

UGA ENERGY PRIMER 2019

ENERGY USE ON UGA'S MAIN AND HEALTH SCIENCES CAMPUSES FOR FISCAL YEAR 2019

Electricity

How Much

UGA is Georgia Power's largest customer in northeast Georgia, purchasing 308,957,654 kilowatt-hours (kWh) of electricity in FY19. This is up 4.7% from 10 years ago.

What it Costs

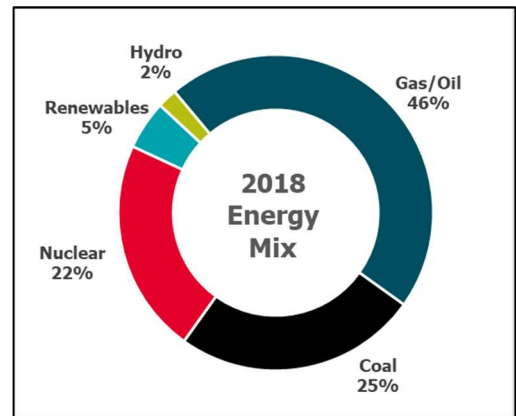
UGA paid \$16.2 million for electricity in FY19. Half of the electricity used at UGA is on a Real Time Price tariff, which means the price per unit of electricity changes every hour depending on market demand. The annual average cost is about 4.5 cents per kWh, but it can be over ten times that on hot afternoons or cold nights.

Where it Comes From

UGA buys electricity from Georgia Power, most of which is used on the main campus through the substation located adjacent to Joe Frank Harris Commons. UGA owns and operates its own electrical distribution system connected to this substation.

At right is the latest Georgia Power annual mix of the primary fuel sources that were used to generate all of the electricity sold in the year (source: "Georgia Power Facts and Figures 2019").

Georgia Power owns and operates one megawatt of their solar resource on UGA property along South Milledge Avenue through a research partnership with the university. The energy it generates feeds directly to the grid, while UGA retains the renewable energy credits (RECs). The array generated 1,667,450 kWh in 2019, offsetting about 0.5% of UGA's consumption of electricity from the grid.



How it is Used

UGA uses electricity for HVAC systems, lighting, computing, refrigeration (labs and food service), and myriad office and residential plug loads.

HVAC equipment ranges from window units to very large commercial systems. Most campus buildings are cooled and dehumidified with chilled water that is distributed throughout campus in underground pipes. Within a building, chilled water is pumped into coils through which large fans blow fresh and recirculated air to be distributed in air ducts. Pumps and fans in HVAC systems use a large amount of electricity.

Most buildings on the main campus are connected to one of six chilled water districts. Some of these buildings have their own chillers that may provide chilled water to their neighbors. UGA also has two district energy plants (DEP1 and DEP2) that serve the central/northwest and south/science districts, respectively. As the DEPs grow in capacity it allows UGA to remove old, inefficient chillers from individual buildings.

Heating Fuel

How Much

UGA burned 10,490,745 therms of natural gas and no other heating fuels in FY19. This is 11% less total heating fuel energy than was consumed 10 years ago, which at the time included coal and fuel oil.

What it Costs

UGA paid \$4.3 million for natural gas in FY19. UGA buys most of its natural gas on an interruptible contract, meaning that it pays a lower price but must curtail gas consumption at the request of the provider.

Where it Comes From

UGA is fed by the Atlanta Gas Light distribution pipeline, which is part of the pipeline system that brings natural gas to the region from the Gulf of Mexico. Fuel oil (a petroleum product similar to diesel) is delivered by truck and stored in underground tanks on campus.

How it is Used

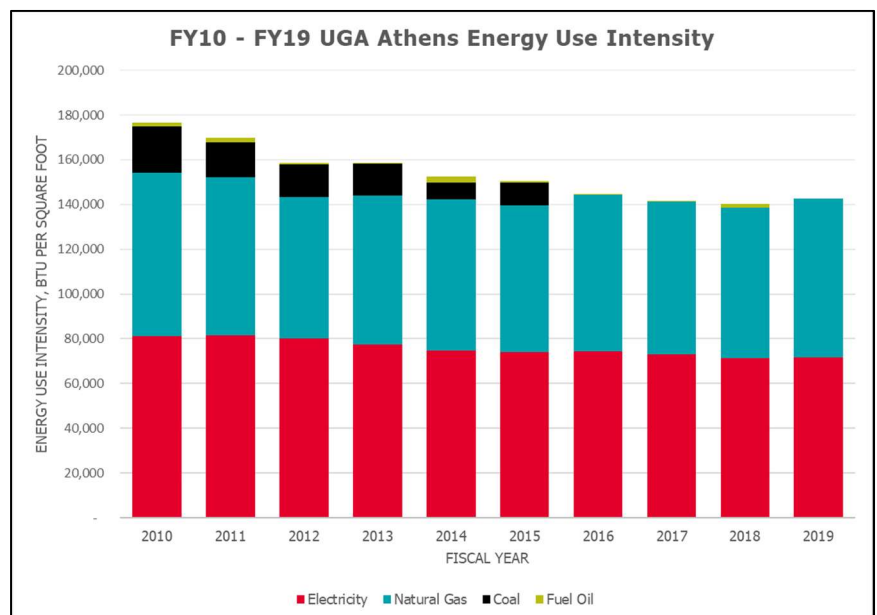
UGA uses heating fuels (mostly natural gas) for space and water heating as well as for laboratory and food service applications. 73% of the FY19 natural gas usage was at the Central Steam Plant, which provides steam throughout most of the main campus in a network of underground pipes. The gas boilers can convert to fuel oil as a backup when natural gas is curtailed, and there is an electrode boiler that can generate steam with electricity in the event of a fuel supply interruption.

Most steam-fed buildings have a heat exchanger that transfers energy from the steam to a closed water loop for use in HVAC systems. Steam is also used to heat domestic hot water and power autoclaves for laboratories. "Used" steam (hot water) returns to the steam plant for reuse. Most buildings that are not connected to the steam plant have independent heating and hot water systems that are fueled by natural gas.

Energy Use Intensity

Energy use intensity (EUI), measured in British thermal units (BTU) per square foot of building space, is a convenient metric to compare energy use in different buildings or track the progress of a campus that has grown 18.7% over the last 10 years. To calculate EUI we normalize the electricity and heating fuel consumption into BTU. We include all metered energy and all conditioned building square footage.

The EUI for FY19 was 142,747 BTU per square foot, which is down 19.2% from 10 years ago. Factors that contributed to this decrease include decommissioning our coal-fired steam plant boiler in 2015, steam distribution system upgrades, replacing outdated chillers with new district energy plants, LED lighting retrofits, and building more efficient buildings.



Who Pays

All utilities used in Resident Instruction (RI) facilities are paid for with state formula funding through the UGA Facilities Management Division Energy Services Department. Non-RI facilities (e.g. Athletics, Housing, and Auxiliary Services) use their respective budgets to reimburse Energy Services or pay utility bills directly.

Greenhouse Gas Emissions

Electricity consumption represents 56% and heating fuels represents 19% of the total UGA greenhouse gas emissions for FY19. While overall gross emissions have decreased 20% since 2010, the proportions of electricity and heating fuels have remained stable during that time. The reduction over that time is due in large part to phasing out coal-fired generation from the electric grid. Also, UGA emissions from heating fuels decreased 13% between 2015 and 2016 when the 1960s-era coal boiler was removed from the steam plant.