GRANT APPLICATION SUMMARY SHEET

Grant Name:	Carbon Pollution Reduction Grant (CPRG) 25-29
Department:	NDOT
Grantor:	ENVIRONMENTAL PROTECTION AGENCY
Pass-Through Grantor (If applicable):	
Total Applied For	$2,077,033.00
Metro Cash Match:	$0.00
Department Contact:	Casey Hopkins 880-1676
Status:	NEW

Program Description:

NDOT's proposal will expand the city's Transportation Demand Management (TDM) Program, Nashville Connector, by implementing an electric-bike (e-bike) rebate program throughout Metro Nashville. This program will provide an opportunity for the city to offer a practical and sustainable alternative to single-occupancy vehicles, which will result in greenhouse gas emissions reductions. This program is also replicable and scalable, meaning it can expand to serve multiple jurisdictions in the Middle Tennessee region. The program also emphasizes equity, offering income-qualifying vouchers at a higher dollar value to ensure that our most disadvantaged populations can meaningfully participate.

Plan for continuation of services upon grant expiration:

If the program is widely successful we would look to Council to support in future budget cycles.

APPROVED AS TO AVAILABILITY OF FUNDS:

Kevin Crumbo/kB — 3/29/2024 | 5:05 AM PDT

Director of Finance **Date**

APPROVED AS TO FORM AND LEGALITY:

Courtney Mohan — 3/29/2024 | 10:38 AM CDT

Metropolitan Attorney **Date**

AP AC

APPROVED AS TO RISK AND INSURANCE:

Balogun Cobb — 3/29/2024 | 8:42 AM CDT

Director of Risk Management Services **Date**

Freddie O'Connell:mpw@nashville.gov — 3/30/2024 | 11:10 AM C

Metropolitan Mayor Date

(This application is contingent upon approval of the application by the Metropolitan Council.

Grants Tracking Form

Part One

Pre-Application ○ **Application** ◉ **Award Acceptance** ○ **Contract Amendment** ○

Department	Dept. No.	Contact	Phone	Fax
NDOT		Casey Hopkins	880-1676	

Grant Name:	Carbon Pollution Reduction Grant (CPRG) 25-29		
Grantor:	ENVIRONMENTAL PROTECTION AGENCY	**Other:**	
Grant Period From:	12/02/24	(applications only) **Anticipated Application Date:**	03/29/24
Grant Period To:	12/03/29	(applications only) **Application Deadline:**	04/01/24
Funding Type:	FED DIRECT	**Multi-Department Grant** ☐ →	**If yes, list below.**
Pass-Thru:		**Outside Consultant Project:** ☐	
Award Type:	COMPETITIVE	**Total Award:**	$2,077,033.00
Status:	NEW	**Metro Cash Match:**	$0.00
Metro Category:	New Initiative	**Metro In-Kind Match:**	$0.00
CFDA #	66.046	**Is Council approval required?** ☑	
Project Description:		**Applic. Submitted Electronically?** ☑	

NDOT's proposal will expand the city's Transportation Demand Management (TDM) Program, Nashville Connector, by implementing an electric-bike (e-bike) rebate program throughout Metro Nashville. This program will provide an opportunity for the city to offer a practical and sustainable alternative to single-occupancy vehicles, which will result in greenhouse gas emissions reductions. This program is also replicable and scalable, meaning it can expand to serve multiple jurisdictions in the Middle Tennessee region. The program also emphasizes equity, offering income-qualifying vouchers at a higher dollar value to ensure that our most disadvantaged populations can meaningfully participate.

Plan for continuation of service after expiration of grant/Budgetary Impact:

If the program is widely successful we would look to Council to support in future budget cycles.

How is Match Determined?

Fixed Amount of $		or		% of Grant		Other: ☑

Explanation for "Other" means of determining match:

A match is not required.

For this Metro FY, how much of the required local Metro cash match:

Is already in department budget?	$0.00		**Fund** N/A	**Business Unit**	N/A
Is not budgeted?	$0.00		**Proposed Source of Match:**		N/A
(Indicate Match Amount & Source for Remaining Grant Years in Budget Below)					

Other:

Number of FTEs the grant will fund:	1.00	**Actual number of positions added:**	1.00	
Departmental Indirect Cost Rate	18.83%	**Indirect Cost of Grant to Metro:**	$391,105.30	
***Indirect Costs allowed?** ◉ Yes ○ No **% Allow.**	7.16%	**Ind. Cost Requested from Grantor:**	$148,652.00	**in budget**

***(If "No", please attach documentation from the grantor that indirect costs are not allowable. See Instructions)**

Draw down allowable? ☐

Metro or Community-based Partners:

Part Two

Grant Budget

Budget Year	Metro Fiscal Year	Federal Grantor	State Grantor	Other Grantor	Local Match Cash	Match Source (Fund, BU)	Local Match In-Kind	Total Grant Each Year	Indirect Cost to Metro	Ind. Cost Neg. from Grantor
Yr 1	FY25	**$514,206.00**	$0.00	$0.00	$0.00	N/A	$0.00	**$514,206.00**	$96,824.98	$43,865.00
Yr 2	FY26	**$383,863.00**	$0.00	$0.00	$0.00	N/A	$0.00	**$383,863.00**	$72,281.40	$25,112.00
Yr 3	FY27	**$388,321.00**	$0.00	$0.00	$0.00	N/A	$0.00	**$388,321.00**	$73,120.84	$25,819.00
Yr 4	FY28	**$392,935.00**	$0.00	$0.00	$0.00	N/A	$0.00	**$392,935.00**	$73,989.66	$26,550.00
Yr 5	FY29	**$397,708.00**	$0.00	$0.00	$0.00	N/A	$0.00	**$397,708.00**	$74,888.42	$27,306.00
Total		**$2,077,033.00**	$0.00	$0.00	$0.00	N/A	$0.00	$2,077,033.00	$391,105.30	$148,652.00

Date Awarded:		**Tot. Awarded:**		**Contract#:**	NOFO-EPA-R-OAR-CPRG1-23-07
(or) **Date Denied:**		**Reason:**			
(or) **Date Withdrawn:**		**Reason:**			

Contact: juanita.paulsen@nashville.gov
vaughn.wilson@nashville.gov

JP

Rev. 5/13/13
5803

GCP Received 3/27/2024

GCP Approved 3/27/2024

OMB Number: 4040-0004
Expiration Date: 11/30/2025

Application for Federal Assistance SF-424

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received: Completed by Grants.gov upon submission.

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: Metropolitan Government of Nashville-Davidson County

* b. Employer/Taxpayer Identification Number (EIN/TIN): 62-0694743

* c. UEI: LGZLHP6ZHM55

d. Address:

* Street1: 1 Public Square
Street2:
* City: Nashville
County/Parish:
* State: TN: Tennessee
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 37201-5007

e. Organizational Unit:

Department Name:

Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:
* First Name: Casey
Middle Name:
* Last Name: Hopkins
Suffix:

Title: Grants Coordinator

Organizational Affiliation:

* Telephone Number: 615-880-1676
Fax Number:

* Email: casey.hopkins@nashville.gov

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

X: Other (specify)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

Metropolitan

*** 10. Name of Federal Agency:**

Environmental Protection Agency

11. Catalog of Federal Domestic Assistance Number:

66.046

CFDA Title:

Climate Pollution Reduction Grants

*** 12. Funding Opportunity Number:**

EPA-R-OAR-CPRGI-23-07

* Title:

Climate Pollution Reduction Grants Program: Implementation Grants (General Competition)

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Music City Bike Bucks

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: TN-007

* b. Program/Project: TN-007

Attach an additional list of Program/Project Congressional Districts if needed.

Nashville Congessional District.docx | Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 12/02/2024

* b. End Date: 12/03/2029

18. Estimated Funding ($):

* a. Federal	2,077,033.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	2,077,033.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 18, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix:

* First Name: Casey

Middle Name:

* Last Name: Hopkins

Suffix:

* Title: Grants Coordinator

* Telephone Number: 615-880-1676

Fax Number:

* Email: casey.hopkins@nashville.gov

* Signature of Authorized Representative: Completed by Grants.gov upon submission.

* Date Signed: Completed by Grants.gov upon submission.

The following attachment is not included in the view since it is not a read-only PDF file.

Upon submission, this file will be transmitted to the Grantor without any data loss.

Nashville Congessional District.docx

Nashville-Davidson County Congressional Districts

Districts – TN-007, TN-006, TN-005

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 02/28/2025

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Climate Pollution Reduction Grants Program		$	$	$ 2,077,033.00	$ 0.00	$ 2,077,033.00
2.						
3.						
4.						
5. Totals		$	$	$ 2,077,033.00	$ 0.00	$ 2,077,033.00

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1)	(2)	(3)	(4)	Total (5)
	Climate Pollution Reduction Grants Program	N/A	N/A	N/A	
a. Personnel	$ 433,346.00	$	$	$	$ 433,346.00
b. Fringe Benefits	119,606.00				119,606.00
c. Travel	2,244.00				2,244.00
d. Equipment	0.00				0.00
e. Supplies	11,335.00				11,335.00
f. Contractual	222,900.00				222,900.00
g. Construction	0.00				0.00
h. Other	1,138,950.00				1,138,950.00
i. Total Direct Charges (sum of 6a-6h)	1,928,381.00				$ 1,928,381.00
j. Indirect Charges	148,652.00				$ 148,652.00
k. TOTALS (sum of 6i and 6j)	$ 2,077,033.00	$	$	$	$ 2,077,033.00
7. Program Income	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00

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Prescribed by OMB (Circular A -102) Page 1A

SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8. Climate Pollution Reduction Grants Program	$ 0.00	$ 0.00	$ 0.00	$ 0.00
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	$ 0.00	$ 0.00	$ 0.00	$ 0.00

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 514,206.00	$ 187,379.00	$ 88,955.00	$ 237,872.00	$ 0.00
14. Non-Federal	$ 0.00	0.00	0.00	0.00	0.00
15. TOTAL (sum of lines 13 and 14)	$ 514,206.00	$ 187,379.00	$ 88,955.00	$ 237,872.00	$ 0.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS) (b)First	(c) Second	(d) Third	(e) Fourth
16. Climate Pollution Reduction Grants Program	$ 514,206.00	$ 383,863.00	$ 388,321.00	$ 392,935.00
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	$ 514,206.00	$ 383,863.00	$ 388,321.00	$ 392,935.00

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: 1,928,381

22. Indirect Charges: 148,652

23. Remarks: Additional budget schedules are with the attachments.

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Prescribed by OMB (Circular A -102) Page 2

OMB Number: 2030-0020
Expiration Date: 06/30/2024

Preaward Compliance Review Report for All Applicants and Recipients Requesting EPA Financial Assistance

Note: Read Instructions before completing form.

I. A. Applicant/Recipient (Name, Address, City, State, Zip Code)

Name: Metropolitan Government of Nashville-Davidson County

Address: 1 Public Square

City: Nashville

State: TN: Tennessee Zip Code: 37201-5007

B. Unique Entity Identifier (UEI): LGZLHP6ZHM55

C. Applicant/Recipient Point of Contact

Name: Casey Hopkins

Phone: 615-880-1676

Email: casey.hopkins@nashville.gov

Title: Grants Coordinator

II. Is the applicant currently receiving EPA Assistance? ☒ Yes ☐ No

III. List all pending civil rights lawsuits and administrative complaints filed under federal law against the applicant/recipient that allege discrimination based on race, color, national origin, sex, age, or disability. (Do not include employment complaints not covered by 40 C.F.R. Parts 5 and 7.)

Litigation Docket #:
3:17-cv-773
3:17-cv-1427
3:17-cv-1547
3:20-cv-00004
3:20-cv-00242
3:20-cv-00636
3:21-cv-00038
3:21-cv-00695
3:21-cv-00807
22C712
3:22-cv-00680
3:22-cv-00973
3:23-cv-00736
3:23-cv-01323

Admin Hearing Docket #:

04-22-1199
494-2022-02053
04-23-1121
494-2023-01136
494-2023-01564
04-22-1714
494-2023-02133
04-23-1071
494-2023-03868
494-2023-02315
494-2023-02448
494-2023-03080
S23-23-002
494-2023-03803
494-2024-00861
494-2024-00923
1-107-24 / EEOC# 25A-2024
494-2024-01279
07.03-240581J
494-2024-01290

494-2023-04032
07.03-241247J
494-2024-01990

IV. List all civil rights lawsuits and administrative complaints decided against the applicant/recipient within the last year that alleged discrimination based on race, color, national origin, sex, age, or disability and enclose a copy of all decisions. Please describe all corrective actions taken. (Do not include employment complaints not covered by 40 C.F.R. Parts 5 and 7.)

D.P. v. Metro. Gov't of Nashville & Davidson Cty., U.S. District Court No. 3:22-cv-00126. Plaintiff accepted an offer of judgment in the amount of $8,000 plus attorneys' fees (for a total award of $28,000) in lawsuit alleging student-on-student sexual harassment at a local high school.

Citlaly Gomez v. Metro. Gov't of Nashville & Davidson Cty., Davidson County Circuit Court No. 20-219-II. Jury returned a verdict in Plaintiff's favor on sexual harassment claim resulting in the statutory cap of $300,000. Plaintiff was also awarded attorneys' fees and interest (for a total award of $556,508.81).

Corey Blankenship v. Metro. Gov't of Nashville & Davidson Cty., U.S. District Court No. 3:19-cv-00146. Jury returned a verdict in Plaintiff's favor on disability claim arising from the Metro Civil Service Commission's withdrawal of the Nashville Fire Department's conditional offer of employment to Plaintiff on grounds that his Type 1 diabetes maintenance did not meet NFPA standards. Jury awarded Plaintiff $125,300 in back pay. Plaintiff also recovered costs, fees, and interest (for a total of $403,701.81). No injunctive relief was allowed, after the Civil Service Commission amended its rules to clarify how the NFPA policies are to be applied.

V. List all civil rights compliance reviews of the applicant/recipient conducted under federal nondiscrimination laws by any federal agency within the last two years and enclose a copy of the review and any decisions, orders, or agreements based on the review. Please describe any corrective action taken. (40 C.F.R. § 7.80(c)(3))

No compliance reviews within last two years.

VI. Is the applicant requesting EPA assistance for new construction? If no, proceed to VII; if yes, answer (a) and/or (b) below.

☐ Yes ☒ No

a. If the grant is for new construction, will all new facilities or alterations to existing facilities be designed and constructed to be readily accessible to and usable by persons with disabilities? If yes, proceed to VII; if no, proceed to VI(b).

☐ Yes ☒ No

b. If the grant is for new construction and the new facilities or alterations to existing facilities will not be readily accessible to and usable by persons with disabilities, explain how a regulatory exception (40 C.F.R. 7.70) applies.

N/A

VII. Does the applicant/recipient provide initial and continuing notice that it does not discriminate on the basis of race, color, national origin, sex, age, or disability in its program or activities? (40 C.F.R 5.140 and 7.95)	☒ Yes	☐ No
a. Do the methods of notice accommodate those with impaired vision or hearing?	☒ Yes	☐ No
b. Is the notice posted in a prominent place in the applicant's/recipient's website, in the offices or facilities or, for education programs and activities, in appropriate periodicals and other written communications?	☒ Yes	☐ No
c. Does the notice identify a designated civil rights coordinator?	☒ Yes	☐ No
VIII. Does the applicant/recipient maintain demographic data on the race, color, national origin, sex, age, or disability status of the population it serves? (40 C.F.R. 7.85(a))	☒ Yes	☐ No
IX. Does the applicant/recipient have a policy/procedure for providing meaningful access to services for persons with limited English proficiency? (Title VI, 40 C.F.R. Part 7, *Lau v Nichols* 414 U.S. (1974))	☒ Yes	☐ No

X. If the applicant is an education program or activity, or has 15 or more employees, has it designated an employee to coordinate its compliance with 40 C.F.R. Parts 5 and 7? Provide the name, title, position, mailing address, e-mail address, fax number, and telephone number of the designated coordinator.

Charles Boddie, Human Resources manager, 750 S. 5th Street Nashville, TN 37206, charles.boddie@nashville.gov, Office: 615-862-8710, Fax: 615-862-8739

XI. If the applicant is an education program or activity, or has 15 or more employees, has it adopted grievance procedures that assure the prompt and fair resolution of complaints that allege a violation of 40 C.F.R. Parts 5 and 7? Provide a legal citation or applicant's/ recipient's website address for, or a copy of, the procedures.

https://www.nashville.gov/departments/human-relations/title-vi-metro-government

For the Applicant/Recipient

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law. I assure that I will fully comply with all applicable civil rights statutes and EPA regulations.

A. Signature of Authorized Official	B. Title of Authorized Official	C. Date
Completed by Grants.gov upon submission.	Grants Coordinator	Completed by Grants.gov upon submission.

For the U.S. Environmental Protection Agency

I have reviewed the information provided by the applicant/recipient and hereby certify that the applicant/recipient has submitted all preaward compliance information required by 40 C.F.R. Parts 5 and 7; that based on the information submitted, this application satisfies the preaward provisions of 40 C.F.R. Parts 5 and 7; and that the applicant has given assurance that it will fully comply with all applicable civil rights statures and EPA regulations.

A. *Signature of Authorized EPA Official	B. Title of Authorized Official	C. Date

Instructions for EPA FORM 4700-4 (Rev. 04/2021)

General. Recipients of Federal financial assistance from the U.S. Environmental Protection Agency must comply with the following statutes and regulations.
Title VI of the Civil Rights Acts of 1964 provides that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. The Act goes on to explain that the statute shall not be construed to authorize action with respect to any employment practice of any employer, employment agency, or labor organization (except where the primary objective of the Federal financial assistance is to provide employment). Section 13 of the 1972 Amendments to the Federal Water Pollution Control Act provides that no person in the United States shall on the ground of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under the Federal Water Pollution Control Act, as amended. Employment discrimination on the basis of sex is prohibited in all such programs or activities. Section 504 of the Rehabilitation Act of 1973 provides that no otherwise qualified individual with a disability in the United States shall solely by reason of disability be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. Employment discrimination on the basis of disability is prohibited in all such programs or activities. The Age Discrimination Act of 1975 provides that no person on the basis of age shall be excluded from participation under any program or activity receiving Federal financial assistance. Employment discrimination is not covered. Age discrimination in employment is prohibited by the Age Discrimination in Employment Act administered by the Equal Employment Opportunity Commission. Title IX of the Education Amendments of 1972 provides that no person in the United States on the basis of sex shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance. Employment discrimination on the basis of sex is prohibited in all such education programs or activities. Note: an education program or activity is not limited to only those conducted by a formal institution. 40 C.F.R. Part 5 implements Title IX of the Education Amendments of 1972. 40 C.F.R. Part 7 implements Title VI of the Civil Rights Act of 1964, Section 13 of the 1972 Amendments to the Federal Water Pollution Control Act, and Section 504 of The Rehabilitation Act of 1973.

Items "Applicant" means any entity that files an application or unsolicited proposal or otherwise requests EPA assistance. 40 C.F.R. §§ 5.105, 7.25. "Recipient" means any State or its political subdivision, any instrumentality of a State or its political subdivision, any public or private agency, institution, organizations, or other entity, or any person to which Federal financial assistance is extended directly or through another recipient, including any successor, assignee, or transferee of a recipient, but excluding the ultimate beneficiary of the assistance. 40 C.F.R. §§ 5.105, 7.25. "Civil rights lawsuits and administrative complaints" means any lawsuit or administrative complaint alleging discrimination on the basis of race, color, national origin, sex, age, or disability pending or decided against the applicant and/or entity which actually benefits from the grant, but excluding employment complaints not covered by 40 C.F.R. Parts 5 and 7. For example, if a city is the named applicant but the grant will actually benefit the Department of Sewage, civil rights lawsuits involving both the city and the Department of Sewage should be listed. "Civil rights compliance review" means: any federal agency-initiated investigation of a particular aspect of the applicant's and/or recipient's programs or activities to determine compliance with the federal non-discrimination laws. Submit this form with the original and required copies of applications, requests for extensions, requests for increase of funds, etc. Updates of information are all that are required after the initial application submission. If any item is not relevant to the project for which assistance is requested, write "NA" for "Not Applicable." In the event applicant is uncertain about how to answer any questions, EPA program officials should be contacted for clarification.

EPA KEY CONTACTS FORM

OMB Number: 2030-0020
Expiration Date: 06/30/2024

Authorized Representative: *Original awards and amendments will be sent to this individual for review and acceptance, unless otherwise indicated.*

Name: Prefix: | First Name: Casey | Middle Name: | Last Name: Hopkins | Suffix:

Title:

Complete Address:

Street1: 750 S. 5th Street
Street2:
City: Nashville | State: TN: Tennessee
Zip / Postal Code: 37206 | Country: USA: UNITED STATES

Phone Number: 615-880-1676 | **Fax Number:**

E-mail Address:

Payee: *Individual authorized to accept payments.*

Name: Prefix: | First Name: Kristin | Middle Name: | Last Name: Kumrow | Suffix:

Title:

Complete Address:

Street1: 750 S. 5th Street
Street2:
City: Nashville | State: TN: Tennessee
Zip / Postal Code: 37206 | Country: USA: UNITED STATES

Phone Number: 615-862-8707 | **Fax Number:**

E-mail Address:

Administrative Contact: *Individual from Sponsored Programs Office to contact concerning administrative matters (i.e., indirect cost rate computation, rebudgeting requests etc).*

Name: Prefix: | First Name: Kristin | Middle Name: | Last Name: Kumrow | Suffix:

Title:

Complete Address:

Street1: 750 S. 5th Street
Street2:
City: Nashville | State: TN: Tennessee
Zip / Postal Code: 37206 | Country: USA: UNITED STATES

Phone Number: 615-862-8707 | **Fax Number:**

E-mail Address:

EPA KEY CONTACTS FORM

Project Manager: *Individual responsible for the technical completion of the proposed work.*

Name: **Prefix:** | **First Name:** Meghan | **Middle Name:**

Last Name: Mathson | **Suffix:**

Title:

Complete Address:

Street1: 750 S. 5th Street

Street2:

City: Nashville | **State:** TN: Tennessee

Zip / Postal Code: 37206 | **Country:** USA: UNITED STATES

Phone Number: 615 –862 –7174 | **Fax Number:**

E-mail Address:

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, ''Disclosure of Lobbying Activities,'' in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, ''Disclosure of Lobbying Activities,'' in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

* APPLICANT'S ORGANIZATION	Metropolitan Government of Nashville-Davidson County
* PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE	
Prefix:	
* First Name:	Casey
Middle Name:	
* Last Name:	Hopkins
Suffix:	
* Title:	Grants Coordinator
* SIGNATURE:	Completed on submission to Grants.gov
* DATE:	Completed on submission to Grants.gov

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OMB Number: 4040-0013
Expiration Date: 02/28/2025

1. * Type of Federal Action:
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- [ ] c. cooperative agreement
- [ ] d. loan
- [ ] e. loan guarantee
- [ ] f. loan insurance

2. * Status of Federal Action:
- [x] a. bid/offer/application
- [ ] b. initial award
- [ ] c. post-award

3. * Report Type:
- [x] a. initial filing
- [ ] b. material change

4. Name and Address of Reporting Entity:

[x] Prime [ ] SubAwardee

** Name:* Metropolitan Government of Nashville-Davidson County

** Street 1:* 1 Public Square *Street 2:*

** City:* Nashville *State:* *Zip:* 37201-5007

Congressional District, if known:

5. If Reporting Entity in No.4 is Subawardee, Enter Name and Address of Prime:

6. * Federal Department/Agency:

Environmental Protection Agency

7. * Federal Program Name/Description:

Climate Pollution Reduction Grants

CFDA Number, *if applicable:* 66.046

8. Federal Action Number, *if known:*

9. Award Amount, *if known:*

$

10. a. Name and Address of Lobbying Registrant:

Prefix: ** First Name:* Ana *Middle Name:*

** Last Name:* Cruz *Suffix:*

** Street 1:* 601 Thirteenth St NW *Street 2:* Suite #250S

** City:* Washington *State:* DC: District of Columbia *Zip:* 20005

b. Individual Performing Services (including address if different from No. 10a)

Prefix: ** First Name:* Ana *Middle Name:*

** Last Name:* Cruz *Suffix:*

** Street 1:* 601 Thirteenth St NW *Street 2:*

** City:* Washington *State:* DC: District of Columbia *Zip:* 20005

11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when the transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

*** Signature:** Completed on submission to Grants.gov

***Name:** *Prefix:* ** First Name:* Casey *Middle Name:*

** Last Name:* Hopkins *Suffix:*

Title: **Telephone No.:** **Date:** Completed on submission to Grants.gov

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GREATER NASHVILLE REGIONAL COUNCIL

Priority Climate Action Plan

Nashville-Davidson-Murfreesboro-Franklin, TN MSA

March 2024

Greater Nashville Regional Council
44 Vantage Way, Suite 450 | Nashville, Tennessee 37228 | Phone: (615) 862-8828 | Fax: (615) 862-8840
GNRC.org

PREVIEW Date: Mar 27, 2024 Workspace ID: WS01280112 Funding Opportunity Number: EPA-R-OAR-CPRGI-23-07

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Atlas of Maps in Appendix A

List of Abbreviations and Acronyms

AFOLU	"Agriculture, Forestry, and Other Land Use" Emissions Sector
BAU	Business as usual
CAA	Clean Air Act
CAPs	Criteria Air Pollutants
CARP	Metro Nashville's Climate Adaptation and Resilience Plan
CCAP	Comprehensive Climate Action Plan
CEJST	Climate and Economic Justice Screening Tool
CH_4	Methane
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CPRG	Climate Pollution Reduction Grant
C & D	Construction and demolition landfill
DOE	U.S. Department of Energy
DMU	Diesel Multiple Unit
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
EV	Electric Vehicle
F-gases	Fluorinated Gases
FLIGHT	EPA's Facility Level Information on Green Houe Gases Tool
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 Code of Federal Regulations Part 98)
GNRC	Greater Nashville Regional Council
GWh	Gigawatt hour
HFCs	Hydrofluorocarbons
ICE	Internal Combustion Engines
IRA	Inflation Reduction Act
ICLEI	Local Governments for Sustainability (formerly known as the International Council for Local Environmental Initiatives)
kW	Kilowatt
kWh	Kilowatt hour
LEARN	ICLEI's Land Emissions and Removals Navigator Tool
LED	Light Emitting Diode
LIDAC	Low-income disadvantaged community
LPC	Local Power Companies
MDHA	Metropolitan Development and Housing Agency
MMT	Million Metric Ton

MPO	Metropolitan Planning Organization
MSW	Municipal Solid Waste
MSA	Metropolitan Statistical Area
MT	Metric Ton
MW	Megawatt
MWh	Megawatt hour
NDOT	Nashville Department of Transportation
NEI	EPA's National Emissions Inventory
NES	Nashville Electric Service
NF_3	Nitrogen Trifluoride
N_2O	Nitrous Oxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NREL	National Renewable Energy Laboratory
O_3	Ozone
PCAP	Priority Climate Action Plan
RTP	Regional Transportation Plan
SF_6	Sulfur Hexafluoride
SO_2	Sulfur Dioxide
QAPP	Quality Assurance Project Plan
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TIP	Transportation Improvement Program
TVERS	Tennessee Voluntary Emissions Reduction Strategy
TCC	Transportation Coordinating Committee
TPB	Transportation Policy Board
VMT	Vehicle Miles Traveled
VOCs	Volatile Organic Compounds
WARM	Waste Reduction Model

1.0 Introduction

1.1 Program Overview

The U.S. Environmental Protection Agency's Climate Pollution Reduction Grants (CPRG) program provides $5 billion in grants to states, local governments, tribes, and territories to develop and implement ambitious plans for reducing greenhouse gas emissions and other harmful air pollution. Authorized under Section 60114 of the Inflation Reduction Act, this two-phase program provides $250 million for noncompetitive planning grants, and approximately $4.6 billion for competitive implementation grants. Through the CPRG program, EPA is seeking to achieve three broad objectives:

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

CPRG includes two phases of investment. Phase 1 provides noncompetitive grants to state and local/regional agencies to develop custom plans to reduce greenhouse gases (GHGs). Phase 2 provides funding to help implement priority measures identified in those plans. Priorities for the phase 1 planning grants include:

- Establishing ambitious measures that will achieve significant cumulative GHG reductions by 2030 and beyond;
- Prioritizing strategies that will achieve substantial community benefits (such as reduction of criteria air pollutants (CAPs) and hazardous air pollutants (HAPs), particularly in low income and disadvantaged communities;
- Identifying opportunities to leverage other funding sources to maximize these GHG reductions and community benefits; and
- Crafting innovative policies and programs that are replicable and can be "scaled up" across multiple jurisdictions.

Priority Climate Action Plan

The first deliverable of the CPRG planning grant is a Priority Climate Action Plan (PCAP). The PCAP must include a focused list of near-term, high-priority, implementation-ready measures that have been identified for implementation by the lead organization and any other collaborating entities (e.g., municipalities, tribes). The PCAP includes:

- A GHG inventory;
- Quantified GHG reduction measures;
- A low-income and disadvantaged communities benefits analysis; and,
- A review of authority to implement.

A Comprehensive Climate Action Plan (CCAP) will be completed following the PCAP. The CCAP provides the scope for more detailed inventory, modeling, technical analysis, and community engagement.

1.2 Lead Entities

In response to the opportunities provided by EPA through the CPRG, the TN Department of Environment and Conservation (TDEC) is leading a statewide effort to develop the Tennessee Volunteer Emission Reduction Strategy or TVERS.

Local partners of the three largest metropolitan statistical areas (MSAs) within Tennessee are working in partnership with TDEC to develop regional emissions reduction plans for their respective areas. The Greater Nashville Regional Council (GNRC) is designated as the lead entity for the EPA's CPRG Program across the Nashville-Davidson- Murfreesboro-Franklin, TN Metropolitan Statistical Area (MSA).

GNRC is a public body corporate and politic originally established by the Tennessee Development District Act of 1965. Today, GNRC serves as council of governments empowered by State law to convene local and state leaders for the purposes of planning and programming state and federal investments into a range of social services and public infrastructure across a thirteen-county region. The 93-member governing body of the Regional Council includes 13 county mayors, 52 municipal mayors, 2 state legislators, a private citizen from each county representing issues of business and commerce, and a private citizen from each county representing issues of social equity and inclusion.

GNRC's mission is to assist local communities and state agencies in the development of plans and programs that guide growth and development in the most desirable, efficient, and cost-effective manner, while ensuring the continued long-term livability of the region. GNRC carries several designations as it works on behalf of State and local partners.

- GNRC is designated by the U.S. Economic Development Administration as the region's economic development district to act on behalf of local officials, chambers of commerce, and private sector investors.
- GNRC staff provide regional transportation planning for the Nashville Metropolitan Planning Organization (MPO) and has representation on the neighboring Clarksville Urbanized Area MPO, Middle Tennessee Rural Planning Organization (RPO), and Dale Hollow RPO.
- GNRC is designated as the Area Agency on Aging and Disability for the primary purpose to coordinate the delivery of services and programs to enhance the quality of life of the region's older population.
- GNRC staffs the Mid-Cumberland Area Development Corporation and administers lending programs to small businesses with resources provided by the U.S. SBA and the U.S. EDA, and USDA.
- GNRC staffs the Middle Tennessee Tourism Council to provide tourism marketing and other promotional support to the tourism economy.
- GNRC staffs Cumberland Region Tomorrow to encourage responsible growth and ensure that the region's communities grow to be vibrant and livable places that offer a range of transportation and housing choices, while preserving the region's natural environment.

GNRC's professional staff have decades of combined expertise in community development; land use, environment, and transportation planning; economic development; project and program management; grant writing and management; aging and disability services; policymaking; and data analysis. The organization's extensive experience and permanence in Middle Tennessee have enabled GNRC to establish relationships with organizations and agencies in the public, private, and non-profit sectors to better serve the region's residents and communities. GNRC staff are often working with federal, state, and local departments of transportation and economic development agencies; community housing agencies; water and sewer utilities, electric and natural gas utilities, and broadband service providers; religious and community-based organizations;

community health and private health organizations; and universities in addition to local governments and the public.

GNRC is uniquely positioned to leverage its existing capacity and organizational structure to convene key decision makers, practitioners, and public and private sector stakeholders in developing the CPRG deliverables that address the unique concerns of the MSA and position municipal and county governments and other implementing agencies for subsequent EPA grants and other federal funds to achieve the climate pollution reduction goals of the PCAP and CCAP.

1.3 Geographic Scope

GNRC's planning area for the CPRG program consists of seventeen counties within Middle Tennessee. As a multi-faceted organization, GNRC serves a variety of counties in its day-to-day activities. For example, GNRC member counties differ slightly from the counties found in the Nashville MSA, which in turn differ slightly from the counties served by the Nashville MPO, which is also staffed by GNRC. In recognition of this fact, GNRC has extended its Climate Action Planning Area to represent the thirteen counties included in the Nashville MSA, along with four additional counties that are traditionally included in GNRC's area of service. The complete list of counties included in the PCAP are as follows: Cannon County, Cheatham County, Davidson County, Dickson County, Houston County, Humphreys County, Macon County, Maury County, Montgomery County, Robertson County Rutherford County, Smith County, Stewart County, Sumner County, Trousdale County, Williamson County, and Wilson County.

1.4 Interagency Coordination

In its role as a regional convenor, GNRC coordinates with state and local agencies and organizations on regional and local planning efforts and continued to expand these relationships through the CPRG planning effort. GNRC leveraged its existing capacity and organizational structure to convene key decision makers, practitioners, and public and private sector stakeholders to develop PCAP deliverables that address the unique concerns of the planning area. Specifically, GNRC currently facilitates regional dialogue among the following relevant groups:

- Regional Council Body: The Regional Council body is comprised of 93 members and includes 65 mayors and county executives, 26 mayoral appointments, and 2 state legislators.
- Transportation Policy Board: The board is empowered to adopt formal transportation plans and programs on behalf of the Nashville Area Metropolitan Planning Organization. The TPB is comprised of mayors and county executives of member governments, the Governor (or TDOT designee), a representative of area transit agencies, a representative of county highway departments, and representatives of the Federal Highway Administration and Federal Transit Administration.
- Middle Tennessee Mayors Caucus: The Middle Tennessee Mayors Caucus was formed in 2009 in order to provide leadership on important issues facing a rapidly changing regional landscape. Transportation, and particularly the pursuit of a modern regional transit system, served as the early catalyst, but in its brief history, the Caucus has served as an effective forum for building working relationships among mayors and has helped local governments support each other on issues ranging from flood recovery to state and federal legislative and policy priorities. Today, the Caucus serves as GNRC's primary forum for area mayors to advocate for the region's policy and legislative priorities.
- Economic Development Advisory Committee: The Economic Development Advisory Committee advises GNRC on a variety of projects and initiatives aimed at supporting regional economic development goals. Its primary purpose is to guide the development of the federally required

Comprehensive Economic Development Strategy for northern Middle Tennessee which opens doors to federal grants. The membership is comprised of three mayors appointed by the GNRC chairperson, business representatives appointed by each of the thirteen (13) county mayors, and social equity representatives also appointed by county mayors.

- Regional Environmental Roundtable: Recognizing the impact of rapid growth and development in Middle Tennessee and the need for collaboration, GNRC convenes a regional environmental roundtable comprised of local experts, practitioners, and advocates from non-profit organizations and State and federal public agencies to collaborate on issues and challenges related to the environmental quality of the region. The group was established by GNRC in 2020 to assist in a major update to the regional transportation plan and to help inform the Council's activities in environmental and conservation focus areas.

In addition, GNRC worked closely with the statewide CPRG planning effort, TVERS, and the two CPRG TN MSA planning grant recipients, the cities of Knoxville and Memphis, and the City of Chattanooga. In the Nashville planning area, GNRC collaborated with Metro Nashville's Mayors Office and Office of Sustainability and the Metro Nashville Health Department.

1.5 Community Engagement

GNRC conducted community engagement to provide an opportunity for members of the general public to help shape the priorities presented as part of the PCAP. Building relationships takes time, commitment, and transparency. The timeline associated with the development of the PCAP was short. More extensive community engagement and partnerships with other agencies will be conducted in the development of the CCAP.

Coordinating with the statewide CPRG effort, TVERS, GNRC hosted four public events in the Nashville planning area to engage with community members. Three of the events were in-person where attendees could ask questions and provide input on the planning elements. One of the public events was a virtual meeting with polling using Poll Everywhere software to engage participants and receive feedback. Two of the facilities are in a low-income disadvantaged community as identified using the CEJST.

- October 19, 2023, Lentz Public Health Building, Nashville
- February 22, 2024 – Virtual Meeting
- February 27, 2024 – Hadley Park Community Center, Nashville
- February 28, 2024 – Southeast Community Center, Nashville

In addition, through its partnership with TDEC, GNRC was able to review the responses from the statewide planning survey. The survey was available to the public from September to November 2023 and was on the MetroQuest platform. TDEC provided GNRC with response data from participants who identified a home location in the Nashville planning area. The statewide survey had 1,639 total responses with 540 respondents in the Nashville planning area.

1.6 Findings from Outreach

During stakeholder and community meetings, GNRC provided an overview of air pollution, GHG emissions and an overview of the EPA's CPRG within the context of the Nashville planning area and the statewide effort, TVERS. GNRC staff had conversations with attendees and activities were available to solicit input from individuals. Activities focused on identifying the community's priorities for emissions reduction by sector and levels of support for their jurisdictions focus on emissions reduction measures. In addition, individuals were asked to share what actions they currently take that reduce emissions and what were the challenges and barriers to doing more.

Prioritization of Sectors to Reduce Emissions:

1. Transportation
2. Grid Electricity
3. Solid Waste
4. Stationary Fuels
5. AFOLU

Most individuals who participated in an engagement activity already do the following to reduce their emissions:

- recycle and reduce their waste and compost organic materials,
- use energy efficient appliances and lightbulbs,
- consolidate their errands and daily trips to reduce the miles that they drive, and
- take transit and/or walk and bike instead of drive.

The primary challenges for reducing their emissions are:

- The lack of a safe, connected, and convenient transit, pedestrian and biking infrastructure makes it difficult to not have to drive,
- High cost of efficient or sustainable alternatives, and
- Limited knowledge or information

Actions that they would like their community, city, or county to focus on include:

- Incentives for waste and recycling,
- More transit options – trains and buses – and free service,
- Expand and improve existing local and regional transit systems and infrastructure,
- Invest in building energy efficiency and weatherization improvements and programs,
- Protect and increase the tree canopy,
- Reduce travel demand and increase alternative travel modes with choices, behaviors, and incentives, and
- Improve transportation infrastructure and ITS to reduce travel times and idling.

1.7 Future Coordination and Engagement

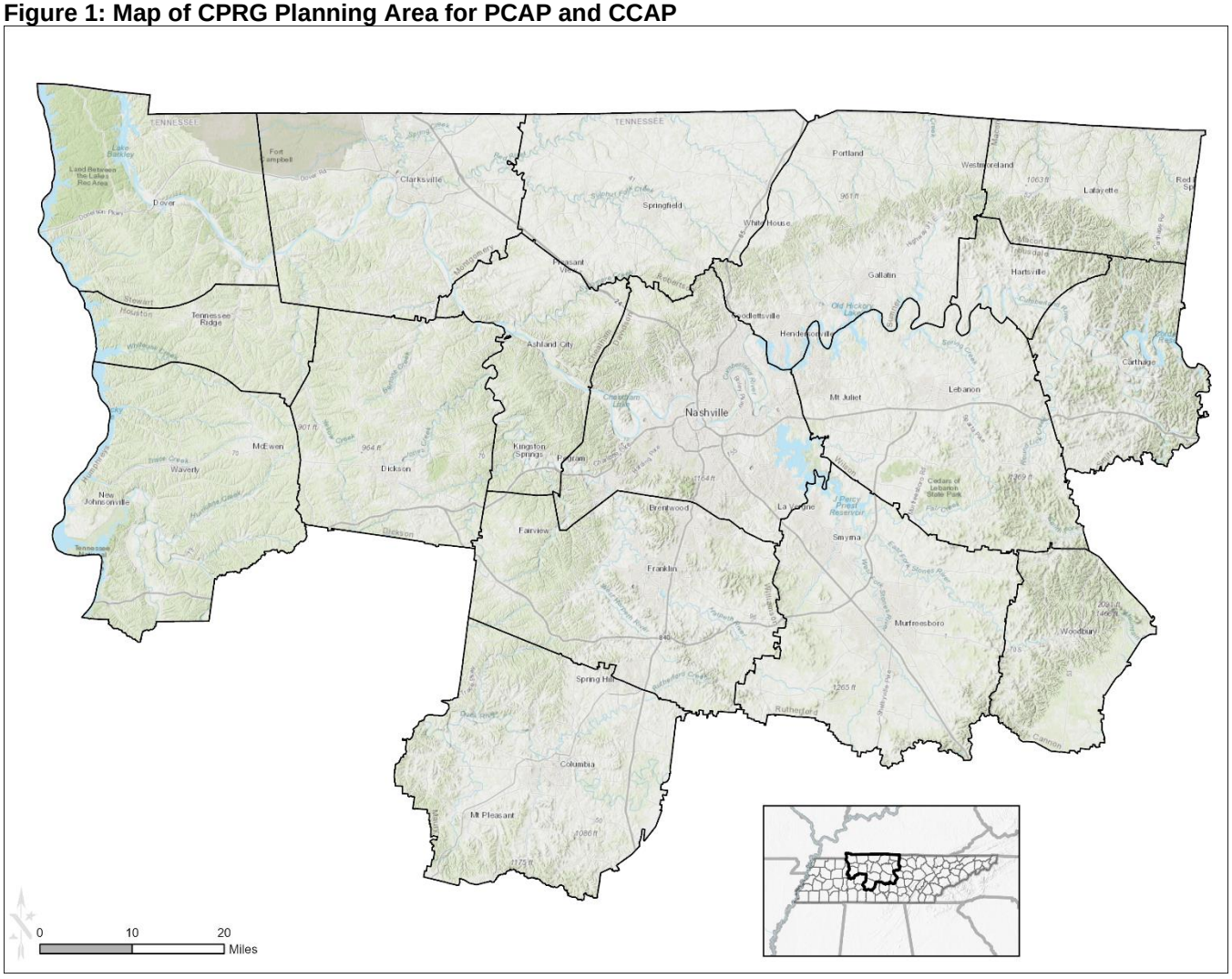
To complete the CCAP, GNRC will expand coordination and engagement efforts undertaken in developing the PCAP. The activities and relationships built during the PCAP establish a foundation to build from and expand outreach.

2.0 Regional Context

2.1 Geographic Extent

The geographic extent of the PCAP encompasses the 14 counties located within the Nashville-Davidson-Murfreesboro-Franklin, TN MSA including Cannon, Cheatham, Davidson, Dickson, Hickman, Macon, Maury, Robertson, Rutherford, Smith, Sumner, Trousdale, Williamson, and Wilson, as well as 4 additional counties located outside of the MSA that are represented in the ongoing planning efforts of the GNRC including Houston, Humphreys, Montgomery, and Stewart.

Figure 1: Map of CPRG Planning Area for PCAP and CCAP



2.2 Key Issues and Challenges

Rapid Population Growth

The 17-county CPRG Nashville planning area has experienced significant change since 2000. In 2000, over 1.5 million people lived here and by 2019 an additional ~645,000 people lived in the region pushing the population over 2.1 million. It is anticipated that by 2030, nearly 2.6 million people will live here, an 18% increase from

2019. And by 2050, over 3.2 million people are anticipated to live in the region, which is a 25% increase from 2030. Similarly, employment is expected to increase over the next three decades. In 2019, there were approximately 1.5 million jobs, and it is anticipated that by 2030 there will be 1.9 million and over 2.6 million jobs by 2050.

Sprawling Development Patterns, High Vehicle Miles Traveled, Traffic Congestion

Sprawling development patterns create greater distances between where people work, live and shop. Future projections indicate the fastest growing areas of the 17-county CPRG region are expected to be in counties surrounding Metro Nashville/Davidson County which are; Rutherford, Sumner, Williamson, and Wilson County as well as a few counties separated from Davidson County such as Trousdale and Montgomery County.

In 2021, one out of every three residents work in a different county in which they live across the metropolitan planning area. This geographic mismatch between locations of work and home contributes to the region's high vehicle miles traveled. In 2019, the base year for the GHG inventory, over 26.5 million annual vehicles miles were traveled, a 33% increase from 2005's 19.9 million annual vehicle miles traveled. And it is estimated that by 2050, over 41 million annual vehicle miles will be traveled, a 106% increase from 2005In 2019, the daily VMT per capita was 33.3 miles and if these trends continue, the daily VMT per capita in 2050 is anticipated to increase to 35 miles. .

Traffic congestion is often the first visible sign of economic prosperity as more people commute to work and school and make more trips to spend their increased discretionary income. The region's rapid growth has led to additional traffic volumes and increased demand on the existing transportation system. As a result, the duration of congestion has increased and the reliability of congestion has worsened in recent years. Based on NPMRDS (INRIX) data, the duration of congestion, measured by person-hours of excessive delay, has increased two percent annually for the Nashville area.

In the future, the region will need to move people more efficiently than driving alone. According to Transportation for America's The Congestion Con report, the region has added freeways faster than the population has grown, but it has not prevented congestion. Over the last 25 years, the Nashville urbanized area has increased freeway lane miles by 107%, population by 101%, yet increased annual hours of delay by 329%. Transit solutions and safe access to active transportation are necessary to maintain mobility across the region and access to economic opportunities.

Limited Public Transportation Options

The region's public transit services are provided by local governments. WeGo Public Transit (MTA) and other local transit agencies operate limited systems within their jurisdictions. WeGo Public Transit (RTA) provides regional services with express buses to locations in Montgomery, Robertson, Rutherford, Sumner, and Williamson County. The Music City Star, a commuter train service, provides connections to Wilson County.

Rising Cost of Living

Rising housing costs have pushed many families to seek housing farther from places of employment. As a result, they may be hindered by longer commutes and/or higher transportation costs, or worse yet, pass on employment prospects due to limited transportation mobility – not only affecting individual households but the region's economic vitality.

The cost of housing and transportation can be a burden to households. Cost-burden is a measure of the amount of income spent on housing and/or transportation. Those who spend more than 30% of their income on housing are considered cost burdened. Transportation cost is considered a burden if the cost accounts for more than 15% of a households' income. In the Nashville planning area 47% of households are cost burdened - 25% of households are housing cost burdened and 22% are transportation cost burdened.

Diversity and Demographic Shifts

The Middle Tennessee area continues to grow and diversify. The region's total population added nearly 330,000 residents between 2010 and 2020, an increase of more than 22%. Over the same time period, the percentage of ethnic and racial minorities increased by 13% and the elderly population rose by 52% regionwide, both outpacing the total population growth.

The region's recent growth outpaces many of our peer regions such as Indianapolis, Kansas City, and Louisville, and growth is projected to continue. By 2045, the MPO region is expected to reach more than 2.7 million residents - an additional million people in the next 25 years. Over that time horizon, the region's racial minority population is expected to increase at a faster rate than the total population and represent 22% of the region's population by 2045. In addition, the senior population is projected to more than double to nearly half a million seniors by 2045.

Climate Shifts and Extreme Weather

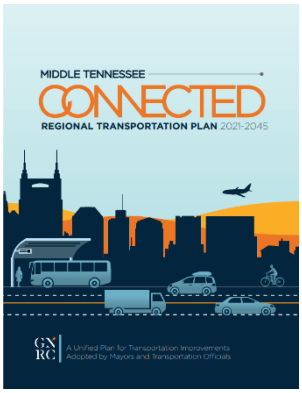
Climate change and its implications have been the focus of ongoing conversation across the globe for more than two decades. Locally, the Nashville region has seen the impact of extreme weather on its communities with unprecedented flooding in 2010, the March 2020 Tornado, increasing periods of drought and rain, as well as extreme temperature fluctuations. From rolling hills to lush farms to meandering streams, Middle Tennessee offers unmatched beauty. But the environment's importance goes well beyond beauty. Its health and vitality are directly tied to the physical and emotional health of its residents, as well as their economic well-being.

2.3 Related Plans and Programs

Comprehensive Economic Development Strategy (GNRC)

The Comprehensive Economic Development Strategy (CEDS) is a federally required document that serves as a gateway for grant-based investments from the U.S. Economic Development Administration. The CEDS is a regional blueprint for creating a stronger, more diverse economy and includes a set of strategies and proposed actions to ensure the continued prosperity and resiliency of the greater Nashville area.

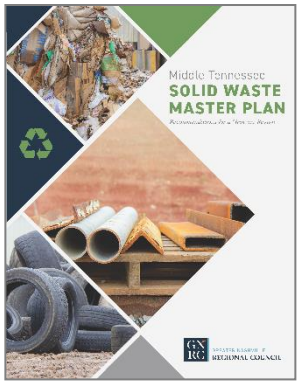
GNRC.org/CEDS



Regional Transportation Plan (GNRC)

In early 2021, mayors and transportation officials from across Middle Tennessee adopted an update to the region's transportation plan. The RTP allocates more than $10.5 billion in anticipated federal grants and matching funds to improve transportation throughout a seven-county planning area that includes Nashville and the surrounding counties of Maury, Robertson, Sumner, Rutherford, Williamson, and Wilson.

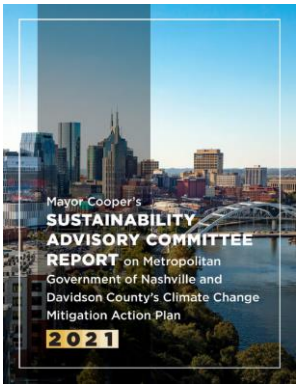
GNRC.org/Transportation



Regional Solid Waste Master Plan (GNRC)

GNRC, in partnership with local solid waste departments and the TN Dept. of Environment and Conservation, recently completed Middle Tennessee's first regional master plan for solid waste. The effort was launched as a response to a call-to-action by the GNRC Mayors Caucus to build support and capacity for multi-jurisdictional coordination on a range of issues impacting local solid waste management.

GNRC.org/SolidWaste

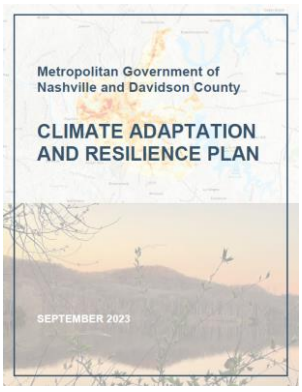


Climate Action Plan (Metro Nashville)

The plan serves as Metro Nashville's guiding document for its sustainability goals. A central recommendation of the CAP is that Metro carefully focus short- and long-term attention on the three key areas or "forks in the road" that will result in the greatest carbon reductions and enable the City to reach its sustainability targets:

- Decarbonization of the electrical grid;
- Electrification of motor vehicles; and
- Electrification (greening) of buildings.

Driving change in these three areas typically results in 60% to 70% greenhouse gas reductions and makes most cities' mitigation goals attainable.



Climate Adaptation and Resilience Plan (Metro Nashville)

The plan serves as Metro Nashville's guiding document for its resilience goals and represents the city's first effort to approach the climate crisis from a stance of resilience and is intended to inform future Metro investments and programs. It focuses on Nashville's five main climate hazards—flooding, tornados, extreme heat and heat waves, extreme cold and winter storms, and thunderstorms—and documents the outcomes of a high-level vulnerability assessment that considered the direct and indirect impacts of climate-driven disruptions, and the opportunities to build adaptive capacity across the built environment, natural environment, economic systems, and public services. It sets forth a strategic plan for deploying proactive strategies to reduce vulnerability and lower risk.

3.0 Greenhouse Gas Inventory

3.1 Scope of the Inventory

A greenhouse gas (GHG) inventory accounts for emission sources and their associated quantified emissions. The GNRC PCAP GHG inventory was developed through ICLEI's ClearPath tool and includes the following sectors: transportation; solid waste; grid electricity (residential, commercial, and industrial); stationary fuels; solid waste; water and wastewater; agriculture, forestry, and other land uses (AFOLU); and other sources. The year 2019 was chosen as the inventory's base year to provide a more representative pattern of general emissions before the pandemic the following year.

3.2 Data Review and Accounting Method

Various data sources, including national data sets and locally reported data, were used for input in ClearPath to calculate emissions for each sector. The table below highlights the data required for each sector along with its corresponding data source.

Figure 2: Data Sources for each Emissions Sector

Sector	Data Required	Data Source
Transportation	Vehicle Miles Traveled (VMT)	TDOT – 2019 HPMS
	Fuel Economy and Emission Rates	ClearPath Default Factor Set
	Emissions Estimates for Rail, Marine, Aviation, and Off-Road Mobile Sources	EPA National Emissions Inventory (NEI)
Grid Electricity	Consumption Data for Residential, Commercial, and Industrial Electricity	NREL SCOPE
Stationary Fuels	Fuel Consumption Data for Coal, Distillate Fuel Oil, HGL/Propane, and Wood and Waste	State-Level Energy Information Administration (EIA) Data, Downscaled to Planning Area
	Consumption Data for Residential, Commercial, and Industrial Natural Gas	NREL SCOPE
AFOLU	Emissions from Natural and Working Lands	ICLEI LEARN Tool
Solid Waste	Landfilled Waste at MSW and C&D Landfills	TDEC – 2019 ReTrac

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 the PCAP, GNRC used the community-wide track of the ClearPath tool. GNRC obtained county-level data for each of the 17-counties and summed the data to create the regional priority GHG inventory.

3.3 Regional GHG Emissions

The priority GHG inventory developed for the PCAP has a baseline year of 2019. The Transportation Sector has the highest emissions, followed by Grid Electricity, and Stationary Fuels. The top three sectors account for over 90% of total emissions in the region. The PCAP GHG inventory does not include Water and Wastewater Sector or Other sources. Those will be accounted for in the CCAP GHG inventory.

Figure 3: Total GHG Emissions by Sector

Sector	Million Metric Tons of Carbon Dioxide Equivalents (CO_2e)	Percent of Total CO_2e Emissions
Transportation	14.4	44%
Grid Electricity	13.3	41%
Stationary Fuels	3.2	10%
Agriculture, Forestry, and other Land Uses	1.1	3%
Solid Waste	0.5	2%
Total Emissions	**32.6**	**100%**

Transportation

Similar to the U.S., the Nashville planning area's largest source of GHG emissions were Transportation activities (44%) of total GHG emissions. Transportation activities were the largest source (28.6 percent) of total U.S. greenhouse gas emissions in 2019[1]. From 1990 to 2021, transportation CO_2 emissions from fossil fuel combustion increased by 19%. Transportation activities occur in all communities and the transportation sector is comprised of several sub-sectors of mobile sources: on-road vehicles, offroad vehicles, aviation, watercraft, and rail.

In the planning area, on-road vehicles are the largest source of emissions with 90% of CO_2e which includes light-duty (gasoline) passenger vehicles and heavy-duty (diesel) vehicles. The heavy-duty on-road sub-sector is mainly freight and services vehicles and public transit vehicles.

Offroad equipment is the second largest source of emissions in the transportation sector with 8% of CO_2e emissions. Offroad equipment includes construction equipment, generators, offroad vehicles, farm equipment, and other miscellaneous equipment.

Figure 4: Sources of Transportation Sector Emissions

Source	Million Metric Tons of Carbon Dioxide Equivalents (CO_2e)	Percent of Total Transportation Sector CO_2e Emissions
On-road	12.9	90%
Offroad	1.2	8%
Aviation	0.2	1%
Rail	0.1	1%
Water	0.1	>1%
Total Transportation Sector Emissions	**14.4**	**100%**

Grid Electricity

The electric power sector accounted for 25% of total U.S. greenhouse gas emissions in 2019. Power generation and/or consumption occurs among all communities. In the Nashville planning area, this sector was the second largest source of emissions with 41% of total CO_2e. This sector's emissions are comprised of the energy used by residences, businesses, and industries.

[1] U.S. Department of Energy. Alternative Fuels Data Center. Maps and Data- Greenhouse Gas Emissions by Economic Sector. https://afdc.energy.gov/data/10802

Figure 5: Sources of Grid Electricity Sector Emissions

Source	Million Metric Tons of Carbon Dioxide Equivalents (CO_2e)	Percent of Total Grid Electricity Sector CO_2e Emissions
Commercial	6.1	46%
Residential	5.2	39%
Industrial	2.0	15%
Total Grid Electricity Sector Emissions	**13.2**	**100%**

Stationary Fuel

The stationary fuel sector includes the energy used to heat buildings for air and water temperature comfort. The primary sources of GHG emissions are from fuels such as natural gas, kerosene and other fuels including wood. Emissions from the commercial and residential sectors have increased since 1990. In the Nashville planning area, 10% of GHG emissions are attributable to stationary fuels.

Agriculture, Forestry and other Land Uses

This sector includes fluxes of carbon from activities such as converting forests to agricultural use and practices that remove CO_2 from the atmosphere and store it in long-term carbon sinks like forests. In 2019, 3% of total regional GHG emissions come from these activities.

Solid Waste

This sector includes landfills, composting, and anaerobic digestion. Landfills were the third largest source of anthropogenic methane emissions in 2021, and landfills accounted for 1.9% of total U.S. greenhouse gas emissions. In 2019, 2% of the total GHG emissions come from landfills (MSW and C&D) in the region.

3.4 GHG Emissions by Type of Gas

Greenhouse gases are gases in the atmosphere that act similarly to the glass in a greenhouse: they absorb the sun's energy and heat that is radiated from the Earth's surface, trap it in the atmosphere and prevent it from escaping into space. This process is the main reason for the greenhouse effect that keeps the Earth's temperature warmer than it would otherwise be, allowing life on Earth to exist. Many greenhouse gases occur naturally in the atmosphere, but human activity adds enormous amounts, boosting the greenhouse effect that is contributing to global warming.

Carbon Dioxide (CO_2) and other greenhouse gases like methane and nitrous oxide are emitted when we burn fossil fuels, produce materials such as steel, cement, and plastics, and grow the food we eat. The primary sources of greenhouse gas emissions in the United States are carbon dioxide (CO_2) and methane (CH_4). Smaller emissions include Nitrous oxide (N_2O) and fluorinated gases (F-gases) including Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur hexafluoride (SF_6).

Greenhouse gases are also absorbed through natural and man-made processes. Natural causes of greenhouse gas absorption include oceans and plants. Manmade processes of greenhouse gas absorption include carbon capture systems. There are also some industrial cases of using gases produced on-site and either capturing & storing the gas or using that gas in other industry activities (kind of like recycling). This includes manufacturing concrete and steel.

CO_2 emissions are the largest GHG emissions in the region, with nearly 94% of the total emissions. And the primary sources of those emissions are the transportation sector and production of electricity to power our homes and businesses.

Figure 6: Total GHG Emissions by Sector and Type of Gas

Sector	CO_2	CH_4	N_2O
Transportation	14,318,971	774	277
Grid Electricity	13,199,205	1,209	181
Stationary Fuels	3,102,350	4,314	21
AFOLU	0	0	89,550
Solid Waste	0	19,554	0
Total	**30,620,526**	**25,851**	**90,028**

4.0 GHG Reduction Measures

4.1 Regional Priorities

Existing projects and planned projects identified through stakeholder engagement and interagency and intergovernmental coordination provided an inventory of existing GHG reduction measures in the Nashville planning area. These measures were considered in the selection of priority GHG reduction measures. In addition, selection of priority measures was based on the regionwide emissions inventory with a focus on achieving the most significant reductions possible while considering regional and community goals and input from planning partners, stakeholders, and the public.

For the Nashville region's PCAP, an emissions reduction measure includes programs and projects that will achieve or facilitate the reduction of greenhouse gas air pollution in the 17-counties. These are near-term, high-priority, implementation-ready measures that will be led by GNRC and/or collaborating entities or other entities in the planning area. This list is not exhaustive of the Nashville area's priorities. Additional GHG reduction measures will be included in the CCAP.

Figure 7: List of Strategies and Priority Measures

Strategy 1: Transition to cleaner mobile sources such as electric, hybrid and other alternative fuels and support these vehicles through the availability of fueling infrastructure.	**Measure 1.1 -** Electrification of Light- and Heavy-Duty On-Road Vehicle Fleets **Measure 1.2 -** Electrification of Public Transit Bus Fleet **Measure 1.3 -** Electrification of Public Transit Commuter Rail Fleet
Strategy 2: Increase use of alternative modes of transportation with programs, policies and projects that improve existing and expand bicycle and pedestrian infrastructure.	**Measure 2.1 -** Launch Rebate Program to Incentivize Individuals to Purchase an e-Bike
Strategy 3: Implement travel demand management strategies and expand public transit options to reduce VMT from personal automobile use.	**Measure 3.1 -** Implement TDM Programming and Expand Transit Options
Strategy 4: Invest in residential, commercial, and government facilities energy efficiency and weatherization improvements and programs.	**Measure 4.1 -** Retrofit Residential Buildings for Natural Gas and Electricity Efficiency; Electrification **Measure 4.2 -** Retrofit Commercial and Industrial Buildings for Natural Gas and Electricity Efficiency, including exterior infrastructure; Electrification **Measure 4.3 -** Retrofit Exterior Public Lighting with higher efficiency lightbulbs; Electrification **Measure 4.4 -** Weatherization of Low-Income Residential Buildings and Units

Strategy 5: Invest in renewable energy capture and storage infrastructure.	**Measure 5.1 -** Increase Residential Renewable Energy Capture and Storage Infrastructure **Measure 5.2 -** Increase Other Renewable Energy Capture and Storage Infrastructure
Strategy 6: Reduce emissions from landfills through programs, policies, and projects that divert waste and/or capture methane emissions.	**Measure 6.1 -** Invest in Landfill and Methane Gas Recovery **Measure 6.2 -** Invest in Waste Diversion and Sustainable Materials Management
Strategy 7: Reduce tree canopy lost to land development and replace trees lost to development, natural disasters, and natural loss.	**Measure 7.1 -** Expand Tree Canopy Coverage

4.2 Transportation and Mobility Strategies

An efficient, accessible multimodal transportation system that moves people effectively whether by transit, carpooling, walking and biking, or individual vehicles has the power to transform the quality of life in the region as well as reducing environmental impacts. Implementing the region's long-range transportation plan (RTP 2045) and locally adopted transportation and community plans can transform our region and communities into better places to live, work, and socialize.

Strategy 1: Transition to cleaner mobile sources such as electric, hybrid and other alternative fuels and support these vehicles through the availability of fueling infrastructure.

Measure 1.1 Electrification of Light- and Heavy-Duty On-Road Vehicle Fleets

Action	15% increase in on-road EVs
Estimate of quantifiable GHG emissions reductions through 2030	134,502 tons of CO_2e
Implementing agency or agencies	Local Governments
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	GNRC 17 County CPRG Region
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, others TBD
Metrics for tracking progress	Rates at which internal combustion engines are retired and replaced with electric engines.
Applicable inventory sector	Transportation

Measure 1.2 Electrification of Public Transit Bus Fleet

Action	Replace diesel bus fleet with EV bus fleet
Estimate of quantifiable GHG emissions reductions through 2030	CO: 76.39 kg/day NOx: :105.19 kg/day $PM_{2.5}$: 0.21 kg/day PM_{10}: 0.21kg/day

	VOC : 2.45kg/day
Implementing agency or agencies	Metro Transit Authority (MTA)
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	GNRC 17 County CPRG Region
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, FTA, State and Local Funds
Metrics for tracking progress	TBD
Applicable inventory sector	Transportation

Measure 1.3 Electrification of Public Transit Commuter Rail Fleet

Action	Replace uncontrolled tier diesel commuter rail with tier 4 DMU commuter rail
Estimate of quantifiable GHG emissions reductions through 2030	CO2e: no reduction but benefits in other GHGs NOx:1,132.73 kg/day $PM_{2.5}$: 28.47 kg/day PM_{10}: 29.35 kg/day VOC: 67.64 kg/day
Implementing agency or agencies	Regional Transportation Authority (RTA)
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	GNRC 17 County CPRG Region
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, FHWA, FTA, State and Local Funds
Metrics for tracking progress	TBD
Applicable inventory sector	Transportation

Strategy 2: Increase use of alternative modes of transportation with programs, policies and projects that improve existing and expand bicycle and pedestrian infrastructure.

Measure 2.1 Launch Rebate Program to Incentivize Individuals to Purchase an e-Bike

Action	0.5% decrease in passenger vehicle trips per day through Nashville's E-Bike rebate program
Estimate of quantifiable GHG emissions reductions through 2030	46,187.24 kg of CO_2e/day; 101,150.049 CO_2e by 2030
Implementing agency or agencies	Metro Nashville
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	Davidson County
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, others TBD

Metrics for tracking progress	Planning & Initializing phase: development of rebate ranges anticipated to be based on income and development of program and public education plan.
Applicable inventory sector	Transportation

Strategy 3: Implement travel demand management strategies and expand public transit options to reduce VMT from personal automobile use.

Measure 3.1 Implement TDM Programming and Expand Transit Options

Action	10% reduction in on-road personal vehicle VMT
Estimate of quantifiable GHG emissions reductions through 2030	1,515,638 tons of CO_2e
Implementing agency or agencies	Transit Agencies, Local Government, State Government
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	GNRC 17 County CPRG Region
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, others TBD
Metrics for tracking progress	TBD
Applicable inventory sector	Transportation

4.3 Building and Infrastructure Reduction Measures

Our built environment including buildings, homes, and utility features consume energy to maintain a comfortable and safe environment for people and goods. There is potential to reduce direct and indirect greenhouse gas emissions through weatherization improvements and upgrades to more energy efficient appliances and products.

Weatherizing buildings – or sealing gaps where air leaks in or out of the building and adding insulation – can reduce the amount of energy used to heat and cool the air in buildings due to losses. This not only reduces energy consumption and associated GHG emissions, but it also improves comfort and saves occupants money by reducing their energy bill. Similarly, installing new, or replacing older, appliances and devices that use less energy to do the same operation can reduce GHG emissions.

Strategy 4: Invest in residential, commercial, industrial and government facilities energy efficiency and weatherization improvements and programs.

Measure 4.1 Retrofit Residential Buildings for Natural Gas and Electricity Efficiency; Electrification

Actions	4% per year retrofit for natural gas efficiency 3% per year retrofit for electricity efficiency 2% per year electrification of natural gas
Estimate of quantifiable GHG emissions reductions through 2030	Natural Gas Efficiency – 93,856 metric tons of CO_2e Electricity Efficiency – 591,529 metric tons of CO_2e Natural Gas Electrification – 112,820 metric tons of CO_2e
Implementing agency or agencies	Local Governments, Utilities, and Housing and Development Authorities

Implementation schedule and milestones	2025-2030
Geographic location (if applicable)	Metro Nashville and Surrounding Counties
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, others TBD
Metrics for tracking progress	Number of housing units using natural gas retrofit/year, divided by the number of housing units using natural gas in the region = % natural gas retrofit achieved Number of housing units using electricity retrofit/year, divided by the number of housing units in the region using electricity = % electricity retrofit achieved Number of housing units using natural gas electrified/year, divided by the number of housing units in the region using natural gas = % electrification achieved
Applicable inventory sector	Grid Electricity; Residential Buildings

Measure 4.2 Retrofit Commercial and Industrial Buildings for Natural Gas and Electricity Efficiency, including exterior infrastructure; Electrification

Actions	5% per year retrofit for natural gas efficiency 5% per year retrofit for electricity efficiency 5% per year electrification of natural gas
Estimate of quantifiable GHG emissions reductions through 2030	Natural Gas Efficiency – 301,756 metric tons of CO_2e Electricity Efficiency – 1,174,746 metric tons of CO_2e Natural Gas Electrification – 466,283 metric tons of CO_2e
Implementing agency or agencies	Local Governments and Utilities, and governing bodies
Implementation schedule and milestones	2025-2030
Geographic location (if applicable)	Metro Nashville and Surrounding Counties
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, others TBD
Metrics for tracking progress	Commercial sq. ft. currently using natural gas retrofits/year, divided by the number of commercial sq. ft. using natural gas in the region = % retrofit achieved Commercial sq. ft. currently using electricity retrofits/year, divided by the number of commercial sq. ft. using electricity in the region = % retrofit achieved Amount of commercial sq. ft. electrified/year divided by the amount of commercial sq. ft. in the region = % electrification achieved
Applicable inventory sector	Grid Electricity; Commercial Buildings

Measure 4.3 Retrofit Exterior Public Lighting with higher efficiency lightbulbs; Electrification

Actions	Replace streetlights and exterior lighting with LED bulbs at public facilities
Estimate of quantifiable GHG emissions reductions through 2030	10,665 MT CO_2e

Implementing agency or agencies	Local Governments and Utilities, and governing bodies
Implementation schedule and milestones	2034
Geographic location (if applicable)	Metro Nashville and Surrounding Counties
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, others TBD
Metrics for tracking progress	TBD
Applicable inventory sector	Grid Electricity;

Measure 4.4 Weatherization of Low-Income Residential Buildings and Units

Actions	Implement weatherization program to improve building efficiency
Estimate of quantifiable GHG emissions reductions through 2030	1,078 metric tons of CO_2e
Implementing agency or agencies	Local Governments, and Housing and Development Authorities
Implementation schedule and milestones	2025-2030
Geographic location (if applicable)	Metro Nashville and Surrounding Counties
Milestones for implementing authority	No additional authority is required
Funding Sources	CPRG, federal and state rebates available for weatherization
Metrics for tracking progress	As collaboration between housing developers and housing agencies across the region continues, further milestones and implementation schedules will be created. MDHA has a weatherization plan in place, a major milestone for the entire strategy will be the completion of their 982 retrofits by 2026.
Applicable inventory sector	Grid Electricity; Commercial Buildings

4.4 Renewable Energy Reduction Measures

Renewable energy, such as solar, are some of the cleanest sources of energy available. The Tennessee Valley Authority (TVA) has programs to encourage solar power production. TVA developed a roadmap for achieving Net Zero GHG emission by 2050 in the recently released The Valley Pathways Study. TVA and through local power companies (LPCs), such as Nashville Electric Services (NES), provide electricity to the Nashville planning area. This measure addresses the fossil fuel fired electric power generation sector by promoting increases in renewable energy. Specifically, expansion of solar power capture as the most likely near-term area for renewable energy growth by local jurisdictions and LPCs.

Strategy 5: Invest in renewable energy capture and storage infrastructure.

Measure 5.1 Increase Residential Renewable Energy Capture and Storage Infrastructure

Action	Installation of 125 residential 4kW system soler energy systems annually
Estimate of quantifiable GHG emissions reductions through 2030	1,657 Metric Tons CO_2e
Implementing agency or agencies	TVA, Local Governments
Implementation schedule and milestones	Annual rollout, starting in 2024 and ending in 2034. Progress should be assessed annually or biannually, ensuring installation goals are met. Quantitative milestones can be established by setting goals related to the number of systems installed and by hitting significant GHG emission reductions.
Geographic location (if applicable)	Because the entirety of the climate action planning area is served by TVA, the exact location of the solar installations is not specified.
Milestones for implementing authority	No additional authority is required.
Funding Sources	CPRG, federal and state renewable energy installation tax credits, others TBD
Metrics for tracking progress	This measure can be implemented immediately, so long as individuals looking to install their own solar energy systems follow all permitting requirements and other state and local regulations.
Applicable inventory sector	Grid Electricity

Measure 5.2 Increase Other Renewable Energy Capture and Storage Infrastructure

Action	Increase solar capacity of 1000kW per year for non-residential buildings, with 125 system installations annually.
Estimate of quantifiable GHG emissions reductions through 2030	3,317 Metric Tons CO_2e
Implementing agency or agencies	TVA, Local Governments, and LPCs
Implementation schedule and milestones	Implementation will begin in 2024 and will continue throughout 2034. It is recommended that installation progress is checked annually to ensure the region is on track to reach its goal. Milestones should be established using major GHG emission reduction targets.
Geographic location (if applicable)	Because the entirety of the climate action planning area is served by TVA, the exact location of the solar installations is not specified.
Milestones for implementing authority	No additional authority is required.
Funding Sources	CPRG, federal and state renewable energy installation tax credits, others TBD
Metrics for tracking progress	This measure can be implemented immediately, so long as companies and other commercial enterprises looking to install their own solar energy systems follow all permitting requirements and other state and local regulations.
Applicable inventory sector	Grid Electricity

4.5 Solid Waste Reduction Measures

These measures focus on programs and incentives to reduce or divert waste, including food and/or yard waste, and projects to capture methane emissions from waste.

Food and/or yard waste in the Nashville planning area is primarily disposed of in a landfill (MSW or C&D landfill). Reducing the volume of these materials may reduce the methane emissions at landfills. Diversion reduces methane emissions at landfills and provides economic benefits through creation of soil and increase in air space and lifespan of the region's landfills.

Strategy 6: Reduce emissions from landfills through programs, policies, and projects that divert waste and/or capture methane emissions.

Measure 6.1 Invest in Landfill and Methane Gas Recovery

Action	Implement methane gas recovery onsite and at remote locations for waste to energy production
Estimate of quantifiable GHG emissions reductions through 2030	355,784 tons of CO_2e
Implementing agency or agencies	Solid Waste Authorities, Local Governments
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	GNRC 17-County CPRG Region
Milestones for implementing authority	No additional authority is required.
Funding Sources	CPRG, others TBD
Metrics for tracking progress	TBD
Applicable inventory sector	Solid Waste

Measure 6.2 Invest in Waste Diversion and Sustainable Materials Management

Action	Increase in curbside recycling, composting, and other reuse programming
Estimate of quantifiable GHG emissions reductions through 2030	59,241 metric tons of life cycle CO_2e
Implementing agency or agencies	Solid Waste Authorities, Local Governments
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	GNRC 17-County CPRG Region
Milestones for implementing authority	No additional authority is required.
Funding Sources	CPRG, others TBD
Metrics for tracking progress	TBD
Applicable inventory sector	Solid Waste

4.6 Land Use and Sequestration Reduction Measures

There is potential for preservation and reduction of tree loss in the Nashville planning area. As well as opportunities to increase trees with planting programs to replace tree canopy lost to natural disasters and storms. In the region, there are non-profit organizations and local governments that provide low-cost and/or free trees and tree planting services.

Strategy 7: Reduce tree canopy lost to land development and replace trees lost to development, natural disasters, and natural loss.

Measure 7.1 Expand Tree Canopy Coverage

Action	Tree plantings on easements and on new developments in locations with suitable soils and environmental conditions and the lowest risk for removal
Estimate of quantifiable GHG emissions reductions through 2030	22 lbs of CO_2/year per tree planted
Implementing agency or agencies	NES
Implementation schedule and milestones	2024-2030
Geographic location (if applicable)	Metro Nashville and NES service areas and property
Milestones for implementing authority	No additional authority is required.
Funding Sources	CPRG, others TBD
Metrics for tracking progress	TBD
Applicable inventory sector	AFOLU

5.0 Benefits Analysis for LIDACs

5.1 Program Requirements

The CPRG program requirements for the LIDAC benefits analysis are to undertake meaningful community engagement and to advance the goals of the Justice 40 Initiative set forth in Executive Order 14008, which aims to deliver forty percent of the overall benefits of relevant federal investments to disadvantaged communities. Implementation of the reduction measures identified and included in this PCAP are anticipated to provide significant benefits to low-income disadvantaged communities.

The implementation of the emissions reduction strategies are anticipated to have a broad range of benefits beyond GHG emissions reduction and air quality improvement. They are anticipated to provide benefits to LIDACs in the planning area.

5.2 Identifying Low-Income and Disadvantaged Communities

To identify disadvantaged communities within the seventeen counties of this planning effort, a review of the Environmental Justice Screening and Mapping Tool (EJScreen), and the Climate and Economic Justice Screening Tool (CEJST). These tools provide information at the census tract-level by defined categories and thresholds.

Climate and Economic Justice Screening Tool (CEJST)

The CEJST classifies census tracts that are disadvantaged if it is:

1. At or above the threshold for one or more environmental, climate, or other burdens[2],
2. At or above the threshold for an associated socioeconomic burden[3], and
3. If the census tract is completely surrounded by disadvantaged census tracts/communities that meet the two burden thresholds above – and is at or above the 50th percentile for low income – it is also considered disadvantaged.

Figure 8: CEJST Categories, Burdens, and Description of Burdens

Categories	Environmental, Climate, or other Burden	Socioeconomic burden
Climate Change	Expected agriculture loss rate ≥ 90th percentile OR Expected building loss rate ≥ 90th percentile OR Expected population loss rate ≥ 90th percentile OR Projected flood risk ≥ 90th percentile OR Projected wildfire risk ≥ 90th percentile	Low Income
Energy	Energy cost ≥ 90th percentile OR PM 2.5 in the air ≥ 90th percentile	Low Income
Health	Asthma ≥ 90th percentile OR Diabetes ≥ 90th percentile OR Heart disease ≥ 90th percentile OR Low life expectancy ≥ 90th percentile	Low Income

[2] Environmental, Climate, or other burdens are census tracts at or above 90th percentile for one of the data indicators.

[3] Socioeconomic Burdens are: Low Income = 65th percentile or above for census tracts that have people in households whose income is less than or equal to twice the federal poverty level, not including students enrolled in higher education. And if high school education is less than 10% of people ages 25 or older in the census tract.

Housing	Historic underinvestment = Yes Housing cost ≥ 90th percentile OR Lack of green space ≥ 90th percentile OR Lack of indoor plumbing ≥ 90th percentile OR Lead paint ≥ 90th percentile	Low Income
Legacy Pollution	Abandoned mine land present = Yes OR Formerly Used Defense Site (FUDS) present = Yes OR Proximity to hazardous waste facilities ≥ 90th percentile OR Proximity to Superfund or National Priorities List (NPL) sites ≥ 90th percentile OR Proximity to Risk Management Plan (RMP) sites ≥ 90th percentile	Low Income
Transportation	Diesel particulate matter ≥ 90th percentile OR Transportation barriers ≥ 90th percentile OR Traffic proximity and volume ≥ 90th percentile	Low Income
Water and Wastewater	Underground storage tanks and releases ≥ 90th percentile (NEW) OR Wastewater discharge ≥ 90th percentile	Low Income
Workforce Development	Linguistic isolation ≥ 90th percentile OR Low median income ≥ 90th percentile OR Poverty ≥ 90th percentile OR Unemployment ≥ 90th percentile	High school education <10%

Environmental Justice Screening and Mapping Tool (EJScreen)

In addition to the CEJST, the EPA's EJScreen was used to complement the LIDAC identification and analysis. The EPA defines disadvantaged communities as:

1. Any census tract that is included as disadvantaged in CEJST;
2. Any census block group at or above the 90th percentile for any of the EJScreen's Supplemental Indexes when compared to the nation or state; and/or
3. Any geographic area within Tribal lands, as include in EJScreen

Figure 9: EPA's EJScreen Indexes and Indicators

Environmental Justice Indexes	Socioeconomic Indicators
Particulate Matter 2.5	Demographic Index
Ozone	Supplemental Demographic Index
Diesel Particulate Mater	People of Color
Air Toxics Cancer Risk	Low Income
Air Toxics Respiratory HI	Unemployment Rate
Toxic Releases to Air	Limited English Speaking
Traffic Proximity	Less than high school education
Lead Paint	Under age 5
Superfund Proximity	Over age 64
RMP Facility Proximity	
Hazardous Waste Proximity	
Underground Storage Tanks	
Wastewater Discharge	

5.3 LIDACs within the Planning Area

This section identifies the low-income disadvantaged communities within the seventeen-county planning area which includes the following counties in Tennessee: Cannon, Cheatham, Davidson, Dickson, Hoston, Humphreys, Macon, Maury, Montgomery, Robertson, Rutherford, Smith, Stewart, Sumner, Williamson, Wilson, and Trousdale County.

For the PCAP and CCAP climate action prioritization and analysis, EPA requires applicants to use the Climate and Economic Justice Screening Tool (CJEST), which excludes race as a determining factor. The CJEST tool was used to identify LIDAC communities for EPA's CPRG. The tool incorporates 21 factors correlated with high exposure risk, but it excludes race.

Regionwide, 23% of the population resides within a LIDAC. Davidson County has the largest population within a LIDAC, while Humphreys County has the largest proportion of its population within a LIDAC, 83%.

Figure 10: LIDACs Total Population and Proportion of Population by County

County	Total Population of County	LIDAC Population of County	Percent of Total Population identified as LIDAC
Cannon County	14,178	10,455	74%
Cheatham County	40,181	3,583	9%
Davidson County	687,488	263,971	38%
Dickson County	52,680	22,764	43%
Houston County	8,164	4,994	61%
Humphreys County	18,435	15,372	83%
Macon County	23,842	13,387	56%
Maury County	91,976	27,158	30%
Montgomery County	200,180	17,116	9%
Robertson County	70,280	16,774	24%
Rutherford County	315,815	30,963	10%
Smith County	19,740	15,042	76%
Stewart County	13,427	2,582	19%
Sumner County	183,437	30,162	16%
Trousdale County	10,231	0	0%
Williamson County	225,389	0	0%
Wilson County	136,666	11,740	9%
Regional Total	2,112,109	486,063	23%

Based on the analysis of climate and economic burdens, the most impacted communities, those census tracts that exceed multiple categories, are in Davidson County along the interstates of I65, I24, I40, and I440. Houston County on the far western side of the Nashville planning area is another area with LIDAC that exceeds multiple categories of burden including climate change, energy, and transportation burdens.

5.4 Existing Risks, Impacts and Vulnerabilities

The eight environmental, climate, or other burdens categories, along with the socioeconomic burden, as low-income or educational attainment, identified the LIDACs within the 17 countries. Health, Transportation, and

Climate Change are the categories of burdens that impact the largest number of people in the Nashville planning area.

Health

Health burdens include asthma, diabetes, heart disease, and low life expectancy combined with being low-income. Houston County has the largest proportion (22%) of the county's population in LIDACs while Davidson County has the largest total population, 106,774 people, in LIDACs that exceed any of the four heath burdens and socioeconomic burden according to CEJST.

Transportation

Transportation burdens include a high level of diesel particulate matter in the air, average relative cost and time spent of transportation relative to all other census tracts, and the number of vehicles (average annual daily traffic) at major roads combined with being low-income. Cannon County has the largest proportion (74%) burdens county's population in LIDACs while Davidson County has the largest total population, 98,245 people, in LIDACs that exceed any of the three transportation burdens and socioeconomic burden according to CEJST.

Climate Change

Climate Change burdens include expected agricultural value at risk from losses, expected building value at risk from losses , and expected fatalities and injuries due natural hazards(defined by CEJST); number of properties at risk of floods occurring in the next thirty years (projected from a high-precision climate model) from tides, rain, riverine and storm surges, or a 26% risk total over the 30-year time horizon; and wildfire exposure for any specific location in the contiguous U.S. today and with future climate change combined with being low-income. Humphreys County has the largest proportion (83%) of the county's population in LIDACs while Davidson County has the largest total population, 114,554 people, in LIDACs that exceed any of the five climate change burdens and socioeconomic burden according to CEJST.

Workforce Development

Workforce development burdens include share of households where no one over age 14 speaks English very well; low median income calculated as a share of the area's median income, share of people in poverty; and the number of unemployed people as a share of the labor force combined with the population with less than high school education. Macon County has the largest proportion (56%) of the county's population in LIDACs while Davidson County has the largest total population, 129,754 people, in LIDACs that exceed any of the four workforce development burdens and socioeconomic burden according to CEJST.

Housing

Housing burdens include census tracts that experienced historic underinvestment based on redlining maps between 1935 and 1940; share of households that are both earning less than 80% of Housing and Urban Development's Area Median Family Income and are spending more than 30% of their income on housing costs; share of land with developed surfaces covered with artificial materials like concrete or pavement, excluding crop land used for agricultural purposes; housing without indoor kitchen facilities or complete plumbing facilities; and share of homes built before 1960, which indicates potential lead paint exposure combined with being low-income. Cannon County has the largest proportion (29%) of the county's population in LIDACs while Davidson County has the largest total population, 122,137 people, in LIDACs that exceed any of the five housing burdens and socioeconomic burden according to CEJST.

Legacy Pollution

Legacy burdens include presence of an abandoned mine left by legacy coal mining operations; properties that were owned, leased, or possessed by the United States, under the jurisdiction of the Secretary of Defense prior to October 1986; number of hazardous waste facilities in proximity; number of proposed or listed Superfund or National Priorities list (NPL) sites in proximity; count of Risk Management Plan (RMP) facilities in

proximity[4] combined with being low-income. Davidson County has the largest proportion (10%) of the county's population in LIDACs and the largest total population, 69,366 people, in LIDACs that exceed any of the five legacy pollution burdens and socioeconomic burden according to CEJST.

Energy

Energy burdens include the average household annual energy cost in dollars divided by the average household income, and the percentile of fine inhalable particles with 2.5 or smaller micrometer diameters combined with being low-income. Houston County has the largest proportion (31%) of the county's population in LIDACs while Davidson County has the largest total population, 11,675 people, in LIDACs that exceed any of the two energy burdens and socioeconomic burden according to CEJST.

Water and Wastewater

There are no LIDACs impacted by water and wastewater burdens in the Nashville planning area.

5.5 Potential Benefits

The most impacted LIDACs, those census tracts that exceed multiple categories of burden, are in Davidson County and Metro Nashville and are near transportation infrastructure. Thus, most transportation priority emissions reduction measures in this PCAP will provide positive benefits to LIDACs because of their proximity to major highways and interstates as well as potentially reducing their transportation costs through transit investments and ITS infrastructure.

In addition, as TVA implements their net zero emissions the LIDAC communities in Humphreys and Stewart County may experience improved health impacts as there are two TVA power plants in those counties. The Cumberland TVA power plant is a coal-fired plant while the Johnsonville TVA power plant is a Natural Gas dual-fuel combustion turbine and combined cycle plant. TVA intends to retire the Cumberland Fossil Plant by 2028. Improvements to the region's buildings and built environment, investments in renewable energy, and upgrades to the electricity distribution infrastructure have the potential to provide positive impacts to the grid energy sector while reducing the cost of energy to families and business across the region and in LIDACs.

[4] These facilities are mandated by the Clean Air Act to file RMPs because they handle substances with significant environmental and public health risks.

6.0 Authority to Implement

GNRC has reviewed the existing statutory and regulatory authority to implement each priority measure. This plan is non-regulatory in nature and the priority GHG emissions reduction measures are a list of voluntary actions available to state and local governments for implementation. No new regulatory authority is given by the EPA CPRG and no new authority will be needed for these priority GHG emissions reduction measures. GNRC and the region's local governments have existing authority to apply for, administer, and subaward federal grants as allowed by the Tennessee Code Annotated (TCA), which provides sufficient authority for the voluntary implementation by state and local governments of these priority reduction measures. No actions are needed to obtain authority.

Appendix

A. Atlas of Maps

Figure A: GNRC Planning Area – State and National Context

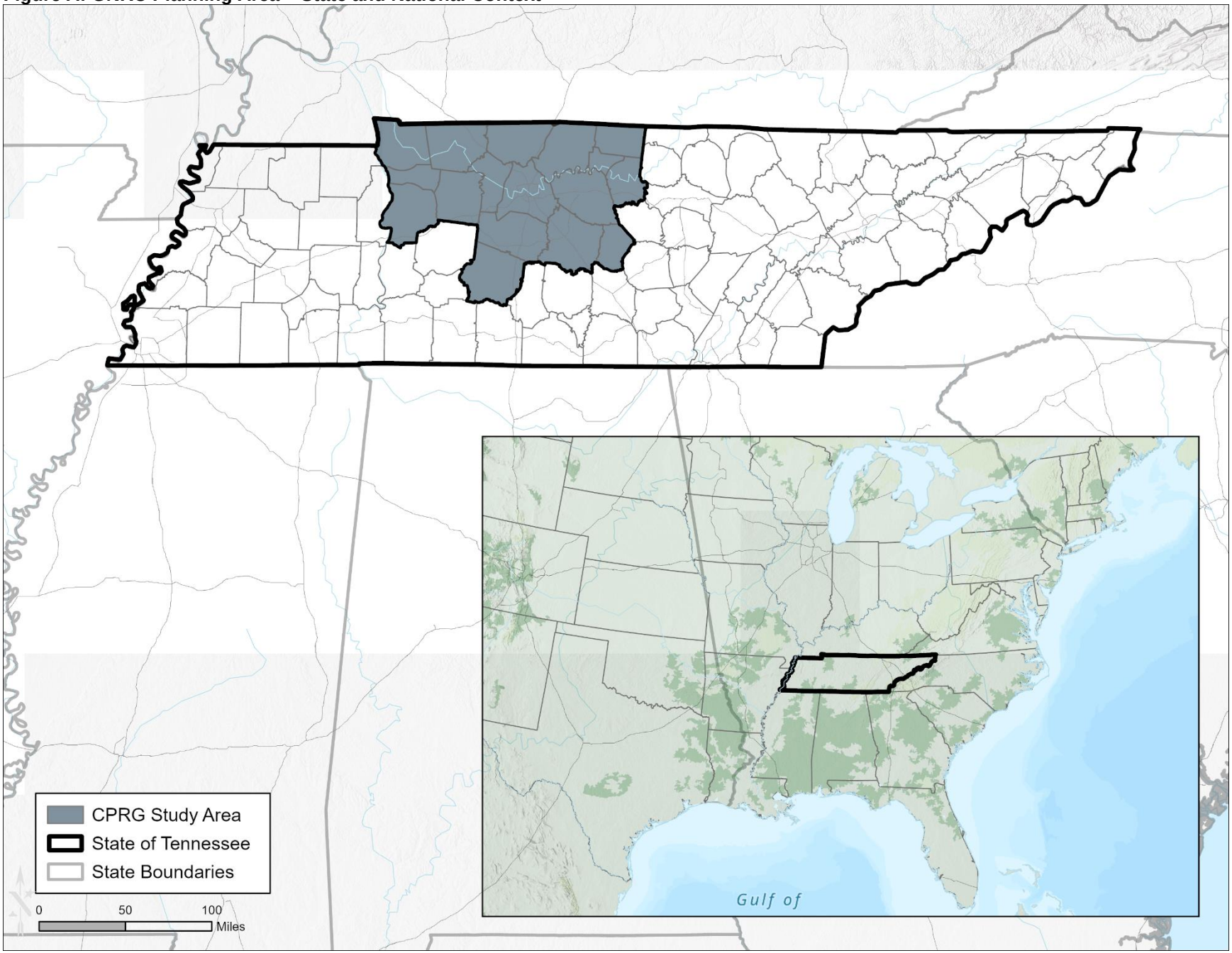


Figure B: GNRC Planning Area – Regional Context

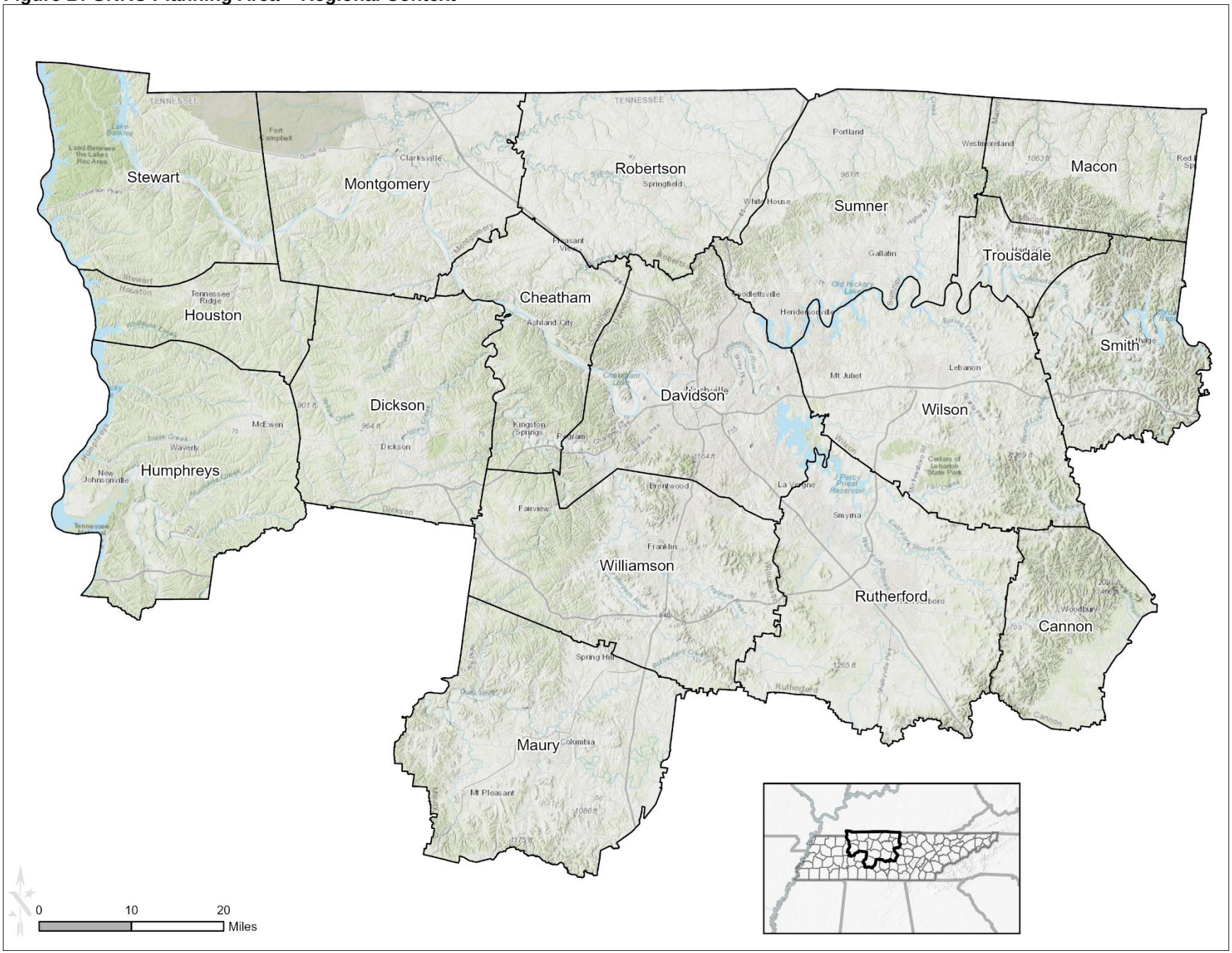


Figure C: Health Factors for Low Income and Disadvantaged Communities

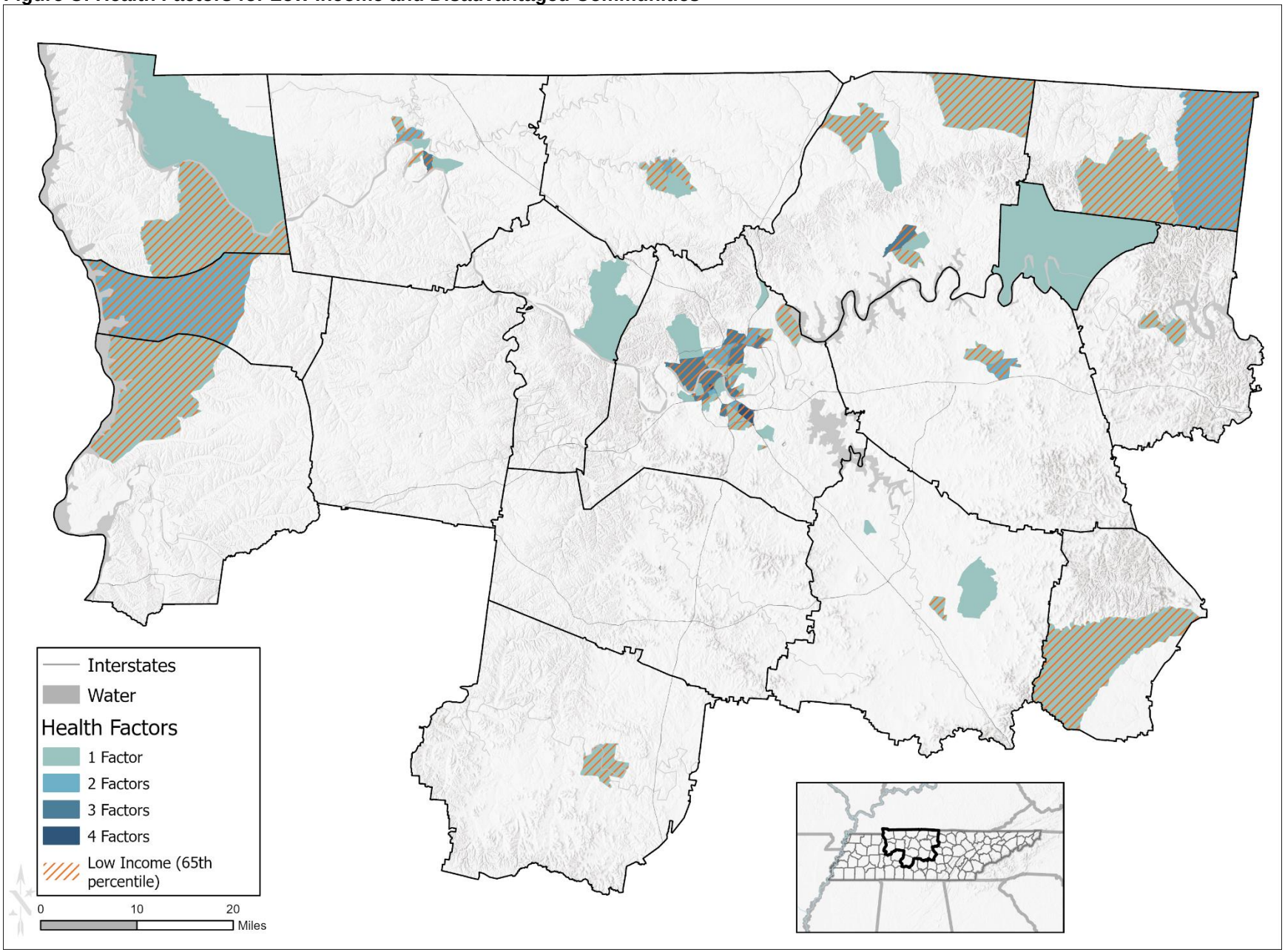


Figure D: LIDAC Health Factor - Asthma

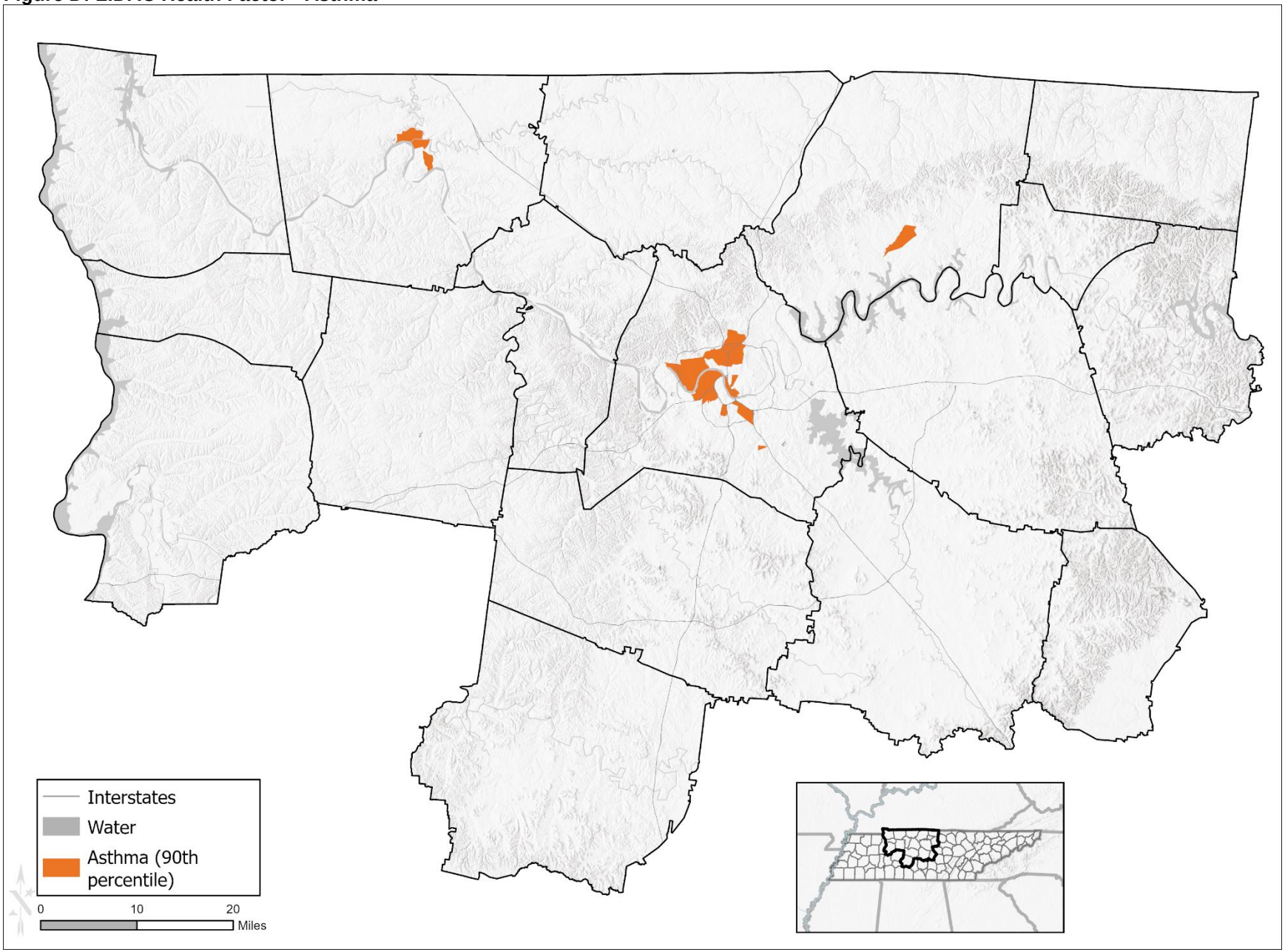


Figure E: LIDAC Health Factor - Diabetes

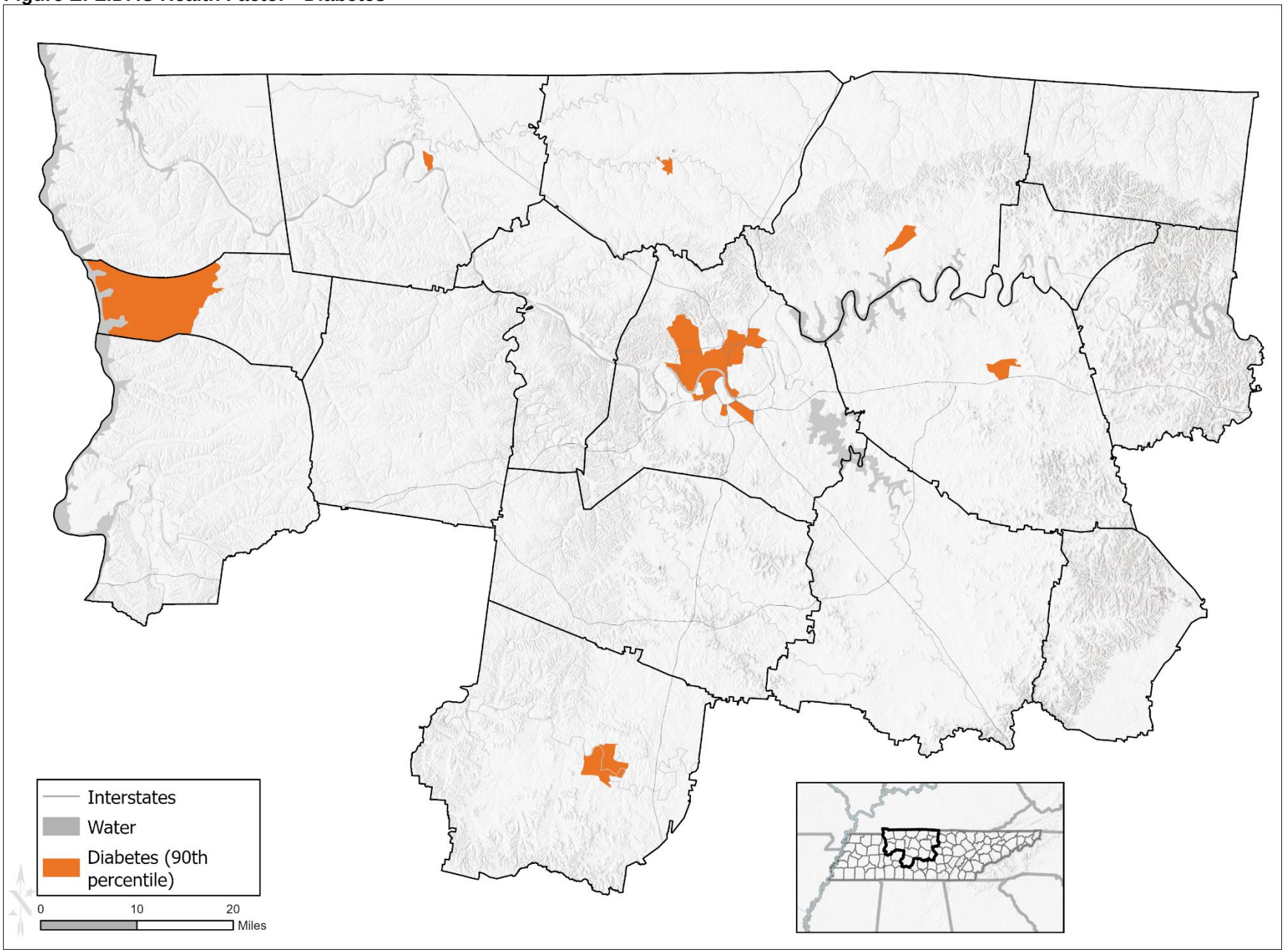


Figure F: LIDAC Health Factor - Heart Disease

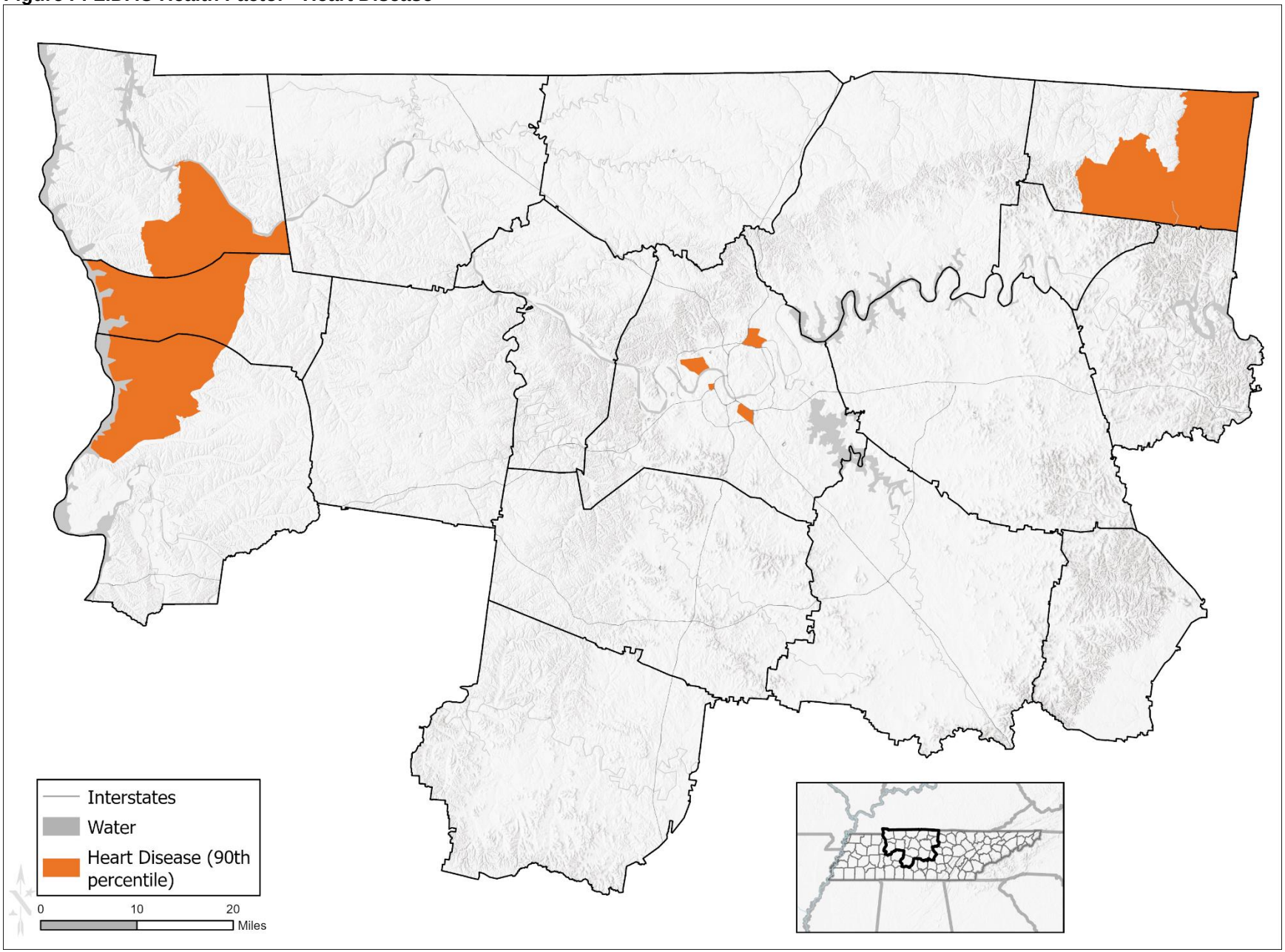


Figure G: LIDAC Health Factor - Low Life Expectancy

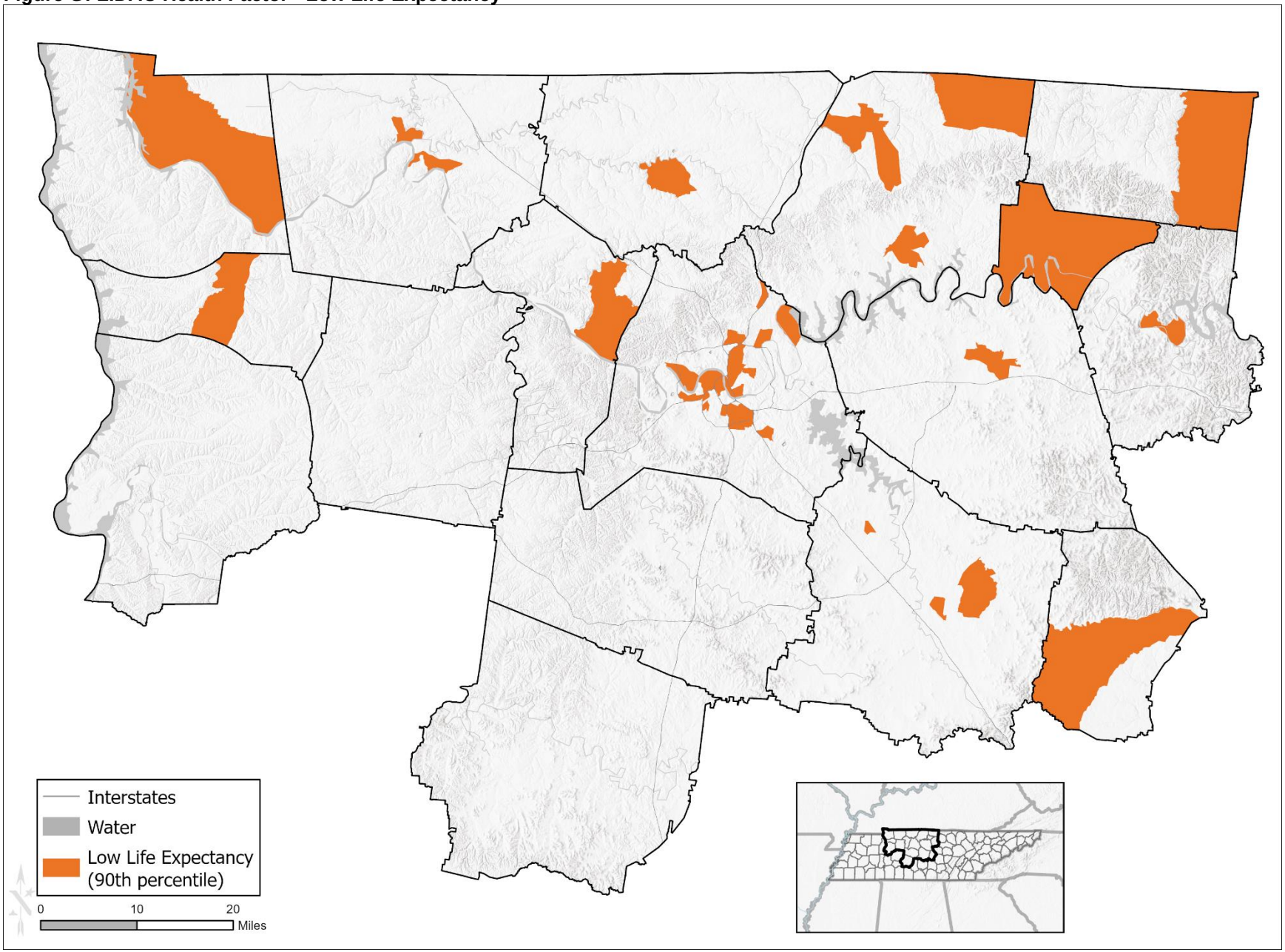


Figure H: Transportation Factors for Low Income and Disadvantaged Communities

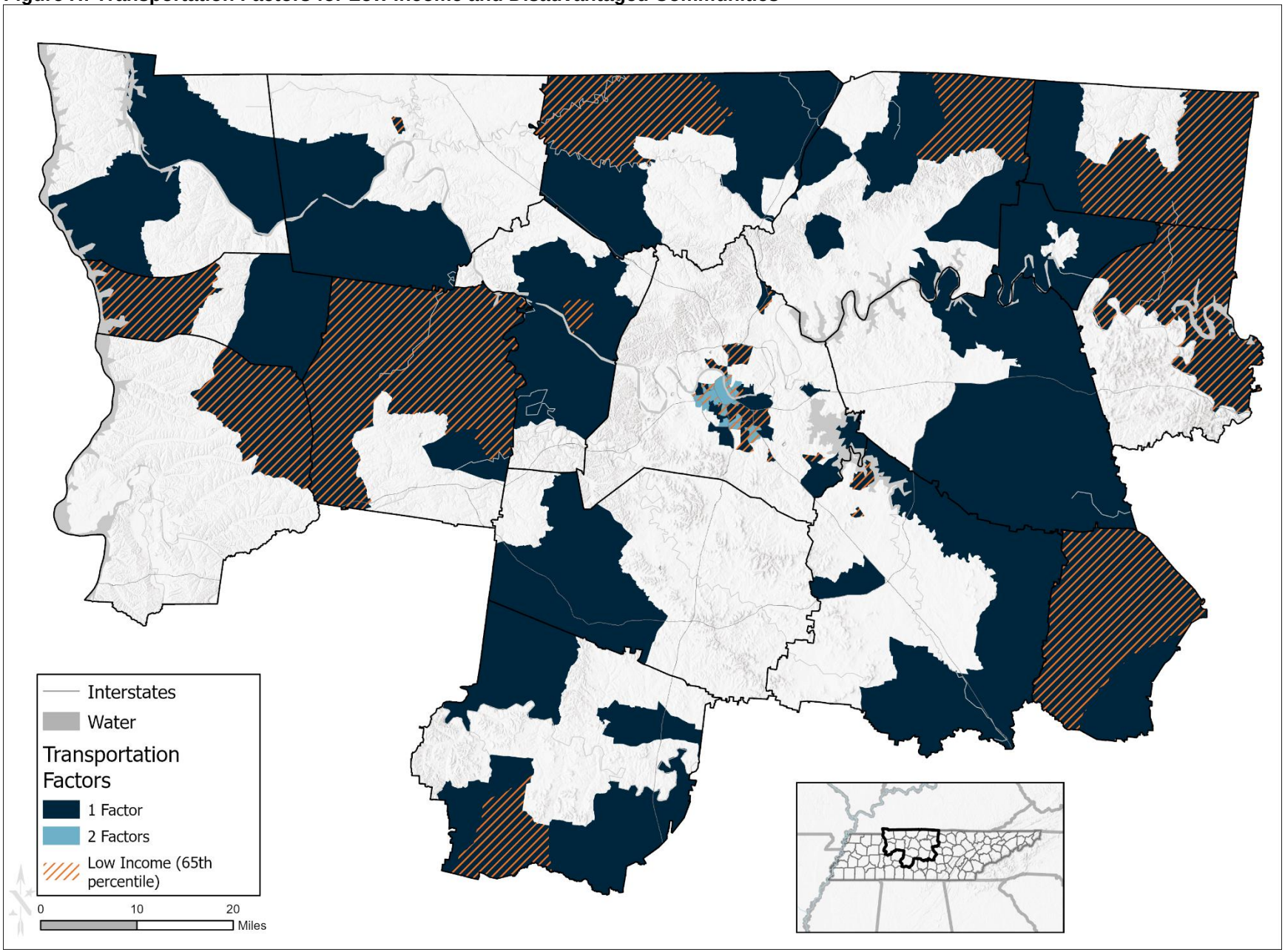


Figure I: LIDAC Transportation Factor - Traffic Proximity and Volume

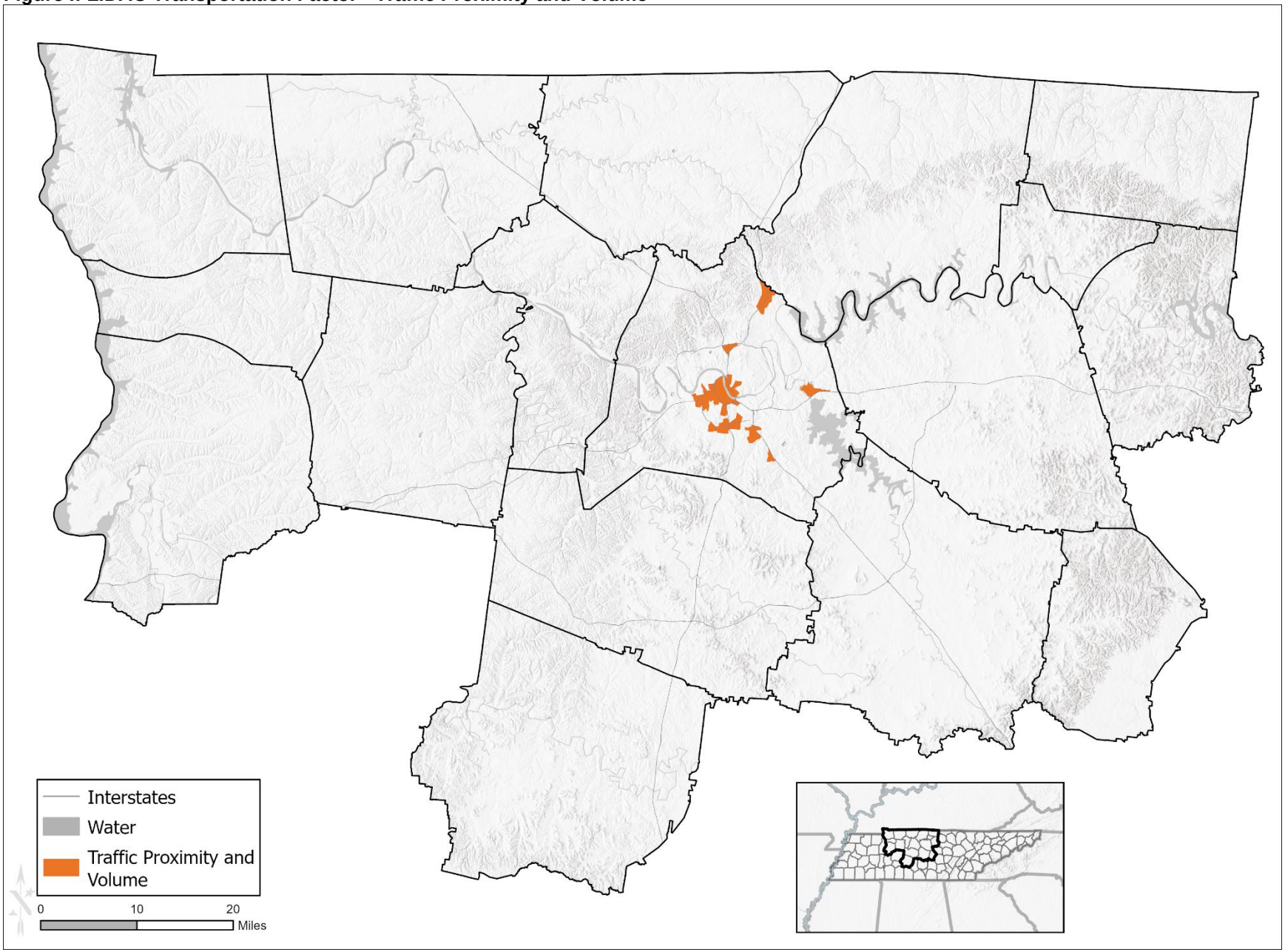


Figure J: LIDAC Transportation Factor - Travel Barriers

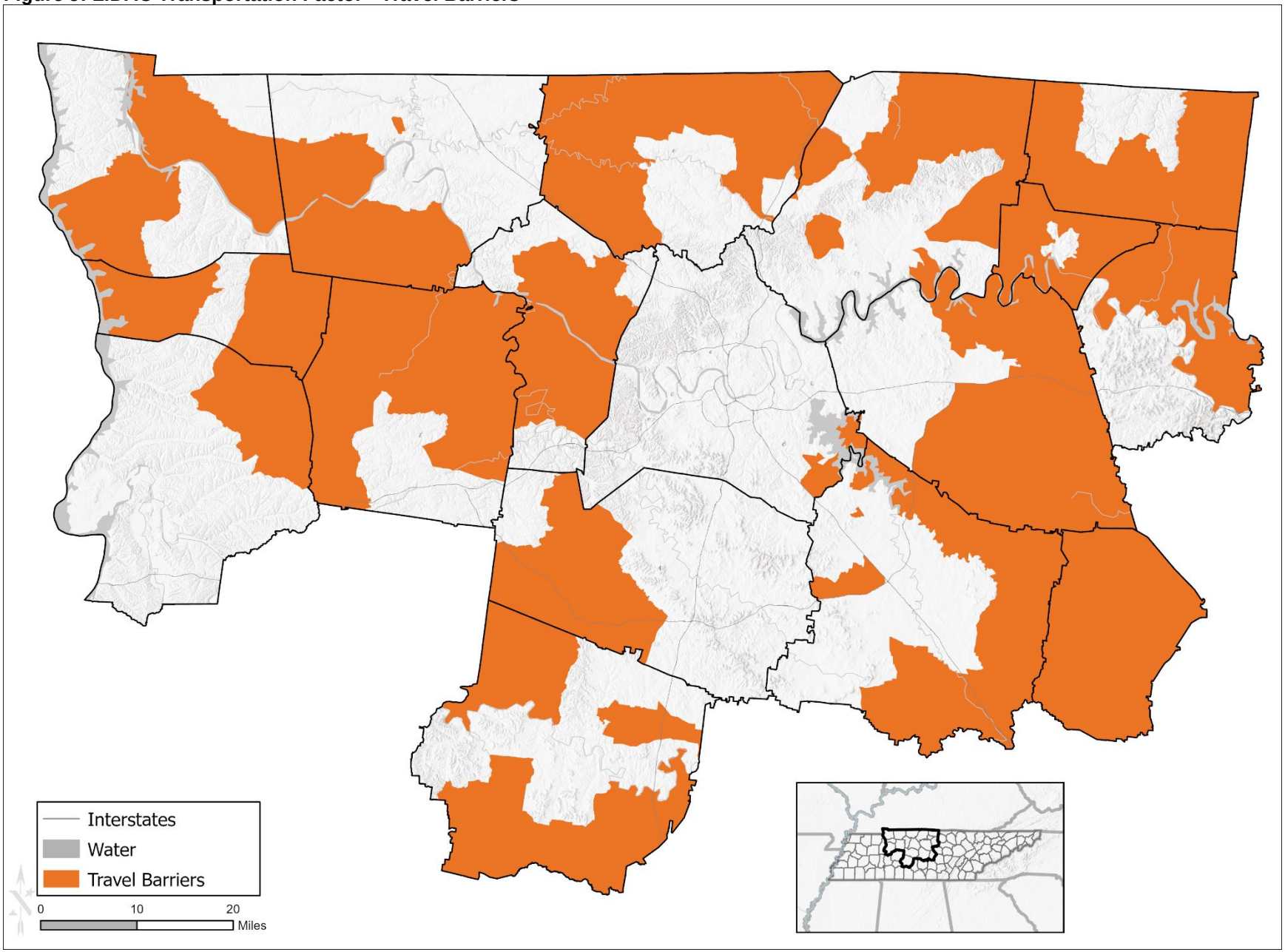


Figure K: Climate Change Factors for Low Income and Disadvantaged Communities

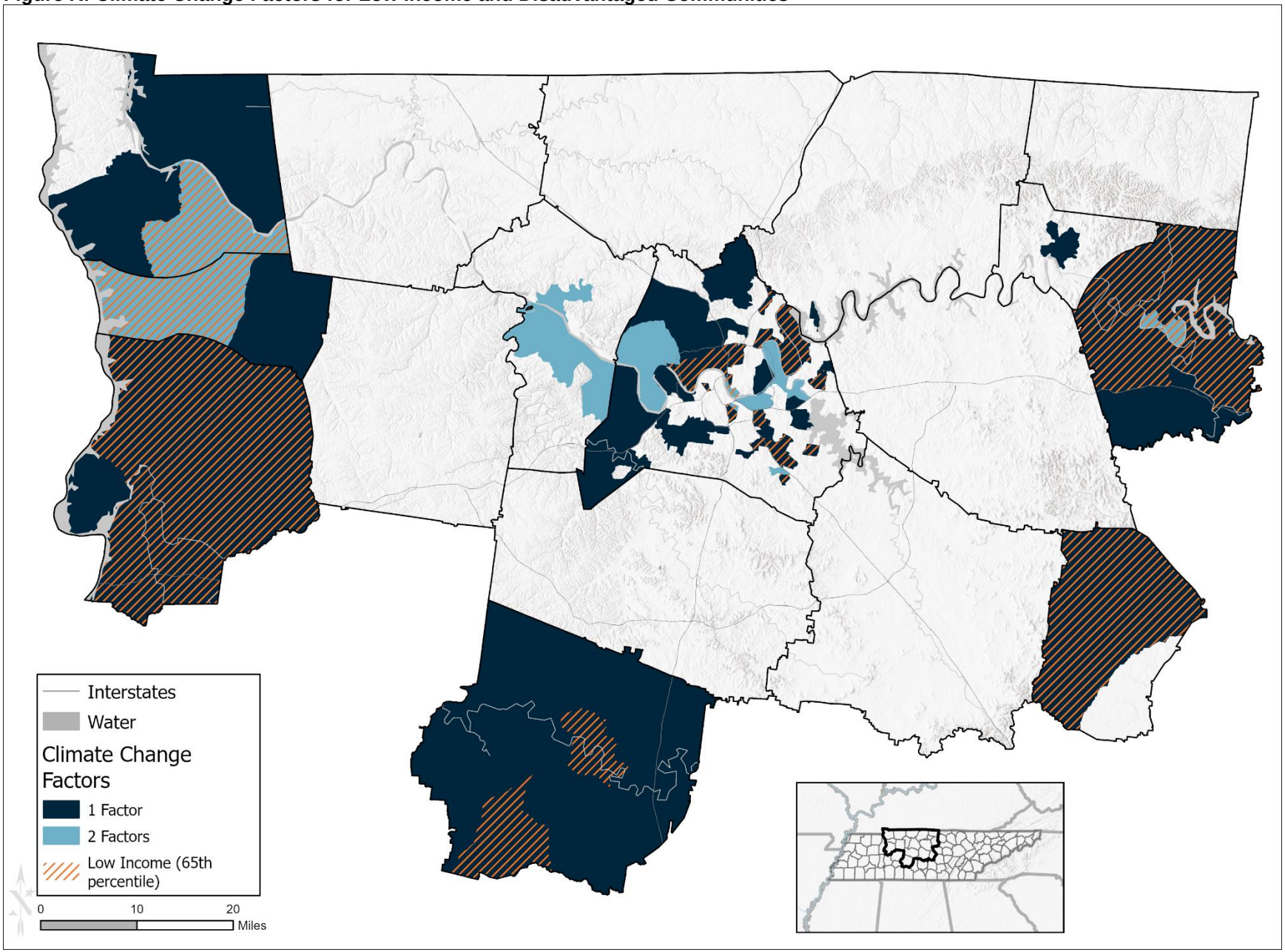


Figure L: LIDAC Climate Change Factor - Expected Building Loss

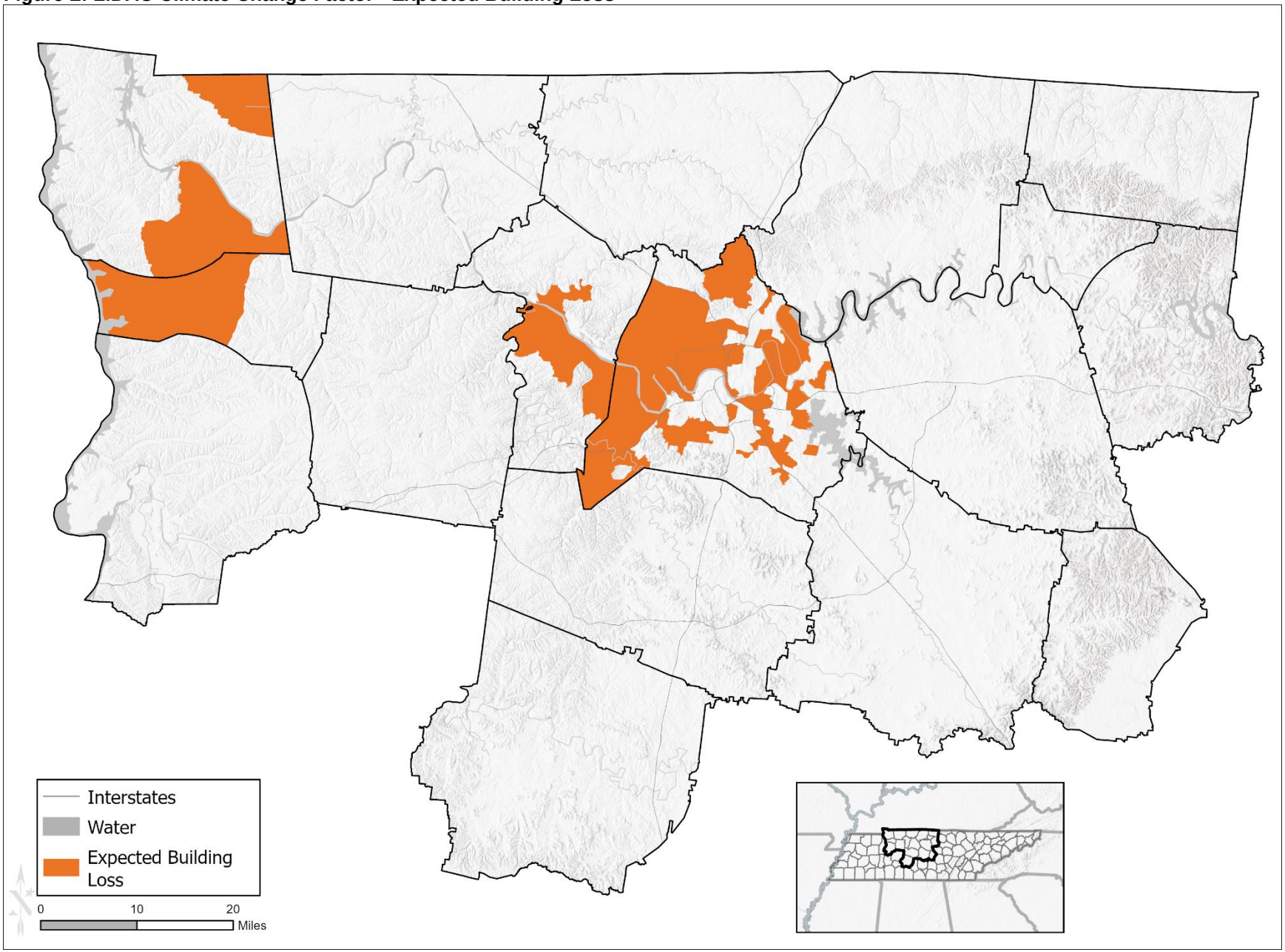


Figure M: LIDAC Climate Change Factor - Expected Population Loss

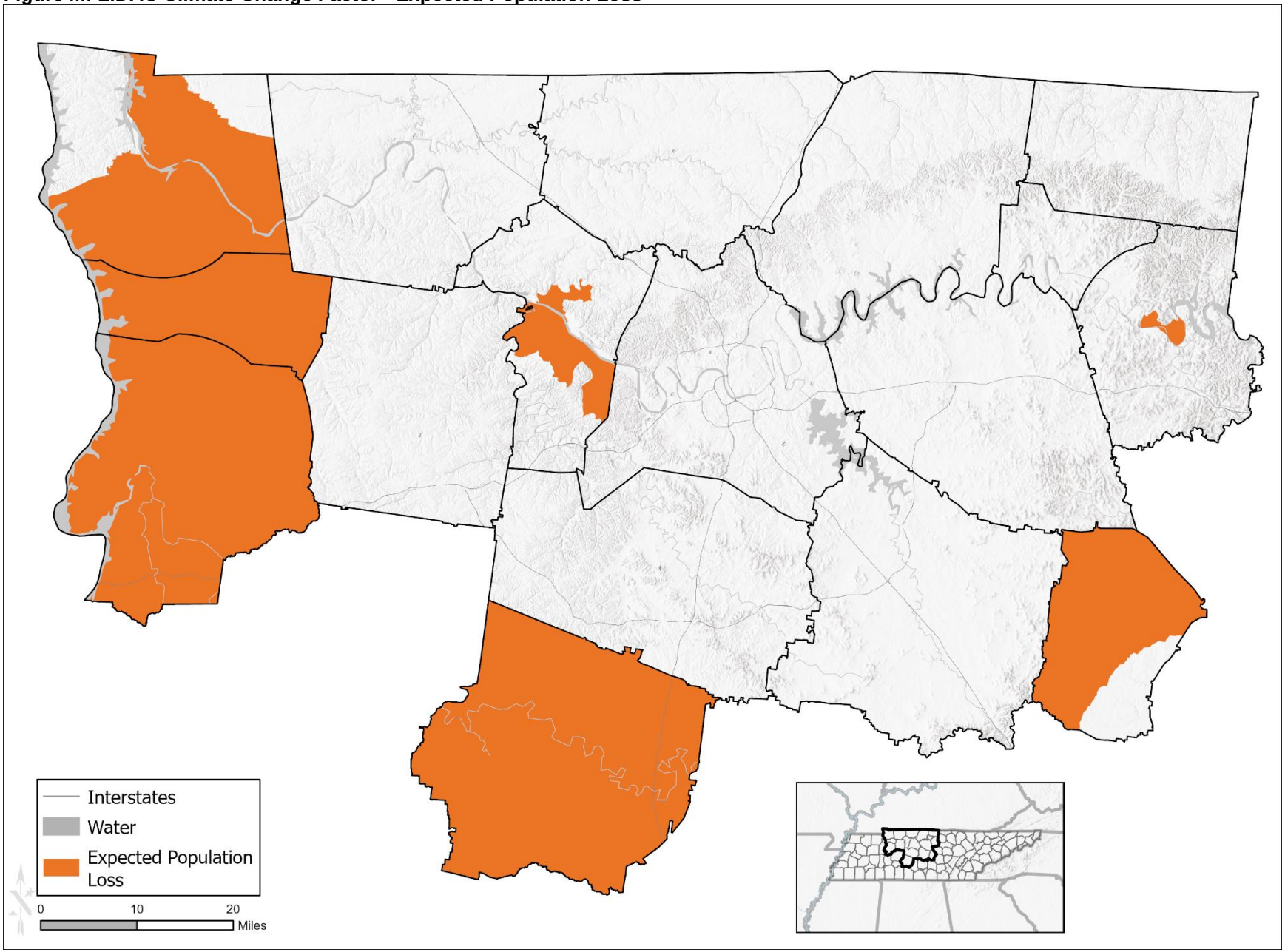


Figure N: LIDAC Climate Change Factor - Projected Flood Risk

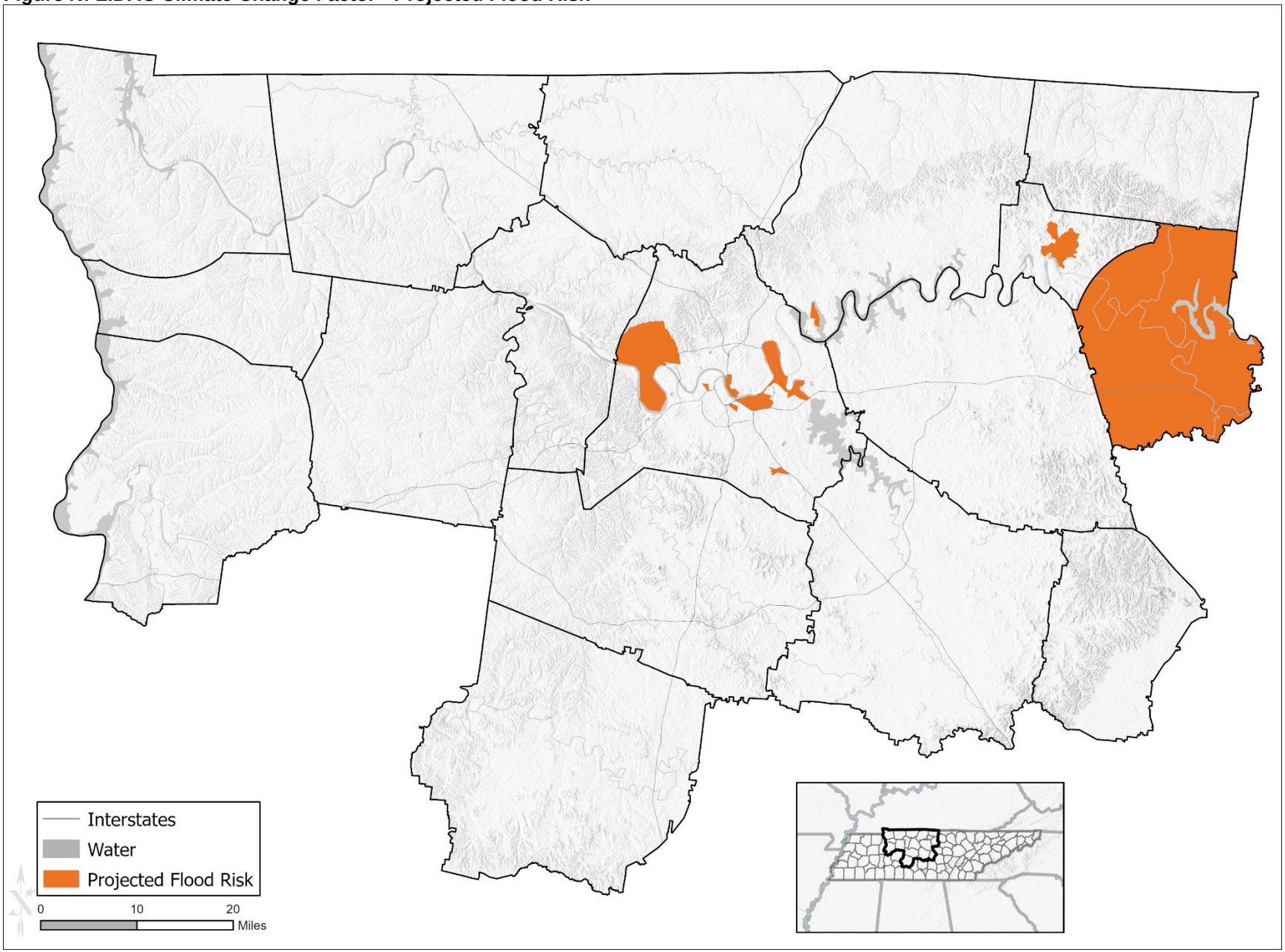


Figure O: Workforce Development Factors for Low Income and Disadvantaged Communities

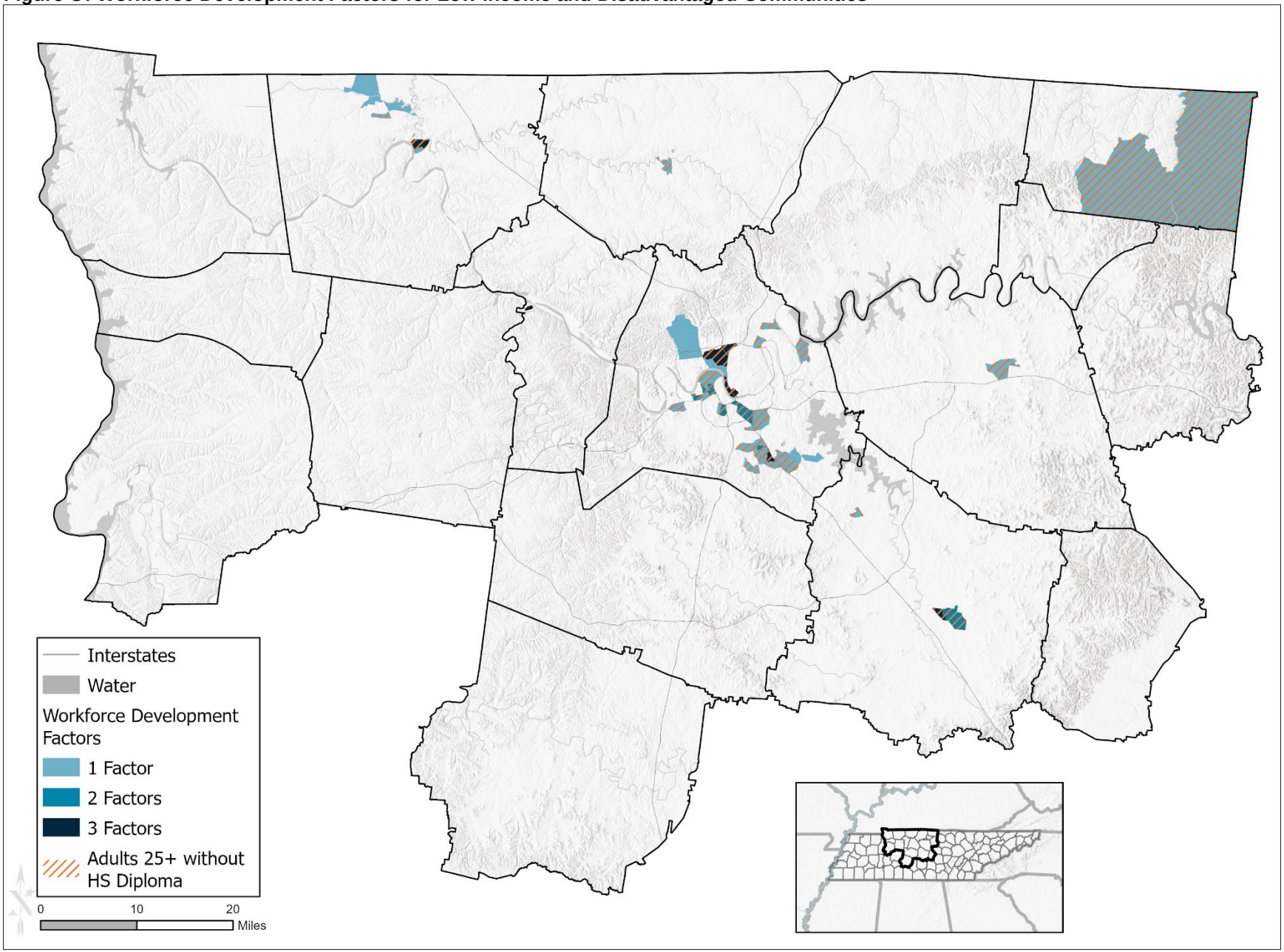


Figure P: LIDAC Workforce Development Factor - Linguistic Isolation

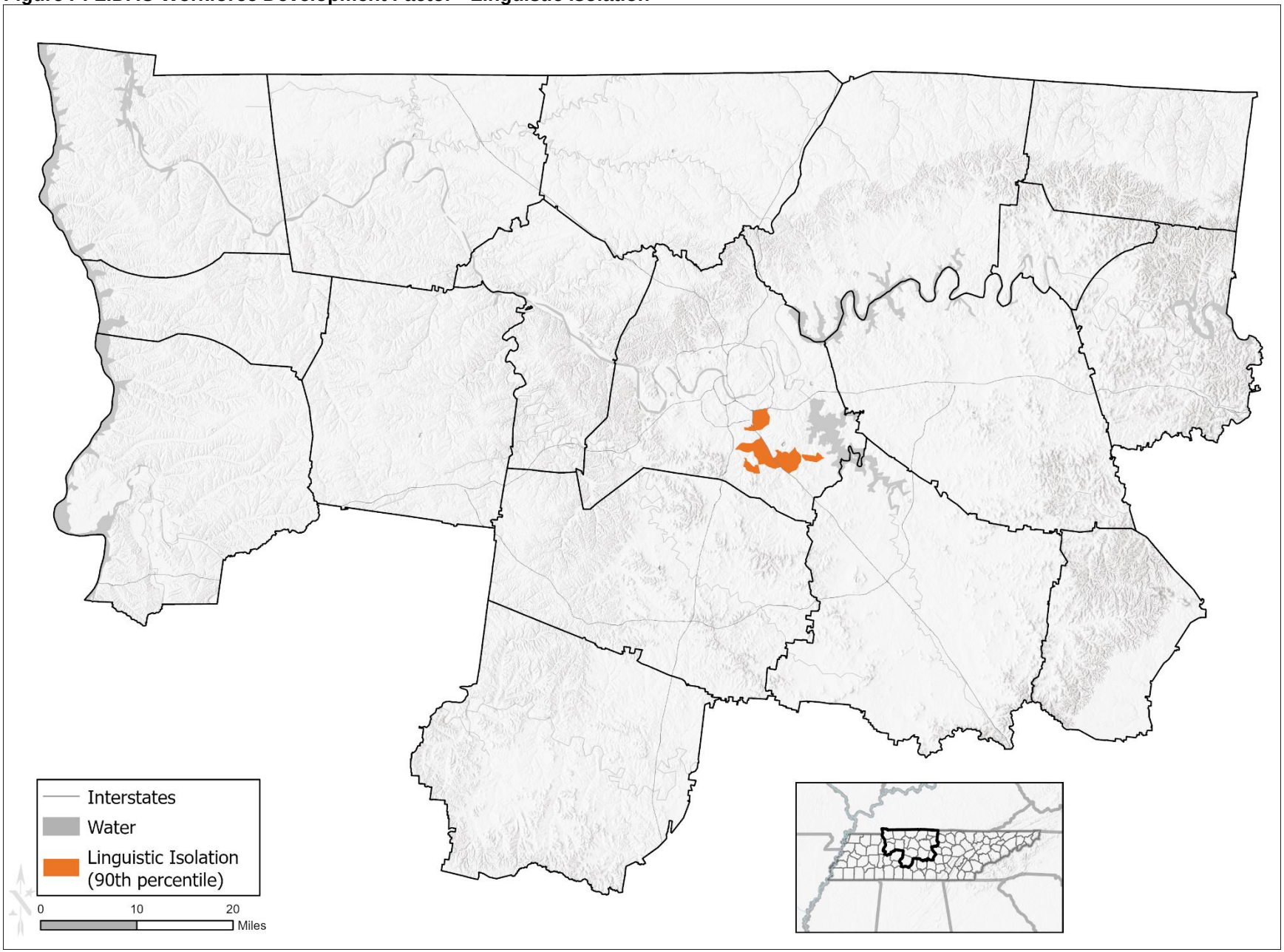


Figure Q: LIDAC Workforce Development Factor - Low and Median Income

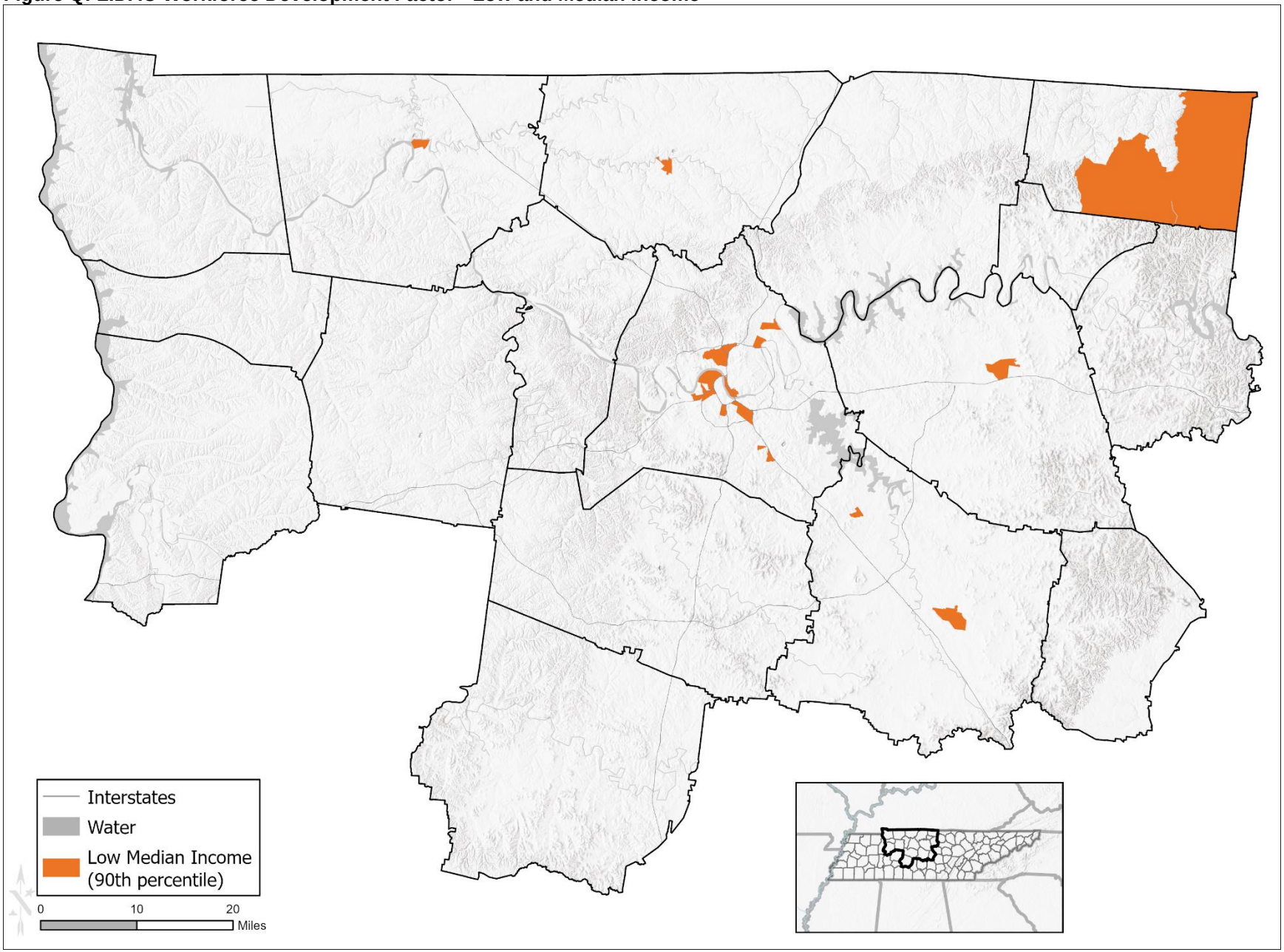


Figure R: LIDAC Workforce Development Factor - Poverty

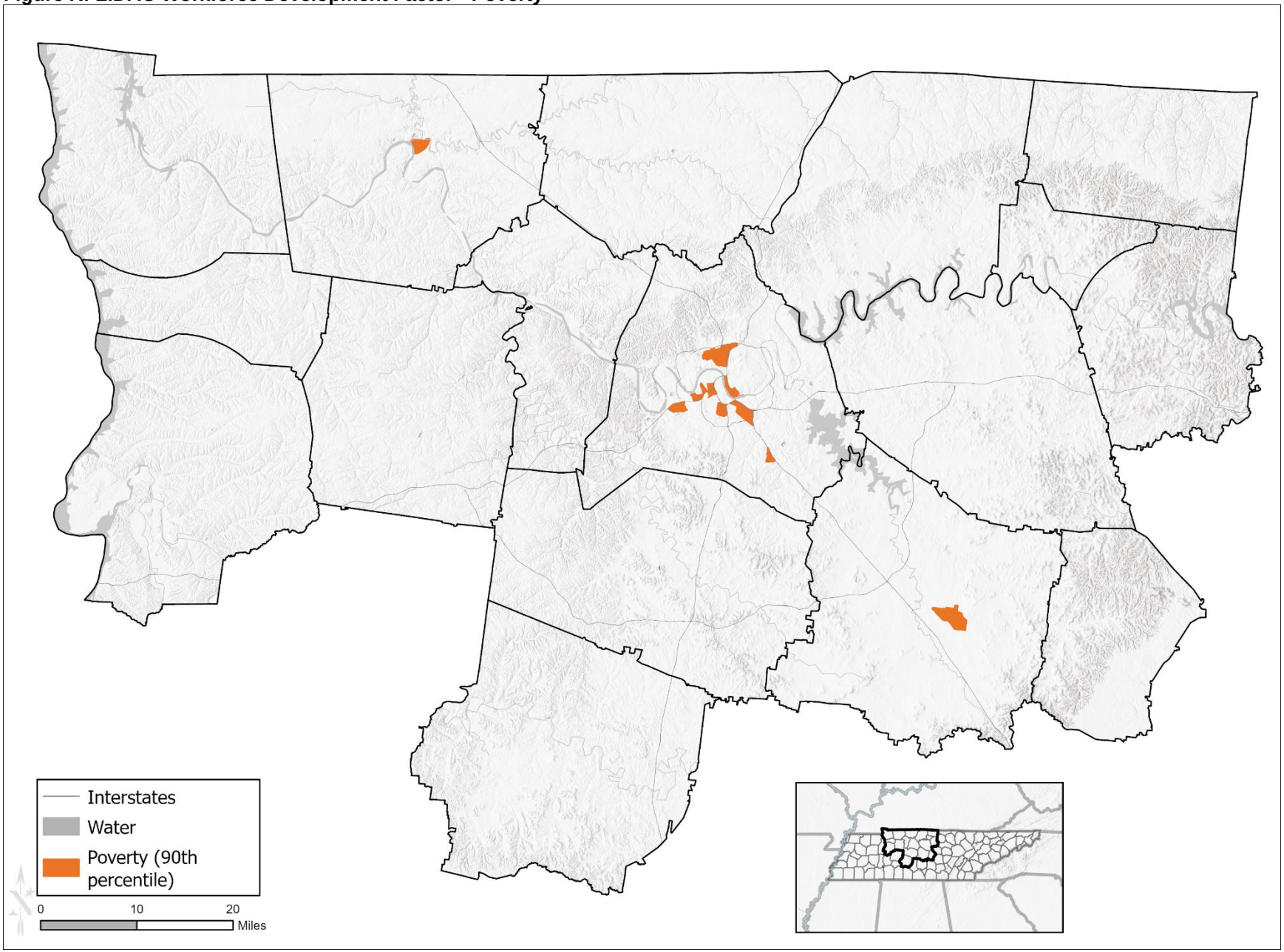


Figure S: LIDAC Workforce Development Factor - Unemployment

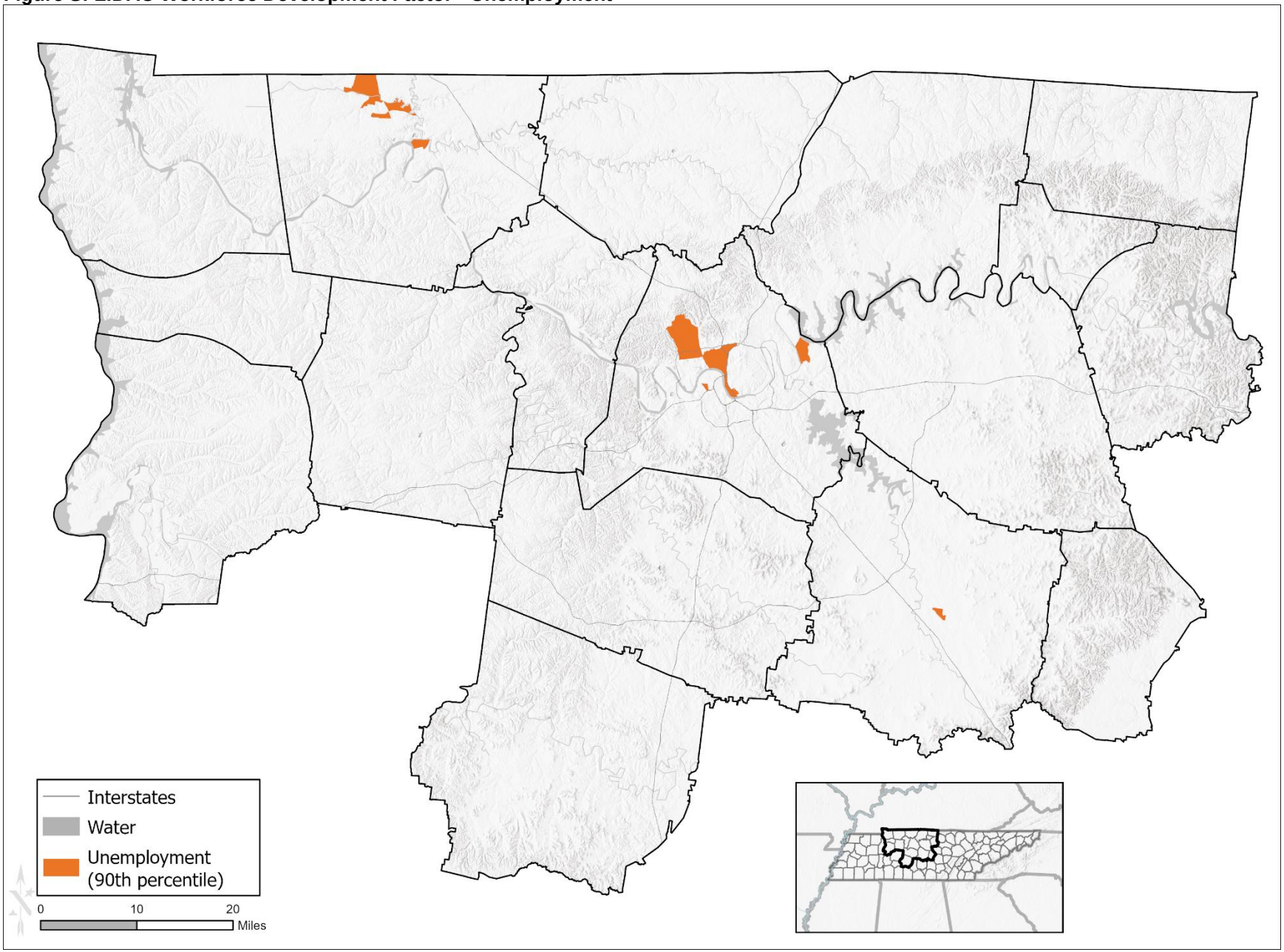


Figure T: Housing Factors for Low Income and Disadvantaged Communities

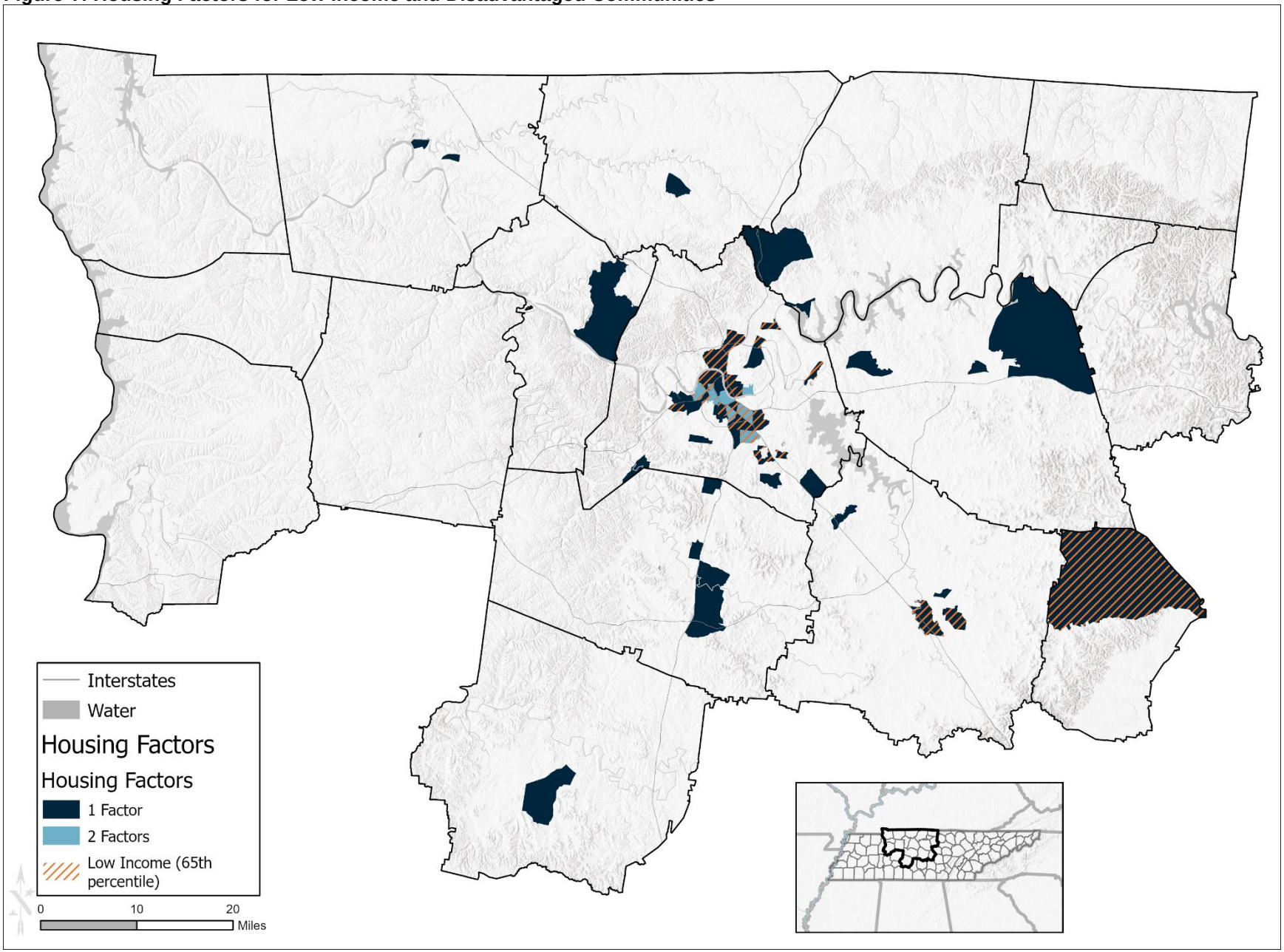


Figure U: LIDAC Housing Factor – Housing Burden

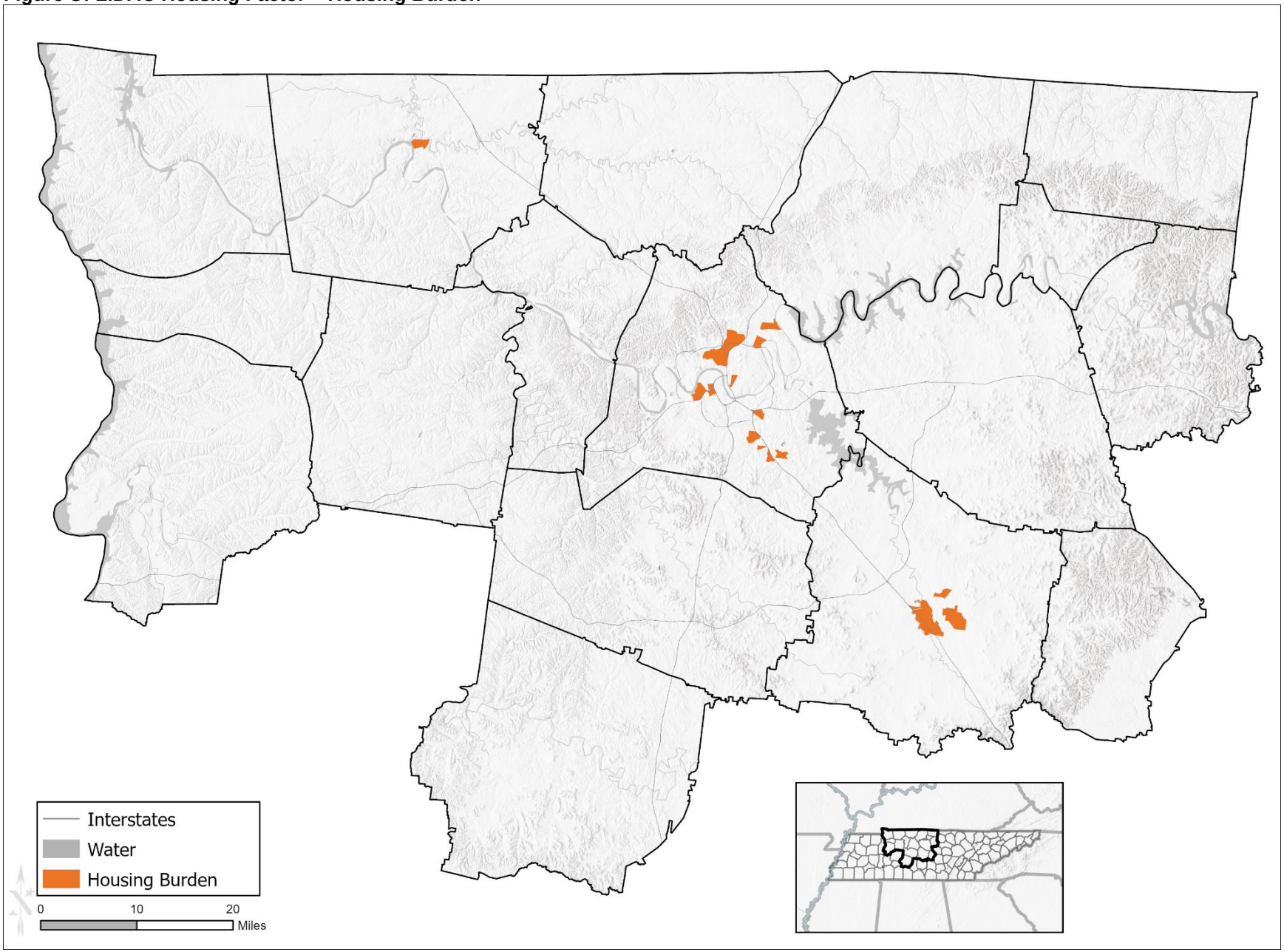


Figure V: LIDAC Housing Factor – Lack of Greenspace

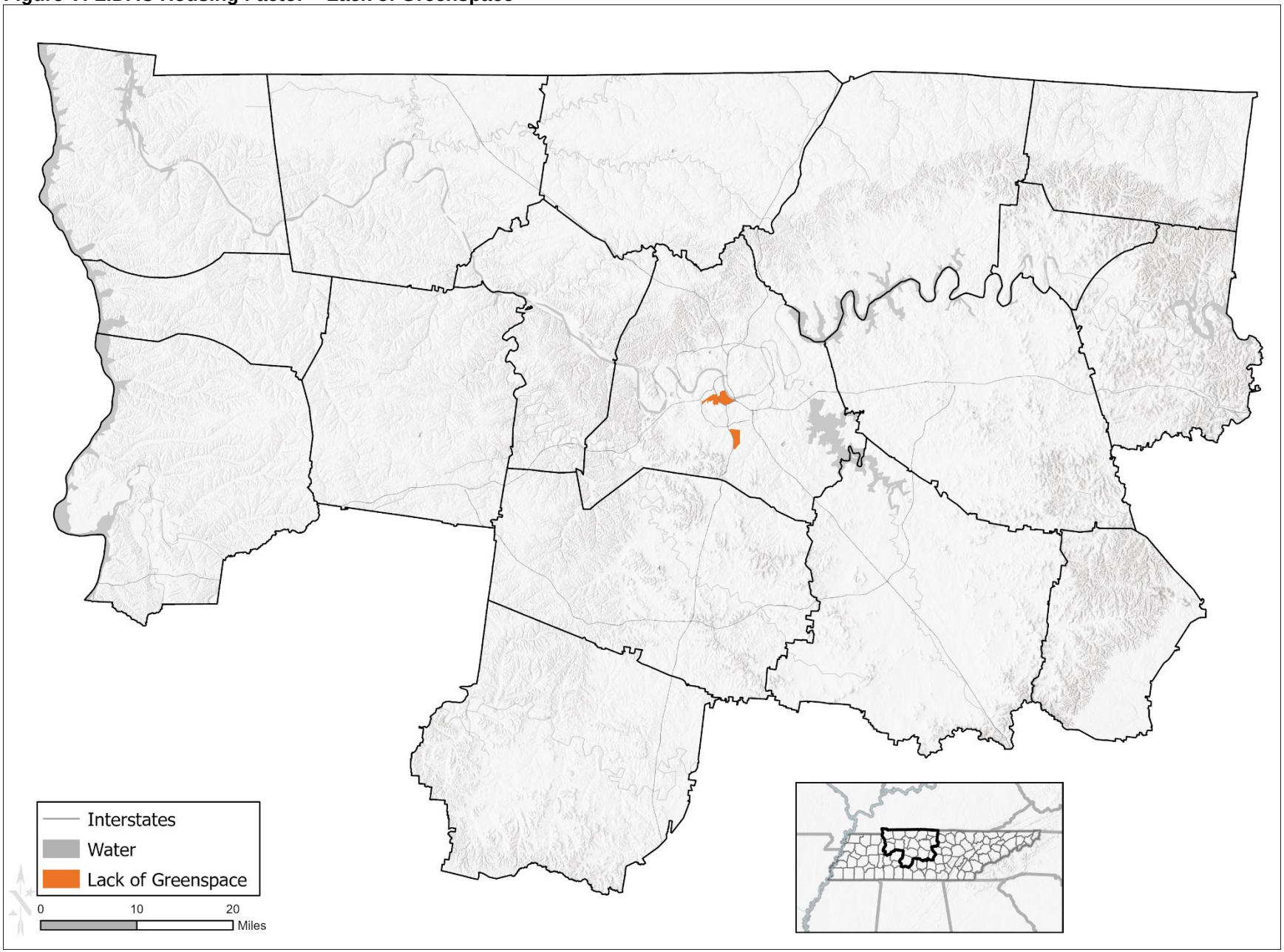


Figure W: LIDAC Housing Factor – Historic Underinvestment

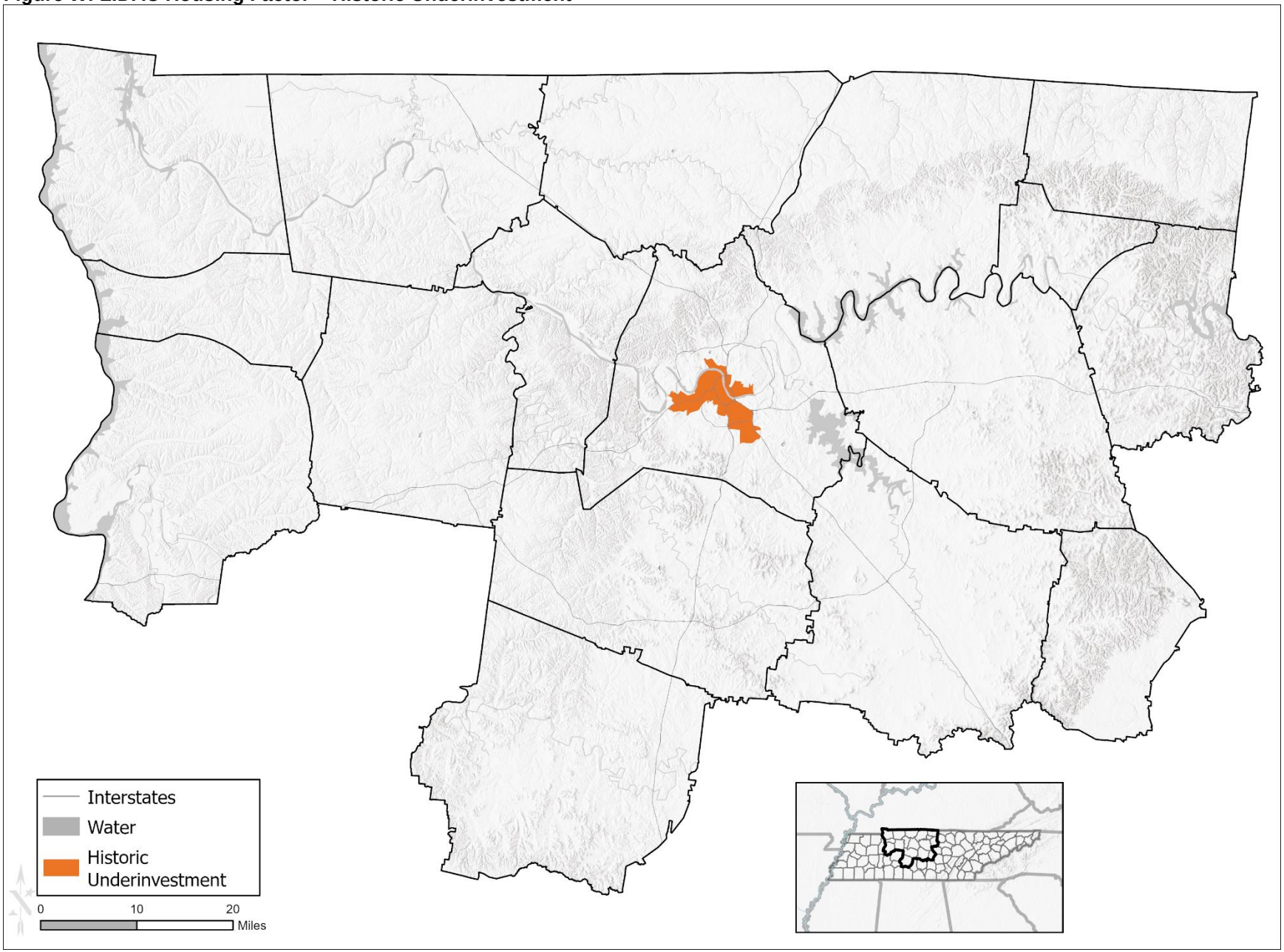


Figure X: LIDAC Housing Factor – Lack of Indoor Plumbing or Kitchen

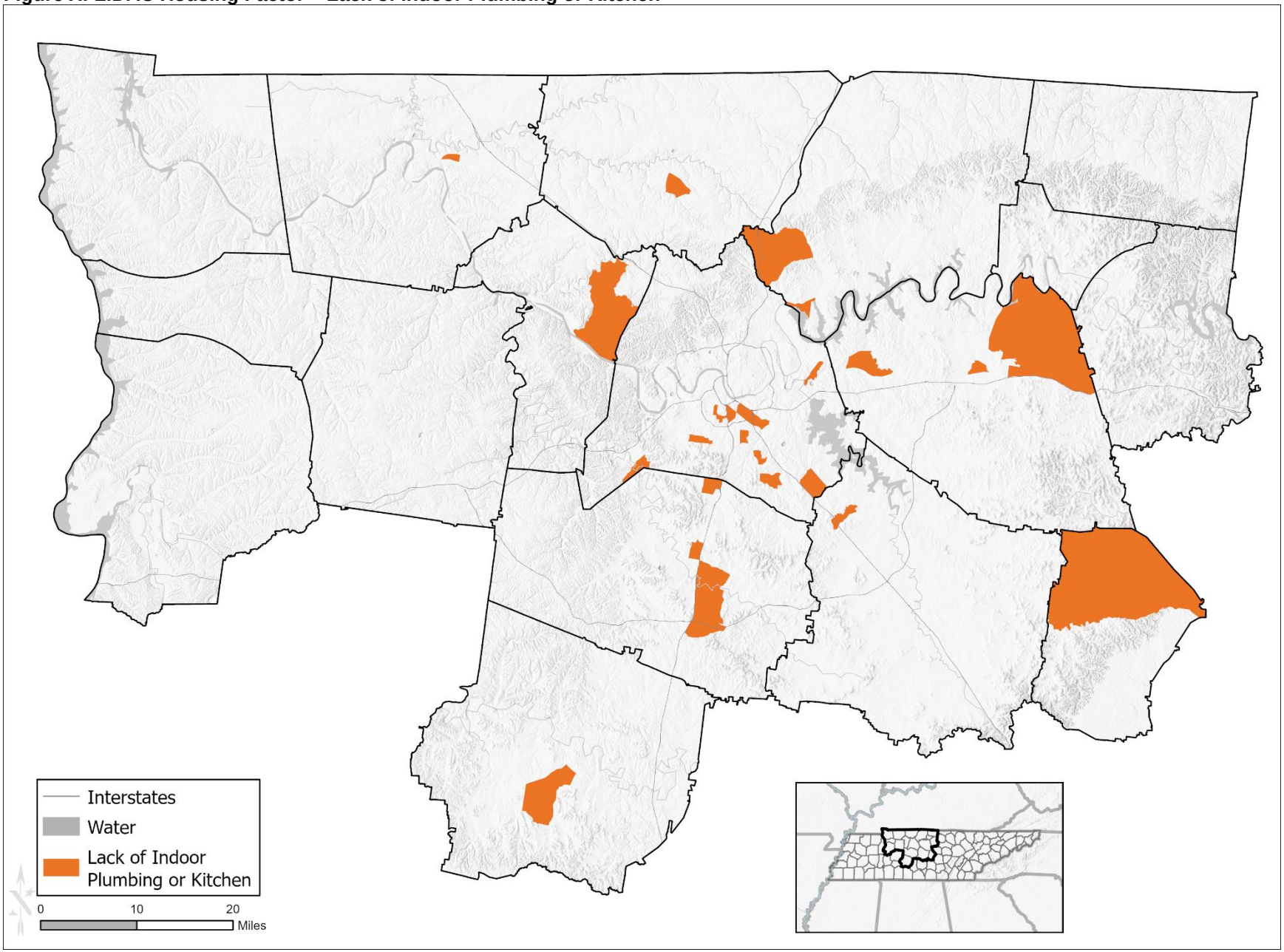


Figure Y: LIDAC Housing Factor – Lead Paint

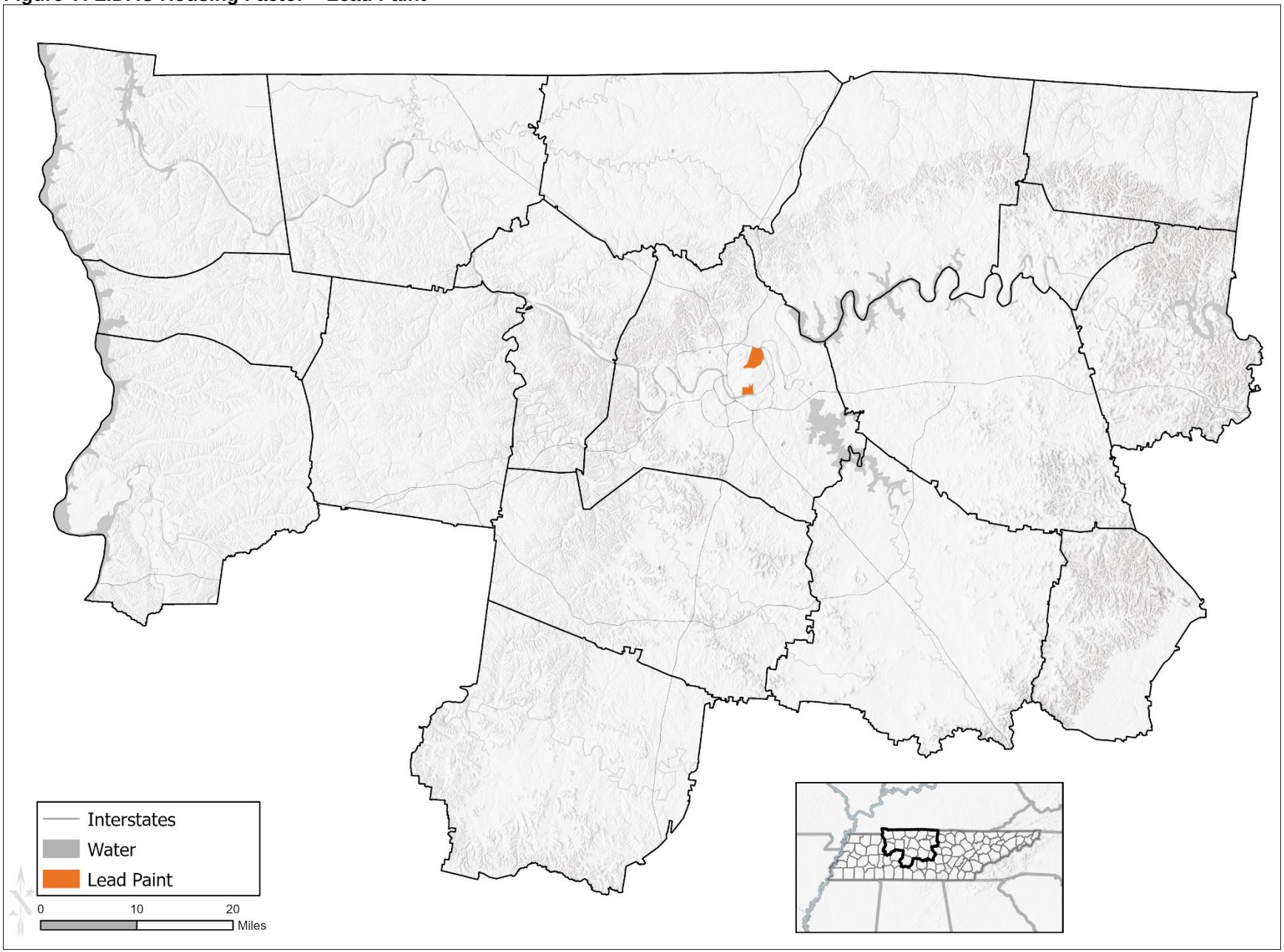


Figure Z: Legacy Pollution Factors for Low Income and Disadvantaged Communities

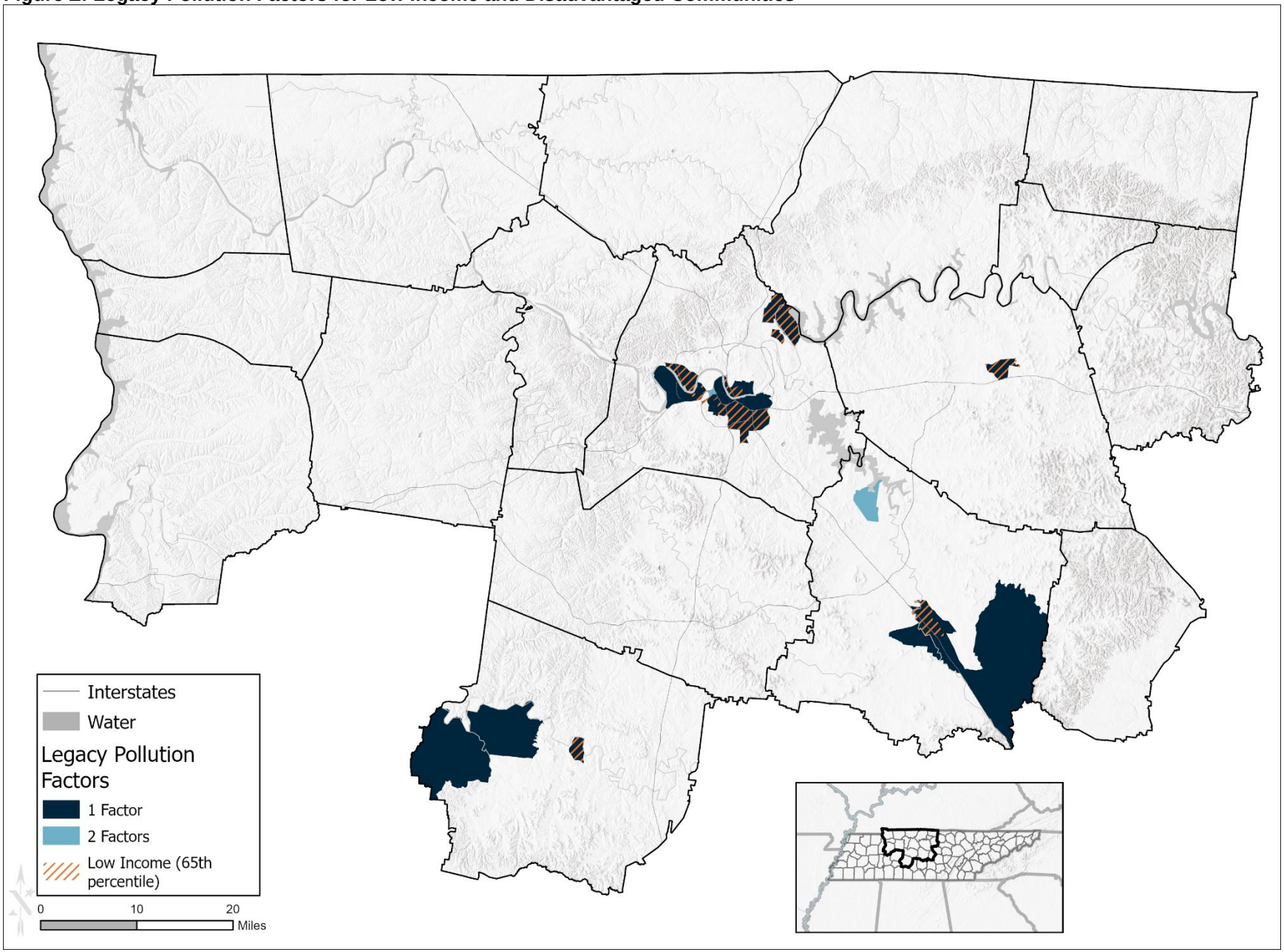


Figure AA: LIDAC Legacy Pollution Factor – Hazardous Waste Sites

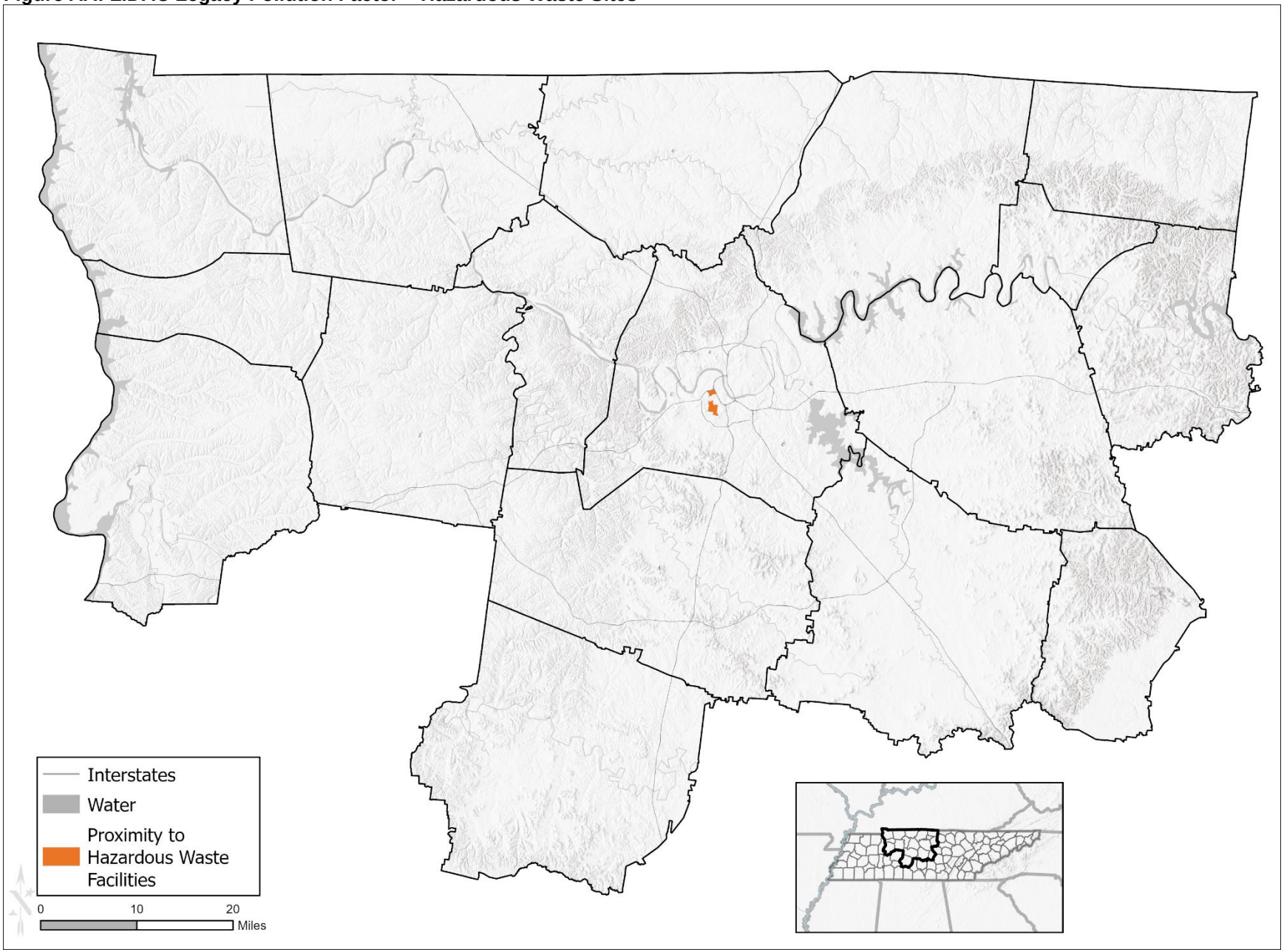


Figure BB: LIDAC Legacy Pollution Factor – Formerly Used Defense Sites

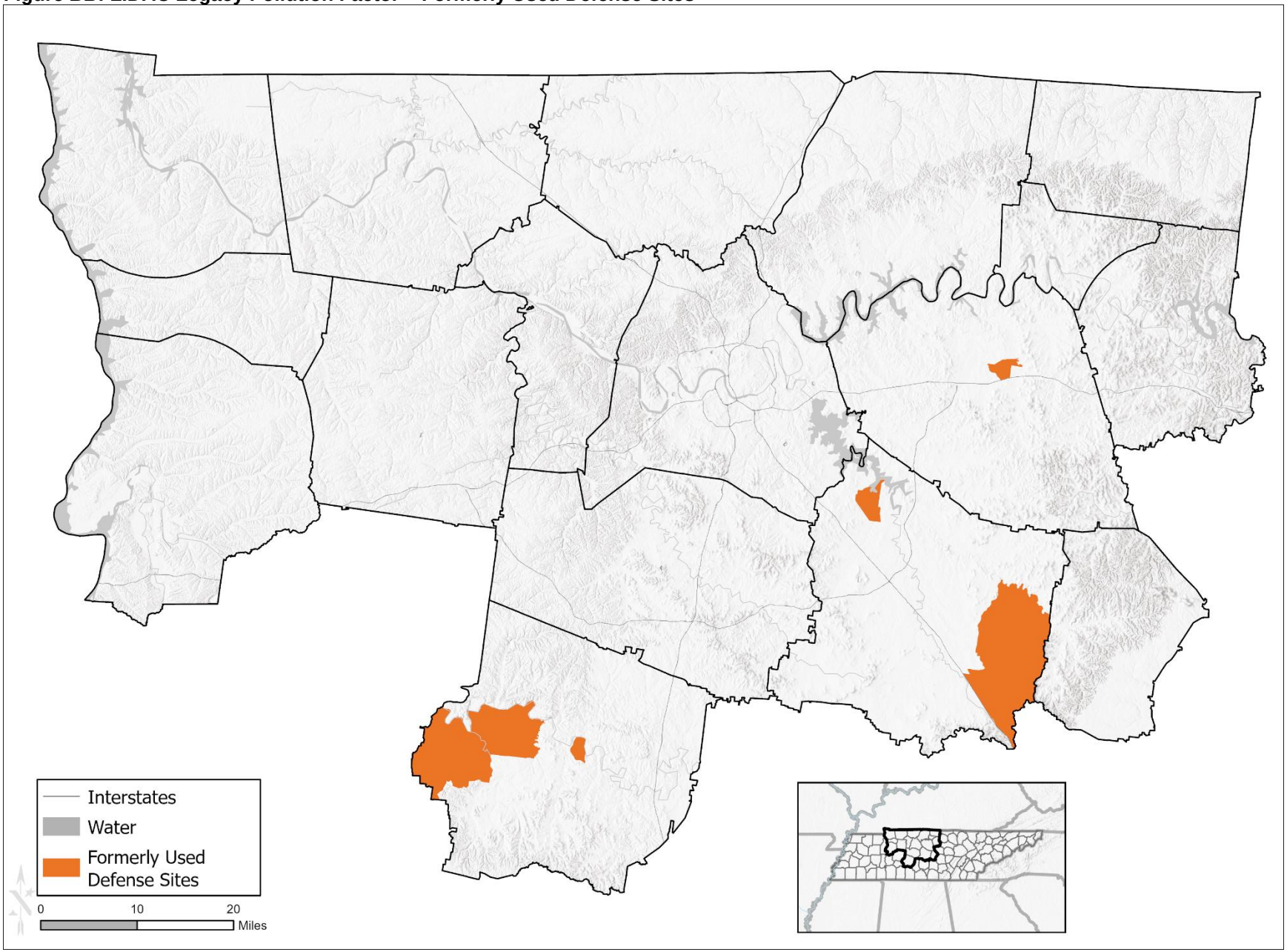


Figure CC: LIDAC Legacy Pollution Factor – Proximity to Risk Management Plan

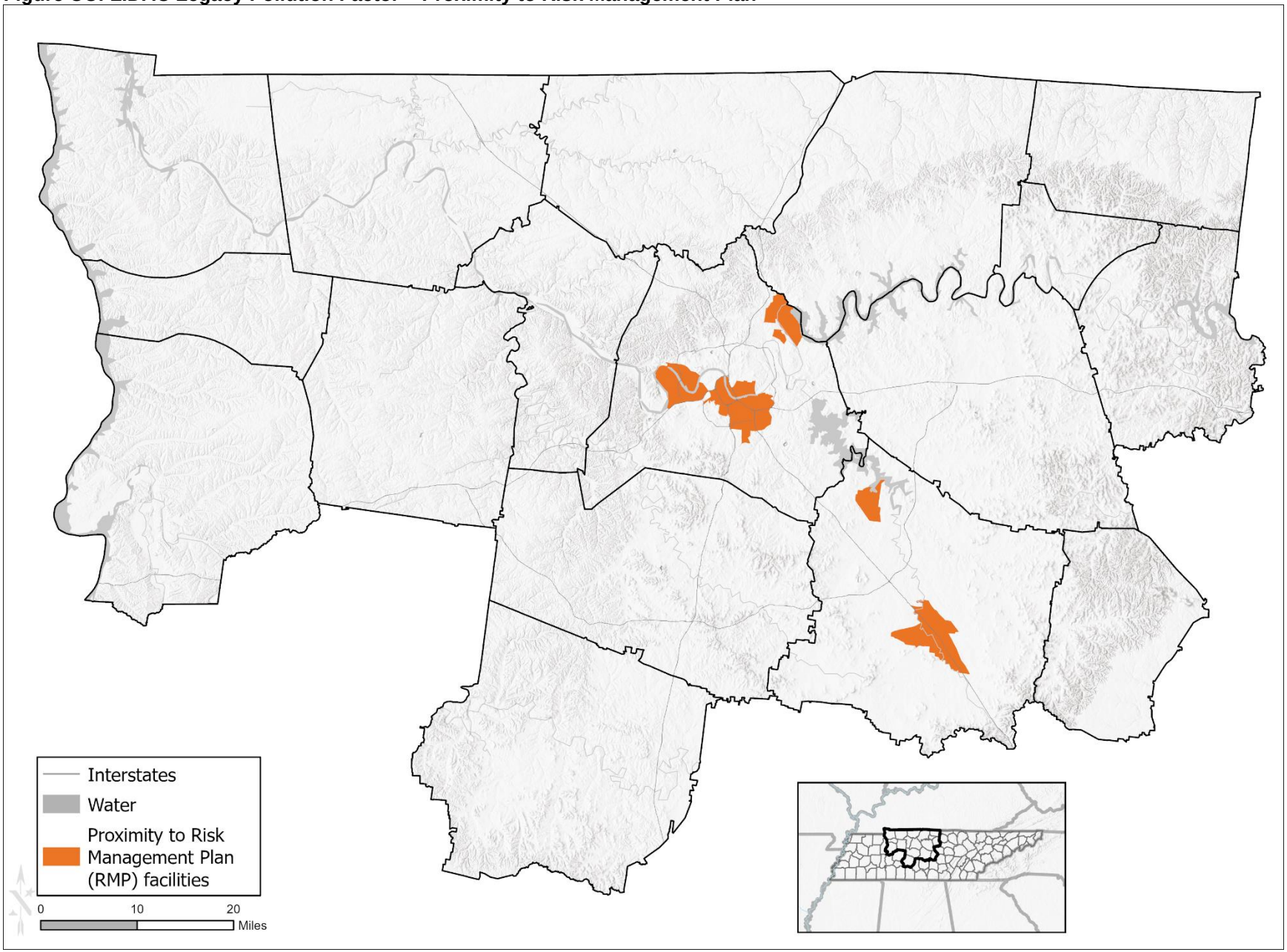


Figure DD: Energy Factors for Low Income and Disadvantaged Communities

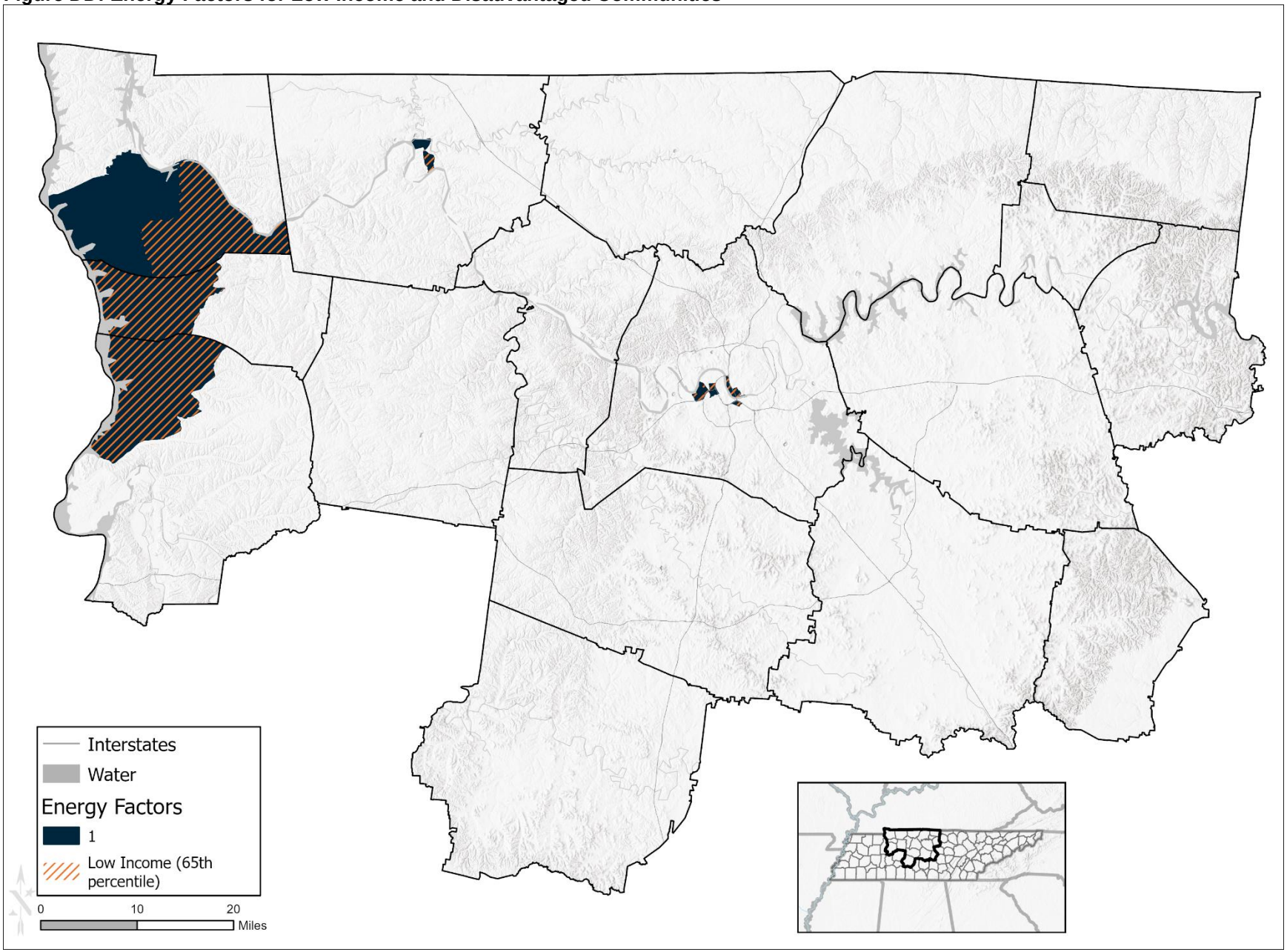


Figure EE: LIDAC Energy Factor – Energy Burden

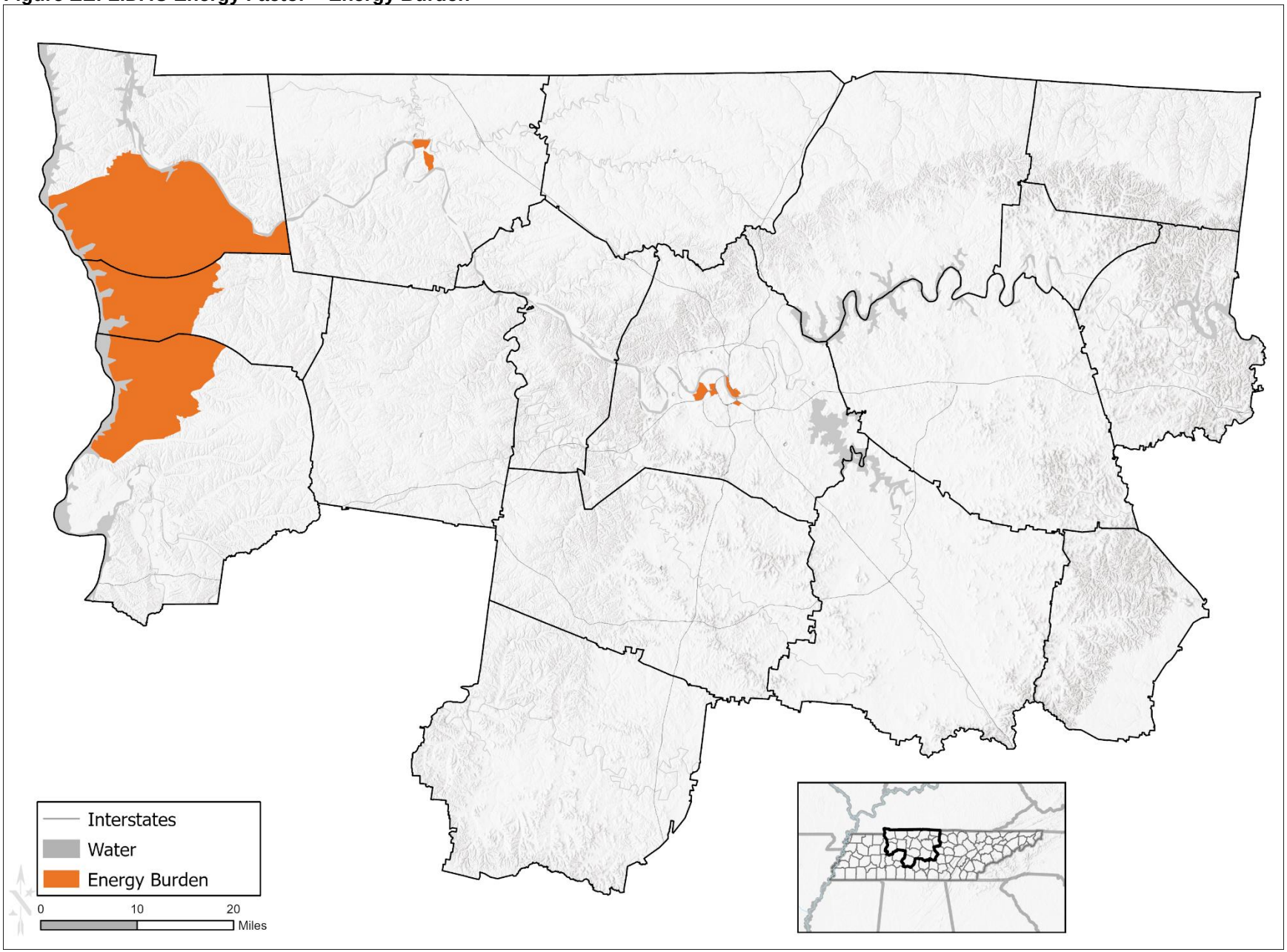


Figure FF: Water and Wastewater Factors for Low Income and Disadvantaged Communities

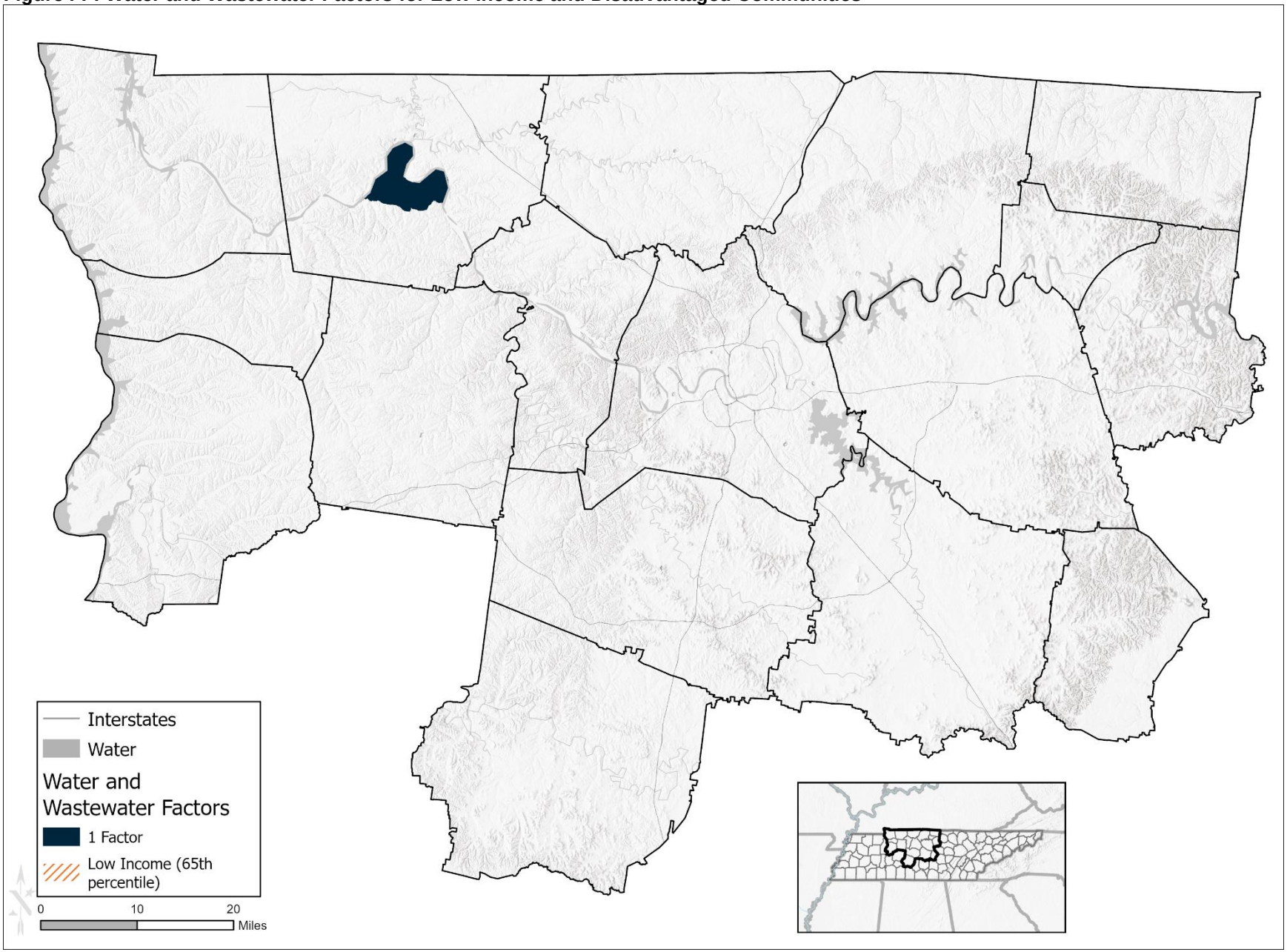
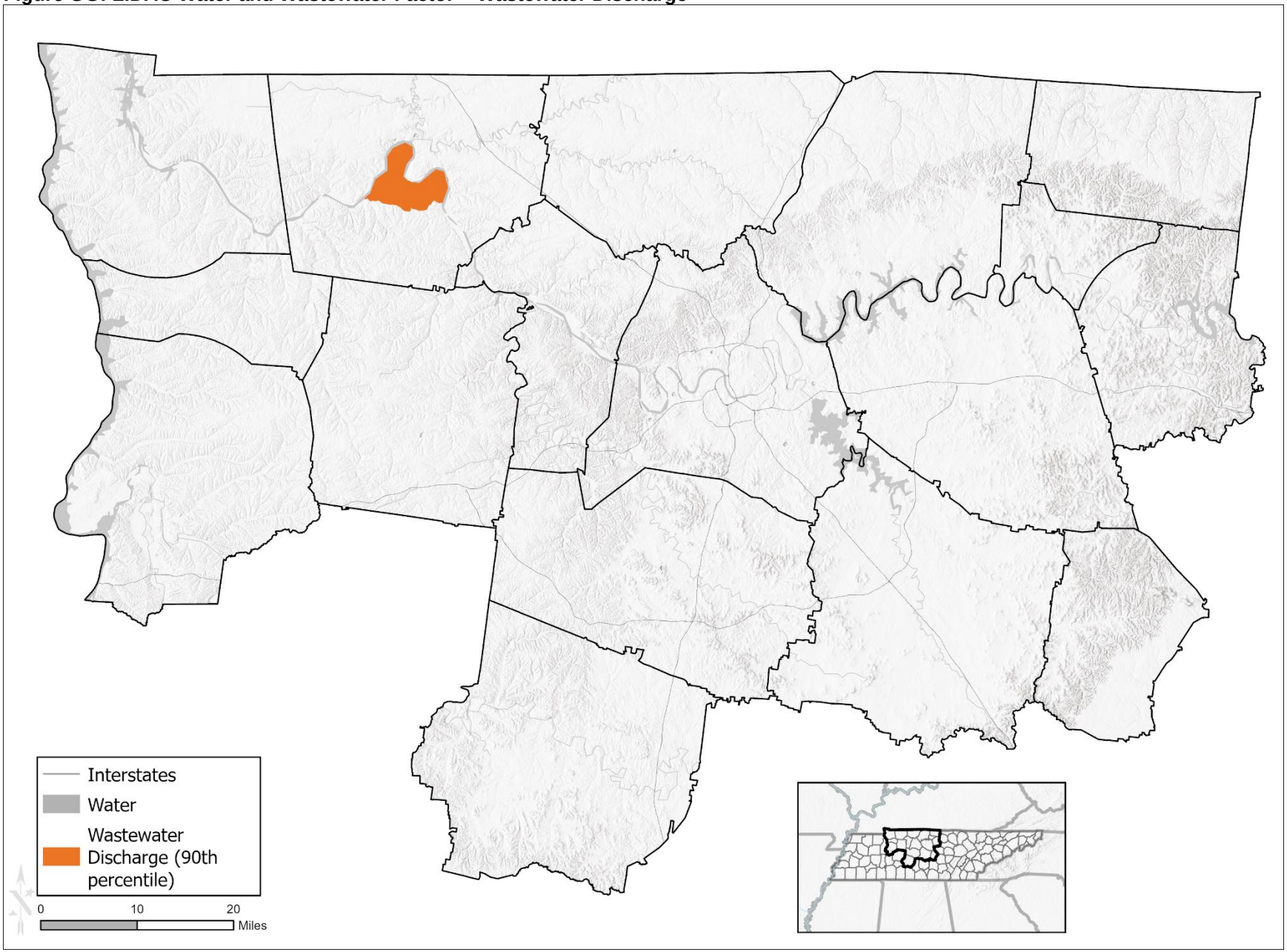
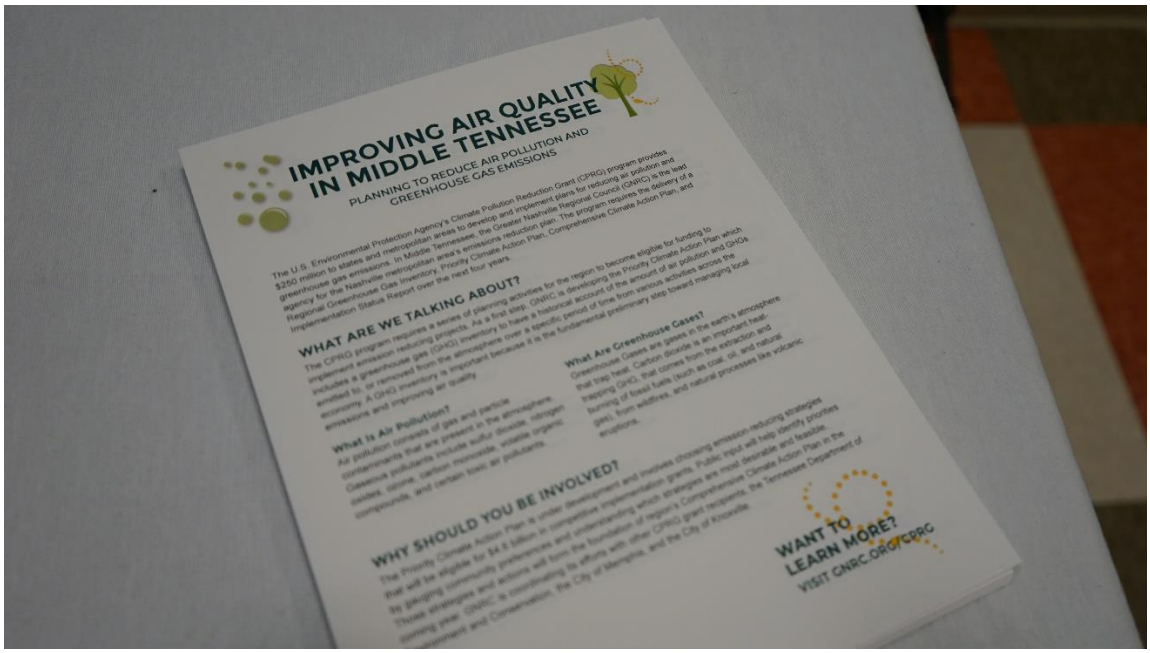
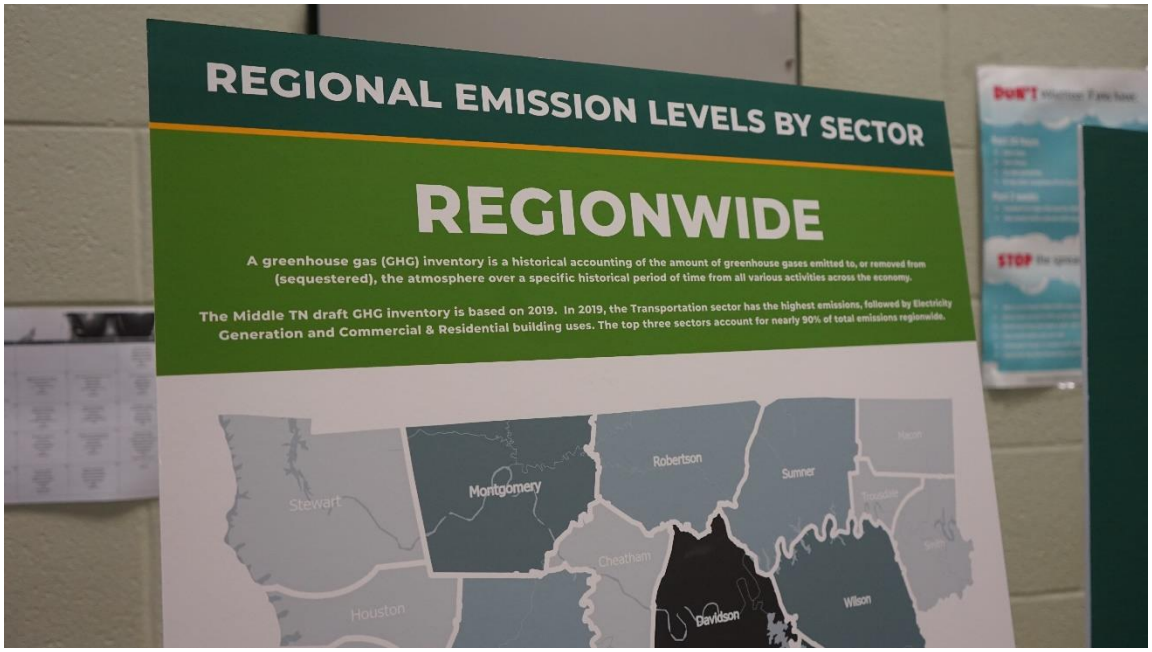


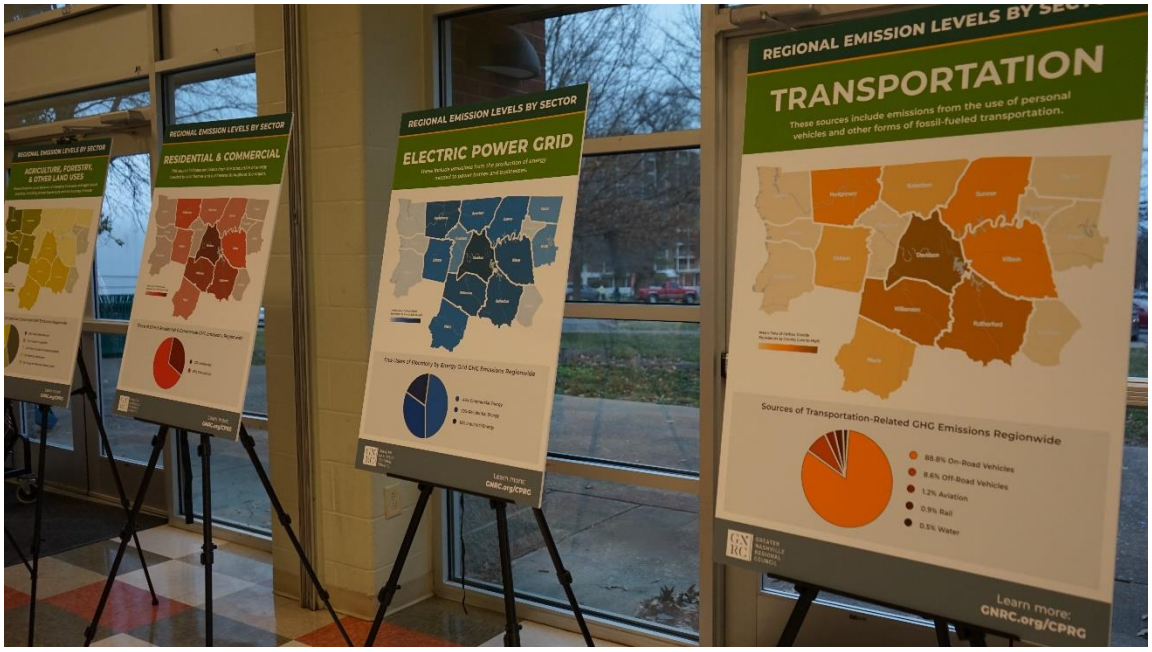
Figure GG: LIDAC Water and Wastewater Factor – Wastewater Discharge

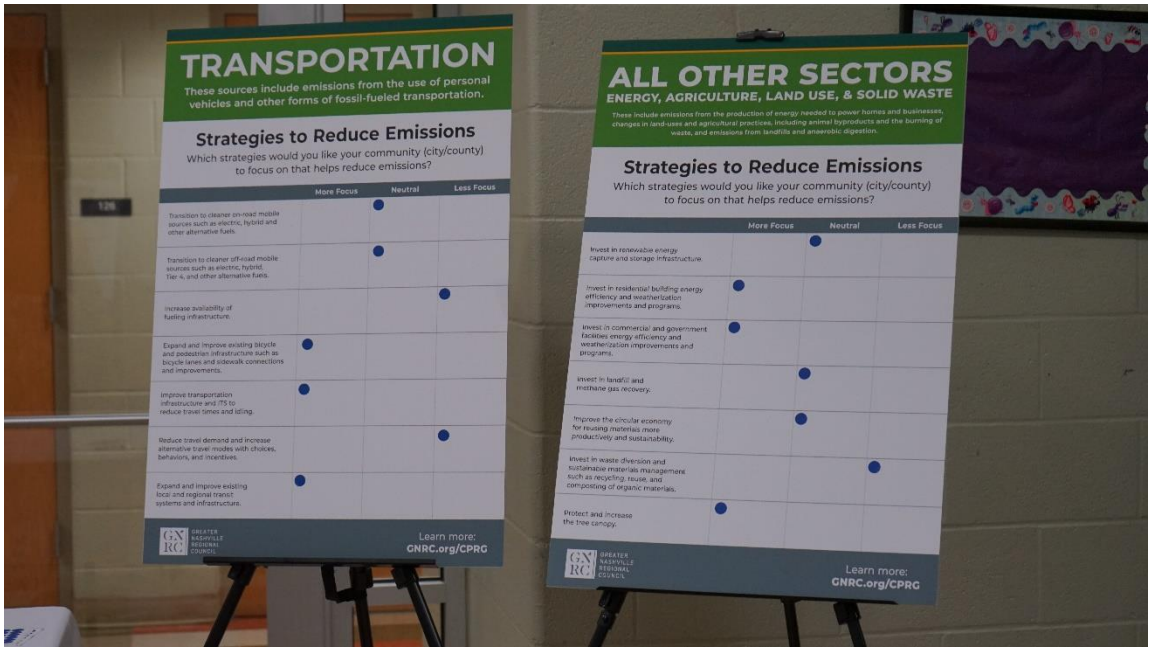


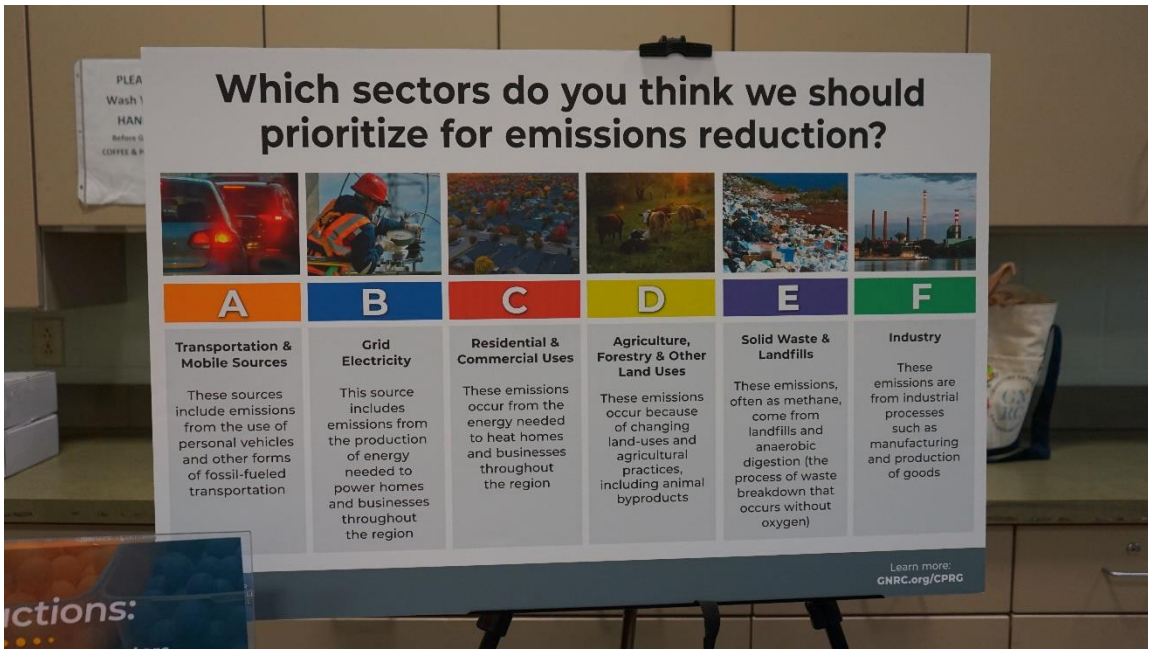
B. Community Engagement Materials

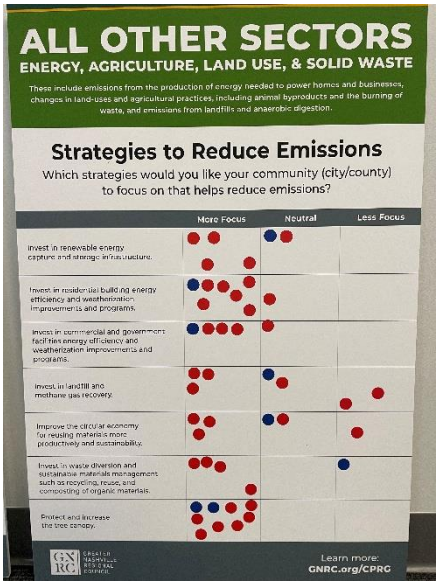


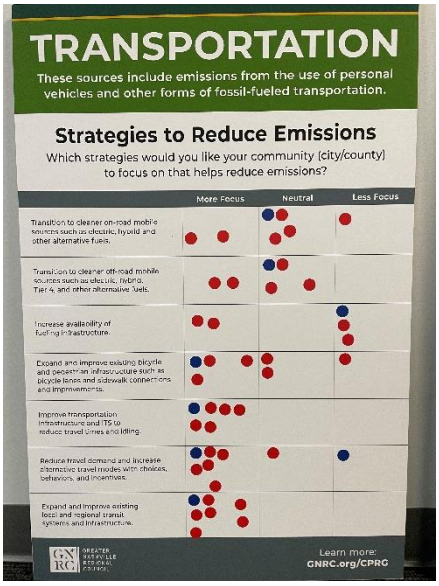

REGIONAL EMISSION LEVELS BY SECTOR
REGIONWIDE
A greenhouse gas (GHG) inventory is a historical accounting of the amount of greenhouse gases emitted to, or removed from (sequestered), the atmosphere over a specific historical period of time from all various activities across the economy.
The Middle TN draft GHG inventory is based on 2019. In 2019, the Transportation sector has the highest emissions, followed by Electricity Generation and Commercial & Residential building uses. The top three sectors account for nearly 90% of total emissions regionwide.
Stewart
Montgomery
Robertson
Sumner
Cheatham
Houston
Davidson
Wilson

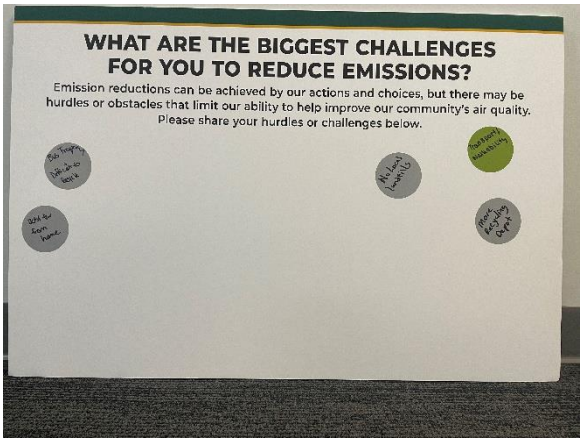

REGIONAL EMISSION LEVELS BY SECTOR
AGRICULTURE, FORESTRY, & OTHER LAND USES
REGIONAL EMISSION LEVELS BY SECTOR
RESIDENTIAL & COMMERCIAL
REGIONAL EMISSION LEVELS BY SECTOR
ELECTRIC POWER GRID
Learn more: GNRC.org/CPRG
REGIONAL EMISSION LEVELS BY SEC
TRANSPORTATION
These sources include emissions from the use of personal vehicles and other forms of fossil-fueled transportation.
Sources of Transportation-Related GHG Emissions Regionwide
88.8% On-Road Vehicles
8.6% Off-Road Vehicles
1.2% Aviation
0.9% Rail
0.5% Water
Learn more: GNRC.org/CPRG

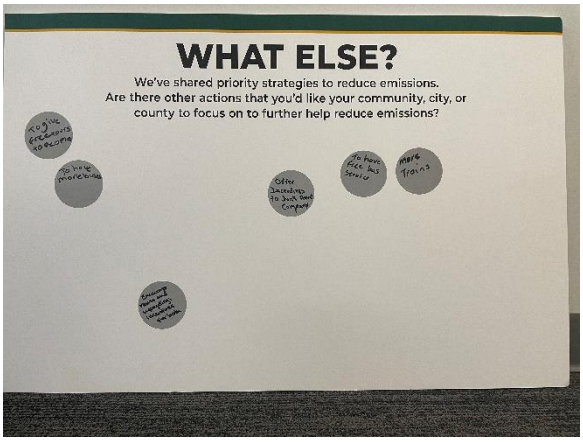



Which sectors do you think we should prioritize for emissions reduction?
A
Transportation & Mobile Sources
These sources include emissions from the use of personal vehicles and other forms of fossil-fueled transportation
B
Grid Electricity
This source includes emissions from the production of energy needed to power homes and businesses throughout the region
C
Residential & Commercial Uses
These emissions occur from the energy needed to heat homes and businesses throughout the region
D
Agriculture, Forestry & Other Land Uses
These emissions occur because of changing land-uses and agricultural practices, including animal byproducts
E
Solid Waste & Landfills
These emissions, often as methane, come from landfills and anaerobic digestion (the process of waste breakdown that occurs without oxygen)
F
Industry
These emissions are from industrial processes such as manufacturing and production of goods
Learn more:
GNRC.org/CPRG


ALL OTHER SECTORS
ENERGY, AGRICULTURE, LAND USE, & SOLID WASTE
These include emissions from the production of energy needed to power homes and businesses, changes in land-uses and agricultural practices, including animal byproducts and the burning of waste, and emissions from landfills and anaerobic digestion.
Strategies to Reduce Emissions
Which strategies would you like your community (city/county) to focus on that helps reduce emissions?
More Focus
Neutral
Less Focus
Invest in renewable energy capture and storage infrastructure.
Invest in residential building energy efficiency and weatherization improvements and programs.
Invest in commercial and government facilities energy efficiency and weatherization improvements and programs.
Invest in landfill and methane gas recovery.
Improve the circular economy for reusing materials more productively and sustainably.
Invest in waste diversion and sustainable materials management such as recycling, reuse, and composting of organic materials.
Protect and increase the tree canopy.
Learn more:
GNRC.org/CPRG


TRANSPORTATION
These sources include emissions from the use of personal vehicles and other forms of fossil-fueled transportation.
Strategies to Reduce Emissions
Which strategies would you like your community (city/county) to focus on that helps reduce emissions?
More Focus
Neutral
Less Focus
Transition to cleaner on-road mobile sources such as electric, hybrid and other alternative fuels.
Transition to cleaner off-road mobile sources such as electric, hybrid, Tier 4, and other alternative fuels.
Increase availability of fueling infrastructure.
Expand and improve existing bicycle and pedestrian infrastructure such as bicycle lanes and sidewalk connections and improvements.
Improve transportation infrastructure and ITS to reduce travel times and idling.
Reduce travel demand and increase alternative travel modes with choices, behaviors, and incentives.
Expand and improve existing local and regional transit systems and infrastructure.
Learn more:
GNRC.org/CPRG


WHAT ARE THE BIGGEST CHALLENGES FOR YOU TO REDUCE EMISSIONS?
Emission reductions can be achieved by our actions and choices, but there may be hurdles or obstacles that limit our ability to help improve our community's air quality. Please share your hurdles or challenges below.


WHAT ELSE?
We've shared priority strategies to reduce emissions.
Are there other actions that you'd like your community, city, or county to focus on to further help reduce emissions?

The following attachment is not included in the view since it is not a read-only PDF file.

Upon submission, this file will be transmitted to the Grantor without any data loss.

Areas_MetroNashville.xls

2010 FIPS Code	Disadvantaged Across Multiple Conditions	State/Territory	County Name
47037015804	Transportation	Tennessee	Davidson County
47037011002	Transportation	Tennessee	Davidson County
47037014300	Transportation	Tennessee	Davidson County
47037015615	Climate Change	Tennessee	Davidson County
47037015618	Climate Change	Tennessee	Davidson County
47037017402	Transportation	Tennessee	Davidson County
47037017500	Transportation	Tennessee	Davidson County
47037012600	Transportation and Climate Change	Tennessee	Davidson County
47037010501	Climate Change	Tennessee	Davidson County
47037010303	Transportation and Climate Change	Tennessee	Davidson County
47037010601	Climate Change	Tennessee	Davidson County
47037013601	Transportation	Tennessee	Davidson County
47037019108	Transportation	Tennessee	Davidson County
47037010701	Climate Change	Tennessee	Davidson County
47037013900	Transportation	Tennessee	Davidson County
47037018901	Transportation	Tennessee	Davidson County
47037015900	Transportation	Tennessee	Davidson County
47037017200	Transportation	Tennessee	Davidson County
47037019006	Climate Change	Tennessee	Davidson County
47037019118	Climate Change	Tennessee	Davidson County
47037019200	Transportation	Tennessee	Davidson County
47037019300	Transportation and Climate Change	Tennessee	Davidson County
47037016300	Transportation	Tennessee	Davidson County
47037012802	Climate Change	Tennessee	Davidson County
47037017300	Transportation	Tennessee	Davidson County
47037015623	Climate Change	Tennessee	Davidson County
47037015627	Climate Change	Tennessee	Davidson County
47037015803	Transportation and Climate Change	Tennessee	Davidson County
47037010702	Climate Change	Tennessee	Davidson County
47037011001	Transportation and Climate Change	Tennessee	Davidson County
47037012701	Climate Change	Tennessee	Davidson County
47037012801	Climate Change	Tennessee	Davidson County
47037012702	Transportation and Climate Change	Tennessee	Davidson County
47037015802	Transportation and Climate Change	Tennessee	Davidson County
47037010502	Climate Change	Tennessee	Davidson County
47037010904	Transportation and Climate Change	Tennessee	Davidson County
47037014800	Transportation	Tennessee	Davidson County
47037016000	Transportation and Climate Change	Tennessee	Davidson County
47037017401	Transportation	Tennessee	Davidson County
47037014400	Transportation	Tennessee	Davidson County
47037016200	Transportation	Tennessee	Davidson County
47037015613	Climate Change	Tennessee	Davidson County
47037015620	Transportation	Tennessee	Davidson County
47037016100	Transportation and Climate Change	Tennessee	Davidson County
47037013800	Transportation and Climate Change	Tennessee	Davidson County

The following attachment is not included in the view since it is not a read-only PDF file.

Upon submission, this file will be transmitted to the Grantor without any data loss.

SF424A_AdditionalAttachment .docx

Attachment – Additional Future Funding Period (Year 5)

SECTION E – BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program	**FUTURE FUNDING PERIODS (YEARS)**				
	(a) First	**(b) Second**	**(c) Third**	**(d) Fourth**	**(f) Fifth**
16. Climate Pollution Reduction Grants Program	*Provided in Standard Form 424A, Page 2*				$397,708.00
20. TOTAL (sum of lines 16 - 19)					**$397,708.00**

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

FREDDIE O'CONNELL
MAYOR

OFFICE OF THE MAYOR
METROPOLITAN COURTHOUSE
NASHVILLE, TENNESSEE 37201
PHONE: (615) 862-6000
EMAIL: mayor@nashville.gov

March 28, 2024

Via electronic mail to Diana.Alarcon@nashville.gov
Diana Alarcon
Director
Nashville Department of Transportation and Multimodal Infrastructure
750 S 5th St
Nashville, TN 37206

RE: Climate Pollution Reduction Grant – Nashville Department of Transportation and Multimodal Infrastructure Letter of Support in response to EPA's CPRG Implementation Grant General Competition

Ms. Alarcon,

I am writing on behalf of the Metropolitan Government of Nashville and Davidson County (Metro Nashville) in support of the Nashville Department of Transportation and Multimodal Infrastructure's (NDOT) application for the U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant Program: Implementation Grants General Competition, EPA-R-OAR-CPRGI-23-07. If funded, we look forward to working across Metro Nashville departments and with community partners to help implement NDOT's proposed transportation measure included in the application to EPA.

NDOT is the department tasked with design, construction, and management of a safe, reliable public transportation network for Metro Nashville, with a focus on enabling a high quality of life and prosperity for our residents. Metro Nashville is acting to address climate change. In 2021, the city published its climate action plan, which identifies reducing trips in single occupancy vehicles as a significant area opportunity to drive emissions reductions and sustainability. With 51 percent of the community's greenhouse gases coming from the transportation sector, we know that to address climate change locally, we need to encourage mode shift in addition to other mobility strategies.

NDOT's proposal will expand the city's Transportation Demand Management (TDM) Program, Nashville Connector, by implementing an electric-bike (e-bike) rebate program throughout Metro Nashville. This program will provide an opportunity for the city to offer a practical and sustainable alternative to single-occupancy vehicles, which will result in greenhouse gas emissions reductions of 60.38 $mtCO_2e$ based on the reduction in vehicle miles traveled (VMT) that would occur under the e-bike program from 2025 to 2030.

This program is also replicable and scalable, meaning it can expand to serve multiple jurisdictions in the Middle Tennessee region and beyond. The program also emphasizes equity, offering income-qualifying vouchers at a higher dollar value to ensure that our most disadvantaged populations can meaningfully participate.

If awarded, Metro Nashville, and specifically the Mayor's Office, will support NDOT by performing equitable and meaningful outreach and engagement on the e-bike rebate program; supporting any workforce development, job creation, and other related training opportunities; and supplementing CPRG funding with our own funding, programs, etc. as feasible.

Metro Nashville fully supports the implementation of the e-bike rebate program and believe that it aligns with our local decarbonization, transportation, and mobility goals. We look forward to working with NDOT on this project.

Sincerely,

Freddie O'Connell
Mayor

Project Narrative File(s)

*** Mandatory Project Narrative File Filename:** Workplan_MetroNashville.pdf

Add Mandatory Project Narrative File | Delete Mandatory Project Narrative File | View Mandatory Project Narrative File

To add more Project Narrative File attachments, please use the attachment buttons below.

Add Optional Project Narrative File | Delete Optional Project Narrative File | View Optional Project Narrative File

Overall Project Summary and Approach

Nashville has an exceptional opportunity to implement ambitious measures that will achieve significant cumulative greenhouse gas (GHG) reductions by 2030 and beyond. This opportunity will expand our Transportation Demand Management (TDM) Program, Nashville Connector, by implementing an electric-Bike (e-bike) rebate program serving the city of Nashville and Davidson County. This program pursues an innovative approach to mode shift and transportation sector decarbonization that is replicable and be "scaled up" across multiple jurisdictions. The Nashville Department of Transportation and Multimodal Infrastructure (NDOT), in partnership with the Office of the Mayor, seeks a $2.07 M Climate Pollution Reduction Implementation Grant (CPRG) through the Environmental Protection Agency (EPA) to develop and administer Music City Bike Bucks, an e-Bike rebate program. Together, Nashville Connector and Music City Bike Bucks represent modern, resilient, and complete mobility options. E-bikes are like traditional bicycles but use a motor to make riding easier. E-bikes use rechargeable batteries and are able to travel up to 28 miles per hour. Because e-bikes are able to assist with pedaling, this allows cycling to be more accessible to different levels of bike riders, allows for those commuting on e-bikes to keep up with the flow of traffic, and allows for biking to be a choice mode of travel for longer distances relative to traditional bikes. E-bikes reduce carbon emissions because they use an electric motor in lieu of gasoline and can save riders money that would otherwise be used on fuel and maintenance for a car. In recent years, e-bikes have grown increasingly popular. Due to high demand, the prices for e-bicycles have also greatly increased.

As society progresses towards sustainable and efficient transportation solutions. E-bikes have emerged as a compelling option for many individuals as their primary mode of travel. In recent years, e-bike sales have significantly outpaced all other electric vehicles[1]. E-bikes allow travelers to ride their bikes with exerting less physical effort which results in users being able to travel faster and longer and can be equipped so that users can carry cargo and children. This encourages individuals to travel via e-bike to the grocery store, commute to work, and transport children to childcare easily uphill. Combining the convenience of a bicycle with the assistance of electric power, e-bikes offer a practical and eco-friendly alternative to traditional cars and public transportation. With advancements in battery technology, e-bikes provide extended range and faster speeds, making them suitable for commuting longer distances without hassle of parking or traffic congestion. Moreover, their versatility allows riders to navigate urban landscapes effortlessly while reducing carbon emissions and promoting healthier lifestyles. As cities invest in infrastructure to accommodate cyclists and incentivize e-bike usage, the shift towards embracing e-bikes as a primary mode of travel is poised to accelerate, contributing to a cleaner, greener future. Furthermore, when vehicle drivers change their trips to e-bike trips, they take up less space on the road and significantly reduce traffic congestion.

The Nashville region's Priority Climate Action Plan (PCAP) includes programs and projects (measures) that will achieve or facilitate the reduction of greenhouse gas air pollution. Specifically, strategy 2 and supporting strategy 3 from the PCAP's transportation and mobility sections include pollution reduction measures which will be implemented through this grant opportunity.

[1] https://www.nrel.gov/news/program/2023/small-but-mighty-electric-bicycles-can-bridge-the-gap-in-access-to-transportation.html

Strategy 2: Increase use of alternative modes of transportation with programs, policies and projects that improve existing and expand bicycle and pedestrian infrastructure.	**Measure 2.1 -** Launch Rebate Program to Incentivize Individuals to Purchase an e-Bike
Strategy 3: Implement travel demand management strategies and expand public transit options to reduce VMT from personal automobile use.	**Measure 3.1 -** Implement TDM Programming and Expand Transit Options

Downtown Nashville will see a 45% increase in traffic and 40,000 additional workers with 84% of downtown Nashville employees drive to work alone[2]. In 2022, Nashville ranks 24th in congestion in the United States and 131 worldwide with a $689 cost of congestion per driver. Nashville commuters lost an average of 41 hours because of congestion[3]. In 2024, Forbes ranked Nashville as the top worst city to commute[4]. Additionally, Nashville's most recent greenhouse gas emissions inventory, completed in 2022 using 2019 data, found that 51 percent of emissions came from the transportation sector. In recent years, NDOT has developed a Transportation Demand Management program to educate commuters and businesses about travel options to encourage mode shifts.

Nashville Connector uses proven TDM Strategies to reduce Congestion with a goal of improving air quality. Nashville Connector uses targeted marketing to help engage residents about travel options. Consulting with large employers, the program offers tailored solutions for their employees. The program works with land use planners to ensure new developments incorporate facilities to reduce driving alone. To achieve these goals, we facilitate partnerships with nonprofits and transportation service providers and use technology to encourage mode shift. Incorporating an e-bike rebate program will encourage residents to mode shift. With each vehicle mile converted from driving alone to a mode shift like bicycling, vehicle miles traveled (VMT) is directly reduced. With each VMT reduction, VOC, NOx, CO and PM2.5 emissions are reduced, each reduction having a positive impact on air quality and fewer localized health effects, especially for vulnerable groups.

Description of GHG Reduction Measures

Increasing use of alternative modes of transportation with programs, policies, and projects that improve existing and expand bicycle and pedestrian infrastructure can be achieved through this grant opportunity. This is attainable through the measure of launching a rebate program to incentivize individuals to purchase an e-bike. The estimate of quantifiable GHG emissions reductions through 2030 in the Nashville MSA PCAP is 46,187.24 kg of CO2e/day and 101,150.049 CO2e by 2030.

Demonstration of Funding Need

In 2023, the Metropolitan Council expressed interest in using American Rescue Plan (ARP) Act funds to provide subsidies to residents of Nashville and Davidson County for the purchase of an e-bike[5]. This effort was widely popular among Nashville residents and their representatives. Ultimately Metro did not implement the program due to funding availability of ARP dollars. Metro Nashville has not applied for

[2] Transportation Consultants, LLC, & KCI Technologies, Inc. (2017, September). *Downtown Multimodal Mobility-Update Technical Memorandum 1: Development of Future Traffic Growth*. Nashville.
[3] https://inrix.com/scorecard-city-2022/?city=Nashville%20TN&index=131
[4] https://www.forbes.com/home-improvement/moving-services/hardest-commutes-in-us/
[5] https://nashville.legistar.com/LegislationDetail.aspx?ID=5991801&GUID=0289E37A-1B53-4F55-A5BF-D80B4BE523CF&FullText=1

other federal or non-federal funding to implement the Music City Bike Bucks program. The Carbon Pollution Reduction Grant through the EPA provides Metro Nashville through NDOT to implement a e-bike rebate program. Without this grant, it will take multiple budget cycles to implement a program of this scale.

Transformative Impact

Nashville's transportation sector produces significant greenhouse gas (GHG) emissions that contribute to climate change. According to Nashville's 2019 Greenhouse Gas Emissions Inventory, community emissions totaled roughly 11.25 million metric tons – with over half derived from the transportation sector alone[6]. Through the Music City Bike Bucks project, Nashvillians will be further encouraged to mode shift and use electric bicycles rather than internal combustion engine (ICE) vehicles via the accessibility and affordability of an e-bike.

Nashville needs access to sustainable transportation and has established a foundation to support the pursuit of sustainable transportation projects. In February 2022, Metro adopted a resolution to reduce GHG emissions by 80 percent in 2050 from 2014 levels and provided a comprehensive set of strategies and actions to meet the 2050 goal[7]. The Music City Bike Bucks project specifically touches upon the emissions associated with personal vehicles across the Metro Nashville area and aims to significantly reduce GHG emissions in the transportation sector by increasing accessibility and affordability of e-bikes.

An efficient, accessible multimodal transportation system that moves people effectively has the power to transform the quality of life in the Nashville region as well as reducing environmental impacts. Nashville sits in a basin which traps air pollutants, which, according to the EPA, originate mostly in mobile sources such as motor vehicles. The Metro Health Department tracks five pollutants: carbon monoxide, ozone, sulfur dioxide, PM2.5, and PM10. Ground-level ozone and airborne particles pose the greatest threat to human health in Davidson County. Metro health issues an Air Quality Index (AQI) based upon EPA standards Monday through Friday, which helps residents understand the impact that local air quality can have on their health.

Impact of GHG Reduction Measures

According to the EPA, the major GHGs emitted during the combustion of fossil fuels from on-road mobile sources are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The proposed e-bike rebate program is expected to reduce these three pollutants by shifting a total of 52 miles per week that are currently being completed by internal combustion engine (ICE) motor vehicles to non-emitting e-bikes. The following table includes the anticipated annual breakdown of e-bike rebates. The technical appendix provides additional details regarding the allocation of these vouchers, as well as other assumptions and data sources used for purposes of estimating GHG emissions and resultant reductions from the program.

[6] https://www.nashville.gov/sites/default/files/2023-03/Greenhouse-Gas-Emissions-Inventory-Presentation-2019.pdf?ct=1677700781

[7] https://nashville.legistar.com/LegislationDetail.aspx?ID=5393859&GUID=4471E711-0361-4489-B8D5-76347758BC0D&Options=ID|Text|&Search=RS2022-1358

Annual Allocated E-Bike Voucher Assumptions					
	Commuter E-Bike Vouchers per Year		Cargo E-Bike Vouchers per Year		Total Voucher Value per Year
Voucher Type	Number	Value	Number	Value	
Standard	166	$300	100	$500	**$200,000**
Income-Qualifying	45	$1,200	33	$1,400	

Magnitude of GHG Reductions from 2025 through 2030

The anticipated reduction of 60.38 $mtCO_2e$ of emissions is modeled based on the reduction in vehicle miles traveled (VMT) that would occur under the e-bike program from 2025 to 2030. This reduction is an important piece of the regional puzzle for reducing emissions that are influencing global warming and environmental and public health. The durability of the emissions reductions is based upon the assumption that residents will participate fully in the program each year, people will bike the assumed miles per week, and e-bikes stay in working condition for the length of the 5 years.

Cumulative Reduction in GHG Emissions With E-Bike Program (2025-2030)				
Timeframe	Total CO_2 ($mtCO_2e$) Reduction	Total CH_4 ($mtCO_2e$) Reduction	Total N_2O ($mtCO_2e$) Reduction	Total ($mtCO_2e$) Reduction
2025-2030	57.55	0.88	1.96	**60.38**

Annual emissions for the reference case (i.e., baseline) scenario and e-bike program scenario are provided in the technical appendix, including absolute reductions, cumulative reductions, and cumulative reductions for the specified timeframe of 2025-2030.

Magnitude of GHG Reductions from 2025 through 2050

The anticipated reduction of 609.67 $mtCO_2e$ of emissions is modeled based on the reduction in vehicle miles traveled (VMT) that would occur under the e-bike program from 2025-2050. Emission reductions include an assumption that ICE vehicle models are slowly replaced by EV models over the timeframe. The durability of the emissions reductions becomes less reliable following the completion of the grant-funded 5-year-program as e-bikes will inevitably be phased out due to the age of the e-bike, need for maintenance, and/or need for battery replacements. Upon the successful completion of the CPRG-funded program, Nashville-Davidson County intends to extend the program using local funding, which may include a battery replacement and/or maintenance voucher to address the durability of the original grant funding's impact. The modeled cumulative reduction in GHG emissions over the course of the 2025-2050 timeframe only considers, however, the original number of e-bikes funded through the grant. Should the program be extended, the reductions will be much greater.

Cumulative Reduction in GHG Emissions With E-Bike Program (2025-2050)				
Timeframe	**Total CO_2 ($mtCO_2e$) Reduction**	**Total CH_4 ($mtCO_2e$) Reduction**	**Total N_2O ($mtCO_2e$) Reduction**	**Total ($mtCO_2e$) Reduction**
2025-2050	579.73	9.28	20.66	**609.67**

Annual emissions for the reference case (i.e., baseline) scenario and e-bike program scenario are provided in the technical appendix, including absolute reductions, cumulative reductions, and cumulative reductions for the specified timeframe of 2025-2050.

Cost Effectiveness of GHG Reductions

To measure the cost effectiveness of the e-bike voucher program, the following formula was used.

Cost effectiveness of GHG reductions = (requested CPRG funding) / (sum of quantified GHG reductions from CPRG funding from 2025-2030)

Cost effectiveness of GHG reductions = \$2,077,033 / 60.38 $mtCO_2e$

Cost effectiveness of GHG reductions = \$34,399 per 1 $mtCO_2e$

An additional benefit beyond $mtCO_2e$ saved includes the impact on the perception of e-bikes as a viable, environmentally friendly, cost-effective, and practical mode of transportation. In addition, the anticipated reduction in VMT will reduce Particulate Matter (PM) PM2.5, NO_x, and carbon monoxide (CO), particularly in low-income and disadvantaged neighborhoods.

Documentation of GHG Reduction Assumptions

The estimated reduction in GHGs through the e-bike program was calculated using a publicly available tool developed by the Rocky Mountain Institute (RMI) specifically for modeling the impacts of an e-bike voucher program. Outputs from this tool (i.e., gallons of gasoline and VMT per year) were then converted to $mtCO_2e$ of CO_2, CH_4, and N_2O. Key program notes and assumptions for estimating the reduction in GHGs include the following:

- CO_2, CH_4, and N_2O are the only pollutants quantified in this analysis.
- ICE on-road vehicle types modeled to estimate gallons of gasoline and VMT include light-duty vehicles (i.e., pickup trucks and SUVs) and passenger vehicles (i.e., sedans, and hatchbacks). Calculations for VMT only account for trips of 5 miles or less as these are the most likely trips to be replaced with an e-bike trip. The number of vehicles (including the percentage of EVs) and trip lengths were sourced through the tool for Nashville-Davidson County, while the percentage of ICE vehicle types is based on state averages.
- Annual population growth for the projections was calculated to be 1.5% based on Nashville-Davidson County's 2010-2020 Census numbers.
- Heavy-duty, hybrid, and EV emissions are not quantified; however, a progressive replacement of ICE vehicles with EV models is included. These outputs are modeled by the RMI tool.

- Calculations assume 344 vouchers are given out each year ($200,000) for a total of 1,720 vouchers ($1,000,000). An assumption is also made that e-bike models are readily available at local bike shops and that there is an unmet demand for e-bike vouchers.
- Half (50%) of the allocated vouchers will be reserved for income-qualifying participants, of which 54% will be allocated for commuter e-bikes and the remaining 46% allocated for cargo e-bikes. For the other half of the vouchers (i.e., non-income-qualifying participants), it is assumed that 50% will be allocated for commuter e-bikes and the other 50% allocated for cargo e-bikes.
- A total of 32 miles per week is assumed for income-qualifying e-bike participants and 22 miles for standard e-bike participants.
- Annual gallons of gasoline and VMT from passenger and light-duty vehicles were converted to kilograms and grams of CO_2, CH_4, and N_2O for the baseline and e-bike program scenarios using EPA Emissions Factors. Pollutants were then converted to $mtCO_2e$ using global warming potential (GWP) factors from the IPCC's Fifth Assessment Report (2013).
- Emissions projections for 2031-2050 use the annual average growth rate of each pollutant for the timeframe 2025-2030 to project emissions. These projections only account for the e-bikes funded by the CPRG.

Full documentation of assumptions and data sources, as well as background calculations and formulas used, can be found in the technical appendix and calculation spreadsheet.

Expected Outputs and Outcomes

NDOT through Nashville Connector has several expected outcomes for the Music City Bike Bucks program. These outputs and outcomes collectively contribute to the overall success and effectiveness of the e-bike rebate program in promoting sustainable transportation and mitigating environmental impacts. Our team will collect the necessary data to help determine the below outcomes. The outcomes will determine the performance measures and plan.

Outputs:

Number of e-bikes purchased with voucher.	Total amount of voucher disbursed.	Demographic breakdown of vouchers distributed.	Geographic distribution of e-bike purchases.

Outcomes:

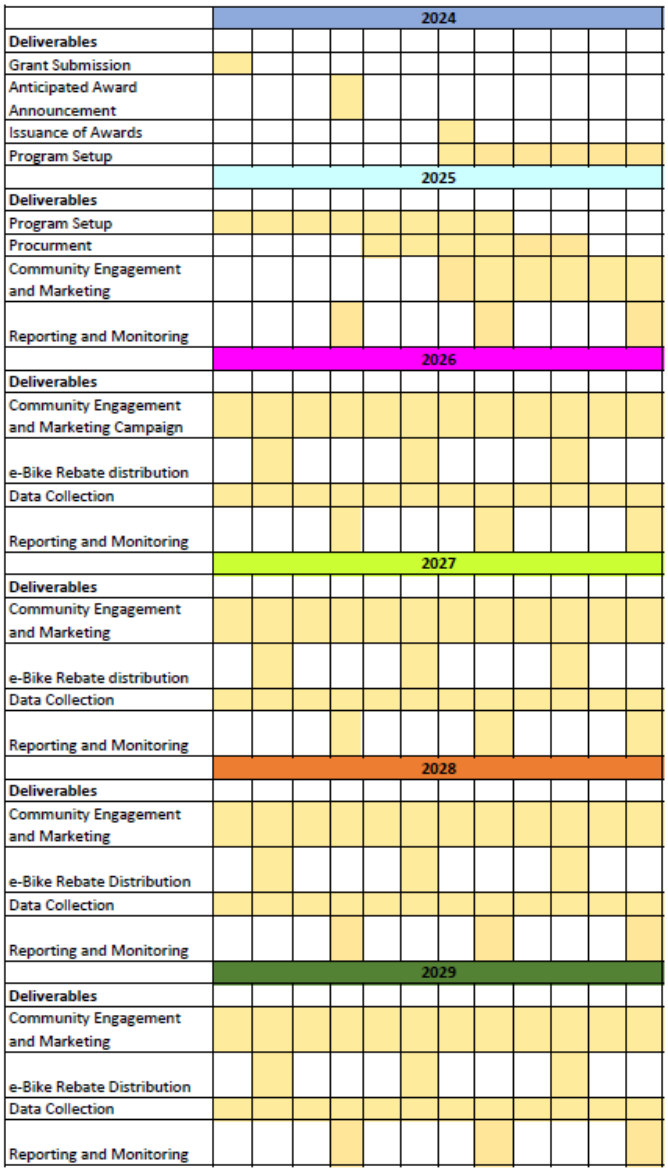
Reduction in GHG emissions from the transportation sector.	Decrease in vehicle miles traveled (VMT) and associated congestion.	Increase in active transportation mode share.	Savings in fuel for individuals and communities.	Enhanced mobility and access to transportation options, particularly for income-qualified participants.

Performance Measures and Plan

NDOT's performance measurement plan for Music City Bike Bucks is important to the success of the entire program. NDOT will regularly review and adjust the performance measurement plan based on feedback, data analysis, and changes in program goals. Using data analysis tools like Replica and trip tracking apps like Strava, NDOT will incorporate data collection in the performance measures and plan.

Performance Measure	Performance Plan	Target Measure
Number of Vouchers Issued	Track the total number of vouchers provided to individuals for purchasing e-bikes.	NDOT will set a **344 e-bike** target for the number of rebates to be issued annually.
Emissions Reduction	Measure the reduction in GHG emissions resulting from e-bike adoption compared to traditional vehicles.	NDOT is seeking to reduce **60.38 mtCO_2e** of emissions on the reduction in vehicle miles traveled (VMT).
Equity and Access	Evaluate the program's effectiveness in promoting equity and providing access to transportation options for disadvantaged communities	NDOT is committed to distributing **at least 40%** of the programs benefits to disadvantaged communities**.**
Customer Satisfaction	Conduct surveys to gauge participant satisfaction with the voucher program and e-bike ownership experience.	NDOT will use the survey data to identify areas for improvement based on feedback.
Mode Shift	Measure the percentage of participants who shift from using cars or other motorized vehicles to e-bikes for their daily transportation needs.	NDOT will set targets for mode shift and track progress towards reducing reliance on cars.

Authorities, Implementation Timeline, and Milestones



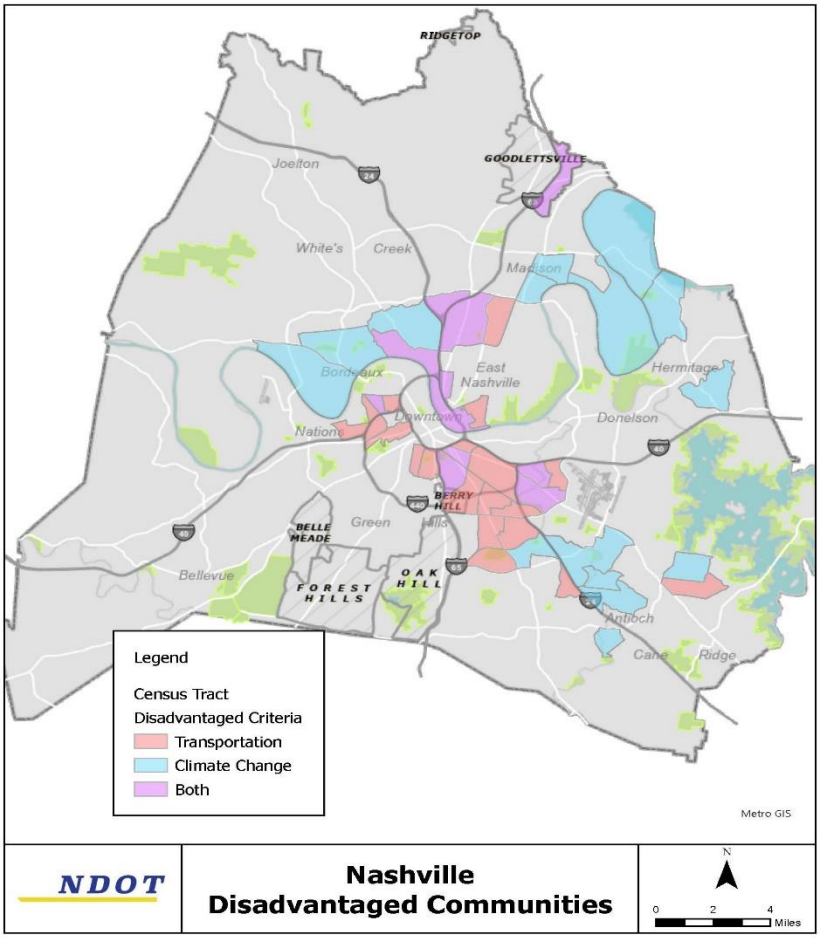
NDOT through Metro Nashville have existing authority to apply for, administer, and subaward federal grants as allowed by the Metro Charter and Tennessee Code Annotated (TCA), which provides sufficient authority for the implementation of the Music City Bike Bucks program and priority reduction measures. NDOT will implement measure 2.1 and 3.1 through our TDM program.

The implementation of Music City Bike Bucks will follow a carefully structured timeline with key milestones to ensure its success. Initially, the program will undergo program setup, including stakeholder consultation, policy formulation, and partnership establishment with bike retailers in Nashville. Following this, the program will be officially launched, accompanied by a comprehensive marketing and outreach campaign to raise awareness, and encourage participation. Simultaneously, the application process and rebates will be disbursed. Concurrently, data collection will be established to track program metrics and evaluate performance against the performance measurement plan. As the program progresses, ongoing monitoring and reporting will occur, with periodic reviews to assess effectiveness, address challenges, and make any necessary adjustments. Below is a schedule of the anticipated timeline subject to award issuance. The period of performance will be from 2025 through 2029.

Low-Income and Disadvantaged Communities

The goals set forth in Executive Order 14008, which aims to deliver forty percent of the overall benefits of relevant federal investments to disadvantaged communities. Implementation of an e-bike rebate program will provide benefits to low-income and disadvantaged communities. To identify disadvantaged communities within Nashville, NDOT underwent a review of the Environmental Justice Screening and Mapping Tool (EJScreen), and the Climate and Economic Justice Screening Tool (CEJST). Nashville-Davidson County has a large population of low-income and disadvantaged communities with 38% of total population identified as LIDAC.

NDOT is committed to Justice40 and will be providing **at least 40%** of the program's benefits to residents in the transportation and/or climate change disadvantaged census tracts. Below shows the census tracts for disadvantaged transportation and climate change. In addition, the program will distribute **at least 40%** to income qualifying participants.



Community Benefits

The implementation of Music City Bike Bucks rebate program offers multifaceted community benefits that extend beyond individual users. By incentivizing the adoption of e-bikes, communities can experience reduced traffic congestion, leading to smoother traffic flow and less wear on road infrastructure. Additionally, the program promotes cleaner air and reduced GHG emissions, contributing to improved public health outcomes and a more sustainable environment. Moreover, increased e-bike usage fosters a culture of active transportation, encouraging residents to engage in physical activity while commuting, which can lead to long-term health benefits and decreased healthcare costs. Furthermore, by providing vouchers and promoting access to e-bikes in disadvantaged communities, the program promotes equity and enhances mobility options for residents across socioeconomic backgrounds. Overall, the community benefits of an e-bike rebate program are far-reaching, positively impacting both

the environment and well-being of residents while fostering a more inclusive and sustainable transportation system.

Implementing Music City Bike Bucks throughout the county, including disadvantaged communities, can have several benefits that **improve access to resources and quality of life** for all members of Nashville. Some of these benefits include:

- **Increased access to transportation:** E-bikes are becoming increasingly popular due to their environmental and health benefits and lower operating costs. By providing vouchers for e-bikes, it becomes easier for people to own and use e-bikes. This can provide people with more reliable and affordable transportation options, which can improve access to jobs, healthcare, education, and other resources.
- **Improved air quality:** E-bikes emit fewer pollutants and greenhouse gases than traditional gas-powered vehicles. By encouraging the use of e-bikes, the program can help reduce air pollution and mitigate the effects of climate change. This can lead to improved health outcomes and a cleaner environment for everyone in the city, but especially those in disadvantaged communities who may be more susceptible to the negative impacts of climate change and pollution, such as respiratory problems, heart disease, and extreme weather events, and long-term health and economic impacts.
- **Economic benefits:** The program can help support local businesses and create job opportunities in the purchase of e-bikes and management of the of the program. Additionally, e-bikes are cheaper to operate and maintain than gas-powered vehicles, which can save individuals and families money in the long run.
- **Community empowerment:** By focusing on distributing e-bikes equitably, the project can help reduce disparities in access to resources and transportation options among disadvantaged neighborhoods and other underserved communities. This can improve the overall quality of life for all members of the city by promoting greater social equity and inclusion.

Community Engagement

Education and outreach will be important in implementing the voucher program. NDOT will work in low-income and disadvantaged communities to promote this opportunity and achieve our performance goals. To do this, NDOT will partner with community-based organizations (CBOs) with expertise in e-bikes and related equipment to conduct county-wide education and outreach on the Music City Bike Bucks rebate program. Our outreach will include community events to promote electric bicycles (including electric bicycle demonstration). NDOT will develop a strategy to support organizations and groups that are representative of disadvantaged or low-income communities to provide education, technical assistance, ride opportunities, etc. NDOT will develop a strategy to engage disadvantaged or low-income communities through activities relevant to the community being served, and through the use of culturally appropriate outreach and education materials in the language(s) commonly spoken within the community.

NDOT will incorporate both traditional community engagement and pop-up engagement. Our goal is to reach every community that is interested in participating in the program. We will attend events like the Juneteenth ride, Tour de Nash, Bike to Work Week, and Open Streets events to educate, promote, and facilitate participation in the Music City Bike Bucks program. NDOT will also have pop-up outreach events at Plaza Mariachi, Casa Azafran, Southeast Community Center, etc.

Job Quality

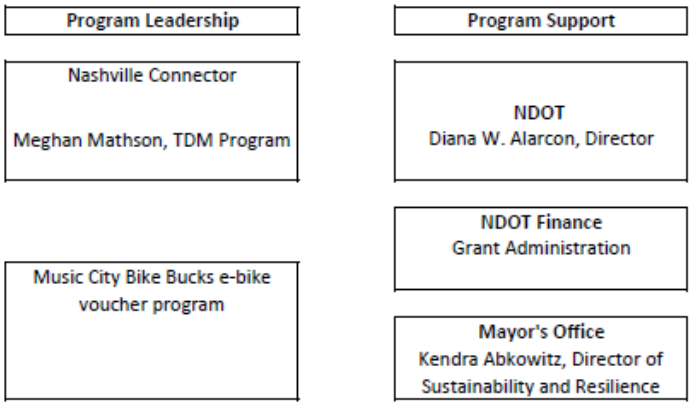
Job quality and creation are essential components of e-bike rebate programs, contributing to both economic growth and social well-being. By incentivizing the adoption of e-bikes, this program stimulates demand for e-bike manufacturing, sales, and servicing, thus creating employment opportunities across various sectors. In addition, this program will generate business opportunities for all fourteen existing local brick-and-mortar bike shops in Nashville. This program will participate with any bike shop located brick-and-mortar within Nashville-Davidson County. This program will benefit the many small businesses and create job opportunities for the program. Furthermore, this opportunity promotes the employment and workforce training within the transportation and urban planning sectors. This program is proposing hiring a planner to support the implementation and management of the Music City Bike Bucks program. Finally, NDOT is committed to promoting good-paying jobs and labor standards that prioritize employee rights. The Metro Government labor policy ensures that employees have the freedom to join a union and engage in collective bargaining without fear of reprisal. NDOT recognizes the importance of entrepreneurship in creating high-paying jobs and plans to collaborate with universities and community colleges to help workers develop their skills and entrepreneurship abilities in the industry sectors. NDOT has established a Handshake Account in coordination with Metro's Human Resources (HR) department, which will target colleges and universities nationwide, aiming to connect with potential candidates from all backgrounds.

Programmatic Capability and Past Performance

NDOT has programmatic capabilities including organizational capacity, expertise, and resources available to effectively implement and manage this program. NDOT's team has robust capabilities encompassing various aspects, including policy development, outreach and marketing, application processing, data management, monitoring, and evaluation. NDOT will successfully leverage these capabilities to streamline operations, maximizing outreach and participation, ensure transparency and accountability, and achieve our desired outcomes.

The department is led by Diana Alarcon, CAPP who has overseen the transformation of the department to a high achieving department of transportation with an emphasis on safety, complete streets, and modernization. Specifically, the program and grant administration process will be through NDOT's TDM program, Nashville Connector. Currently NDOT has three employees managing and expanding Nashville Connector. The program is led by Meghan Mathson who has over seven years in implementing transportation demand management programs and policies. Joining Meghan's team, we have our TDM Planner, Valeria Martinez. Val supports the implementation of NDOT's TDM program by engaging stakeholders, employers, organizations, and developers. Val has three years of experience in planning and urban affairs. In addition, Dahlia Grub serves as a planning technician for NDOT. Dahlia provides technical assistance for Nashville Connector. Dahlia has one year of experience in environmental planning.

Supporting the Nashville Connector team, NDOT has a staff member dedicated to grant coordination and multiple finance team members with experience in grant administration. Finally, supporting the program will be Mayor Freddie O'Connell's office through the Director of Sustainability and Resilience, Kendra Abkowitz, PhD, MBA.



Past Performance

Moreover, past performance plays a crucial role in demonstrating the effectiveness and impact of implementing a federally funded grant program. Metro and, more specifically, NDOT, has significant experience working with federal agencies through numerous formula and discretionary grant programs. Among the more notable recent grant partnerships include:

- Successful completion of a Vision Zero Action and Implementation Plan in 2022 using $470,000 of a $1,500,000 Congestion Mitigation and Air Quality (CMAQ) grant. The grant program was delivered under budget.
- Development of a Metro Nashville Connector Transportation Demand Management (TDM) program in 2022 using the remainder of the $1.5 million in CMAQ grant funding. The program was delivered under budget and received a second CMAQ grant award for three years of operation.
- A $1.5 million Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) Grant in 2022 for the Charlotte Avenue/Dr. Martin L King, Jr. Boulevard Transit Headways and Congestion Management project. This project is conducted in partnership with the Tennessee Department of Transportation (TDOT) and is currently on schedule.
- A $3.4 million CMAQ grant in 2022 to develop and operate the Nashville Traffic management Center (TMC) for three years.
- A $200,000 grant from TDOT, combined with $400,000 in local funds and $400,000 in Federal Transit Administration (FTA) Section 5307 funds, for Connect Downtown—a joint project between NDOT, WeGo Transit, the Downtown Partnership, and TDOT to address mobility and traffic congestion in the downtown core. This project was delivered on budget and was completed earlier this year.

As demonstrated by its successful track record of completing federally funded projects, NDOT does not anticipate any cost overruns on this project. In the unlikely event that a cost overrun occurs, NDOT has the financial and staff capacity to absorb it. By continuously building and leveraging programmatic capabilities and learning from past performance, the Music City Bike Bucks e-bike rebate program can adapt and thrive in meeting the evolving needs and challenges of promoting sustainable transportation.

Reporting Requirements

NDOT is committed to documenting various aspects of program implementation, outcomes, and financial utilization. Along with all EPA programmatic reporting requirements, NDOT will provide information on voucher distribution, purchases, program impact, equity and access. By documenting and reporting on the aspects, Music City Bike Bucks can track progress, measure effectiveness, and demonstrate accountability to stakeholders, ultimately contributing to the success and sustainability of the program.

Expenditure of Awarded Funds

This proposal is to use $1,000,000 of the requested EPA CPRG funds to provide vouchers to residents of Nashville and Davidson County for the purchase of an e-bike. NDOT will administer this program through Nashville Connector and will contract with a third party to assist with the administration. NDOT will work to implement this program within the first year and begin administering e-bike vouchers throughout the performance period. Two types of rebates would be available:

Voucher Type	**e-bike**	**e-cargo bike**
Standard	$300	$500
Income-Qualified	$1200	$1400

Income-Qualified Voucher Individuals with a household income below 80% of the Area Median Income of Nashville and Davidson County or below 200% of the relevant federal poverty level. Applicants would be required to submit an application for a rebate. This application would require proof of residency of Nashville and Davidson County and proof of income if applying for an Income-Qualified Voucher. All applicants must be 18 year of age or older.

Vouchers will be limited to one per person. The voucher must be used to purchase a new e-bike from a participating bike shop. The rebates would be available for all classes of e-bikes, as defined by Tennessee Code Annotated § 55- 8-301:

Class 1	an electric bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of twenty miles per hour (20 mph).
Class 2	an electric bicycle equipped with a motor that may be used exclusively to propel the bicycle, and that is not capable of providing assistance when the bicycle reaches the speed of twenty miles per hour (20 mph).
Class 3	an electric bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of twenty-eight miles per hour (28 mph)

E-bikes purchased through this program must have two or three wheels and fully operable pedal. The electric motor must be 750 watts or less and cannot be gas-powered. Full-suspension mountain bikes are excluded from the program. There is no minimum or maximum purchase price. E-cargo bikes must have an extended frame designed to carry additional people or cargo. E-cargo bikes must meet all of the following criteria:

Designed to carry one or more passengers in addition to the rider OR designed to carry heavier or bulkier loads than a traditional bicycle can carry	Bike has an extended frame (long tail, long john, Bakfiet or box bike)	Bike's extended frame has a published cargo load carrying capacity of at least 100 lbs.

The rebate must be redeemed at a participating bike shop. Metro will partner with all bike shops in Nashville and Davidson County. The bike shops must have a brick-and-mortar location in Nashville and Davidson County and must sell e-bikes that meet the criteria above and provide on-site sales, service, and repair of e-bikes. In addition to the $1,000,000 reserved for voucher distribution, NDOT will fund personnel, administration, and outreach and education through the grant.

The following attachment is not included in the view since it is not a read-only PDF file.

Upon submission, this file will be transmitted to the Grantor without any data loss.

Cover_MetroNashville.pdf

NOTE: USE OF THIS EXAMPLE COVER PAGE IS OPTIONAL. IF THIS INFORMATION IS PROVIDED IN A DIFFERENT FORMAT, EPA WILL NOT REVIEW AN APPLICATION UNFAVORABLY.

CPRG IMPLEMENTATION GRANTS COMPETITION
COVER PAGE FOR APPLICATION

APPLICANT INFORMATION

Organization	Metropolitan Government of Nashville-Davidson County
Primary Contact Name	Meghan Mathson
Phone Number	615-862-7174
Email Address	meghan.mathson@nashville.gov

TYPE OF APPLICATION ☑ Individual Applicant ☐ Lead Applicant for a Coalition

If lead applicant for a coalition, provide a list of the coalition members below.

FUNDING REQUESTED: *Provide total EPA CPRG Implementation Grant funding requested.*

$2,077,033

APPLICATION TITLE: *Provide the title of your proposed project.*

Music City Bike Bucks

BRIEF DESCRIPTION OF GHG MEASURES: *Describe each GHG reduction measure contained in the application (1-2 sentences each).*

Launch rebate program to incentivize indivduals to purchase an e-bike.

Implement TDM programming and expand transit options.

SECTORS: *Identify the sector(s) associated with the GHG reduction measures included in the application.*

- [ ] Industry
- [ ] Electricity Generation
- [x] Transportation
- [ ] Other (please describe)
- [ ] Commercial and Residential Buildings
- [ ] Agriculture/Natural and Working Lands
- [ ] Waste and Materials Management

EXPECTED TOTAL CUMULATIVE GHG EMISSION REDUCTIONS

For all proposed measures combined, provide the estimated cumulative GHG reductions:

Estimated cumulative GHG reductions for 2025-2030 (in metric tons)

60.38 mtCO2e

Estimated cumulative GHG reductions from 2025-2050 (in metric tons)

609.67 mtCO2e

LOCATIONS: *List the primary location(s) where the proposed measures will be implemented*

City Nashville

State; Territory; Federally recognized Tribe TN

APPLICABLE PRIORITY CLIMATE ACTION PLAN(S) (PCAP) ON WHICH MEASURES ARE BASED

PCAP Lead Organization(s): Greater Nashville Regional Council

PCAP Title(s): Priority Climate Action Plan: Nashville-Davidson-Murfreesboro-Franklin,

PCAP Website link(s) (if applicable):

List of GHG reduction measures and PCAP page reference for each measure:

Measure 2.1 - Launch rebate program to incentivize individuals to purchase an e-bike (pg.16-17) Measure 3.1 Implement TDM programming and expand transit options (pg.17)

The Music City Bike Bucks project significantly increases the amount of e-bikes in the Nashville area to equitably meet the goals of the community and future demand for e-bikes. In doing so, the project costs include efforts in planning and development, community engagement, and personnel. The total estimated project cost is approximately $2.07 M as shown in Table 1. No cost sharing/matching funds or leveraged resources are required as a condition of eligibility under this program. The budget by project is shown in Table 2.

BUDGET BY YEAR							
COST-TYPE	**CATEGORY**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**	**TOTAL**
Direct Costs	TOTAL PERSONNEL	*$80,810*	*$83,639*	*$86,567*	*$89,597*	*$92,733*	*$433,346*
	TOTAL FRINGE BENEFITS	*$22,304*	*$23,085*	*$23,893*	*$24,729*	*$25,595*	*$119,606*
	TOTAL TRAVEL	*$482*	*$417*	*$432*	*$449*	*$464*	*$2,244*
	TOTAL EQUIPMENT	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
	TOTAL SUPPLIES	*$6,455*	*$1,220*	*$1,220*	*$1,220*	*$1,220*	*$11,335*
	TOTAL CONTRACTUAL	*$122,900*	*$25,000*	*$25,000*	*$25,000*	*$25,000*	*$222,900*
	TOTAL OTHER	*$237,390*	*$225,390*	*$225,390*	*$225,390*	*$225,390*	*$1,138,950*
	TOTAL DIRECT	*$470,341*	*$358,751*	*$362,502*	*$366,385*	*$370,402*	*$1,928,381*
	TOTAL INDIRECT	$43,865	$25,112	$25,819	$26,550	$27,306	$ 148,652
TOTAL FUNDING		**$514,206**	**$383,863**	**$388,321**	**$392,935**	**$397,708**	**$2,077,033**

Table 1.

BUDGET BY PROJECT			
Project Number	**Project Name**	**Total Cost**	**% of Total**
1	*E-Bike Voucher Program*	*$2,077,033*	*100%*
2	*Name 2*	*$0*	*0%*
3	*Name 3*	*$0*	*0%*
4	*Name 4*	*$0*	*0%*
5	*Name 5*	*$0*	*0%*

Total		*$2,077,033*	*100%*

Table 2.

Contractual

The planning and development costs include the development of an online voucher portal to provide equitable and effective access to the voucher program. This portal will be accommodating and encouraging across incomes, languages, and abilities. An application portal and document processing services would be contracted through a company such as APTIM. Furthermore, Trips would be tracked through Nashville Connector's existing mobile application in tandem with the potential addition of a mapping interface (e.g., Strava). The National Renewable Energy Library also offers an open-source trip-tracking mobile application, OpenPATH, that could be used as well.

Community Engagement

Additionally, this cost includes preparing for and conducting community engagement. Throughout the project's life cycle, Metro has and will continue to lean on procedural equity measures to include meaningful public engagement. Procedural equity in transportation planning involves identifying and engaging communities that are most burdened by an unbalanced transportation system. These costs will be used for six events during the launch year and two every other year. Community-wide outreach event ideas include Tour de Nash, Open Streets Nashville, Tomato Art Fest, Centennial Park Earth Day, Nashville's Juneteenth Celebration, Tennessee Smart Mobility Expo, etc. In addition, NDOT will host targeted booth outreach events. Targeted booth outreach events could include locations such as Plaza Mariachi, Casa Azafran, the Southeast Community Center, etc. NDOT will provide outreach and coordination with the fourteen local brick and mortar bike shops in the County to participate in the program. Finally, NDOT will use funding for traditional and non-traditional media advertisements. This will include social media campaigns, newspaper ads, local media ads, and WeGo bus shelter advertisements.

Personnel

This program is looking to hire a planning position to oversee the development, maintenance, and operation of Music City Bike Bucks. The position will be responsible for managing all aspects of the program, from initial setup to administration and evaluation. In addition, this planner will assist Nashville Connector in furthering TDM goals and initiatives within Nashville. The budget includes direct costs, benefits, and travel costs for the two positions. A 3.5% cost of living factor was applied annually to the employee salary. Fringe Benefits were calculated using 27.6%, which was provided by the current position rate. Finally, NDOT's 18.83% indirect cost factor was applied to the project total (i.e., modified total direct costs).

The following attachment is not included in the view since it is not a read-only PDF file.

Upon submission, this file will be transmitted to the Grantor without any data loss.

Budgetcalcs_MetroNashville.xlsx

Introduction:

This Excel Spreadsheet is provided to aid Climate Pollution Reduction Grant implementation grant applicants in developing the required budget table(s) within the budget narrative. Applicants may submit a budget spreadsheet (no page limit) with their application.

The individual worksheets are formatted for 1 page width of 8.5" x 11" landscape orientation.

Instructions:

The template contains 5 tabs (titled "Measure 1 Budget" through "Measure 5 Budget") where applicants can create budgets for up to 5 discrete GHG measures contained in their application. Applicants should leave excess tabs blank (ie, if an application is for a single GHG measure, only Tab 1 should contain any numerical entries.) The Consolidated Budget tab will automatically sum budget totals across all GHG measure Tabs. If an application includes more than 5 GHG measures, users may add duplicate tabs, but will need to manually update the formulas contained on the Consolidated Budget tab.

Measure Tab Instructions:

Below is a description of the steps an applicant should complete to finish each measure tab of the template.

- **In column C,** provide itemized costs descriptions in each cost category. Insert or delete rows as needed.

- **In columns D through H,** fill in the cost for the line item per year - personnel, fringe benefits, travel, equipment, installation, or labor supplies, contractual costs, and other direct costs (i.e., subawards, participant support costs), and indirect costs for each applicable year. Subtotals will calculate automatically.

- **Column J** will automatically calculate the total cost for the line item for the entire measure, including subtotals for each budget category - personnel, fringe benefits, travel, equipment, installation, or labor supplies, contractual costs, and other direct costs (i.e., subawards, participant support costs), and indirect costs.

Please check all formulas and calculations before finalizing your budget tables.

Consolidated Budget Instructions:

This table will update automatically based on the budget detail entered in the tabs for measures 1-5. If your application includes more than 5 individual measures, you will need to add additional tabs, update the formulas below, and add additional lines to the "Budget by Project" table to include the additional measures.

Consolidated Budget Table

This table will update automatically based on the budget detail entered in the tabs for measures 1-5. If your application includes more than 5 individual measures, you will need to add additional tabs, update the formulas below, and add additional lines to the "Budget by Project" table to

BUDGET BY YEAR							
COST-TYPE	**CATEGORY**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**	**TOTAL**
Direct Costs	TOTAL PERSONNEL	*$80,810*	*$83,639*	*$86,567*	*$89,597*	*$92,733*	*$433,346*
	TOTAL FRINGE BENEFITS	*$22,304*	*$23,085*	*$23,893*	*$24,729*	*$25,595*	*$119,606*
	TOTAL TRAVEL	*$482*	*$417*	*$432*	*$449*	*$464*	*$2,244*
	TOTAL EQUIPMENT	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
	TOTAL SUPPLIES	*$6,455*	*$1,220*	*$1,220*	*$1,220*	*$1,220*	*$11,335*
	TOTAL CONTRACTUAL	*$122,900*	*$25,000*	*$25,000*	*$25,000*	*$25,000*	*$222,900*
	TOTAL OTHER	*$237,390*	*$225,390*	*$225,390*	*$225,390*	*$225,390*	*$1,138,950*
	TOTAL DIRECT	*$470,341*	*$358,751*	*$362,502*	*$366,385*	*$370,402*	*$1,928,381*
	TOTAL INDIRECT	$43,865	$25,112	$25,819	$26,550	$27,306	$ 148,652
TOTAL FUNDING		**$514,206**	**$383,863**	**$388,321**	**$392,935**	**$397,708**	**$2,077,033**

BUDGET BY PROJECT			
Project Number	**Project Name**	**Total Cost**	**% of Total**
1	*E-Bike Voucher Program*	*$2,077,033*	*100%*
2	*Name 2*	*$0*	*0%*
3	*Name 3*	*$0*	*0%*
4	*Name 4*	*$0*	*0%*
5	*Name 5*	*$0*	*0%*
Total		*$2,077,033*	*100%*

Detailed Budget Table

This Excel Workbook is provided to aid applicants in developing the required budget table(s) within the budget narrative.

BUDGET BY YEAR							
COST-TYPE	CATEGORY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
Direct Costs	**Personnel**						
	Staff person 1 (NDOT): Planner 2 @ $80,810/yr, 1 FTE with cost of living adjustment (3.5%)	$ 80,810	$ 83,639	$ 86,567	$ 89,597	$ 92,733	$ 433,346
							$0
							$0
	TOTAL PERSONNEL	$ 80,810	$ 83,639	$ 86,567	$ 89,597	$ 92,733	$ 433,346
	Fringe Benefits						
	Full-time Employee @ 27.6% of salary (pension, insurance, etc.)	$22,304	$23,085	$23,893	$24,729	$25,595	$119,606
							$0
							$0
	TOTAL FRINGE BENEFITS	$22,304	$23,085	$23,893	$24,729	$25,595	$119,606
	Travel						
	In-state, inter-county outreach travel 1: annual outreach and supply delivery to existing local bike shops (14), assumes one-way trip distance of 15 miles with $0.67/mi reimbursement rate with escalation	$281	$292	$303	$314	$325	$1,515
	In-state, inter-county outreach travel 2: travel to annual community events for booth outreach (6 in launch year, 2 every other year), assumes one-way trip distance of 15 miles with $0.67/mile reimbursement rate with escalation	$121	$42	$43	$45	$46	$297
	In-state, inter-county outreach travel 3: travel to low-income and disadvantaged community booth outreach events (4 per year), assumes one-way trip distance of 15 miles with $0.67/mile reimbursement rate with escalation	$80	$83	$86	$90	$93	$432
							$0
							$0
							$0
							$0
							$0
	TOTAL TRAVEL	$482	$417	$432	$449	$464	$2,244
	Equipment						
							$0
							$0
	TOTAL EQUIPMENT	$0	$0	$0	$0	$0	$0
	Supplies						
	Community outreach booth event supplies 1: $250 outdoor event tent, $200 plastic folding table, and two chairs @ $85/each	$535	$0	$0	$0	$0	$ 535
	Community outreach booth event supplies 2: two tablets for application assistance; Pricing assumes Verizon "More Unlimited" Plan @ $30/month/device, one-time device purchase ($500/device)	$1,720	$720	$720	$720	$720	$4,600
	Traditional media - advertising 3: printing costs (flyers, sandwich boards, banner); $0.60/color sheet-$500 annual budget; one-time cost of $200/board, assumes 1 per bike shop, Walk Bike Nashville, and e-bike program staff; $500 banner	$4,200	$500	$500	$500	$500	$6,200
							$0
	TOTAL SUPPLIES	$6,455	$1,220	$1,220	$1,220	$1,220	$11,335
	Contractual						
	Graphic design consultant: branding, one newsletter and two flyer templates; $250/hr for 16 days	$32,000	$0	$0	$0	$0	$32,000
	Translation services consultant: Spanish, Somali, and Arabic translations of program application, new user interface communications, and social media advertisement graphic @ $175/hr for 6 days	$8,400	$0	$0	$0	$0	$8,400
	E-bike rebate application portal and application processing subscription (APTIM product and service); Portal set up and license ($50,000), one-time document retention fee ($7,500), annual portal and dashboard maintenance ($5,000), 10% processing fee on rebate total dollar amount	$82,500	$25,000	$25,000	$25,000	$25,000	$182,500
							$0
							$0
	TOTAL CONTRACTUAL	$122,900	$25,000	$25,000	$25,000	$25,000	$222,900
	OTHER						
	Annual community events sponsorship/booth fees (assumes Walk Bike Nashville fees of $3,000/event)	$18,000	$6,000	$6,000	$6,000	$6,000	$42,000
	Digital media - advertising 1: social media ad fees and Facebook post boosts (Meta and Twitter @ $1.25/cost per link click, $15,000 ceiling for Facebook post boosts, and $0.90/cost per link click	$16,250	$16,250	$16,250	$16,250	$16,250	$81,250
	Traditional media - advertising 1: WeGo transit agency community impact partnership cost @$2,000/yr for bench, bus, and shelter advertisements	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000

	Traditional media - advertising 2: newspaper ads (Nashville Scene, 38,000 weekly circulation, $15/CPM for half page or medium rectangle ad, twice/yr)	*$1,140*	*$1,140*	*$1,140*	*$1,140*	*$1,140*	*$5,700*
	Participant support costs 1: e-bike standard commuter voucher @ $300/commute e-bike, total annual count: 166	*$49,800*	*$49,800*	*$49,800*	*$49,800*	*$49,800*	*$249,000*
	Participant support costs 2: e-bike standard cargo voucher @ $500/cargo e-bike, total annual count: 100	*$50,000*	*$50,000*	*$50,000*	*$50,000*	*$50,000*	*$250,000*
	Participant support costs 3: e-bike income-qualified commuter voucher @ $1,200/commute e-bike, total annual count: 45	*$54,000*	*$54,000*	*$54,000*	*$54,000*	*$54,000*	*$270,000*
	Participant support costs 4: e-bike income-qualified cargo voucher @ $1,400/cargo e-bike, total annual count: 33	*$46,200*	*$46,200*	*$46,200*	*$46,200*	*$46,200*	*$231,000*
							$0
	TOTAL OTHER	*$237,390*	*$225,390*	*$225,390*	*$225,390*	*$225,390*	*$1,138,950*
	TOTAL DIRECT	*$470,341*	*$358,751*	*$362,502*	*$366,385*	*$370,402*	*$1,928,381*

Indirect Costs	**Indirect Costs**						
	Modified Total Direct Costs [NDOT rate (18.83%) x (personnel + fringe + travel + supplies + services)]	*$ 43,865*	*$ 25,112*	*$ 25,819*	*$ 26,550*	*$ 27,306*	*$148,652*
							$0
	TOTAL INDIRECT	*$43,865*	*$25,112*	*$25,819*	*$26,550*	*$27,306*	*$148,652*

TOTAL FUNDING		***$514,206***	***$383,863***	***$388,321***	***$392,935***	***$397,708***	***$2,077,033***

Technical Appendix. Documentation of GHG Emission Reduction Estimates

Introduction

According to the Environmental Protection Agency (EPA), the major greenhouse gases (GHGs) emitted during the combustion of fossil fuels from on-road mobile sources are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The impact of the proposed e-bike voucher program on these emissions in Nashville-Davidson County was evaluated using a national spreadsheet tool for modeling vehicle trips and gasoline usage. Then, NDOT calculated the emissions based on these trips and associated fuel consumption. The following sections describe the methodologies and assumptions, including source data and other pertinent details.

GHG Reduction Estimate Method and Tools Used

As previously mentioned, a combination of a spreadsheet tool and hand calculations by NDOT in a spreadsheet was used to estimate GHG reductions. The tool *E-Bike Environment and Economics Impact Assessment Calculator for Cities* is available through the Rocky Mountain Institute (RMI). The publicly available spreadsheet provides cities with a comprehensive tool for determining the environmental and economic impact of replacing vehicle trips with e-bike trips. Although there is no specific version number for this tool, the version used was last updated by the developer in October 2023. This tool was specifically used to estimate annual short vehicle trips under 5 miles in Nashville-Davidson County for the years 2025-2030. Once outputs were converted to kilograms and grams, an average annual growth rate was applied to calculate projections for 2031-2050 years.

Measure Implementation Assumptions

To estimate the reduction in the three GHGs, assumptions are made regarding the e-bike program's implementation, milestones, and anticipated lifetime. These include 1,720 vouchers totaling $1,000,000 being fully allocated over the 5-year program. The following assumptions are made regarding the allocation of vouchers for specific e-bike types (i.e., commuter or cargo) and by income qualification (i.e., standard or income qualifying) each year of the program. These assumptions rely upon the availability of e-bikes at participating bike shops and existing unmet demand by residents for such a program.

Annual Allocated E-Bike Voucher Assumptions					
	Commuter E-Bike Vouchers per Year		Cargo E-Bike Vouchers per Year		Total Voucher Value per Year
Voucher Type	Number	Value	Number	Value	
Standard	166	$300	100	$500	$200,000
Income-Qualifying	45	$1,200	33	$1,400	

GHG Reduction Estimate Assumptions

Key assumptions and data sources for the RMI tool and NDOT hand calculations are provided in the table on the following page. The 'Index + Sources' and 'User Inputs' tabs in the *GHGcalcs_NDOT.xlsx* provide additional details regarding the RMI tool's assumptions and data sources.

Key Assumptions and Data Sources		
Data Point for Projections	**Tool Input/Value**	**Data Source**
RMI Tool		
Population	683,622	U.S. Census Bureau. 2022. Population.
Average Annual Growth Rate for Population Growth Projection	1.5%	U.S. Census Bureau. 2010, 2020. Population.
Percent of Electric Vehicles (EVs) Registered to Residents	0.7%	Davidson County Clerk's Office. 2023.
EV Replacements of ICEs (Business-As-Usual Scenario)	9% of Vehicles are EVs by 2030	Tool Assumption. Does not include the effect of non-CPRG federal incentives.
Estimate of Average Miles Biked per Week - Income-Qualified Program Participants	32	City of Denver E-Bike Participant Survey.
Estimate of Average Miles Biked per Week - Market-Rate (Standard) Program Participants	22	City of Denver E-Bike Participant Survey.
Trip Breakdown by Mileage and Total Miles Traveled	Various	Replica. 2023.
Percent of Weekly Miles Traveled by Vehicle Types	2.9% - 42.8% based on Vehicle Type	Julie Blackley (April 25, 2023). Which Vehicle Types is the Most Popular in Each State? I See Cars.
Representative Fuel Efficiencies for ICE Vehicles	18 mpg - 34 mpg based on Vehicle Type	ICE Vehicle Models (2007-2022). CarSheet. 2023.
Key Data Outputs from RMI Tool: Fuel Usage (Gallons of Gasoline) and VMT for Sedans, Hatchbacks, Pickup Trucks, and SUVs (2025-2030) *[see GHGcalcs_NDOT.xlsx 'RMI_Outputs_VMT' and 'RMI_Outputs_Gasoline' tabs]*		
NDOT Calculations		
CO_2 Emission Factor (per Gallon of Gasoline)	8.78	EPA. GHG Emission Factors Hub. 2024.
CH_4 Emission Factor – 2019 Gasoline Passenger Vehicle (Grams per Mile)	0.0051	EPA. GHG Emission Factors Hub. 2024.
CH_4 Emission Factor – 2019 Gasoline Light Duty Vehicle (Grams per Mile)	0.0080	EPA. GHG Emission Factors Hub. 2024.
N_2O Emission Factor – 2019 Gasoline Passenger Vehicle (Grams per Mile)	0.0015	EPA. GHG Emission Factors Hub. 2024.
N_2O Emission Factor – 2019 Gasoline Light Duty Vehicle (Grams per Mile)	0.0013	EPA. GHG Emission Factors Hub. 2024.
Key Data Outputs from NDOT Calculations: CO_2 ($mtCO_2e$), CH_4 ($mtCO_2e$), N_2O ($mtCO_2e$) Emissions for Sedans, Hatchbacks, Pickup Trucks, and SUVs (2025-2030, 2025-2050) *[see GHGcalcs_NDOT.xlsx '_5yrEmissions' and '_CPRG_Projections' tabs]*		

Reference Case Scenario – GHG Emissions without E-Bike Program

The reference case scenario (i.e., baseline) models the total emissions of the three GHGs for the years 2025-2030 and 2025-2050 without the e-bike program. The RMI tool was first used to calculate annual miles traveled for trips under five miles for the years 2025-2030. Vehicles include four ICE on-road vehicle types, including pickup trucks, SUVs, sedans, and hatchbacks. In addition, weekly VMT per vehicle type was calculated for the years 2025-2030. A gradual replacement of ICE vehicle types with EV models is incorporated into RMI's model. Heavy-duty vehicles, motorcycles, and hybrid vehicles are not accounted for in the below GHG emissions calculations.

2025-2030: CO_2 (mt CO_2-e)

1.) Total gallons of gasoline per year by vehicle type = total ICE (pickup trucks) gallons of gasoline per year + total ICE (SUVs) gallons of gasoline per year + total ICE (sedans) gallons of gasoline per year + total ICE (hatchbacks) gallons of gasoline per year

**data sourced from the RMI tool*

2.) Calculation year CO_2 (kilograms) emitted, 2025-2030 = [total gallons of gasoline used by on-road passenger ITE vehicles per year (i.e., sedans and hatchbacks) + total gallons of gasoline used by light-duty ITE vehicles per year (i.e., pickup trucks and SUVs)] * 8.78 (i.e., CO_2 factor per gallon of gasoline)

3.) Calculation year CO_2 (mt CO_2-e) emitted per year, 2025-2030 = (CO_2 (kilograms) emitted per year / 1,000) * 1 (GWP factor for CO_2)

4.) Cumulative CO_2 (mt CO_2-e) emitted 2025-2030 = sum of annual CO_2 (mt CO_2-e) emitted for 2025-2030

2025-2030: CH_4, N_2O (mt CO_2-e)

5.) Total annual VMT per year by vehicle type = (weekly ICE (pickup trucks) VMT*52) + (weekly ICE (SUVs) VMT*52) + (weekly ICE (sedans) VMT*52) + (weekly ICE (hatchbacks) VMT*52)

**data sourced from the RMI tool*

6.) Calculation year CH_4 (mt CO_2-e), 2025-2030 = (CH_4 (grams) emitted per year / 1,000,000) * 28 (GWP for CH_4)

Calculation year N_2O (mt CO_2-e), 2025-2030 = (N_2O (grams) emitted per year / 1,000,000) * 265 (GWP for N_2O)

7.) Cumulative CH_4 (mt CO_2-e) emitted 2025-2030 = sum of annual CH_4 (mt CO_2-e) emitted for calculation years 2025-2030

Cumulative N_2O (mt CO_2-e) emitted 2025-2030 = sum of annual N_2O (mt CO_2-e) emitted for calculation years 2025-2030

2025-2050: CO_2, CH_4, N_2O (mt CO_2-e)

Next, to project emissions for the 2025-2050 horizon year, an average annual growth rate was applied to the emission outputs from the RMI tool (i.e., equations 2 and 6). The following equations show the

calculations for CO_2 (mt CO_2-e) as an example. CH_4 (mt CO_2-e) and N_2O (mt CO_2-e) use the same equations and methodology.

8.) Average annual growth rate for CO_2 (mt CO_2-e) for 2031-2050 emissions projections = 1 – (((2025 CO_2 (mt CO_2-e) – 2030 CO_2 (mt CO_2-e)) / 2025 CO_2 (mt CO_2-e))/10))

9.) Calculation year CO_2 (mt CO_2-e), 2031-2050 = previous calculation year CO_2 (mt CO_2-e) * average annual growth rate

10.) Cumulative CO_2 (mt CO_2-e) emitted 2025-2050 = sum of annual CO_2 (mt CO_2-e) emitted for calculation years 2025-2050

Cumulative CH_4 (mt CO_2-e) emitted 2025-2050 = sum of annual CH_4 (mt CO_2-e) emitted for calculation years 2025-2050

Cumulative N_2O (mt CO_2-e) emitted 2025-2050 = sum of annual N_2O (mt CO_2-e) emitted for calculation years 2025-2050

Results are shown in the table below.

Baseline GHG Emission Projections Without E-Bike Program								
Horizon Year	**Pollutant**	**Metric Tons CO2-Equivalent ($mtCO_2e$)**	**Horizon Year**	**Pollutant**	**Metric Tons CO2-Equivalent ($mtCO_2e$)**	**Horizon Year**	**Pollutant**	**Metric Tons CO2-Equivalent ($mtCO_2e$)**
2025	CO_2	4,996.55	2034	CO_2	4,976.19	2043	CO_2	4,963.15
	CH_4	74.92		CH_4	77.47		CH_4	79.17
	N_2O	166.86		N_2O	172.54		N_2O	176.32
	Total	5,238.34		*Total*	5,226.20		*Total*	5,218.64
2026	CO_2	5,013.95	2035	CO_2	4,974.74	2044	CO_2	4,961.71
	CH_4	75.59		CH_4	77.66		CH_4	79.36
	N_2O	168.34		N_2O	172.96		N_2O	176.75
	Total	5,257.88		*Total*	5,225.35		Total	5,217.81
2027	CO_2	5,026.10	2036	CO_2	4,973.29	2045	CO_2	4,960.26
	CH_4	76.18		CH_4	77.85		CH_4	79.55
	N_2O	169.66		N_2O	173.37		N_2O	177.17
	Total	5,271.93		*Total*	5,224.51		Total	5,216.99
2028	CO_2	5,027.67	2037	CO_2	4,971.84	2046	CO_2	4,958.82
	CH_4	76.61		CH_4	78.03		CH_4	79.74
	N_2O	170.62		N_2O	173.79		N_2O	177.60
	Total	5,274.89		*Total*	5,223.67		*Total*	5,216.16
2029	CO_2	5,013.12	2038	CO_2	4,970.39	2047	CO_2	4,957.37
	CH_4	76.80		CH_4	78.22		CH_4	79.94
	N_2O	171.04		N_2O	174.21		N_2O	178.03
	Total	5,260.95		*Total*	5,222.82		*Total*	5,215.33

Baseline GHG Emission Projections Without E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)
2030	CO_2	4,981.99	2039	CO_2	4,968.94	2048	CO_2	4,955.93
	CH_4	76.73		CH_4	78.41		CH_4	80.13
	N_2O	170.89		N_2O	174.63		N_2O	178.46
	Total	5,229.61		Total	5,221.98		Total	5,214.51
2031	CO_2	4,980.54	2040	CO_2	4,967.49	2049	CO_2	4,954.48
	CH_4	76.92		CH_4	78.60		CH_4	80.32
	N_2O	171.30		N_2O	175.05		N_2O	178.89
	Total	5,228.75		Total	5,221.15		Total	5,213.69
2032	CO_2	4,979.09	2041	CO_2	4,966.05	2050	CO_2	4,953.04
	CH_4	77.10		CH_4	78.79		CH_4	80.52
	N_2O	171.71		N_2O	175.47		N_2O	179.32
	Total	5,227.90		Total	5,220.31		Total	5,212.87
2033	CO_2	4,977.64	2042	CO_2	4,964.60			
	CH_4	77.29		CH_4	78.98			
	N_2O	172.13		N_2O	175.90			
	Total	5,227.05		Total	5,219.48			

Baseline GHG Emission Projections Without E-Bike Program				
	Total CO_2 ($mtCO_2e$)	Total CH_4 ($mtCO_2e$)	Total N_2O ($mtCO_2e$)	Total ($mtCO_2e$)
2025-2030	30,059.38	456.83	1,017.40	**31,533.61**
2025-2050	129,394.94	2,030.88	4,522.99	**135,948.81**

Measure-Specific Activity Data – GHG Emissions with E-Bike Program

Like the baseline scenario, the emissions scenario used the RMI tool for base calculations of the three GHG emissions for 2025-2030. While the intent is to carry the program forward using local funding after the program's 5 years, the calculations assume the e-bike program ends. An annual average growth rate was applied to emissions to project the years between 2030-2050 for the e-bikes that were sourced by the CPRG. It should be noted that all e-bikes are likely not to last through this timeframe and, therefore, emissions numbers by ICE vehicles are likely higher in latter years; however, the difference may be negligible as the share of non-emitting EVs increases and ICE vehicles are increasingly phased out.

It was assumed that an average of 54 miles of weekly vehicle trips completed by ICE on-road passenger and light duty vehicles were replaced with non-emitting e-bike trips. Thirty-two (32) miles were assumed to be completed weekly by income-qualified program participants while 22 miles were assumed to be completed by standard program participants.

2025-2030: CO_2 (mt CO_2-e) [with E-Bike Program]

1.) Total gallons of gasoline per year by vehicle type = total ICE (pickup trucks) gallons of gasoline per year + total ICE (SUVs) gallons of gasoline per year + total ICE (sedans) gallons of gasoline per year + total ICE (hatchbacks) gallons of gasoline per year

**data sourced from the RMI tool, reduction in VMT calculated in model*

2.) Calculation year CO_2 (kilograms) emitted, 2025-2030 = [total gallons of gasoline used by on-road passenger ITE vehicles (i.e., sedans and hatchbacks) per year + total gallons of gasoline used by light-duty ITE vehicles (i.e., pickup trucks and SUVs) per year] * 8.78 (i.e., CO_2 factor per gallon of gasoline)

3.) Calculation year CO_2 (mt CO_2-e) emitted per year, 2025-2030 = (CO_2 (kilograms) emitted per year / 1,000) * 1 (GWP for CO_2)

4.) Cumulative CO_2 (mt CO_2-e) emitted 2025-2030 = sum of annual CO_2 (mt CO_2-e) emitted for 2025-2030

2025-2030: CH_4, N_2O (mt CO_2-e) [with E-Bike Program]

5.) Total annual VMT per year by vehicle type (i.e., pickup trucks, SUVs, sedans, and hatchbacks) = [weekly ICE (pickup trucks) VMT*52] + [weekly ICE (SUVs) VMT*52] + [weekly ICE (sedans) VMT*52] + [weekly ICE (hatchbacks) VMT*52]

**data sourced from the RMI tool, reduction in VMT calculated in model*

6.) Calculation year CH_4 (mt CO_2-e), 2025-2030 = (CH_4 (grams) emitted per year / 1,000,000) * 28 (GWP for CH_4)

Calculation year N_2O (mt CO_2-e), 2025-2030 = (N_2O (grams) emitted per year / 1,000,000) * 265 (GWP for N_2O)

7.) Cumulative CH_4 (mt CO_2-e) emitted 2025-2030 = sum of annual CH_4 (mt CO_2-e) emitted for calculation years 2025-2030

Cumulative N_2O (mt CO_2-e) emitted 2025-2030 = sum of annual N_2O (mt CO_2-e) for calculation years 2025-2030

2025-2050: CO_2, CH_4, N_2O (mt CO_2-e) [with E-Bike Program]

Next, to project emissions for the 2025-2050 horizon year, an average annual growth rate was applied to the emission outputs from the RMI tool (i.e., equations 2 and 6). The following equations show the calculations for CO_2 (mt CO_2-e) as an example. CH_4 (mt CO_2-e) and N_2O (mt CO_2-e) use the same equations and methodology. Results are shown in the table on the following page.

8.) Average annual growth rate for CO_2 (mt CO_2-e) for 2031-2050 emissions projections = 1 – ((2025 CO_2 (mt CO_2-e) – 2030 CO_2 (mt CO_2-e)) / 2025 CO_2 (mt CO_2-e))/10)

9.) Calculation year CO_2 (mt CO_2-e), 2031-2050 = previous calculation year CO_2 (mt CO_2-e) * average annual growth rate

10.) Cumulative CO_2 (mt CO_2-e) emitted 2025-2050 = sum of annual CO_2 (mt CO_2-e) emitted for calculation years 2025-2050

Cumulative CH_4 (mt CO_2-e) emitted 2025-2050 = sum of annual CH_4 (mt CO_2-e) emitted for calculation years 2025-2050

Cumulative N_2O (mt CO_2-e) emitted 2025-2050 = sum of annual N_2O (mt CO_2-e) emitted for calculation years 2025-2050

Scenario GHG Emission Projections With E-Bike Program								
Horizon Year	**Pollutant**	**Metric Tons CO2-Equivalent ($mtCO_2e$)**	**Horizon Year**	**Pollutant**	**Metric Tons CO2-Equivalent ($mtCO_2e$)**	**Horizon Year**	**Pollutant**	**Metric Tons CO2-Equivalent ($mtCO_2e$)**
2025	CO_2	4,993.66	2034	CO_2	6,702.28	2043	CO_2	7,580.04
	CH_4	74.88		CH_4	77.18		CH_4	78.70
	N_2O	166.77		N_2O	171.88		N_2O	175.28
	Total	5,235.31		Total	6,951.34		Total	7,834.02
2026	CO_2	5,008.24	2035	CO_2	6,794.56	2044	CO_2	7,684.40
	CH_4	75.50		CH_4	77.35		CH_4	78.87
	N_2O	168.15		N_2O	172.26		N_2O	175.66
	Total	5,251.89		Total	7,044.16		Total	7,938.94
2027	CO_2	5,017.64	2036	CO_2	6,888.11	2045	CO_2	7,790.20
	CH_4	76.05		CH_4	77.51		CH_4	79.05
	N_2O	169.37		N_2O	172.63		N_2O	176.04
	Total	5,263.06		Total	7,138.26		Total	8,045.29
2028	CO_2	5,016.07	2037	CO_2	6,982.95	2046	CO_2	7,897.46
	CH_4	76.43		CH_4	77.68		CH_4	79.22
	N_2O	170.23		N_2O	173.01		N_2O	176.43
	Total	5,262.73		Total	7,233.64		Total	8,153.11
2029	CO_2	4,998.52	2038	CO_2	7,079.09	2047	CO_2	8,006.20
	CH_4	76.57		CH_4	77.85		CH_4	79.39
	N_2O	170.54		N_2O	173.39		N_2O	176.81
	Total	5,245.63		Total	7,330.33		Total	8,262.40
2030	CO_2	4,967.70	2039	CO_2	7,176.56	2048	CO_2	8,116.43
	CH_4	76.51		CH_4	78.02		CH_4	79.56
	N_2O	170.40		N_2O	173.76		N_2O	177.20
	Total	5,214.61		Total	7,428.34		Total	8,373.19
2031	CO_2	6,432.89	2040	CO_2	7,275.37	2049	CO_2	8,228.18
	CH_4	76.68		CH_4	78.19		CH_4	79.74
	N_2O	170.77		N_2O	174.14		N_2O	177.58
	Total	6,680.34		Total	7,527.70		Total	8,485.50

Scenario GHG Emission Projections With E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)
2032	CO_2	4,962.54	2041	CO_2	4,939.36	2050	CO_2	4,916.30
	CH_4	76.84		CH_4	78.36		CH_4	79.91
	N_2O	171.14		N_2O	174.52		N_2O	177.97
	Total	5,210.52		Total	5,192.24		Total	5,174.17
2033	CO_2	4,959.96	2042	CO_2	4,936.79			
	CH_4	77.01		CH_4	78.53			
	N_2O	171.51		N_2O	174.90			
	Total	5,208.48		Total	5,190.23			

Scenario GHG Emission Projections With E-Bike Program				
	Total CO_2 ($mtCO_2e$)	Total CH_4 ($mtCO_2e$)	Total N_2O ($mtCO_2e$)	Total ($mtCO_2e$)
2025-2030	30,001.83	455.95	1,015.45	**31,473.23**
2025-2050	128,815.21	2,021.60	4,502.33	**135,339.14**

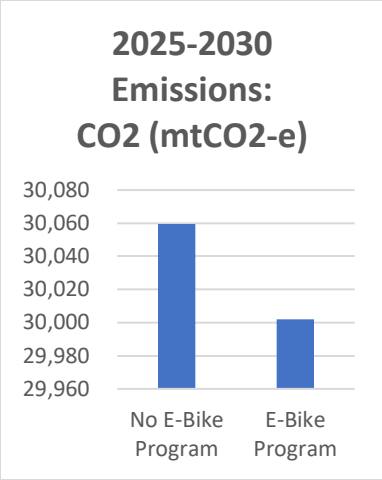
GHG Emissions Reduced

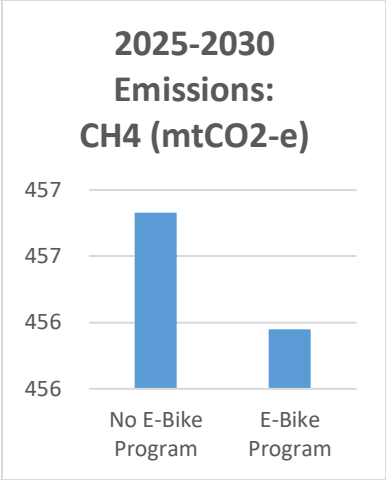
This section includes the absolute annual reductions for each of the three pollutants for the near-term (2025-2030) and long-term (2025-2050) timeframes, as well as the cumulative reductions for these timeframes. Bar charts of modeled emission reductions for each pollutant are included on the final page.

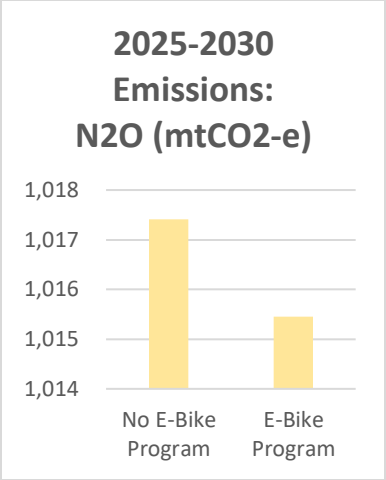
Absolute GHG Emission Reductions With E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)
2025	CO_2	2.89	2034	CO_2	18.81	2043	CO_2	28.93
	CH_4	0.04		CH_4	0.29		CH_4	0.47
	N_2O	0.10		N_2O	0.66		N_2O	1.04
	Total	3.03		Total	19.76		Total	30.43
2026	CO_2	5.71	2035	CO_2	19.94	2044	CO_2	30.05
	CH_4	0.09		CH_4	0.31		CH_4	0.49
	N_2O	0.19		N_2O	0.70		N_2O	1.08
	Total	5.99		Total	20.95		Total	31.62
2027	CO_2	8.46	2036	CO_2	21.07	2045	CO_2	31.16
	CH_4	0.13		CH_4	0.33		CH_4	0.51
	N_2O	0.29		N_2O	0.74		N_2O	1.13
	Total	8.87		Total	22.14		Total	32.80

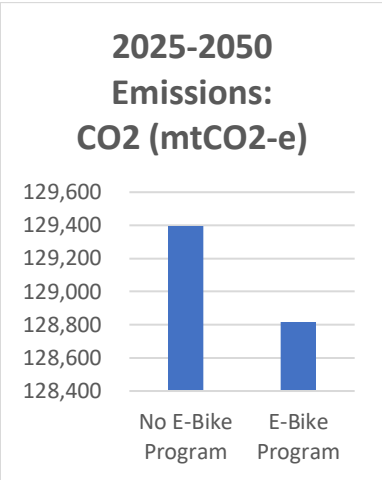
Absolute GHG Emission Reductions With E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent ($mtCO_2e$)
2028	CO_2	11.60	2037	CO_2	22.19	2046	CO_2	32.28
	CH_4	0.18		CH_4	0.35		CH_4	0.53
	N_2O	0.39		N_2O	0.78		N_2O	1.17
	Total	12.17		Total	23.33		Total	33.98
2029	CO_2	14.60	2038	CO_2	23.32	2047	CO_2	33.40
	CH_4	0.22		CH_4	0.37		CH_4	0.55
	N_2O	0.50		N_2O	0.82		N_2O	1.22
	Total	15.32		Total	24.51		Total	35.16
2030	CO_2	14.29	2039	CO_2	24.44	2048	CO_2	34.51
	CH_4	0.22		CH_4	0.39		CH_4	0.57
	N_2O	0.49		N_2O	0.87		N_2O	1.26
	Total	15.00		Total	25.70		Total	36.34
2031	CO_2	15.42	2040	CO_2	25.56	2049	CO_2	35.63
	CH_4	0.24		CH_4	0.41		CH_4	0.59
	N_2O	0.53		N_2O	0.91		N_2O	1.31
	Total	16.19		Total	26.88		Total	37.52
2032	CO_2	16.55	2041	CO_2	26.69	2050	CO_2	36.74
	CH_4	0.26		CH_4	0.43		CH_4	0.61
	N_2O	0.57		N_2O	0.95		N_2O	1.35
	Total	17.38		Total	28.07		Total	38.70
2033	CO_2	17.68	2042	CO_2	27.81			
	CH_4	0.28		CH_4	0.45			
	N_2O	0.61		N_2O	1.00			
	Total	18.57		Total	29.25			

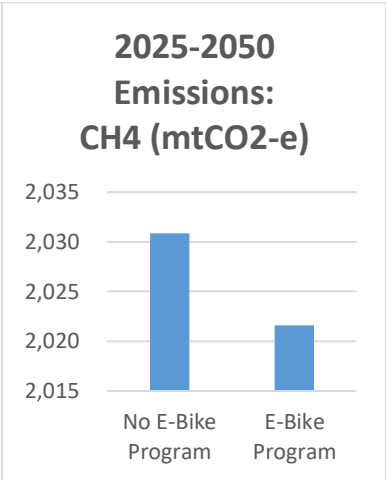
Cumulative GHG Emission Reductions With E-Bike Program				
	Total CO_2 ($mtCO_2e$)	Total CH_4 ($mtCO_2e$)	Total N_2O ($mtCO_2e$)	Total ($mtCO_2e$)
2025-2030	57.55	0.88	1.96	**60.38**
2025-2050	579.73	9.28	20.66	**609.67**

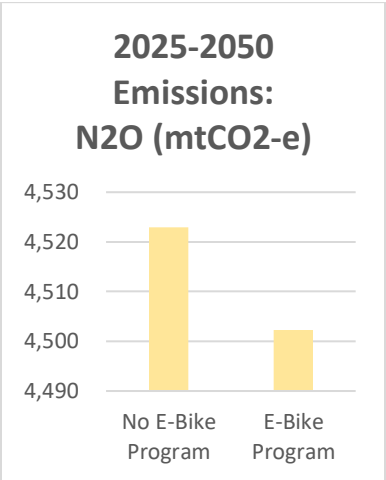












The following attachment is not included in the view since it is not a read-only PDF file.

Upon submission, this file will be transmitted to the Grantor without any data loss.

GHGCalcs_MetroNashville.xlsm

		Without Ebikes			With Ebikes			Reduction
Horizon Year	Pollutant	kilograms (kg)/grams (g)/grams (g)	metric tons (mt)	metric tons CO2-equivalent (mtCO2e)	kilograms (kg)/grams (g)/grams (g)	metric tons (mt)	metric tons CO2-equivalent (mtCO2e)	metric tons CO2-equivalent (mtCO2e)
2025	CO2	4,996,552.18	4,996.55	**4,996.55**	4,993,664.15	4,993.66	**4,993.66**	**2.89**
	CH4	2,675,849.71	2.68	**74.92**	2,674,303.05	2.67	**74.88**	**0.04**
	N20	629,674.10	0.63	**166.86**	629,310.15	0.63	**166.77**	**0.10**
	Total	*8,302,075.99*	*4,999.86*	***5,238.34***	*8,297,277.35*	*4,996.97*	***5,235.31***	***3.03***
2026	CO2	5,013,951.43	5,013.95	**5,013.95**	5,008,240.91	5,008.24	**5,008.24**	**5.71**
	CH4	2,699,571.64	2.70	**75.59**	2,696,497.03	2.70	**75.50**	**0.09**
	N20	635,256.28	0.64	**168.34**	634,532.77	0.63	**168.15**	**0.19**
	Total	*8,348,779.35*	*5,017.29*	***5,257.88***	*8,339,270.71*	*5,011.57*	***5,251.89***	***5.99***
2027	CO2	5,026,099.43	5,026.10	**5,026.10**	5,017,639.80	5,017.64	**5,017.64**	**8.46**
	CH4	2,720,626.24	2.72	**76.18**	2,716,047.04	2.72	**76.05**	**0.13**
	N20	640,210.80	0.64	**169.66**	639,133.23	0.64	**169.37**	**0.29**
	Total	*8,386,936.47*	*5,029.46*	***5,271.93***	*8,372,820.07*	*5,020.99*	***5,263.06***	***8.87***
2028	CO2	5,027,665.12	5,027.67	**5,027.67**	5,016,066.73	5,016.07	**5,016.07**	**11.60**
	CH4	2,736,067.75	2.74	**76.61**	2,729,755.88	2.73	**76.43**	**0.18**
	N20	643,844.46	0.64	**170.62**	642,359.16	0.64	**170.23**	**0.39**
	Total	*8,407,577.33*	*5,031.05*	***5,274.89***	*8,388,181.78*	*5,019.44*	***5,262.73***	***12.17***
2029	CO2	5,013,116.17	5,013.12	**5,013.12**	4,998,518.57	4,998.52	**4,998.52**	**14.60**
	CH4	2,742,777.63	2.74	**76.80**	2,734,790.98	2.73	**76.57**	**0.22**
	N20	645,423.41	0.65	**171.04**	643,544.01	0.64	**170.54**	**0.50**
	Total	*8,401,317.20*	*5,016.50*	***5,260.95***	*8,376,853.56*	*5,001.90*	***5,245.63***	***15.32***
2030	CO2	4,981,992.82	4,981.99	**4,981.99**	4,967,700.24	4,967.70	**4,967.70**	**14.29**
	CH4	2,740,361.63	2.74	**76.73**	2,732,499.95	2.73	**76.51**	**0.22**
	N20	644,854.88	0.64	**170.89**	643,004.89	0.64	**170.40**	**0.49**
	Total	*8,367,209.33*	*4,985.38*	***5,229.61***	*8,343,205.07*	*4,971.08*	***5,214.61***	***15.00***
Average annual growth rate	***CO2***	***1.000***		**30,059.38**	***0.999***		**30,001.83**	**57.55**
	CH4	***1.002***	***Total***	**456.83**	***1.002***	***Total***	**455.95**	**0.88**
	N20	***1.002***		**1,017.40**	***1.002***		**1,015.45**	**1.96**
				31,533.61			***31,473.23***	***60.38***
2031	CO2	4,980,541.13	4,980.54	**4,980.54**	4,965,117.34	4,965.12	**4,965.12**	**15.42**
	CH4	2,746,968.35	2.75	**76.92**	2,738,446.28	2.74	**76.68**	**0.24**
	N20	646,409.56	0.65	**171.30**	644,404.17	0.64	**170.77**	**0.53**
	Total	*8,373,919.04*	*4,983.93*	***5,228.75***	*8,347,967.79*	*4,968.50*	***5,212.56***	***16.19***
2032	CO2	4,979,089.86	4,979.09	**4,979.09**	4,962,535.79	4,962.54	**4,962.54**	**16.55**
	CH4	2,753,591.00	2.75	**77.10**	2,744,405.56	2.74	**76.84**	**0.26**
	N20	647,967.98	0.65	**171.71**	645,806.49	0.65	**171.14**	**0.57**
	Total	*8,380,648.84*	*4,982.49*	***5,227.90***	*8,352,747.84*	*4,965.93*	***5,210.52***	***17.38***
2033	CO2	4,977,639.01	4,977.64	**4,977.64**	4,959,955.59	4,959.96	**4,959.96**	**17.68**
	CH4	2,760,229.62	2.76	**77.29**	2,750,377.80	2.75	**77.01**	**0.28**
	N20	649,530.17	0.65	**172.13**	647,211.86	0.65	**171.51**	**0.61**
	Total	*8,387,398.80*	*4,981.05*	***5,227.05***	*8,357,545.25*	*4,963.35*	***5,208.48***	***18.57***
2034	CO2	4,976,188.58	4,976.19	**4,976.19**	4,957,376.72	4,957.38	**4,957.38**	**18.81**
	CH4	2,766,884.25	2.77	**77.47**	2,756,363.04	2.76	**77.18**	**0.29**
	N20	651,096.12	0.65	**172.54**	648,620.29	0.65	**171.88**	**0.66**
	Total	*8,394,168.94*	*4,979.61*	***5,226.20***	*8,362,360.05*	*4,960.78*	***5,206.44***	***19.76***
2035	CO2	4,974,738.58	4,974.74	**4,974.74**	4,954,799.20	4,954.80	**4,954.80**	**19.94**
	CH4	2,773,554.91	2.77	**77.66**	2,762,361.30	2.76	**77.35**	**0.31**
	N20	652,665.84	0.65	**172.96**	650,031.79	0.65	**172.26**	**0.70**
	Total	*8,400,959.33*	*4,978.16*	***5,225.35***	*8,367,192.29*	*4,958.21*	***5,204.40***	***20.95***
2036	CO2	4,973,289.00	4,973.29	**4,973.29**	4,952,223.01	4,952.22	**4,952.22**	**21.07**
	CH4	2,780,241.66	2.78	**77.85**	2,768,372.62	2.77	**77.51**	**0.33**
	N20	654,239.35	0.65	**173.37**	651,446.36	0.65	**172.63**	**0.74**
	Total	*8,407,770.01*	*4,976.72*	***5,224.51***	*8,372,041.99*	*4,955.64*	***5,202.37***	***22.14***
2037	CO2	4,971,839.84	4,971.84	**4,971.84**	4,949,648.17	4,949.65	**4,949.65**	**22.19**
	CH4	2,786,944.53	2.79	**78.03**	2,774,397.02	2.77	**77.68**	**0.35**
	N20	655,816.65	0.66	**173.79**	652,864.00	0.65	**173.01**	**0.78**
	Total	*8,414,601.03*	*4,975.28*	***5,223.67***	*8,376,909.19*	*4,953.08*	***5,200.34***	***23.33***
2038	CO2	4,970,391.11	4,970.39	**4,970.39**	4,947,074.66	4,947.07	**4,947.07**	**23.32**
	CH4	2,793,663.56	2.79	**78.22**	2,780,434.53	2.78	**77.85**	**0.37**
	N20	657,397.76	0.66	**174.21**	654,284.73	0.65	**173.39**	**0.82**
	Total	*8,421,452.43*	*4,973.84*	***5,222.82***	*8,381,793.92*	*4,950.51*	***5,198.31***	***24.51***
2039	CO2	4,968,942.79	4,968.94	**4,968.94**	4,944,502.50	4,944.50	**4,944.50**	**24.44**
	CH4	2,800,398.79	2.80	**78.41**	2,786,485.18	2.79	**78.02**	**0.39**
	N20	658,982.67	0.66	**174.63**	655,708.56	0.66	**173.76**	**0.87**
	Total	*8,428,324.26*	*4,972.40*	***5,221.98***	*8,386,696.23*	*4,947.94*	***5,196.29***	***25.70***
2040	CO2	4,967,494.90	4,967.49	**4,967.49**	4,941,931.67	4,941.93	**4,941.93**	**25.56**
	CH4	2,807,150.26	2.81	**78.60**	2,792,548.99	2.79	**78.19**	**0.41**
	N20	660,571.41	0.66	**175.05**	657,135.48	0.66	**174.14**	**0.91**
	Total	*8,435,216.57*	*4,970.96*	***5,221.15***	*8,391,616.13*	*4,945.38*	***5,194.26***	***26.88***
2041	CO2	4,966,047.43	4,966.05	**4,966.05**	4,939,362.17	4,939.36	**4,939.36**	**26.69**
	CH4	2,813,918.00	2.81	**78.79**	2,798,626.00	2.80	**78.36**	**0.43**
	N20	662,163.98	0.66	**175.47**	658,565.50	0.66	**174.52**	**0.95**
	Total	*8,442,129.42*	*4,969.52*	***5,220.31***	*8,396,553.68*	*4,942.82*	***5,192.24***	***28.07***
2042	CO2	4,964,600.39	4,964.60	**4,964.60**	4,936,794.01	4,936.79	**4,936.79**	**27.81**
	CH4	2,820,702.06	2.82	**78.98**	2,804,716.24	2.80	**78.53**	**0.45**
	N20	663,760.39	0.66	**175.90**	659,998.64	0.66	**174.90**	**1.00**
	Total	*8,449,062.84*	*4,968.08*	***5,219.48***	*8,401,508.89*	*4,940.26*	***5,190.23***	***29.25***
2043	CO2	4,963,153.76	4,963.15	**4,963.15**	4,934,227.19	4,934.23	**4,934.23**	**28.93**
	CH4	2,827,502.48	2.83	**79.17**	2,810,819.72	2.81	**78.70**	**0.47**
	N20	665,360.64	0.67	**176.32**	661,434.90	0.66	**175.28**	**1.04**
	Total	*8,456,016.88*	*4,966.65*	***5,218.64***	*8,406,481.81*	*4,937.70*	***5,188.21***	***30.43***
2044	CO2	4,961,707.56	4,961.71	**4,961.71**	4,931,661.70	4,931.66	**4,931.66**	**30.05**
	CH4	2,834,319.29	2.83	**79.36**	2,816,936.49	2.82	**78.87**	**0.49**
	N20	666,964.76	0.67	**176.75**	662,874.28	0.66	**175.66**	**1.08**
	Total	*8,462,991.61*	*4,965.21*	***5,217.81***	*8,411,472.48*	*4,935.14*	***5,186.20***	***31.62***
2045	CO2	4,960,261.77	4,960.26	**4,960.26**	4,929,097.55	4,929.10	**4,929.10**	**31.16**
	CH4	2,841,152.54	2.84	**79.55**	2,823,066.58	2.82	**79.05**	**0.51**
	N20	668,572.74	0.67	**177.17**	664,316.80	0.66	**176.04**	**1.13**
	Total	*8,469,987.05*	*4,963.77*	***5,216.99***	*8,416,480.92*	*4,932.58*	***5,184.19***	***32.80***
2046	CO2	4,958,816.41	4,958.82	**4,958.82**	4,926,534.73	4,926.53	**4,926.53**	**32.28**
	CH4	2,848,002.26	2.85	**79.74**	2,829,210.00	2.83	**79.22**	**0.53**

Global Warming Potential (GWP) Values	
CO2	1
CH4	28
N20	265
Source: IPCC, Fifth Assessment Report (AR5), 2013.	

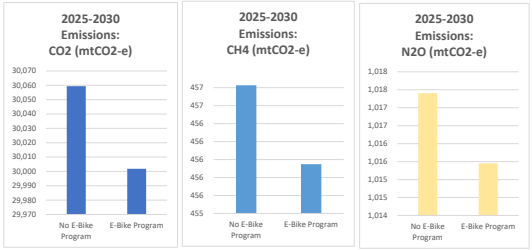
grams (g)	metric tons (mt)
1,000,000	1
kilograms (kg)	**metric tons (mt)**
1,000	1

	TOTALS WITHOUT EBIKES				TOTALS WITH EBIKES			
	CO2 (mtCO2e)	CH4 (mtCO2e)	N20 (mtCO2e)	Total (mtCO2e)	CO2 (mtCO2e)	CH4 (mtCO2e)	N20 (mtCO2e)	Total (mtCO2e)
2025-2030	30,059.38	456.83	1,017.40	31,533.61	30,001.83	455.95	1,015.45	31,473.23
2025-2050	129,394.94	2,030.88	4,522.99	135,948.81	128,815.21	2,021.60	4,502.33	135,339.14

Cumulative Reduction				
Horizon Years	CO2 (mtCO2e)	CH4 (mtCO2e)	N20 (mtCO2e)	Total (mtCO2e)
2025-2030	57.55	0.88	1.96	60.38
2025-2050	579.73	9.28	20.66	609.67

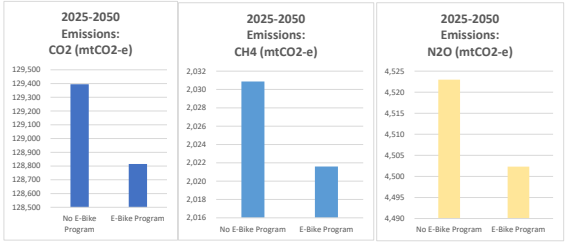
2025-2030

	CO2 (mtCO2e)	CH4 (mtCO2e)	N20 (mtCO2e)
No E-Bike Program	30,059	457	1,017
E-Bike Program	30,002	456	1,015



2025-2050

	CO2 (mtCO2e)	CH4 (mtCO2e)	N20 (mtCO2e)
No E-Bike Program	129,395	2,031	4,523
E-Bike Program	128,815	2,022	4,502



	N20	670,184.60	0.67	**177.60**	665,762.45	0.67	**176.43**	**1.17**
	Total	*8,477,003.27*	*4,962.33*	***5,216.16***	*8,421,507.18*	*4,930.03*	***5,182.18***	***33.98***
2047	CO2	4,957,371.47	4,957.37	**4,957.37**	4,923,973.24	4,923.97	**4,923.97**	**33.40**
	CH4	2,854,868.49	2.85	**79.94**	2,835,366.79	2.84	**79.39**	**0.55**
	N20	671,800.34	0.67	**178.03**	667,211.25	0.67	**176.81**	**1.22**
	Total	*8,484,040.31*	*4,960.90*	***5,215.33***	*8,426,551.28*	*4,927.48*	***5,180.17***	***35.16***
2048	CO2	4,955,926.95	4,955.93	**4,955.93**	4,921,413.08	4,921.41	**4,921.41**	**34.51**
	CH4	2,861,751.28	2.86	**80.13**	2,841,536.98	2.84	**79.56**	**0.57**
	N20	673,419.98	0.67	**178.46**	668,663.20	0.67	**177.20**	**1.26**
	Total	*8,491,098.21*	*4,959.46*	***5,214.51***	*8,431,613.26*	*4,924.92*	***5,178.17***	***36.34***
2049	CO2	4,954,482.85	4,954.48	**4,954.48**	4,918,854.26	4,918.85	**4,918.85**	**35.63**
	CH4	2,868,650.66	2.87	**80.32**	2,847,720.59	2.85	**79.74**	**0.59**
	N20	675,043.53	0.68	**178.89**	670,118.32	0.67	**177.58**	**1.31**
	Total	*8,498,177.04*	*4,958.03*	***5,213.69***	*8,436,693.17*	*4,922.37*	***5,176.17***	***37.52***
2050	CO2	4,953,039.18	4,953.04	**4,953.04**	4,916,296.76	4,916.30	**4,916.30**	**36.74**
	CH4	2,875,566.68	2.88	**80.52**	2,853,917.66	2.85	**79.91**	**0.61**
	N20	676,670.99	0.68	**179.32**	671,576.60	0.67	**177.97**	**1.35**
	Total	*8,505,276.84*	*4,956.59*	***5,212.87***	*8,441,791.02*	*4,919.82*	***5,174.17***	***38.70***

			2031-2050 Total Without E-Bike Program	**99,335.56** **1,574.05** **3,505.58** ***104,415.20***		**2031-2050 Total With E-Bike Program**	**98,813.38** **1,565.65** **3,486.88** ***103,865.91***	**522.18** **8.40** **18.70** ***549.29***
			2025-2050 Total Without E-Bike Program	**129,394.94** **2,030.88** **4,522.99** ***135,948.81***		**2025-2050 Total With E-Bike Program**	**128,815.21** **2,021.60** **4,502.33** ***135,339.14***	**579.73** **9.28** **20.66** ***609.67***

		With E-Bikes					WithOUT E-Bikes				
		RMI TOOL MODEL OUTPUT		KILOGRAMS	GRAMS	GRAMS	RMI TOOL MODEL OUTPUT		KILOGRAMS	GRAMS	GRAMS
		Annual Total Gallons of Gasoline	Annual VMT	CO2	CH4	N20	Annual Total Gallons of Gasoline	Annual VMT	CO2	CH4	N20
2025	Passenger vehicles	180,543	290,109,348	1,585,169	1,479,558	435,164	180,648	290,277,130	1,586,085	1,480,413	435,416
	Light duty vehicles	388,211	149,343,172	3,408,495	1,194,745	194,146	388,436	149,429,543	3,410,467	1,195,436	194,258
		568,754	***439,452,520***	***4,993,664***	***2,674,303***	***629,310***	***569,083***	***439,706,673***	***4,996,552***	***2,675,850***	***629,674***
2026	Passenger vehicles	181,316	292,516,958	1,591,956	1,491,836	438,775	181,523	292,850,493	1,593,771	1,493,538	439,276
	Light duty vehicles	389,098	150,582,567	3,416,285	1,204,661	195,757	389,542	150,754,265	3,420,180	1,206,034	195,981
		570,415	***443,099,526***	***5,008,241***	***2,696,497***	***634,533***	***571,065***	***443,604,758***	***5,013,951***	***2,699,572***	***635,256***
2027	Passenger vehicles	181,903	294,637,751	1,597,110	1,502,653	441,957	182,210	295,134,504	1,599,802	1,505,186	442,702
	Light duty vehicles	389,582	151,674,314	3,420,530	1,213,395	197,177	390,239	151,930,034	3,426,297	1,215,440	197,509
		571,485	***446,312,064***	***5,017,640***	***2,716,047***	***639,133***	***572,449***	***447,064,537***	***5,026,099***	***2,720,626***	***640,211***
2028	Passenger vehicles	182,093	296,124,891	1,598,776	1,510,237	444,187	182,514	296,809,605	1,602,472	1,513,729	445,214
	Light duty vehicles	389,213	152,439,867	3,417,291	1,219,519	198,172	390,113	152,792,346	3,425,193	1,222,339	198,630
		571,306	***448,564,758***	***5,016,067***	***2,729,756***	***642,359***	***572,627***	***449,601,951***	***5,027,665***	***2,736,068***	***643,844***
2029	Passenger vehicles	181,702	296,671,100	1,595,343	1,513,023	445,007	182,233	297,537,494	1,600,002	1,517,441	446,306
	Light duty vehicles	387,605	152,721,046	3,403,175	1,221,768	198,537	388,737	153,167,051	3,413,114	1,225,336	199,117
		569,307	***449,392,147***	***4,998,519***	***2,734,791***	***643,544***	***570,970***	***450,704,545***	***5,013,116***	***2,742,778***	***645,423***
2030	Passenger vehicles	180,826	296,422,568	1,587,656	1,511,755	444,634	181,347	297,275,406	1,592,224	1,516,105	445,913
	Light duty vehicles	384,971	152,593,106	3,380,044	1,220,745	198,371	386,078	153,032,132	3,389,769	1,224,257	198,942
		565,797	***449,015,674***	***4,967,700***	***2,732,500***	***643,005***	***567,425***	***450,307,538***	***4,981,993***	***2,740,362***	***644,855***

Passenger vehicles: sedans + hatchbacks
Light duty vehicles: pickup trucks + SUVs

	CO2 factor (per gallon of gasoline)	CH4 factor (grams per mile)	N20 factor (grams per mile)
Passenger vehicles	8.78	0.0051	0.0015
Light duty vehicles		0.008	0.0013

Source: EPA. GHG Emission Factors Hub. 2022.

Source: These calculations are a simplified version of those found in the 'Incentive - Finance Calculations' tab in the RMI tool

State	TN
City	Nashville
Population	683,622
Number of cars	622,281

Financial Aspect	**Value**
Inflation	3.20%
Current Retail Price ($/kWh)	$ 0.13
Yearly Retail Rate Increase (%)	2.48%
Current Gas Price ($/gal)	$ 3.73
Yearly Average Gas Increase (%)	3.74%
Gas Car Maintenance ($/mile)	$ 0.10
EV Maintenance ($/mile)	$ 0.06
Car depreciation ($/mile)	$ 0.08
Ebike Financials	**Value**
Average cost of bike checkup (parts & labor	$ 75.00
Per bike weekly cost maintenance	$ 1.44
Weeks year	52
Battery Cost declines per year BNEF (2025-2	3.8%
Percent Cargo bikes	39%
Percent commuter bikes	61%

With Ebikes

	Pickup Truck	SUV		Sedan	Hatchback			
	Fuel used	Fuel used	LIGHT DUTY TOTAL	Fuel used	Fuel used	PASSENGER TOTAL	TOTAL	
Year	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	
1	150,054	238,158	**388,211**	166,176	14,367	**180,543**	**568,754**	2025
2	150,396	238,702	**389,098**	166,888	14,428	**181,316**	**570,415**	2026
3	150,583	238,999	**389,582**	167,428	14,475	**181,903**	**571,485**	2027
4	150,441	238,772	**389,213**	167,603	14,490	**182,093**	**571,306**	2028
5	149,819	237,786	**387,605**	167,243	14,459	**181,702**	**569,307**	2029
6	148,801	236,170	**384,971**	166,437	14,389	**180,826**	**565,797**	2030
7	147,116	233,495	**380,611**	164,880	14,255	**179,135**	**559,746**	
8	144,746	229,734	**374,480**	162,547	14,053	**176,600**	**551,080**	
9	141,674	224,858	**366,532**	159,414	13,782	**173,196**	**539,728**	
10	138,044	219,098	**357,142**	155,640	13,456	**169,096**	**526,237**	

Without Ebikes

	Pickup Truck	SUV		Sedan	Hatchback			
	Fuel used	Fuel used	LIGHT DUTY TOTAL	Fuel used	Fuel used	PASSENGER TOTAL	TOTAL	
Year	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	ICE (gallons)	
1	150,140	238,296	**388,436**	166,272	14,375	**180,648**	**569,083**	2025
2	150,568	238,974	**389,542**	167,078	14,445	**181,523**	**571,065**	2026
3	150,837	239,402	**390,239**	167,710	14,499	**182,210**	**572,449**	2027
4	150,789	239,324	**390,113**	167,990	14,524	**182,514**	**572,627**	2028
5	150,257	238,480	**388,737**	167,731	14,501	**182,233**	**570,970**	2029
6	149,229	236,849	**386,078**	166,916	14,431	**181,347**	**567,425**	2030
7	147,533	234,157	**381,690**	165,347	14,295	**179,642**	**561,332**	
8	145,150	230,376	**375,526**	163,001	14,092	**177,093**	**552,619**	
9	142,064	225,477	**367,540**	159,853	13,820	**173,673**	**541,213**	
10	138,419	219,691	**358,110**	156,061	13,492	**169,554**	**527,664**	

Source: These calculations are a simplified version of those found in the 'Incentive - Finance + Emissions' tab in the RMI tool

	Year	Miles with Ebikes (under five mile trips)						
		Ebikes (Annual)	*Gas Pickup Truck Number of Miles (Annual)*	*Gas SUV (Annual)*	LIGHT DUTY TOTAL (ANNUAL)	Gas Sedan (Annual)	Gas Hatchback (Annual)	PASSENGER TOTAL (ANNUAL)
2025	1	*435,240*	*140,450,106*	*321,989,338*	**149,343,172**	*259,235,036*	*25,400,551*	**290,109,348**
2026	2	*870,480*	*141,615,698*	*324,661,520*	**150,582,567**	*261,386,421*	*25,611,350*	**292,516,958**
2027	3	*1,305,720*	*142,642,433*	*327,015,365*	**151,674,314**	*263,281,512*	*25,797,036*	**294,637,751**
2028	4	*1,816,464*	*143,362,399*	*328,665,926*	**152,439,867**	*264,610,386*	*25,927,242*	**296,124,891**
2029	5	*2,327,208*	*143,626,835*	*329,272,159*	**152,721,046**	*265,098,466*	*25,975,066*	**296,671,100**
2030	6	*2,327,208*	*143,506,513*	*328,996,315*	**152,593,106**	*264,876,384*	*25,953,306*	**296,422,568**
2031	7	*2,327,208*	*142,732,551*	*327,221,966*	**151,770,138**	*263,447,848*	*25,813,334*	**294,823,896**
2032	8	*2,327,208*	*141,276,030*	*323,882,813*	**150,221,392**	*260,759,480*	*25,549,920*	**291,815,350**
2033	9	*2,327,208*	*139,107,162*	*318,910,569*	**147,915,195**	*256,756,305*	*25,157,678*	**287,335,406**
2034	10	*2,327,208*	*136,356,728*	*312,605,051*	**144,990,608**	*251,679,705*	*24,660,259*	**281,654,194**
	Year		**Miles without Ebikes (under five mile trips)**					
	1	-	*140,531,334*	*322,175,557*	**149,429,543**	*259,384,962*	*25,415,241*	**290,277,130**
	2	-	*141,777,171*	*325,031,707*	**150,754,265**	*261,684,460*	*25,640,552*	**292,850,493**
	3	-	*142,882,925*	*327,566,706*	**151,930,034**	*263,725,399*	*25,840,529*	**295,134,504**
	4	-	*143,693,889*	*329,425,883*	**152,792,346**	*265,222,231*	*25,987,193*	**296,809,605**
	5	-	*144,046,281*	*330,233,760*	**153,167,051**	*265,872,656*	*26,050,923*	**297,537,494**
	6	-	*143,919,396*	*329,942,871*	**153,032,132**	*265,638,460*	*26,027,976*	**297,275,406**
	7	-	*143,137,122*	*328,149,465*	**152,200,325**	*264,194,581*	*25,886,501*	**295,659,564**
	8	-	*141,670,537*	*324,787,242*	**150,640,879**	*261,487,640*	*25,621,267*	**292,630,233**
	9	-	*139,489,857*	*319,787,916*	**148,322,121**	*257,462,661*	*25,226,889*	**288,125,887**
	10	-	*136,726,297*	*313,452,308*	**145,383,578**	*252,361,835*	*24,727,096*	**282,417,564**

52 Weeks 1 Year

APPLICATION FOR Carbon Pollution Reduction Grant (CPRG)

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

DocuSigned by:
Diana W. Alarcon
CCA6046554B9461...

Diana W. Alarcon, Director
Nashville Department of Transportation
and Multimodal Infrastructure

3/26/2024
Date

DocuSign

Certificate Of Completion

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Document Pages: 141
Signatures: 3
Initials: 1
Certificate Pages: 15
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Envelope Originator:
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730 2nd Ave. South 1st Floor
Nashville, TN 37219
Vaughn.wilson@nashville.gov
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Location: DocuSign

Signer Events	Signature	Timestamp
Alla Cross alla.cross@nashville.gov Security Level: Email, Account Authentication (None) Signature Adoption: Pre-selected Style Using IP Address: 170.190.198.185	AC	Sent: 4/11/2024 11:24:12 AM Viewed: 4/11/2024 12:02:15 PM Signed: 4/11/2024 12:03:53 PM
Electronic Record and Signature Disclosure: Accepted: 4/11/2024 12:02:15 PM ID: b297fd3f-f14e-4e98-ae62-4a891403035c		
Aaron Pratt aaron.pratt@nashville.gov Security Level: Email, Account Authentication (None) Signature Adoption: Pre-selected Style Using IP Address: 170.190.198.185	Aaron Pratt	Sent: 4/11/2024 12:03:58 PM Viewed: 4/11/2024 12:22:12 PM Signed: 4/11/2024 12:22:23 PM
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Kevin Crumbo/mjw maryjo.wiggins@nashville.gov Security Level: Email, Account Authentication (None) Signature Adoption: Pre-selected Style Using IP Address: 170.190.198.100	Kevin Crumbo/mjw	Sent: 4/11/2024 12:22:28 PM Viewed: 4/12/2024 9:53:13 AM Signed: 4/12/2024 9:53:52 AM
Electronic Record and Signature Disclosure: Accepted: 4/12/2024 9:53:13 AM ID: b5a13791-88f8-41b6-a8ef-2c66c41ea6bb		
Courtney Mohan courtney.mohan@nashville.gov Security Level: Email, Account Authentication (None) Signature Adoption: Pre-selected Style Using IP Address: 170.190.198.185	Courtney Mohan	Sent: 4/12/2024 9:53:56 AM Viewed: 4/12/2024 10:05:47 AM Signed: 4/12/2024 11:52:22 AM

Signer Events	Signature	Timestamp
Electronic Record and Signature Disclosure: Accepted: 4/12/2024 10:05:47 AM ID: e652ffa2-e095-4ad9-92fa-48172e8a43b5		

In Person Signer Events	Signature	Timestamp

Editor Delivery Events	Status	Timestamp

Agent Delivery Events	Status	Timestamp

Intermediary Delivery Events	Status	Timestamp

Certified Delivery Events	Status	Timestamp

Carbon Copy Events	Status	Timestamp
Danielle Godin danielle.godin@nashville.gov Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via DocuSign	COPIED	Sent: 4/12/2024 11:52:26 AM Viewed: 4/12/2024 2:34:19 PM
Sally Palmer sally.palmer@nashville.gov Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Accepted: 4/12/2024 7:48:54 AM ID: ee7edf41-bf88-40c2-8ab5-5f20cb34bf07	COPIED	Sent: 4/12/2024 11:52:27 AM

Witness Events	Signature	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	4/11/2024 11:24:12 AM
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Signing Complete	Security Checked	4/12/2024 11:52:22 AM
Completed	Security Checked	4/12/2024 11:52:27 AM

Payment Events	Status	Timestamps

Electronic Record and Signature Disclosure