

### Energy Use in the World Research

Directions: Today you will be conducting research about how different countries around the world use different sources of energy for their citizens.

#### Renewable and Nonrenewable Energy

Renewable Energy	Nonrenewable Energy
What is the definition of renewable energy?	What is the definition of nonrenewable energy?
What are some examples of renewable energy sources?	What are some examples of nonrenewable energy sources?

#### Energy Sources in Other Countries

While most countries create most of their energy using fossil fuels, some countries are trying to create energy using other energy resources as well. You will do some research on four countries around the world that use other energy resources. Fill out the table for each country and the energy resource that it uses.

Country: France	Energy Resource: Nuclear Power
<b>Background:</b> France's present electricity generation mix is a result of the French government deciding in 1974, just after the first oil shock, to rapidly expand the country's nuclear power capacity, using Westinghouse technology. This decision was taken in the context of France having substantial heavy engineering expertise, but few known indigenous energy resources. Nuclear energy, with the fuel cost being a relatively small part of the overall cost, made good sense in minimizing imports and achieving greater energy security. France has been using a majority of nuclear energy to fuel its county since the early 1980's. France derives about 70% of its electricity from nuclear energy, due to a long-standing policy based on energy security. Government policy is to reduce this to 50% by 2035. France is the world's largest net exporter of electricity due to its very low cost of generation, and gains over €3 billion per year from this. The country has been very active in developing nuclear technology. Reactors and especially fuel products and services have been a significant export. About 17% of France's electricity is from recycled nuclear fuel.	
Is this country using a renewable or nonrenewable energy resource?  <div>Renewable</div> <div>Nonrenewable</div>	How much of the country's power is generated using nuclear power?  Quote:

How long has France been using this energy resource?	
Quote:	
What are the pros to this energy resource?	What are the cons to this energy resource?

Country: Brazil	Energy Resource: Hydroelectricity
<p>Background: Brazil largely relies on hydropower for electricity generation; in 2020, hydropower supplied 66% of its electricity demand. Brazil has the largest installed hydropower capacity in South America, with two thirds of the continent's total capacity. The first hydroelectric unit began producing energy in Brazil in 1984. In 2018, Brazil overtook the United States as the world's second largest hydropower producer by installed capacity. The hydropower sector makes up two-thirds of total Brazilian energy capacity and meets more than three-quarters of electricity demand. Large hydropower remains the major source of electricity supply, with other renewable energies representing about 10 per cent. Most of Brazil's hydropower capacity is located north in the Amazon River Basin, but electricity demand centers are mainly along the eastern coast, particularly in the south. National electricity reliability is challenged because of the country's reliance on one resource (hydropower), the long distance between hydropower generation and demand centers, continued drought conditions, and deforestation.</p>	
Is this country using a renewable or nonrenewable energy resource?  <div>Renewable</div> <div>Nonrenewable</div>	How much of the country's power is generated using hydroelectric power?  Quote:
How long has Brazil been using this energy resource?	
Quote:	
What are the pros to this energy resource?	What are the cons to this energy resource?

Country: Germany	Energy Resource: Solar Power
<p><b>Background:</b> Solar power in Germany has gone through turbulent times since it got off to a flying start in the wake of Germany's Renewable Energy Act in the year 2000. German companies quickly ascended to global leadership in solar power technology before a collapse after 2012 forced many of them to drop out of business. However, far from being a sun-drenched country, Germany has one of the highest solar power outputs in the world and still boasts cutting-edge research and many new industry actors. They expect a second wave in solar power expansion that could soon pave the way for the technology's full systemic integration. Solar power in Germany consists almost exclusively of photovoltaics (PV) and accounted for an estimated 8.2 percent of the country's gross-electricity generation in 2019. Renewables are cutting deeper into the market share for coal, the fuel on which Germany's wealth and industrial prowess was built. The government forecasts that green power will make up about 80% of the electricity mix by 2038, compared with just over 40% in 2019.</p>	
<p>Is this country using a renewable or nonrenewable energy resource?</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px 10px;">Renewable</div> <div style="border: 1px solid black; padding: 2px 10px;">Nonrenewable</div> </div>	<p>How much of the country's power is generated using solar power?</p> <p>Quote:</p>
<p>How long has Germany been using this energy resource?</p> <p>Quote:</p>	
<p>What are the pros to this energy resource?</p>	<p>What are the cons to this energy resource?</p>

Country: China	Energy Resource: Wind Power
<p><b>Background:</b> China built newer windfarm capacity in 2020 than the whole world combined in the year before, leading to an annual record for windfarm installations despite the Covid-19 pandemic. A study has revealed that China led the world's biggest ever increase in wind power capacity as developers built almost 100GW worth of windfarms last year – enough to power almost three times the number of homes in the UK and a rise of nearly 60% on the previous year. Wind power remained China's third-largest source of electricity at the end of 2020, accounting for <b>6.1%</b> of total power generation. China has been growing its wind power productions since 1990. China's grid-connected installed capacity of wind power has exceeded 300 gigawatts, doubling from the level five years ago.</p>	
<p>Is this country using a renewable or nonrenewable energy resource?</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px 10px;">Renewable</div> <div style="border: 1px solid black; padding: 2px 10px;">Nonrenewable</div> </div>	<p>How much of the country's power is generated using wind power?</p> <p>Quote:</p>

How long has China been using this energy resource?	
Quote:	
What are the pros to this energy resource?	What are the cons to this energy resource?

State: Tennessee	Energy Resource: Fossil Fuels
<p>Background: Tennessee produces a majority of its energy by burning fossil fuels. Memphis is home to Tennessee's only petroleum refinery, which processes about 180,000 barrels of oil per day. This petroleum refinery was constructed in 1941. In 2020, the amount of electricity generated annually in Tennessee by natural gas exceeded coal-fired generation for the first time. Natural gas accounted for 20% of the state's net generation and coal's share was 18%. Tennessee uses about 50 times more coal than it produces. About 80% of the coal consumed in the state is used for electric power generation, and the rest is used at industrial facilities.</p>	
<p>Is Memphis using a renewable or nonrenewable energy resource?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 10px;">Renewable</div> <div style="border: 1px solid black; padding: 2px 10px;">Nonrenewable</div> </div>	<p>How much of Tennessee's power is generated using fossil fuels?</p> <p>Quote:</p>
<p>How long has Tennessee been using this energy resource?</p> <p>Quote:</p>	
What are the pros to this energy resource?	What are the cons to this energy resource?

Follow Up Questions:

Which source of energy do you think is the most sustainable and why?

Which source of energy do you think is the best for the environment and why?

Why do you think it is important to conserve our resources?