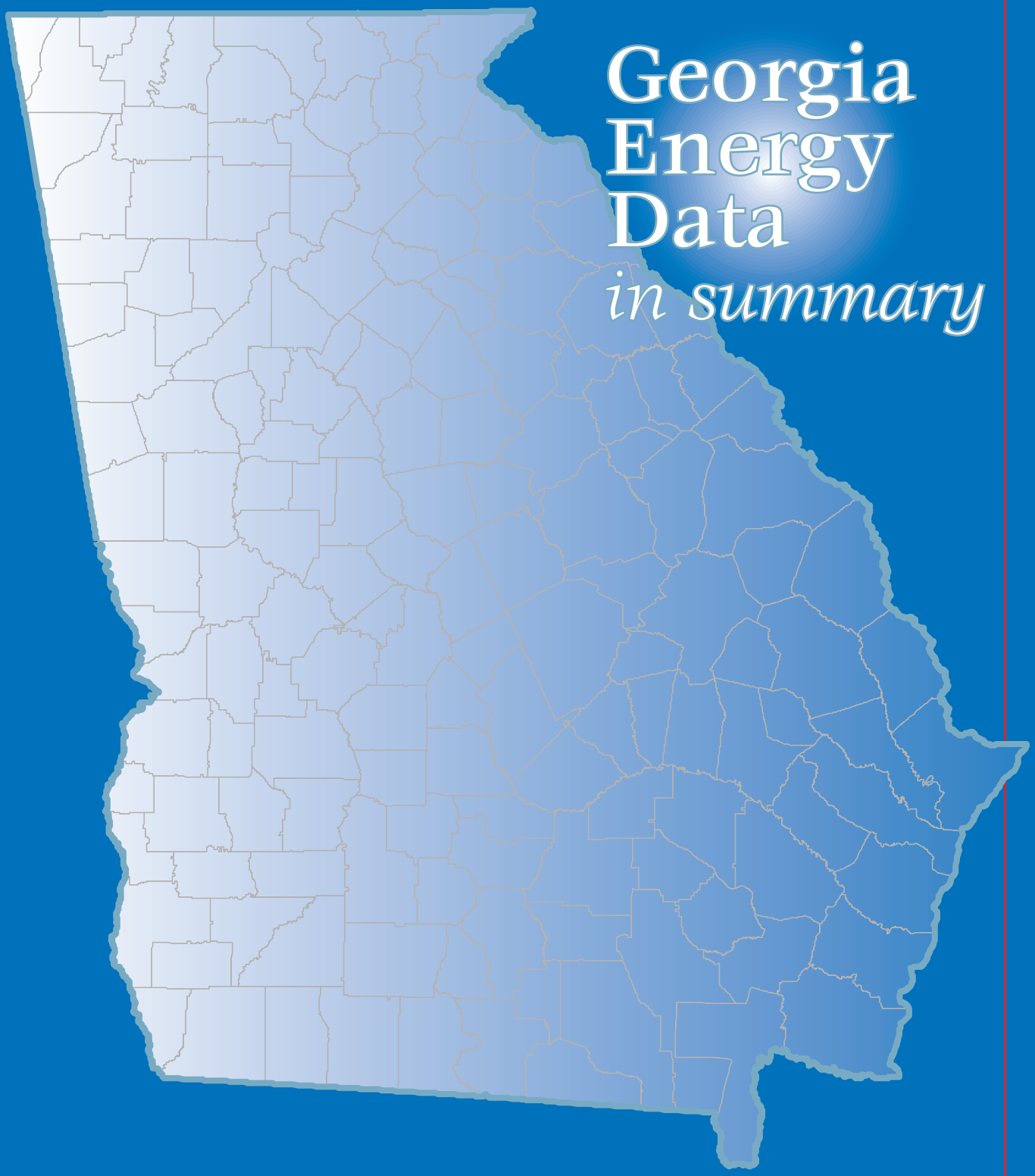

Georgia Energy Data *in summary*

Georgia Environmental Facilities Authority

Georgia Energy Data

in summary

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in summary

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Introduction

With less than 5% of the world's total population, the United States consumes approximately 25% of the world's energy. In 1995 alone, the United States consumed 941 million tons of coal, 21,581 billion cubic feet of natural gas, and 6,469 million barrels of petroleum. Thus, every hour the United States uses more than 100,000 tons of coal, 2.5 billion cubic feet of natural gas, and 738,000 barrels of petroleum—enough energy to fly around the world 2,500 times.

In Georgia, the energy situation is reflective of the national picture. The same factors that influence the use of energy for the country as a whole also influence how Georgians consume energy. Some of these factors are population, per capita personal income, and gross state product. During the past three decades significant changes in all these factors have impacted Georgians' energy consumption patterns. In addition, the population split between urban or rural settings, industrial growth, structural changes in the economy, and personal choices such as less efficient vehicles and more appliances in our homes have all impacted energy consumption patterns in the state.

As population increases, energy consumption generally does as well. If they increase at the same rate, per capita energy use—energy use per person—stays constant over time. However, during the oil crises of the 1970s, energy efficiency increased and per capita energy use actually declined. During the 1980s and 1990s, energy demand began again increasing at a greater rate than population. Georgia in fact showed a greater rise in per capita energy use than the United States average.

In 1970, nearly 4.6 million people lived in Georgia, 2.3% of the United States population. See *Figures 1 and 2*. That same year, residents of Georgia consumed only 1.8% of all the energy used in the country. Twenty-five years later, the state's population had grown to nearly 7.2 million, and consumption patterns had shifted. By 1995, 2.7% of the United States population resided in Georgia, but now Georgians were

Figure 1.
Georgia Population, *1970-1997*

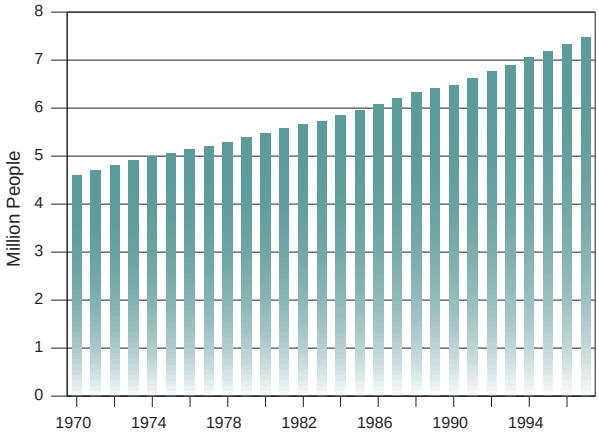
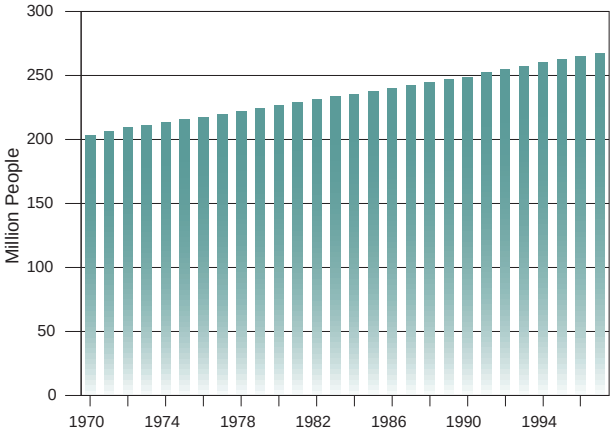


Figure 2.
United States Population, *1970-1997*



responsible for 2.8% of the energy consumed in the country. In 1997, Georgia's population reached nearly 7.5 million. With 2.8% of the United States population, Georgia ranked 10th among all states.

Per capita personal income in Georgia (in constant dollars) increased by 44% between 1980 and 1996, from $14,350 to $20,675. Along with this increase, Georgia's national income rank also shifted from 37th to 26th highest. But national per capita personal income also increased by 29%—about 1.5% per year—during that time, and Georgia still lags behind the 1996 national average of $22,060 per person.

Georgia's gross state product (in constant dollars) increased by 94% between 1980 and 1995, from $96 billion to $187 billion. At the same time, the United States gross domestic product increased by only 49%, from $4.5 trillion to $6.7 trillion.

In today's society, energy consumption is an integral part of daily life. Although it would be impossible to live without some form of energy, whether it be for cooking food or heating homes, Georgians have choices when it comes to the forms and efficiency of energy used to meet everyday needs. Decisions made about using energy are important. For example, different forms of energy vary in terms of cost, availability, convenience, and environmental impact. Energy efficient products may cost more to purchase but are less expensive to operate. The savings on energy costs they provide often pay back the added investment quickly.

To assist Georgia's government and civic leaders, private organizations, and citizens in making the most appropriate energy choices, this publication provides a compilation of energy-related statistics relevant to Georgia. The *Georgia Energy Databook* covers in detail the factors influencing energy consumption and production, historical energy consumption in Georgia, and how Georgia's energy consumption compares with the rest of the nation.

Energy Consumption in Georgia

Historical Energy Consumption

Energy consumption in Georgia has increased significantly since 1970. In 1995, Georgia's primary energy use included:

- 31.3 million short tons of coal;
- 370 billion cubic feet of natural gas;
- 177.7 million barrels of oil;
- 492 trillion Btu of electricity from nuclear generation and from hydroelectric, biofuels, and other renewable sources of power.

Between 1970 and 1995, total energy consumption in Georgia more than doubled. In 1970, energy consumption in the state accounted for 1.8% of total United States energy consumption. By 1980, Georgia's share of energy use accounted for 2.1% of the United States total. In 1995, energy consumption in Georgia accounted for 2.8% of total United States consumption, placing Georgia 12th among all states in terms of total energy use.

During this same time, 1970 to 1995, total energy consumption for the United States as a whole increased by 36%. Yet, as shown in *Figures 3 and 4,* the trends in energy consumption by fuel were different for the country as a whole than for Georgia. In both Georgia and the United States, petroleum led all other fuels consumed. But in Georgia, since 1975, coal has been the second most used fuel, unlike the United States as a whole, where natural gas consumption remains higher than that of coal.

Figure 3.
Georgia Energy Consumption by Fuel,
1970-1995

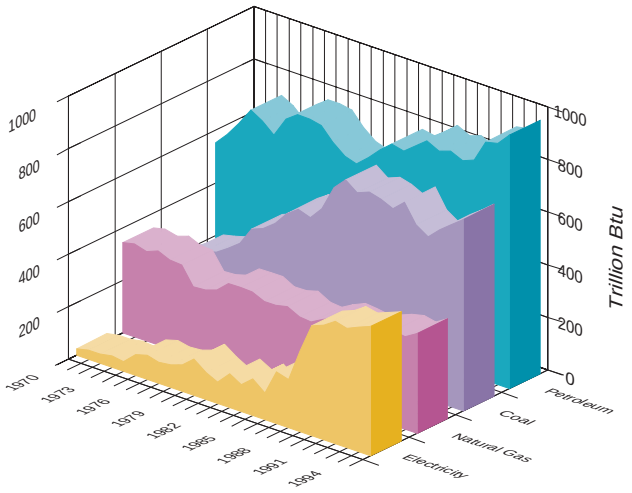
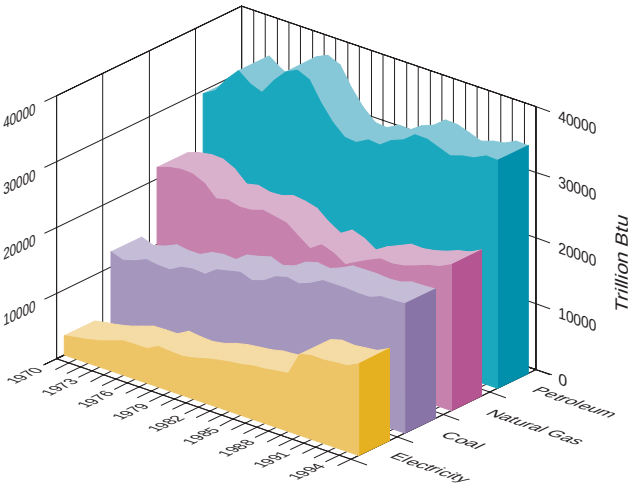


Figure 4.
United States Energy Consumption by Fuel,
1970-1995



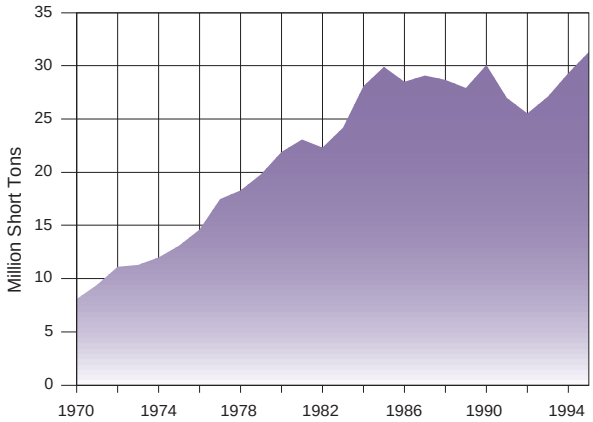
Per capita energy consumption for Georgia also increased by 32%, from 264 million Btu in 1970, to 349 million Btu in 1995. During the same period, national per capita energy consumption grew much less, about 6% from 326 million Btu

to 344 million Btu, resulting in Georgia surpassing the national average by 4 million Btu in 1995.

Today, the generation of electricity is the activity in Georgia that consumes the most energy. In 1995, 42% of all energy consumed in the state was used to produce electricity, a large shift from 1970 when 23% of the energy was used for producing electricity. Nationally, in 1995, 35% of total energy consumption was by electric utilities, also an increase from 1970, when 25% of the energy used in the United States went to produce electricity.

Figure 5.

Georgia Coal Consumption, *1970-1995*



Coal

Between 1970 and 1995, energy consumption increases in Georgia were considerable for all fuels used, but one of the most significant increases occurred with the use of coal. In 1995, Georgia ranked 10th in the United States in terms of coal consumption, accounting for 3.7% of all the coal used in the nation—a dramatic change from 1970 when Georgia accounted for just 1.6% of national coal use. Between 1970 and 1995, total coal consumption in Georgia increased by 285%, from 8.1 million short tons to 31 million short tons. See *Figure 5.*

Because direct coal use in the residential, commercial, and transportation sectors has been in decline for more than 40 years, the increase in coal consumption in Georgia is attributable to electric utilities and the industrial sector. Electric utilities have been Georgia's primary consumers of coal for many years, responsible for 92% of total Georgia coal consumption in 1970 and 94% in 1995. Although electric utilities' share of total coal consumption increased by just 2% over the span of 25 years, the quantity of coal increased significantly, from 7.5 million short tons in 1970 to 29.3 million short tons in 1995, or 291%.

Natural Gas

Although 1995 natural gas consumption levels were higher than those in 1970, during this period there was no steady increase or decrease in natural gas consumption. *Figure 6* illustrates how total natural gas consumption in Georgia has fluctuated in the past 25 years, reaching a low of 261 billion cubic feet in 1974 and a high of 370 billion cubic feet in 1995.

In 1996, Georgia ranked 15th in the nation for natural gas consumption and was responsible for 1.9% of the natural gas consumed in the United States. In Georgia, all economic sectors use natural gas: 49% of use is in the industrial sector, 34% in the residential sector, 16% in the commercial sector, 1% by electric utilities, and a fraction in the transportation sector.

Figure 6.

Georgia Natural Gas Consumption, *1970-1995*

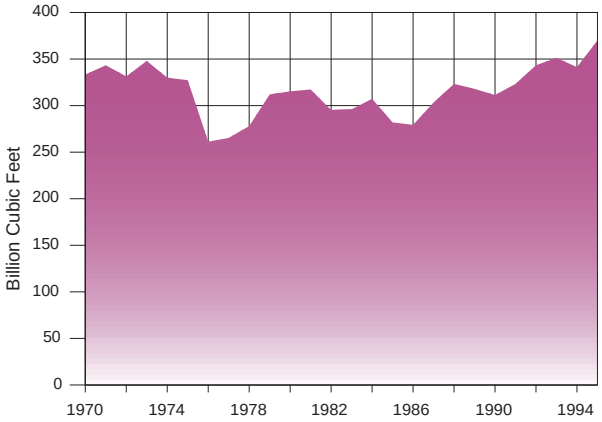
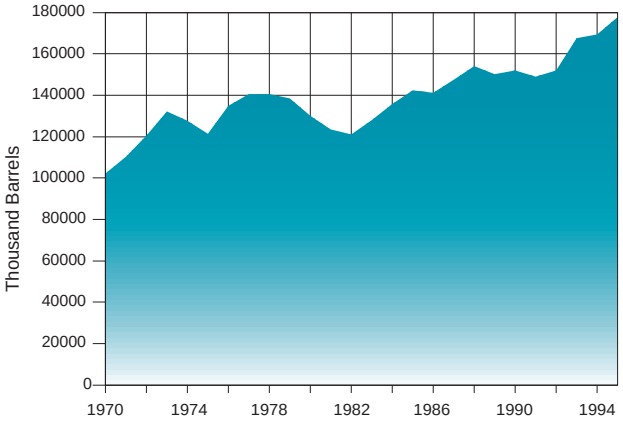


Figure 7.

Georgia Petroleum Consumption, *1970-1995*



Petroleum

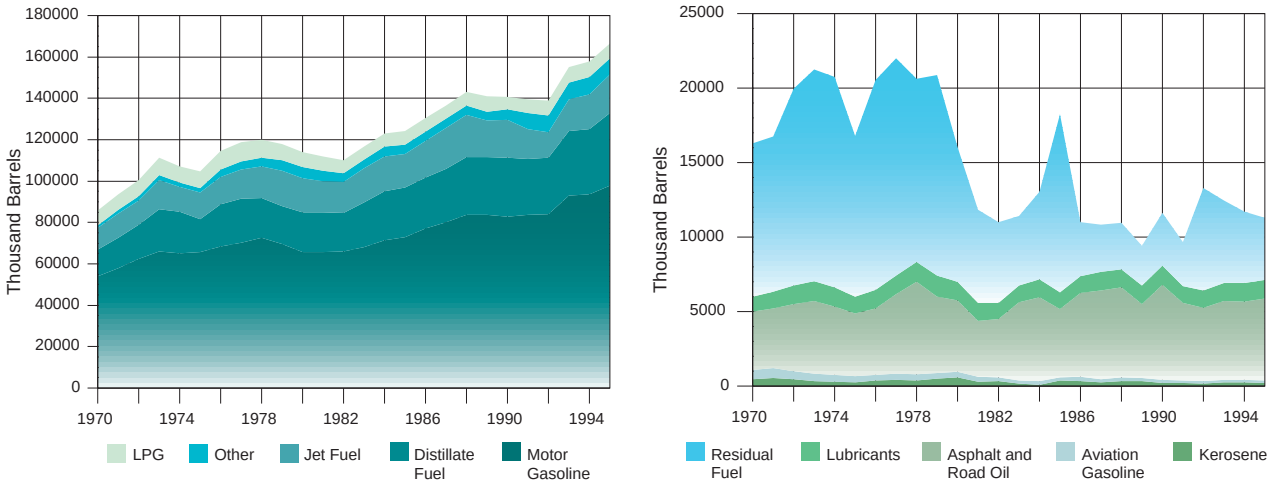
The large increases in population and changing transportation needs of the region have contributed significantly to Georgia's 74% increase in petroleum consumption from 1970 to 1995. During that period, total petroleum consumption in Georgia grew from 102,104 thousand barrels to 177,723 thousand barrels as shown in *Figure 7.* As of 1995, Georgia ranked 11th in the country for total petroleum consumption.

Although petroleum consumption in the residential sector and for electric utilities declined during this time period, petroleum consumption by the transportation sector doubled between 1970 and 1995, going from 73,283 thousand barrels to 146,031 thousand barrels. Most notable among the increases in the use of transportation fuels is distillate fuel, which increased by 176%. Diesel fuel, used to power diesel engines in trucks, railroad engines, and agricultural machinery, is one component of the distillate fuel category. Also, motor gasoline consumption increased by 81%, from 54,081 thousand barrels in 1970 to 97,672 thousand barrels in 1995. *Figure 8* breaks down petroleum consumption in the state by petroleum product category.

While the majority of petroleum fuels showed significant increases, consumption of aviation gasoline, liquefied petroleum gasses (LPG), and residual fuel all decreased. Residual fuel is primarily used for commercial boilers and industrial process heating, to power ships, and for electricity generation. As the industrial and commercial sectors have switched to other fuels for heating, and Georgia's electric utilities have moved away from oil for electrical generation, residual fuel consumption has declined. The consumption of kerosene, which is primarily used for space heating, cook stoves, and water heaters, has fluctuated over the years, with the highest consumption of 552 thousand barrels in 1980, and lowest consumption of 86 thousand barrels just four years later in 1984.

Figure 8.

Georgia Petroleum Consumption by Fuel *, 1970-1995*



Energy Consumption in Georgia by Sector

One useful way to look at energy consumption and trends in Georgia is to examine the four economic end-use sectors: industrial, transportation, residential, and commercial as shown in *Figure 9. Figure 10* shows that total energy consumption for each sector has increased since 1970.

Figure 9.

Georgia Energy Consumption by Sector, *1995*

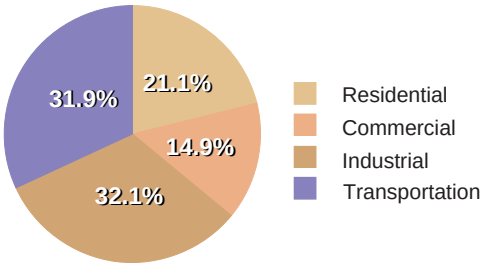
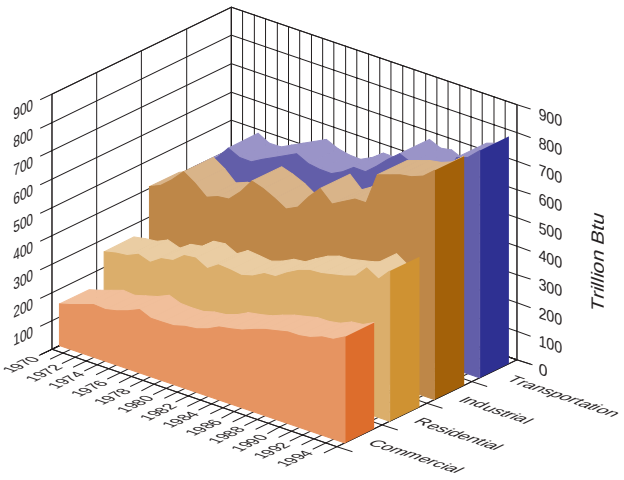


Figure 10.

Georgia Energy Consumption by Sector, *1970-1995*



Industrial Sector Energy

Georgia's industrial sector consists of agriculture, forestry, and fishing; mining; construction; and manufacturing industries, which together accounted for 24% of gross state product in 1994. In 1996, 34,186 industrial establishments employed 793,064 workers. The leading industries in terms of employment are those associated with the construction and textile/apparel industries.

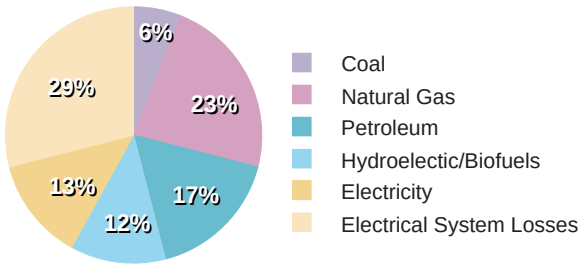
From 1977 to 1996, the number of manufacturing establishments increased by 13%. In 1996, Georgia had more than 10,733 manufacturing establishments. In addition to textile mill and textile products, the primary manufacturing industries are food products and printing/publishing, which together account for 46% of the work force in manufacturing.

With 32.1% of the total energy use in 1995, the industrial sector is the largest energy using sector in Georgia, just edging out the transportation sector. Since 1970, the industrial and transportation sectors have traded positions several times as the largest user of energy in Georgia.

Total industrial energy consumption steadily increased from 1970 to 1995, starting at 407.1 trillion Btu and reaching 807.2 trillion Btu, an increase of 98%. As shown in *Figure 11*, natural gas leads as the fuel most used by industry in 1995, providing 23% of energy use to that sector. Petroleum (17%), electricity (13%), hydroelectric/biofuels (12%), and coal (6%) follow.

Figure 11.

Georgia Industrial Energy Consumption by Fuel, *1995*

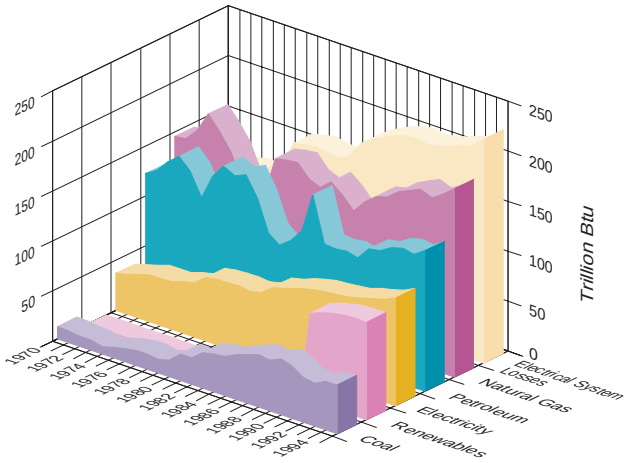


During the past 25 years, natural gas use has increased overall with some fluctuations year to year, as shown in *Figure 12*. From 1985 to 1995, industrial use of natural gas in Georgia steadily increased, peaking at 188.5 trillion Btu in 1995.

Electricity use by industry also has steadily risen since 1970, reaching 107.5 trillion Btu in 1995, almost a 200% increase over 1970 levels.

Figure 12.

Georgia Industrial Sector Energy Consumption by Fuel, *1970-1995*



Correspondingly, electrical system losses (ESL) have increased during the same time period and accounted for another 28% of industrial sector energy use in 1995. ESL are those losses attributable to the energy lost during generation, transmission, and distribution of electricity. These losses represent the difference between the amount of energy that is input at electric utilities and the amount of electricity that is actually purchased by end-users, as measured by their energy bills.

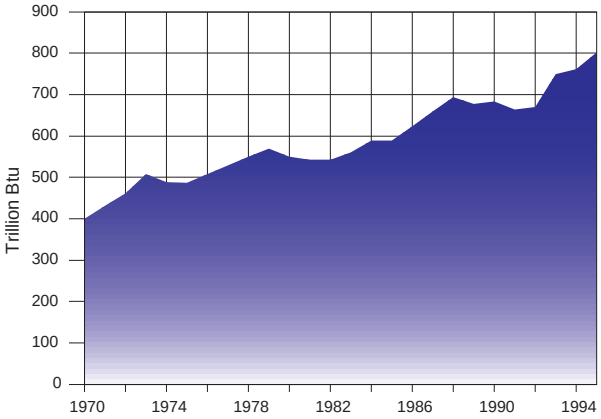
Since 1990, hydroelectric power and biofuels (two forms of renewable energy) use by industry has remained fairly steady. (Changes in data reporting in 1990 prevent trend analysis prior to that date.) Industrial coal use peaked in 1990 at 56.1 trillion Btu, then dipped slightly, but showed another rise in the last couple of years. While petroleum use by industry has fluctuated more than any other fuel during the past 25 years, petroleum does show a steady increase in use since 1986.

Transportation Sector Energy

The transportation sector was the second largest energy consuming sector in 1995, accounting for 31.9% of Georgia's total energy consumption. Total transportation energy consumption rose steadily from 1970 to 1995, starting at 400.6 trillion Btu and reaching 801.4 trillion Btu, an increase of 100% as shown in *Figure 13*. The rate of increase is due mainly to growth in automobile and air travel. The transportation sector accounts for nearly 6% of Georgia's gross state product, while employing approximately 123,000 individuals.

Figure 13.

Georgia Transportation Sector Energy Consumption, *1970-1995*



Georgia, with a land and inland water area of 58,910 square miles, is the largest state east of the Mississippi River. Most travel occurs on Georgia's extensive road system with 85,091 miles of rural roads and 26,655 miles of urban roads. A total of 89,132 million vehicle miles were driven on Georgia's roads in 1995. Motor fuel used for highway travel combined with use of motor fuels for non-highway use totaled 5,462,605 thousand gallons. In 1996, 4,966,348 drivers were licensed to drive 6,356,000 registered motor vehicles including automobiles, trucks, motorcycles, and buses in Georgia.

Petroleum accounts for 99% of energy used in the transportation sector and 38% of all energy used in Georgia. Motor gasoline is the single largest fuel type used in Georgia transportation, accounting for 63% of transportation energy use and 20% of total energy use in the state in 1995. From 1970 to 1995, motor gasoline use increased by 81%, growing from 281.6 trillion Btu to 508.4 trillion Btu.

The major reason for the rise is increasing miles driven in cars and light trucks, vans, and sport utility vehicles. While new automobile and light truck fuel efficiency increased nationally until tapering off in the late 1980s, vehicle miles driven have continued to increase. In Georgia, between 1970 and 1997, the average miles traveled per person rose from 17 to 34 miles per day. At the same time, the types of vehicles being driven have changed. National data shows that more consumers are purchasing and driving larger, less fuel efficient pickup trucks and sport utility vehicles. Georgia appears to be following suit.

One factor in the increasing miles driven is Georgia's spread out development pattern, which makes people rely solely on personal vehicles for travel. Between 1990 and 1997, the Atlanta metropolitan area grew from approximately 65 miles long north to south to 100 miles long. Current development patterns cause a 10 to 20% increase in land consumption for each 1% increase in population.

Another factor in the increase in petroleum consumption is low gasoline prices. Georgia has one of the lowest motor gasoline prices of any state, which is a combination of two factors. First, the state has low wholesale prices because two pipeline companies have major supply storage in the state. Second, Georgia's fuel taxes are the second lowest in the country as shown in *Table 1*.

Distillate fuel, used mainly to move goods and mass transportation vehicles, accounts for the second largest share of transportation energy in

Table 1.

State Taxes on Motor Fuels, *1997*

(dollars per gallon)

State	Gasoline	Diesel fuel
Alabama	0.16	0.17
Alaska	0.08	0.08
Arizona	0.18	0.18
Arkansas	0.185	0.185
California	0.18	0.18
Colorado	0.22	0.205
Connecticut	0.39	0.18
Delaware	0.23	0.22
District of Columbia	0.20	0.20
Florida	0.04	0.04
Georgia	0.075	0.075
Hawaii (Honolulu)	0.325*a*	0.325*a*
Idaho	0.25	0.25
Illinois	0.19	0.215
Indiana	0.15	0.16
Iowa	0.20	0.225
Kansas	0.18	0.20
Kentucky	0.15	0.12
Louisiana	0.20	0.20
Maine	0.19	0.20
Maryland	0.235	0.2425
Massachusetts	0.21	0.21
Michigan	0.15	0.15
Minnesota	0.20	0.20
Mississippi	0.18	0.18
Missouri	0.17	0.17
Montana	0.27	0.2775
Nebraska	0.253	0.253
Nevada	0.23	0.27
New Hampshire	0.18	0.18
New Jersey	0.105	0.135
New Mexico	0.22	0.18
New York	0.08*b*	0.10*b*
North Carolina	0.217	0.217
North Dakota	0.20	0.20
Ohio	0.22	0.22
Oklahoma	0.16	0.13
Oregon	0.24	0.24
Pennsylvania	0.12*c*	0.12*c*
Rhode Island	0.28	0.28
South Carolina	0.16	0.16
South Dakota	0.18	0.18
Tennessee	0.20	0.17
Texas	0.20	0.20
Utah	0.19	0.19
Vermont	0.16	0.17
Virginia	0.175	0.16
Washington	0.23	0.23
West Virginia	0.205	0.205
Wisconsin	0.237	0.237
Wyoming	0.08	0.08

a For County of Honolulu; for County of Maui LPG tax is $0.18/gal.; other counties have all fuels taxed at $0.26/gal.

b Plus a petroleum business tax; the amount varies but is usually in the range of $0.12 to $0.14/gal.

c Plus 0.1035 oil franchise tax.

Georgia, consuming 21% in 1995. Distillate fuel use in the transportation sector went from 45.1 trillion Btu to 166 trillion Btu from 1970 to 1995, an increase of 268%, reflecting the tremendous growth of the Atlanta region as a distribution center for goods.

Atlanta also serves as an important rail freight hub and intermodal freight transfer point. Both CSX Transportation and Norfolk Southern Corporation own and operate extensive freight service over the railroad corridors in Atlanta and the surrounding areas. Amtrak provides passenger rail service on two long distance routes. In 1997, Georgia ridership of Amtrak totaled 137,278 passengers. Currently, there are 5,059 miles of rail lines in Georgia. In addition, the Georgia Department of Transportation is looking at a Commuter Rail Plan using existing rail lines for passenger service with 40 stations and serving 50 Georgia counties.

Jet fuel use, comprising 13% of the transportation sector's energy use, enabled travel at Georgia's 409 aircraft facilities including airports, STOLports, seaplane bases, and military airstrips. Transportation use of jet fuel grew from 59.0 trillion Btu to 104.6 trillion Btu from 1970 to 1995, an increase of 77%, reflecting the increase in air travel in Georgia. Air passenger traffic in Atlanta alone has increased from 1.2 million international and 36.7 million domestic passengers in 1983 to 2.9 million international and 54.8 million domestic passengers in 1995. Atlanta Hartsfield International Airport was the second busiest United States airport in 1995 in terms of paying passengers.

Residential Sector Energy

Georgia's residential sector consists of all private residences, owned or rented, occupied or vacant, including single-family homes, multifamily housing, and mobile homes. Secondary homes, such as summer homes, are also included. Institutional housing, such as school dormitories or military barracks, however, are not included in the residential sector.

Georgia's residential sector, which accounts for just over 21% of the state's total energy use, ranks third among end-use sectors in the total amount of energy consumed. Georgia's residential energy consumption is a reflection of the state's population of nearly 7.5 million, which lives in approximately three million housing units throughout the state. Energy consumption in this sector has more than doubled in the past 25 years, rising from 254.7 trillion Btu in 1970 to 530.1 trillion Btu in 1995. In comparison, during the same period, residential energy consumption for the United States as a whole increased by approximately 35%.

The residential sector's energy consumption increase is not solely explained by population increases in the state. Because energy consumption has increased at a rate faster than that of Georgia's population, per capita energy consumption for this sector has also increased greatly. From 1970 to 1995, per capita residential sector energy consumption increased by 33%, from 55.5 million Btu per person in 1970 to 73.7 million Btu per person in 1995. The increase is much greater than the national average increase of 5% during the same time. In 1970, per capita residential energy consumption for the United States was 65.5 million Btu compared to 68.7 million Btu in 1995. See *Table 2*.

Table 2.

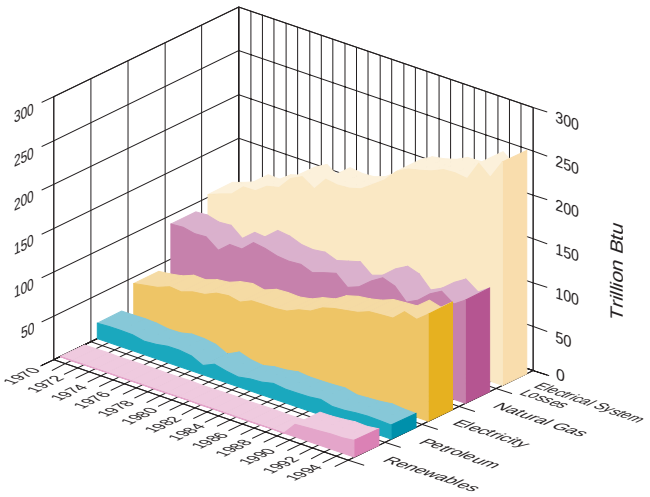
Residential Per Capita Energy Consumption, *1970-1995*

Georgia	Energy Consumed (Million Btu)	Population	Energy Consumed Per Capita (Million Btu)
1970	254,700,000	4,587,930	55.52
1980	344,800,000	5,436,105	63.43
1990	447,200,000	6,478,216	69.03
1995	530,100,000	7,192,305	73.70
Total Change from 1970-1995			***33%***

United States	Energy Consumed (Million Btu)	Population	Energy Consumed Per Capita (Million Btu)
1970	13,310,000,000	203,302,031	65.47
1980	15,069,300,000	226,545,805	66.52
1990	16,520,500,000	248,709,873	66.42
1995	18,056,500,000	262,760,639	68.72
Total Change from 1970-1995			***5%***

Figure 15.

Georgia Residential Energy Consumption by Fuel, *1970-1995*



Today, electricity is the fuel most used in the residential sector, as shown in *Figure 14*. Prior to 1994, natural gas was the most used fuel in this sector. See *Figure 15*. Electricity provides energy for lights and appliances in virtually every home in Georgia, heating in 27% of the state's residences, air conditioning in a growing number of residences, and water heating in a number of homes as well. Residential use of electricity was 35.8 billion kilowatt-hours in 1995, which is almost three times the amount consumed in 1970. Electrical system losses accounted for another 75 billion kilowatt-hours during 1995. *Figure 16* illustrates Georgia's increased electricity demand from 1970 to 1995.

Figure 14.

Georgia Residential Energy Use by Fuel, *1995*

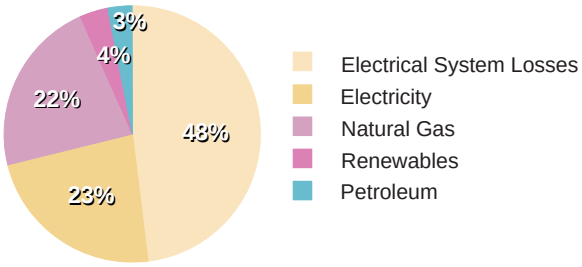
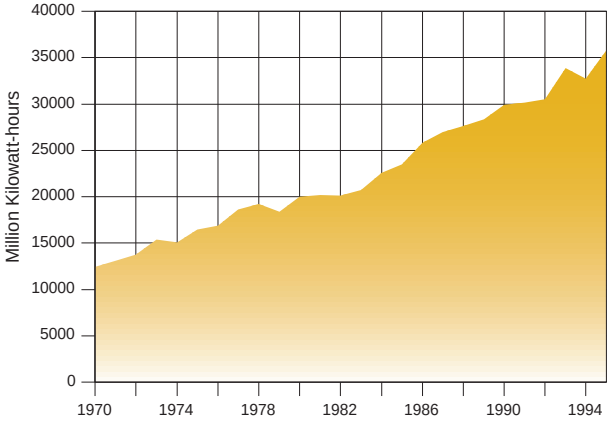


Figure 16.

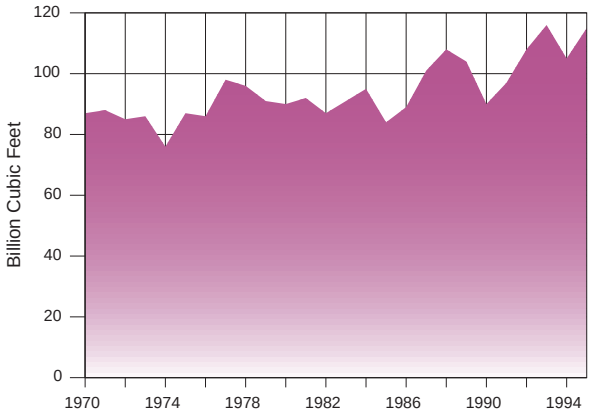
Georgia Residential Sector Electricity Consumption, *1970-1995*



Providing heat to over 53% of the homes in the states, natural gas is the second most used fuel in Georgia's residential sector. Many Georgia residents also rely on natural gas for cooking and water heating. In 1995, 115 billion cubic feet of natural gas were consumed in Georgia's residential sector, a 32% increase over the amount used in 1970. *Figure 17* shows the fluctuations in the residential sector's consumption of natural gas from 1970 to 1995.

Figure 17.

Georgia Residential Sector Natural Gas Consumption, *1970-1995*



Used as a heating fuel in approximately 15% of Georgia's homes, petroleum products account for only 3% of the total energy use of this sector. Accounting for over 93% of petroleum consumption, liquefied petroleum gases (LPG) are the primary petroleum products used in Georgia's residential sector. Propane is a major component of the LPG category, and is still an important source of fuel in many rural parts of Georgia.

In 1995, slightly more than four million barrels of petroleum were consumed by Georgia's residential sector. This amount is 6% less than in 1970.

Figure 18 shows that total residential petroleum consumption reached its peak of 4,905 thousand barrels in 1977 and a low of 2,663 thousand barrels just two years later. During the past 25 years, consumption of all the petroleum products in the residential consumption mix has also fluctuated. See *Figure 19.*

Figure 18.

Georgia Residential Sector Petroleum Consumption, *1970-1995*

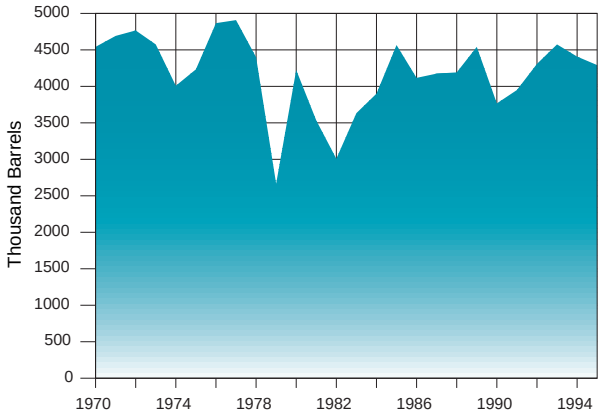
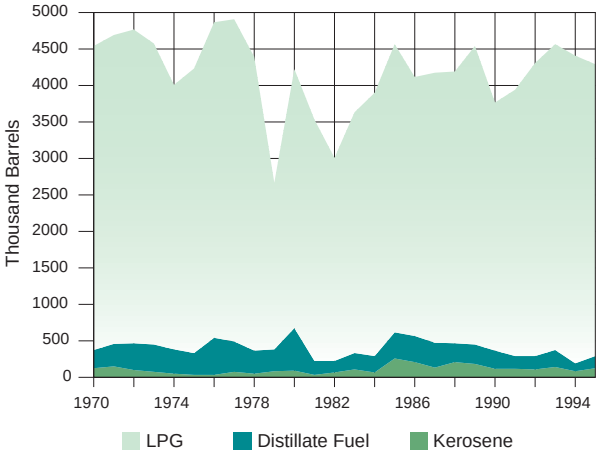


Figure 19.

Georgia Residential Sector Petroleum Consumption by Category, *1970-1995*



During the first decades of this century, fuel wood consumption dropped sharply as oil, gas, and electricity were substituted as fuel for domestic heating and cooking. Then, during the early 1970s though the mid 1980s, escalating fuel prices forced more and more Georgians to turn to wood as their primary home heating fuel. Georgia's residential sector used about 1,600 thousand cords of fuel wood in 1986. This amount had dropped to 723 thousand cords by 1990, but increased by 31% to 948 thousand cords in 1995.

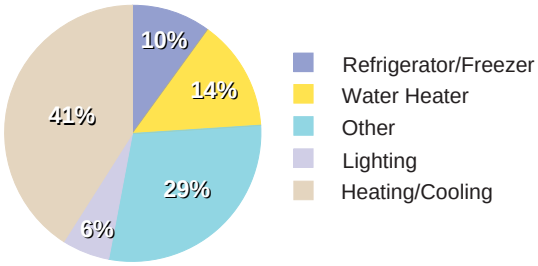
Although residential wood fuel consumption has increased in the past few years, the percentage of households using wood as their primary home heating fuel decreased from 4.9% in 1970 to 3.8% in 1990. Most of the wood consumed by the residential sector is used primarily as secondary heating or in fireplaces and wood burning stoves for aesthetic purposes.

In 1995, Georgia's residential sector consumed 42 million kilowatt-hours of solar-generated energy, a 56% increase from 1990 when 27 million kilowatt-hours were consumed. Overall, solar energy currently makes up only 0.02% of all the energy consumed in the residential sector.

Despite efficiency improvements in many electricity consuming products, electricity demand is expected to continue to grow, but at a slowing pace. Although the single most important factor in increased demand is the number of customers, the increased residential use of personal computers and other office equipment, microwave ovens, dishwashers, clothes dryers, VCRs and other appliances and electronics in a home continues fueling electricity consumption. As these products become more affordable to the average consumer, their use will grow. *Figure 20* shows the typical home energy use breakdown by end-use.

Figure 20.

Typical Home Energy Use



Besides the more widespread use of energy-consuming appliances, certain demographic changes are contributing to increases in total energy consumption in the residential sector. In Georgia, like many other parts of the country, trends of fewer people per household and larger homes also increase overall energy consumption. In 1980, there was an average of 2.7 people per household in Georgia. By 1996, the average dropped to 2.4 people per household.

Commercial

Georgia's commercial sector consists of service providers such as hotels and restaurants, wholesale and retail trade, religious and nonprofit organizations, health, social, and educational institutions, and federal, state, and local governments. This sector does not include businesses engaged in transportation, manufacturing, or other industrial activities.

Together, commercial sector businesses accounted for 64% of gross state product in 1994. Over 2.6 million people are employed in this sector, or 73% of Georgia's total nonagricultural workforce.

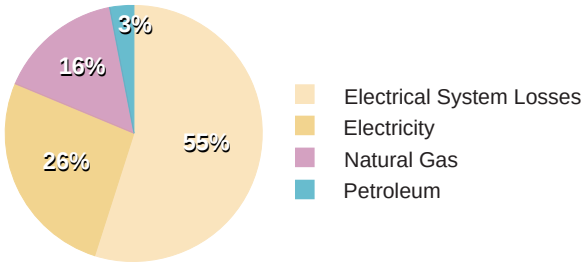
In terms of employment, the commercial sector has grown more than any other sector, 90%, since 1970. The leading commercial industries in terms of current and projected employment are services (business, educational, and health) and food and beverage establishments. The service providers employ the most people, 944.1 thousand, or 40% of those employed by the commercial sector. Georgia's service industry has grown by 173% since 1970. Trade employs the next largest number of people, 915.5 thousand, or 35% of the commercial workforce.

Despite its high number of employees, Georgia's commercial activities result in the smallest share of the state's total energy consumption. In 1995, the commercial sector used 15% of the total. Between 1970 and 1995, commercial energy consumption in Georgia nearly doubled. During the same period, commercial energy consumption for the United States as a whole increased by only 67%.

As shown in *Figure 21,* electricity, which accounts for over 26% of consumption, is the most commonly used fuel in the commercial sector. In 1995, almost 29 billion kilowatt-hours of electricity were used, more than triple the amount used in 1970. In addition, electrical system losses attributable to the commercial sector were another 60 billion kilowatt-hours.

Figure 21.

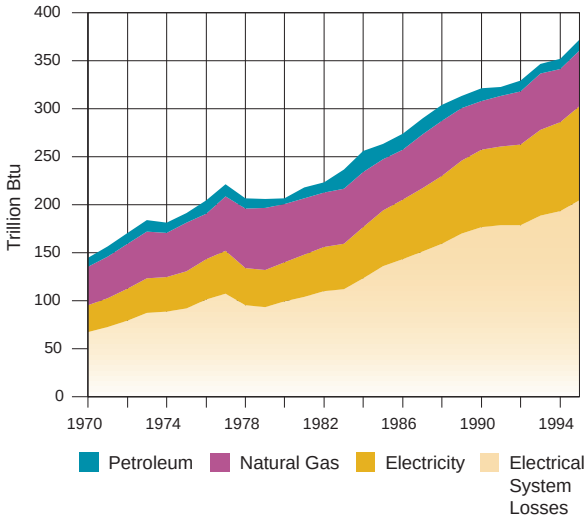
Georgia Commercial Sector Energy Consumption by Fuel, *1995*



Prior to 1985, natural gas was the fuel most used by the commercial sector. See *Figure 22.* However, natural gas now accounts for approximately 16% of the sector's total energy use. In 1995, 57 billion cubic feet of natural gas were used. Between 1970 and 1995, commercial natural gas consumption increased by 46%.

Figure 22.

Georgia Commercial Sector Energy Consumption by Fuel, *1970-1995*

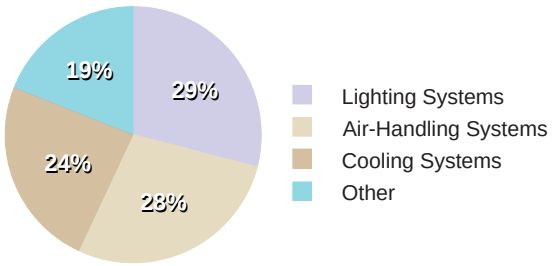


Petroleum products account for only 3% of the energy used in the commercial sector. Between 1970 and 1995, the use of petroleum fuels increased until it reached its peak of almost four million barrels in 1984 and since has declined by 44% to 2.2 million barrels in 1995.

Among the petroleum fuels, the most consumed by the commercial sector is distillate, accounting for 63% of the total. Liquid petroleum gases follow, accounting for 32% of the total. The commercial sector primarily uses these two fuels for space heating. All other petroleum products combined account for less than 5% of the total consumed in this sector. Although 1995 distillate fuel consumption is almost twice the amount consumed in 1970, the 1995 level is 37% less than that consumed in 1984.

Figure 23 shows how a typical large office building consumes energy in four main areas.

Figure 23.
Typical Energy Use by Large Commercial Office Building



Energy Efficiency and Energy Intensity

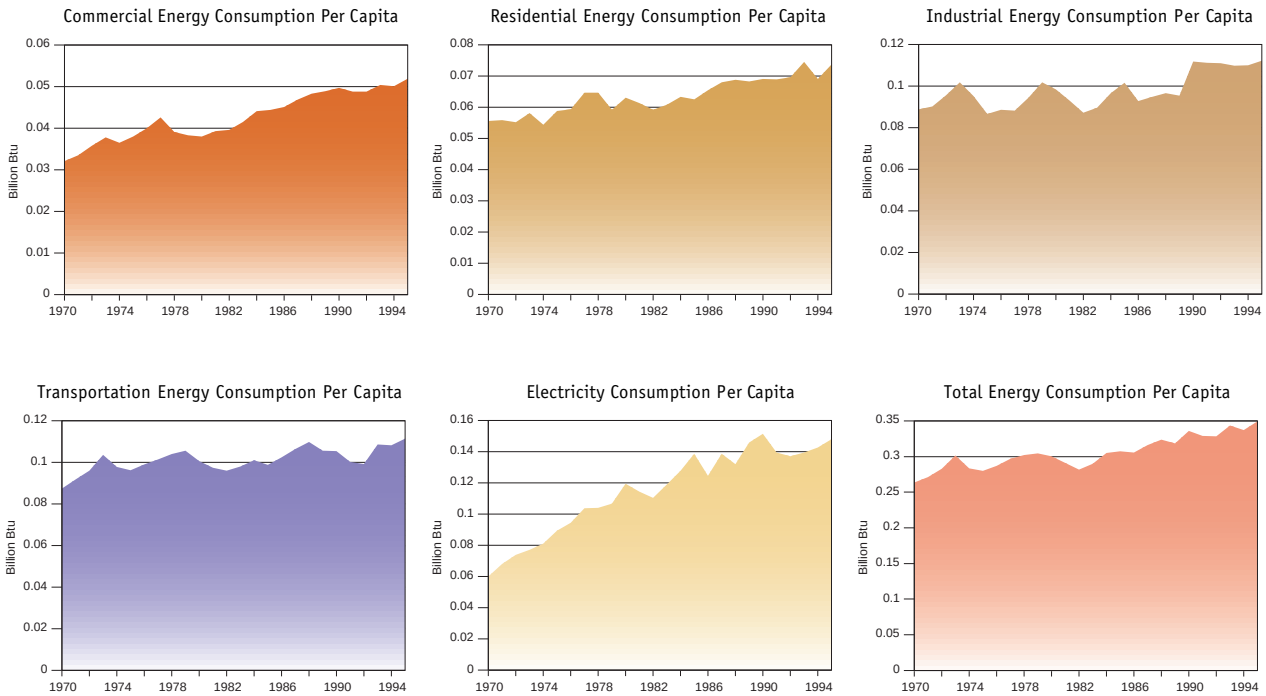
Energy efficiency means achieving more work while consuming the same amount, or less, of energy. Per capita energy use and energy intensity, which measures energy use per unit of output or per unit of value, are helpful measures to look at trends in energy efficiency.

Total energy consumption in Georgia is increasing. While Georgia's population has also increased, population alone does not account for all the growth in energy use. In fact, between 1970 and 1995, total energy consumption on a *per capita* basis also grew in Georgia—by 32%. As shown in *Figure 24*, all sectors showed an increase in per capita consumption. However, the bulk of the change in total energy consumption per capita is attributable to increases in electric consumption per capita.

Overall, 1970 per capita energy consumption in Georgia was much lower than the US average; but by 1995, Georgia exceeded the United States average of 344 million Btu by five million Btu. Still, Georgia currently ranks 26th nationally in terms of total energy use per capita. *Figure 25* shows Georgia's position compared to other states in terms of energy use per capita for each of the economic sectors.

Table 3 and Figure 26 provide energy intensity and other indicators that help assess energy efficiency in Georgia's economic sectors since 1980. From 1980 to 1995, while per capita energy consumption has increased in Georgia, total energy use per dollar of gross state product

Figure 24. **Georgia Energy Consumption Per Capita by Sector,** *1970-1995*



has actually decreased slightly, as has industrial energy use per dollar of manufacture value added. Residential electricity use per capita mirrors total residential energy use, having increased steadily since the early 1980s. Electricity use per dollar of gross state product and commercial energy use per employee fluctuated on a yearly basis but overall have remained stable from 1980 to 1995. In the transportation sector, motor fuel use per vehicle mile traveled decreased from 1980 to 1990, but since 1990 has stabilized.

Figure 25.

Energy Consumption Per Capita by Sector Georgia's Rank Among States and District of Columbia, *1995*

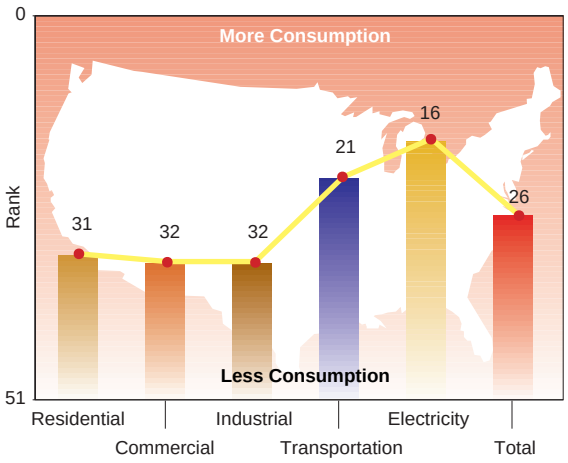
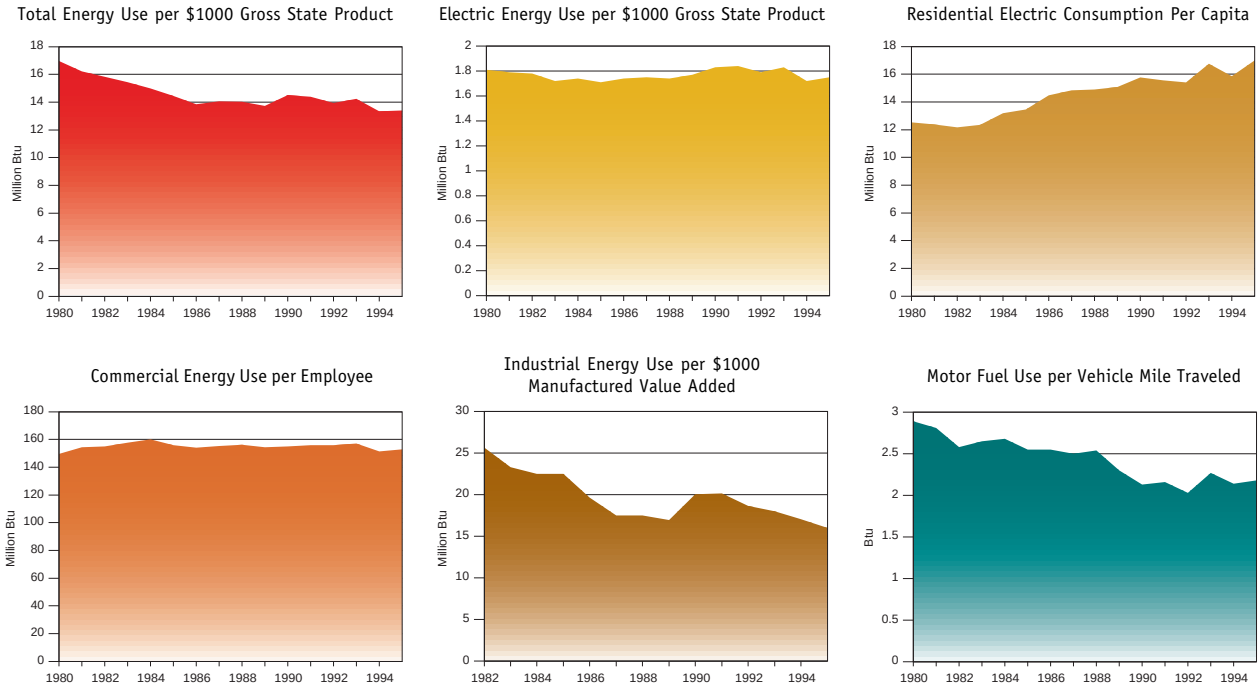


Table 3. **Energy Efficiency and Intensity Indicators,** *1980-1995*

Year	Total Energy Energy Use per $1000 Gross State Product (million Btu)	Electric Energy Use per $1000 Gross State Product (million Btu)	Residential Electricity Use per Capita (million Btu)	Commercial Energy Use per Employee (million Btu)	Industrial Energy Use per $1000 Manufacture Value Added (million Btu)	Motor Fuel Use Per Vehicle Miles Traveled (Btu)
1980	16.97	1.81	12.52	149.50	N/A	2.89
1981	16.22	1.79	12.37	154.45	N/A	2.81
1982	15.83	1.78	12.16	155.01	25.65	2.58
1983	15.44	1.72	12.34	157.76	23.30	2.65
1984	14.98	1.74	13.20	160.23	22.50	2.68
1985	14.44	1.71	13.45	155.82	22.47	2.55
1986	13.86	1.74	14.48	154.22	19.64	2.55
1987	14.07	1.75	14.83	155.24	17.47	2.50
1988	14.02	1.74	14.91	156.26	17.48	2.54
1989	13.73	1.77	15.08	154.49	16.92	2.30
1990	14.51	1.83	15.76	155.09	20.04	2.13
1991	14.38	1.84	15.55	156.05	20.13	2.16
1992	13.94	1.79	15.41	155.98	18.63	2.03
1993	14.23	1.83	16.76	157.02	18.00	2.27
1994	13.34	1.72	15.85	151.36	17.02	2.14
1995	13.40	1.75	16.99	152.91	15.99	2.18

Figure 26. **Energy Efficiency and Intensity Indicators,** *1980-1995*

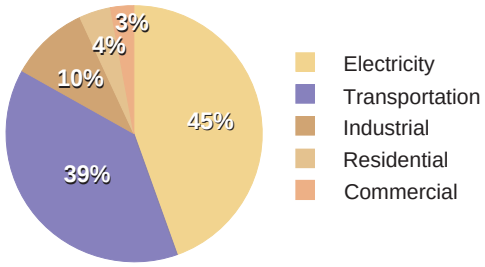


Impacts of Energy Use

Using energy helps keep homes comfortable, run businesses, and connect communities in Georgia, but it also has unwanted consequences. Combustion of any fuel containing carbon produces emissions of carbon dioxide (CO_2), the main gas that contributes to global climate change. In Georgia, carbon dioxide emissions from energy use of fossil fuels totaled 155 million tons in 1990. The electricity sector contributed the highest percentage with 45%, followed by transportation with 39%, and industrial, residential, and commercial with 10%, 4%, and 3%, respectively. See *Figure 27.* These environmental impacts are not limited or unique to Georgia, but they do affect the quality of life of Georgia citizens.

Figure 27.

Georgia CO_2 Emissions by Sector, *1990*



Energy Supply in Georgia

Energy Marketing

Electricity Marketing

In Georgia, electricity is provided by three types of electric retail suppliers: electric membership corporations (EMCs), municipalities, and investor-owned power companies. Georgians are served by a total of 99 electric retail suppliers.

Currently, 42 EMCs provide service to Georgia residents, 39 of which formed a generation and transmission cooperative in 1974 called Oglethorpe Power Corporation. Oglethorpe Power is the largest electric cooperative in the United States in terms of revenues, assets, kilowatt-hour sales, and number of consumers. In terms of area served, it ranks in the top ten in the country. Together these 39 EMCs serve nearly 70% of the land area of Georgia and approximately 1.1 million customers.

Historically, EMCs did not generate their own power, but bought it wholesale and distributed it to members. Through Oglethorpe Power, however, the EMCs became involved in both the generation and transmission of electricity. In March of 1997, Oglethorpe Power underwent a restructuring that divided the corporation into separate power generation, transmission, and system operations companies, known as Oglethorpe Power, Georgia Transmission Corporation, and Georgia Systems Operations Corporation. Under the new structure, member EMCs enter into wholesale contracts and transmission service agreements with the newly created companies.

The three EMCs that are not a part of Oglethorpe Power receive their power from the Tennessee Valley Authority.

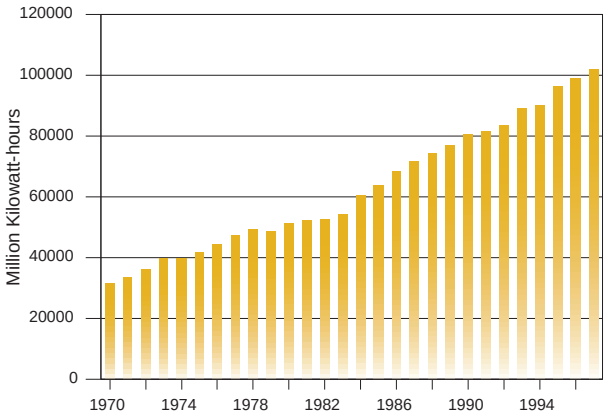
In Georgia, 52 municipalities also provide electricity to their residents. Of these, 48 are members of the Municipal Electric Authority of Georgia (MEAG). MEAG is an electric generation and transmission non-profit corporation. Together, MEAG communities supply electricity to 10% of Georgia's population and sold 10.9 billion kilowatt-hours of electricity in 1996.

Most of the remaining electric customers in Georgia are served by Georgia's two investor-owned utilities, Georgia Power Company and Savannah Electric and Power Company. Both of these utilities are subsidiaries of Southern Company. Together these utilities serve the most people in Georgia. Georgia Power is the state's largest utility; it generates, distributes, and sells electricity in all but six of Georgia's 159 counties, covering 57,000 square miles of the state. In 1996, Georgia Power served 1.7 million people, and sold more than 74 billion kilowatt-hours to residential and commercial customers. Savannah Electric and Power serves more than 250,000 residents in a 5-county, 2,000-square-mile region.

Between 1970 and 1997, total electricity consumption in Georgia increased by more than 220%, from 31,501 million kilowatt-hours in 1970 to 101,780 million kilowatt-hours in 1997. *Figure 28* illustrates the steady increase in electricity sales during these years.

Figure 28.

Georgia Electricity Sales, *1970-1997*



Natural Gas Marketing

In 1998, there were 1.5 million residential, 123 thousand commercial, and three thousand industrial natural gas customers in Georgia. Until 1998, those natural gas customers were served by 84 municipal gas systems and two investor-owned natural gas distribution companies: the Atlanta Gas Light Company (AGL) and United Cities Gas Company.

On November 1, 1998, restructuring of the natural gas industry got underway in Georgia (see box on page 21). At that time, more than 15 state-certified gas suppliers made their services available to 1.4 million natural gas customers. The remaining customers are served by United Cities Gas Company (in the Columbus and Gainesville areas) and the Municipal Gas Authority of Georgia (MGAG), the largest non-profit natural gas joint action agency in the United States.

MGAG, established in 1987 to provide affordable natural gas to 60 member municipally-owned gas systems in Georgia through its volume purchase power, today serves 75 cities in Georgia, Alabama and Florida along five pipelines. Its members provide approximately 33 trillion Btu of natural gas to an estimated 155 thousand customers.

Unlike electricity, no natural gas is produced in Georgia. All natural gas consumed in the state must be imported by pipelines that transport gas to Georgia from Alabama and beyond. Four interstate pipeline suppliers of natural gas provide wholesale natural gas to Georgia's natural gas utilities serving end-users. These pipelines are:

- Southern Natural Gas Company
- Transcontinental Gas Pipeline Company
- South Georgia Natural Gas Company
- East Tennessee Natural Gas Company

Restructuring of Natural Gas and Electric Markets

Fundamental change in the structure of the natural gas and electricity industries is happening in Georgia. Currently, in most markets, these energy services are provided by regulated monopolies, both public and private utilities. A natural gas or electric utility has territory that it is obligated to serve. In exchange, the Georgia Public Service Commission sets the rates and terms of service for that utility. Change to the monopoly aspects is being discussed and implemented; restructuring these aspects can bring increased economic efficiency and could lead to consumer benefits. Restructuring could ultimately impact all natural gas and electricity customers.

The Natural Gas Competition and Deregulation Act, passed by the Georgia legislature in April 1997, opens one segment of the natural gas market to competition. The legislation only applies to customers of Georgia's two investor-owned gas utilities, Atlanta Gas Light Company and United Cities Gas Company if that utility applies for alternative regulation. Currently, only Atlanta Gas Light Company has chosen this option. As a result, customers of Atlanta Gas Light Company can now choose their natural gas provider.

Utility companies will continue to operate the pipeline system, through which the natural gas flows, as a distribution company, but must provide access to their pipelines for certified marketers of natural gas. Marketers can then compete to arrange for the purchase and transportation of natural gas to customers. The transition from monopoly to competition is being regulated by the Public Service Commission to ensure fair competition and customer choice, with the aim that all customers share in any cost reductions from competition.

In Georgia, the Public Service Commission has begun investigating the issue of electric industry restructuring, which could take many different forms. Competition at the wholesale level would likely bring changes at the generating level. More comprehensive restructuring involving retail competition would enable consumers to choose from whom they buy electric power.

Energy Production

Production of Fuels

There are no crude oil or natural gas reserves located in Georgia, and therefore no production of these fuels. Georgia does have limited coal reserves in the northwest corner of the state. In 1984, the last year for which any coal production in Georgia is reported, 33 miners were employed in a single surface mine. Total production for 1984 was 125,000 short tons of bituminous coal.

In 1995, processing of wood products in Georgia generated 478 million cubic feet of wood and bark residues. Approximately 48%, or 230 million cubic feet, of the residue was used as industrial fuel. This number is down 19% from 1992, when 273 million cubic feet of residue was

used as industrial fuel, but up 9% from the 212 million cubic feet used in 1989.

Industrial wood consumption accounts for approximately 84% of total wood consumption in Georgia, while the residential sector consumes the remaining 16%.

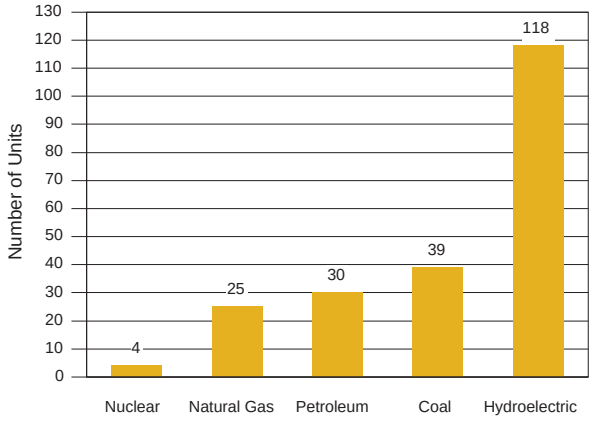
Electricity Production and Generation

Electricity Production Capacity

Electricity for Georgia is produced by a total of 216 generating units located in 54 power plants throughout the state. Together these plants provide Georgia with more than 23,000 megawatts of net summer production capacity. Of these 216 generating units, 118 are hydroelectric, 39 are coal fired, 30 are petroleum fueled, 25 are gas fired, and four are nuclear fueled. See *Figure 29*. *Table 4* provides information about the location of these plants and their production capabilities.

Figure 29.

Georgia Electric Generating Plant Units by Fuel, *1997*



Georgia power plants produced more than 3.4% of the nation's total electrical output. The electric generating facilities in the state currently have the capability to produce electricity in excess of Georgia's current needs. Net interstate flow of electricity is the difference between the amount of energy in the electricity sold within Georgia (including electrical system losses) and the energy that is input at the electric utilities in Georgia.

In 1995, net interstate flow of electricity was -15,246 million kilowatt-hours. This amount is approximately 5% of all electricity produced in Georgia that year. The negative number indicates that the energy input at electric utilities in Georgia was greater than what was required to meet electricity demand within Georgia's borders. Therefore, Georgia was a net seller of electricity to other states.

A positive number for net interstate flow of electricity would mean that the amount of energy used in a state is greater than the amount of energy produced in the state. States with a positive net interstate flow of electricity must import electricity produced in other states.

In addition to its existing electricity production capabilities, Georgia power producers are planning capacity additions that include 14 new generating units. These units will provide the state with a total additional production capacity of between 2,061 megawatts in summer and 2,258 megawatts in winter. Of these additional units, ten are planned to be gas fired, and four conventional hydroelectric.

Table 4. **Georgia Electric Generating Plants**

Utility Company Plant (County)	No. Generating Units and (Energy Source)	Summer Capacity megawatts	Winter Capacity megawatts	Year of Commercial Operation[7]
Crisp County Power Commission		**31.6**	**31.7**	
Plant Crisp (Worth)	2 (1 natural gas, 1 coal)	17.5	17.6	1958
Warwick (Worth)	4 (water)	14.1	14.1	1930, 1940, 1950
Fort Valley Utility Commission		**3.0**	**3.0**	
John Harmon Gen (Peach)	1 (natural gas)	3.0	3.0	1980
Georgia Power Company		**19,182.7**	**19,505.3**	
Arkwright (Bibb)	6 (4 coal, 2 oil)	197.2	202.2	1941, 1942, 1948, 1969, 1969
Atkinson (Cobb)	5 (3 natural gas, 2 oil)	251.0	267.2	1941, 1945, 1970
Barnett Shoals (Oconee)	4 (water)	1.6	1.6	1910
Bartletts Ferry (Harris)	6 (water)	171	171.0	1926, 1928, 1951, 1985
Bowen (Bartow)	5 (4 coal, 1 oil)	3248.1	3257.0	1971, 1972, 1974, 1975
Burton (Rabun)	2 (water)	7.4	7.4	1927
Edwin I. Hatch (Appling)[1]	2 (uranium)	1622.0	1622.0	1975, 1979
Estatoah (Rabun)	1 (water)	0.1	0.1	1928
Flint River (Dougherty)	3 (water)	3.3	3.3	1921, 1925
Goat Rock (Harris)	6 (water)	26.0	26.0	1972, 1915, 1920, 1955, 1956
Hammond (Floyd)	4 (coal)	835.1	835.1	1954, 1955, 1970
Harllee Branch (Putnam)	4 (coal)	1565.1	1565.1	1965, 1967, 1968, 1969
Jack McDonough (Cobb)	4 (2 oil, 2 coal)	565.0	581.2	1963, 1964, 1971
Langdale (Harris)	2 (water)	0.6	0.6	1924, 1926
Lloyd Shoals (Jasper)	6 (water)	17.4	17.4	1911, 1916, 1917
McManus (Glynn)	12 (oil)	581.2	698.2	1952, 1959, 1964, 1972
Mitchell (Dougherty)	6 (3 oil, 3 coal)	296.8	323.2	1948, 1971
Morgan Falls (Fulton)	7 (water)	9.1	9.1	1903
Nacoochee (Rabun)	2 (water)	5.6	5.6	1926
North Highlands (Muscogee)	4 (water)	30.9	30.9	1963
Oliver Dam (Muscogee)	4 (water)	51.7	51.7	1959
Riverview (Harris)	2 (water)	0.2	0.2	1918
Robins (Houston)	2 (natural gas)	158.6	190.8	1995
Scherer (Monroe)[2]	4 (coal)	3351.5	3351.5	1982, 1984, 1987, 1989
Sinclair Dam (Baldwin)	2 (water)	40.0	40.0	1953
Tallulah Falls (Habersham)	6 (water)	64.8	64.8	1913, 1914, 1920
Terrora (Rabun)	2 (water)	14.6	14.6	1925
Tugalo (Habersham)	4 (water)	44.8	44.8	1923, 1924
Vogtle (Burke)[3]	2 (uranium)	2328.0	2328.0	1987, 1989
Wallace Dam (Hancock)	6 (water)	317.0	317.0	1979, 1980
Wansley (Heard)[4]	3 (2 coal, 1 oil)	1783.8	1795.9	1976, 1978, 1980
Wilson (Burke)	7 (oil)	297.7	393.7	1972, 1973
Yates (Coweta)	7 (coal)	1270.2	1263.4	1950, 1952, 1957, 1958, 1974
Yonah (Stephens)	3 (water)	26.1	26.1	1925
Oglethorpe Power Corporation		**565.7**	**566.3**	
Rocky Mountain Project (Floyd)[5]	2 (water)	565.2	565.2	1995
Tallassee Hydro Project (Clarke)	2 (water)	0.5	1.1	1986
Savannah Electric & Power Co.		**1,316.6**	**1,453.7**	
Boulevard (Chatham)	3 (natural gas)	46.4	59.9	1970
Kraft (Chatham)	5 (2 natural gas, 3 coal)	350.3	354.7	1958, 1961, 1965, 1969, 1972
McIntosh (Effingham)[6]	9 (8 natural gas, 1 coal)	809.1	928.3	1979, 1994, 1995
Riverside (Chatham)	5 (natural gas)	110.5	110.8	1926, 1936, 1949, 1954, 1956
Tennessee Valley Authority		**33.0**	**29.0**	
Blue Ridge (Fannin)	1 (water)	15.0	13.0	1931
Nottely (Union)	1 (water)	18.0	16.0	1956
Corps of Engineers (Mobile Dist.)		**995.0**	**1007.0**	
Allatoona (Bartow)	3 (water)	82.0	82.0	1950
Buford (Forsyth)	3 (water)	98.0	98.0	1957
Carters (Murray)	4 (water)	550.0	562.0	1975, 1977
Walter F. George (Clay)	4 (water)	150.0	150.0	1963
West Pointe (Troup)	3 (water)	85.0	85.0	1975
Woodruff Dam (Decatur)	3 (water)	30.0	30.0	1956
Corps of Engineers (Savannah Dist.)		**964.0**	**964.0**	
Hartwell Lake (Hart)	5 (water)	356.0	356.0	1962, 1983
J. Strom Thurmond Dam (Columbia)	7 (water)	280.0	280.0	1953
Richard Russell Dam (Elbert)	4 (water)	328.0	328.0	1985, 1986
Total	**216**	**23,092**	**23,560**	

Notes:

1. Plant jointly owned by Oglethorpe Power, MEAG, City of Dalton, and Georgia Power.
2. Plant jointly owned by Gulf Power, Oglethorpe Power, MEAG, City of Dalton, and Georgia Power.
3. Plant jointly owned by Oglethorpe Power, MEAG, City of Dalton, and Georgia Power.
4. Plant jointly owned by Oglethorpe Power, MEAG, City of Dalton, and Georgia Power.
5. Plant jointly owned by Oglethorpe Power and Georgia Power.
6. Plant jointly owned by Georgia Power and Savannah Electric.
7. Years indicate when units came into commercial operation.

How is Electricity Produced?

Most of the electricity produced and consumed in Georgia is generated by electric power plants. A power plant contains generating units that convert primary energy, such as fossil fuels, uranium, or falling water, into electric energy. In Georgia, 54 power plants comprise a total of 216 generating units.

The two principal parts of a power plant are the prime mover and the generator. The prime mover is the engine, turbine, water wheel, or similar machine that drives the electric generator. The generator is where the electricity is created. The prime mover is connected to the generator by a shaft. The most common prime movers in Georgia are steam turbines, gas combustion turbines, and water turbines.

Most of the electricity generated in Georgia is produced by **steam turbine** prime movers. At a steam turbine generating unit, fossil fuels are burned to create heat. The heat then boils water or other fluid in a boiler to create high pressure steam. The expanding steam pushes against the blades of the turbine, causing the turbine to spin. The spinning turbine turns the shaft of the generator.

Like a fossil fuel burning plant, a **nuclear plant** also uses steam turbine prime movers to produce electricity. In a nuclear fission plant, heat from the fission process heats water to produce steam, which drives the turbines.

Gas turbine prime movers operate similar to steam turbine prime movers. In a gas turbine generating unit, hot gas is produced by the combustion of natural gas and distillate oil. These gases pass directly through the turbine to spin the generator shaft.

Water turbine prime movers are called hydroelectric generating units. In hydroelectric power generation, flowing water is used to apply pressure to the blades of the turbine. Pressure spins the turbine connected to the generator. Although more than half of the electric generating units in Georgia are hydroelectric, they produce only 15% of the electricity. Because the flow of water does not spin the turbine with the same force as steam pressure, more hydroelectric units are needed to produce the same amount of electricity as a steam turbine prime mover. However, hydroelectric power is still an important source of renewable energy.

Inside a generator, a powerful magnet is attached to the end of the shaft from the turbines. This magnet is turned inside a coil of wires. This spinning magnet produces a flow of electrons in the wire. The flow of electrons is the electric current. The faster the turbine spins, the faster the magnet spins, and the greater the voltage of the electric current.

When electricity leaves the generator, it flows to a transformer. At the transformer, the electric pressure, or voltage, is increased to between 70,000 and 345,000 volts so it can be transmitted over long distances. The high-voltage electricity travels along large wires called transmission lines until it reaches a substation near where the electricity will be used. At the substation, another transformer decreases the voltage to between 120 and 240 volts so it can be distributed to homes and businesses along distribution lines.

Most traditional electrical production is very inefficient. Only a small amount of the energy input, whether it its coal, natural gas, or oil, remains when the electricity reaches its final destination of homes, offices, and industry. These energy losses are the electrical system losses (ESL). Most energy is lost during the production of electricity. For example, in 1995, total energy input at electric utilities in Georgia was 1,064 trillion Btu. But because of the energy lost during conversion to electricity and power plant use, net generation by Georgia power plants was 348 trillion Btu. In addition, another 2% of the original energy is lost during transmission and distribution of electricity. As a result, total electrical system losses equaled almost 70 percent of the original energy input.

In addition to traditional methods of electricity production that rely on fossil fuels or water as energy sources, there are other forms of electricity production that use renewable energy sources. Although these other methods of electric power generation currently only contribute a small amount to total power production in the United States, they are gaining more widespread interest.

Solar power is derived from the light and heat of the sun. Two types of solar energy can be used to generate electricity. Solar thermal energy generators use the heat from the sun to heat water in boilers. Just like fossil fuel boilers, the heated water forms steam which turns the turbines in a power plant. The process known as photovoltaic conversion generates electricity directly from sunlight through photochemical processes. No turbine or generator is needed.

Wind power uses the energy force in the wind to turn the blades of a turbine that is similar to a typical windmill. Like in most other power plants, a wind turbine is then connected to the generator.

Geothermal power comes from the heat energy located deep within the earth. A geothermal power plant captures the steam that is created where magma flows close to the earth's surface. The steam is then used in a conventional steam-turbine plant.

Fuels Used in Electricity Production

As of August 1998, the existing capacity of Georgia electric utilities totaled 23,092 megawatts. Based on primary energy sources, coal-fired capacity accounted for 57% (13,233 megawatts) of the state's existing capacity. Nuclear capacity accounted for 17% (3,950 megawatts); water (both conventional and pumped storage hydroelectric), 15% (3,412 megawatts); natural gas, 6% (1,276 megawatts); petroleum, 5% (1,228 megawatts).

Figures 30 and 31 demonstrate the different input fuel breakdowns at electric utilities in Georgia and the United States. *Table 5* provides information on Georgia electric utility generation by fuel type from 1982 to 1997.

Cogeneration and Small Power Production

In addition to the electricity produced by Georgia's electric utilities, a significant amount of power is produced by private sources.

Figure 30.
Georgia Electric Utility Production Capability by Fuel, *1997*

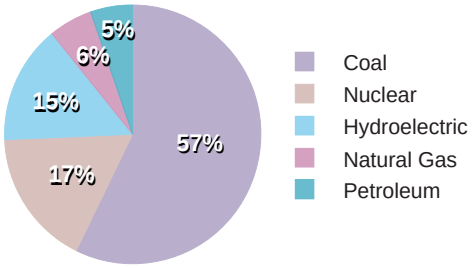


Figure 31.
United States Electric Utility Production Capability by Fuel, *1997*

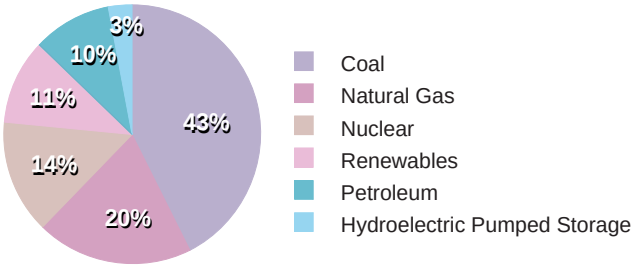


Table 5. **Georgia Electric Utility Net Generation by Fuel** *(Gigawatt-hours)*, *1982-1997*

Year	Coal	Petroleum	Natural Gas	Nuclear	Hydroelectric[1]	Renewables[2]	Total
1982	49,465	183	134	6,605	3,598	0	59,985
1983	54,482	135	124	7,774	4,065	0	66,580
1984	63,821	88	46	5,472	4,083	0	73,510
1985	67,828	130	65	10,130	2,772	0	80,925
1986	72,349	270	421	7,238	2,097	0	82,375
1987	67,185	184	57	15,259	3,121	0	85,806
1988	64,834	260	119	15,149	2,011	0	82,373
1989	63,405	158	50	24,961	3,674	0	92,248
1990	67,565	165	152	24,797	4,887	0	97,566
1991	59,985	108	61	26,016	4,639	0	90,809
1992	58,235	128	77	27,996	5,342	0	91,778
1993	63,296	237	218	27,233	4,753	0	95,737
1994	64,728	161	80	28,927	4,857	0	98,753
1995	65,880	219	573	30,661	4,684	0	102,017
1996	63,231	292	345	29,925	4,936	0	98,729
1997	66,180	201	568	30,414	4,418	0	101,781

1. Includes conventional and pumped storage hydroelectric
2. Includes geothermal, biomass, wind, solar thermal, and photovoltaic

Cogeneration, the sequential production of electricity and heat from a single fuel source, is one such source of privately generated power. In the cogeneration process, heat that is created when electricity is produced is recovered and then used in commercial or industrial processes. Making use of waste heat greatly increases overall fuel utilization efficiency. With a fuel utilization efficiency rate of 70 to 80%, cogeneration efficiency may be double that of a typical utility electrical generation plant.

A second source of non-utility power generation is from small-scale private producers who use a variety of renewable energy resources to produce electricity. Waste materials and by-products, such as wood residues and pecan and peanut shells, and small scale hydroelectric generation provide the primary energy input for the majority of Georgia's cogeneration and small power production facilities.

At the turn of the century, privately-owned cogeneration facilities supplied about half of the industrial sector's electricity needs. However, the vast expansion of electric utilities during the post-World War II period, along with the accompanying decline in electricity prices, led to the abandonment of cogeneration facilities by most industries. By 1970, only about 3% of the electricity used in the industrial sector was generated by cogeneration facilities.

In 1978, Congress passed the Public Utilities Regulatory Policies Act (PURPA), which was designed to encourage the development of cogeneration and small power production facilities. Certain industries in Georgia, particularly the pulp and paper and textile industries, have found it advantageous to operate cogeneration facilities. By the end of 1985, 39 such production facilities operated in Georgia. Together, these facilities augmented Georgia's electricity generating capacity by approximately 600 megawatts. At that time, firms in the wood and paper production industries owned half of the cogeneration and small power production capability in the state.

Today, there are 72 non-utility power producers in Georgia which have the capacity to produce over 1,600 megawatts. Many of the businesses that have the greatest production capabilities are wood and paper mills.

Energy Prices

Electricity Prices

Consumer electricity rates for Georgia's two investor-owned electric utilities, Georgia Power Company and Savannah Electric and Power Company are regulated by the Georgia Public Service Commission. Rates for cities that provide electric service are set by the elected officials of the cities. The rates for EMCs are established by a board elected by the individual EMC members.

Since 1970, electricity prices have increased significantly for all economic sectors in Georgia. See *Figure 32*. Between 1970 and 1995, the cost for electricity increased the most for the industrial sector: 360%. Still, the industrial sector pays the lowest cost, $13.39 per million Btu. The industrial sector is followed by the

residential sector, which saw costs increase by 337% (from $5.18 to $22.62 per million Btu), and the commercial sector with an increase of 270% (from $5.85 to $21.64 per million Btu). The transportation sector showed a cost increase of 178% (from $9.23 to 25.63 per million Btu) between 1980 and 1995. These prices have also increased at a rate greater than that of the electricity consumption of each of the sectors.

At the same time, the fuel cost to the electric utilities of coal, petroleum, and natural gas have declined almost every year since the early 1980s, as demonstrated in *Table 6*.

Figure 32.

Georgia Electricity Prices by Sector,

1970-1994

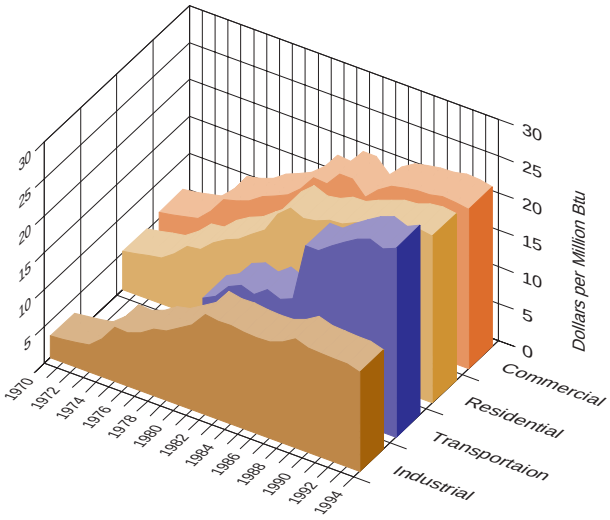


Table 6. **Fuel Receipts and Costs at Electric Utilities in Georgia,** *1982-1997*

Year	Coal Thousand Short Tons	Dollars per Million Btu	Petroleum Thousand Barrels	Dollars per Million Btu	Natural Gas Million Cubic Feet	Dollars per Million Btu
1982	21169	1.86	255	6.69	1501	4.07
1983	21856	1.90	25	4.59	1671	4.18
1984	26650	1.93	121	5.79	582	4.44
1985	26256	1.88	524	5.48	792	4.31
1986	27329	1.81	239	2.32	5787	2.00
1987	26351	1.79	400	3.45	805	3.72
1988	25135	1.75	374	2.84	1334	2.73
1989	25434	1.78	230	4.27	626	3.16
1990	27888	1.79	304	4.86	1757	2.97
1991	24694	1.80	217	4.74	1580	2.76
1992	22851	1.80	217	4.34	1199	2.82
1993	23327	1.76	326	3.47	2994	3.24
1994	28761	1.69	222	3.96	1078	3.21
1995	28490	1.67	240	3.78	3196	2.72
1996	28870	1.58	485	4.31	2619	2.81
1997	28346	1.59	279	4.21	3074	2.66

Natural Gas Prices

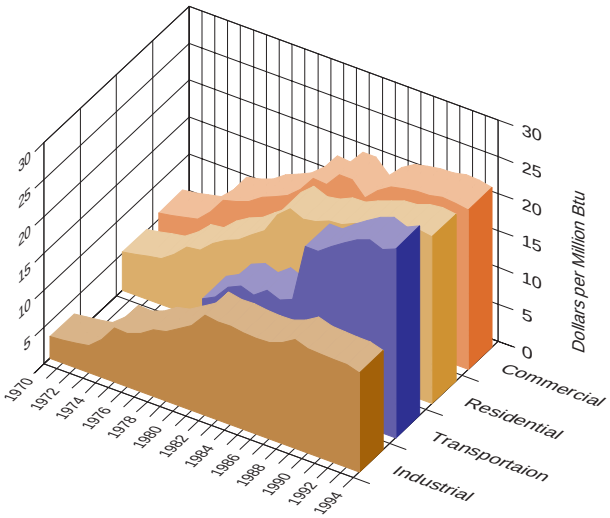
Consumer natural gas rates for Georgia's two investor-owned gas companies, Atlanta Gas Light Company and United Cities Gas Company, are regulated by the Georgia Public Service Commission. Rates for most of the gas distributed by the municipalities is regulated by the local government of the municipality. However, the Public Service Commission does have jurisdiction over municipal gas rates when the service is offered outside of the county limits.

Like electricity prices, natural gas prices in Georgia have also shown significant increases since 1970, as shown in *Figure 33*. Prices for all sectors have increased dramatically, and although the residential sector has had the smallest increase in the past 25 years, residential customers still pay the highest rates. Overall, between 1970 and 1996, residential rates increased by 532% (from $1.05 to $6.64 per thousand cubic feet), commercial rates increased by 696% (from $0.74 to $5.89 per thousand cubic feet), utility rates increased by 893% (from $0.29 to $2.88 per thousand cubic feet), and industrial rates increased by 973% (from $0.41 to $4.40 per thousand cubic feet).

Figure 33.

Georgia Natural Gas Rates by Sector,

1970-1996



Bibliography

Bureau of Transportation Statistics. *Transportation Statistics Annual Report 1996*. Washington, DC: United States Department of Transportation, 1996.

Colker, Laura J. *Energy Facts and Impacts: A Handbook for Georgia Students*. Atlanta, GA: Governor's Office of Energy Resources.

Energy Information Administration (EIA). *Annual Electric Generator Report*. Washington, DC: United States Department of Energy, January 1997.

EIA. *Electric Power Annual 1997 Volume I*. Washington, DC: United States Department of Energy, July 1988.

EIA. *Electric Power Annual 1996 Volume II*. Washington, DC: United States Department of Energy, 1997.

EIA. *Electric Power Annual 1995 Volume I*. Washington, DC: United States Department of Energy, 1996.

EIA. *Electric Power Annual 1993*. Washington, DC: United States Department of Energy, 1994.

EIA. *Electric Power Annual 1991*. Washington, DC: United States Department of Energy, 1992.

EIA. *Electric Power Annual 1989*. Washington, DC: United States Department of Energy, 1990.

EIA. *Electric Power Annual 1988*. Washington, DC: United States Department of Energy, 1989.

EIA. *Electric Power Annual 1986*. Washington, DC: United States Department of Energy, 1987.

EIA. *Electric Power Annual 1985*. Washington, DC: United States Department of Energy, 1986.

EIA. *State Energy Data Report 1995, Consumption Estimates*. Washington, DC: United States Department of Energy, December 1997.

Georgia Department of Transportation. *Fact Book 1998*. Atlanta, GA: Author, 1998.

Georgia Public Service Commission. *Staff Report on Electric Industry Restructuring, Docket Number 7313-U*. Atlanta, GA: Author, January 1998.

Heery Energy Consultants, Inc. *Georgia Cogeneration Handbook*. The Governor's Office of Energy Resources, August 1988.

Johnson, Tony G., Anne Jenkins, and John W. Wells. *Georgia's Timber Industry—An Assessment of Timber Product Output and Use, 1995. (Resource Bulletin SRS-14)*. Asheville, NC: Department of Agriculture, Forest Service, Southern Research Station, 1997.

Office of Policy Planning and Evaluation. *Climate Wise: Wise Rules of Industrial Efficiency*. Washington, DC: United States Environmental Protection Agency, July 1998.

University of Georgia, Graduate School of Business Administration, Division of Research. *Georgia Statistical Abstract*. Athens, Georgia: Author, 1997.

Glossary of Terms

Biofuels
Non-fossil biomass energy sources and biomass-derived fuels, which make up energy sources from recent-term plant and animal matter. Examples include: fuel wood, wood by-products, garbage, and crop waste.

British Thermal Unit (Btu)
The amount of heat energy required to raise the temperature of one pound of water one degree Fahrenheit at or near 39.2 degrees Fahrenheit. A Btu is approximately the amount of heat given off when a wooden kitchen match is burned completely.

Cooling Degree Days
The relative measurements of outdoor air temperature that are obtained by subtracting an established base temperature of 65 degrees Fahrenheit from the mean daily temperature.

Electrical System Losses (ESL)
The amount of energy lost during generation, transmission, and distribution of electricity.

Energy
The capacity to do work.

Energy Efficiency
The ability to achieve more work while consuming the same amount, or less, of energy.

Fossil Fuel
Coal, oil, natural gas, and other fuels originating from geologic deposits of ancient plant and animal life.

Geothermal Energy
Energy from the heat of the earth's interior.

Gross State Product
The total monetary value of a state's annual output of goods and services.

Heating Degree Days
The relative measurements of outdoor air temperature that are obtained by subtracting the mean daily temperature from an established base temperature of 65 degrees Fahrenheit.

Hydroelectric Power
The production of electricity from the kinetic energy of falling water. There are two types of hydroelectric power plants. A conventional hydroelectric power plant utilizes streamflow to drive turbines as the water naturally passes downstream. A pumped-storage hydroelectric power plant uses energy to pump and recirculate streamwater to storage areas so that it can be released to drive turbines at times of peak electric demand. Because pumped storage hydroelectricity uses more energy than it produces, it is not considered a renewable source of energy.

Joule
The international system unit of energy, equal to the work done when a current of one ampere is passed through a resistance of one ohm for one second.

Kilowatt
One thousand watts

Kilowatt-hour
One kilowatt of electric power delivered for one hour.

Non-Renewable Resources
Energy resources that can be depleted, such as the fossil fuels natural gas, petroleum, and coal.

Photovoltaic
Derived from the Greek word "photo" meaning light and "volt" for the Italian physicist Alessandro Volta, who was a pioneer in the study of electricity, photovoltaics is the method by which light energy is converted directly into electricity. Most photovoltaic cells are made of silicon or another semiconductor material that is treated with special additives. When sunlight hits the cells, a flow of electrons is generated. The resulting flow of electrons is direct current electricity.

Primary Energy
Energy in its naturally occurring form, such as coal, natural gas, oil, uranium, or solar radiation before it is converted to end-use forms, such as electricity.

Renewable Resources
Energy sources, such as biofuels, geothermal, tidal, wind, and solar energy sources, that are not depleted with use or can be replenished indefinitely.

Solar Energy
The radiant energy of the sun that can be converted into other forms of energy, such as heat or electricity.

Turbine
A fan-like piece of machinery at a power plant that spins when steam, hot gases, water, or other energy pushes on its blades.

Watt
A unit of power in the international system equal to one joule per second.

Appendix A: Energy-Related Organizations

Many energy-related organizations are involved in the day-to-day management and tracking of Georgia's energy resources. Among these are:

State Agencies

Georgia Environmental Facilities Authority

Division of Energy Resources
100 Peachtree Street, Suite 2090
Atlanta, GA 30303
(404) 656-5176 (phone)
(404) 656-7970 (fax)
http://www.gefa.org

The Division of Energy Resources of the Georgia Environmental Facilities Authority is the primary Georgia agency for energy programs, grants and educational materials. Through a broad array of programs ranging from the Weatherization Assistance Program, which provides for the installation of weatherization materials in low-income homes, to assisting fleets in the use of clean alternative fuels, GEFA annually assists thousands of Georgia citizens throughout the state. Whether through information provided during a Home Energy Clinic, or information requested in a telephone call, GEFA represents energy education and information.

GEFA originally began as the State Fuel Allocation Office, founded in 1973 to address issues of fuel allocation. In 1974, with a broader range of responsibilities, that office became the State Energy Office. In 1976, the Georgia General Assembly authorized the creation of the Office of Energy Resources as a division of the Office of Planning and Budget. Like its predecessors, this office was designated as the state's primary agency for implementing energy programs. In 1983, the Governor's Office of Energy Resources became an agency independent of the Office of Planning and Budget.

In 1994, the inclusion of the Division of Energy Resources within the Georgia Environmental Facilities Authority (GEFA) expanded the programs and resources of both organizations. Created in 1986, GEFA had been primarily a lending organization to assist Georgia cities and counties with loans and financing for water, sewer and solid waste projects. The 1994 addition of the Division of Energy Resources brought the energy dimension to the organization.

Georgia Public Service Commission

244 Washington Street, SW, Suite 155
Atlanta, GA 30334
(404) 656-4501 (phone)
(800) 282-5813 (phone)
(404) 656-2341 (fax)
http://www.psc.state.ga.us

The Georgia Public Service Commission (PSC) was originally established in 1879 as the Railroad Commission of Georgia. Today, the PSC is a quasi-legislative, quasi-judicial agency composed of five elected Commissioners. The PSC's mission is to ensure that consumers receive the best possible value in telecommunications, electric, and natural gas services and to improve transportation pipeline safety. Most of the regulatory activities of the PSC are in relation to privately owned natural gas and electric power utilities. The PSC has the authority to set rates and require long-range energy plans and projections.

Consumers' Utility Counsel

2 Martin Luther King Jr. Drive
Plaza Level East
Atlanta, GA 30334
(404) 565-3982
http://www2.state.ga.us/GaOCA/cuc.htm

The Consumers' Utility Counsel (CUC) was created by legislation in 1975. Today the CUC is a division of the Governor's Office of Consumer Affairs. As legislated, the CUC is authorized to appear on behalf of the public in Georgia in matters involving public utilities. The CUC must receive copies of all applications for rate changes and new tariff filings prior to action by the PSC. The CUC is authorized to appear in all proceedings before the PSC and has statutory authority to initiate either administrative or judicial proceedings regarding Georgia's regulated utilities.

Georgia Department of Natural Resources

205 Butler Street, SE
Atlanta, GA 30334
http://www.dnr.state.ga.us/dnr

The mission of the Department of Natural Resources is to sustain, enhance, protect and conserve Georgia's natural, historic and cultural resources for present and future generations. This mission is carried out through six divisions:

Coastal Resources Division
(912) 264-7218

Environmental Protection Division
(404) 656-4713 or (888) EPD-5947

Historic Preservation Division
(404) 656-2840

Parks Recreation, and Historic Sites Division
(404) 656-3530

Pollution Prevention Assistance Division
(404) 651-5120 or (800) 685-2443

Wildlife Resources Division
(770) 918-6400

Several of these divisions deal with energy-related issues, such as consumption of natural resources and air quality.

The Georgia Forestry Commission

P.O. Box 819
Macon, GA 31202-0819
(912) 751-3500 (phone), (800) GATREES (phone)
(912) 751-3465 (fax)
http://www2.state.ga.us/GFC

In Georgia, approximately 65% of the land is covered by trees. The Georgia Forestry Commission (GFC) is the state agency with the responsibility of managing and protecting the 24 million acres of public and private forest land in Georgia. Employing more than 700 people throughout the state, the mission of the GFC is to enhance the quality of life for all citizens of Georgia by providing leadership in the protection, management, and wise use of natural resources.

Federal Agencies

United States Environmental Protection Agency

Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104
(404) 562-9900 (phone)
(800) 241-1754 (phone)
http://www.epa.gov/region4

Additional useful EPA phone numbers:

Acid Rain Hotline
(202) 564-9620

Clearinghouse for Inventories and Emissions Factors
(919) 541-5285

Indoor Air Quality Information
(800) 767-7236

Radon Information
(800) 745-0037

Toxic Release Inventory
(800) 535-0202

The mission of the United States Environmental Protection Agency (EPA) is to protect human health and to safeguard the natural environment — air, water, and land — upon which life depends. In addition to ensuring that federal laws protecting human health and the environment are enforced fairly and effectively, the EPA works to make environmental protection an integral consideration in United States policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy. The EPA also has the responsibility to ensure that environmental protection contributes to making our communities and ecosystems diverse, sustainable, and economically productive.

United States Department of Energy

Headquarters, General Information
1000 Independence Avenue, SW
Washington, DC 20585
(202) 586-5000 (phone)
http://www.doe.gov

United States Department of Energy

Atlanta Regional Support Office
730 Peachtree Street, Suite 876
Atlanta, GA 30308
(404) 347-2837 (phone)
(404) 347-3098 (fax)

Additional useful DOE phone numbers:

Alternative Fuels
(800) 423-1363

Clean Cities
(800) 224-8437

Energy Efficiency and Renewable Energy
(800) 523-2929

Energy Star and Green Lights Program
(888) STAR-YES

The mission of the United States Department of Energy (DOE) is to foster a secure and reliable energy system that is environmentally and economically sustainable, to be a responsible steward of the Nation's nuclear weapons, to clean up its own facilities, and to support continued United States leadership in Science and Technology. The DOE achieves its mission though various programs and offices, including: the Office of Energy Efficiency and Renewable Energy; Office of Energy Research; Energy Information Administration, Federal Energy Technology Center; Energy Star Program; and many more.

The Energy Information Administration

National Energy Information Center
Forrestal Building, Room 1F-048
1000 Independence Avenue, SW
Washington, DC 20585
(202) 586-8800 (phone)
(202) 586-0727 (fax)
e-mail: infoctr@eia.doe.gov
http://www.eia.doe.gov

The Energy Information Administration (EIA) is an independent statistical and analytical agency within the United States Department of Energy. The EIA maintains comprehensive data and information pertaining to energy reserves, energy production, energy demand, energy technologies, energy prices and expenditures, and energy forecasting.

The National Energy Information Center is a branch of the EIA. The Center provides statistical and analytical energy information and referral services to federal, state, and local agencies; the academic community; industrial and commercial organizations; and the general public. In addition to a national telephone line to respond to inquiries, the Center operates a public reading room in Washington, and provides extensive resources on the Internet.

Total Georgia Energy Consumption by Source, 1970 - 1995 (Trillion Btu)

Year	Coal[a]	Natural Gas[b]	Petroleum											Nuclear Electric Power	Hydroelectric Power[d]	Biofuels[e]	Other[a,f]	Net Interstate Flow of Electricity/Losses[g]	Total
			Asphalt and Road Oil[a]	Aviation Gasoline[a]	Distillate Fuel[a]	Jet Fuel[a]	Kerosene[a]	LPG[a]	Lubricants[a]	Motor Gasoline	Residual Fuel[a]	Other[a,c]	Total						
1970	193.2	342.8	26.0	3.0	74.5	59.0	2.6	28.1	6.2	284.1	64.6	5.6	553.6	0	26.4	0	0	93.5	1209.5
1971	219.6	353.2	26.6	3.2	85.3	66.0	3.1	28.6	7.0	303.6	65.4	10.1	598.8	0	34.6	0	0	71.3	1277.5
1972	261.6	341.4	30.1	2.6	96.3	65.8	2.5	30.2	7.5	327.2	83.0	10.9	656.2	0	35.1	0	0	65.9	1360.3
1973	271.5	358.5	32.4	2.5	118.9	79.8	1.9	31.2	8.0	346.7	89.4	11.9	722.7	0	44.0	0	0	82.7	1479.4
1974	283.9	339.6	30.4	2.3	117.0	67.2	1.7	28.5	7.7	341.6	88.9	12.3	697.6	0.5	38.2	0	0	58.3	1418.0
1975	312.0	335.4	27.9	2.0	93.9	72.6	1.4	30.3	6.8	344.3	68.0	11.2	658.3	34.1	45.1	0	0	31.3	1416.1
1976	347.6	268.4	29.6	2.0	118.0	74.8	2.0	33.4	7.6	359.3	88.5	19.8	734.8	45.7	46.0	0	0	30.9	1473.3
1977	415.7	271.8	35.4	2.0	123.1	79.8	2.4	33.8	7.6	369.0	91.9	22.2	767.1	40.0	42.1	0	0	11.5	1548.2
1978	434.4	286.0	41.3	2.0	111.2	86.0	2.1	31.9	8.1	381.1	77.1	24.8	765.7	46.8	38.9	0	0	27.2	1598.9
1979	469.6	324.5	34.2	1.9	106.9	96.8	2.7	28.2	8.5	365.5	84.6	27.6	756.9	55.4	45.9	0	0	-7.1	1645.1
1980	521.5	325.3	31.8	1.9	113.2	92.6	3.1	27.3	7.6	344.1	56.8	28.8	707.3	92.0	45.9	0	0	-52.7	1639.4
1981	552.1	325.2	24.9	1.7	112.3	83.6	1.5	24.8	7.3	344.6	39.5	28.8	669.0	79.8	24.3	0	0	-30.9	1619.5
1982	535.4	303.5	26.1	1.2	107.0	85.0	1.8	23.0	6.6	346.9	33.9	23.1	654.7	73.1	8.2	0	0	-12.2	1592.7
1983	584.8	303.2	34.7	1.1	126.8	93.0	0.9	23.1	6.9	357.0	29.1	22.5	695.2	84.8	43.3	0	0	-52.0	1659.3
1984	681.5	315.3	37.4	1.1	138.0	94.4	0.5	22.2	7.4	375.4	36.8	25.8	739.2	59.3	43.2	0	0	-58.8	1779.8
1985	725.7	289.7	30.4	1.1	138.7	91.5	2.1	24.6	6.9	383.3	75.0	23.8	777.4	109.5	29.5	0	0	-98.8	1833.0
1986	692.5	286.6	37.4	1.3	143.4	100.1	1.9	23.1	6.7	404.3	22.8	25.6	766.5	78.2	22.5	0	0	14.6	1860.9
1987	710.6	311.3	39.7	1.1	151.6	111.2	1.2	23.2	7.6	419.9	19.9	24.6	800.1	164.4	33.1	0	0	-57.2	1962.3
1988	699.0	331.1	40.1	1.1	162.6	114.6	1.9	24.6	7.4	439.3	19.6	24.4	835.6	162.8	21.3	0	0	-6.4	2043.4
1989	676.8	325.9	32.9	1.1	163.8	98.5	1.8	27.2	7.5	438.8	16.7	23.8	812.2	267.7	40.5	0	0	-83.1	2040.0
1990	718.2	319.4	42.5	1.0	166.2	104.2	1.1	21.8	7.8	434.3	22.2	26.5	827.6	264.8	50.8	102.1	0.1	-106.6	2176.3
1991	646.2	331.8	34.5	0.9	157.0	81.5	1.1	24.4	6.9	439.6	18.6	41.5	806.0	279.4	48.3	107.2	0.1	-39.6	2179.3
1992	615.5	351.5	32.5	0.8	158.5	70.0	0.9	26.0	7.1	440.9	43.2	43.2	823.1	298.9	55.6	111.1	0.1	-34.4	2221.4
1993	659.4	360.1	35.3	0.8	182.2	85.8	1.3	27.5	7.2	488.6	34.9	43.4	907.0	290.9	49.4	114.7	0.1	-14.5	2367.0
1994	691.9	351.6	34.8	0.8	183.4	95.9	1.4	27.4	7.5	491.3	30.2	44.0	916.8	308.8	50.5	114.9	0.1	-58.0	2376.5
1995	728.5	380.0	36.7	0.8	205.5	104.6	1.1	26.4	7.4	513.1	26.2	41.9	963.6	326.8	48.8	116.3	0.1	-52.0	2512.1

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels.

c. "Other" is the subtotal of 16 petroleum products consumed by the industrial sector.

d. If applicable, through 1989, includes all net imports of electricity, and, from 1990, includes only the portion of imports of electricity that is derived from hydroelectric power.

e. Ethanol blended into motor gasoline is accounted for in the motor gasoline and total petroleum series. It is also included in the biofuels series to give complete biofuels data. It is included only once in the energy total.

f. Includes geothermal, wind, photovoltaic, and solar thermal energy.

g. Net interstate flow of electricity is the difference between the amount of energy in the electricity sold within a state (including associated losses) and the energy input at the electric utilities within the state. A positive number indicates that more electricity came into the state than went out of the state during the year. A negative number indicates that more electricity went out of the state than came into the state.

h. From 1990, includes ethanol, which is included in both motor gasoline and biofuels in this table, but only once in the total.

Note: Totals may not equal sum of components due to the independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Total Georgia Energy Consumption by Source, 1970 - 1995 (Physical Units)

	Thousand Short Tons	Billion Cubic Feet	Petroleum (Thousand Barrels)											Million Kilowatt-hours				
Year	Coal[a]	Natural Gas[b]	Asphalt and Road Oil[a]	Aviation Gasoline[a]	Distillate Fuel[a]	Jet Fuel[a]	Kerosene[a]	LPG[a]	Lubricants[a]	Motor Gasoline	Residual Fuel[a]	Other[a,c]	Total	Nuclear Electric Power	Hydroelectric Power[d]	Biofuels[e]	Other[a,f]	Net Interstate Flow of Electricity/Losses[g]
1970	8131	333	3916	600	12781	10506	457	7430	1023	54081	10279	1031	102104	0	2519	0	0	27394
1971	9429	343	4002	634	14650	11749	542	7574	1154	57794	10402	1858	110359	0	3302	0	0	20906
1972	11114	331	4537	522	16525	11716	446	8041	1236	62286	13209	2009	120526	0	3386	0	0	19324
1973	11348	348	4875	489	20417	14174	329	8340	1323	65993	14216	2181	132337	0	4232	0	0	24247
1974	12006	330	4577	458	20081	11950	296	7636	1267	65032	14144	2253	127694	44	3654	0	0	17087
1975	13141	327	4198	399	16115	12887	246	8168	1126	65541	10809	2038	121527	3093	4334	0	0	9175
1976	14623	261	4457	387	20257	13274	344	9007	1250	68396	14074	3597	135044	4134	4432	0	0	9051
1977	17538	265	5331	396	21137	14155	415	9200	1249	70250	14611	4010	140754	3713	4032	0	0	3369
1978	18293	278	6217	396	19096	15258	376	8688	1341	72555	12260	4485	140673	4277	3755	0	0	4958
1979	19752	312	5151	377	18347	17165	473	7675	1403	69572	13463	5037	138663	5095	4431	0	0	-2094
1980	21892	315	4795	386	19437	16421	552	7444	1250	65506	9036	5272	130097	8436	4423	0	0	-15441
1981	23073	317	3757	330	19276	14829	272	6813	1198	65602	6281	5265	123625	7235	2328	0	0	-9055
1982	22295	295	3927	244	18374	15085	313	6367	1093	66046	5395	4241	121085	6606	3652	0	0	-3589
1983	24202	296	5229	220	21761	16495	154	6402	1144	67969	4635	4085	128095	7774	4120	0	0	-15244
1984	28072	307	5639	219	23693	16790	86	6168	1220	71471	5859	4786	135932	5472	4137	0	0	-17230
1985	29898	282	4580	212	23818	16236	367	6825	1137	72975	11931	4372	142453	10130	2826	0	0	-28970
1986	28460	279	5641	253	24610	17742	338	6342	1112	76959	3628	4667	141291	7238	2151	0	0	4273
1987	29126	303	5977	218	26033	19691	220	6337	1257	79934	3164	4565	147396	15259	3175	0	0	-16764
1988	28654	323	6048	227	27922	20295	337	6731	1212	83630	3118	4490	154009	15149	2065	0	0	-1868
1989	27918	318	4958	210	28125	17451	314	7394	1243	83531	2659	4400	150287	24961	3929	0	0	-24353
1990	30067	311	6398	196	28537	18439	198	6021	1279	82670	3539	4880	152157	24797	NA	NA	NA	-31256
1991	26957	323	5192	182	26960	14441	194	6747	1145	83688	2954	7626	149128	26016	NA	NA	NA	-11616
1992	25481	343	4897	166	27207	12422	155	7185	1167	83924	6875	8003	152002	27996	NA	NA	NA	-10078
1993	27081	351	5324	167	31273	15204	223	7614	1188	93007	5548	8043	167591	27233	NA	NA	NA	-4250
1994	29254	341	5251	160	31485	16936	243	7548	1242	93527	4798	8151	169341	28927	NA	NA	NA	-17009
1995	31288	370	5526	156	35275	18451	195	7288	1221	97672	4165	7774	177723	30661	NA	NA	NA	-15246

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels.

c. "Other" is the subtotal of 16 petroleum products consumed by the industrial sector.

d. If applicable, through 1989, includes all net imports of electricity, and, from 1990, includes only the portion of imports of electricity that is derived from hydroelectric power.

e. Ethanol blended into motor gasoline is accounted for in the motor gasoline and total petroleum series. It is also included in the biofuels series to give complete biofuels data. It is included only once in the energy total.

f. Includes geothermal, wind, photovoltaic, and solar thermal energy.

g. Net interstate flow of electricity is the difference between the amount of energy in the electricity sold within a state (including associated losses) and the energy input at the electric utilities within the state. A positive number indicates that more electricity came into the state than went out of the state during the year. A negative number indicates that more electricity went out of the state than came into the state.

Note: Totals may not equal sum of components due to the independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Transportation Energy Consumption, 1970 - 1995 (Trillion Btu)

Year	Coal[a]	Natural Gas[b]	Petroleum								Biofuels[c]	Electricity[a]	Net Energy	Electrical System Energy Losses[d]	Total[c]
			Aviation Gasoline[a]	Distillate Fuel[a]	Jet Fuel[a]	LPG[a]	Lubricants[a]	Motor Gasoline	Residual Fuel[a]	Total					
1970	(s)	7.1	3.0	45.1	59.0	0.4	3.3	281.6	1.1	393.5	0	0	400.6	0	400.6
1971	(s)	6.9	3.2	50.0	66.0	0.4	3.6	301.1	0.9	425.1	0	0	432.1	0	432.1
1972	(s)	8.2	2.6	54.2	65.8	0.4	3.8	324.8	1.5	453.2	0	0	461.4	0	461.4
1973	(s)	6.3	2.5	67.5	79.8	0.4	3.8	344.2	3.7	502.0	0	0	508.3	0	508.3
1974	(s)	5.0	2.3	66.4	67.2	0.4	3.6	339.4	3.9	483.3	0	0	488.3	0	488.3
1975	(s)	4.3	2.0	60.2	72.6	0.4	3.1	342.0	2.7	483.0	0	0	487.3	0	487.3
1976	(s)	3.5	2.0	63.4	74.8	0.5	3.5	357.0	3.5	504.6	0	0	508.2	0	508.2
1977	(s)	3.0	2.0	70.5	79.8	0.5	3.7	366.7	2.4	525.6	0	0	528.6	0	528.6
1978	0	3.5	2.0	71.9	86.0	1.0	4.0	378.9	2.8	546.7	0	0	550.2	0	550.2
1979	0	4.3	1.9	77.1	96.8	0.5	4.2	363.1	21.7	565.4	0	(s)	569.7	(s)	569.7
1980	0	7.6	1.9	82.3	92.6	0.3	3.7	342.1	18.8	541.8	0	0.1	549.4	0.1	549.6
1981	0	7.9	1.7	85.1	83.6	0.8	3.6	342.3	16.7	533.7	0	0.1	541.6	0.1	541.8
1982	0	7.4	1.2	84.7	85.0	0.7	3.3	344.6	14.5	534.1	0	0.1	541.6	0.2	541.8
1983	0	6.1	1.1	94.1	93.0	0.9	3.4	354.8	7.2	554.5	0	0.1	560.7	0.2	560.9
1984	0	6.1	1.1	104.8	94.4	1.2	3.7	370.7	7.2	583.1	0	0.1	589.4	0.3	589.7
1985	0	5.5	1.1	105.0	91.5	0.8	3.4	375.1	6.3	583.3	0	0.2	589.0	0.4	589.4
1986	0	5.4	1.3	111.3	100.1	0.7	3.3	396.3	4.3	617.2	0	0.2	622.9	0.5	623.3
1987	0	6.3	1.1	122.0	111.2	0.5	3.8	411.4	3.1	653.0	0	0.2	659.6	0.4	660.0
1988	0	7.1	1.1	132.5	114.6	0.5	3.6	430.9	2.8	686.0	0	0.2	693.3	0.5	693.8
1989	0	7.2	1.1	131.6	98.5	0.4	3.7	429.8	4.2	669.4	0	0.2	676.8	0.5	677.3
1990	0	7.5	1.0	132.4	104.2	0.4	3.8	424.8	8.3	674.9	e0.1	0.2	e682.7	0.5	e683.2
1991	0	7.6	0.9	129.9	81.5	0.4	3.4	431.7	7.3	655.1	0.1	0.2	663.0	0.5	663.5
1992	0	7.7	0.8	133.9	70.0	0.4	3.5	432.2	21.2	662.1	0.1	0.2	670.0	0.5	670.5
1993	0	7.2	0.8	149.9	85.8	0.4	3.6	484.5	16.1	741.1	0.1	0.2	748.6	0.4	749.0
1994	0	7.2	0.8	154.8	95.9	0.9	3.7	486.3	11.8	754.2	0.1	0.2	761.6	0.5	762.1
1995	0	7.9	0.8	166.0	104.6	0.5	3.7	508.4	8.8	792.8	(s)	0.2	800.9	0.5	801.4

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels. Transportation use of natural gas is gas consumed in the operation of pipelines, primarily in compressors, and since 1990, is also consumed as vehicle fuel.

c. Ethanol blended into motor gasoline, which is accounted for under motor gasoline, is shown separately here to display the use of renewable energy by the transportation sector, and included only once in the total.

d. Incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical system energy losses.

e. There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

(s) Btu value less than 0.05, and physical unit value less than 0.5.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Transportation Energy Consumption, 1970 - 1995 (Physical Units)

Year	Thousand Short Tons	Billion Cubic Feet	Petroleum (Thousand Barrels)								Million Kilowatt-hours			
	Coal[a]	Natural Gas[b]	Aviation Gasoline[a]	Distillate Fuel[a]	Jet Fuel[a]	LPG[a]	Lubricants[a]	Motor Gasoline	Residual Fuel[a]	Total	Biofuels[c]	Electricity[a]	Net Energy	Electrical System Energy Losses[d]
1970	1	7	600	7747	10506	100	549	53608	172	73283	0	0	-	0
1971	1	7	634	8579	11749	108	592	57326	136	79123	0	0	-	0
1972	(s)	8	522	9308	11716	108	634	61827	236	84351	0	0	-	0
1973	(s)	6	489	11582	14174	116	626	65529	592	93108	0	0	-	0
1974	(s)	5	458	11401	11950	107	600	64602	626	89743	0	0	-	0
1975	(s)	4	399	10331	12887	106	516	65110	427	89776	0	0	-	0
1976	(s)	3	387	10880	13274	122	573	67969	562	93766	0	0	-	0
1977	(s)	3	396	12104	14155	139	617	69814	375	97600	0	0	-	0
1978	0	3	396	12344	15258	282	663	72127	447	101517	0	0	-	0
1979	0	4	377	13243	17165	134	694	69131	3454	104197	0	2	-	5
1980	0	7	386	14135	16421	76	618	65116	2995	99747	0	16	-	38
1981	0	8	330	14602	14829	212	592	65171	2656	98392	0	17	-	40
1982	0	7	244	14544	15085	203	540	65608	2314	98538	0	25	-	60
1983	0	6	220	16148	16495	241	566	67547	1146	102363	0	24	-	58
1984	0	6	219	17988	16790	320	603	70577	1153	107649	0	34	-	79
1985	0	5	212	18031	16236	212	562	71415	1009	107677	0	56	-	130
1986	0	5	253	19101	17742	188	550	75439	683	113955	0	59	-	135
1987	0	6	218	20949	19691	130	621	78309	499	120418	0	51	-	117
1988	0	7	227	22746	20295	136	599	82021	449	126473	0	59	-	133
1989	0	7	210	22595	17451	117	615	81829	666	123482	0	62	-	138
1990	0	7	196	22731	18439	106	632	80873	1325	124302	e916	65	-	143
1991	0	7	182	22292	14441	112	566	82185	1165	120943	726	63	-	138
1992	0	8	166	22995	12422	110	577	82286	3376	121932	883	62	-	132
1993	0	7	167	25729	15204	117	587	92231	2568	136603	985	59	-	125
1994	0	7	160	26568	16936	249	614	92578	1873	138978	1093	69	-	144
1995	0	8	156	28494	18451	140	603	96781	1405	146031	111	73	-	151

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels. Transportation use of natural gas is gas consumed in the operation of pipelines, primarily in compressors, and since 1990, is also consumed as vehicle fuel.

c. Ethanol blended into motor gasoline, which is accounted for under motor gasoline, is shown separately here to display the use of renewable energy by the transportation sector, and included only once in the total.

d. Incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical system energy losses.

e. There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

(s) Btu value less than 0.05, and physical unit value less than 0.5.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Industrial Energy Consumption, 1970 - 1995 (Trillion Btu)

Year	Coal	Natural Gas[a]	Petroleum									Hydroelectric Power[b]	Biofuels	Other[b,d]	Electricity[b]	Net Energy	Electrical System Energy Loss[e]	Total
			Asphalt and Road Oil[b]	Distillate Fuel[b]	Kerosene[b]	LPG[b]	Lubricants[b]	Motor Gasoline	Residual Fuel[b]	Other[b,c]	Total							
1970	12.0	145.3	26.0	23.4	1.7	9.2	2.9	0.7	53.2	5.6	122.5	0.6	0	0	37.0	317.4	89.7	407.1
1971	11.5	146.6	26.6	25.5	1.9	9.4	3.4	0.5	52.2	10.1	129.6	0.6	0	0	39.8	328.1	96.3	424.4
1972	10.0	159.3	30.1	27.9	1.8	10.8	3.6	0.5	56.2	10.9	141.9	0.6	0	0	43.3	355.0	104.3	459.3
1973	9.7	179.3	32.4	28.0	1.3	12.6	4.2	0.4	60.4	11.9	151.3	0.6	0	0	46.9	387.8	112.2	500.0
1974	7.1	166.4	30.4	24.0	1.3	12.2	4.0	0.4	55.6	12.3	140.2	0.6	0	0	47.0	361.2	114.6	475.8
1975	10.2	149.4	27.9	20.7	1.1	12.9	3.7	0.3	39.2	11.2	117.1	0.5	0	0	47.3	324.5	114.1	438.6
1976	13.2	123.7	29.6	31.5	1.7	14.1	4.1	0.2	41.5	19.8	142.4	0.6	0	0	51.4	331.3	123.8	455.1
1977	15.1	104.8	35.4	29.1	1.8	14.2	3.8	0.2	49.6	22.2	156.3	0.5	0	0	53.7	330.4	129.6	460.1
1978	15.2	115.5	41.3	24.8	1.8	13.5	4.1	0.2	40.2	24.8	150.6	0.6	0	0	63.2	345.0	154.6	499.6
1979	13.4	157.5	34.2	21.6	2.1	17.9	4.3	0.2	47.5	27.6	155.5	0.6	0	0	65.2	392.1	157.3	549.4
1980	16.5	160.1	31.8	23.3	2.5	11.7	3.8	0.1	33.7	28.8	135.8	0.6	0	0	65.5	378.5	159.3	537.8
1981	26.7	161.3	24.9	16.8	1.2	9.8	3.7	0.1	19.7	28.8	105.2	0.6	0	0	66.1	359.9	157.6	517.5
1982	26.6	148.7	26.1	13.8	0.6	10.5	3.4	0.1	18.8	23.1	96.3	0.6	0	0	64.7	336.9	155.4	492.3
1983	35.1	143.9	34.7	17.5	0.1	8.2	3.5	0.1	18.3	22.5	105.0	0.6	0	0	67.3	352.0	161.3	513.3
1984	38.2	153.4	37.4	18.0	0.1	5.8	3.7	2.8	24.9	25.8	118.5	0.6	0	0	75.9	386.6	176.8	563.4
1985	39.1	143.9	30.4	21.3	0.4	7.1	3.5	6.6	65.4	23.8	158.3	0.6	0	0	78.9	420.8	185.4	606.1
1986	44.9	131.9	37.4	23.2	0.4	7.2	3.4	6.1	9.7	25.6	113.0	0.6	0	0	83.1	373.5	191.2	564.8
1987	49.0	144.9	39.7	20.9	0.3	6.8	3.9	6.4	9.2	24.6	111.7	0.6	0	0	86.1	392.3	196.7	588.9
1988	52.9	154.2	40.1	19.8	0.6	8.1	3.7	6.1	10.8	24.4	113.6	0.6	0	0	88.7	409.9	200.4	610.3
1989	51.2	157.1	32.9	23.1	0.4	9.1	3.8	6.8	10.7	23.8	110.7	0.6	0	0	90.0	409.5	201.9	611.5
1990	56.1	166.4	42.5	23.7	0.1	6.9	3.9	6.7	12.8	26.5	123.2	f0.3	f87.6	f0	91.2	f524.7	199.2	f723.9
1991	52.8	171.6	34.5	20.0	0.2	8.5	3.5	6.2	11.0	41.5	125.2	0.3	92.0	0	92.8	534.6	201.7	736.4
1992	44.9	176.5	32.5	16.3	0.1	8.5	3.6	6.4	21.5	43.2	132.1	0.6	95.0	0	96.2	545.4	205.4	750.8
1993	43.2	171.9	35.3	22.4	0.1	9.2	3.6	3.7	17.6	43.4	135.5	0.5	97.2	0	99.2	547.6	209.6	757.1
1994	48.5	179.1	34.8	20.2	0.1	8.5	3.8	4.1	18.0	44.0	133.5	0.6	97.8	0	102.2	561.5	213.1	774.6
1995	49.1	188.5	36.7	28.1	0.2	8.8	3.7	4.4	16.6	41.9	140.5	0.5	97.4	0	107.5	583.4	223.8	807.2

Notes:

a. Includes supplemental gaseous fuels.

b. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

c. "Other" is the subtotal of 16 petroleum products

d. Includes geothermal, wind, photovoltaic, and solar thermal energy.

e. Incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical system energy losses.

f. There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Industrial Energy Consumption, 1970 - 1995 (Physical Units)

Year	Thousand Short Tons: Coal	Billion Cubic Feet: Natural Gas[a]	Petroleum (Thousand Barrels): Asphalt and Road Oil[b]	Distillate Fuel[b]	Kerosene[b]	LPG[b]	Lubricants[b]	Motor Gasoline	Residual Fuel[b]	Other[b,c]	Total	Million Kilowatt-hours: Hydroelectric Power[b]	Biofuels	Other[b,d]	Electricity[b]	Net Energy	Electrical System Energy Loss[e]
1970	506	141	3916	4014	296	2430	474	124	8457	1031	20741	58	0	0	10853	-	26300
1971	490	142	4002	4374	344	2492	562	102	8299	1858	22032	55	0	0	11678	-	28234
1972	429	155	4537	4786	318	2869	602	96	8944	2009	24160	56	0	0	12694	-	30555
1973	417	174	4875	4815	228	3374	697	82	9611	2181	25864	55	0	0	13733	-	32876
1974	306	162	4577	4125	232	3263	667	74	8842	2253	24034	49	0	0	13775	-	35586
1975	434	145	4198	3557	200	3478	610	60	6243	2038	20384	56	0	0	13866	-	33446
1976	554	120	4457	5403	300	3799	678	45	6595	3597	24874	57	0	0	15060	-	36277
1977	642	102	5331	4995	325	3866	632	44	7885	4010	27087	49	0	0	15734	-	37992
1978	643	112	6217	4255	313	3666	678	30	6397	4485	26041	53	0	0	18520	-	45309
1979	555	152	5151	3715	371	4856	710	35	7563	5037	27438	56	0	0	19107	-	46111
1980	679	155	4795	3993	449	3188	632	26	5361	5272	23717	54	0	0	19195	-	46676
1981	1100	157	3757	2891	220	2703	606	21	3141	5265	18605	54	0	0	19379	-	46185
1982	1087	144	3927	2367	108	2895	553	16	2987	4241	17093	54	0	0	18960	-	45539
1983	1420	140	5229	3012	23	2275	579	20	2905	4085	18127	54	0	0	19737	-	47286
1984	1544	150	5639	3089	11	1610	617	525	3966	4786	20242	54	0	0	22259	-	51809
1985	1575	140	4580	3653	65	1964	575	1251	10397	4372	26855	54	0	0	23122	-	54324
1986	1801	128	5641	3984	63	1979	562	1160	1550	4667	19605	54	0	0	24367	-	56050
1987	1960	141	5977	3583	56	1853	636	1217	1463	4565	19351	54	0	0	25227	-	57641
1988	2115	150	6048	3401	110	2213	613	1154	1723	4490	19753	54	0	0	25984	-	58743
1989	2067	153	4958	3970	64	2462	629	1299	1707	4400	19489	54	0	0	26388	-	59179
1990	2232	162	6398	4068	23	1915	647	1280	2030	4880	21242	fNA	fNA	fNA	26717	-	58382
1991	2101	167	5192	3433	28	2340	579	1173	1747	7626	22118	NA	NA	NA	27193	-	59123
1992	1787	172	4897	2797	10	2345	590	1223	3425	8003	23290	NA	NA	NA	28197	-	60196
1993	1720	167	5324	3838	22	2560	601	711	2804	8043	23904	NA	NA	NA	29084	-	61424
1994	1933	174	5251	3472	14	2340	628	778	2857	8151	23491	NA	NA	NA	29942	-	62443
1995	1949	184	5526	4831	35	2441	617	829	2639	7774	24692	NA	NA	NA	31493	-	65599

Notes:

a. Includes supplemental gaseous fuels.

b. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

c. "Other" is the subtotal of 16 petroleum products

d. Includes geothermal, wind, photovoltaic, and solar thermal energy.

e. Incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical system energy losses.

f. There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Residential Energy Consumption, 1970 - 1995 (Trillion Btu)

Year	Coal			Natural Gas[b]	Petroleum				Biofuels	Solar[c]	Electricity[a]	Net Energy	Electrical System Energy Losses[d]	Total
	Bituminous Coal and Lignite[a]	Anthracite[a]	Total		Distillate Fuel[a]	Kersoene[a]	LPG[a]	Total						
1970	1.1	0	1.1	90.1	1.5	0.7	15.7	17.9	0	0	42.6	151.6	103.1	254.7
1971	0.7	0	0.7	91.1	1.8	0.8	16.0	18.6	0	0	44.7	155.0	108.1	263.1
1972	0.5	0	0.5	87.9	2.1	0.5	16.2	18.8	0	0	47.0	154.3	113.2	267.5
1973	0.6	0	0.6	88.8	2.2	0.4	15.4	18.1	0	0	52.5	159.9	125.7	285.6
1974	0.5	0	0.5	78.3	2.0	0.3	13.5	15.7	0	0	51.5	146.1	125.6	271.7
1975	0.4	0	0.4	89.5	1.7	0.2	14.5	16.4	0	0	56.2	162.5	135.4	297.9
1976	0.2	0	0.2	88.7	2.9	0.2	16.0	19.2	0	0	57.7	165.7	138.9	304.7
1977	0.3	0	0.3	101.0	2.5	0.4	16.2	19.1	0	0	63.5	183.9	153.3	337.2
1978	0.2	0	0.2	99.1	1.8	0.3	14.8	16.9	0	0	65.6	181.7	160.4	342.1
1979	0.2	0	0.2	94.5	1.8	0.4	8.4	10.6	0	0	62.7	168.0	151.2	319.3
1980	0.2	0	0.2	93.1	3.4	0.5	13.1	16.9	0	0	68.4	178.6	166.2	344.8
1981	0.3	0	0.3	94.4	1.1	0.2	12.1	13.3	0	0	68.9	177.0	164.3	341.3
1982	0.1	0	0.1	89.4	0.9	0.4	10.0	11.3	0	0	68.7	169.6	165.1	334.7
1983	(s)	0	(s)	93.8	1.3	0.6	11.9	13.8	0	0	70.7	178.3	169.4	347.8
1984	0.6	0	0.6	97.8	1.3	0.3	13.0	14.7	0	0	77.0	190.1	179.2	369.3
1985	0.3	(s)	0.3	86.4	2.1	1.5	14.2	17.8	0	0	80.2	184.7	188.4	373.1
1986	0.1	0	0.1	91.6	2.1	1.1	12.9	16.2	0	0	88.1	195.9	202.6	398.4
1987	0.3	0	0.3	103.2	2.0	0.7	13.5	16.3	0	0	92.1	211.9	210.4	422.4
1988	0.2	(s)	0.2	110.8	1.5	1.2	13.6	16.3	0	0	94.2	221.5	213.0	434.5
1989	0.1	(s)	0.1	106.4	1.6	1.0	15.1	17.6	0	0	96.7	220.9	216.9	437.8
1990	0.2	(s)	0.2	92.7	1.5	0.6	12.3	14.4	14.5	0.1	102.1	224.0	223.2	447.2
1991	0.1	(s)	0.1	99.3	1.0	0.6	13.2	14.9	15.2	0.1	103.0	232.5	223.9	456.5
1992	0.3	(s)	0.3	110.9	1.0	0.6	14.6	16.2	16.0	0.1	104.2	247.8	222.4	470.1
1993	0.2	(s)	0.2	118.8	1.4	0.8	15.1	17.3	17.4	0.1	115.6	269.3	244.0	513.4
1994	0.2	(s)	0.3	108.6	0.7	0.5	15.3	16.4	17.1	0.1	111.7	254.2	232.9	487.1
1995	0.5	(s)	0.5	117.7	0.9	0.7	14.5	16.1	19.0	0.1	122.2	275.6	254.5	530.1

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels.

c. Includes small amounts of solar energy consumed by the commercial sector that cannot be separately identified.

d. Incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical systems energy losses.

(s) Btu value less than 0.05, and physical unit value less than 0.5.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Residential Energy Consumption, 1970 - 1995 (Physical Units)

	Coal (Thousand Short Tons)			Billion Cubic Feet	Petroleum (Thousand Barrels)				Thousand Cords	Million Kilowatt-hours			
Year	Bituminous Coal and Lignite[a]	Anthracite[a]	Total	Natural Gas[b]	Distillate Fuel[a]	Kersoene[a]	LPG[a]	Total	Biofuels	Solar[c]	Electricity[a]	Net Energy	Electrical System Energy Losses[d]
1970	44	0	44	87	250	121	4164	4536	0	0	12474	-	30229
1971	28	0	28	88	306	150	4229	4685	0	0	13099	-	31669
1972	21	0	21	85	363	97	4304	4764	0	0	13786	-	33182
1973	27	0	27	86	375	76	4122	4573	0	0	15383	-	36827
1974	20	0	20	76	335	48	3625	4008	0	0	15098	-	36813
1975	18	0	18	87	298	34	3896	4229	0	0	16457	-	39696
1976	9	0	9	86	503	34	4323	4860	0	0	16904	-	40718
1977	14	0	14	98	422	68	4416	4905	0	0	18610	-	44938
1978	7	0	7	96	315	47	4029	4392	0	0	19218	-	47017
1979	9	0	9	91	304	77	2282	2663	0	0	18367	-	44326
1980	8	0	8	90	578	91	3553	4222	0	0	20033	-	48713
1981	11	0	11	92	184	34	3313	3531	0	0	20207	-	48159
1982	5	0	5	87	163	62	2779	3003	0	0	20147	-	48390
1983	1	0	1	91	225	103	3304	3631	0	0	20726	-	49656
1984	25	0	25	95	231	61	3603	3894	0	0	22570	-	52535
1985	13	1	14	84	353	257	3952	4562	0	0	23505	-	55222
1986	3	0	3	89	364	203	3549	4116	0	0	25808	-	59365
1987	13	0	13	101	343	130	3701	4173	0	0	26991	-	61672
1988	9	1	10	108	258	206	3724	4187	0	0	27609	-	62418
1989	4	(s)	5	104	267	177	4093	4537	0	0	28349	-	63578
1990	8	(s)	8	90	250	111	3400	3761	723	27	29933	-	65409
1991	3	(s)	3	97	178	113	3651	3943	761	30	30187	-	65632
1992	13	(s)	13	108	178	109	4020	4306	801	32	30528	-	65172
1993	8	(s)	8	116	236	136	4196	4568	871	35	33867	-	71524
1994	10	(s)	10	105	113	80	4216	4408	854	37	32735	-	68267
1995	21	(s)	21	115	159	126	4001	4285	948	42	35812	-	74595

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels.

c. Includes small amounts of solar energy consumed by the commercial sector that cannot be separately identified.

d. Incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical systems energy losses.

(s) Btu value less than 0.05, and physical unit value less than 0.5.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Commercial Energy Consumption, 1970 - 1995 (Trillion Btu)

	Coal				Petroleum									
Year	Bituminous Coal and Lignite[a]	Anthracite[a]	Total	Natural Gas[b]	Distillate Fuel[a]	Kersoene[a]	LPG[a]	Motor Gasoline	Residual Fuel[a]	Total	Electricity[a]	Net Energy	Electrical System Energy Losses[c]	Total[d]
1970	2.0	0	2.0	39.9	4.2	0.2	2.8	1.8	0.7	9.7	27.9	79.4	67.6	147.0
1971	1.2	0	1.2	43.2	5.1	0.3	2.8	1.9	0.7	10.8	30.1	85.3	72.7	158.0
1972	0.9	0	0.9	46.4	6.0	0.2	2.9	1.9	0.7	11.7	33.2	92.2	79.9	172.1
1973	1.2	0	1.2	48.7	6.2	0.1	2.7	2.0	0.8	11.9	36.5	98.2	87.3	185.5
1974	0.9	0	0.9	45.6	5.6	0.1	2.4	1.9	0.7	10.6	36.4	93.5	88.8	182.3
1975	0.8	0	0.8	50.8	5.0	0.1	2.6	2.0	0.5	10.0	38.3	99.9	92.4	192.3
1976	0.4	0	0.4	47.6	8.4	0.1	2.8	2.0	0.5	13.8	42.1	103.9	101.4	205.3
1977	0.6	0	0.6	56.8	7.0	0.1	2.9	2.1	0.6	12.7	44.6	114.6	107.6	222.3
1978	0.3	0	0.3	61.9	5.2	0.1	2.6	2.1	0.5	10.5	39.0	111.7	95.3	207.0
1979	0.4	0	0.4	64.8	5.1	0.1	1.5	2.1	0.6	9.4	38.7	113.4	93.4	206.7
1980	0.3	0	0.3	60.6	1.8	0.1	2.3	1.9	0.1	6.2	40.8	108.0	99.3	207.3
1981	0.5	0	0.5	58.7	7.1	0.1	2.1	2.2	0.1	11.6	43.8	114.6	104.3	218.9
1982	0.2	0	0.2	56.4	6.1	0.8	1.8	2.2	(s)	10.9	46.0	113.5	110.4	223.9
1983	0.1	0	0.1	57.7	12.6	0.2	2.1	2.1	3.3	20.2	46.9	125.0	112.4	237.4
1984	1.2	0	1.2	57.4	12.9	0.1	2.3	1.9	4.5	21.7	53.2	133.5	123.9	257.4
1985	0.6	(s)	0.6	53.0	9.0	0.3	2.5	1.6	2.9	16.3	58.1	128.0	136.4	264.4
1986	0.1	0	0.1	51.8	5.8	0.4	2.3	1.9	6.5	16.9	62.3	131.1	143.3	274.4
1987	0.6	0	0.6	56.0	5.8	0.2	2.4	2.1	6.3	16.8	66.2	139.7	151.3	291.0
1988	0.4	(s)	0.4	57.4	7.0	0.1	2.4	2.4	4.8	16.7	70.6	145.1	159.6	304.8
1989	0.2	(s)	0.2	54.5	5.7	0.4	2.7	2.1	1.6	12.5	76.0	143.1	170.3	313.5
1990	0.4	(s)	0.4	50.8	7.4	0.4	2.2	2.7	0.74	13.1	80.9	145.2	176.9	322.1
1991	0.1	(s)	0.1	52.4	5.0	0.3	2.3	1.7	0.1	9.5	82.2	144.3	178.8	323.0
1992	0.6	(s)	0.6	55.2	6.0	0.2	2.6	2.2	(s)	11.0	84.0	150.8	179.2	330.1
1993	0.4	(s)	0.4	59.1	6.6	0.4	2.7	0.3	(s)	10.0	89.3	158.8	188.7	347.4
1994	0.5	(s)	0.5	55.7	6.0	0.8	2.7	0.9	(s)	10.5	92.7	159.4	193.3	352.7
1995	1.0	(s)	1.0	58.0	8.2	0.2	2.6	0.3	0.1	11.3	98.3	168.6	204.8	373.4

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels.

c. Incurred in the generation, transmission, and distribution of electricity plus use and unaccounted for electrical system energy losses.

d. Small amounts of solar energy consumed in the commercial sector cannot be separately identified and are included in residential consumption.

(s) Btu value less than 0.05, and physical unit value less than 0.5.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Commercial Energy Consumption, 1970 - 1995 (Physical Units)

	Coal (Thousand Short Tons)			Billion Cubic Feet	Petroleum (Thousand Barrels)						Million Kilowatt-hours		
Year	Bituminous Coal and Lignite[a]	Anthracite[a]	Total	Natural Gas[b]	Distillate Fuel[a]	Kersoene[a]	LPG[a]	Motor Gasoline	Residual Fuel[a]	Total	Electricity[a]	Net Energy	Electrical System Energy Losses[c]
1970	82	0	82	39	713	39	735	349	108	1945	8174	-	19807
1971	53	0	53	42	874	49	746	365	106	2141	8814	-	21308
1972	39	0	39	45	1035	31	760	362	114	2302	9735	-	23432
1973	50	0	50	47	1069	25	727	382	121	2324	10693	-	25598
1974	38	0	38	44	955	16	640	357	113	2081	10679	-	26038
1975	33	0	33	49	851	11	688	372	80	2002	11226	-	27079
1976	17	0	17	46	1436	11	763	381	84	2676	12340	-	29725
1977	26	0	26	55	1203	22	779	393	101	2498	13063	-	31544
1978	13	0	13	60	900	15	711	398	82	2106	11416	-	27929
1979	17	0	17	62	867	25	403	406	96	1797	11342	-	27372
1980	14	0	14	59	315	12	627	363	10	1327	11965	-	29096
1981	21	0	21	57	1227	18	585	410	9	2249	12831	-	30581
1982	9	0	9	55	1041	143	490	422	5	2101	13476	-	32367
1983	2	0	2	56	2161	28	583	402	518	3693	13756	-	32956
1984	47	0	47	56	2217	15	636	370	708	3945	15605	-	36322
1985	24	(s)	25	52	1546	46	697	309	468	3066	17014	-	39973
1986	5	0	5	50	992	73	626	360	1039	3090	18257	-	41996
1987	24	0	24	55	1004	34	653	408	995	3093	19411	-	44353
1988	17	(s)	17	56	1203	21	657	455	767	3102	20694	-	46785
1989	8	(s)	8	53	975	73	722	404	259	2432	22260	-	49922
1990	14	(s)	14	49	1271	64	600	516	69	2520	23725	-	51843
1991	5	(s)	5	51	862	53	644	330	22	1912	24096	-	52390
1992	25	(s)	25	54	1038	37	709	415	6	2205	24605	-	52528
1993	14	(s)	14	58	1134	65	740	64	6	2010	26181	-	55291
1994	18	(s)	18	54	1035	149	744	171	7	2106	27167	-	56656
1995	38	(s)	39	57	1407	35	706	62	12	2221	28814	-	60018

Notes:

a. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

b. Includes supplemental gaseous fuels.

c. Incurred in the generation, transmission, and distribution of electricity plus use and unaccounted for electrical system energy losses.

d. Small amounts of solar energy consumed in the commercial sector cannot be separately identified and are included in residential consumption.

(s) Btu value less than 0.05, and physical unit value less than 0.5.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Energy Inputs at Electric Utilities, 1970 - 1995 (Trillion Btu)

	Coal				Petroleum									
Year	Bituminous Coal and Lignite	Anthracite	Total	Natural Gas[a]	Heavy Oil[b, c]	Light Oil[b,d]	Petroleum Coke[b]	Total	Nuclear Electric Power	Hydro-Electric Power[e]	Biofuels	Geothermal Energy	Other[b, f]	Total[g]
1970	178.1	0	178.1	60.5	9.7	0.3	0	10.0	0	25.8	0	0	0	274.5
1971	206.2	0	206.2	65.4	11.7	3.0	0	14.7	0	34.0	0	0	0	320.4
1972	250.2	0	250.2	39.7	24.6	6.0	0	30.6	0	34.6	0	0	0	355.0
1973	259.9	0	259.9	35.4	24.5	15.0	0	39.5	0	43.4	0	0	0	378.3
1974	275.5	0	275.5	44.3	28.7	19.0	0	47.7	0.5	37.6	0	0	0	405.7
1975	300.6	0	300.6	41.5	25.5	6.3	0	31.8	34.1	44.5	0	0	0	452.4
1976	333.8	0	333.8	4.8	43.0	11.9	0	54.8	45.7	45.4	0	0	0	484.4
1977	399.7	0	399.7	6.2	39.3	14.1	0	53.4	40.0	41.6	0	0	0	540.8
1978	418.7	0	418.7	6.0	33.5	7.5	0	41.0	46.8	38.4	0	0	0	550.9
1979	455.6	0	455.6	3.3	14.8	1.3	0	16.0	55.4	45.3	0	0	0	575.7
1980	504.5	0	504.5	3.8	4.2	2.4	0	6.6	92.0	45.4	0	0	0	652.3
1981	524.6	0	524.6	2.9	3.0	2.2	0	5.2	79.8	23.8	0	0	0	636.2
1982	508.5	0	508.5	1.6	0.6	1.5	0	2.1	73.1	37.6	0	0	0	622.9
1983	549.6	0	549.6	1.7	0.4	1.3	0	1.7	84.8	42.8	0	0	0	680.5
1984	641.6	0	641.6	0.6	0.2	1.0	0	1.2	59.3	42.6	0	0	0	745.3
1985	685.7	0	685.7	0.9	0.4	1.4	0	1.7	109.5	29.0	0	0	0	826.8
1986	647.4	0	647.4	5.9	2.2	1.0	0	3.2	78.2	21.9	0	0	0	756.7
1987	660.6	0	660.6	0.8	1.3	0.9	0	2.2	164.4	32.5	0	0	0	860.6
1988	645.5	0	645.5	1.6	1.1	1.8	0	3.0	162.8	20.8	0	0	0	833.5
1989	625.3	0	625.3	0.7	0.2	1.9	0	2.0	267.7	40.0	0	0	0	935.7
1990	661.5	0	661.5	2.0	0.7	1.3	0	2.0	264.8	50.5	0	0	0	980.9
1991	593.2	0	593.2	0.9	0.1	1.1	0	1.3	279.4	48.0	0	0	0	922.7
1992	569.6	0	269.6	1.2	0.4	1.2	0	1.6	298.9	55.0	0	0	0	926.3
1993	615.6	0	615.6	3.1	1.1	2.0	0	3.0	290.9	48.9	0	0	0	961.5
1994	642.7	0	642.7	1.1	0.4	1.7	0	2.1	308.8	49.9	0	0	0	1004.6
1995	677.9	0	677.9	8.0	0.7	2.2	0	2.9	326.8	48.2	0	0	0	1063.9

Notes:

a. Includes supplemental gaseous fuels.

b. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

c. Prior to 1980, based on oil used in steam plants. Since 1980, heavy oil includes fuel nos. 4, 5, and 6 and residual fuel oils.

d. Prior to 1980, based on oil used in internal combustion and gas turbine engine plants. Since 1980, light oil includes fuel oil nos. 1 and 2, kerosene, and jet fuel.

e. If applicable, through 1989, includes all net imports of electricity, and, from 1990, includes only the portion of imports of electricity that is delivered from hydroelectric power.

f. "Other" is electricity generated for distribution from wind, photovoltaic, and solar thermal energy.

g. If applicable, from 1990, includes net imports of electricity generated from nonrenewable energy sources not shown in other columns.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Energy Inputs at Electric Utilities, 1970 - 1995 (Physical Units)

	Coal (Thousand Short Tons)			Billion Cubic Feet	Petroleum (Thousand Barrels)				Million Kilowatt-hours				
Year	Bituminous Coal and Lignite	Anthracite	Total	Natural Gas[a]	Heavy Oil[b, c]	Light Oil[b,d]	Petroleum Coke[b]	Total	Nuclear Electric Power	Hydro-Electric Power[e]	Biofuels	Geothermal Energy	Other[b, f]
1970	7498	0	7498	59	1542	58	0	1600	0	2461	0	0	0
1971	8857	0	8857	63	1861	518	0	2378	0	3247	0	0	0
1972	10625	0	10625	38	3916	1033	0	4948	0	3330	0	0	0
1973	10854	0	10854	34	3891	2577	0	6469	0	4178	0	0	0
1974	11642	0	11642	43	4563	3266	0	7829	44	3605	0	0	0
1975	12656	0	12656	40	4059	1077	0	5136	3093	4278	0	0	0
1976	14043	0	14043	5	6833	2035	0	8868	4134	4374	0	0	0
1977	16857	0	16857	6	6250	2414	0	8664	3713	3983	0	0	0
1978	17631	0	17631	6	5334	1283	0	6616	4277	3702	0	0	0
1979	19171	0	19171	3	2350	219	0	2569	5095	4374	0	0	0
1980	21191	0	21191	4	670	415	0	1085	8436	4369	0	0	0
1981	21941	0	21941	3	476	372	0	848	7235	2274	0	0	0
1982	21195	0	21195	2	89	259	0	349	6606	3598	0	0	0
1983	22778	0	22778	2	65	215	0	280	7774	4065	0	0	0
1984	26455	0	26455	1	32	169	0	201	5472	4083	0	0	0
1985	28285	0	28285	1	57	235	0	292	10130	2772	0	0	0
1986	26652	0	26652	6	356	169	0	525	7238	2097	0	0	0
1987	27130	0	27130	1	207	154	0	361	15259	3121	0	0	0
1988	26513	0	26513	2	180	315	0	494	15149	2011	0	0	0
1989	25839	0	25839	1	27	318	0	346	24961	3874	0	0	0
1990	27812	0	27812	2	115	218	0	333	24797	4887	0	0	0
1991	24848	0	24848	1	20	194	0	213	26016	4639	0	0	0
1992	23656	0	23656	1	69	199	0	268	27996	5342	0	0	0
1993	25339	0	25339	3	170	336	0	506	27233	4753	0	0	0
1994	27293	0	27293	1	61	297	0	358	28927	4857	0	0	0
1995	29280	0	29280	8	109	385	0	494	30661	4684	0	0	0

Notes:

a. Includes supplemental gaseous fuels.

b. The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

c. Prior to 1980, based on oil used in steam plants. Since 1980, heavy oil includes fuel nos. 4, 5, and 6 and residual fuel oils.

d. Prior to 1980, based on oil used in internal combustion and gas turbine engine plants. Since 1980, light oil includes fuel oil nos. 1 and 2, kerosene, and jet fuel.

e. If applicable, through 1989, includes all net imports of electricity, and, from 1990, includes only the portion of imports of electricity that is delivered from hydroelectric power.

f. "Other" is electricity generated for distribution from wind, photovoltaic, and solar thermal energy.

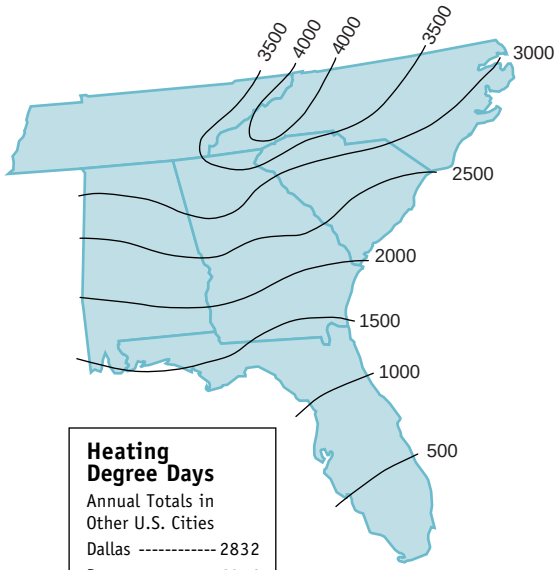
g. If applicable, from 1990, includes net imports of electricity generated from nonrenewable energy sources not shown in other columns.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *State Energy Data Report 1995*.

Appendix C: Georgia Climate Maps

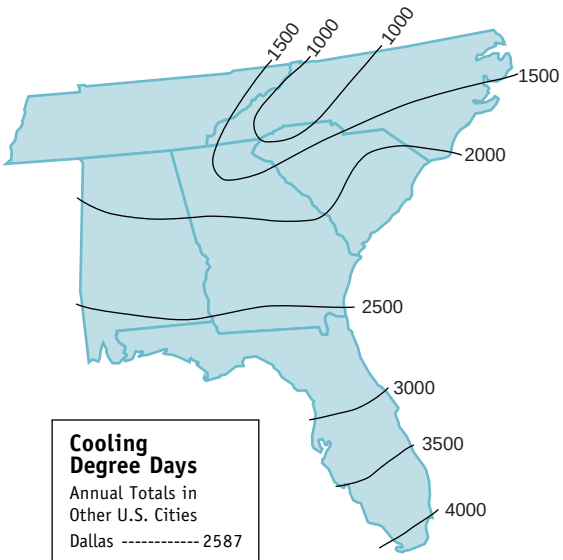
Heating and Cooling Degree Days, Southeastern U.S.



Heating Degree Days
Annual Totals in Other U.S. Cities

Dallas	2832
Denver	6016
Chicago	6127
Los Angeles	1245
New Orleans	1465
New York	4909
San Francisco	3080
Seattle	5185

Value determined by subtracting average daily temperature from a base of 65° (65°-50°=15 days) and totaled for the year

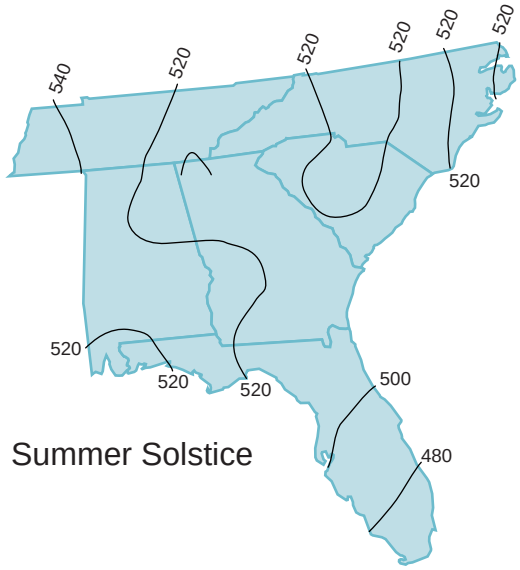


Cooling Degree Days
Annual Totals in Other U.S. Cities

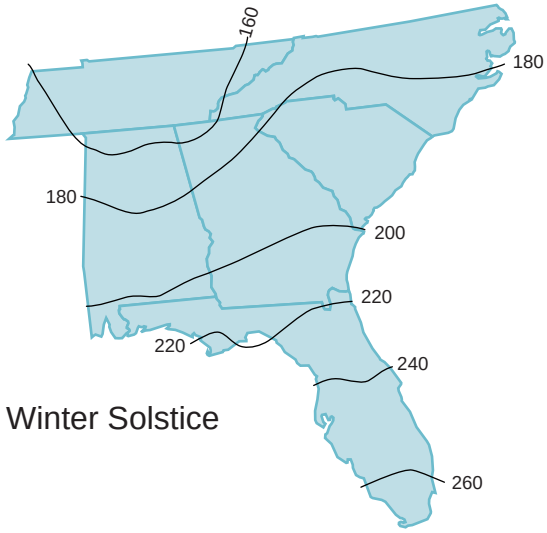
Dallas	2587
Denver	630
Chicago	925
Los Angeles	1185
New Orleans	2706
New York	1048
San Francisco	44
Seattle	129

Value determined by subtracting a base of 65° from average daily temperature (75°-65°=10 days) and totaled for the year

Mean Daily Solar Radiation, Southeastern U.S. (Calories/Square Centimeter)

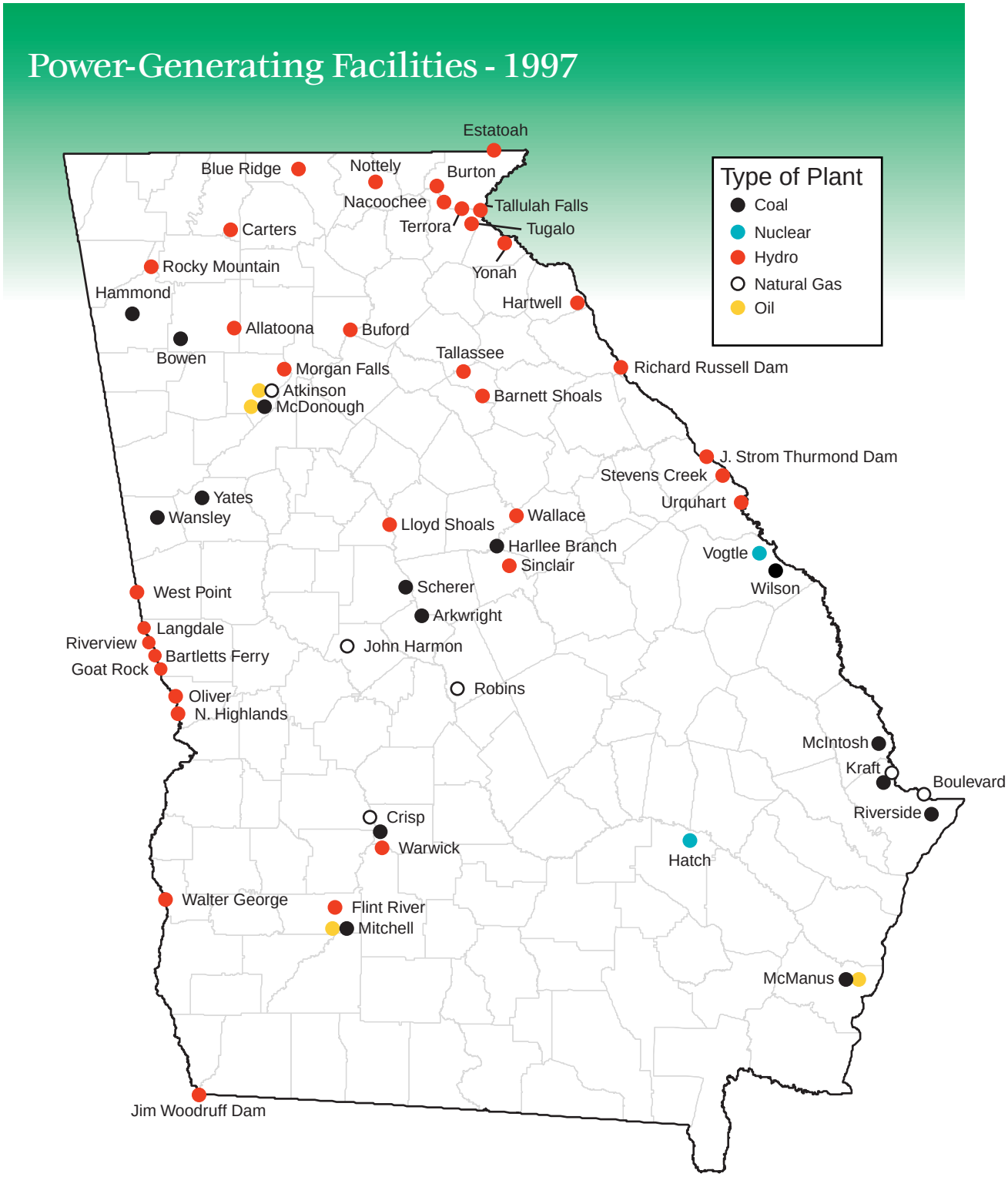


Summer Solstice

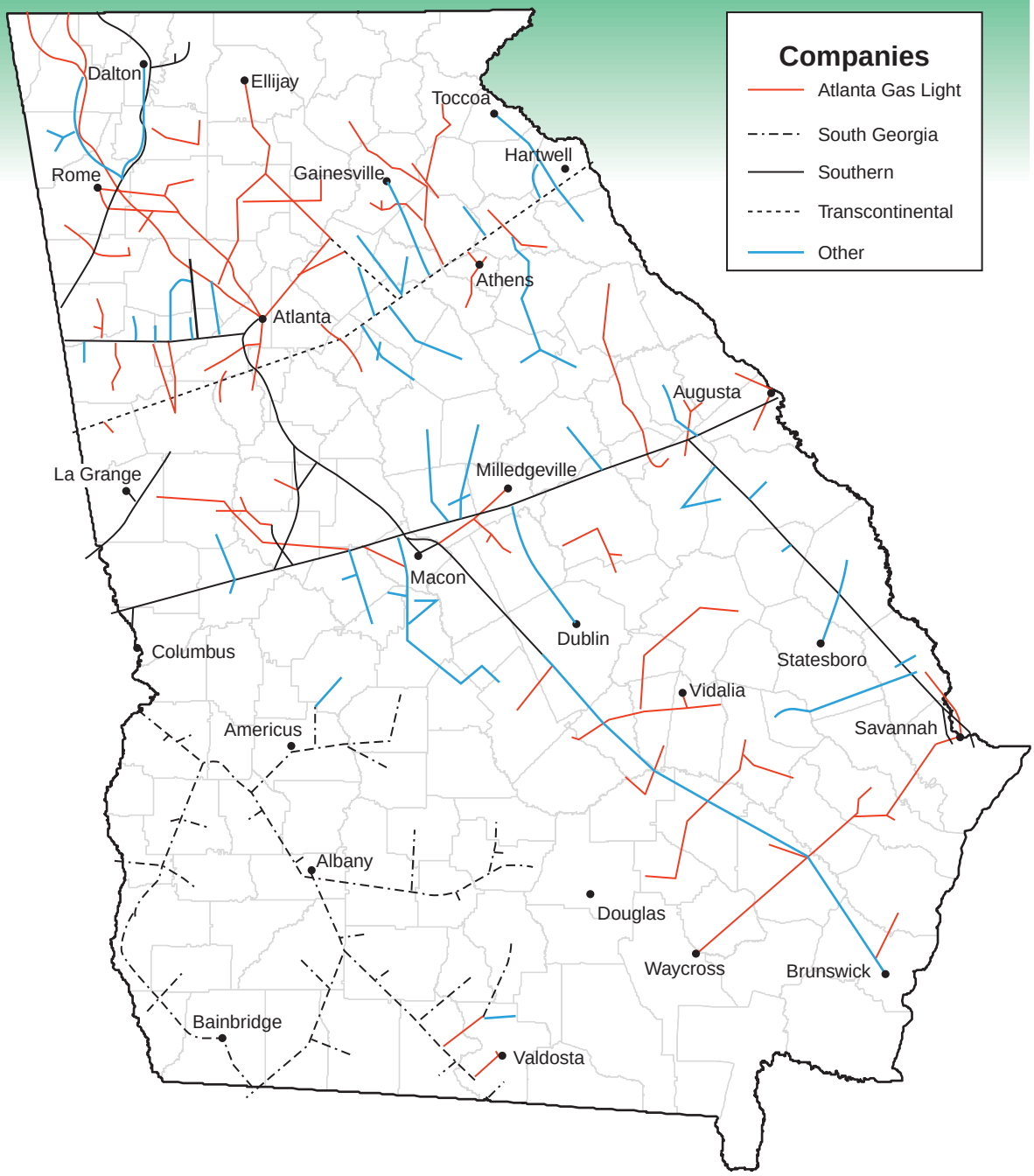


Winter Solstice

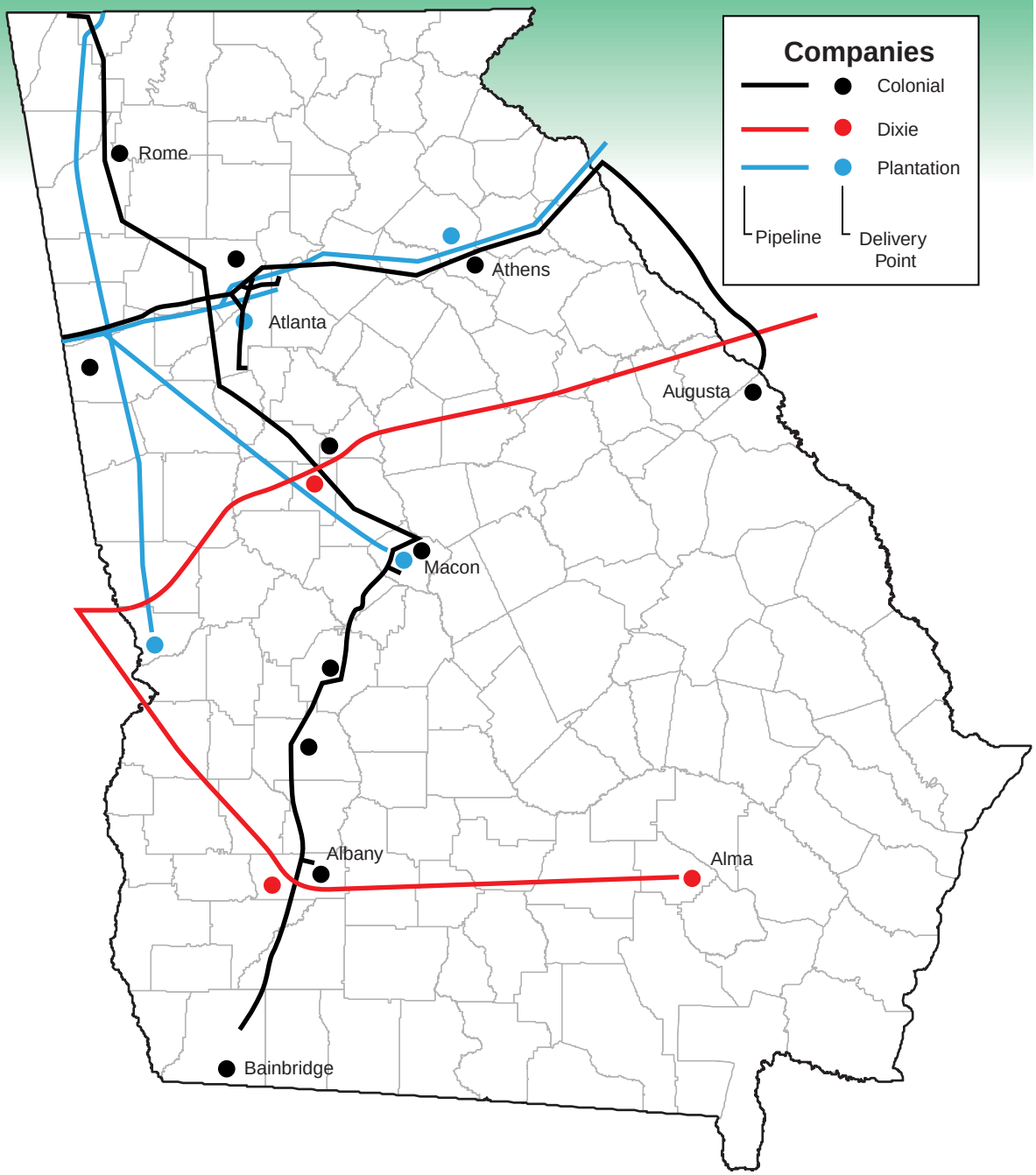
Appendix D: Georgia Energy-Related Maps



Natural Gas Pipelines - 1998



Petroleum Pipelines - 1998



Conversion Factors

Average Energy Content of Various Fuels

1 kilowatt-hour of electricity	3,413 Btu
1 cubic foot of natural gas	1,008 to 1,034 Btu
1 therm of natural gas	100,000 Btu
1 gallon of liquefied petroleum gas (LPG)	95,475 Btu
1 gallon of crude oil	138,095 Btu
1 barrel of crude oil	5,800,000 Btu
1 gallon of kerosene or light distillate oil	135,000 Btu
1 gallon of middle distillate oil or diesel fuel oil	138,690 Btu
1 gallon of residual fuel oil	149, 690 Btu
1 gallon of gasoline	125,000 Btu
1 gallon of ethanol	84,400 Btu
1 gallon of methanol	62,800 Btu
1 pound of coal	8,100 to 13,000 Btu
1 ton of coal	16,200,000 to 26,000,000 Btu
1 ton of coke	26,000,000 Btu
1 ton of wood	9,000,000 to 12,000,000 Btu
1 standard cord of wood	18,000,000 to 24,000,000 Btu
1 face cord of wood	6,000,000 to 8,000,000 Btu

Measurement Conversions

1 short ton (ton) = 2,000 pounds = 6.6 barrels (crude oil)

1 long ton = 2,240 pounds = 7.4 barrels (crude oil)

1 barrel (bbl) = 42 gallons = 5.615 cubic feet = 159 liters

1 Mcf = 1,000 cubic feet

1 therm = 10^5 Btu = 100,000 Btu

1 Btu = 252 calories

1 thousand Btu (kBtu) = 1,000 Btu

1 quad = 10^{15} (quadrillion) Btu = 1,000,000,000 MMBtu

1 kilowatt-hour (kWh) = 1,000 watt-hours

1 megawatt-hour (MWh) = 1,000 kWh or 1,000,000 watt-hours

1 gigawatt-hour (GWh) = 1,000 MWh = 1,000,000,000 watt-hours

1 gallon = 4.524 pounds of liquefied petroleum gas

1 standard cord of wood = 8 feet x 4 feet x 4 feet
= 128 cubic feet = approx. 4,000 pounds

1 face cord of wood = 8 feet x 4 feet x 16 inches
= 42.7 cubic feet = approx. 1,333 pounds