



Fuel Information Sheet

Wood (Biomass)

- Maine has 17 million acres of forest.
- Wood is a renewable energy source; we can grow more trees and manage forested areas.
- Wood must be transported to where it is used.
- Wood requires storage space and proper “seasoning.”
- The amount of energy stored in wood is less than the amount of energy stored in an equivalent amount of a fossil fuel.
- Labor is involved in preparing wood for use - cutting, splitting, and stacking.
- Many people enjoy the warmth of a fire and find them aesthetically pleasing.
- Wood burning stoves and furnaces often generate uneven heating.
- Supplementary devices (fans, grates) are sometimes added to aid in distributing heat to greater areas in the home.
- Wood provides intense heat. Many wood burning furnaces or stoves need to be manually replenished every few hours to provide heat throughout the day.
- Wood can be used as a fuel because trees capture and store radiant energy from the sun through a process called photosynthesis.
- Fire burning equipment must be properly installed and regularly cleaned to reduce the risk of fire.
- For some, wood has a low cost, especially if it's available from the homeowners own woodlot.
- Burning wood produces smoke, particulate matter, and other harmful emissions.
- Many Maine families use wood as a primary heat source.
- Scientists are developing trees that can be grown to full size in less than half the time of the average tree.
- Outdoor wood boilers (owb's) are furnaces that are installed outdoors to keep the wood mess outside the home. They burn 4-foot long logs that last half the day – but the low temperatures and slow burning in the firebox create lots of air pollution problems.
- Certified wood stoves for indoor use can use 1-2 foot pieces of wood that can be burned in fast, hot fires which result in less air pollution.
- Pellet stoves have become a popular way to burn wood. Wood pellets are made from dry sawdust compressed under high pressure and pushed through a die. Pellets usually come from the byproduct of sawmills and are very easily transportable due to their size (about half an inch) and their weight.
- Pellet stoves require electricity for their operation, pellets come in bags that require storage and lower grade or pellets that are unused for long periods of time can disintegrate into sawdust.

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Natural Gas

- Natural gas was formed by the decomposition of tiny sea plants and animals that lived millions of years ago.
- Natural gas is a clean burning fossil fuel.
- The chemical name for natural gas is methane.
- More than half the homes in the United States use natural gas for heat.
- Natural gas is odorless. Chemicals are added to the gas to give it an odor.
- Natural gas is found in oil fields and coal beds. Natural gas is not found in Maine.
- When burned, natural gas provides immediate heat.
- Natural gas is a nonrenewable resource.
- The invention of high-pressure pipelines has made it possible to ship natural gas all over the United States.
- If leaks occur in natural gas pipelines, fires and explosions can result.
- Natural gas is readily available to consumers as a public utility in urban areas and in bottles in other areas.
- In addition to using natural gas to heat their homes, many people use natural gas for their dryers and ovens.



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Heating Oil (Petroleum)

- The word petroleum comes from the word *petro* meaning rock and the word *oleum* meaning oil.
- Petroleum was formed over millions of years from the remains of plants and microorganisms.
- Petroleum is a nonrenewable resource.
- There is an immediate release of heat when burned.
- In recent years the cost of oil has risen.
- A small storage space is needed.
- Safe storage is difficult.
- Heating oil has a high heat value.
- Petroleum is a hydrocarbon; a chemical compound that contains hydrogen and carbon.
- 80% of Maine homes use oil-based heating systems.
- The United States imports about 2/3 of the petroleum it uses from other countries.
- Petroleum straight from the ground (crude oil) is not usable. Crude oil must be refined into heating oil and other products.
- Harmful emissions are produced when petroleum products are burned.
- Oil must be transported by pipeline, truck, or tanker to where it is refined and/or used.
- If oil is spilled into the water or onto the land, it can cause damage to the environment.
- The United States has petroleum reserves in Alaska and offshore but there is a high cost and environmental price to pay for it. The drilling for oil in these areas is also controversial.



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Electricity

- Electricity is a secondary energy source. It must be generated for use.
- Coal generates about half the electricity in the United States. When burned, coal produces the highest amount of carbon dioxide of all fossil fuels.
- When coal is burned sulfur dioxide is given off. Sulfur dioxide is a major cause of acid rain and is a contributor to several respiratory diseases.
- In Maine, hydroelectric dams and wind generate a small but growing percentage of our electricity.
- Electric heat is versatile; it can be used to warm individual spaces and/or for entire homes.
- Homeowners can easily add additional electric heat to new areas of their homes (additions, basements, workshops, garages).
- Unlike heating systems that require piping which limits where these systems can go, electric heating systems can be installed just about any place in the home.
- Nearly all homes already have electricity in place.
- Alternative energy sources such as solar and wind can be used to generate electricity that can be used to heat homes.
- Electric heating systems operate cleanly, are long-lasting, and are low maintenance.
- No onsite fuel storage is required.
- Electric heating systems do not require the ventilation needed to burn a fuel.
- Electric heat is expensive.



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Propane

- Propane is a clean burning fossil fuel.
- Propane exists in liquid and gas forms. Propane is stored as a liquid in pressurized tanks because it takes up less space, making it very portable.
- Propane is mostly used in rural areas that do not have natural gas service. Homes and businesses use it for heating, hot water, cooking, and clothes dryers.
- Half of America's farms rely on propane to dry crops, power tractors, heat greenhouses, and warm chicken houses.
- Like natural gas, propane is colorless and odorless. A chemical is added to propane as a safety measure.
- Propane is a nonrenewable energy source.
- The 2000 Olympic Games torch burned a mix of propane and butane, which provides a lower emission and better luminosity and consumes less fuel.
- Propane is usually more expensive than natural gas, heating oil, or kerosene. Propane supplies and price are tied to oil and natural gas supplies and costs.
- Propane heaters come in a variety of shapes and sizes allowing flexible placement in tight spaces. Small portable space heaters are designed to heat one room or area of the home at a time providing heat to only the areas that need it and offering greater energy efficiency.
- Propane gas stoves and fireplaces heat more evenly and more efficiently than wood-burning ones.
- Propane is a less expensive alternative to electricity.



Fuel Information Sheet

Solar

- The sun radiates more energy in one second than people have used since time began. It takes the sun's energy just over 8 minutes to travel the 93 million miles to the Earth.
- The sun is made up of helium and hydrogen gas. It produces radiant energy in a process called nuclear fusion.
- Solar energy systems have no ongoing fuel costs.
- Energy from the sun is renewable.
- There is a high initial cost of installation and high ongoing maintenance cost.
- Harnessing energy from the sun is difficult because the energy that reaches the Earth is widely spread out.
- In northern areas there may not be enough sun during winter months to make this practical as it may require supplemental heating. Often supplemental heating is supplied as expensive electric heat.
- Solar energy systems do not require fuels to be stored in the traditional sense. Solar systems often have batteries for storing energy.
- Solar energy systems do not produce emissions of greenhouse gases or particulate matter.
- The amount of solar radiation that reaches an area depends on the time of day, season of the year, cloud coverage, and geographic location.
- Passive solar homes do not need special equipment.
- Passive solar technologies are means of using sunlight for useful energy without use of active mechanical systems.
- Active solar technologies convert solar energy into usable heat, cause air-movement for ventilation or cooling, or store heat for the future and require the use of electrical or mechanical equipment, such as pumps and fans, to increase the usable heat in a system.
- Photovoltaic or solar cells convert radiant energy into electricity.

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Geothermal

- Geothermal energy can be used to heat homes in several ways: through direct use in heating systems (these use hot water from springs or reservoirs near the surface), by electrical generation (which is then used for heat), and by geothermal heat pumps (using stable ground or water temperatures near the earth's surface to control building temperatures above ground). The last method is the one used by some Maine people to heat their homes.
- Geothermal energy is generated in the earth's core, about 4,000 miles below the surface. Temperatures hotter than the sun's surface are continuously produced inside the earth.
- Examples of geothermal energy are hot springs, volcanoes, and geysers.
- Geothermal energy is renewable.
- People in Maine typically access geothermal heat through their wells.
- Despite our seasonal changes in temperature, the temperature 10-30 feet below the ground remains fairly constant year round. Geothermal heat pumps use the Earth's constant temperatures to heat and cool buildings by transferring heat from the ground (or water) into buildings in winter and reverse the process in the summer.
- Geothermal heat pumps do not have ongoing fuel costs.
- According to the U.S. Environmental Protection Agency (EPA), geothermal heat pumps are the most energy-efficient, environmentally clean, and cost-effective systems for temperature control.
- Most homes still use traditional furnaces and air conditioners; geothermal heat pumps are becoming more popular.