

Energy Use Differences in Georgia, Mississippi, and California

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## **Major differences in energy use among the three states in the areas of electricity generation, renewables, nuclear power, and transportation.**

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#### **Introduction**

Georgia is the eighth most populous state, with a population of 10.08 million as at 2014 and accounts of 3.2% of the U.S. The total energy consumption per Capita is 275 million Btu with the total energy production in 2016 being 648 trillion Btu (EIA-Georgia, 2018). Secondly, Mississippi had a population of 2.98 million which accounts for 0.9% of the U.S. as of 2014 (EIA-Mississippi, 2018). The total state consumption per Capita was 391 million Btu, and total energy production was at 332 trillion Btu as of 2016. Finally, at 38.7 million, California is the most populated state in the nation with a 12.1% of the U.S. The total energy consumption per capita is 199 million Btu, and the total energy production is 2,431 trillion Btu (EIA- California, 2018). This review looks into the main differences in energy use among the three states in the areas of electricity generation, renewables, nuclear power, and transportation.

#### **Electricity generation**

In Georgia, electricity generation is mainly through natural gas which accounts for 40% of the net-electricity generation as of 2016. Natural gas electricity production is supplemented by two nuclear plants which account for 25% of the state's net electricity generation. The use of coal-fired power plants is declining and is currently less than 20% from over 40% in 2009 ((EIA- Georgia, 2018). Similarly, Mississippi relies heavily on natural gas for electricity generation. However, the state relies more on natural gas-fired power plants as they account for more than 80% of the state's net electricity generation (EIA-Mississippi, 2018). Currently, nuclear production is at less than 10% of the state's net electricity generation. Also, coal-fired power

plants account for less than 10% of net electricity with biomass also contributing fewer quantities (EIA-Mississippi, 2018). In California, natural gas-fired power plants account for two-fifths of the state's net electricity generation. Renewable sources such as hydropower account for a similar amount, and as of 2016, nuclear power accounted for less than 10% of electricity generated. Hydroelectric power also contributes to the states power grid depending with annual precipitation. In state coal-fired generation accounts for 0.2%. Non-hydroelectric renewable electricity accounts for more than 25% of electricity generated in the state.

Mississippi relies more on natural gas-fired power plants than Georgia and California where accounts for less than half of the net electricity. Even though coal-fired power plants electricity generation is declining in Georgia, it is the highest compared to the Mississippi and California with the latter having a coal-powered transmission of less than 0.2%. These low coal usage rates in California are as a result of state-enacted emission standards (EIA- California, 2018). Nuclear power is used in Georgia in electricity generation more than in Mississippi and California. Its usage is low in Mississippi and California due to the shutdown of reactors. However, this is not the case in Georgia where two more reactors will be built in the next two-three years. Renewable energy is more effective in California where it contributes more than 25% to the power grid and is poised to increase in the future (EIA- California, 2018). Even though Georgia has a potential of generating electricity through renewable energy, the power contributes less than 10% to the state power grid. This is also the case with Mississippi.

### **Renewables**

Renewables have been a focus of many states because they help in reducing carbon emissions. In the three states, only California has a renewable portfolio standard and a renewable energy target. The state has set up regulations and guidelines that promote and

facilitate the use of renewable energy. In Georgia, renewables are mainly biomass and hydroelectric power (EIA-Georgia, 2018). Due to the vast state's forestry, the state uses wood and wood-derived fuels for electricity generation. Biomass production in Georgia is second to the Biomass produced in California. In the latter, the utility-scale also benefits from biomass through wood and wood waste. In Mississippi, Biomass only accounts for less than 2% and does not count towards the state energy mix supply (EIA-Mississippi, 2018).

Georgia has also invested in hydroelectric power producers with over 30 large producers in the state. This power is connected to the power grid and contributes to less than 10% (EIA-Georgia, 2018). However, this does not match California which is the third largest producer of hydroelectric power. Solar photovoltaic and other solar resources have also been immensely used in California where it accounts for over 5% of its utility scale electricity generation. Solar resources are utilized dramatically as the state has the world largest solar energy producers. Also, the state encourages residents through the California Solar initiative to install solar power systems at their homes and in business. This has facilitated the production of solar energy which is at 9,800 megawatts (EIA- California, 2018). There are vast differences between the solar production ranges of California, Georgia, and Mississippi with the last two states reporting 1,067 megawatts and 230 megawatts respectively. California still leads in other renewables such as geothermal energy with over 43 operating geothermal sites and wind energy which has 5,500 megawatts of installed capacity.

Renewables production has prospered in California due to the initiatives were taken by the state to encourage small-scale solar systems ownership at homes and businesses. Besides, the renewable portfolio standards established in 2002 are guiding the actions of the state and encouraging long-term investments in renewable energy. Hence, the state utilizes all the

resources capable of producing renewables to generate power and connect it to the power grid. This includes offshore wind and the south-eastern deserts. Even though Georgia has made considerable steps through biomass, they are still below that of California. Mississippi has not taken any action towards generating renewables.

### **Nuclear Power**

Nuclear power is also used as an energy generating approach by different states. Until lately, the federal government had not approved the construction of nuclear reactors. However, Georgia received a green light to construct two new reactors. The existing four reactors in two plants generate close to 26% of the state's net electricity generation (EIA-Georgia, 2018). At these levels, the state leads Mississippi and California in Nuclear power use. Mississippi has a 1,443 megawatt Grand Gulf Nuclear Power Station which is currently on an extended shutdown and contributes less than 10% to the power grid (EIA-Mississippi, 2018). This is also the case in California where two reactors have been shut down since 2013. The current contribution of nuclear power plants to net generation in California is less than 10%. However, like Mississippi, this percentage is declining at a fast rate.

While California and Mississippi are reducing their reliance on nuclear power plants for electricity generation, Georgia is in the course of constructing two more reactors making the total number of reactors to be six. More states are moving away from nuclear power from the environmental threats it poses. However, Georgia has improved its present facilities to increase production of current reactors. This indicates that nuclear power is a long-term energy action plan for the state.

### **Transportation**

The transportation sector is one of the leading petroleum energy consumers in states. Motor gasoline is the primary fuel consumed by the large sector. In Georgia, the transport sector consumes close to 90% of all the petroleum produced in the state through motor gasoline. This is also the case in California where the state requires all motorist to consume CaRFG (California Reformulated Gasoline) which reduces emissions. All player in the transportation sector in California have to adhere to these fuel specifications. In Mississippi, there are no restriction or specifications and the commonly used source of energy for the transportation sector is motor gasoline. The choice of California to have regulations may have been driven by the high percentage of emissions produced by the transportation sector mainly due to the state's huge population.

End-user consumption is at 437 trillion Btu in Mississippi and an expenditure of \$ 6,084 million (EIA-Mississippi, 2018). In Georgia, the end user consumption rises to 795 trillion Btu and an expenditure of \$ 12,926 million (EIA-Georgia, 2018). These end-user consumption rates spike in California to 3,116 trillion Btu and an expenditure of \$ 56,880 million which is 12.6% of the nation's total transportation expenditure. Energy usage in the transportation sector correlates with the population of the state. In California, a high number of vehicles assure the top expenditures in petroleum energy. In California, the transport sector is the largest energy consumer at 39.8% as well as in Georgia where it is at 28.0%. In Mississippi, the trend continues at 37.5% thereby indicating that the transport sector is the highest consumer in the three states.

### **Conclusion**

Although there are similarities, the differences in the energy approach of the three states, Georgia, Mississippi, and California are well defined. One of the core observations is made on the fact that energy production and consumption is highly dependent on the approach used by the

state in producing energy. In Georgia, Natural gas prevails, but the plans of nuclear power are well pronounced. Unlike other states, Georgia has renovated current nuclear reactors and is building new ones as from 2019. This is likely to support electricity generation in the state in the future.

In Mississippi, natural gas prevails to a great extent. The generation of electricity through the approach is quite efficient and economic more than coal and this the long-term course of action for the state. However, in these two states, few efforts have been geared to improve renewable energy. California is an energy-efficient state has policies and structures that guide its effort in energy production and consumption. The state extensively uses renewables more than any other state and encourages residents to adopt these systems. In addition, the state has a wide variety of energy sources that ensure it meets set objectives for energy efficiency. The plan at California should be adopted in Georgia and Mississippi as it emphasizes on using available sources of energy.

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