

# GEORGIA ENERGY

## Industry Overview



# GEORGIA RENEWABLE ENERGY QUICK FACTS

As the world moves toward a more sustainable lifestyle, the market for clean energy grows more competitive. The U.S. national energy plan seeks to ensure **10 percent of our electricity comes from renewable sources by 2012**, and 25 percent by 2025.

**#1**

in Commercial  
Timberland  
in the USA

**Georgia's energy ecosystem focuses on energy generation, transmission, distribution, storage and conservation.** Georgia is engaged in extensive research on the use of biofuels, solar power, fuel cells, battery technology and waste to energy. Georgia has a growing community of smart grid technology companies, and the Georgia Institute of Technology Center for Innovative Fuel Cell and Battery Technologies is helping to create the battery technologies of the future for the state's long-established industry. Atlanta is a national leader in energy conservation with more than three million square feet of LEED certified buildings already built, and is also home to Southface and the Greenguard Environmental Institute.

**#3**

in Biofuel Potential  
in the USA

**Georgia is America's leading source of sustainable biomass** and boasts an abundance of renewable natural resources such as pine trees, agricultural products and waste streams from industrial processes. **Ranked third in the United States for its biofuel potential**, Georgia's bioenergy industry is projected to pump nearly **\$5 billion** into the state's economy over the next 10 years.

Georgia leads the nation with a diverse portfolio of renewable energy research and access to a world-class collection of leading research and development universities and centers. Georgia stands as the vanguard of the green movement and serves many aspects of the global energy market.

**22M**

Acres of Privately  
Owned Timberland

## BIOENERGY

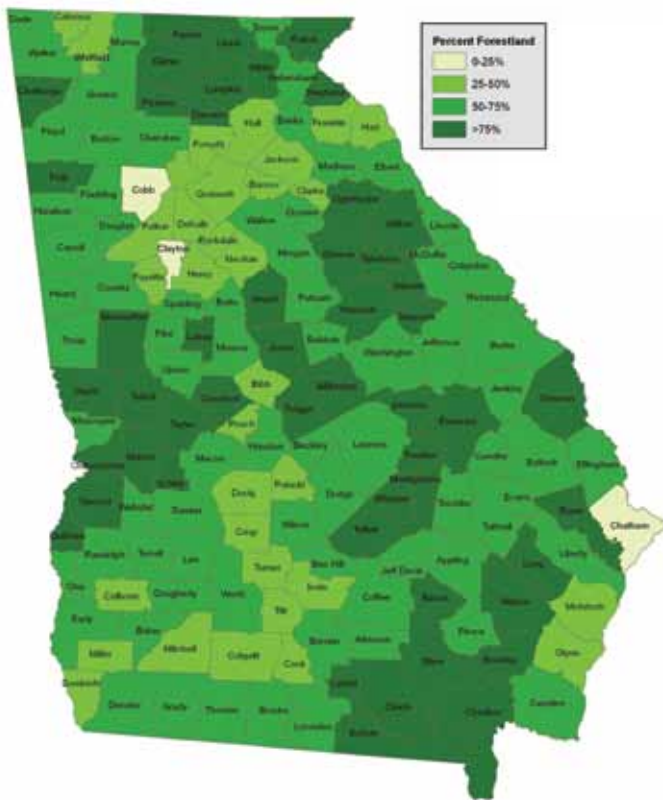
Biofuel in the U.S. is an increasingly important and expanding industry, and Georgia holds significant potential for growth. **As the #3 state in the U.S. for biofuel potential**, bioenergy has already experienced considerable development in Georgia.

- **The University of Georgia** features a comprehensive focus on a variety of Georgia's resources and energy sectors, especially agricultural.
- **Dr. Marilyn Brown**, researcher at the Georgia Institute of Technology and distinguished visiting scientist at Oak Ridge National Laboratory, helps pioneer research and development of new products and processes.
- **The Herty Advanced Materials Development Center** in Savannah offers permitted pilot testing for biomass projects.

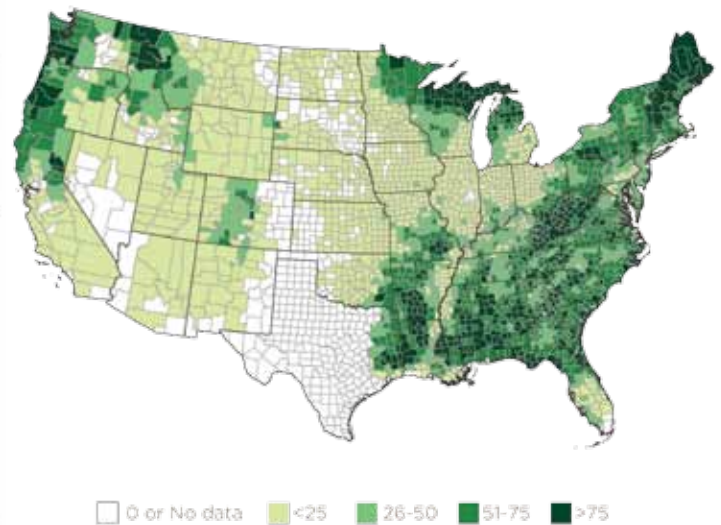
## TIMBER

- Ranked **#1 in commercial timberland in the U.S.**, Georgia's extensive forests are the leading resource for research and development in the bioenergy industry.
- Georgia has a well-educated supply of logging contractors that ensures a constant flow of raw material from forests to mills.
- Approximately **1,000 logging contractor companies** operate in Georgia.
- As of early 2011, **1,711 timber harvesters and procurement foresters** have earned a **Master Timber Harvester designation**, indicating their training and track records in proper timber harvesting methods.

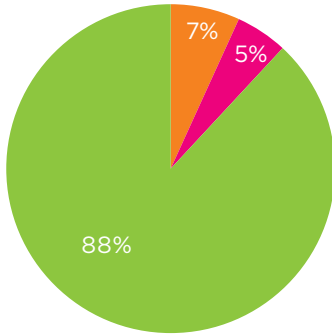
**PERCENTAGE OF LAND IN FOREST BY COUNTY**



**PERCENTAGE OF TIMBERLAND IN U.S.**

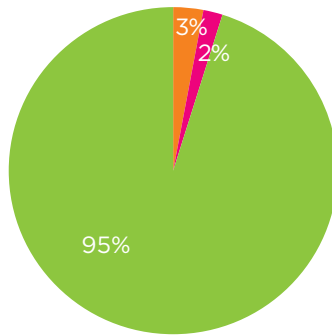


**METRIC TONNES OF  
SOFTWOODS**

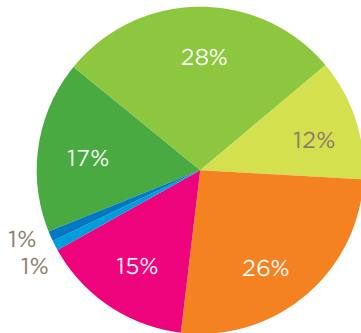


■ Growth ■ Removals ■ Inventory

**METRIC TONNES OF  
HARDWOODS**



**AREA OF TIMBERLAND  
BY FOREST-TYPE**



■ Natural loblolly-shortleaf and longleaf-slash ■ Planted loblolly-shortleaf and longleaf-slash ■ Oak-pine  
 ■ Bottomland hardwood ■ Other softwoods and hardwoods ■ Oak-hickory ■ Non-stocked

**FORESTS**

The recent addition of **Georgia Biomass LLC**, a major wood pellet facility in southeast Georgia with the world’s largest renewable energy capacity of wood pellets, will increase Georgia’s biomass exports to Europe, providing clean, sustainable energy. This plant will capitalize on Georgia’s extensive biomass resources and impressive network of roads and rail as well as its deepwater port system, which allows for easy access to the rest of the world.

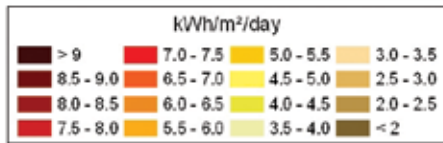
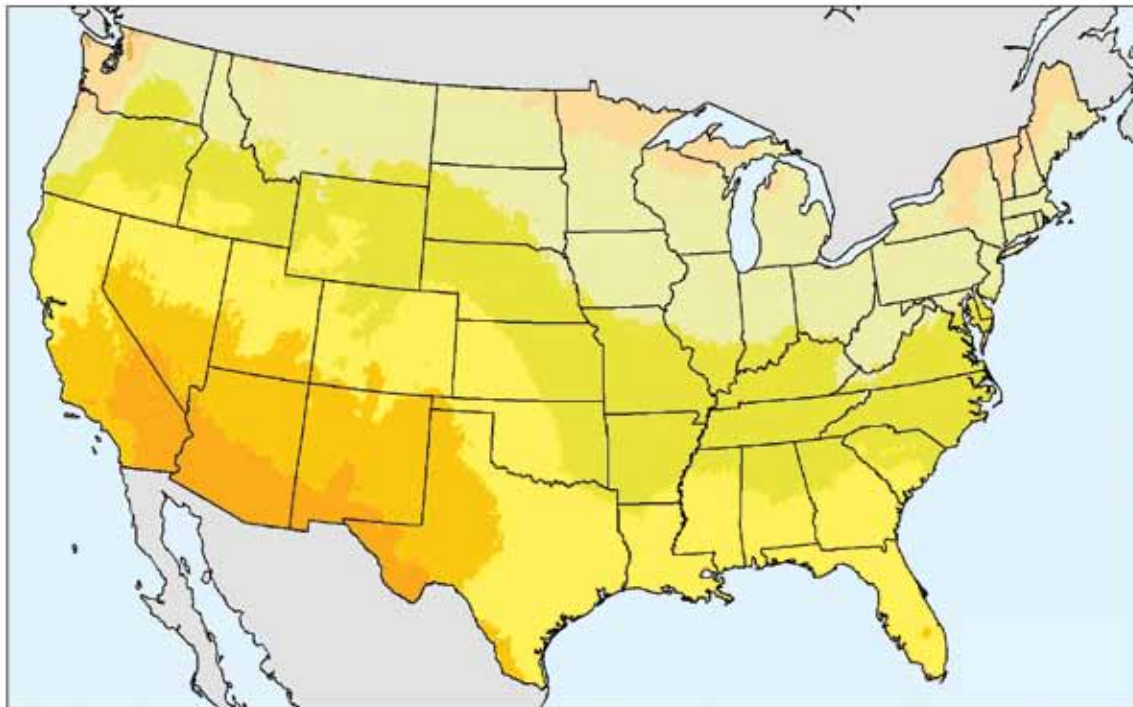
- Georgia contains the largest area of forest cover in the southern United States with **24.8 million acres covering 65 percent of the state.**
- More than 22 million acres are privately owned timberland – more than any other state in the U.S.
- Georgia’s forest cover has increased by approximately **371,000 acres** since 1997, demonstrating that **Georgia’s forest resources are abundant and sustainable.**
- In every region of the state, tree growth exceeds tree removal: Georgia’s timber resources and forestry operations are monitored by the Georgia Forestry Commission through the Forest Inventory and Analysis program and through Georgia’s Best Management Practices for Forestry. These programs provide frequently updated metrics on the sustainability of Georgia’s forests.

**ALTERNATIVE BIOMASS**

- Georgia also boasts **10 million acres** of agricultural land. **Giant miscanthus** is Georgia’s newest, fast-growing energy crop. Reaching an average height of **15 feet** in a year, it shows great economic promise for the state. Its natural characteristics adapt well to Georgia’s climate, as it crowds out weeds and is carbon neutral. Additionally, giant miscanthus returns nutrients to the soil each year and has low environmental inputs. With every region of Georgia already having higher growth than removal of trees, the clean and environmental usage of giant miscanthus as a renewable energy source will only improve the overall efficiency and conservation in Georgia.
- The first guaranteed, university-backed strain of giant miscanthus grass is being commercialized at Repeve Renewables.



## GLOBAL HORIZONTAL SOLAR RADIATION - ANNUAL



Model estimates of monthly average daily total radiation, averaged from hourly estimates of global horizontal irradiance over 2 years (1999-2000). The model inputs are hourly visible irradiance from the GOES-East and GOES-West geostationary satellite, and monthly average aerosol optical depth, precipitable water vapor and ozone sampled at a 10km resolution.



## SOLAR INDUSTRY

- Georgia's business-friendly environment, incentives, world-class research facilities, favorable geographic location and excellent logistics infrastructure attract photovoltaic (PV) technology companies, as well as developers and manufacturers of solar technologies. Leading the industry with carbon nanotube solar cells, solar energy is becoming less expensive, more commercially feasible and more efficient.
- **Suniva**, the Georgia-grown manufacturer of high-efficiency monocrystalline silicon solar cells and high-power density solar modules, is headquartered in Georgia. **Enfinity**, the world's largest developer of solar PV solutions, and the German company **MAGE Solar** have both chosen Georgia as their U.S. headquarters, citing the state's strategic location, **Quick Start** workforce training program and low-cost production as key factors in their decision.

Other related cleantech companies that flourish in Georgia include: **GE Energy**, **Johnson Controls**, **Landis & Gyr**, **Logan Energy** and **Siemens Energy and Automation**.

- Georgia's World-Class Research Facilities: The U.S. Department of Energy (DOE) established a **University Center of Excellence for Photovoltaics Research and Education (UCEP)** at the Georgia Institute of Technology, one of only two such centers in the United States. The Center's mission is to improve the fundamental understanding of the science and technology of advanced PV devices, to fabricate record-high efficiency solar cells and to provide industry guidelines for achieving cost-effective and high-efficiency PV devices.
- Further accelerating the growth of Georgia's cleantech sector is the **Georgia Research Alliance**, a unique nonprofit organization that brings together Georgia's research universities, business community and state government to create opportunities to grow Georgia's economy through scientific discovery.

# GEORGIA'S RENEWABLE ENERGY ECOSYSTEM



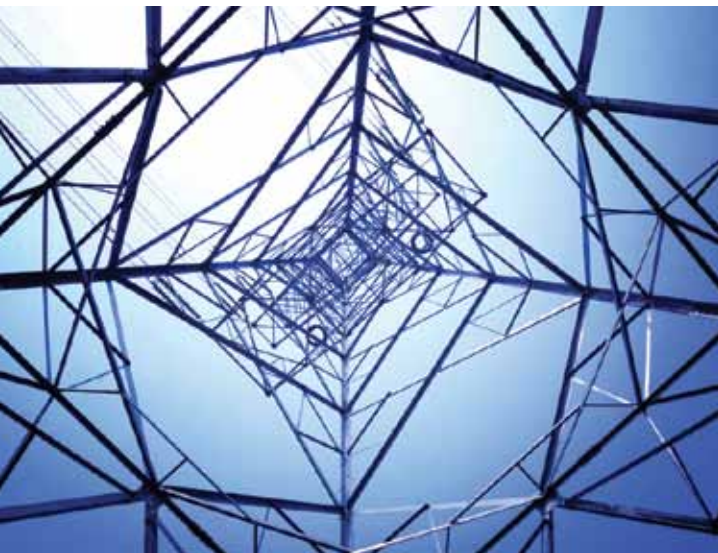


## WIND

Georgia's coastal waters include large areas with good wind resources in shallow water that have the potential for wind farm development in close proximity to land sites for transmission grid access. These qualities, in addition to the Port of Savannah's strength in accommodating break bulk and overweight wind energy cargo, contributed to **ZF Wind Power's** decision to build its world class manufacturing facilities in Georgia.

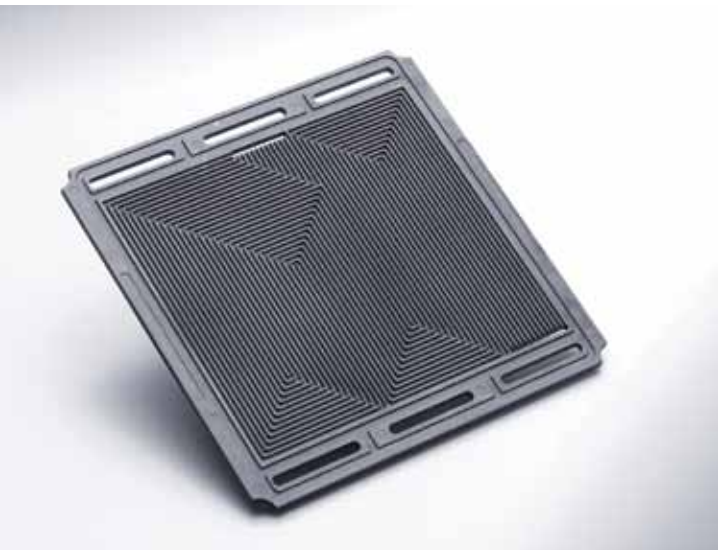
## SMART GRID

- Georgia is positioned to lead the nation in the development of Smart Grid deployment and in the development, manufacturing and sale of the technology and systems that will make the Smart Grid a reality.
- **GE Energy** has established its headquarters and world-class Smart Grid division in metro Atlanta, along with an emerging cluster of companies that will continue to propel the growth of Georgia's Smart Grid industry.
- The Technology Association of Georgia's (TAG) Smart Grid Society was created to accelerate economic growth within Georgia's Smart Grid companies by exploring key technologies and collaborations necessary to drive Smart Grid systems into reality. [ge.ecomagination.com/smartgrid](http://ge.ecomagination.com/smartgrid)



## BATTERIES AND FUEL CELLS

- Georgia's battery and fuel cell industry includes top companies from around the world such as **Saft, Exide, Yuasa, Fiamm** and **GS Battery**, which have established manufacturing, R&D and battery design facilities in Georgia.
- Georgia Tech's Center for Innovative Fuel Cell and Battery Technologies focuses on fuel cells and battery technology for ultra-low emission vehicles, distributed stationary power supplies and wireless telecommunications. The center offers short courses on fuel cell technology, and industry partners are invited to share their technology needs to collaborate on open and proprietary research projects. [gtri.gatech.edu/atlanta/fcibt](http://gtri.gatech.edu/atlanta/fcibt)



## GEORGIA ENERGY ASSOCIATIONS

**Georgia Environmental Finance Authority (GEFA):** GEFA promotes energy efficiency, renewable energy and energy assistance programs. [gefa.org](http://gefa.org)

**Georgia Solar Energy Association (GSEA):** Through statewide efforts, GSEA promotes the economic and environmental benefits of solar energy through education, advocacy and industry support. [gasolar.org](http://gasolar.org)

**Georgia Research Alliance:** This unique nonprofit organization brings together Georgia's research universities, business community and state government to create opportunities to grow Georgia's economy through scientific discovery. [gra.org](http://gra.org)

**Southeast Energy Efficiency Alliance (SEEA):** This nonprofit organization brings together all levels of the public, private and nonprofit sectors to promote energy efficient policies and practices. [seealliance.org](http://seealliance.org)

**Association of Energy Engineers:** This national association, headquartered in Atlanta, promotes the scientific and educational interests of those engaged in the energy industry and fosters action for sustainable development. [aeecenter.org](http://aeecenter.org)

**Southface Energy Institute:** This institute focuses on promoting sustainable homes, workplaces and communities through education, research, advocacy and technical assistance. [southface.org](http://southface.org)

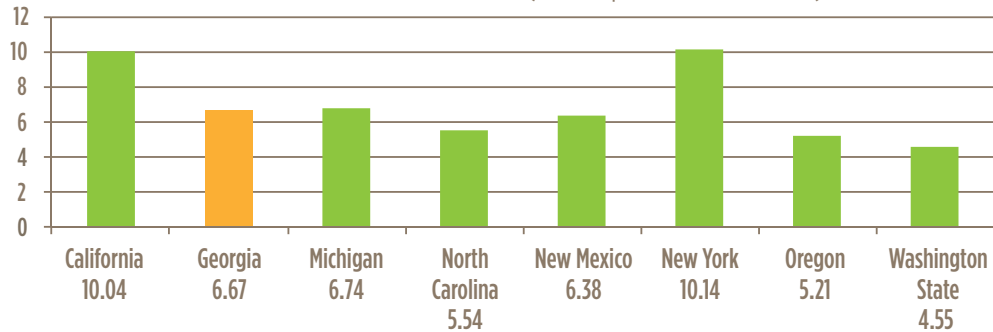
**Greenguard Environmental Institute (GEI):** Founded in Georgia in 2001, GEI oversees third-party certification programs that identify acceptable product emission standards and certify low-emitting products. [greenguard.org](http://greenguard.org)

## GEORGIA'S CENTER OF INNOVATION (COI) FOR ENERGY

- Accelerates companies' growth by up to 12 months, helping them commercialize new products, services and business models.
- Coordinates the **Bioenergy One Stop Shop** – an opportunity for companies to present their bioenergy projects to representatives from a multitude of state and federal agencies.
- Connects companies with university research, industry expertise and Georgia resources for the energy industry. The Center has strong partnerships with the University System of Georgia and Herty Advanced Materials Development Center, providing direct access to research and pilot testing facilities.
- Connects companies with potential funding sources through statutory incentives, matching research grants, low interest loans and offers guidance in seeking venture capital. [georgiainnovation.org/energy](http://georgiainnovation.org/energy)



**AVERAGE RETAIL PRICE OF ELECTRICITY TO ULTIMATE CUSTOMERS  
IN INDUSTRIAL SECTOR (Cents per kilowatt hour)**



### LOW BUSINESS COSTS

Georgia's electricity costs are below the national average, which enables solar technology manufacturers and renewable energy producers in Georgia to be more competitive.

Georgia has available and comparatively inexpensive real estate. Companies can find large manufacturing and technology facilities with clean room capacity that can be modified for solar production, reducing time and start-up costs.

### BUSINESS INCENTIVES

Georgia provides a wide variety of statutory and negotiated incentives to help companies realize their goals. Among these:

- State Job Tax Credit ranging from \$3,750 - \$20,000 per job over five years is offered to qualified industries
- State Quality Jobs Tax credit of \$12,500 - \$25,000 per job over five years is available to qualifying companies that create at least 50 jobs that pay at least 110 percent of the county average wage
- State Sales and Use Tax Exemption for qualified manufacturing machinery, material handling and clean room equipment
- State tax incentive of 35 percent of total system cost as a corporate tax credit up to \$500,000 for commercial applications

- CNBC ranked Georgia's workforce #1 in its "America's Top States to do Business, 2009" ranking. Georgia's nationally recognized Quick Start workforce training program offers customized, job-specific training and orientation to ensure that Georgia companies have the highly-skilled talent they need to thrive
- Utility Power Premium: Georgia Power and many of the Electric Membership Corporations (EMCs) that service Georgia now offer incentives, including a rebate for installing solar as well as paying a premium for the power generated
- Modified Accelerated Cost Recovery Systems (MACRS) Depreciation: Commercial customers can take advantage of accelerated five year depreciation for solar property. In the first year, approximately 32 percent of the basis of the property can be depreciated
- Federal tax incentive of 30 percent of total system cost as a grant or investment tax credit

# GEORGIA LOGISTICS INFRASTRUCTURE

## SEAPORTS

- Georgia's seaports include the largest single-operator container facility in North America.
- **Garden City Terminal in Savannah holds the title of fastest growing and fourth largest in total volumes.** It serves more than 40 lines of steamships, has convenient intermodal connections, state-of-the-art cargo handling equipment and value-added services.
- **Savannah is responsible for moving 20 percent of the East Coast's overseas container cargo** and is one of few ports in the United States with two class-1 railroad facilities on the terminal.
- The **Port of Brunswick is building a pellet facility** to serve Georgia's growing biomass industry and is the second-largest grain facility on the East Coast.
- The **Port of Savannah** is experienced in accommodating loading and unloading of break bulk and overweight wind energy cargo, all of which can be assembled or manufactured in Georgia.
- The port's **five deepwater berths with direct rail and truck access to major interstates**, a variety of cranes (including two Gantry cranes and a barge crane), open or covered storage, an in-house engineering team and the Foreign Trade Zone designation, make Savannah an ideal location to import and export energy equipment. [gaports.com](http://gaports.com)

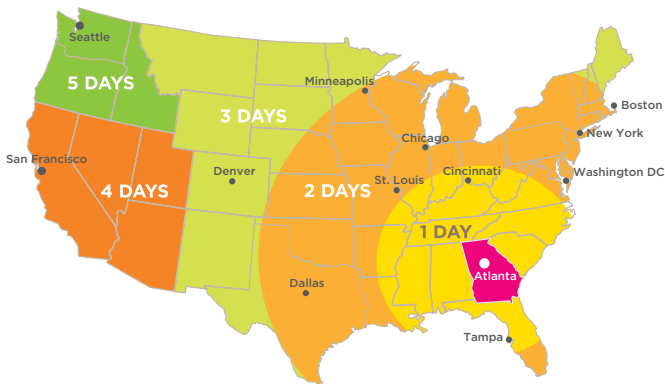
## GROUND TRANSPORTATION

- During any given week, a combined 5.9 million tons of freight move across Georgia's 1,200 miles of interstate highways and 20,000 miles of federal and state highways.
- With 4,700 miles of rail, **Georgia has the most extensive rail system and largest intermodal hub in the Southeast.**
- Georgia is served by two class-1 railroads (CSX and Norfolk Southern) and 24 short-line companies.

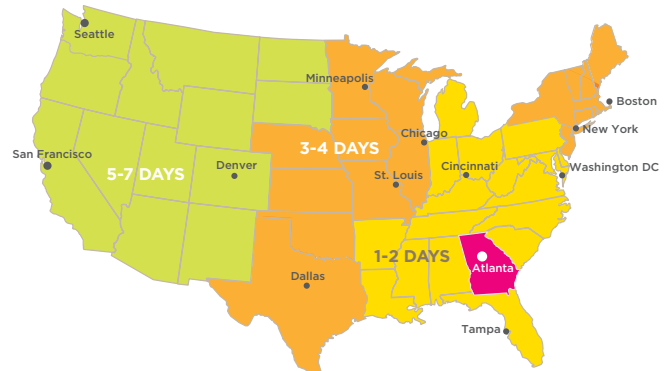
## AIR TRANSPORTATION

- Georgia is home to **Hartsfield-Jackson Atlanta International Airport, the world's busiest with 90 million passengers per year.** The airport also serves as home base to Delta Air Lines, the world's second-largest carrier, and it is recognized as the 11th-largest air cargo hub, hosting 14 cargo-only carriers. Hartsfield-Jackson serves six continents and allows business travelers to reach 80 percent of the U.S. market within two hours of flight time and any major North American city within four hours.
- Through Georgia's network of 144 public and private airports, companies can easily access locations statewide. [atlanta-airport.com](http://atlanta-airport.com)

TRUCK TRANSIT TIMES FROM GEORGIA



RAIL TRANSIT TIMES FROM GEORGIA





## THE GEORGIA BUSINESS ADVANTAGE NO COST SERVICES FOR YOUR COMPANY

Companies seeking a competitive edge in an increasingly global marketplace will find world-class support and resources through the renewable energy industry-focused team of the Georgia Department of Economic Development. Representing decades of experience, expertise and thought leadership with the energy sector, our staff can provide:

- Extensive site selection, evaluation and building services
- Comprehensive location data, including community demographics, supplier industry reports, maps and regional data
- Analysis of forestry biomass resources for a given biomass procurement area and assist with identifying forestry biomass suppliers (provided by The Georgia Forestry Commission)
- Coordination with community officials regarding project needs, existing utilities and specific site requirements
- Information on business cost environment, taxes and available incentives
- Access to Quick Start workforce training (top ranked nationally)
- Access to advanced academic intellectual talent and research
- Access to international markets
- Coordination of traffic and highway requirements
- Coordination with the Georgia Ports Authority to identify project specific shipping and logistics requirements
- Unique cross-industry connections, cutting-edge technology insight and expertise through Georgia's Center of Innovation for Energy



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