



Drawdown Georgia Bringing Climate Solutions Home



3/10/21



High-Level Overview

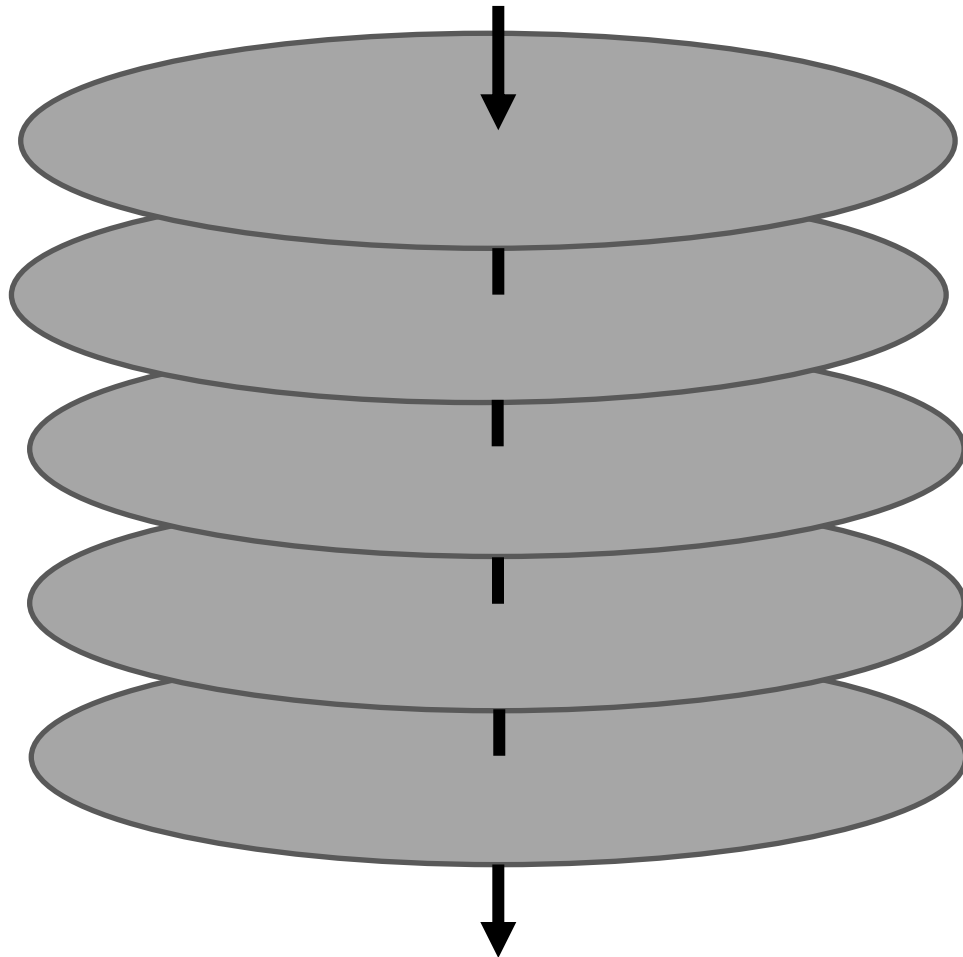
- Drawdown Georgia™ is a statewide initiative to identify and scale climate solutions in Georgia.
- Researchers from Georgia Institute of Technology, University of Georgia, Emory University, and Georgia State University identified 20 high-impact climate solutions that, if scaled, could cut state carbon dioxide emissions by about a third this decade.
- The work is based on the 100 global solutions identified by Project Drawdown®.
- Scaling the 20 high-impact solutions in Georgia can also support societal priorities “Beyond Carbon,” such as advancing equity, growing the economy, improving public health, and nourishing the larger environment.

Drawdown Georgia Research Team

- The team of researchers spent about 18 months analyzing climate solutions. This included collaboration with outside organizations and the general public.
- The research was publicly released in October 2020.



Analyzing Project Drawdown Solutions



The Drawdown Georgia Research Team ran the 100 global solutions from Project Drawdown 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?

The result: 20 Drawdown Georgia Solutions for 2030

20 Drawdown Georgia Solutions for 2030



bringing climate solutions home

www.DrawdownGA.org

Electricity



Cogeneration

Demand Response

Rooftop Solar



Large-Scale Solar

Landfill Methane

Buildings & Materials



Recycling

Refrigerant
Management



Retrofitting

Food & Agriculture



Composting

Conservation
Agriculture



Plant-Forward Diet

Reduced Food
Waste

Land Sinks



Afforestation &
Silvopasture

Coastal Wetlands



Temperate Forest
Stewardship

Transportation



Electric Vehicles

Energy-Efficient Cars

Energy-Efficient Trucks

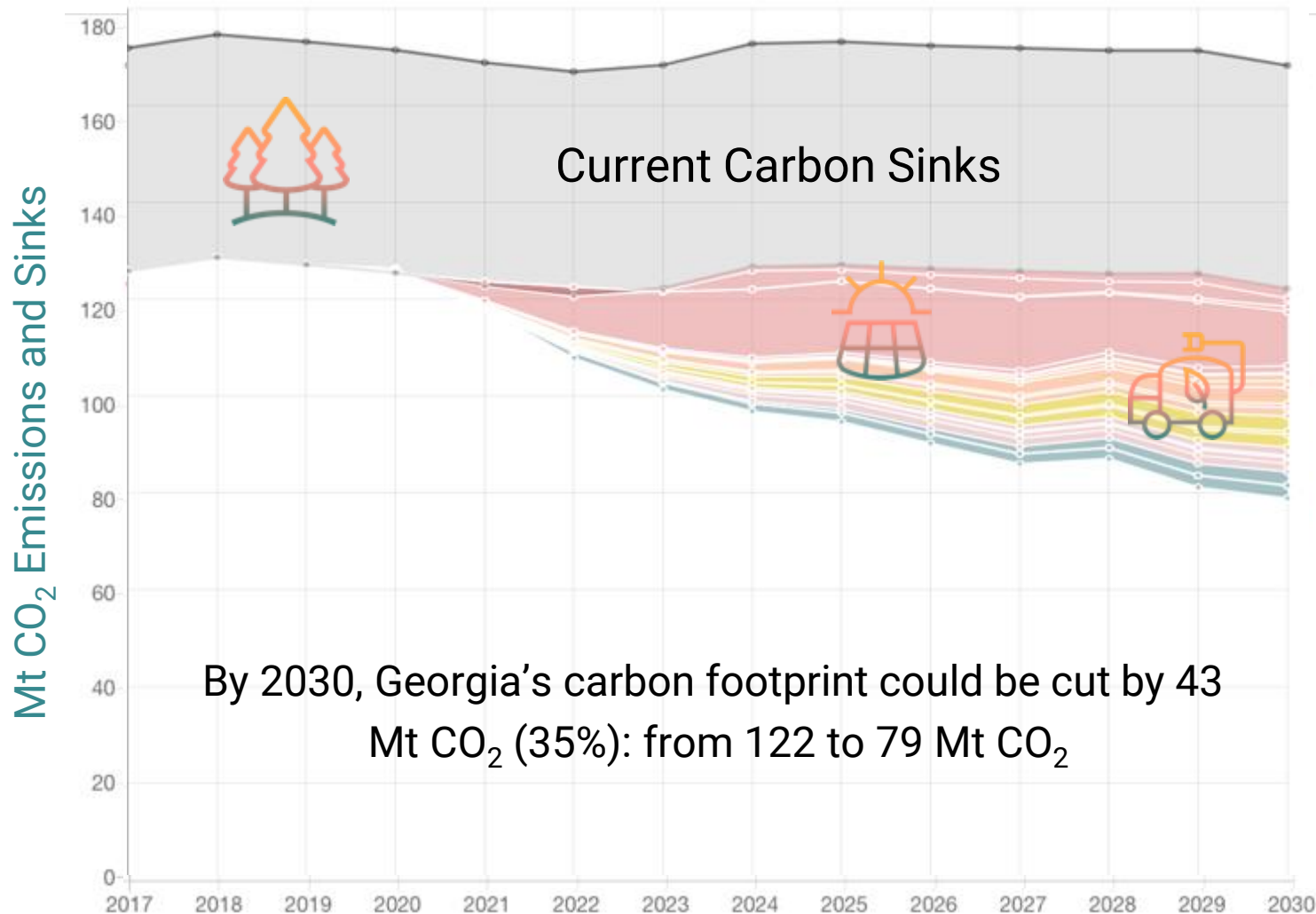


Mass Transit



Alternative Mobility

Scaling Solutions to Ambitious but Achievable Levels



- Scaling the 20 Drawdown Georgia solutions to ambitious, but achievable, levels can reduce the state's carbon emissions by 35% by 2030.
- The top black line represents a projection of total state-level carbon emissions if current trends and policies continue.
- The gray wedge shows baseline annual sequestration at 46 million metric tons (Mt) CO₂ per year from Georgia's natural carbon sinks, such as forests.
- The height of each colorful wedge represents the emission reductions achieved by a Drawdown Georgia solution in a given year.

Beyond Carbon

Drawdown Georgia solutions have impacts beyond their ability to help us reverse climate change. Most of those impacts are incredibly positive and will lift up our communities. However, we recognize that there is the potential for less positive impacts, so we've mapped all the possibilities so that we're pursuing progress with eyes wide open.



Equity



Environment



Public Health



Economy

Summaries of High-Impact Solutions





Cogeneration

Cogeneration plants capture heat from industrial processes or from coal- and gas-fired power production to warm buildings, fuel manufacturing, or create electricity. Cogeneration reduces emissions when it displaces fossil fuels as the source of energy.

QUICK FACTS

- Cogeneration systems, also called combined heat and power systems, can be used in individual buildings, in a district heating network, or in manufacturing and electricity generation systems.
- In 2017, Georgia had 43 cogeneration facilities totaling 1.4 GW of capacity.
- Many of the largest cogeneration facilities in the state are industrial (e.g. pulp and paper), but some are commercial (e.g. the 3,000 KW system in the Bank of America Plaza in Atlanta).

BEYOND CARBON

- Cogeneration systems can be cost competitive and create local jobs.
- These systems can reduce coal- and natural gas-fired generation, leading to overall improvements in air quality and benefiting the environment and public health.
- Issues to watch include potential impacts on localized air pollution. There is a need to look carefully at system design, primary energy source, and plant siting.

ELECTRICITY

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by adding 16 new 25 MW cogeneration plants that generate electricity with waste heat from industrial processes.



Demand Response

Demand response programs can help reduce peak load, shift the timing of electricity usage, or reduce overall electricity demand. Peak load is often met by higher emitting and more expensive sources of energy. Relying on these sources less reduces carbon pollution.

QUICK FACTS

- In Georgia, we meet peak demand primarily with natural gas. More polluting and less efficient single-cycle diesel combustion turbines also contribute.
- Demand response works. It has been used extensively in industrial and commercial sectors since the 1970s to reduce peak demand.
- Georgia Power has demand response programs for both industrial and residential customers and has proposed additional programs in its latest Integrated Resource Plan.

BEYOND CARBON

- Demand response can reduce fossil fuel powered electricity generation, improving air quality and benefiting the environment and public health.
- These programs are affordable and have the potential to benefit low-income households. However, access for these households to targeted demand response technologies and mismatches in scheduling present issues to watch.
- Environmental issues to watch include end-of-life disposability for demand response equipment that require lithium-ion batteries.

ELECTRICITY

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia if 187,000 additional households shift 10% of their peak electricity use to off-peak times.



Landfill Methane

Landfills are sources of methane emissions, a powerful greenhouse gas. Methane is created from anaerobic digestion of municipal solid waste in landfills. The gas can be captured and used, including to generate electricity.

QUICK FACTS

- In 2019, Georgia had 92 landfills totaling more than 495 Mt of waste.
- Out of Georgia's 25 operational landfills: 18 generate electricity, 4 use landfill gas directly, and the other 3 upgrade landfill gas to renewable natural gas.
- There is 66 MW of electricity capacity at the operational landfills in Georgia.
- There is potential for additional landfill gas projects in the state. The EPA's Landfill Methane Outreach Program shows there are 25 landfills categorized as "Future Potential" or "Candidate" for landfill gas-to-energy retrofitting in Georgia.

BEYOND CARBON

- This solution is cost-effective and can create jobs associated with the design, construction, and operation of energy recovery systems.
- These systems improve overall air quality when they capture landfill gas instead of emitting methane and other gases. Improved air quality has environmental and public health benefits.
- Air quality benefits are even greater if the captured gas displaces the use of fossil fuels to generate electricity.
- Issues to watch include impacts on localized air pollution, so we need to look carefully at the system design and the primary energy source.

ELECTRICITY

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by opening 4 typical landfill facilities with 5 MW gas-to-energy systems.



Large-Scale Solar

Solar photovoltaic (PV) systems convert solar energy into electricity. Utility-scale solar is defined as any ground mounted solar panel facility that has a capacity rating larger than 5 MW. Community-scale solar generally has a capacity of 0.5-5MW. This solution can be coupled with on-site storage (batteries) to improve reliability.

QUICK FACTS

- In mid-2019, Georgia had more than 1,570 MW of solar PV capacity, with more than 1,500 MW of that at utility-scale facilities.
- As of 2019, there were no large-scale solar + storage projects in the state.
- According to the U.S. Energy Information Administration, utility-scale facilities produced 98% of the state's solar PV generation in 2018.
- Georgia Power's 2019 Integrated Resource Plan calls for 2,000 MW of new utility-scale solar by 2022.

BEYOND CARBON

- Solar generation can displace fossil fuels. This can lead to better air quality, which has both environmental and public health benefits.
- Construction and operation of new solar facilities can create new jobs. According to the Georgia Solar Job Census 2019, there are 270 solar companies operating in the state.
- There is an opportunity to diversify the solar workforce. The Solar Jobs Census 2019 found women comprised only 26% of the solar workforce and 73% were white.
- Issues to watch include water usage associated with cleaning the panels, end-of-life disposability of solar panels, and land use for installations. Thoughtful and creative siting of facilities can help mitigate some of the land-use concerns.

ELECTRICITY

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by adding 10 new 100 MW utility-scale solar installations as well as 36 new 5 MW community solar projects.



Rooftop Solar

Solar photovoltaic systems convert solar energy into electricity. Rooftop solar systems are small-scale installations that can produce electricity primarily for onsite use. When combined with storage, additional benefits can accrue.

QUICK FACTS

- As of 2019, there was about 16 MW of existing rooftop solar capacity in Georgia, with 4.3 MW on homes.
- Most of Georgia's residential rooftop solar is associated with Solarize programs, a community group that organizes crowdsourcing campaigns to bring down the costs of rooftop solar panels through bulk purchasing from selected distributors and installers.
- Nationally, the cost for solar panels has fallen in recent years. A 2019 study found the average price for a 6 kW solar system dropped from \$35,100 in 2011 to \$13,000 in 2021.

BEYOND CARBON

- Solar generation can displace fossil fuels, improving air quality and generating environmental and public health benefits.
- Construction and operation of solar systems creates local and statewide employment.
- There is an opportunity to diversify the solar workforce. The Solar Jobs Census 2019 found women comprised only 26% of the solar workforce and 73% were white.
- Energy bills are expected to decrease with expansion of rooftop solar, though upfront cost is an issue to watch, as it can hinder adoption and exacerbate inequities for under-resourced groups. Research from Tufts University and the University of California, Berkeley, highlights the need to address significant racial and ethnic disparities in solar adoption (even after controlling for income).
- An environmental issue to watch is large-scale disposability of solar panels.

ELECTRICITY

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by adding 295,000 new 5 kW home solar systems.

Lead Researcher

Dr. Marilyn A. Brown, CEM, NAE, NAS
Interim Chair, School of Public Policy
Georgia Institute of Technology
Climate and Energy Policy Lab: www.cepl.gatech.edu





Recycling & Waste Management

Recycling can reduce greenhouse gas emissions because it is often less energy intensive than producing new items. This solution considers increases in recycling at the household level; increases in industrial and commercial recycling; and a focus on increasing paper recycling.

QUICK FACTS

- Stanford University estimates that one ton of recycled plastic saves about 5,800 kWh of energy.
- According to Project Drawdown, about 66% of paper is currently recycled in the United States.
- Many cities in Georgia, including Atlanta, have active recycling programs.
- A 2005 report from the Georgia Department of Community Affairs found Georgians throw away 1.9 million tons of paper annually, as well as 1 million tons of plastics, 0.36 million tons of metal, and 0.24 million tons of glass.

BEYOND CARBON

- Recycling can help improve soil and water quality by diverting waste from landfills. This creates environmental and public health benefits.
- This solution can help create jobs associated with expanded or upgraded recycling services.
- Issues to watch include the siting of recycling centers, which may be disproportionately located in under-resourced communities. This could impact local air quality and negatively impact property values. Other issues to watch include cost and infrastructure needs.

BUILDINGS & MATERIALS

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by recycling at least 20% of currently disposed paper waste annually.



Refrigerant Management

Hydrofluorocarbons (HFCs) are chemicals used to cool refrigerators and air conditioners. They are also an extremely potent greenhouse gas. Efforts to control leakages, replace HFCs with alternative refrigerants, and to properly dispose of and recycle existing HFCs would lower greenhouse gas emissions.

QUICK FACTS

- HFCs were introduced to replace CFCs, a class of refrigerant chemicals that were phased out because they were depleting the ozone layer.
- HFCs have an extremely high global warming potential, with thousands of times the heat trapping potential of CO₂.
- In December 2020, Congress passed legislation to phase down HFCs nationwide by 40% by 2024 and by 85% by 2036. The phase down will be administered by the U.S. Environmental Protection Agency.

BEYOND CARBON

- Reducing refrigerant leakage and replacing HFCs with alternatives is associated with indoor air quality improvements, which has environmental and public health benefits.
- Improved cooling systems can reduce energy bills.
- Issues to watch include the proper installation and disposal of alternative refrigerants, which are still chemical agents.

BUILDINGS & MATERIALS

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by reducing refrigerant leakage rates by 8% in all of Georgia's grocery stores.



Retrofitting

Buildings use electricity and natural gas for heating, ventilation, and cooling (HVAC); water heating; lighting; and to power appliances and electronic devices. Retrofitting existing buildings can reduce energy demand and lower the associated greenhouse gas emissions.

QUICK FACTS

- There are many ways to retrofit a building. This solution considers a range of options including: improving insulation, installing LED lighting, replacing conventional HVAC systems with high-efficiency heat pumps, and switching conventional windows with high-efficiency windows.
- There are lots of opportunities to deploy this solution. The 2017 American Housing Survey reports that Georgia has about 4.2 million homes, including 2.8 million single-family detached residential units.
- Retrofitting technologies are mature and market ready and innovations continue to improve the options.

BEYOND CARBON

- Retrofitting can reduce energy demand and therefore reduce fossil fuel power generation. This can lead to improved air quality, which has environmental and public health benefits.
- Reducing energy demand can also reduce energy burden, the percentage of a household income that is spent on energy costs.
- Installation of retrofits can create local jobs.
- For residential focus, issues to watch include cost and awareness barriers for under-resourced communities and energy burdened customers, necessitating external financing and support solutions.

BUILDINGS & MATERIALS

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e by retrofitting 20% of Georgia's homes to save 20% of their annual energy use.

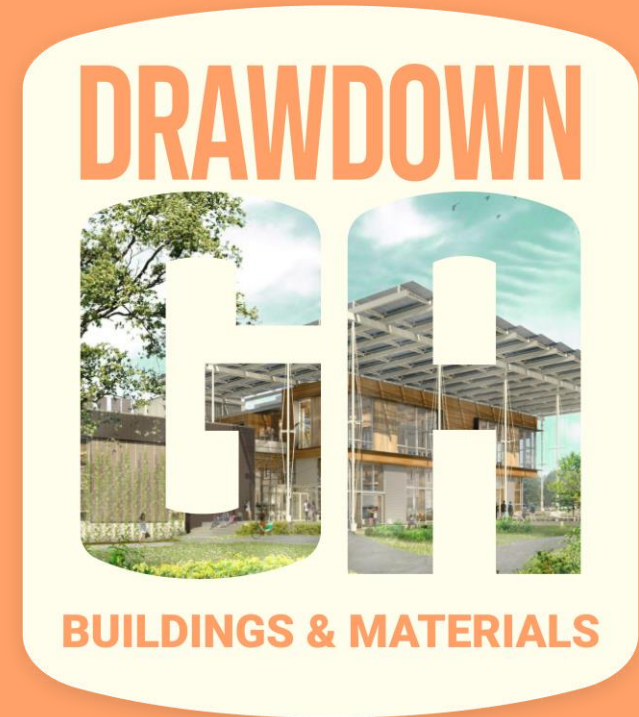
Lead Researcher

Dr. Daniel Matisoff

Associate Professor, School of Public Policy

Georgia Institute of Technology

Climate and Energy Policy Lab: www.cepl.gatech.edu





Composting

When organic matter decomposes in landfills, it releases carbon dioxide and methane, a potent greenhouse gas. Composting allows for organic matter to be broken down by microbes. The process sequesters carbon and produces fertilizer.

QUICK FACTS

- According to the U.S. Environmental Protection Agency, food and yard waste together make up more than 30% of what we throw away. This material could be composted instead.
- Georgia currently operates about 38 composting facilities at various scales.
- Composting creates a nutrient rich soil that can be used for gardening and agriculture.

BEYOND CARBON

- Composting has many environmental benefits including enriching soil health and reducing the need for chemical fertilizers.
- Composting diverts waste from landfills.
- This solution can be affordable at scale, however there are costs associated with interventions and education required for households and businesses to change disposal practices including plastics separation.

FOOD & AGRICULTURE

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by diverting 2 million tons of organic and food waste to composting from landfills.



Conservation Agriculture

Conservation Agriculture refers to a set of agricultural practices that supports biosequestration via crop rotation, managing soil organic matter including cover crops, and reduced tillage.

QUICK FACTS

- Georgia has about 3.8 million acres of croplands.
- In Georgia, 47% of croplands are already under conservation tillage practices.
- According to Project Drawdown, conservation agriculture practices increase the carbon sequestration rate at an average of 0.2 tons of carbon per acre per year.
- Cotton & peanut dominates more than 50% of the croplands in Georgia.

BEYOND CARBON

- Conservation agriculture has many environmental benefits. It improves water quality and quantity, lowers soil erosion, and improves soil health.
- Farmers may see increases in crop/agricultural yield, which can increase income and wages.
- Issues to watch include concerns around cultural fit and use of excessive herbicides, particularly for farmers that worry conservation agriculture will vary yield and income, especially for certain row crops.

FOOD & AGRICULTURE

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 0.5 Mt of CO₂e in Georgia if we increased conservation agriculture practices so that 90% of the croplands in the state practiced conservation tillage.



Plant-Forward Diet

A plant-forward diet can reduce emissions associated with meat production. This solution assumes people 1) maintain a 2,500 calorie per day nutritional regime; 2) meet daily protein requirements; and 3) purchase locally produced food when available.

QUICK FACTS

- On average, Georgians consume about 105 lbs of meat (beef, pork, poultry & fish) each year.
- More than half of the meat consumed in the state each year comes from beef and pork.
- This solution considers both displacing meat with plant-based alternatives and adopting to low-carbon meats.

BEYOND CARBON

- Plant-forward diets are associated with many environmental benefits. This includes improved air and water quality as well as less extensive farming practices.
- Reducing meat consumption can mean reductions in obesity, incidence of cancer, and risk of developing diabetes and heart diseases, which also means reduced long-term health-care costs.
- Issues to watch include concerns around cultural fit and way of life as well as addressing food desert and solution access considerations.

FOOD & AGRICULTURE

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia if 25% of Georgians adopt a plant-forward or lower-carbon-emitting diet, or by reducing statewide meat consumption by 25%.



Reduced Food Waste

Food waste refers to food that is produced but not eaten. Food waste generates greenhouse gases in every step of the food production and distribution process. When wasted food decomposes in landfills, it produces carbon dioxide and methane, a potent greenhouse gas.

QUICK FACTS

- Food waste occurs for a variety of reasons, such as people purchasing more food than they need or customers rejecting bruised or misshapen produce. Food waste also can occur when food rots on farms or in the distribution process.
- According to the USDA, between 30-40% of the nation's food supply is wasted each year.
- Drawdown Georgia has estimated that each year Georgians contribute about 2 million tons of food waste.

BEYOND CARBON

- Reducing food waste has positive environmental impacts, including decreased land, water, and other resources use.
- Food that is donated instead of thrown away can improve food security.
- Issues to watch include potential price and labor impacts, which are difficult to predict.

FOOD & AGRICULTURE

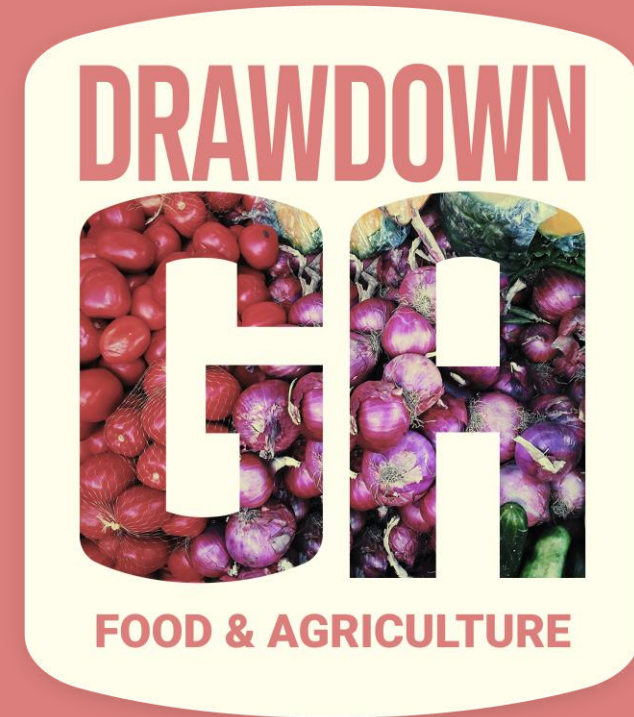
GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia if we prevent 12% of the state's current food waste.

Lead Researchers

Dr. Sudhagar Mani
Professor
School of Chemicals, Materials, and Biomedical
Engineering
University of Georgia

Dr. Jeffrey D. Mullen
Associate Professor
Agricultural & Applied Economics
University of Georgia





Afforestation & Silvopasture

Afforestation means creating forests in places that are no longer forested, such as planting trees on degraded agricultural or pasture lands and in urban areas. Silvopasture is the practice of adding trees to pastureland. Forests sequester carbon in trees, soil, and other vegetation.

QUICK FACTS

- Silvopasture is an ancient practice, integrating trees and pasture into a single system for raising livestock.
- Shade-tolerant and semi-tolerant crops, such as blueberries and blackberries, can also be incorporated in silvopastures.
- According to the USDA, Georgia has about 2.8 million acres of pastureland.
- Almost 60% of land in Georgia is naturally-recruited and planted temperate forests.
- Georgia's forests currently offset about 8% of the state's CO₂ emissions and can sequester 1 to 4 tons of carbon per acre per year.

BEYOND CARBON

- Positive environmental impacts of afforestation include improved air and water quality, and increased wildlife habitats and biodiversity.
- Improved air and water quality benefit public health.
- Silvopasture has the potential to cut farmers' costs by reducing the need for feed, fertilizer and herbicides.
- Issues to watch include changes in the amount of rural land use available for farming. Reductions may be supplemented by farming tree products. In addition, there may be economic barriers to implement and maintain afforestation for low-income farmers.

LAND SINKS

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by planting 7% of current pasture lands with mixed hardwood & loblolly tree species.



Coastal Wetlands

Coastal wetlands, including seagrasses, tidal salt marshes, and freshwater marshes, are powerful carbon sinks. These ecosystems sequester carbon in plants and soils.

QUICK FACTS

- Georgia has about 100 miles of coastline.
- According to the Georgia Department of Natural Resources, the state has 420,324 acres of tidal marshes, the largest of any state on the U.S. Atlantic seaboard.
- Georgia's tidal marshes sequester 1.4 Mt of CO₂ each year, primarily through sediments.

BEYOND CARBON

- Coastal wetlands provide positive socioeconomic benefits by acting as the first line of defense from storm surges and flooding.
- Environmental benefits include enhanced water quality as well as critical habitats, nurseries, and shelter for fish, migratory birds, and other wildlife.
- Coastal wetlands can increase coastal tourism, improving quality of life and job opportunities.

LAND SINKS

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by increasing Georgia's coastal wetland area by 71%.



Temperate Forest Stewardship

Restoring and protecting temperate-climate forests has many benefits including carbon sequestration from trees, soil, and other vegetation.

QUICK FACTS

- Almost 60% of land in Georgia is naturally-recruited and planted temperate forests.
- Georgia is the number one forestry state in the nation.
- According to the Georgia Forestry Commission, about 150,000 acres are planted in Georgia with pine seedlings each year.
- Georgia's forests currently offset about 8% of the state's CO₂ emissions and can sequester 1 to 4 tons of carbon per acre per year.

BEYOND CARBON

- Positive environmental impacts include improved air quality, improved water quality, and increased wildlife habitats and biodiversity.
- Improved air and water quality also benefit public health.
- Forests create jobs in forest protection and management.
- They also offer low-cost recreational opportunities and can bring tourism-related jobs.

LAND SINKS

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia if we increase forest cover by 3.5% with mixed tree species.

Lead Researchers

Dr. Jacqueline E. Mohan, M.E.M., Ph.D.
Associate Professor,
Terrestrial Ecosystem Ecology & Biogeochemistry
Odum School of Ecology
University of Georgia

Dr. Puneet Dwivedi
Associate Professor,
Sustainability Sciences
Warnell School of Forestry & Natural Resources
University of Georgia





Alternative Mobility

Replacing emissions-intensive vehicle miles traveled with zero- or low-carbon alternatives can reduce greenhouse gas emissions. This solution considers the role of bike infrastructure, walkable cities, telecommuting, and e-bikes.

QUICK FACTS

- Cars are the dominant form of transportation in the United States, with 87% of daily trips occurring in personal vehicles.
- Prior to the coronavirus pandemic, adults in the U.S. spent an average of 1 hour driving every day.
- Cars are often used for short trips (under 4 miles). Replacing those with walking, biking, or micro e-mobility solutions can contribute to emissions reductions.
- Telecommuting grew dramatically in 2020 as a result of the pandemic. It is an area to watch in the coming years.

BEYOND CARBON

- Alternative mobility solutions can improve air and water quality and therefore benefit the environment and public health.
- Additional public health benefits come with increased physical activity.
- Telecommuting can improve productivity because workers spend less time in traffic jams -- estimated to cost about \$87 billion in the United States in 2018. A 2014 paper by Dennis Ong et al. found video conferencing reduces energy use by 93% compared to in-person meetings.
- Issues to watch include rural versus urban adoption rates, gentrification impacts, road infrastructure zoning/cost, and last-mile considerations.

TRANSPORTATION

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by eliminating 2.5% of vehicle miles traveled.



Electric Vehicles

Electric vehicles are powered by electric batteries instead of conventional fuels such as gasoline and diesel. The emissions profile of these vehicles is lower. However, the exact emissions vary depending on the generation mix that provides the electricity.

QUICK FACTS

- In 2018, about 14,000 electric vehicles were registered in Georgia.
- Georgia previously had a tax credit to incentivize the purchase of electric vehicles. In 2015, the state legislature eliminated the tax credit of up to \$5,000 for electric vehicles and established a \$200 annual user fee for electric vehicle owners.
- Electric vehicles can reduce CO2 emissions in Georgia compared to most comparable conventional vehicles. These reductions could grow significantly (up to 50% per vehicle by 2030) if Georgia's electricity grid continues to become lower emitting.

BEYOND CARBON

- Electric vehicles offer environmental and public health benefits from localized air quality improvements.
- This solution can also create jobs associated with manufacturing, selling, installing, and maintaining batteries and other EV components.
- Medium-term issues to watch include end-of-life disposal of batteries, location and cost of charging infrastructure, and vehicle purchase cost. Higher purchase costs can make access to these vehicles challenging for under-resourced individuals and communities.
- State or federal EV tax credits can help defray upfront costs, but they can result in equity issues and their outlook is uncertain.

TRANSPORTATION

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by replacing 250,000 gasoline-powered vehicles with electric vehicles.



Energy-Efficient Cars

There are a range of cost-effective technologies available to reduce or replace petroleum fuel use in light-duty vehicles, including cars and pickups. Among these, hybrids deliver the most substantial reductions, by pairing an electric motor and battery with an internal combustion engine.

QUICK FACTS

- Hybrid technology allows a vehicle to regenerate braking loss and operate both engine and motor at greater efficiency, improving fuel economy and lowering emissions.
- According to Georgia Department of Transportation, there are about 8.5 million vehicles registered in Georgia. The vast majority of these vehicles are light-duty vehicles (cars, SUVs, pickups) that have traditional internal combustion engines.
- Federal regulations, including Corporate Average Fuel Economy (CAFE) standards, have helped drive down the amount of CO₂ emitted per mile by the average light-duty vehicle. According to the U.S. Environmental Protection Agency, vehicle emissions fell by about 14% between 2009 and 2018.

BEYOND CARBON

- Energy-efficient cars create environmental and public health benefits from localized air quality improvements.
- Consumers benefit from increased fuel economy, paying a smaller share of household income on net travel expenses.
- This solution can also create jobs associated with the automotive supply chain. However, mode shifts to hybrids and EVs displace jobs in gasoline-car manufacturing and reduce gasoline tax revenues that are used to maintain roadways.
- Issues to watch include sustained low fuel prices, which is a deterrent to investing in efficiency. Higher upfront costs for fuel economy technologies can also make access to these vehicles challenging for under-resourced communities.

TRANSPORTATION

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by exceeding regulatory requirements on fleetwide fuel economy for light-duty vehicles by just 3% through 2030.



Energy-Efficient Trucks

U.S. trucks consume about 50 billion gallons of diesel fuel each year. Increasing fuel efficiency for both new and existing trucks can lead to significant emission reductions. Numerous fuel-saving technologies are available at compelling paybacks.

QUICK FACTS

- According to the Georgia Department of Revenue, there were about 400,000 registered medium-duty and heavy-duty trucks in Georgia in 2019. These large vehicles consume a disproportionate share of motor fuel.
- Emissions from trucks can be cut by reducing idle time and increasing route and operating efficiency via infrastructure and technology improvements.
- Fuel efficient medium-duty and heavy-duty trucks are available and are already a strong presence in the market.
- In certain applications, such as fleets and delivery trucks, electrification can reduce costs and reduce emissions.

BEYOND CARBON

- Energy-efficient trucks offer environmental and public health benefits from localized air quality improvements.
- This solution can also create jobs when we design and make fuel-efficient trucks and underlying technologies in Georgia.
- Issues to watch include the higher upfront investment costs and early depreciation and sunk costs associated with incumbent assets.

TRANSPORTATION

GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by reducing diesel fuel use in medium- and heavy-duty trucks by 10%.



Mass Transit

Public mass transit includes modes such as buses, trains, and streetcars. When people rely on mass transit instead of cars, it reduces greenhouse gas emissions.

QUICK FACTS

- The technology for mass transit options is readily available and there are well-established markets for it in Georgia, particularly in the larger metropolitan areas.
- Behavioral shifts, however, are required to achieve maximum greenhouse gas reductions.
- Transit options in Georgia released an estimated 0.245 lbs CO₂ per passenger mile, compared to 0.891 lbs of CO₂ per passenger mile for a single occupancy personal vehicle.
- Ridership trends and transit-oriented development for housing are critical to successfully leveraging transit as a decarbonization solution.

BEYOND CARBON

- The reduction in higher emitting vehicles is associated with improved air quality, which offers environmental and public health benefits.
- Mass transit can increase business and property values in areas around transit stations.
- Potential equity benefits of mass transit include access to low-cost transportation in low-income communities and for those who cannot drive or do not have a driver's license.

TRANSPORTATION

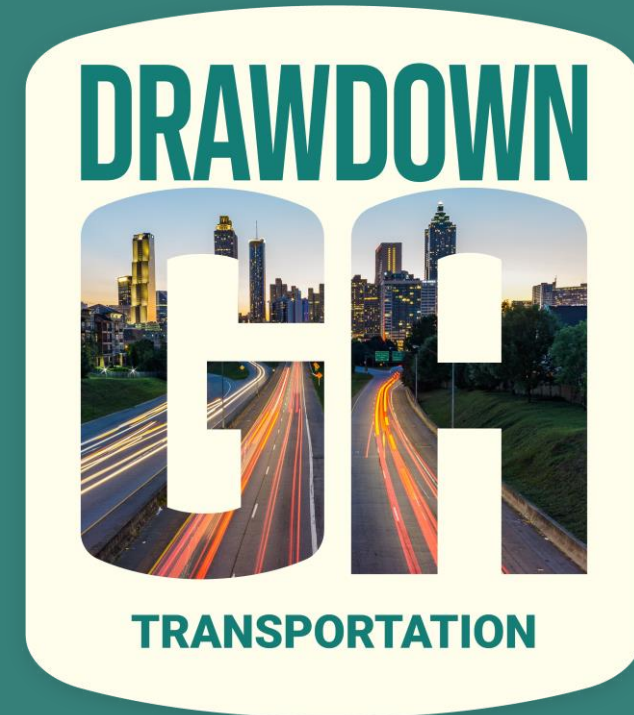
GEORGIA'S 2030 MEGATON OPPORTUNITY

We could reduce 1 Mt of CO₂e in Georgia by locating 320,000 additional households in transit-oriented developments.

Lead Researchers

Dr. Richard A. Simmons
Strategic Energy Institute
Georgia Institute of Technology

Dr. Michael O. Rodgers
Regents Researcher
Transportation Systems Engineering
Georgia Institute of Technology



Drawdown Georgia Research Team

Core Research Team

Dr. Marilyn A. Brown- Georgia Institute of Technology

Blair Beasley- Ray C. Anderson Foundation

Dr. Kim Cobb- Georgia Institute of Technology

Michael Oxman- Georgia Institute of Technology

Daniel Rochberg- Emory University

Dr. Marshall Shepherd- University of Georgia

Dr. Beril Toktay- Georgia Institute of Technology

Working Group Leads

Dr. Marilyn A. Brown- Georgia Institute of Technology

Dr. Puneet Dwivedi- University of Georgia

Dr. David M. Iwaniec- Georgia State University

Dr. Sudhagar Mani- University of Georgia

Dr. Daniel Matisoff- Georgia Institute of Technology

Dr. Jacqueline E. Mohan- University of Georgia

Michael Oxman- Georgia Institute of Technology

Dr. Richard A. Simmons- Georgia Institute of Technology

Dr. Laura Taylor- Georgia Institute of Technology

*For more information go to:
www.drawdownga.org/about-us*



www.drawdownga.org

