord. – In the CEJST, workforce development is a concern in the majority of disadvantaged census tracts in Cabarrus County, near the town of Kannapolis and northeast of Mount Pleasant. – Proximity to RMP facilities and Superfund sites are pollution concerns near the city of Concord.
Chester, SC	– EJScreen identifies residents as 44% low income and 42% people of color. – $24,399 is the per capita income and 17% identify as persons with disabilities. – 3% of the population speak Spanish. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Ozone, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Lead Paint, RMP Facility Proximity, Underground Storage Tanks. and Wastewater Discharge. Wastewater discharge is primarily near Great Falls. – Many of the census block groups were identified throughout the county, near the City of Chester and Town of Airlee. – The primary health indicators identified in the CEJST were low life expectancy, heart disease and diabetes. – Transportation barriers were another major indicator from the CEJST for Chester County.

County	Socioeconomic Analysis Results
Cleveland, NC	– EJScreen identifies residents as 42% low income and 28% people of color. – $24,505 is the per capita income and 16% identify as persons with disabilities. – 3% of the population speak Spanish and 2% speak Asian-Pacific Island languages. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases To Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. – The Town of Shelby has a high number of census block groups with Diesel PM concerns and Hazardous Waste Proximity near Kings Mountain. – In the CEJST, transportation barriers and wastewater (underground storage tanks and wastewater discharges) are the major concerns in the County's disadvantaged census tracts.
Gaston, NC	– EJScreen identifies residents as 33% low income and 30% people of color. – $30,607 is the per capita income and 16% identify as persons with disabilities. – 6% of the population speak Spanish and 2% speak Indo-European Island languages. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks and Wastewater Discharge. – One census block group was above the 90th percentile for all supplemental indexes, in Northwest Gastonia (west of N. Chester Street, off interstate 85). – West of the Catawba River and North of the town of Belmont were numerous census block groups with Hazardous Waste and Wastewater discharge concerns. – In the CEJST, health categories such as heart disease and low life expectancy (13/19 census tracts), and proximity to RMP and Superfund sites (12/19 of the census tracts) were in majority of disadvantaged census tracts.
Iredell, NC	– EJScreen identifies residents as 26% low income and 25% people of color. – $37,667 is the per capita income and 12% identify as persons with disabilities. – 6% of the population speak Spanish, 2% speak Indo-European Island languages and 1% speak Asian-Pacific languages. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Underground Storage Tanks, and Wastewater Discharge. – In the City of Statesville, near Bagnal Blvd, is a census block group that has all supplemental indexes above the 90th percentile. – From the CEJST, the primary climate concern is expected agricultural loss. RMP and Superfund proximity is a pollution concern primarily south of City of Statesville.

County	Socioeconomic Analysis Results
Lancaster, SC	– EJScreen identifies residents as 30% low income and 30% people of color. – $35, 974 is the per capita income and 14% identify as persons with disabilities. – 5% of the population speak Spanish and 1% Indo-European languages. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Ozone, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility, Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. – Toxic Release to Air were primarily located near Kershaw Camden Highway, North of Heath Springs. – RMP Facility Proximity and Wastewater Discharge, were solely near Town of Kershaw, off Gold Mine Highway. – Workforce development and transportation burdens account for half of the burdens indicated in the disadvantaged census tracts from the CEJST.
Lincoln, NC	– EJScreen identifies residents as 29% low income and 16% people of color. – $35,929 is the per capita income and 15% identify as persons with disabilities. – 8% of the population speak Spanish. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, RMP Facility, Underground Storage Tanks, and Wastewater Discharge. – Majority of the census block groups were identified near the Town of Lincolnton. – In all of the census tract identified as disadvantaged from the CEJST, expected agricultural loss was the sole climate concern.
Mecklenburg, NC	– EJScreen identifies residents as 26% low income and 54% people of color. – $43,919 is the per capita income and 8% identify as persons with disabilities. – 12% of the population speak Spanish, 5% Asian, 2% Indo-European or Pacific Island languages, 1% French or Haitian, and 1% Arabic. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. – One census block group is above the 90th percentile for all supplemental indexes; located off S Tryon Street in the Reamount and Brookhill Rd area. – 51 out of 63 census tracts in the CEJST identify workforce development as a burden. – Underground storage tanks, formerly used defense sites, housing costs and history of underinvestment were pollution and housing concerns near midtown of the City of Charlotte, off Interstate 77. – Traffic volume and proximity and asthma are additional burdens that are flagged throughout Mecklenburg County.

County	Socioeconomic Analysis Results
Rowan, NC	– EJScreen identifies residents as 39% low income and 29% people of color. – $27,964 is the per capita income and 17% identify as persons with disabilities. – 8% of the population speak Spanish. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. – One census block group is above the 90th percentile for all supplemental indexes in the City of Salisbury; located east of Main Street and north of Alexander Blvd S. – The Town of China Grove had several census block groups of concern with wastewater discharge. – In the CEJST, expected agriculture loss and workforce development are the primary concerns for the area.
Stanly, NC	– EJScreen identifies residents as 31% low income and 20% people of color. – $27,964 is the per capita income and 17% identify as persons with disabilities. – 6% of the population speak Spanish. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, RMP Facility Proximity, Underground Storage Tanks, and Wastewater Discharge. – Majority of identified census block groups were around City of Albemarle. – Lack of indoor plumbing was the primary housing concern identified in the CEJST in half the census tracts.
Union, NC	– EJScreen identifies residents as 22% low income and 29% people of color. – $40,270 is the per capita income and 9% identify as persons with disabilities. – 9% of the population speak Spanish, 1% Russian, Polish or Slavic, 2% Indo-European, and 1% Asian or Pacific Island languages. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, RMP Facility Proximity, Hazardous Waste, Underground Storage Tanks, and Wastewater Discharge. – Census block groups were identified around the City of Monroe and Towns of Marshville and Wingate. – In the CEJST, transportation barriers are identified in half of the disadvantaged census tracts.

County	Socioeconomic Analysis Results
York, SC	– EJScreen identifies residents as 24% low income and 31% people of color. – $37, 804 is the per capita income and 11% identify as persons with disabilities. – 92% of residents speak English at home while 5% speak Spanish, and 3% Asian or Pacific Island languages. – EJScreen has identified census block groups within the county that are at or above the 90th percentile for these supplemental indexes (compared to the US): Particulate Matter, Ozone, Diesel PM, Air Toxics Cancer Risk, Air Toxics Respiratory, Toxic Releases to Air, Traffic Proximity, Lead Paint, Superfund Proximity. RMP Facility Proximity, Hazardous Waste, and Underground Storage Tanks. Near Rock Hill, Delphia and York are majority of the census block groups that have high Ozone exposure. Air Toxic Cancer Risk is primarily near Rock Hill. – In the CEJST, transportation burdens, energy costs, wastewater discharge, and asthma are burdens throughout York County in disadvantaged census tracts. – York County has a census tract (census tract 45091061202) where 9% of the lands are of the Catawba Tribe.