

Taking the Temperature: Transportation Impacts on Greenhouse Gas Emissions in the Atlanta Region

Executive Summary

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The Atlanta region is facing many factors that can potentially drive a rise in greenhouse gas (GHG) emissions at a time when national policies are stressing the reduction of all GHG emissions. The Atlanta Regional Commission (ARC) has begun to consider strategies for reducing transportation-based GHG emissions and is evaluating the role these strategies might play in *Plan 2040*.

Regional planning for climate change is gaining more attention across the country. Hundreds of local governments, including several here in the Atlanta region, are taking steps to reduce their greenhouse gas emissions. While the debate on climate change continues, the benefits of reducing harmful emissions extend beyond adapting to a changing climate and to new federal regulations. Taking appropriate actions now can help alleviate congestion and improve public health. *Envision6*, the current regional transportation plan (RTP), contains strategies that lead to reductions of primary pollutants, as well as CO₂ emissions.

What is Climate Change?

Climate change refers to any significant change in measures of climate lasting for an extended period. Although climate change is commonly associated with extreme temperatures, it also includes measures such as precipitation and wind. The change in temperature is caused by carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and other gases trapped in the atmosphere. Hotter weather has many implications on the region. The potential impacts to Georgia include more frequent and more intense heat waves, storms, droughts, and forest fires. Longer and hotter summers will likely degrade regional air quality, increase the risk of the spread of infectious diseases, and challenge water supplies and agriculture. This ultimately affects our economy and our quality of life.

The region's limited transportation infrastructure will also be challenged. While all types and levels of impacts have economic implications, this paper deals exclusively with the issues around transportation.

Transportation Factors

The transportation sector is responsible for 34 percent of domestic CO₂ emissions, the predominant greenhouse gas contributing to global climate change. In Georgia, power and transportation are the leading sources of CO₂ emissions. Most CO₂ generated in the transportation sector is emitted from tailpipes. Between 1990 and 2007, mobile-source CO₂ emissions in Georgia increased 40 percent. This increase in CO₂ can be attributed to four factors:

1. *Increase in vehicle miles traveled (VMT)*

The Atlanta region has experienced significant growth in population and consequently VMT from 1990 to the present. The population exploded, increasing by 62 percent between 1990 and 2005. As communities developed further and further from the city center, residents saw a 60 percent increase in VMT during that time. Based on *Envision6*, VMT is forecast to increase 54 percent by 2030.

2. *Fleet inefficiency*

Fleet efficiency is considered by many experts to be the most critical factor in impacting emissions. Although fuel economy in many vehicles continues to improve,

this is offset by the increasing number of fuel-inefficient vehicles in the fleet. The number of sport utility vehicles and pick-up trucks, the least fuel efficient vehicles in the fleet, registered in Georgia has increased dramatically over the last two decades.

3. *Increase in freight volume*

Trucks are the primary mode of freight transportation in the region, accounting for approximately 84 percent of all freight movement. Truck VMT in the Atlanta region is expected to increase 55 percent between 2005 and 2030.

4. *Congestion*

Congestion and its associated impacts, such as wasted time and fuel, decreased regional economic competitiveness, and worsened air quality, are among the most significant problems facing the Atlanta region. Low travel speeds and idling also lead to decreased vehicle efficiency and results in increased ozone precursor and CO₂ emissions.

Transportation and Land Use Scenarios

Five scenario tests incorporating different land use strategies, as well as the new CAFE standard for fuel economy designated in the Energy Independence and Security Act (EISA), were analyzed for future impact on CO₂ emissions and compared to 1990 conditions.

1. Future local land use plans versus *Envision6*.
2. EISA mpg standard versus the current Atlanta mpg trend.
3. Comparison of future local plans, *Envision6*, future local plans with EISA and *Envision6* with EISA.
4. *Envision6* versus a high-density land use scenario
5. TPB Concept 3 plus transit/density focused land use. This scenario provided the biggest reduction in emissions, roughly 7 percent below 2005 levels.

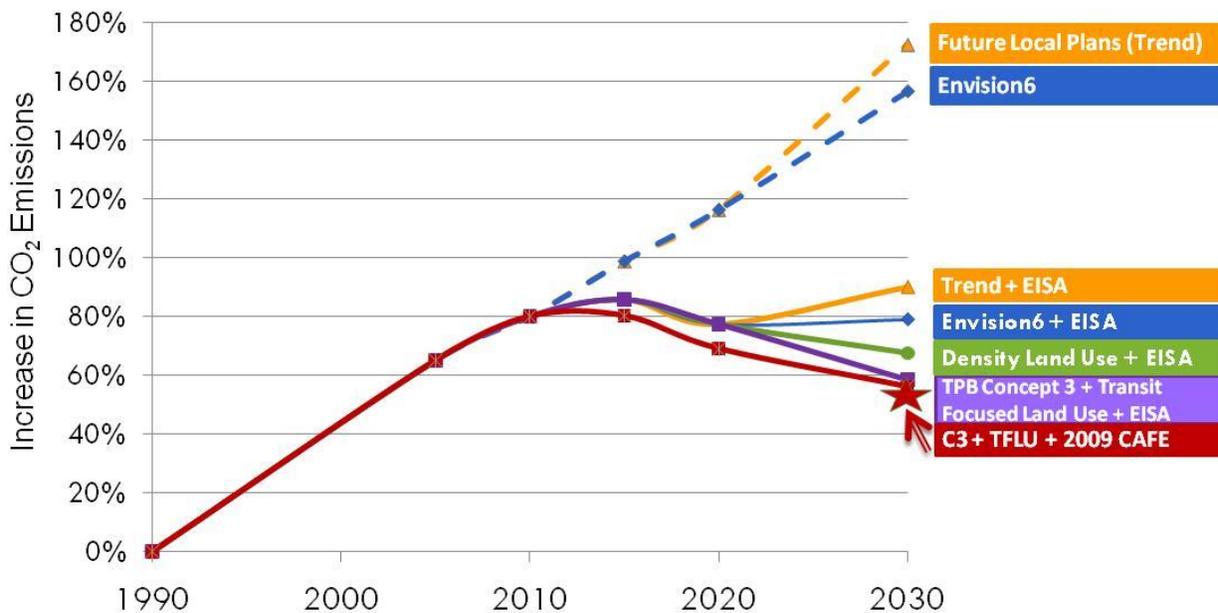


Figure 1. CO₂ emissions of various scenario tests

Regional land use policies focusing on significant expansion to the regional transit system result in the greatest benefit. However, it would come at the most significant cost and likely take the longest to implement.

Reducing Transportation Greenhouse Gas Emissions

The key to reducing greenhouse gas emissions is widely thought to be fourfold:

- Improve light and heavy duty vehicle fuel efficiency.
- Reduce amount of carbon in fuel.
- Improve on-the-road operating efficiency by lowering congestion, reducing very high and very low speeds and educating passenger drivers and truck drivers in fuel-economical driving habits.
- Decrease VMT.

Transportation Demand Management (TDM) strategies increase the efficiency of the transportation system and are a vital part of the overall planning process. TDM is becoming more valuable as increasing pressure is placed on the region's roadways and highways. The average single occupant vehicle (SOV) emission rate is approximately one pound of CO₂ per mile. Assuming the current average VMT of 33 miles per person in Atlanta, each person emits 33 pounds of CO₂ every day, just from transportation. Moving SOVs off the road during peak periods, consolidating passengers into higher occupancy vehicles or eliminating work trips altogether can help relieve congestion, improve air quality, and increase convenience for the region's commuters. Effective TDM concepts include: transit, enhanced bicycle and pedestrian systems, parking management, congestion pricing, and employer strategies such as compressed workweeks, teleworking, and carpooling.

ARC supports reduction in greenhouse gases through goals outlined in *Envision6*. Realizing that land use and transportation are mutually dependent, *Envision6* integrates these elements through programs such as the Livable Centers Initiative (LCI) program, the Green Communities Program Fifty Forward, and infill development such as Atlantic Station. ARC also plays a key role in regional and state policies, such as the Governor's Congestion Mitigation Taskforce, State Implementation Plans (SIPs), and Georgia's Clean Air Force's inspection and maintenance (I/M) program. Several cities in the metro region have signed onto the Mayor's Climate Protection Agreement and the International Council on Local Environmental Initiatives (ICLEI). To date, Georgia has not developed a Climate Action Plan for the state nor for the region, but has obtained membership in the Climate Registry, a North American collaboration to calculate, verify and publicly report GHG emissions registries.

Goals and Actions

Lastly, policy recommendations are offered for consideration. The current RTP and RDP address a majority of these issues, but could be continued more aggressively.

Goal 1: Promote sustainable development through integrated land use and transportation strategies

Actions:

- Shift from sprawl to compact development.
- Continue LCI program.
- Increase involvement in ARC's Green Communities Program.
- Support development around transit stations.

- Promote infill development.
- Tie state and federal transportation funds to support sustainable development.

Goal 2: Reduce VMT by supporting alternative modes and implementing transportation pricing measures

Actions:

- Increase programs and incentives to maximize carpooling and vanpooling.
- Adopt transportation pricing policies that discourage SOV travel (congestion pricing, parking pricing, mileage-based user fees, etc.).
- Increase safe, reliable public transportation, including higher occupancy of existing transit buses and rail vehicles.
- Target bike/pedestrian projects in areas that will reduce the number of vehicle trips. Include improvements in sidewalks, crosswalks, bicycle lanes, and lighting.
- Continue to encourage employers to adopt TDM strategies.
- Explore other TDM options.

Goal 3: Support the use of cleaner and more fuel-efficient vehicles and alternative fuels

Actions:

- Support Federal and state investments in R&D to decarbonize transportation vehicles and fuels by 2050, not only in the U.S., but worldwide.
- Encourage conversion of public fleets into clean, efficient vehicles.
- Continue to fund retrofits for cleaner diesel engines on buses, heavy-duty trucks, and locomotives.
- Outlaw and enforce unnecessary idling.

Goal 4: Work with stakeholders to set meaningful and realistic emission-reduction targets.

Actions:

- Identify potential partners, such as the state of Georgia and other Southeastern states. Align goals with local governments. Engage the general public. Increase public awareness.
- Incorporate nonroad emissions. Include rail and airports.
- Model CO₂ emissions with travel demand model.
- Add CO₂ emissions as a criterion in transportation decisions.
- Measure and report progress regularly.
- Develop useful tool for local governments to identify best practices.
- Investigate carbon offsets.

Goal 5: Consider adaptation responses

Actions:

- Develop emergency management plans
- Create inventory of vulnerable infrastructure

ARC has made significant progress with Goals 1, 2, and 3 to address primary pollutants. ARC should continue to support these efforts to address GHGs. The fourth set represents new initiatives that should be tailored to specifically set a framework for setting goals associated with GHG emission reductions.

Thinking Further:

- What role can ARC play to lead the state/southeast region on climate change?
- What should the first step be? Multi-state, state, metro region? Formation of Climate Action Team?
- What actors are not engaged that could bring resources to the table?
- Appropriate role in TIP, RTP, and RDP?
- How to consider and propose adaptation strategies?

Climate change is only one reason to move towards sustainability. An effective transportation system is vital to the future of our region. Improvements in transportation are important for congestion relief, public health, climate change mitigation, and overall quality of life.

Recognizing that transportation and land use are only part of the equation, other realms must also be involved – energy efficiency, buildings, electricity, and industrial sectors. Partnerships with other agencies and organizations are crucial. Breaking old habits may be one of the most difficult obstacles to overcome, but responsiveness to these issues is increasing as fuel prices rise dramatically and congestion worsens.