

Firewood

Firewood is any wooden material that is gathered and used for fuel. Generally, firewood is not highly processed and is in some sort of recognizable log or branch form, compared to other forms of wood fuel like pellets or chips. Firewood can be seasoned (dry) or unseasoned (fresh/wet). It can be classed as hardwood or softwood.

Firewood is a renewable resource. However, demand for this fuel can outpace its ability to regenerate on a local or regional level. Good forestry practices and improvements in devices that use firewood can improve local wood supplies.



Stack of firewood next to a building



Stack of split firewood and a maul for splitting, Czech Republic

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Harvesting

Harvesting or collecting firewood varies by the region and culture. Some places have specific areas for firewood collection. Other places may integrate the collection of firewood in the cycle of preparing a plot of land to grow food as part of a field rotation process. Collection can be a group, family or an individual activity. The tools and methods for harvesting firewood are diverse.

North America

Some firewood is harvested in "woodlots" managed for that purpose,^[1] but in heavily wooded areas it is more usually harvested as a byproduct of natural forests. Deadfall that has not started to rot is preferred, since it is already partly seasoned. Standing dead timber is considered better still, for it has less dirt on the trunk, allowing tools to stay sharper longer, as well as being both seasoned and less rotten. Harvesting this form of timber reduces the speed and intensity of bushfires, but it also reduces habitat for snag-nesting animals such as owls and some rodents.



Firewood collector in Mozambique

Harvesting timber for firewood is normally carried out by hand with chainsaws. Thus, longer pieces – requiring less manual labour, and less chainsaw fuel – are less expensive and only limited by the size of the firebox. In most of the United States, the standard measure of firewood is a cord or 128 cubic feet (3.6 m³), however, firewood can also be sold by weight. The BTU value can affect the price. Prices also vary considerably with the distance from wood lots, and quality of the wood.

Buying and burning firewood that was cut only a short distance from its final destination prevents the accidental spread of invasive tree-killing insects and diseases.^{[2][3]}

Preparing

In most parts of the world, firewood is only prepared for transport at the time it is harvested. Then it is moved closer to the place it will be used as fuel and prepared there. The process of making charcoal from firewood can take place at the place the firewood is harvested.

Most firewood also requires splitting, which also allows for faster seasoning by exposing more surface area. Today most splitting is done with a hydraulic splitting machine, but it can also be split with a splitting maul. More unusual, and dangerous, is a tapered screw-style design, that augers into the wood, splitting it, and can be powered by either a power take-off drive, a dedicated internal combustion engine, or a rugged electric pipe-threading machine, which is safer than the other power sources because the power can be shut off more easily if necessary. Another method is to use a kinetic log splitter, which uses a rack and pinion system powered by a small motor and a large flywheel used for energy storage.



Firewood axe or maul

Hydraulic splitting machine

Methods of splitting firewood

Storing

There are many ways to store firewood. These range from simple piles to free-standing stacks, to specialized structures. Usually the goal of storing wood is to keep water away from it and to continue the drying process.

Stacks: The simplest stack is where logs are placed next to and on top of each other, forming a line the width of the logs. The height of the stack can vary, generally depending upon how the ends are constructed. Without constructing ends, the length of the log and length of the pile help determine the height of a free-standing stack.

There is debate about whether wood will dry more quickly when covered. There is a trade-off between the surface of the wood getting wet vs. allowing as much wind and sun as possible to access the stack. A cover can be almost any material that sheds water – a large piece of plywood, sheet metal, terracotta tiles, or an oiled canvas cloth, even cheap plastic sheeting may also be used. Wood will not dry when *completely* covered. Ideally pallets or scrap wood should be used to raise the wood from the ground, reducing rot and increasing air flow

There are many ways to create the ends of a stack. In some areas, a crib end is created by alternating pairs of logs to help stabilize the end. A stake or pole placed in the ground is another way to end the pile. A series of stacked logs at the end, each with a cord tied to it and the free end of the cord wrapped to log in the middle of the pile, is another way



Firewood stacks at Pühtitsa Convent in Estonia are about 6 meters high.



Stacked with crib end, in eastern France, covered by terracotta tiles.

Under a roof: Under a roof, there are no concerns about the wood being subjected to rain, snow or run-off, but ventilation needs to be provided if the wood is stored green so that moisture released from the wood does not recondense inside. The methods for stacking depend on the structure and layout desired. Whether split, or in 'rounds' (flush-cut and unsplit segments of logs), the wood should be stacked lengthwise, which is the most stable and practical method. Again though, if the wood needs further seasoning there should be adequate air flow through the stack.

Storing outdoors: Firewood should be stacked with the bark facing upwards. This allows the water to drain off, and standing frost, ice, or snow to be kept from the wood.

Round stacks can be made many ways. Some are piles of wood with a stacked circular wall around them. Others like the American Holz Hausen are more complicated.

A Holz hausen, or "wood house", is a circular method of stacking wood; proponents say it speeds up drying on a relatively small footprint. A traditional holz hausen has a 10-foot diameter, stands 10 feet high, and holds about 6 cords of wood. The walls are made of pieces arranged radially, and tilted slightly inward for stability. The inside pieces are stacked on end to form a chimney for air flow. The top pieces are tilted slightly outward to shed rain and are placed bark side up.^[4]



Stacking firewood in a shed

Heating value

The moisture content of firewood determines how it burns and how much heat is released. Unseasoned (green) wood moisture content varies by the species; green wood may weigh 70 to 100 percent more than seasoned wood due to water content. Typically, seasoned (dry) wood has 20% to 25% moisture content. Use of the lower heating value is advised^[5] as a reasonable standard way of reporting this data.

The energy content of a measure of wood depends on the tree species.^[6] For example, it can range from 15.5 to 32 million British thermal units (16.4 to 33.8 GJ) per cord.^[7] The higher the moisture content, the more energy that must be used to evaporate (boil) the water in the wood before it will burn. Dry wood delivers more energy for heating than green wood of the same species.

The Sustainable Energy Development Office (SEDO), part of the Government of Western Australia states that the energy content of wood is 4.5 kWh/kg or 16.2 gigajoules/tonne (GJ/t).^[8]

Here are some examples of energy content of several species of wood:

Wood Species	Heat Value per Cord
<u>Tamarack</u>	22.3 MMBtu (23.5 GJ)
<u>Birch</u>	21.3 MMBtu (22.5 GJ)
<u>Red Fir</u>	20.6 MMBtu (21.7 GJ)
<u>White Fir</u>	16.7 MMBtu (17.6 GJ)



Firewood carrier, Seoul, Korea 1945

Kiln dried firewood

The process of kiln drying firewood was invented by Anthony Cutara, for which a successful US patent was filed in 1983.^[9] In 1987 the US Department of Agriculture replicated the method and published a detailed procedure for the production of kiln dried firewood, citing the higher heat output and increased combustion efficiency as a key benefit of the process^[10]

Measurement

Usually firewood is sold by volume. While a specific volume term may be used, there can be a wide variation in what this means and what the measure can produce as a fuel. For example, acord which is made from 4-foot (1.22 m) logs, will not be a cord when it is cut into 1 foot logs and these split so each piece will fit through a 3-inch (7.6 cm) circle. A measure of green unseasoned wood with 65% moisture contains less usable energy than when it has been dried to 20%. Regardless of the term, firewood measurement is best thought of as an estimate.



Firewood on the way to market

Metric

In the metric system, firewood is usually sold by the stère, equivalent to a volume of 1 cubic meter (1 cubic meter or 0.276 cords). The most common firewood piece length are 33 cm and 50 cm. Wood can also be sold by the kilogram or by the metric tonne, as in Australia.

North America

In the United States and Canada, firewood is usually sold by the full cord, face cord or bag.



Firewood at a local market ready for sale

- A **full cord** or **bush cord** has a volume of 128 cubic feet (3.6 m³), including wood, bark, and air space in a neatly stacked pile.^[11] The actual wood volume of a cord may be in the range of 80 to 100 cubic feet (2.3 to 2.8 m³) as stacked wood takes up more space than a piece of solid wood. The most common firewood piece length is 16 inches (41 cm).^[12]
- A **face cord** is one third of a full or bush cord stack of wood that is 4 by 8 ft (1.22 by 2.44 m) by 16 in (41 cm) and has a volume of 42.6 cubic feet (1.21 m³).^[12]

In popular culture

In Norway, the non-fiction book *Hel Véd* (In English: *Solid Wood: All About Chopping, Drying and Stacking Wood — and the Soul of Wood-Burning*) by Lars Mytting became a bestseller in 2011/2012, selling 150,000 copies. A version of the book has also been published in Sweden, selling 50,000 copies.^[13]

In February 2013, the Norwegian state broadcast NRK sent a 12-hour live program on the topic of woodfire, where a large part of the program consisted of showing firewood burning in a fireplace. More than one million people, 20% of Norway's population, saw part of the program.^[14]

See also

- Biomass
- Cordwood construction
- Estovers
- Multipurpose tree
- Wood ash

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External links

- [Website which compares qualities of American wood species in cord measurements.](#)
- [A Graph showing Fuelwood & Firewood Production in Canada since 1940](#)
- [Article which compares qualities of Australian firewood varieties.](#)

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