



# DRAWDOWN GA

[www.DrawdownGA.org](http://www.DrawdownGA.org)

Introduction to Drawdown Georgia's  
Emissions Dashboard Project

Ground Transportation Sector  
Experts Meeting  
October 22, 2021

Drs. Rich Simmons and Bill Drummond  
Georgia Institute of Technology



# Agenda

10:00 Welcome & Intro to Drawdown Georgia (Dr. Rich Simmons)

- Please use “chat” for asking questions – Ollie Chapman will collect them and read them out
- The session will be recorded for internal use but not shared publicly

10:10 Transportation sector emissions (Dr. Bill Drummond)

10:40 Q&A

10:55 Next Steps and Wrap up (Dr. Rich Simmons)

# Localized climate solutions can help during this “decisive decade” — but where is the atlas of state and local roadmaps?

The **Drawdown Georgia** project aims to identify and activate the most promising solutions to significantly reduce Georgia’s net carbon emissions by 2030.

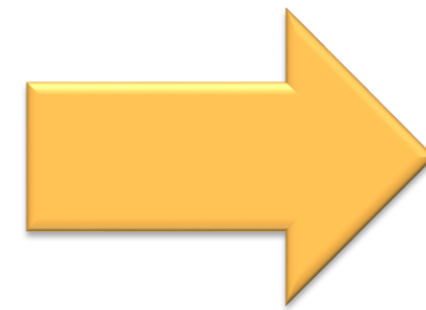
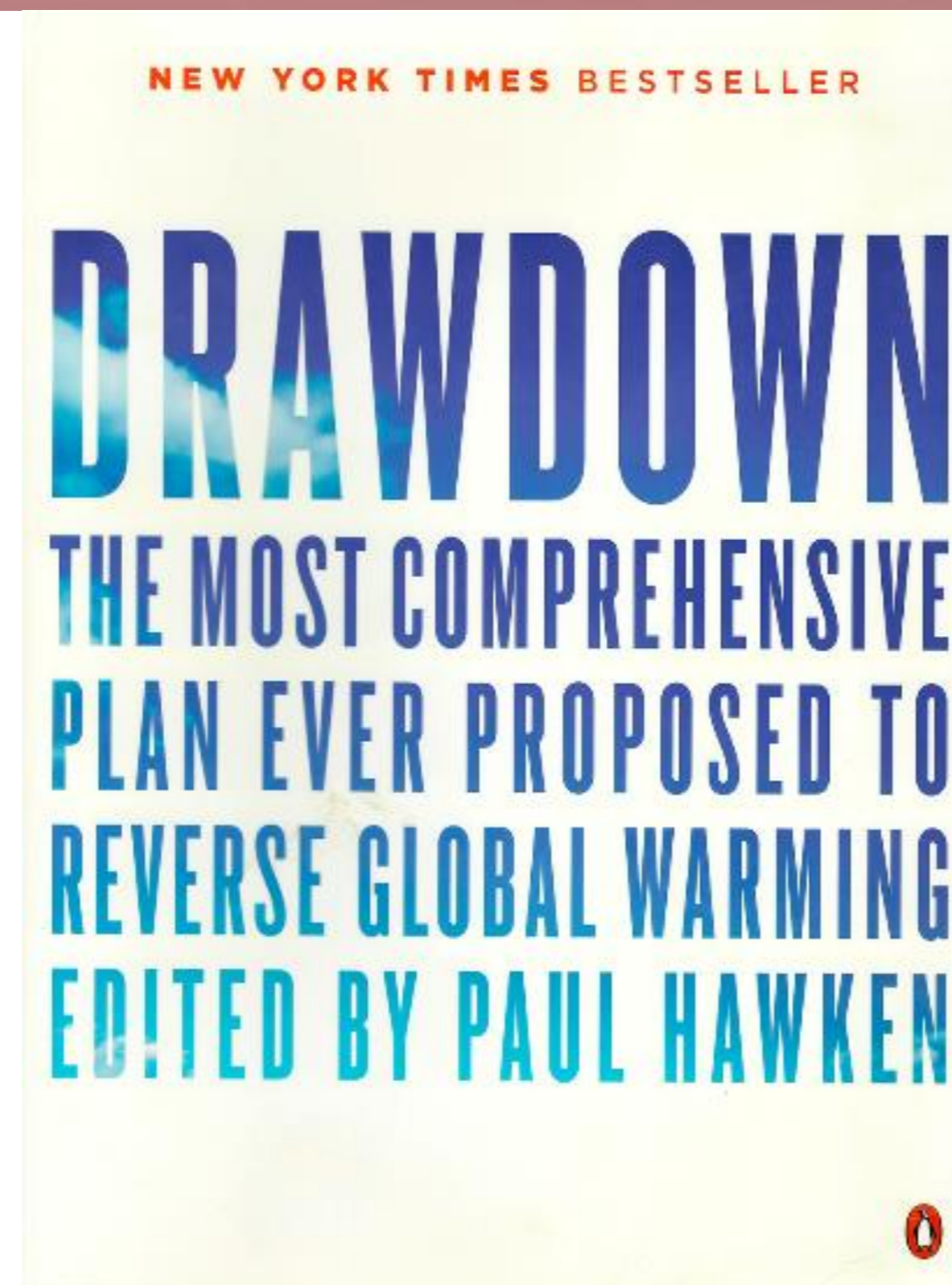
Our methodology can be adapted to fit other states, counties and even cities.



# Trajectory of the Drawdown Georgia Project

We're bringing  
climate solutions home.

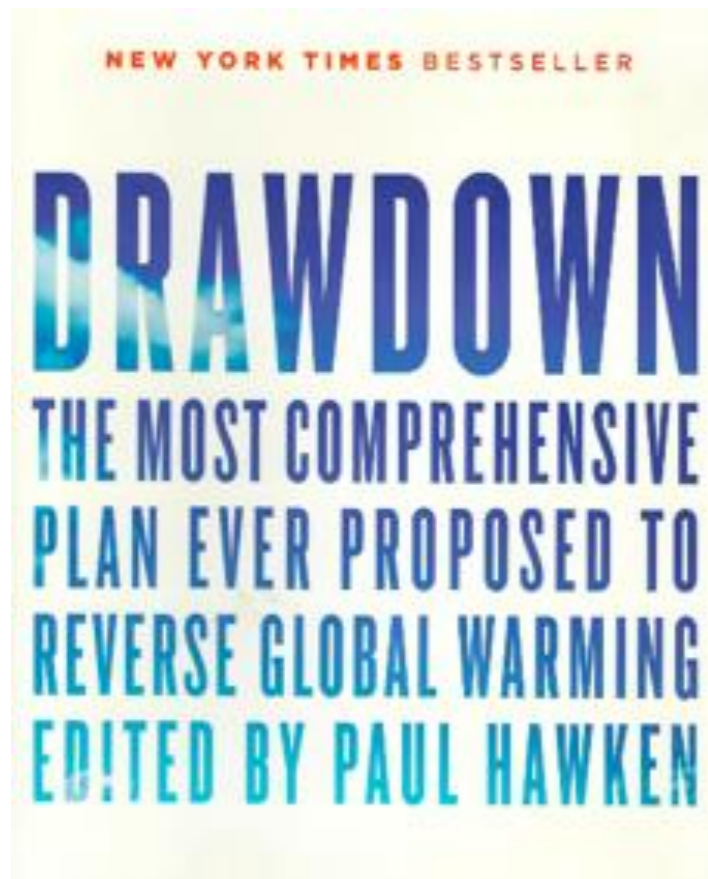
Inspired by Project Drawdown®, we are building a movement in Georgia to accelerate progress toward net zero greenhouse gas emissions.



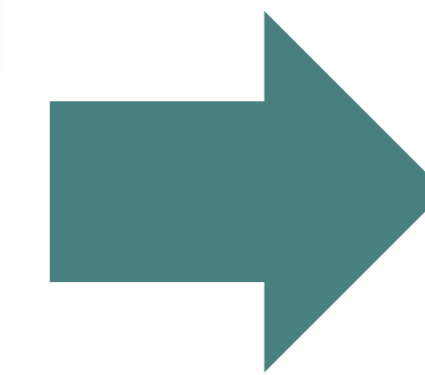
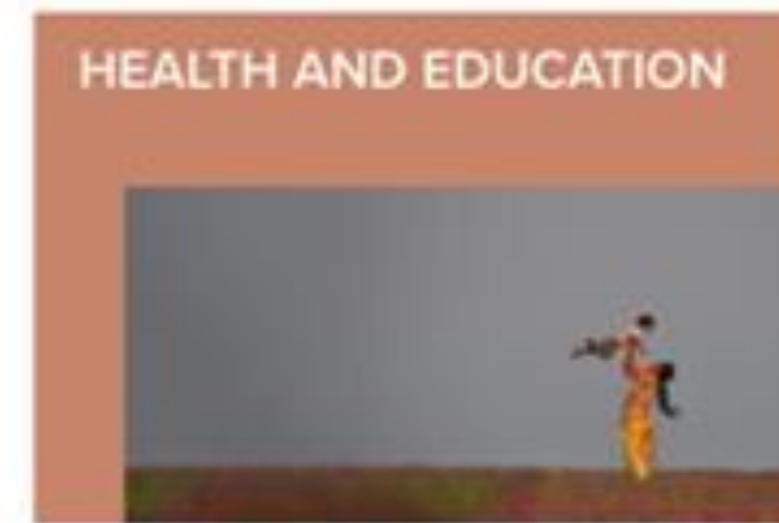
**DRAWDOWN**  
**GA**

bringing climate solutions home

# Starting Point: Project Drawdown Solutions



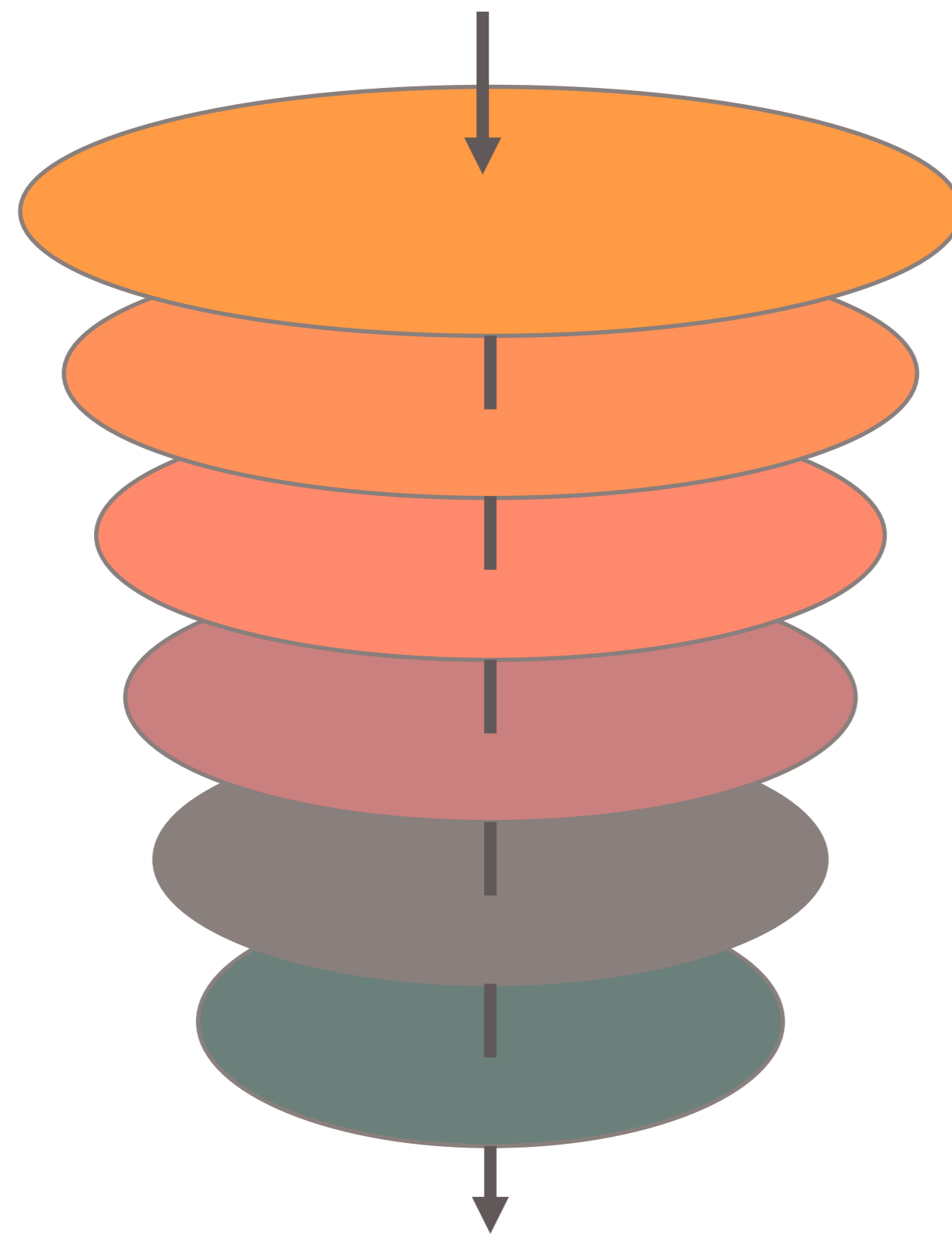
Paul Hawken  
environmentalist,  
entrepreneur, journalist, and  
author  
pioneer in sustainability



Which are  
best for  
Georgia?

# Trajectory of the Drawdown Georgia Project

**The Drawdown Georgia research team ran ~100 global solutions through a series of filters:**



Is the solution relevant in Georgia?

Is it technology and market ready to scale by 2030?

Is there sufficient local experience and available data?






Can the solution deliver 1 million metric tons of annual GHG reduction by 2030?

Is it cost competitive with other solutions?

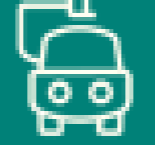

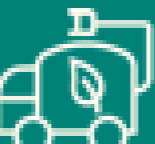


Are there significant “beyond carbon” impacts?

# Result: 20 Drawdown Georgia Solutions for 2030 + Beyond Carbon Dimensions

## Electricity

-  Cogeneration
-  Demand Response
-  Rooftop Solar
-  Large-Scale Solar
-  Landfill Methane

## Transportation

-  Electric Vehicles
-  Energy-Efficient Cars
-  Energy-Efficient Trucks
-  Mass Transit
-  Alternative Mobility

## Food & Agriculture

-  Composting
-  Conservation Agriculture
-  Plant Rich Diet
-  Reduced Food Waste

## Buildings & Materials

-  Recycling
-  Refrigerant Management
-  Retrofitting Buildings

## Land Sinks

-  Afforestation & Silvopasture
-  Coastal Wetlands
-  Temperate Forest Protection & Management

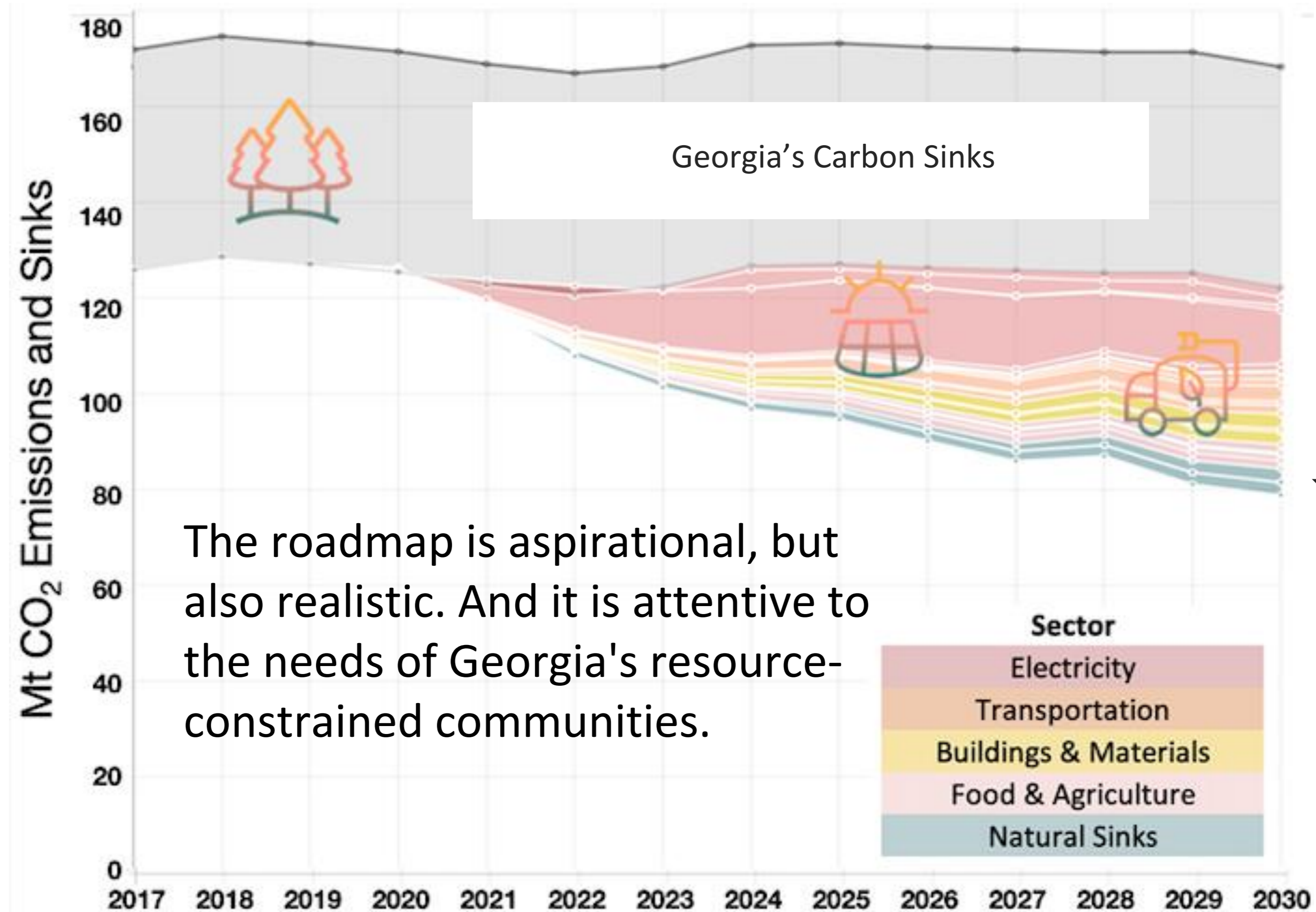
## Beyond Carbon

-  Equity
-  Economic Development & Jobs
-  Public Health
-  Environmental Quality

# Georgia can reduce its carbon footprint by 50% by 2030 below its 2005 baseline



28 Mt CO<sub>2</sub> reduction from 156 Mt CO<sub>2</sub> in 2005 to 128 in 2017 (12 years)



49 Mt CO<sub>2</sub> reduction from 128 Mt CO<sub>2</sub> in 2017 to 79 in 2030 (13 years)



The roadmap is aspirational, but also realistic. And it is attentive to the needs of Georgia's resource-constrained communities.



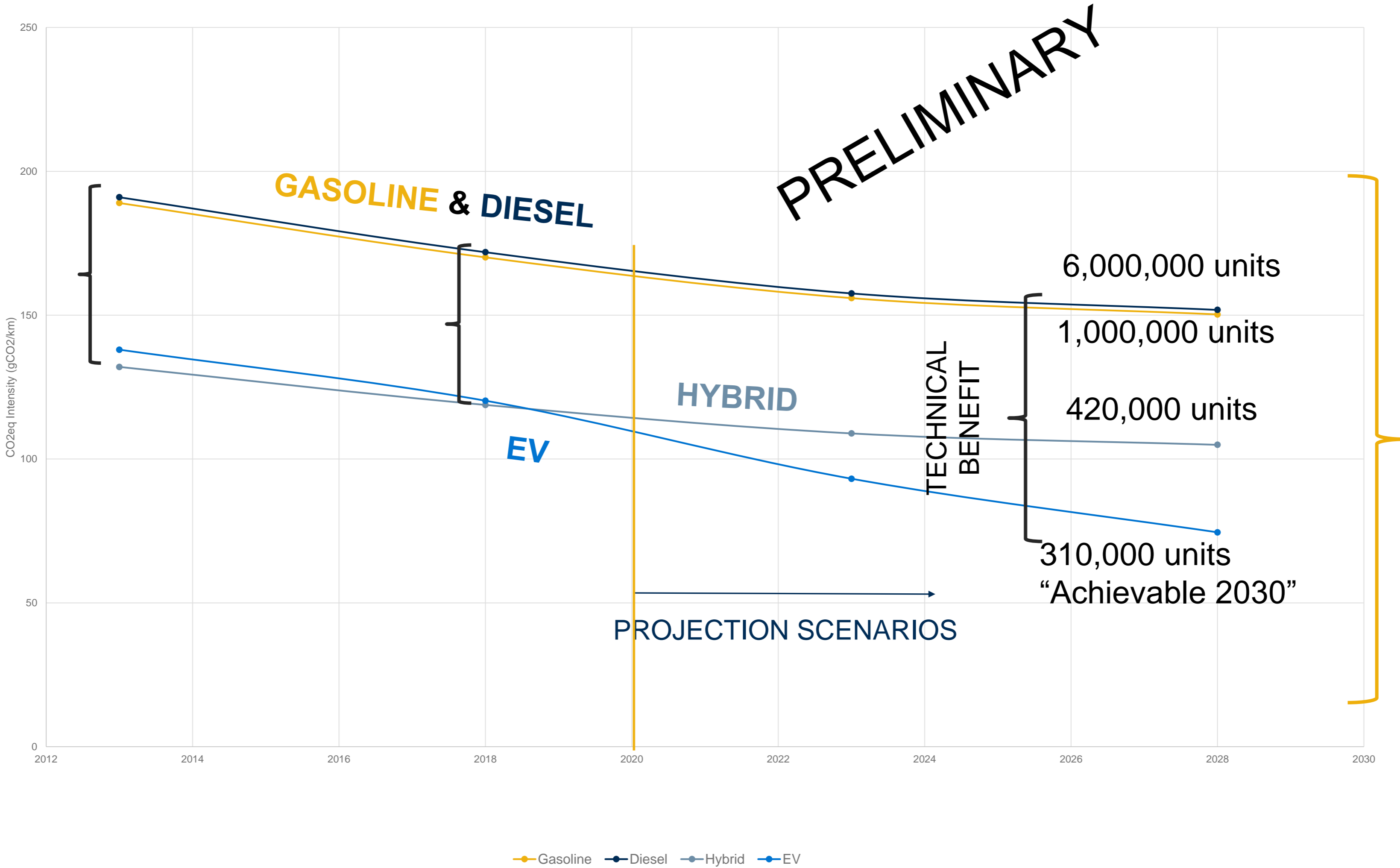
# Electric Vehicles

A solution for Georgia that:

- Reduces carbon emissions
- Is synergistic with a cleaner grid
- Results in air quality benefits
- Helps diversify transportation energy resources
- Can generate new jobs



# Despite an aggressive baseline, grid CO2 intensity reductions propel per vehicle EV contributions



Conventional vehicles improve at 1.5% y/y through 2025

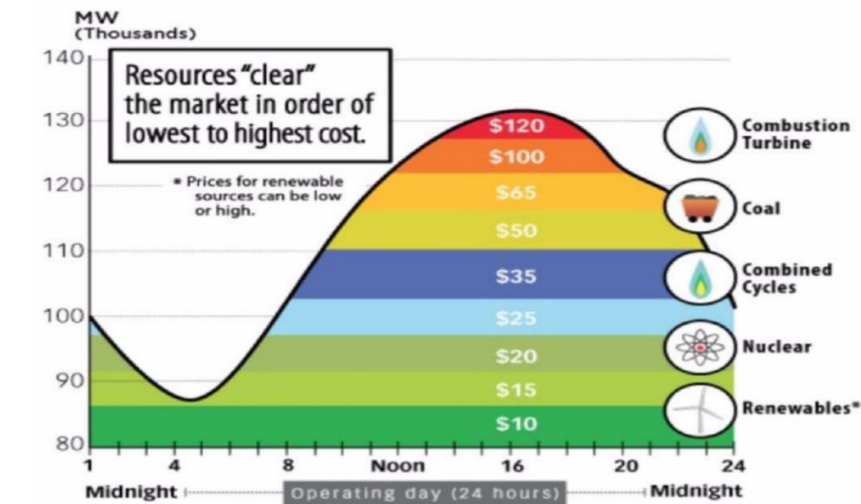
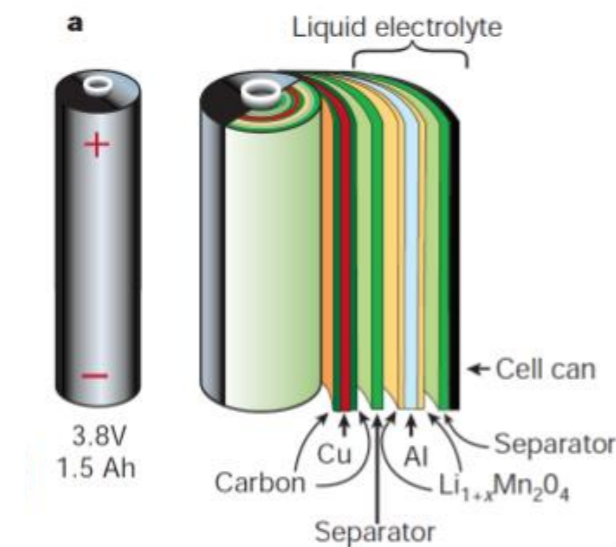
EVs approach a relative CO2 intensity of 50% compared to conventional cars

But, adoption rate will dictate overall impact from this solution

# Summary of GT Vehicle-Grid Research Studies



- **Reuse, Remanufacturing, and Recycling of EV batteries.**
  - Recycling of EV batteries; second use in smart homes and local electrical grids.
  - Partners: PNNL, US Advanced Battery Consortium, Major automaker
- **EVacuating Urban Areas with Electrified Transportation Systems.**
  - Explore evacuations of urban areas with heavily electrified transportation systems.
  - Partners: Sandia, Los Alamos National Labs (w/data from DOE, NREL, NC utility)
- **EV Mobility Systems that Consider Environmental and Grid Impacts.**
  - EV-based mobility systems to increase EV adoption, reduce environmental impacts & congestion.
  - Partners: MARTA, UPS and the Atlanta Regional Commission.
- **Smart Usage of Renewable Energy Resources for Electrified Vehicles.**
  - Smart charging to optimize renewables, net demand, and EV costs.
  - Focus on time of use, and hourly/daily interactions.
  - Partners: Cox Automotive, Georgia Power.
- **Integrated Assessment Modeling of Renewable Hydrocarbons.**
  - Develop carbon to renewable fuels models to assess decarbonization scenarios for alt fuels.
  - Partners: Polytechnic University of Milan, EU Institute for Economics and Environment.
- **Human-Centered Micro e-Mobility**
  - Demonstrate & assess an e-bike/e-trike ecosystem with charging infrastructure for ATL community.
  - Partners: Friends of Refugees, City of Clarkson, Community Stakeholders, e-mobility orgs.



# SE Electric Transportation Regional Initiative



## SETRI



60+ Partner Organizations

- ▶ Utilities
- ▶ Charging Companies
- ▶ Auto OEMs & Transportation
- ▶ NGOs
- ▶ Universities & Labs

### Stakeholder MOU

**MEMORANDUM OF UNDERSTANDING FOR SIGNATORIES TO THE ACCORD**

Signatories to the Transportation Electrification Accord are invited to use the principles in their efforts to advance transportation electrification. Nothing in the Accord binds any signatory to any specific position. Nothing in the Accord authorizes any signatory to speak on behalf of other signatories, though signatories are welcome to use the existence of co-signatories as evidence of the appropriateness of these principles.

<https://southeastev.org/>

### Policy & Government Engagement



### Education & Awareness

### Technology, Infrastructure & Economic Development



# Our current task focus on solution activation



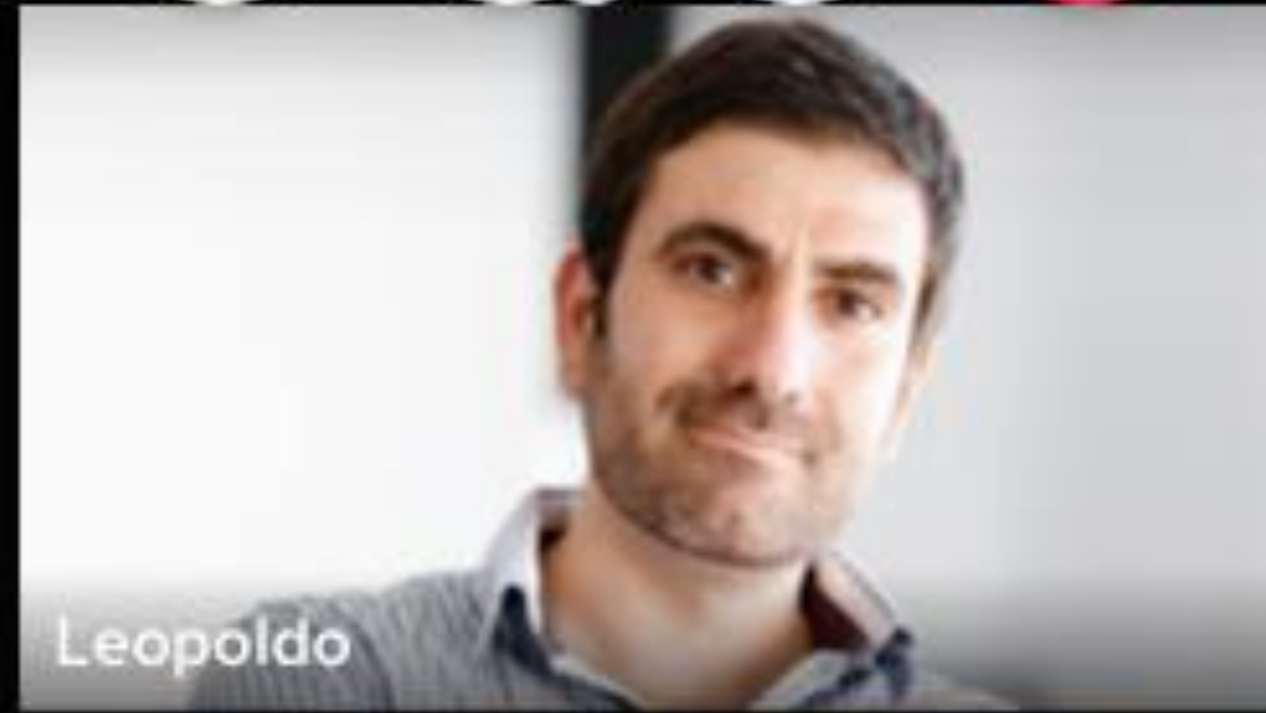
1. Tracking GHG Footprint of Georgia's Counties



2. Business Engagement

3. Planning and Tracking Solution Activation

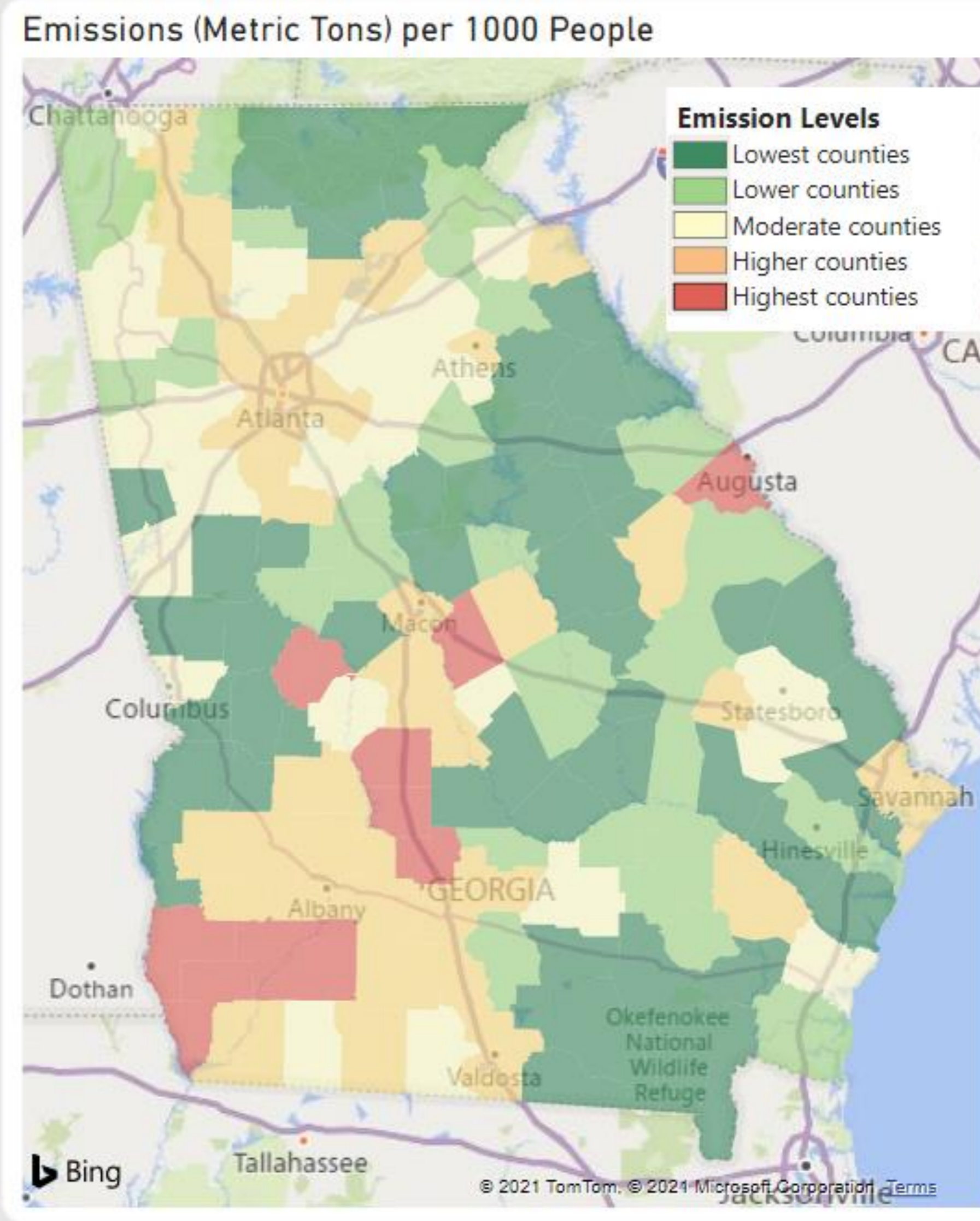
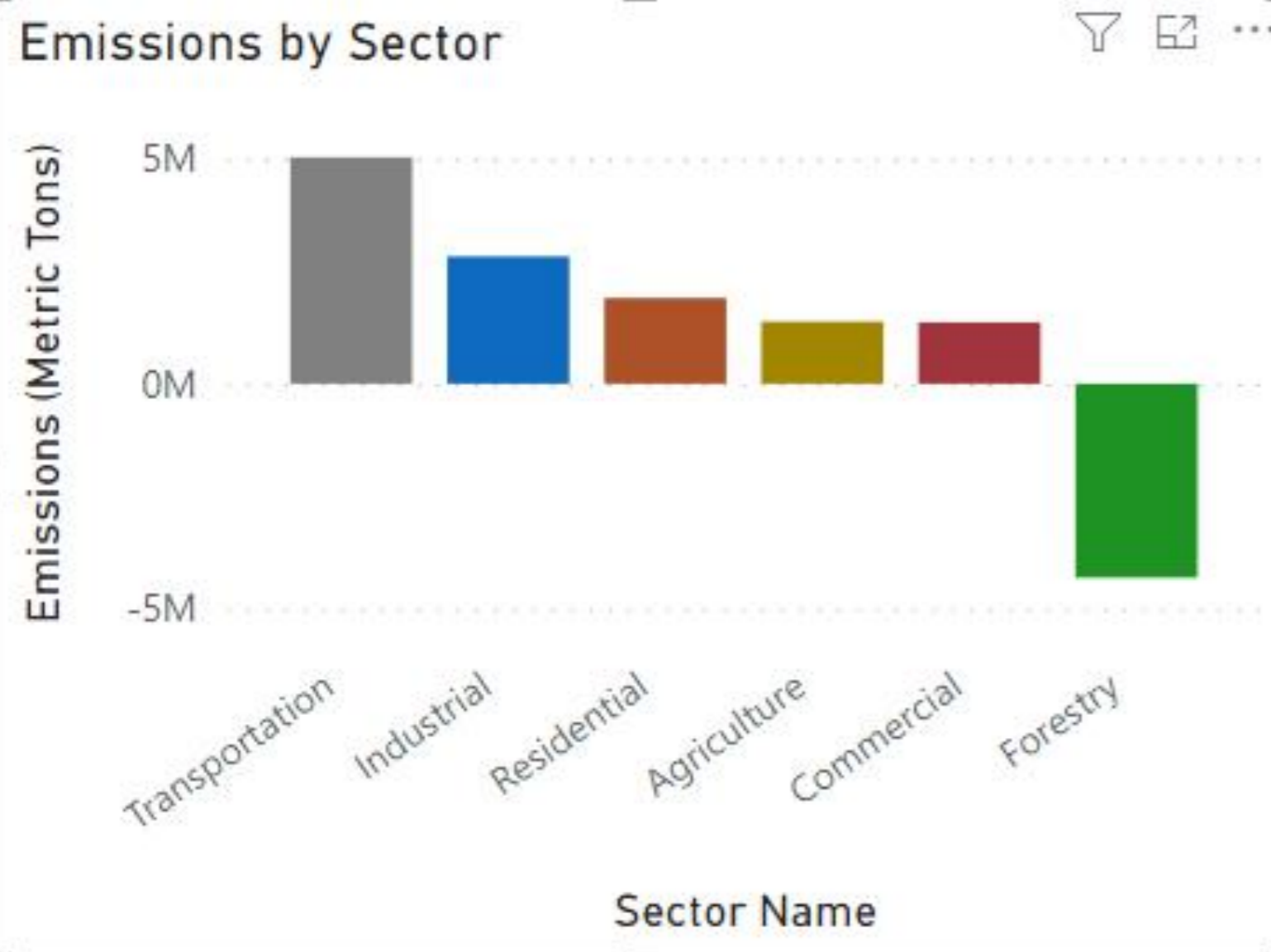




Clear all filters

Month: April  
 Year: 2021

| NAME    | Year | Month | Sector Name    | Emissions (MT) |
|---------|------|-------|----------------|----------------|
| Appling | 2021 | April | Agriculture    | 19,965.18      |
| Appling | 2021 | April | Commercial     | 1,772.70       |
| Appling | 2021 | April | Forestry       | -34,803.33     |
| Appling | 2021 | April | Industrial     | 5,802.65       |
| Appling | 2021 | April | Residential    | 2,579.84       |
| Appling | 2021 | April | Transportation | 10,284.94      |



Emissions for this Month (MT)

**8.20M**

Emissions, Year Total (MT)

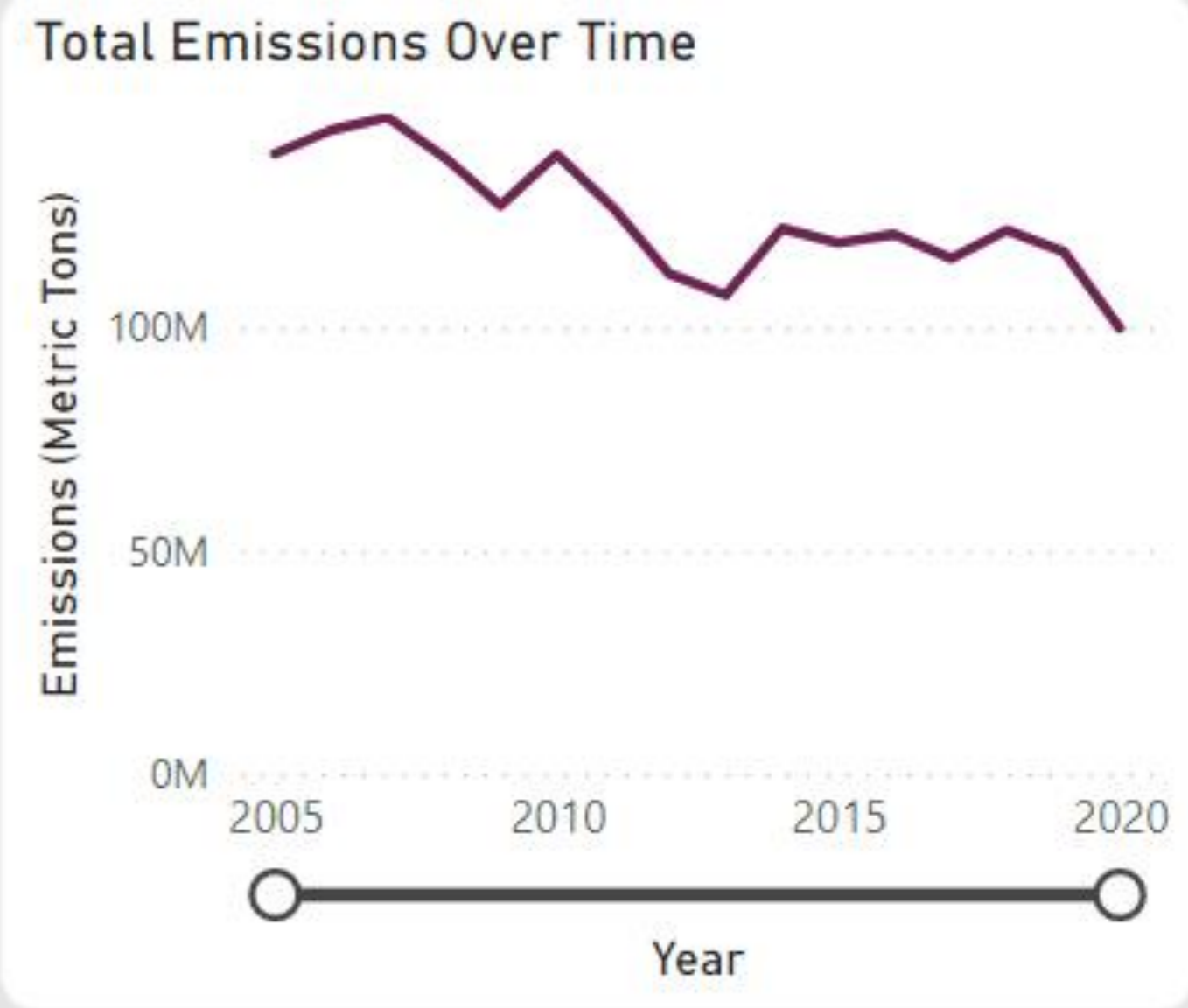
**34.67M**

Emissions per 1000 People (MT)

**751**

Emissions, One Year % Change

**42.60**



Inspired by Project Drawdown, we are building a movement in Georgia to accelerate progress toward net zero greenhouse gas (GHG) emissions. This dashboard tracks GHG emissions in Georgia. Filter by date, county, or sector using the selectors, or click on a county directly on the map. Hold the Ctrl button down to select multiple counties; click outside the state to clear county selections. Note that emissions data for each month is dated on the 1st.

To learn more about Drawdown Georgia, visit [drawdownga.org](https://drawdownga.org)

# Why geospatial tracking and visualization?

- Our goal is to help elected officials, concerned citizens, and interested businesses understand their **local sources** of greenhouse gas emissions ...
- By providing **reasonable emission estimates** that are as timely as possible and as local as possible ...
- Presented in an attractive, interactive, online **dashboard format**, and ...
- Developed with open-source software and publicly-available data.



# Our general strategy

- Identify **recent annual or monthly data sources** for Georgia statewide emissions, including
  - EPA's State Inventory Tool
  - EIA's Open Data API
  - US-DOT's Traffic Trends monthly VMT
- Allocate the statewide totals to individual counties with **plausible indicator variables**
- **Interpolate** annual data to monthly data when needed
- **Avoid** proprietary data
- **Avoid** data that is specific to a single state

# Transportation data sources

1. EIA API monthly gasoline and distillate fuel deliveries
2. US DOT-FHWA monthly **Traffic Volume Trends** with
  - a. Georgia vehicle miles traveled (**VMT**) subdivided by
  - b. Urban arterials, rural arterials, and local roads
3. US DOT-FHWA Highway Performance Monitoring System (**HPMS**) road network GIS dataset
4. Census urbanized areas GIS dataset
5. Census county boundaries GIS dataset

# Transportation overall strategy



1. Download statewide monthly EIA motor gasoline **(MG)** and distillate fuel **(DF)** deliveries
2. Apply EIA CO<sub>2</sub> coefficients to calculate CO<sub>2</sub> emissions
3. Download monthly DOT Traffic Volume Trends **(TVT)**
4. Use TVT to divide emissions into shares for urban arterials **(UAs)**, rural arterials **(RAs)**, and local roads **(LRs)**
5. Use HPMS to calculate each county's share of statewide VMT on UAs, RAs, and LRAs
6. Apply county shares to statewide emissions in the three road categories, and sum by county



U. S. Department of Transportation

Federal Highway Administration

Office of Highway Policy Information

# TRAFFIC VOLUME TRENDS

## August 2021

Travel on all roads and streets changed by **+8.3%** (+21.0 billion vehicle miles) for August 2021 as compared with August 2020. Travel for the month is estimated to be 273.8 billion vehicle miles.

The seasonally adjusted vehicle miles traveled for August 2021 is 261.1 billion miles, an **+8.5%** (+20.4 billion vehicle miles) increase over August 2020. It also represents **-2%** decline (-5.2 billion vehicle miles) compared with July 2021.

Cumulative Travel for 2021 changed by **+12.2%** (+224.4 billion vehicle miles). The Cumulative estimate for the year is 2,068.8 billion vehicle miles of travel.

Estimated Vehicle-Miles of Travel by Region - August 2021 - (in Billions)

Change in Traffic as compared to same month last year.

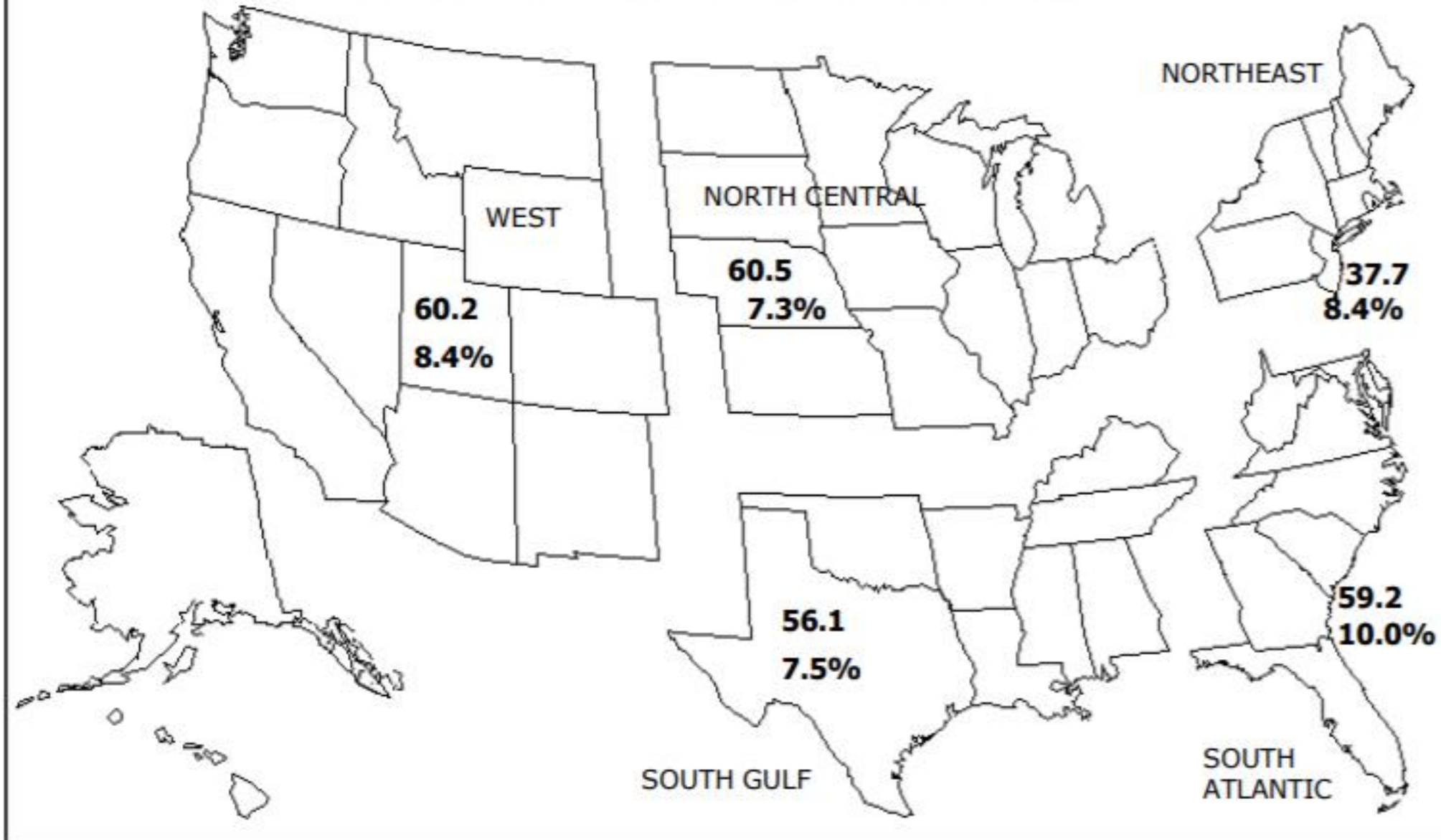


Table - 4. Changes on Urban Arterial Roads by Region and State\*\*

| Region and State      | Number of Stations | August                   |               |                | Percent Change | July                     |               |                |
|-----------------------|--------------------|--------------------------|---------------|----------------|----------------|--------------------------|---------------|----------------|
|                       |                    | Vehicle-Miles (Millions) |               | Percent Change |                | Vehicle-Miles (Millions) |               | Percent Change |
|                       |                    | 2021 (Preliminary)       | 2020          |                |                | 2021 (Revised)           | 2020          |                |
| <b>Northeast</b>      |                    |                          |               |                |                |                          |               |                |
| Connecticut           | 15                 | 1,911                    | 1,812         | 5.5            | 16             | 1,976                    | 1,804         | 9.5            |
| Maine                 | 22                 | 269                      | 239           | 12.6           | 22             | 297                      | 255           | 16.6           |
| Massachusetts         | 194                | 4,117                    | 3,723         | 10.6           | 194            | 4,177                    | 3,730         | 12.0           |
| New Hampshire         | 68                 | 565                      | 519           | 8.9            | 67             | 550                      | 498           | 10.5           |
| New Jersey            | 61                 | 4,403                    | 4,012         | 9.7            | 97             | 4,455                    | 3,839         | 16.0           |
| New York              | 63                 | 6,296                    | 6,004         | 4.9            | 60             | 6,308                    | 5,766         | 9.4            |
| Pennsylvania          | 34                 | 4,487                    | 4,102         | 9.4            | 34             | 4,603                    | 4,169         | 10.4           |
| Rhode Island          | 28                 | 571                      | 487           | 17.3           | 27             | 502                      | 466           | 7.7            |
| Vermont               | 12                 | 133                      | 116           | 13.9           | 11             | 134                      | 118           | 13.5           |
| Subtotal              |                    | <b>22,752</b>            | <b>21,014</b> | <b>8.3</b>     |                | <b>23,002</b>            | <b>20,645</b> | <b>11.4</b>    |
| <b>South Atlantic</b> |                    |                          |               |                |                |                          |               |                |
| Delaware              | 10                 | 493                      | 455           | 8.3            | 13             | 429                      | 409           | 4.8            |
| District of Columbia  | 3                  | 250                      | 216           | 15.7           | 3              | 177                      | 148           | 19.7           |
| Florida               | 127                | 10,212                   | 9,064         | 12.7           | 129            | 10,782                   | 9,203         | 17.2           |
| Georgia               | 128                | 5,704                    | 5,185         | 10.0           | 131            | 5,525                    | 4,938         | 11.9           |
| Maryland              | 37                 | 3,540                    | 3,307         | 7.1            | 37             | 3,795                    | 3,531         | 7.5            |
| North Carolina        | 36                 | 4,790                    | 4,428         | 8.2            | 40             | 5,098                    | 4,485         | 13.7           |
| South Carolina        | 50                 | 1,987                    | 1,802         | 10.3           | 52             | 2,119                    | 1,889         | 12.2           |
| Virginia              | 369                | 3,751                    | 3,359         | 11.7           | 363            | 3,936                    | 3,498         | 12.5           |
| West Virginia         | 11                 | 581                      | 545           | 6.6            | 11             | 680                      | 632           | 7.5            |
| Subtotal              |                    | <b>31,308</b>            | <b>28,361</b> | <b>10.4</b>    |                | <b>32,541</b>            | <b>28,733</b> | <b>13.3</b>    |
| <b>North Central</b>  |                    |                          |               |                |                |                          |               |                |
| Illinois              | 49                 | 4,590                    | 4,287         | 7.0            | 48             | 4,651                    | 4,355         | 6.8            |
| Indiana               | 29                 | 2,776                    | 2,579         | 7.6            | 26             | 2,982                    | 2,780         | 7.3            |
| Iowa                  | 27                 | 917                      | 849           | 8.1            | 24             | 925                      | 851           | 8.6            |
| Kansas                | 17                 | 936                      | 893           | 4.9            | 17             | 936                      | 885           | 5.8            |
| Michigan              | 48                 | 4,451                    | 4,049         | 9.9            | 50             | 4,525                    | 4,126         | 9.7            |
| Minnesota             | 10                 | 2,161                    | 2,044         | 5.7            | 12             | 2,397                    | 2,197         | 9.1            |
| Missouri              | 63                 | 2,713                    | 2,493         | 8.8            | 63             | 2,691                    | 2,458         | 9.5            |
| Nebraska              | 19                 | 599                      | 563           | 6.4            | 19             | 634                      | 589           | 7.7            |
| North Dakota          | 11                 | 160                      | 149           | 7.6            | 11             | 182                      | 176           | 3.3            |
| Ohio                  | 96                 | 4,899                    | 4,549         | 7.7            | 98             | 4,994                    | 4,623         | 8.0            |
| South Dakota          | 4                  | 236                      | 216           | 9.3            | 4              | 227                      | 205           | 10.9           |
| Wisconsin             | 91                 | 2,313                    | 2,099         | 10.2           | 94             | 2,451                    | 2,215         | 10.7           |
| Subtotal              |                    | <b>26,751</b>            | <b>24,770</b> | <b>8.0</b>     |                | <b>27,595</b>            | <b>25,460</b> | <b>8.4</b>     |
| <b>South Gulf</b>     |                    |                          |               |                |                |                          |               |                |
| Alabama               | 103                | 2,230                    | 2,111         | 5.6            | 98             | 2,241                    | 2,053         | 9.2            |
| Arkansas              | 6                  | 1,258                    | 1,194         | 5.4            | 7              | 1,389                    | 1,291         | 7.6            |
| Kentucky              | 20                 | 1,636                    | 1,496         | 9.3            | 20             | 1,486                    | 1,340         | 10.9           |
| Louisiana             | 13                 | 2,122                    | 1,992         | 6.5            | 12             | 2,020                    | 1,833         | 10.2           |
| Mississippi           | 25                 | 1,010                    | 966           | 4.5            | 26             | 1,111                    | 1,007         | 10.3           |
| Oklahoma              | 23                 | 1,611                    | 1,558         | 3.4            | 22             | 1,701                    | 1,560         | 9.0            |
| Tennessee             | 29                 | 3,250                    | 3,076         | 5.7            | 24             | 3,893                    | 3,630         | 7.3            |
| Texas                 | 79                 | 13,514                   | 12,126        | 11.4           | 79             | 13,847                   | 11,961        | 15.8           |
| Subtotal              |                    | <b>26,631</b>            | <b>24,519</b> | <b>8.6</b>     |                | <b>27,688</b>            | <b>24,675</b> | <b>12.2</b>    |
| <b>West</b>           |                    |                          |               |                |                |                          |               |                |
| Alaska                | 57                 | 201                      | 176           | 14.2           | 54             | 205                      | 184           | 11.5           |
| Arizona               | 72                 | 2,674                    | 2,382         | 12.2           | 104            | 3,150                    | 2,820         | 11.7           |
| California            | 101                | 19,188                   | 17,524        | 9.5            | 92             | 20,389                   | 17,829        | 14.4           |
| Colorado              | 35                 | 2,821                    | 2,573         | 9.6            | 34             | 2,461                    | 2,225         | 10.6           |
| Hawaii                | 52                 | 450                      | 349           | 29.0           | 51             | 434                      | 344           | 26.4           |
| Idaho                 | 76                 | 524                      | 488           | 7.2            | 75             | 554                      | 497           | 11.6           |
| Montana               | 14                 | 285                      | 280           | 2.1            | 13             | 316                      | 300           | 5.3            |
| Nevada                | 36                 | 1,193                    | 1,085         | 10.0           | 37             | 1,242                    | 1,100         | 12.9           |
| New Mexico            | 8                  | 669                      | 598           | 12.0           | 19             | 792                      | 683           | 16.0           |
| Oregon                | 43                 | 1,508                    | 1,421         | 6.1            | 42             | 1,545                    | 1,404         | 10.0           |
| Utah                  | -                  | 1,609                    | 1,482         | 8.6            | -              | 1,529                    | 1,384         | 10.5           |
| Washington            | 78                 | 3,058                    | 2,852         | 7.2            | 72             | 3,279                    | 2,952         | 11.1           |
| Wyoming               | 22                 | 172                      | 166           | 3.3            | 26             | 164                      | 153           | 7.4            |

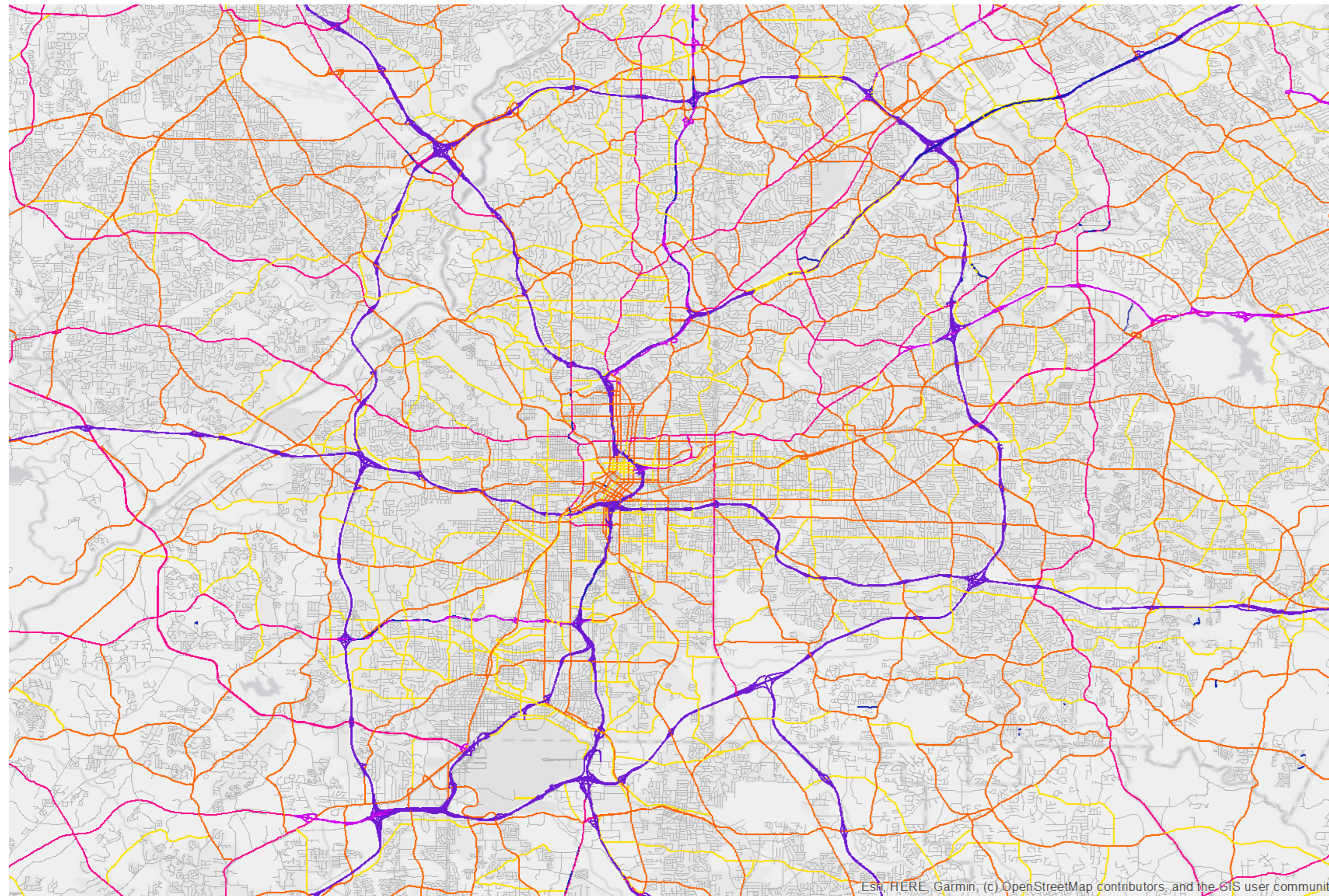


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| <b>South Atlantic</b> |                    |                          |               |                |                    |                          |               |                |
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| Georgia               | 128                | 5,704                    | 5,185         | 10.0           | 131                | 5,525                    | 4,938         | 11.9           |
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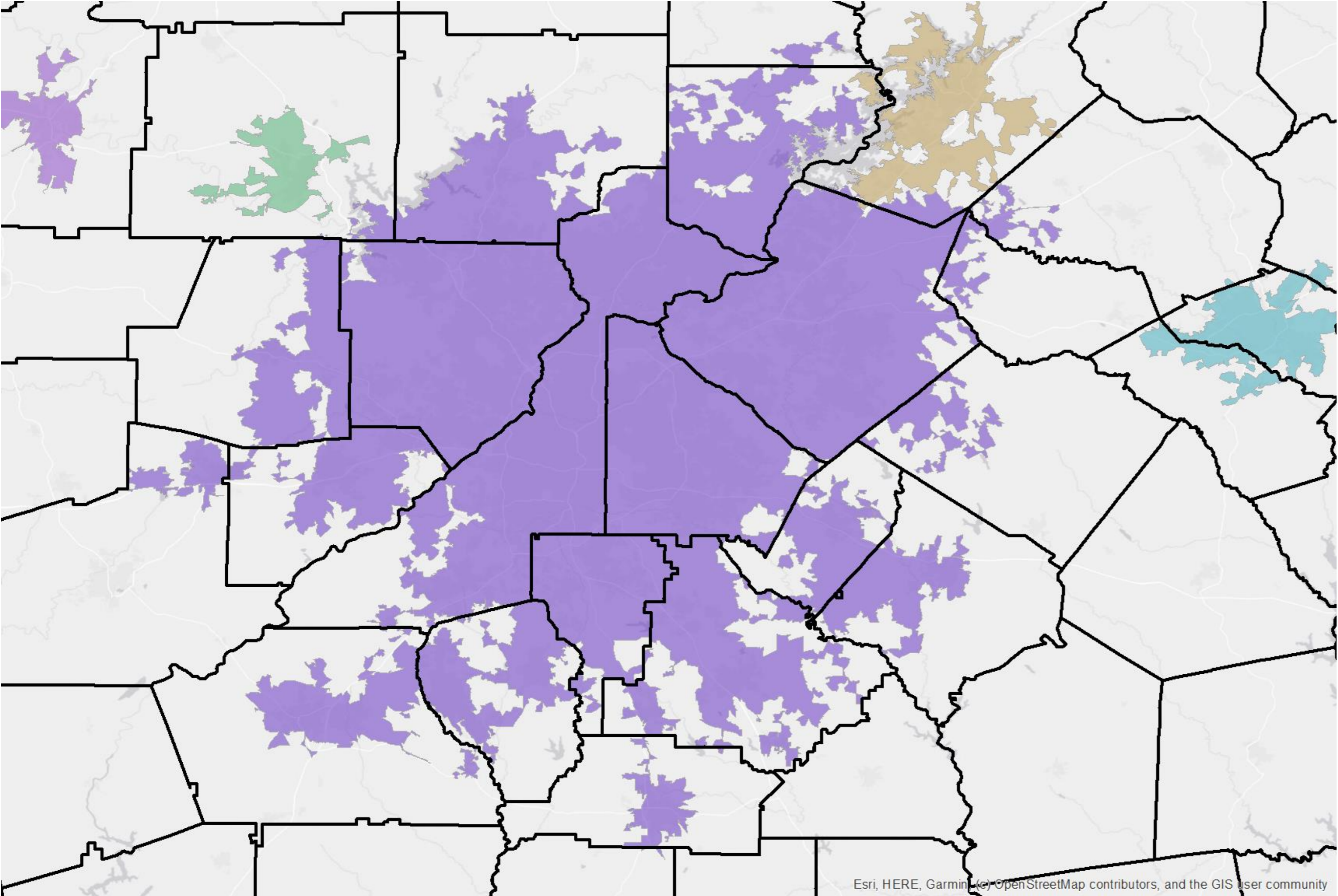
# HPMS by functional class



| Code | Description   |
|------|---|
| 1    | Interstate  |
| 2    | Principal Arterial – Other Freeways and Expressways |
| 3    | Principal Arterial – Other                          |
| 4    | Minor Arterial                                      |
| 5    | Major Collector                                     |
| 6    | Minor Collector                                     |
| 7    | Local   |

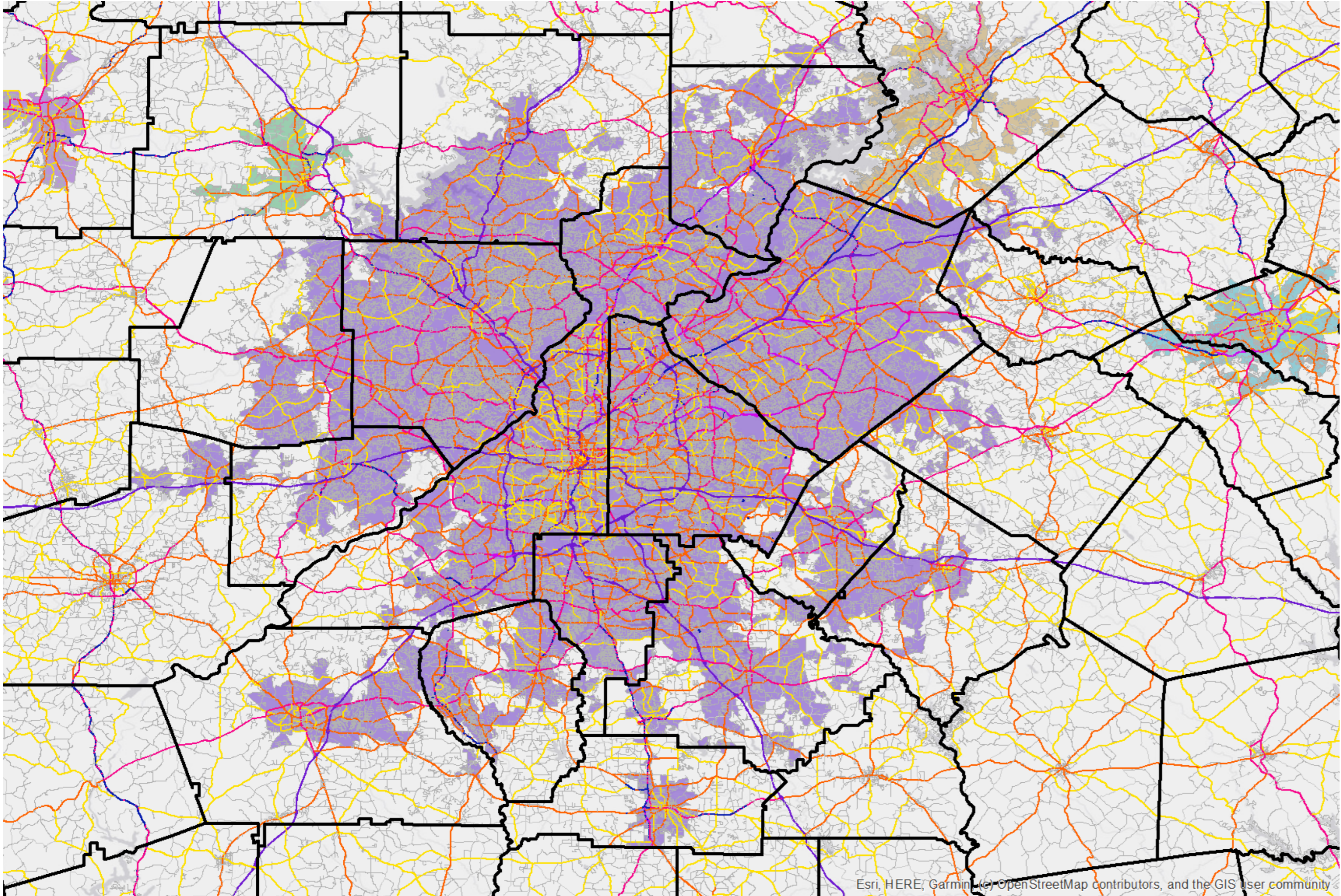
**Local Roads  
Arterials**

# Census urbanized areas (1)



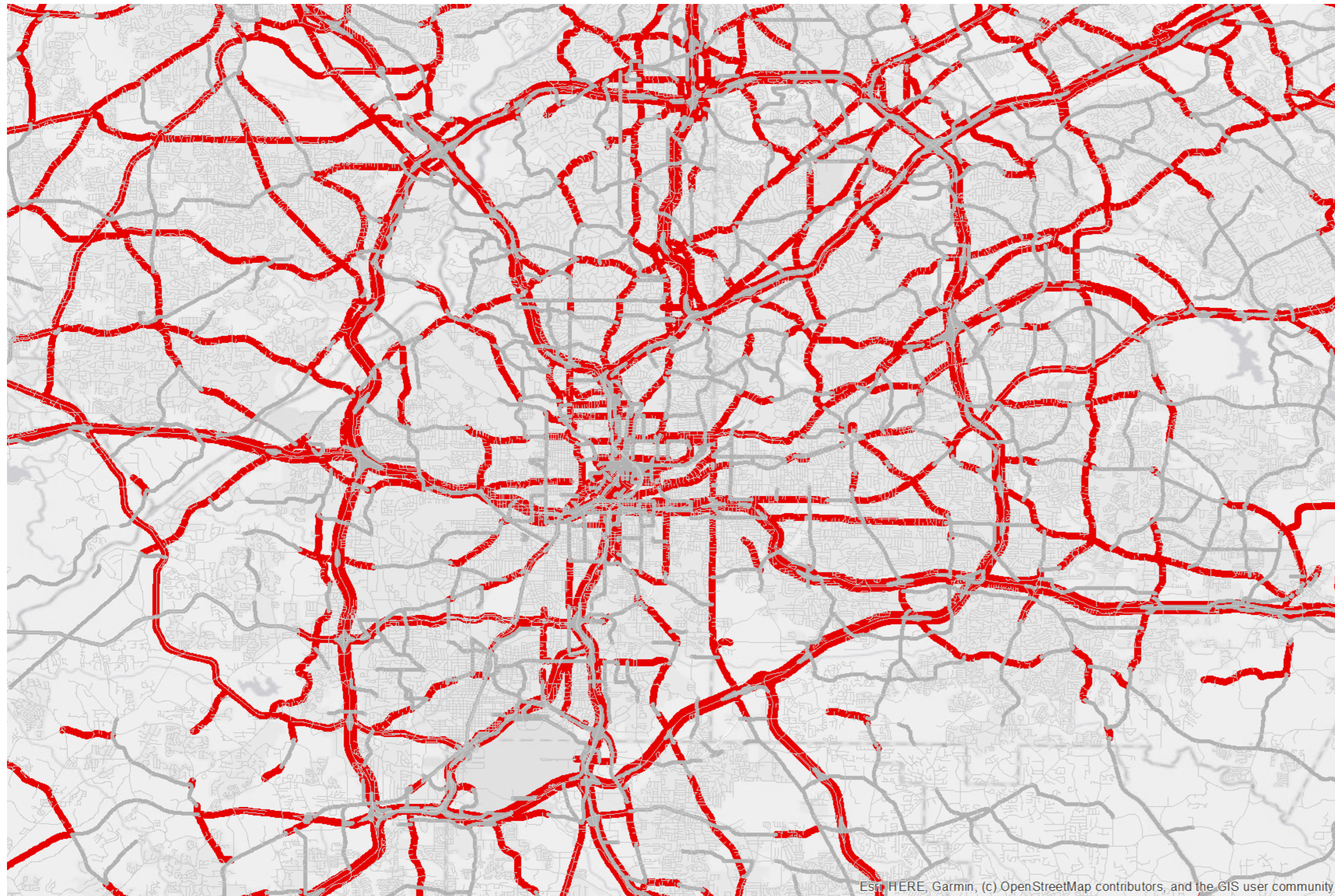
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

# Census urbanized areas (2)



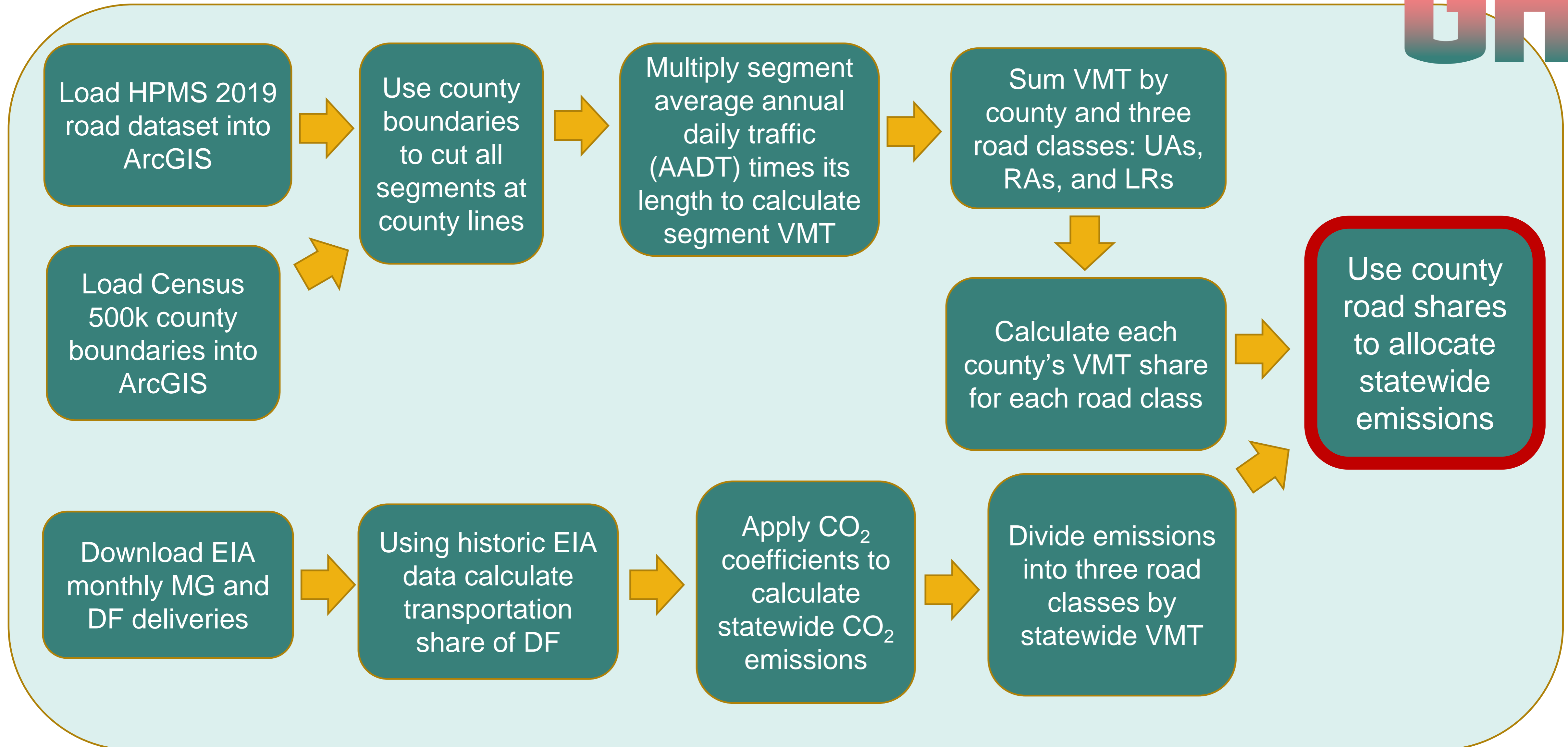


# HPMS by average annual daily traffic (AADT)

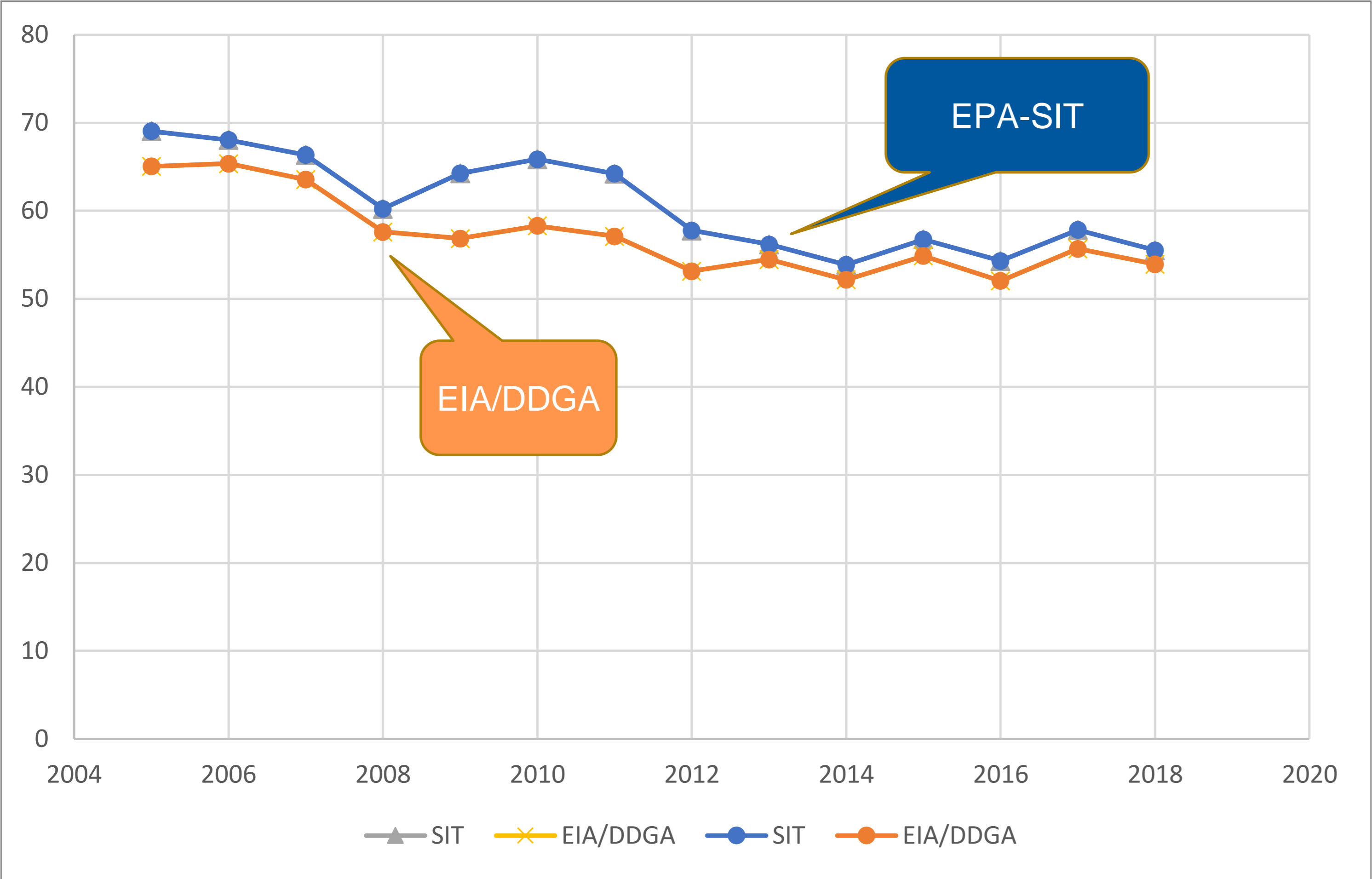


$$\text{VMT} = \text{AADT} * \text{length}$$

# Transportation calculations



# Georgia transportation emissions in millions of metric tons



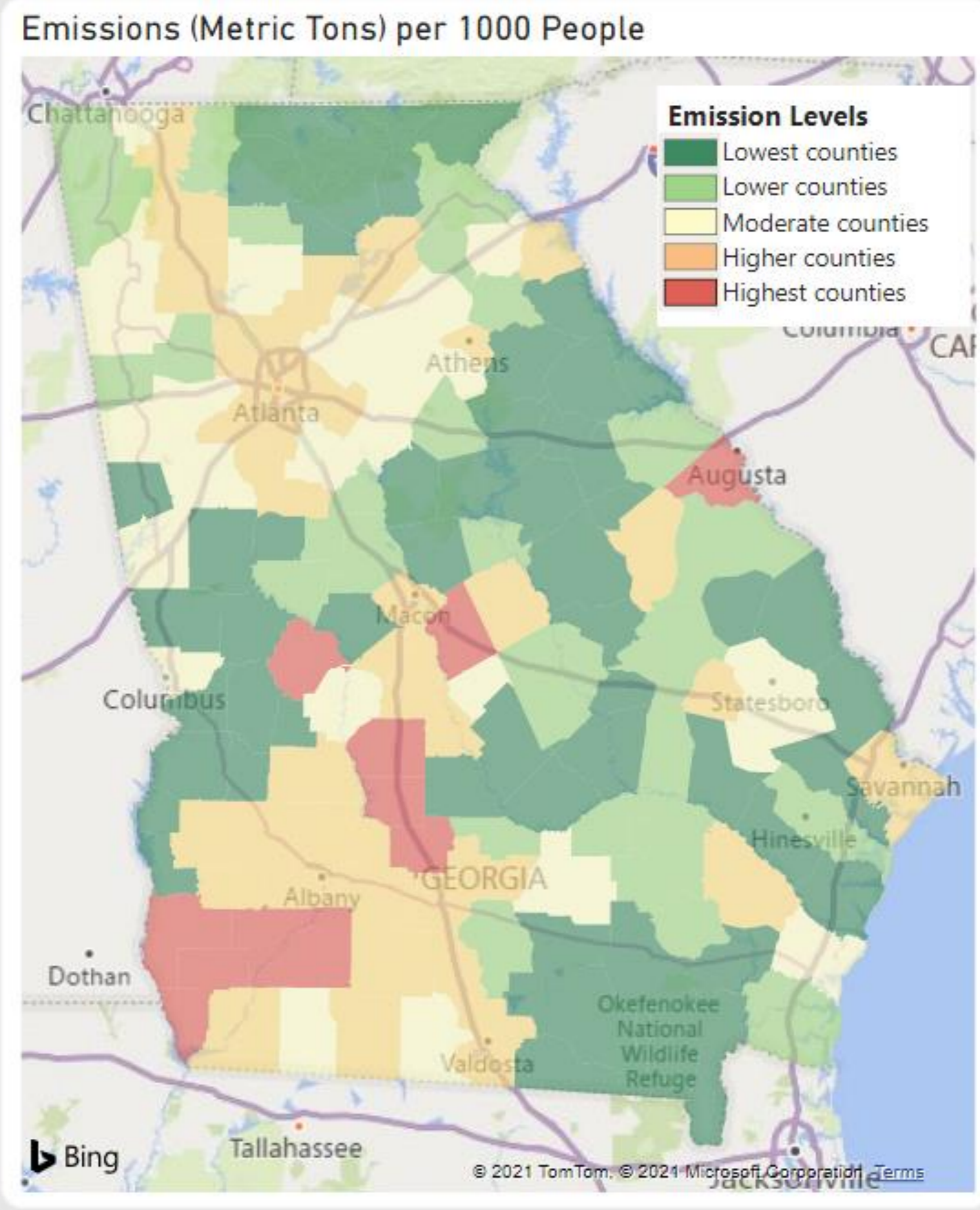
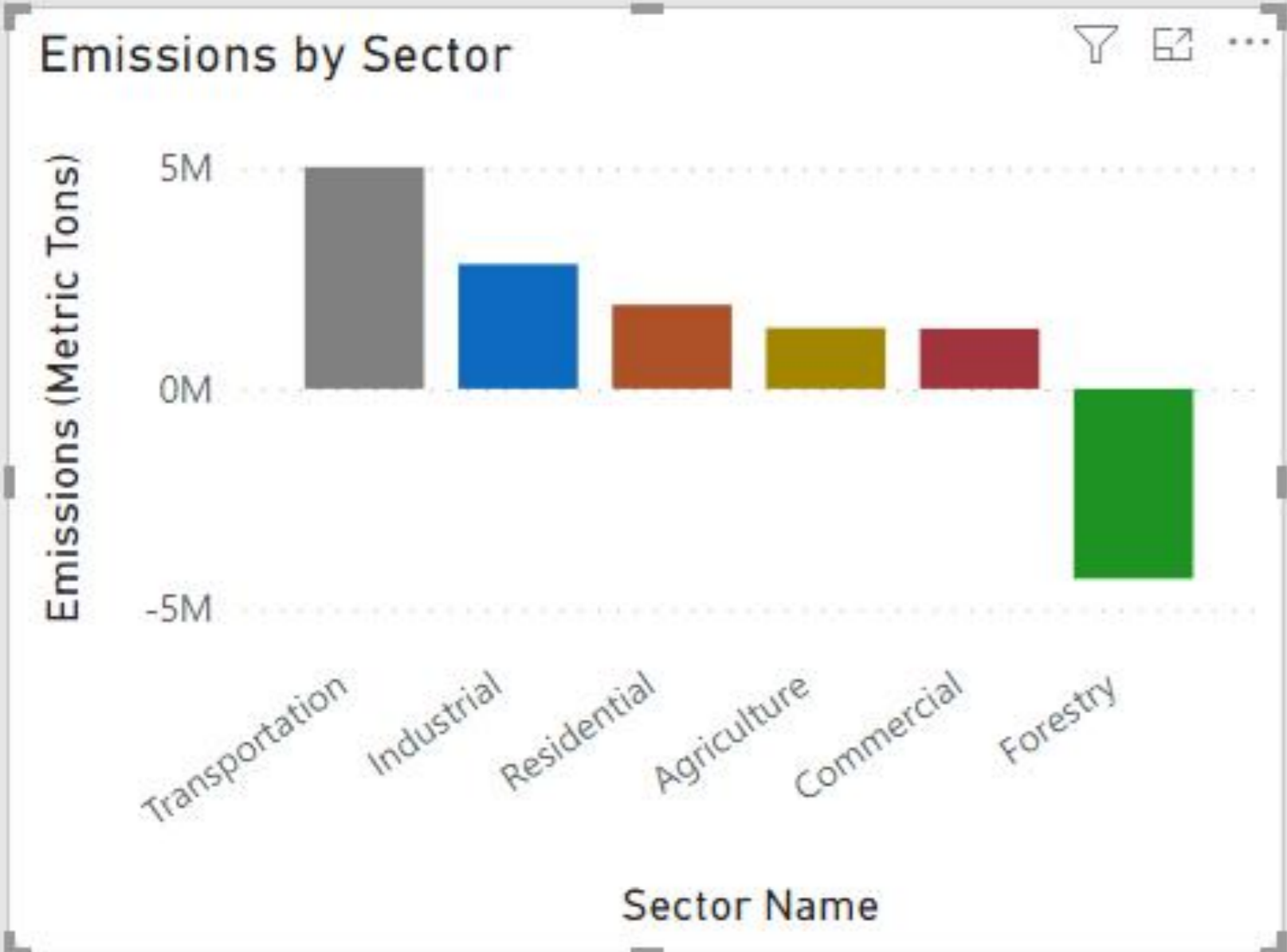
# **Transportation questions and discussion**

# A few of our questions

1. Would it be possible to allocate CO<sub>2</sub> emissions not at the VMT **emission point** location, but at **decision point** locations where people, firms, and government agencies actually make choices to activate (or not activate) drawdown solutions?

↶ Clear all filters
Month 
Year

| NAME    | Year | Month | Sector Name    | Emissions (MT) | Emiss... |
|---------|------|-------|----------------|----------------|----------|
| Appling | 2021 | April | Agriculture    | 19,965.18      |          |
| Appling | 2021 | April | Commercial     | 1,772.70       |          |
| Appling | 2021 | April | Forestry       | -34,803.33     |          |
| Appling | 2021 | April | Industrial     | 5,802.65       |          |
| Appling | 2021 | April | Residential    | 2,579.84       |          |
| Appling | 2021 | April | Transportation | 10,284.94      |          |



Emissions for this Month (MT)

# 8.20M

Emissions, Year Total (MT)

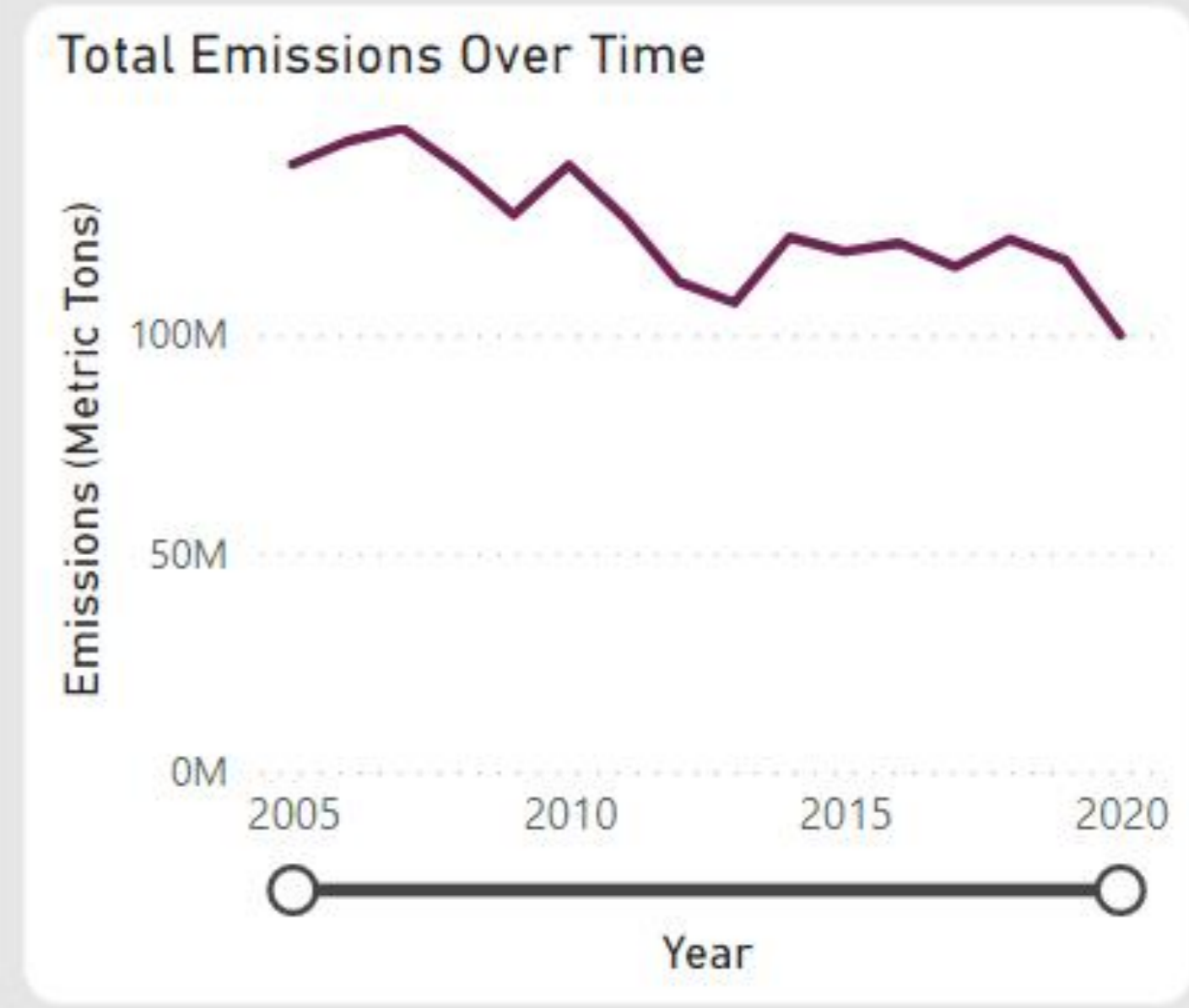
# 34.67M

Emissions per 1000 People (MT)

# 751

Emissions, One Year % Change

# 42.60



Inspired by Project Drawdown, we are building a movement in Georgia to accelerate progress toward net zero greenhouse gas (GHG) emissions. This dashboard tracks GHG emissions in Georgia. Filter by date, county, or sector using the selectors, or click on a county directly on the map. Hold the Ctrl button down to select multiple counties; click outside the state to clear county selections. Note that emissions data for each month is dated on the 1st.

To learn more about Drawdown Georgia, visit [drawdownga.org](https://drawdownga.org)

## Up Next

One more seminar next Friday from 10:00am to 11:00am:

- Forests, Food, and Farms Oct. 29<sup>th</sup> – Drs. Jackie Mohan, Jeff Mullen & Bill Drummond

Updates about the dashboard (and some PPTs) will be posted here:

<https://cepl.gatech.edu/projects/Drawdown-Georgia>



# THANKS!

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For more about Drawdown Georgia:

➤ [www.drawdownga.org](http://www.drawdownga.org)

For more about Drawdown Georgia research program:

➤ <https://cepl.gatech.edu/projects/Drawdown-Georgia>

