

Name:

Date:

Class:

## Energy Source Sheet

In this group you will learn about different types of energy so that you can decide how your building structure will be heated and how it will get electricity.

**Step 1:** Currently, most buildings get their heat, and possibly the energy for their ovens, from natural gas - a fossil fuel. To meet the net-zero greenhouse gas emissions by 2050, you will have to select a different fuel source for your building.

- a. Read the introduction to alternative fuels below. For this project, we are assuming that technology is in place so that the fuel options listed below that power vehicles can also be used to heat building structures. You can assume that the building will have the same emissions as the car.

### Alternative Fuels

Alternative fuels are derived from sources other than petroleum. Most are produced domestically, reducing our dependence on imported oil, and some are derived from renewable sources. Often, they produce less pollution than gasoline or diesel.



Ethanol is produced domestically from corn and other crops. It produces less greenhouse gas (GHG) emissions than gasoline or diesel.



Electricity is produced domestically from a variety of sources such as coal, natural gas, nuclear power, and renewables. Powering vehicles with electricity causes no tailpipe emissions, but generating electricity can produce pollutants and greenhouse gases.



Biodiesel is diesel derived from vegetable oils and animal fats. It usually produces less air pollutants than petroleum-based diesel.



Natural gas is a fossil fuel that is plentiful in the U.S. It produces less air pollutants and GHGs than gasoline.



Propane, also called liquefied petroleum gas (LPG), is a domestically abundant fossil fuel. It produces less harmful air pollutants and GHGs than gasoline.



Hydrogen can be produced domestically from fossil fuels (such as coal), nuclear power, or renewable resources, such as hydropower. Fuel cell vehicles powered by pure hydrogen emit no harmful air pollutants.

Figure and information from <https://www.fueleconomy.gov/feg/current.shtml>

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b. Each member of the expert group should choose one of the energy sources to research using the links provided below. Complete appropriate worksheet for the energy source you choose.

- Ethanol: [https://afdc.energy.gov/vehicles/flexible\\_fuel\\_emissions.html](https://afdc.energy.gov/vehicles/flexible_fuel_emissions.html)
- Electric: [https://afdc.energy.gov/vehicles/electric\\_emissions.html](https://afdc.energy.gov/vehicles/electric_emissions.html)
- Biodiesel: [https://afdc.energy.gov/fuels/biodiesel\\_benefits.html](https://afdc.energy.gov/fuels/biodiesel_benefits.html)
- Natural gas: [https://afdc.energy.gov/vehicles/natural\\_gas\\_emissions.html](https://afdc.energy.gov/vehicles/natural_gas_emissions.html)
- Propane: [https://afdc.energy.gov/vehicles/propane\\_emissions.html](https://afdc.energy.gov/vehicles/propane_emissions.html)
- Hydrogen: [https://afdc.energy.gov/fuels/hydrogen\\_benefits.html](https://afdc.energy.gov/fuels/hydrogen_benefits.html)

**Step 2:** Currently, most buildings get their electricity from fossil fuels. In order to meet Biden's goal of 100% carbon pollution-free electricity by 2035, you will have to select a carbon-free way for your structure to get its electricity.

a. Review the information presented here: <https://www.eia.gov/energyexplained/renewable-sources/> to define renewable energy and see the different types of renewable energy.

b. Each individual should choose one type of renewable energy to focus on. Use the links below to learn about the renewable energy that you chose and complete the Pros and Cons Worksheet for your energy source.

Pros and Cons research documents on renewable energy

- Solar energy: <https://www.solarreviews.com/blog/pros-and-cons-of-solar-energy>
  - Wind energy: [https://www.windustry.org/pros\\_cons\\_wind\\_energy](https://www.windustry.org/pros_cons_wind_energy)
  - Geothermal: <https://www.solarreviews.com/blog/geothermal-energy-pros-and-cons#what-is-it>
  - Hydropower: <https://www.energysage.com/about-clean-energy/hydropower/pros-cons-hydropower/>
  - Nuclear energy: <https://www.solarreviews.com/blog/nuclear-energy-pros-and-cons>
  - Biomass energy: <https://www.solarreviews.com/blog/biomass-energy-pros-and-cons>
- c. When everyone is finished learning about their renewable energy source share the information with your group. There is a space in the worksheet for you to take notes.

Additional energy resources:

<https://www.youtube.com/watch?v=KEeH4EniM3E>

<https://www.youtube.com/watch?v=uihEq92u9Vg>