Clean Air Mississippi Project
CAMP

Mississippi Band of Choctaw Indians

Priority Climate Action Plan

April 1, 2024

OFFICE OF ENVIRONMENTAL PROTECTION
MISSISSIPPI BAND OF CHOCTAW INDIANS

Statutory Authority to Implement

MBCI is a federally-recognized Indian tribe that is governed by a Tribal Council of seventeen elected representatives (the legislature), an elected Tribal Chief (the executive), and an independent judiciary established by MBCI's Tribal Council. MBCI has developed a PCAP pursuant to MBCI Tribal Council Resolution CHO 14-074, which authorizes MBCI's Tribal Chief to apply for EPA grant funding on an ongoing basis. However, MBCI's Tribal Council has not yet adopted legislation authorizing implementation of the PCAP. MBCI has submitted an application for Treatment as an Affected State (TAS) under EPA's Tribal Authority Rule, but that application has been pending final determination by the Regional Administrator since January 2024.

Contents

Figures

Tables

Abbreviations

AC	Alternating current
CAMP	Clean Air Mississippi Project
CCAP	Comprehensive Climate Action Plan
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CPRG	Climate Pollution Reduction Grant
DC	Direct current
DOE	United States Department of Energy
EIA	Energy Information Administration
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
HVAC	Heating, ventilation, and air conditioning
IPCC	Intergovernmental Panel on Climate Change
IRA	Inflation Reduction Act
ILTF	Indian Land Tenure Foundation
kW	Kilowatt
kW_{AC}	Kilowatt alternating current
kW_{DC}	Kilowatt direct current
kWh	Kilowatt hour
LIDAC	Low Income and Disadvantaged Communities
LULUCF	Land Use, Land-Use Change and Forestry
MBCI	Mississippi Band of Choctaw Indians
MDEQ	Mississippi Department of Environmental Quality
MT	Metric tons
MW	Megawatt
MW_{AC}	Megawatt alternating current
MWh	Megawatt hour
NICC	National Indian Carbon Coalition

N_2O	Nitrous oxide
ODS	Ozone depleting substances
OEP	Office of Environmental Protection
PCAP	Priority Climate Action Plan
PFC	Perfluorocarbon
TMT	Thousand metric tons
TWh	Terawatt-hours

Executive Summary

The Climate Pollution Reduction Grant (CPRG) program, funded by the Inflation Reduction Act, is administered by the U.S. Environmental Protection Agency (EPA) to facilitate the development and implementation of climate action plans at state-, local-, tribal-, and territorial-government levels to reduce greenhouse gas (GHG) emissions and other air pollutants. Led by the Mississippi Band of Choctaw Indians (MBCI) Office of Environmental Protection (OEP) and coordinated with the Mississippi Department of Environmental Quality (MDEQ), this document, the Priority Climate Action Plan (PCAP) report, is prepared as a part of the CPRG program. The CPRG program presents a unique opportunity for the MBCI to develop a set of plans to reduce GHG emissions, provide co-benefits to environment, stimulate tribal economy, create workforce opportunities, and provide benefits to low income and disadvantaged communities. In addition to a planning phase with the preparation of this PCAP, the CPRG program includes an implementation phase with grants to help jurisdictions to implement proposed measures in the PCAP.

This PCAP includes three main components: (1) community outreach conducted during the PCAP development and will be continued in the following stages of CPRG program to provide CPRG information to the community and incorporate the feedback to develop reduction measures; (2) development of GHG inventory for MBCI covering the key economic sectors; (3) planning and quantification of priority GHG reduction measures to reduce GHG emissions and providing other benefits including co-benefits to environment, workforce opportunities, stimulating local economy, and benefits to low income and disadvantaged communities.

Jointly with MDEQ, community outreach was performed virtually through online meetings, a dedicated website, and social media outlets. The feedback and comments received from community outreach played a major role in shaping the priority measures in this PCAP. For example, measures and actions such as improving building energy efficiency, planting trees, and investing in distributed solar systems received a wide support from the community (over 80% agreed to support based on the survey results).

The total GHG emissions in the MBCI territory were estimated as 162.9 thousand metric tons (TMT) of CO_2 equivalent (CO_2e) in 2017, with transportation, electric power, and commercial and residential buildings representing the three largest sources of emissions, which emitted 85.9, 51.4, and 15.11 TMT CO_2e in 2017, respectively. Waste and wastewater emit 7.2 and 1.1 TMT CO_2e, respectively. Percentages of emissions by sector are presented in **Figure ES-1**. Mainly due to remaining forestland, the land use, land use change, and forestry sector contributes to 91.0 TMT CO_2e of GHG sequestration in MBCI lands (i.e., a carbon sink), resulting in net emissions of 69.7 TMT CO_2e in 2017. The results of GHG emissions and sinks were based on the GHG inventory developed in Mississippi PCAP (MDEQ 2024) and population and land use scaling factors.

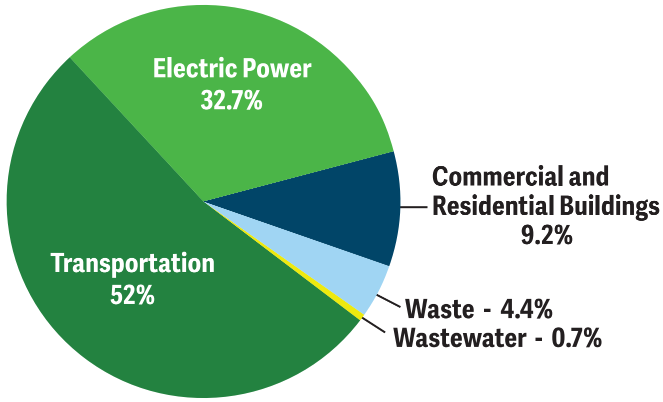

Figure ES-1. Percentages of GHG Emissions by Sector for MBCI (2017).

MBCI has identified six measures as priority GHG reduction measures for this PCAP. These measures were selected based on preliminary feedback from stakeholders as part of the outreach carried out together with the State of Mississippi. These selected priority measures include various policy- and regulatory-type actions for implementation, and they are:

- Residential and Commercial Distributed Solar Generation and Storage
- School Bus Electrification
- Biofuel Use for Transportation or as An Energy Source
- Building Energy Efficiency Improvements
- Forest and Wetland Management
- Waste Management

These six priority measures were assessed with respect to GHG reduction, cost, timeline, and as well as co-benefits to environment, workforce impacts, and benefits to low income and disadvantaged communities. At this stage of the climate action planning, the priority measures are defined in a "unit" form of a reasonable size, rather than as specific projects with a defined geographic footprint (except for forest management measure, for which there is an existing project, already in place). For example, the GHG reductions, co-benefits, and costs associated with promoting rooftop solar generation are estimated per household. Quantification and assessment of these priority measures for the MBCI are based on similar evaluations recently done for the Mississippi PCAP (MDEQ 2024) for MDEQ.

The supporting Information for each priority measure, both quantitative and narrative, allows eligible entities to develop applications in pursuit of grant funding from EPA or other federal sources for implementation of these reduction measures in MBCI. These applications may choose to focus on one or multiple measures. At the grant application stage, it is expected that a potential grantee will propose a specific program—with defined sizes, geographic locations, and activities such as subsidies, incentives, and creation of infrastructure—that builds on the information presented in this document.

In addition to following up on implementation grants, this PCAP will serve as the foundation for MBCI's future Comprehensive Climate Action Plan. This longer-range planning will include further improvements to GHG inventory, modifying and refining current and/or identifying additional measures, and as well as potentially developing monitoring and modeling programs to improve the quantification of emissions and long-term trends

This page intentionally left blank

1 Introduction

The Inflation Reduction Act's (IRA's) Climate Pollution Reduction Grant (CPRG) program presents a unique opportunity for the Mississippi Band of Choctaw Indians (MBCI) to develop a set of plans for reducing greenhouse gas (GHG) emissions, providing additional co-benefits to the environment, stimulating the tribal economy, and creating workforce employment opportunities. The first part of the process is the preparation of this Priority Climate Action Plan (PCAP) to be followed by a Comprehensive Climate Action Plan (CCAP), as well as actions developed and implemented by MBCI to reduce net GHG emissions.

In this plan, an overview of the CPRG process is provided; the community outreach conducted during the PCAP development and to be continued in future stages of the CPRG program is discussed; GHG inventory by key sector (transportation, electric power, commercial and residential buildings, waste, wastewater, and land use, land use change, and forestry) in MBCI is developed and presented; and a set of six priority emission reduction measures is described and quantified. These priority measures are evaluated with respect to GHG reduction benefits and costs, co-benefits to environment, benefits to low income and disadvantaged communities, and workforce needs and impacts.

1.1 About MBCI

Located largely in east central Mississippi, MBCI is a is a federally recognized Indian Tribe (**Figure 1-1**). The Mississippi Band of Choctaw Indians is a sovereign nation and the only federally recognized Tribe located in Mississippi. The Choctaw Tribal Government was organized under the Indian Reorganization Act after a secretarial referendum in 1945 that adopted a Constitution and Bylaws.

MBCI tribal lands are about 35,000 acres, approximately 75% of which are considered as forestland. **Figure 1-1** presents the land cover information obtained from the Multi-resolution Landscape Consortium (2024) related to forestland and developed land area within and surrounding MBCI.

As of October 2022, MBCI has 11,028 members (MBCI 2022). There are 4,548 Tribal members currently employed, with 2,485 working in Tribal Enterprise, 2,026 working in the Tribal Government, Choctaw Health Center, and Division of Schools, and 37 working in Choctaw Housing Authority (MBCI 2022). Much of the MBCI is identified as low income and disadvantaged communities (**Figure 1-2**), on which this PCAP and the overall CPRG program are particularly focused.

1.2 Background of the EPA CPRG Program

The CPRG program, funded by the IRA, is administered by the U.S. Environmental Protection Agency (EPA) to facilitate the development and implementation of climate action plans at state-, local-, tribal-, and territorial-government levels to reduce GHG emissions and other air pollutants. The CPRG program includes: (1) a planning phase with grants to help jurisdictions identify key GHG sources, design corresponding reduction measures, and summarize these in a PCAP and CCAP; and (2) an implementation phase with grants to help jurisdictions implement their proposed reduction measures.

1.3 Objectives

Through the CPRG program, the MBCI Office of Environmental Protection (OEP) developed and prepared this PCAP as the first step in planning, assessing, and ultimately implementing measures to reduce GHG emissions and other air pollutants from tribal lands of the MBCI. It is also a principal aim to use this opportunity to enhance and revitalize economic and social development of the tribe, particularly to low income and disadvantaged communities. Measures developed as part of the CPRG program (and reflected in this PCAP) represent the opportunities and actions identified and selected to significantly reduce net GHG emissions in the MBCI, and to incentivize the creation of employment opportunities, stimulate economic development, as well as to address and improve environmental justice and equity.

1.4 Overview of Planning Process

This document, the MBCI PCAP, is the initial report on priority measures planned for the MBCI to reduce GHG net emissions and other air pollutants. Following the submittal of this PCAP to EPA on April 1, 2024, implementation grant applications will be developed and submitted to implement one or more of the priority measures in this PCAP. A subsequent planning document, the MBCI CCAP, will be prepared by mid-2025, expanding on the work in the PCAP with a more detailed assessment of emission sources and mitigation measures to provide a pathway for accomplishing the above objectives.

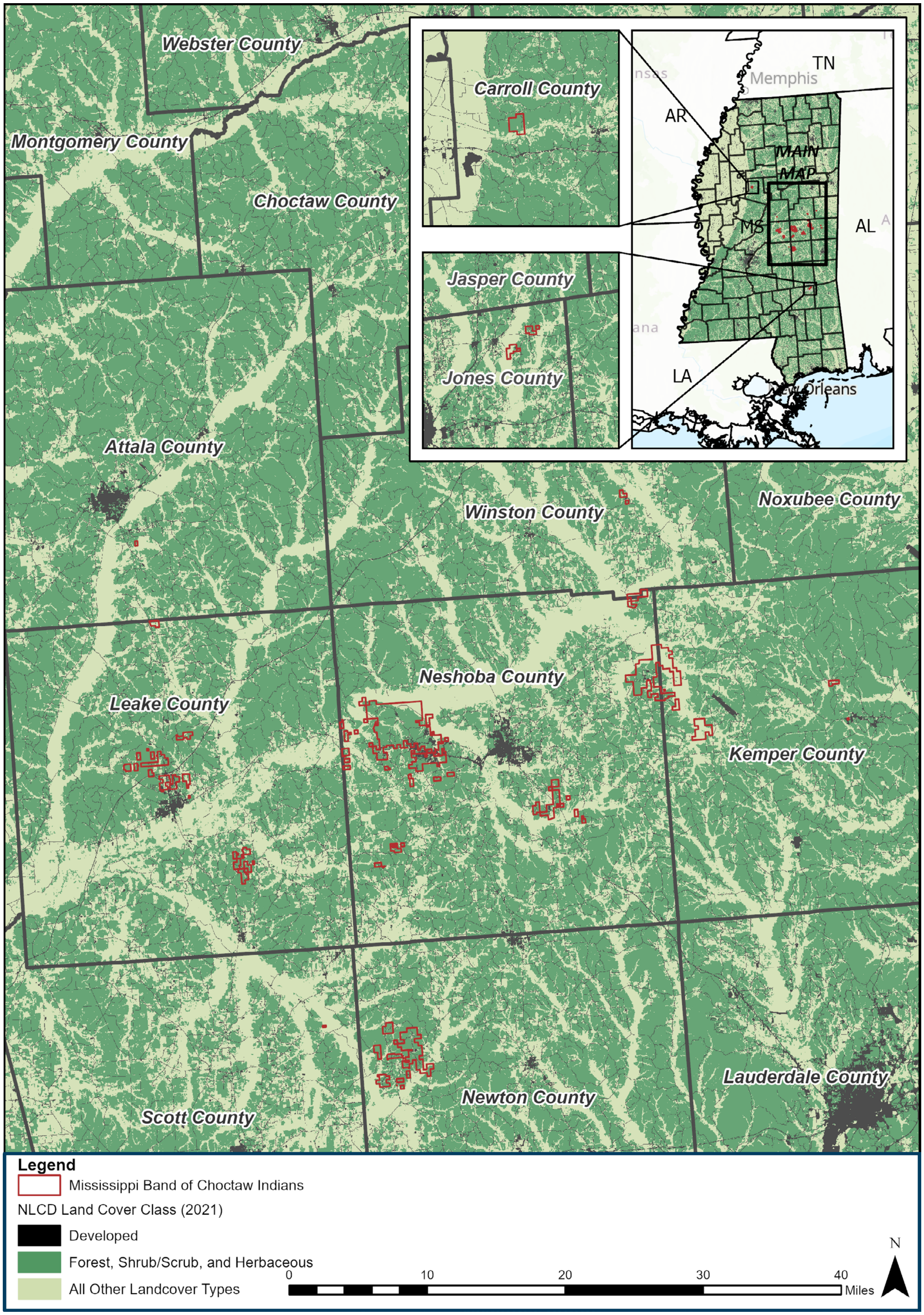

Figure 1-1. Map of MBCI lands and surrounding land cover.

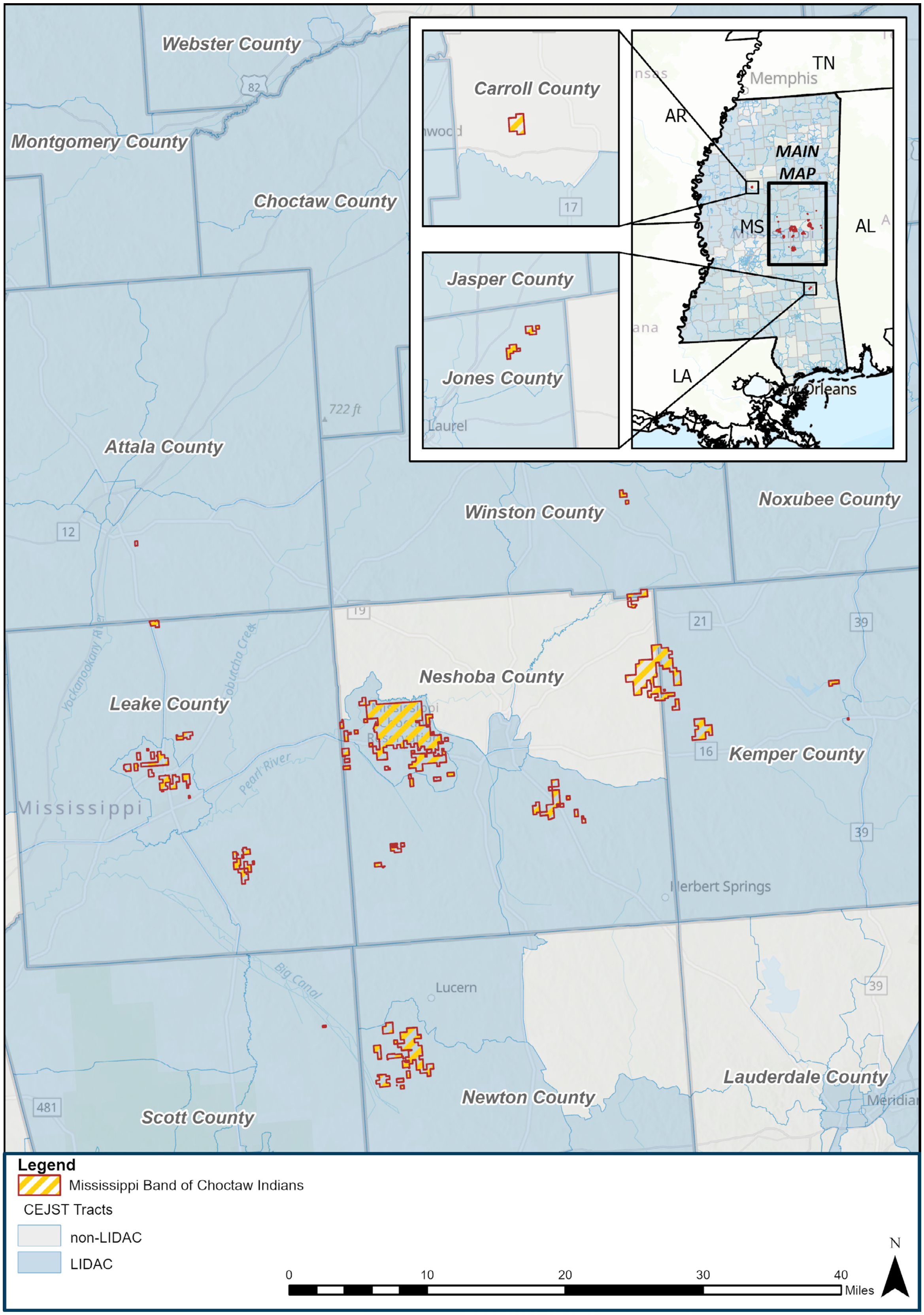

Figure 1-2. Map of MBCI lands and Low Income and Disadvantaged Communities (LIDAC).

1.5 Report Overview

The remaining sections of the PCAP are organized as follows. Chapter 2 provides a description of the outreach activities undertaken to date. Feedback from the outreach has informed priority measures identified in this plan, and MBCI OEP will continue engagement and solicitation to support future phases of the planning. Chapter 3 provides an overview of the methodology adopted in this report to estimate MBCI's GHG inventory and to evaluate the proposed reduction measures. Chapter 4 describes the GHG inventory by sector developed using Mississippi's GHG Inventory from Mississippi's PCAP and scaling factors. Chapter 5 presents a summary and evaluation of six priority GHG reduction measures that can form the basis of specific programs and projects in MBCI. Chapter 6 provides a summary for the GHG inventory and the six priority measures developed for MBCI.

This page intentionally left blank

2 Community Outreach

The OEP coordinated and joined with the Mississippi Department of Environmental Quality (MDEQ) to carry out community outreach during PCAP development. The community outreach processes were applied, and the feedback received is described in this section.

2.1 Goals and Objectives

Outreach regarding the MBCI PCAP project focused on two key tasks: information exchange and notification of outcomes. Goals and objectives defined within each of these tasks guided creation of graphic and other informational materials used to explain the PCAP initiative in everyday language and are specified below.

2.1.1 Information Exchange

GOAL: Make project-related information readily available in simple language via multiple media; provide branding elements and graphics that help to quickly identify the project and related concepts.

> **Objective:** To increase project understanding and recognition by using everyday language and eye-catching, informative graphic elements.

GOAL: Reach out to and engage the tribal community to gather information for PCAP development.

> **Objective:** To gather input from the community to ensure that priority measures reflect the needs and priorities of MBCI.
>
> **GOAL:** Provide opportunities for MBCI members to collaborate early and often with project representatives before decisions are finalized to provide input on community-specific concerns and preferences.
>
> **Objective:** To improve the quality and sustainability of final outcomes by obtaining public input and using it to help guide plan development.

2.1.2 Notification of Outcomes

GOAL: Provide opportunities for public review and comment on the draft priority GHG reduction measures proposed for incorporation into the PCAP.

Objective: To receive public feedback before final plan decisions are made.

GOAL: Make final PCAP outcomes publicly available.

Objective: To close the communication loop and promote project transparency.

2.2 Branding

Coordinated with MDEQ, project branding was developed to boost project recognition among the public and partners. The name Clean Air Mississippi Project (CAMP) was established along with the project logo (**Figure 2-1**). A project-specific email address (camp@mdeq.ms.gov) was established for people to provide comments and ask questions.

Figure 2-1. CAMP Logo.

2.2.1 Branded Informational Materials

The CAMP branding was used on all project materials produced to educate and engage the public about the process. Materials were designed to be suitable for both electronic and hard-copy dissemination, and were distributed by MDEQ, MBCI OEP, consulting team members, and other partners to reach a wide array of interested parties. Materials developed included:

- Graphic-driven overview flyer
- Frequently Asked Questions document
- Quick-response code for quick access to online project information
- Website for project materials and information
- Survey designed to learn more about concerns of Tribal members and how they receive information.

Additional details about the website and survey are included below.

2.2.2 Project Website

A project-specific website was prepared to supply accessible, easily understood information on CAMP and associated surveys and public meetings, and to house related educational materials and ensure they are readily available to the public. This site was established as a standalone site for ease in navigation and maintenance. Educational materials are posted to this site, as well as meeting information, a link to the project survey (see details in Section 2.2.3), and email sign-up for notifications. The website will continue to be updated as the planning process moves forward into the next phase.

Figure 2-2. CAMP Website Landing Page.

2.2.3 Survey

A project survey was developed to gather information about concerns and thoughts related to air quality issues and other environmental challenges. The survey was posted to the CAMP website after the first public meeting (held December 7, 2023; see additional details in Section 2.4.1), and email and social media notifications (see additional details in Section 2.3) were sent to focus attention on its availability.

As of February 26, 2024, 28 people who identified themselves as MBCI members had completed the survey. The greatest number of respondents were aged 50–64 followed by the 30–49 age group. The survey results from these tribal community members are shown subsequently.

Inputs on the climate change/air pollution effects of greatest concern, climate change impacts that are priorities for reduction, and activities for carbon reduction that respondents are likely to participate in are summarized in **Figure 2-3** through **Figure 2-6**, respectively. Most respondents indicated that they would be more likely to participate in carbon pollution reduction activities if there was a tax break or rebate involved, or if it saved money (**Figure 2-6**). Numerous activities that could lessen the impacts of climate change were supported by many respondents, from improving building energy efficiency, planting trees, and to investing in solar (**Figure 2-7**). Respondents identified financial constraints as the primary barrier preventing them from adopting a more sustainable lifestyle (**Figure 2-8**).

Additional details about the responses are shown in the figures below. The survey remains open for continual input. The feedback helped frame concerns raised by MBCI members and identify GHG priority reduction measures.

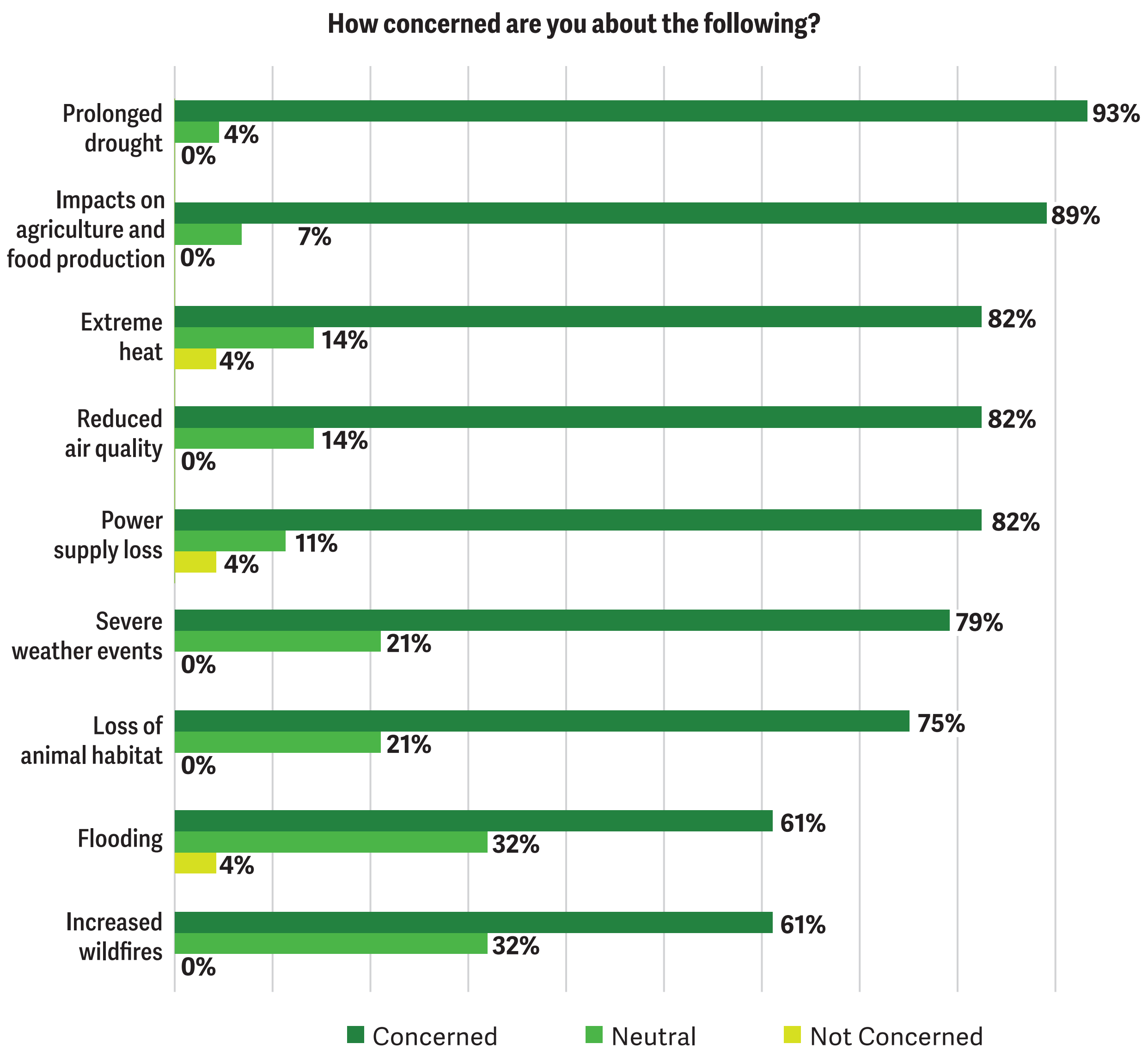

Figure 2-3. Summary of Responses to the Survey Question About Items of Concern.

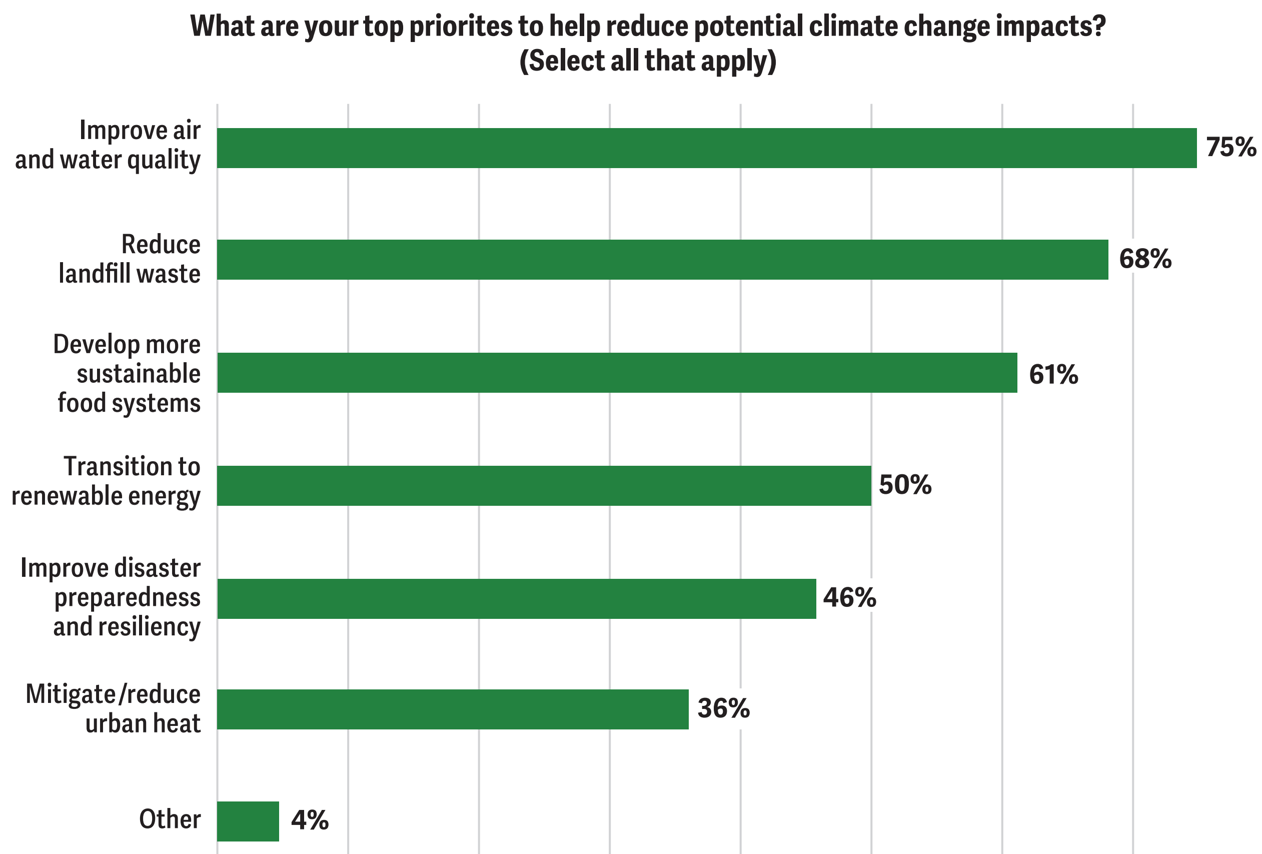

Figure 2-4. Summary of Responses to the Survey Question About Top Priorities to Reduce Potential Climate Change Impacts.

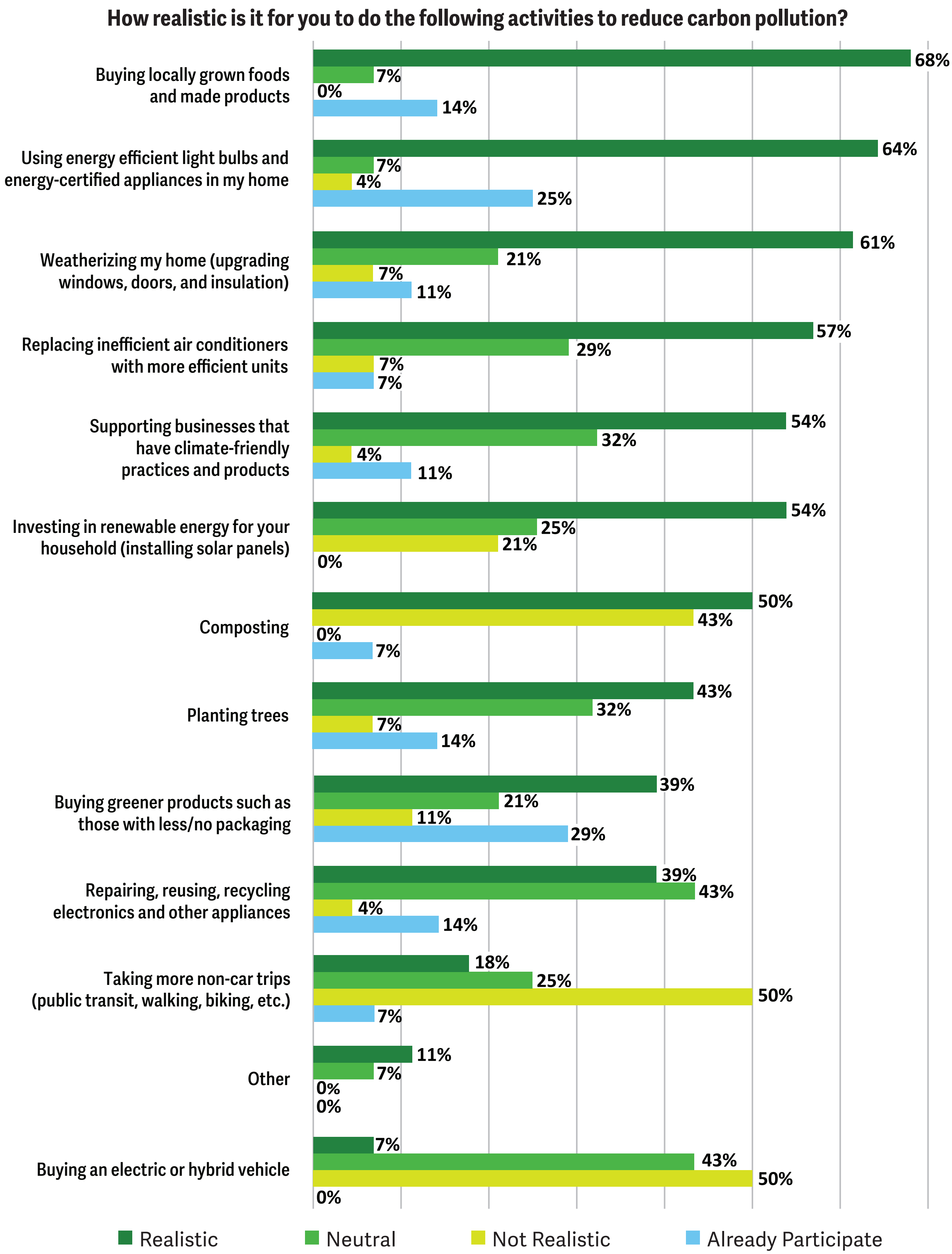

Figure 2-5. Summary of Responses to the Survey Question About Implementing Activities to Reduce Carbon Pollution.

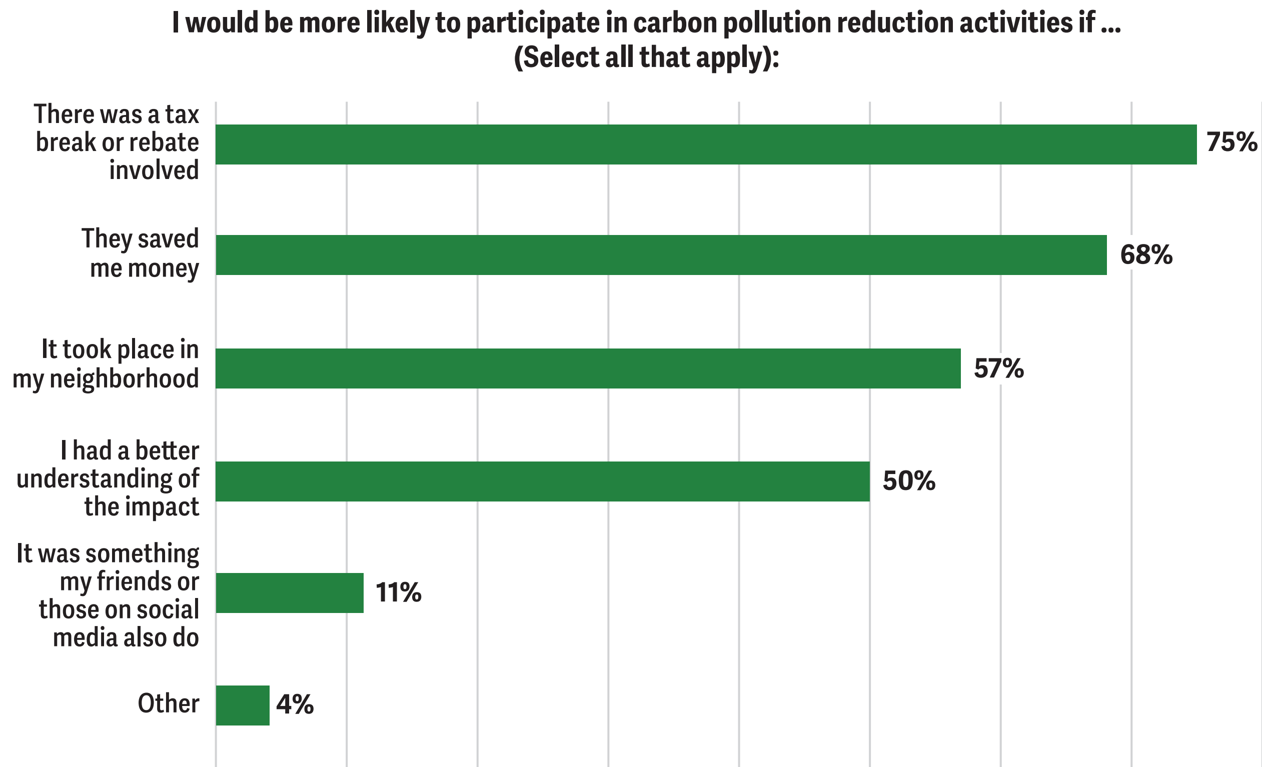

Figure 2-6. Summary of Responses to the Survey Question About Incentives to Participate in Carbon Pollution Reduction Activities

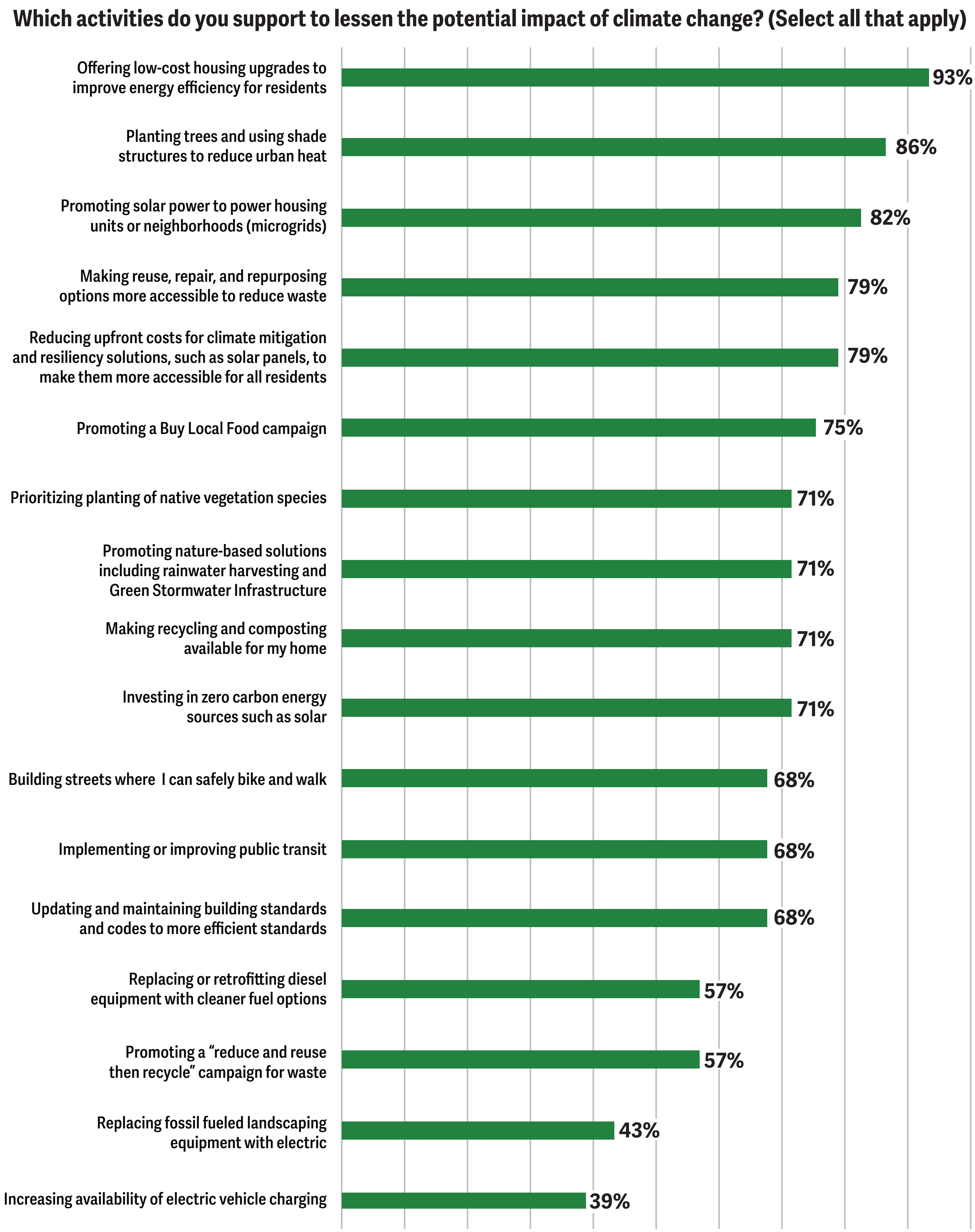

Figure 2-7. Summary of Responses to the Survey Question About Support for Activities to Lessen Potential Climate Change Impacts.

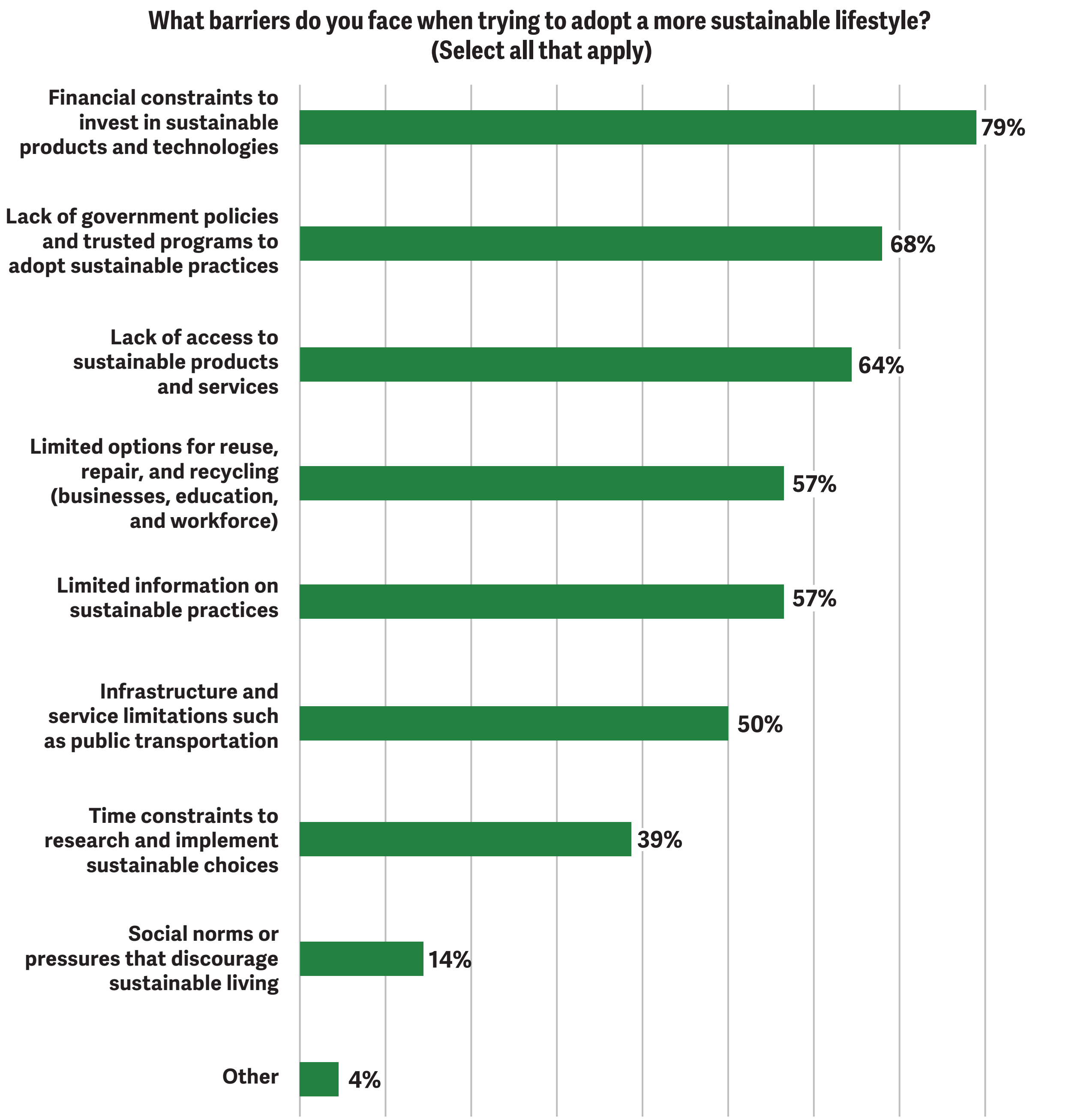

Figure 2-8. Summary of Responses to the Survey Question About Barriers to a More Sustainable Lifestyle.

2.3 Notifications

At key points throughout PCAP development, project notifications were provided via several methods to reach as many people throughout the state as possible.

2.3.1 Distribution Lists and Email Notifications

A project contact database was developed to provide updates throughout the project. In addition to people and organizations identified from the requests made via the project website, the project notifications were shared with MDEQ and Mississippi state agencies to disseminate information through their contact lists.

Email notifications (**Figure 2-9**) were prepared using the CAMP branding and MBCI OEP letterhead. Messages were clear and concise so they could be understood by a wide audience. Multiple email notifications were sent ahead of each meeting (see additional details about meetings in Section 2.4) to inform people about the meeting and then remind them of the date and time. Email notifications were also sent when the survey was opened.

2.3.2 Social Media

In addition to the email notifications (**Figure 2-9**) and coordinated with MDEQ, messages were developed for posting on social media and for sharing with partners (**Figure 2-10**). The social media posts were used to increase public awareness about the project and encourage participation in meetings and the survey.

Figure 2-9. Example Email Notification About the First Public Meeting.

Figure 2-10. Example Social Media Post for the Survey

2.3.3 News Releases

For each public meeting, news releases were prepared to notify all MBCI members about the meeting and its associated opportunity for engagement. The news releases were placed on MBCI OEP letterhead with CAMP branding and disseminated via email and social media.

2.4 Meetings

At key points in the development of this PCAP, two public meetings were held with interested people, agencies, and groups to discuss the initiative and gather ideas, suggestions, and other data to help guide plan development. A summary of the two public meetings is provided below.

2.4.1 First Public Meeting

On December 7, 2023, a virtual Zoom meeting was held in the evening that was open to all interested parties and individuals. The goals of the meeting were to provide background information on the Climate Pollution Reduction Planning Grant, CAMP, Climate Pollution Reduction Implementation Grant opportunities, and examples of GHG reduction measures, as well as inform participants about how they can get involved in the project and provide input.

There were 11 participants representing the general public, Mississippi Energy Developers, Mississippi State University, and Memphis-Shelby County. There was discussion about how research institutions fit within the planning process and how to complete the survey to provide input.

2.4.2 Second Public Meeting

A second virtual Zoom meeting was held on January 18, 2024, during business hours, which was open to all interested parties and individuals. The goals of the meeting were to provide background information on the Climate Pollution Reduction Planning Grant, CAMP, Climate Pollution Reduction Implementation Grant, and GHG reduction measures proposed for the PCAP, as well as to inform participants about how they can get involved in the project and provide input. There were 18 participants from the public and various organizations. There were no questions or comments raised during this meeting

3 Planning and Quantification Methodology

The quantification of GHG inventory and priority GHG reduction measures for MBCI is based on the respective quantification presented in Mississippi PCAP (MDEQ 2024) using USEPA (2023a).

The GHG inventory for MBCI was obtained primarily using a downscaling approach of applying population and land area scaling factors to the statewide GHG inventory results (USEPA 2023b). This is due to the limited amount of location-specific data available for more accurate, direct quantification of emissions sources strictly on MBCI lands. Scaling factors were developed to address this based on the ratios of MBCI's to Mississippi's population, the urban area of MBCI to that of Mississippi, and the forestland area of MBCI to total forestland area in Mississippi. Based on the guidance from USEPA (2023b), these scaling factors were applied to Mississippi's emissions to provide reasonable estimates for the GHG emission inventory for MBCI lands.

Importantly, the GHG emissions estimated in the inventory and the targeted emission reductions from priority measures in this PCAP include all three scopes of emissions. For example, because there are no electricity power plants located within MBCI, the emissions from electricity consumption in MBCI were estimated, representing the scope 2 emissions. Similarly, for any waste processed (such as to landfill) outside of MBCI lands; the GHG emissions from such waste processing belong to the scope 3 of GHG emissions for MBCI. Although these emissions sources are slightly different given with their inherent GHG scopes, this PCAP does not further differentiate the emissions by their scope and addresses all major emissions by sector in MBCI.

For the quantification and assessments of priority measures in this PCAP, the quantified GHG reduction measures in Mississippi PCAP (MDEQ 2024) serve as the basis and were subsequently used. Mississippi PCAP provides the quantified GHG reduction potential by unit measure, e.g., annual 5.4 MT of CO2-e reductions per 7.5 kW_{AC} of newly-installed residential solar generation systems, which are expected to be applicable and is used in this PCAP to describe and assess different reduction measures for MBCI.

This page intentionally left blank

4 GHG Inventory

The GHG emissions from the following key sources/sectors were identified and estimated for MBCI: electric power, transportation, commercial and residential buildings, agriculture, industry, waste, wastewater, and Land Use, Land-Use Change and Forestry (LULUCF). As discussed in Section 2, the results of the GHG inventory for MBCI were primarily obtained based on a scaling approach applied to the Mississippi's GHG inventory presented in Mississippi PCAP (MDEQ 2024). Facility-specific emission data from the EPA's Facility Level Information on GreenHouse gases Tool (USEPA 2023c) were used to assess facility-level GHG emissions in MBCI; no point source of GHG emissions was identified within MBCI using this tool. In 2022, MBCI had a population of 11,028, representing 0.38% of Mississippi's population (2.94 million). Based on Multi-resolution Landscape Consortium (2024), the urban area in MBCI is about 0.14% of total urban area in Mississippi, whereas the total forest land area within MBCI is about 0.12% of total forest land in Mississippi. These population and land cover ratios were subsequently used to provide the emission quantification for MBCI. More detailed information on this scaling procedure applied for each sector is provided subsequently in each sub-section.

The GHG inventory results for MBCI are provided (**Table 4-1**). Aligning with the Mississippi statewide GHG inventory, 2017 was selected and used as the baseline year.

Table 4-1. MBCI GHG emissions and sinks by sector (thousand metric tons of CO_2-equivalent, TMT CO_2e). 2017 was selected as the baseline year for this PCAP.

Baseline Year	2017
Transportation	85.94
Electric Power	51.37
Commercial and Residential Buildings	15.11
Agriculture	-
Industry	-
Waste	7.17
Wastewater	1.09
Land Use, Land-Use Change and Forestry (LULUCF)	-90.95
Total Emissions	**162.86**
Net Emissions	**69.73**

Based on the emissions in 2017, the fractions of GHG emissions by sector in MBCI are provided (**Figure 4-1**).

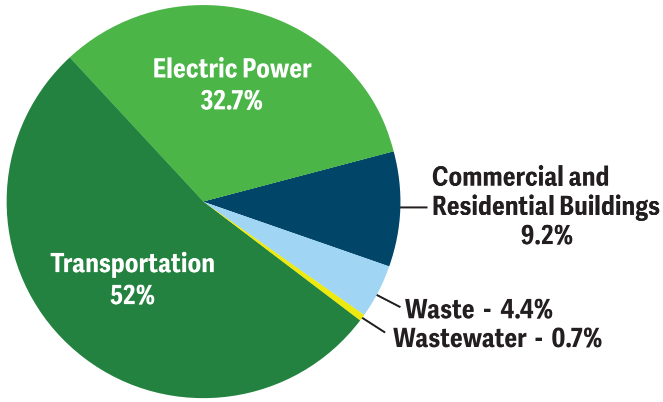

Figure 4-1. Percentages of GHG Emissions by Sector for MBCI (2017).

Transportation, electric power, and commercial and residential buildings represent the three sectors with the most GHG emissions for MBCI, whereas relatively smaller portions of emissions are caused by waste and wastewater (**Table 4-1** and **Figure 4-1**). Transportation on MBCI lands contributes to 52% of total emissions in MBCI and electricity power causes 32.7%.

Carbon sequestration from LULUCF serves as a considerable offset to the total emissions in MBCI (**Table 4-1**). Based on the land cover data in the Multi-resolution Landscape Consortium (2024), forest land area (including forest land, shrub/scrub, and herbaceous) represents 56% of total land area in MBCI, serving as a major driver for the carbon sequestration from LULUCF in MBCI. With a total of 90.95 TMT CO_2e of the carbon sinks, LULUCF sector offsets about 56% of total emissions in MBCI. Compared to the amount of carbon sinks from LULUCF in Mississippi (which is approximately the same as total emissions in Mississippi), the magnitude of carbon sinks from LULUCF is comparatively smaller in MBCI, primarily because the total forest land area within MBCI is about 0.12% of total forest land in Mississippi whereas the population of MBCI is 0.38% of that in Mississippi.

4.1 Transportation

Partitioning of GHG emissions sources from annual results in the transportation sector (**Table 4-2**) include those from fossil fuel combustion (CO_2, CH_4, and N_2O) and the substitution of ozone depleting substances (ODS). The latter are commonly used in transport refrigeration equipment, as well as in other sectors such as chillers, HVAC equipment, and propellant used in spray foam insulation and fire suppressants. GHG emissions from transportation sector in MBCI were estimated by downscaling those from the statewide emissions (including the emissions by source) relative to population.

Table 4-2. Estimated GHG emissions (TMT CO_2e) from MBCI's transportation sector.

Baseline Year	2017
CO_2 from Fossil Fuel Combustion	83.36
Substitution of ODS	1.75
Mobile Combustion (CH_4 and N_2O)	0.83
Total Emissions from Transportation	**85.94**

4.2 Electric Power

No electric power or industrial plant was identified within MBCI boundaries using the EPA's Facility Level Information on GreenHouse gases Tool (USEPA 2023c), only emissions from electricity consumption and associated transmission and distribution losses were thus quantified. Industrial energy consumption is assumed to be negligible, and the electricity in MBCI primarily used in residential and commercial buildings. The MBCI annual electricity consumption in residential and commercial buildings was estimated using the statewide electricity annual consumption in buildings (EIA 2023a) downscaled with the population scaling factor (i.e., 0.38%). The following steps were applied: (1) statewide electricity sales to residential and commercial sectors were downscaled to those for MBCI using the population scaling factor; (2) statewide loss percentages for transmission and distribution were used to estimate the generation needed for the electricity sales calculated in the previous step; and (3) statewide emissions factors (e.g., MT of GHG emissions per kWh of electricity generation) were used to calculate the total emissions for the MBCI's electricity consumption in residential and commercial buildings.

Results of annual electricity consumption, total generation needed (including replacement for transmission and distribution losses), and GHG emissions from corresponding electricity consumption in MBCI are provided (**Table 4-3**). The electricity use per capita was also estimated and is included in **Table 4-3**.

Table 4-3. Estimated GHG emissions from MBCI's electricity consumption.

Baseline Year	2017
Mississippi Electricity Sales to Commercial and Residential Sectors (TWh)	31.70
Transmission and Distribution Losses in Mississippi	4.5%
MBCI Electricity Use per Capita (MWh)	10.79
Estimated MBCI Electricity Sales (GWh)	118.95
Estimated MBCI Electricity Sales Plus Losses (GWh)	124.56
Total Emissions from Electric Power (TMT CO_2e)	**51.37**

4.3 Commercial and Residential Buildings

Results of annual GHG emissions from commercial and residential buildings (**Table 4-4**) include emissions from fossil fuel consumption and substitution of ozone depleting substances (ODS). GHG emissions from commercial and residential building sector in MBCI were estimated by downscaling statewide emissions in the building sector by the population scaling factor, and included partitioning of emissions by source.

Table 4-4. Estimated GHG emissions (TMT CO_2e) from MBCI's commercial and residential building sector.

Baseline Year	2017
CO_2 from Fossil Fuel Combustion (commercial)	5.80
CO_2 from Fossil Fuel Combustion (residential)	4.93
Stationary Combustion (commercial; CH_4 and N_2O)	0.03
Stationary Combustion (residential; CH_4 and N_2O)	0.05
Substitution of ODS (commercial)	2.82
Substitution of ODS (residential)	1.49
Total Emissions from Commercial and Residential Buildings	**15.11**

4.4 Agriculture

GHG emissions from agriculture sector in MBCI are assumed to be negligible.

4.5 Industry

No industrial facility with GHG emissions was identified within MBCI using the EPA's Facility Level Information on GreenHouse gases Tool (USEPA 2023c). GHG emissions from industry sector in MBCI are assumed to be negligible.

4.6 Waste

GHG emissions from waste sector in MBCI (**Table 4-5**) are mainly emitted by landfills. These results of GHG emissions in MBCI (**Table 4-5**) were estimated by downscaling the statewide waste sector emissions by the population scaling factor.

Table 4-5. Estimated GHG emissions (TMT CO_2e) from MBCI's waste sector.

Baseline Year	2017
Landfills	7.17
Total Emissions from Waste	**7.17**

4.7 Wastewater

The GHG emissions for MBCI's wastewater sector (**Table 4-6**) are mainly emitted by municipal wastewater treatment. Several wastewater treatment plants are located within MBCI and GHG emissions from these facilities were thus estimated by downscaling the statewide wastewater sector emissions by the population scaling factor (**Table 4-6**).

Table 4-6. Estimated GHG emissions (TMT CO_2e) from MBCI's wastewater sector.

Baseline Year	2017
Municipal Wastewater Treatment	1.09
Total Emissions from Wastewater	**1.09**

4.8 Land Use, Land-Use Change, and Forestry (LULUCF)

Statewide results of GHG emissions and sinks from the LULUCF sector (**Table 4-7**) include sinks from remaining forest land, land converted to forest land, and urban trees and as well as emissions from forest land converted to land and N_2O from settlement soil. GHG sinks from LULUCF sector in MBCI were estimated by downscaling those results (including source partitioning) by the land use scaling factor: (a) GHG sinks from remaining forest land and land converted to forest land are scaled based on the scaling factor for forest land area, and (b) GHG sinks from urban trees and emissions from land converted to forest land and N_2O from settlement soil are based on the scaling factor for urban land area.

Table 4-7. Estimated GHG emissions and sinks (TMT CO_2e) from MBCI's LULUCF sector.

Baseline Year	2017
Remaining Forest Land	-90.10
Land Converted to Forest Land	-2.39
Forest Land Converted to Land	3.37
Urban Trees	-1.89
N_2O from Settlement Soils	0.06
Total Emissions/Sinks from LULUCF	**-90.95**

This page intentionally left blank

5 Priority Reduction Measures

MBCI has identified six GHG reduction measures as priority for this PCAP. These measures were selected based on preliminary feedback from stakeholders as part of the outreach and public engagement executed in partnership with the MDEQ. These measures include various policy- and regulatory-type actions for implementation:

- Residential and Commercial Distributed Solar Generation and Storage
- School Bus Electrification
- Biofuel Use for Transportation or as An Energy Source
- Building Energy Efficiency Improvements
- Forest and Wetland Management
- Waste Management

Quantification and assessment of these priority measures in the MBCI primarily rely on the similar quantification and evaluation conducted for the Mississippi PCAP (MDEQ 2024). As was done for the Mississippi PCAP, priority measures are defined in a "unit" form/quantity with the measure implementation, rather than as a specific project scope. For example, the GHG reductions, co-benefits, and costs associated with promoting rooftop solar generation are estimated per household. The actual amount of GHG reduction being scaled to the sizes of projects will be ultimately implemented. These measures quantified with reductions/benefits per unit level were applied and extended in this case for the MBCI PCAP to describe, assess, and quantify the GHG reductions, co-benefits, workforce impact, costs, and other information for the priority measures identified for the MBCI and listed previously.

Information presented in this section for each priority measure, both quantitative and narrative, allows the MBCI to develop applications with more refined project scopes, geographic locations, costs, and benefits to seek grant funding from EPA or other federal sources. It also provides the foundation for the subsequent grant applications, which will propose and describe specific programs for implementation of the measures.

5.1 Distributed Solar Generation and Storage

5.1.1 Description of Reduction Measure

GHG emissions from electric power contribute more than 30% of total emissions in MBCI in 2017 and represent the second largest emission source among economic sectors. Planning and implementing measures to reduce the emissions from electric power are critical to reduce the overall GHG emissions. Given no power plant is located within MBCI, the reductions of electricity use from the grid are the key to decrease emissions from electric power generation.

This reduction measure aims to promote and increase the electricity generation/use from distributed solar and storage systems and reduce the electricity consumption from the grid by MBCI. The distributed solar and storage systems commonly include rooftop solar systems, solar canopies, and small-scale electricity storage systems. These distributed energy resources allow electricity customers to manage and reduce the electricity consumption from the grid and sometimes inject power to the grid (NASEM 2023), consequently leading to the reduction of GHG emissions from electricity generation at power plants.

In addition to reducing GHG emissions, development of distributed energy resources can provide co-benefits to environment and benefits such as increasing solar-related job opportunities to low income/disadvantaged communities. Distributed energy generation systems such as rooftop solar systems also provide savings on electricity bills, which facilitate provision of affordable electricity.

Promoting and advancing distributed energy resources is selected as one priority GHG reduction measure by MBCI with a particular emphasis on small-scale solar systems. As presented in the subsequent sections and described previously, quantification of this reduction measure is primarily based on the estimations and analyses conducted in Mississippi PCAP. On a unit measure basis, GHG reduction potentials and other benefits such as reductions of co-pollutants and increase of workforce opportunities are expected to be similar for MBCI.

5.1.2 Quantification of GHG Reduction Per Unit Measure

Aligning with the quantification conducted in the Mississippi PCAP, distributed solar generation systems with a 9 kW_{DC} and a 125 kW_{DC} capacity are assumed to be the average installation sizes in MBCI at residential and commercial buildings, respectively. The inverter loading ratios are assumed to be 1.2 and 1.25 in residential and commercial buildings. Based on the electricity generation and emissions for the entire electric power sector and annual average generation per kW of installed distributed solar generation systems in Mississippi, the GHG reductions per commercial and residential building are estimated (**Table 5-1**).

Table 5-1. Results of estimated annual GHG reductions from the assumed distributed solar for each residential and commercial building in MBCI.

Estimated Factors per Unit Measure	Residential	Commercial
DC Capacity per building (kW_{DC})	**9**	**125**
AC Capacity per building (kW_{AC})	**7.5**	**100**
Annual emission reduction from 2020 level per building (MT CO_2e)	**5.4**	**72.4**

5.1.3 Quantification of Cost Range

The installation price for a 9 kW_{DC}/7.5 kW_{AC} distributed solar at residential buildings in MBCI was estimated to be \$3 per $watt_{DC}$ (i.e., \$27000 for a 9 9 kW_{DC}/7.5 kW_{AC} system at a residential building), whereas the price for installing a 125 kW_{DC}/100 kW_{AC} solar system at commercial buildings in MBCI is assumed to be \$2.5 per watt (i.e., \$312500 for a 125 kW_{DC}/100 kW_{AC} system at a commercial building). These cost estimates align with the information provided in Mississippi PCAP.

5.1.4 Timeline of Implementation

Distributed solar systems are a mature technology and can be deployed immediately. The implementation timeline can be limited by local workforce availability for installations.

5.1.5 Co-benefits to Environment

Based on the data of co-pollutant emissions in Mississippi electric power sector, the co-benefits to environment were quantified for this measure: (a) for a commercial building installed with a 125 kW_{DC}/100 kW_{AC} solar system, annual reductions of SO_2 and NO_X are 6.6 and 33.7 kg, respectively, and (b) for a residential building with a 9 kW_{DC}/7.5 kW_{AC} distributed solar system installed, annual reductions of SO_2 and NO_X are 0.5 and 2.5 kg, respectively.

5.1.6 Workforce Considerations

Programs to promote and increase distributed solar generation and other distributed electricity systems (such as battery storage) are expected to provide significant job opportunities related to installations and maintenance of these systems.

5.1.7 Benefits to Low Income/Disadvantaged Communities

This reduction measure could be expected to provide substantial benefits to low income/ disadvantaged communities, e.g., by providing affordable electricity, increasing related job opportunities, increasing the energy resilience during periods of grid failures during extreme weather events.

5.2 School Bus Electrification

5.2.1 Description of Reduction Measure

The transportation sector emits the largest amount of GHG in MBCI, and this reduction measure, therefore, targets the reduction of GHG emissions in the transportation sector by deploying electric school buses (ESBs) and replacing the existing diesel buses. The deployment of ESBs also provides co-benefits to the environment by reducing the emissions of co-pollutants from burning diesel in internal-combustion-engine buses.

5.2.2 Quantification of GHG Reduction Per Unit Measure

Annual GHG emissions and emission reductions for replacing 10 diesel buses with ESBs were estimated (**Table 5-2**). This quantification of GHG reductions through deployment of ESBs was by using the average vehicle mile traveled (VMT) data estimated for Mississippi, historical and projected future electricity emissions (per kWh of electricity use), and the estimated electric vehicle efficiency ratio for ESBs. The national average annual VMT for diesel buses was estimated as 19,000 miles per year based on the model results from USEPA (2023d); 20,000 miles per year of VMT was thus assumed for the ESBs used in MBCI.

Table 5-2. Results of estimated annual GHG emissions and corresponding reductions in MBCI per 10 ESBs deployed to replace 10 diesel buses.

	Number of school buses and types	Annual GHG emissions (positive) or reductions (negative) (MT CO_2e)
Annual GHG reductions	10 diesel school buses (with 20,000 annual VMT per vehicle)	314
	10 equivalent ESB (with 2020 electricity generation)	104
	10 equivalent ESB (with projected 2030 electricity generation)	55
Annual GHG reductions	With 2020 electricity generation	-210
	With projected 2030 electricity generation	-260

5.2.3 Quantification of Cost Range

Cost information from some existing ESB programs is available (for example, see MDEQ 2024) and can serve as a basis to assess the associated cost for this measure. Further cost breakdowns for ESB and related infrastructure depend on the overall scope of this program employed in MBCI and are not currently estimated for this PCAP.

5.2.4 Timeline of Implementation

Similar to the measure timeline described in the statewide PCAP (MDEQ 2024), this measure of deploying a ESB program is estimated with the following implementation timeline: 3-6 months for program foundation setting, 12-24 months for infrastructure and operations planning and installation, and continuous training, monitoring, and development afterwards.

5.2.5 Co-benefits to Environment

This reduction measure can provide co-benefits of reducing waste, reducing the emissions of co-pollutants from diesel combustion, and helping balance peak electricity demand. ESBs require less maintenance and overall reduced demand in required parts, consequently leading to reduction of waste which would be otherwise produced from diesel buses, e.g., the disposal of associated discarded parts and fluids (such as oil). The adoptions of ESB can lead to reductions of other co-pollutants emitted from use of diesel buses. Additionally, ESB fleets can help balance peak electricity demand in MBCI by providing power back into the grid when buses are not in use, which can also reduce the costs for ESB operations.

5.2.6 Workforce Considerations

Training will be needed for EV safety, operation, and maintenance. By coordinating and collaborating with Mississippi to provide workforce development and training programs, the overall cost can be reduced and additional opportunities can be provided to trainees.

5.2.7 Benefits to Low Income/Disadvantaged Communities

This reduction measure will provide benefits to low income/disadvantaged communities including improved public health in MBCI from reduction in co-pollutants, creation of high-quality jobs and workforce development opportunities, decreased energy costs and increased energy security, and reduced noise pollution.

5.3 Biofuel Use for Transportation or as An Energy Source

5.3.1 Description of Reduction Measure

In addition to deploying ESBs, this reduction measure targets the GHG emission reduction mainly in the transportation sector by replacing diesel or other types of fossil fuels with biodiesel and similar biofuels (replacing fossil fuels with biofuels for fuel consumption in other sectors will be similarly carried out). As also described in Mississippi PCAP (MDEQ 2024), quantification of GHG reduction potentials and costs are mainly focusing on biodiesel, although other types of biofuels likely can have similar benefits (quantification of the other biofuels was not conducted because of the limited data availability for other biofuels). Biodiesel has physical properties like those of petroleum-based diesel and is a renewable fuel that can be manufactured from vegetable oils, animal fats, recycled restaurant grease, or other sources such as oil seeds for use in diesel vehicles or any equipment that operates on diesel fuel. Engines manufactured after 2010 are required to meet the same emissions standards, whether running on biodiesel, petroleum diesel, or any alternative fuel.

5.3.2 Quantification of GHG Reduction Per Unit Measure

Based on the estimated 775 million gallons of diesel used in Mississippi for residential, commercial, and transportation sectors in 2017 (MDEQ 2024) and the population scaling factor, annual diesel consumption in MBCI is estimated to be 2.9 million gallons per year (no industrial consumption of diesel). Assuming 1% of this fuel is supplied by biodiesel (consistent with the market share of biodiesel vehicles) and the estimated 74% of GHG emission reductions from the use of biodiesel (Huo et al. 2008), the emission reductions per unit measure were obtained (**Table 5-3**).

Table 5-3. Results of estimated GHG emission reductions in MBCI from the substation of 1% diesel consumption to biodiesel.

Estimated Factors per Unit Measure	Quantified Results
1% of MBCI annual Biodiesel consumption (gallon)	2.9 million
GHG emission reduction from substitution of diesel to biodiesel (kg CO_2e per gallon)	7.5
Annual emission reduction from the substitution of 1 % diesel use (MT CO_2e)	22

5.3.3 Quantification of Cost Range

A 2014 study conducted by Tennessee State University study (Illukpitiya and de Kof 2014) estimated the biodiesel production costs are $4.29 to $5.92/gallon, which include feedstock costs and capital costs for equipment. MBCI can also coordinate and collaborate with MDEQ to initiate joint biofuel programs to accelerate the adoption of biofuels and to reduce the average costs for biofuel use.

5.3.4 Timeline of Implementation

The technology used to produce biodiesel and other types of biofuels is mature. Development of new biodiesel production facilities in MBCI is estimated to be around 3-5 years. MBCI can also coordinate and collaborate with Mississippi to produce and distribute biodiesel.

5.3.5 Co-benefits to Environment

This measure is expected to provide multiple co-benefits related to cleaner burning and biodegradability (MDEQ 2024). DOE (2024), for example, suggests that biodiesel produces fewer air pollutants like particulate matter and carbon monoxide than petroleum diesel, which can lead to improved MBCI air quality. Biofuels are biodegradable; spills or leaks of biodiesel can have reduced environmental impacts related to soil and water contamination compared to petroleum/diesel.

5.3.6 Workforce Considerations

Biofuel production and its associated supply chain related to feedstock production and distribution may create new jobs in MBCI. Additional considerations include the need for worker safety training to address handling of flammable substances.

5.3.7 Benefits to Low Income/Disadvantaged Communities

Producing and providing feedstock of biofuels can serve as an additional revenue source. Promoting biofuels can lead to reduced co-pollutants in MBCI lands and as well as creating of additional job opportunities related to production and distribution of biofuels.

5.4 Building Energy Efficiency Improvements

5.4.1 Description of Reduction Measure

Energy consumption in residential and commercial buildings includes the energy from fuel combustion and electricity use and emits a combined thirty-eight percent (38%) of GHG emissions from MBCI lands (note that the emissions from electricity use in buildings were separately estimated in Section 4). Improving building energy efficiency to reduce consumption of both fuels and electricity is thus identified as a priority measure to reduce GHG emissions.

Improvement of building energy efficiency includes a broad suite of retrofits and construction practices, which typically target a variety of building components/aspects: (a) building envelope, (b) lighting, (c) HVAC, (d) water heating, (e) appliances, (f) power systems, (g) integrated control systems, and (h) auditing and benchmarking. By retrofitting and improving these building components (e.g., using a more efficient option when a building component is being replaced), this measure aims to increase the overall building energy efficiency and reduce energy consumption. This measure has also been identified as a priority measure in Mississippi PCAP (MDEQ 2024), where descriptions are provided on the potential programs/policies that can be carried out in Mississippi. MBCI can coordinate and collaborate with MDEQ on developing and instituting building energy efficiency improvement programs to accelerate the implementation.

5.4.2 Quantification of GHG Reduction Per Unit Measure

Estimated GHG emission reductions per unit measure (**Table 5-4**) represent the improvement of building energy efficiency (with an overall 30% reduction of all building energy use) in a commercial building (with 10,000 ft^2 floor space) and 100 residential buildings. The results of average energy consumption in commercial and residential buildings in Mississippi (EIA 2023b) and East South Central Census Division (EIA 2023c) are used to estimate the GHG reduction potential from the implementation of this measure in MBCI. The 30% reduction of energy consumption is based on Rohmund et al. (2010), which suggests that a moderate 30% reduction in whole-building energy use can be achieved from 2010 to 2025 and a further 40-45% reduction can be achieved under an aggressive scenario.

Table 5-4. Results of estimated GHG emission reductions per unit measure in MBCI from improving building energy efficiency.

	Annual GHG reduction (MT CO_2e) for 10,000 ft^2 floor space in commercial buildings	Annual GHG reduction (MT CO_2e) for 100 residential buildings
Electricity	15.3	180
Natural gas	3.7	28
Propane	-	10
Fuel Oil	0.0	0.4
Sum	19.1	220

5.4.3 Quantification of Cost Range

Depending on building components and selected options for upgrades and retrofits, the associated costs can be different for building energy efficiency improvements in a particular building. The overall cost estimates were not calculated for this PCAP, although several existing studies and databases, e.g., the National Residential Efficiency Measures Database from the National Renewable Energy Laboratory (NREL 2023) provides itemized cost information.

5.4.4 Timeline of Implementation

Once an energy efficiency improvement program is established, the upgrading and improvement of energy efficiency in both commercial and residential buildings can be carried out immediately.

5.4.5 Co-benefits to Environment

Building energy efficiency improvements reduce fuel consumption on site at commercial and residential buildings and reduce electricity demand, which decrease the emissions of co-pollutants at these buildings and the emissions of co-pollutants at the power plants, respectively. This measure therefore can improve regional air quality and public health.

5.4.6 Workforce Considerations

Deploying building energy efficiency improvement programs leads to the creation of job opportunities associated with retrofitting and upgrading building components such as electric, mechanical, and construction positions. MBCI can also coordinate and collaborate with Mississippi to carry out workforce training and development programs to optimize benefits to local workforce.

5.4.7 Benefits to Low Income/Disadvantaged Communities

This measure provides three key benefits to low income/disadvantaged communities: (1) lower energy costs including fuel and electricity costs; (2) increase job opportunities related to building energy efficiency improvements; and (3) improving local air quality and public health. Adopting energy efficiency measures leads to cost savings from energy use, reducing the financial strain of low income/disadvantaged communities. This measure will promote and increase the building energy upgrade and retrofit projects – together with workforce training programs – can increase the local workforce opportunities. Reduction of fuel use on site at commercial and residential buildings, as previously described, decreases the emissions of co-pollutants, and thus improves local air quality.

5.5 Forest and Wetland Management

5.5.1 Description of Reduction Measure

Carbon sequestration from forestland offsets more than 50% of emissions in MBCI as described previously in Section 4.8; this measure aims to enhance and increase the sequestration of CO_2 from forest as well as wetlands in MBCI through improved management practices. The improved forest management practices focus on creating healthy and resilient multi-age stands of trees and optimizing the carbon sequestration of forests by allowing a greater growth rate of younger cohorts, enabling mature trees to achieve larger sizes, and establishing regeneration of native seedlings. Similar to forest management practices, the improved management of wetlands to optimize carbon sequestration involves the practices of restoring degraded and damaged wetlands, rewetting, and revegetation, increasing the sequestration of carbon in soil and vegetation and reducing GHG emissions.

Improved forest management practices provide co-benefits to environment including improving wildlife habitat, increasing biodiversity, conserving, and protecting endemic and culturally important species, improving water and air quality, and reducing erosion. Wetland management practices provide co-benefits in improving biodiversity and water quality and reducing flooding risks.

A forest management program established in 2023 in coordination among the Indian Land Tenure Foundation (ILTF), National Indian Carbon Coalition (NICC), and the MBCI [ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project (MBCI 2024)] has, as its primary goal, to increase the carbon sequestration of forestland in MBCI lands. Forest management practices are used to increase the carbon sequestration at the forestland in MBCI boundaries by achieving longer rotations with light commercial timber harvesting to allow forests to continue to sequester carbon, and stand improvements. Estimation of carbon sequestration potentials and project cost has been conducted for the ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project, which serves as the basis the quantification of this measure.

5.5.2 Quantification of GHG Reduction Per Unit Measure

The ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project is being carried out for around 25,000 acres of the forestland within MBCI boundaries. The benefits of carbon sequestration from this project were estimated by calculating the difference in sequestration between a baseline scenario and the scenario with improved management practices over a course of 20 years. The baseline scenario is based on management practices maximizing economic output from harvesting forest products, whereas the scenario with improved management practices aims to optimize carbon sequestration of forestland by allowing only light commercial timber harvesting.

The estimated total carbon sequestration over the 20-year period and annual average rate of sequestration from the ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project (MBCI 2024) (**Table 5-5**) is estimated as 2.4 MT CO_2e per acre of managed forestland area, similar to the estimate (3.1 MT CO_2e per acre) provided for the forest carbon management measure in Mississippi PCAP (MDEQ 2024).

Table 5-5. Results of estimated GHG emission reductions per unit measure in MBCI from improved forest management.

	Sequestration (total or per acre)
Total sequestration during a 20-year period (MT CO_2e)	1,230,000
Annual average rate of sequestration (MT CO_2e)	61,700
Annual sequestration rate per forest land area (MT CO_2e per acre)	2.4

Notably, the estimated annual sequestration (61.7 TMT CO_2e) from the ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project (MBCI 2024) nearly equals (~89%) the annual net emissions in MBCI (69.7 TMT CO_2e in 2017). Implementation of improved forest management therefore is expected to significantly reduce the net GHG emission of MBCI.

This measure additionally aims to employ wetland management practices, although the quantification of corresponding GHG reductions was not conducted due to limited data. EPA's State Inventory and Projection Tool (USEPA 2023a), for example, does not provide estimation of annual GHG sequestration in wetlands. The annual sequestration in remaining wetlands was reported in the EPA's GHG Inventory by State (USEPA 2023e) with an estimated annual removal of 0.1 million MT CO_2e in Mississippi. The annual carbon sequestration in wetlands is therefore expected to be in the magnitude of tens to a few hundreds of MT CO_2e, given that the land area in MBCI is about 0.1% of the land area in Mississippi (the ratio of forestland area is similarly around 0.1%). Further quantification of carbon sequestration from the wetland management practices in MBCI was not conducted in this PCAP.

5.5.3 Quantification of Cost Range

The project cost with the improved forest management practices is associated with opportunity cost or the difference in net present values of harvest forest products between the two scenarios (baseline and improved management scenario); the project investment should be greater than the decreased revenue from reduced harvested forest products to be financially feasible. The ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project (MBCI 2024) estimated that the baseline scenario creates $31,878,210 of harvested wood products in net present value over 20 years, whereas $1,051,422 of harvested wood products in net present value is associated with the improved forest management practices. The project investment for the improved forest management practices therefore was estimated to be at least $30,900,000 in net present value, which equals $25 per MT CO_2e sequestered. This project cost of $25 per MT CO_2e is lower than the average cost of common carbon dioxide removal technologies (e.g., average cost for afforestation and reforestation is $120 per MT CO_2e) according to IPCC (2022a). Similarly, the estimate management cost per acre is estimated as $61 per acre per year, consistent with the cost information from other studies. For example, Cook-Patton et al. (2020) suggest annualized costs of afforestation in the Southeast forests of the US averages $55 per acre.

Cost estimation for wetland management was not conducted for this measure due to insufficient data. Cost associated with wetland/peatland restoration was reported in IPCC (2022b), which suggests up to $100 per MT CO_2e sequestered.

5.5.4 Timeline of Implementation

Improved forest and wetland management practices can be implemented immediately. The ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project is currently being carried out for its first 20 years of the project term.

5.5.5 Co-benefits to Environment

Improved forest carbon management practices provide several co-benefits to environment including (a) improving biodiversity, (b) improving wildlife habitat, (c) conserving and protecting endemic and culturally important species, (d) improving air and water quality, and (e) reducing erosion. Wetland management can provide co-benefits including (a) improving water and environmental quality, (b) promoting biodiversity, and (c) reducing flooding risks.

5.5.6 Workforce Considerations

This measure is expected to provide and promote employment opportunities in forestry and wetland management related field. MBCI can coordinate and collaborate with Mississippi to establish workforce training programs to further facilitate the implementation of forest management programs in MBCI and as well as in Mississippi.

5.5.7 Benefits to Low Income/Disadvantaged Communities

This measure of implementing improved forest management practices can greatly benefit the low income/disadvantaged communities, as it provides investments to the forest and wetland management and local communities, offers employment opportunities, and improves environmental quality.

5.6 Waste Management

5.6.1 Description of Reduction Measure

Waste sector in MBCI causes 4.4% of total GHG emissions in 2017, primarily from the release of gases in landfill sites. This reduction measure aims to reduce the emissions from waste sector through improved waste management practices including the capture and utilization of landfill gases. Landfill gases consist approximately 50% CH_4, 50% CO_2, and a small amount of non-CH_4 organic compounds. While CO_2 emissions from solid wastes such as food and forestry products are considered as carbon neutral, CH_4 emissions—given its comparatively large global warming potentials (28 times larger than CO_2)—are the main cause for GHG emissions in waste sector. This reduction measure therefore primarily aims to improve waste management with the implementation of CH_4 capture. The captured CH_4 can further be processed and utilized as fuels (USEPA 2024).

5.6.2 Quantification of GHG Reduction Per Unit Measure

Quantification of this reduction measure of waste management was conducted focusing on the removal of CH_4 from solid waste disposal sites. The EPA's Landfill Gas Energy Benefits Calculator (USEPA 2024) was used to calculate the GHG reduction per landfill gas removed. CH_4 emissions from municipal solid waste were calculated as about 61,400 MT for Mississippi in 2017 using the EPA's State Inventory and Projection Tool (USEPA 2023a); an estimated 230 MT CH_4 emissions in 2017 were therefore estimated for MBCI using the population scaling factor. Based on the CH_4 conversion factors provided in the Landfill Gas Energy Benefits Calculator, the daily landfill gas release for MBCI was estimated as 66,000 cubic feet per day.

Assuming 10% of daily landfill gas in MBCI can be captured by implementing this measure, annual GHG reduction is calculated (**Table 5-6**).

Table 5-6. Results of estimated GHG emission reductions from capturing 10% of landfill gas in MBCI.

Calculator parameter	Value	Notes
Landfill Gas Produced (thousand standard cubic feet per day)	6.6	Assuming 10% of released landfill gas is captured
Direct Equivalent Emissions Reduced (MT CO_2e/yr)	645	Reduction of CH4 emitted directly from the landfill
Avoided Equivalent Emissions Reduced (MT CO_2e/yr)	56	Offset of CO_2 from avoiding the use of fossil fuels
Total Equivalent Emissions Reduced (MT CO_2e/yr)	700	Total = Direct + Avoided

5.6.3 Quantification of Cost Range

The cost estimation of waste management in MBCI was not conducted, although related cost information for the landfill gas capture and utilization projects can be found in the EPA's Landfill Gas Energy Cost Model.

5.6.4 Timeline of Implementation

Technologies for waste management including landfill gas capture and utilization are mature; the implementation of this measure can be carried in a near-term timeframe of 5 years. MBCI can also coordinate with Mississippi to collaborate on waste management programs to accelerate implementation.

5.6.5 Co-benefits to Environment

Waste management practices such as capture of landfill gases can reduce the emissions of other co-pollutants, e.g., volatile organic compounds and hazardous air pollutants, to provide co-benefits to environment.

5.6.6 Workforce Considerations

This measure is expected to promote additional employment opportunities related to planning, construction, management, and operation of waste management facilities such as landfill gas capture and utilization systems.

5.6.7 Benefits to Low Income/Disadvantaged Communities

This measure can directly provide benefits to the low income/disadvantaged communities by reducing local air pollution, creating job opportunities, and stimulating local economy through the sales of the captured and utilized CH_4.

This page intentionally left blank

6 Summary

This document is the initial report on priority measures planned for the MBCI to reduce GHG net emissions and other air pollutants in Tribal lands. Following submission of this PCAP to EPA by April 1, 2024, implementation grant applications will be developed and submitted to seek funds for implementing one or more of these priority actions. A subsequent planning document, the MBCI CCAP, will be prepared by mid-2025 to expand the work in this PCAP with more detailed analyses on the GHG inventory and emission reduction measures for Tribal lands.

GHG inventory was developed for MBCI in this PCAP primarily based on Mississippi's statewide emission inventory (MDEQ 2024) and population and land use scaling factor. Emissions for the year 2017 are used as the baseline year; this determination was made in consideration of several factors, including that it aligns with baseline year 2017 in Mississippi PCAP (MDEQ 2024), 2017 is the latest year with higher availability of alternative emission data sources for comparison. Using 2017 data also eliminates anomalies caused by the COVID-19 Pandemic.

The total GHG emissions in MBCI are 162.9 TMT CO_2e in 2017, with transportation, electric power, and commercial and residential buildings representing the three largest sources of emissions and emitted 85.9, 51.4, and 15.11 TMT CO_2e, respectively. Waste and wastewater emit 7.2 and 1.1 TMT CO_2e, respectively. Mainly due to remaining forestland, the LULUCF sector contributes to 91.0 TMT CO_2e of GHG sequestration in MBCI, leading to net emissions of 69.7 TMT CO_2e in 2017.

Six priority reduction measures have been identified and selected in this PCAP, which are:

- Residential and Commercial Distributed Solar Generation and Storage
- School Bus Electrification
- Biofuel Use for Transportation or as An Energy Source
- Building Energy Efficiency Improvements
- Forest and Wetland Management
- Waste Management

These six priority measures were assessed with respect to GHG reduction, cost, timeline, and as well as co-benefits to environment, workforce impacts, and benefits to low income and disadvantaged communities. A summary of GHG reduction for these six measures with typical scales of application is provided in **Table 6-1**. The scales of implementation for five measures (except forest and wetland management) presented in **Table 6-1** are incremental, e.g., replacement of 1% of annual diesel fuel use in MBCI can be increased to the replacement of 5% of annual diesel fuel use. **Table 6-1** additionally incorporates the information from an existing forest management program, ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project

(MBCI 2024) as described previously, which is being deployed in MBCI and provides an estimated annual carbon sequestration of 61.7 TMT CO_2e. This ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project (MBCI 2024) provides 89% reduction to the estimated annual net GHG emissions in MBCI; the implementation of other measures is expected to further reduce the net emissions in MBCI.

Table 6-1. GHG reduction measures and magnitude of reduction for a planned scale of implementation in MBCI.

Proposed Reduction Measure	Planned Scale of Implementation	Annual GHG Reduction (CO_2e)
Residential and Commercial Distributed Solar Generation and Storage	Install 100 residential buildings and 10 commercial buildings with small scale solar systems annually	1,260 MT
School Bus Electrification	Replace 10 school buses to ESB	260 MT
Biofuel Use for Transportation or as An Energy Source	Replacement of 1% of annual diesel fuel use in MBCI	22 MT
Building Efficiency Improvements	Implementation of efficiency measures reducing total energy use by 30% in 100 residential buildings and 10 commercial buildings	410 MT
Forest and Wetland Management[a]	All forestland in MBCI(the ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project)	61,700 MT
Waste Management	Capture 10% of landfill gases	700 MT

[a]GHG reduction for wetland management was not quantified.

7 References

Cook-Patton, S. C., T. Gopalakrishna, A. Daigneault, S. M. Leavitt, J. Platt, S. M. Scull, O. Amarjargal, P. W. Ellis, B. W. Griscom, J. L. McGuire, S. M. Yeo, and J. E. Fargione. 2020. "Lower cost and more feasible options to restore forest cover in the contiguous United States for climate mitigation." One Earth, 3 (6): 739–752. Cell Press. https://doi.org/10.1016/j.oneear.2020.11.013.

DOE. 2024. "Biodiesel Vehicle Emissions." Accessed January 29, 2024. https://afdc.energy.gov/vehicles/diesels_emissions.html#:~:text=Life%20cycle%20analysis%20completed%20by,than%20those%20from%20petroleum%20diesel.

EIA. 2023a. "Mississippi Profile Analysis." Accessed January 4, 2024. https://www.eia.gov/state/analysis.php?sid=MS#72.

EIA. 2023b. "Residential Energy Consumption Survey (RECS)." Accessed January 2, 2024. https://www.eia.gov/consumption/residential/.

EIA. 2023c. "Commercial Buildings Energy Consumption Survey (CBECS)." Accessed January 3, 2024. https://www.eia.gov/consumption/commercial/.

Huo, H., M. Wang, C. Bloyd, and V. Putsche. 2008. Life-Cycle Assessment of Energy and Greenhouse Gas Effects of Soybean-Derived Biodiesel and Renewable Fuels Energy Systems Division. Oak Ridge, TN: Argonne National Laboratory.

Illukpitiya, P., and J. P. de Kof. 2014. Economics of Small-Scale Biodiesel Production. Nashville, TN: Tennessee State University.

IPCC. 2022a. "Technical Summary." Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, P. R. Shukla, J. Skea, R. Slade, A. A. Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, and J. Malle, eds., 51–147. Cambridge, UK and New York, NY, US: Cambridge University Press.

IPCC. 2022b. "Agriculture, Forestry and Other Land Uses (AFOLU)." Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, P. Shukla, J. Skea, R. Slade, A. Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, and J. Malle, eds., 747–860. Cambridge, UK and New York, NY, US: Cambridge University Press.

MBCI. 2022. State of the Tribe. Mississippi Band of Choctaw Indians.

MBCI. 2024. ILTF/NICC Mississippi Band of Choctaw Indians Forest Carbon Project. Mississippi Band of Choctaw Indians, Indian Land Tenure Foundation, National Indian Carbon Coalition, SIG Carbon.

MDEQ. 2024. Mississippi Department of Environmental Quality Priority Climate Action Plan. Mississippi Department of Environmental Quality, March 01, 2024. *Available from* (press ctrl): MDEQ Priority Climate Action Plan.pdf (cleanairmsproject.com).

Multi-resolution Landscape Consortium. 2024. "Multi-Resolution Land Characteristics Consortium." Accessed January 27, 2024. https://www.mrlc.gov/.

NASEM. 2023. Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions. Washington, DC: National Academies of Sciences, Engineering, and Medicine, the National Academies Press.

NREL. 2023. "National Residential Efficiency Measures Database." National Renewable Energy Laboratory . Accessed January 29, 2024. https://remdb.nrel.gov/.

Rohmund, I., K. Smith, S. Yoshida, and L. Wood. 2010. Assessment of Electricity Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes IEE Whitepaper. Edison Foundation.

USEPA. 2023a. "State Inventory and Projection Tool." Accessed January 27, 2024. https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool.

USEPA. 2023b. User's Guide to Incorporating Existing GHG Inventories for the Priority Climate Action Plan (PCAP). State and Local Climate and Energy Program, U.S. Environmental Protection Agency.

USEPA. 2023c. "Facility Level Information on GreenHouse gases Tool (FLIGHT)." Accessed January 2, 2024. https://ghgdata.epa.gov/ghgp/main.do.

USEPA. 2023d. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021. Washington, DC: United States Environmental Protection Agency.

USEPA. 2023e. Methodology Report for Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990–2021. Washington, DC: Climate Change Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency.

USEPA. 2024. "Landfill Methane Outreach Program (LMOP)." Accessed January 27, 2024. https://www.epa.gov/lmop.