WKO
AUSSENWIRTSCHAFT AUSTRIA

Firewood

Modern Heating with Tradition – How It Is Done in Austria

© LK Steiermark/Danner

www.biomasseverband.at

Österreichischer Biomasse-Verband
Austrian Biomass Association

With support of
Federal Ministry
Republic of Austria
Agriculture, Forestry, Regions and Water Management

Safe, Cheap and Eco-friendly

Wood is the world's oldest fuel, but it is also the most modern. For a million years, the same advantages have made heating and cooking with firewood so attractive. Thanks to technological advances in modern wood furnaces, particularly by Austrian manufacturers, firewood has a promising future as an environmentally friendly, highly efficient and crisis-proof source of energy.

Primary Heating System by Predominantly Used Energy Source and Type of Heating in Austria 2021/2022*

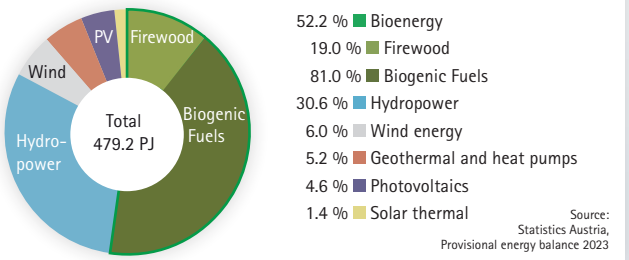
	Single oven	Gas convector	Electric heating	Central heating
Wood, wood chips, pellets, briquettes	74,329	–	–	659,643
Coal, coke, briquettes	873	-	–	2,596
Heating oil and liquefied gas	6,115	–	–	515,191
Electricity	–	–	241,072	-
Natural gas	–	15,160	–	863,159
Solar, heat pump	–	–	–	429,143

*Principal residences only

Source: Statistics Austria

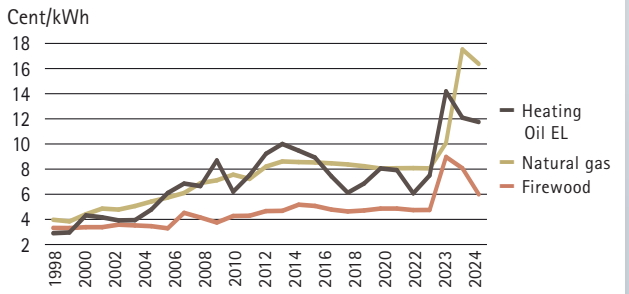
Wood fuels including firewood are by far the most important fuel for single ovens in Austria and come second in central heating.

Gross Domestic Consumption of Renewable Energies 2023



Firewood from domestic forests covers a fifth of the gross domestic consumption of renewable energies in Austria.

Price Development of Energy Sources for Households from 1998 to 2024



Source: proPellets Austria, LK Österreich, E-Control, Statistics Austria, EWO (Heating oil 2023 and 06/2024); Basis: Reference value is the calorific value, pellet order quantity 6 t, 15,000 kWh of gas, 1,000 l of heating oil delivered free of charge, based on a dispensing quantity of 3,000 l, including VAT, delivered, excluding filling surcharge.

The prices of firewood are much lower and more stable than those of fossil fuels.

TIP **„GET OUT OF OIL AND GAS": Right now, you can get 75 percent of the investment costs in federal funding to replace your fossil oil or gas heating system (including coal/coke burners and electric night or direct storage heaters) with a new wood central heating system. Plus, there are funding opportunities from federal states and municipalities. There are also subsidies of EUR 5,000 when replacing a wood boiler more than 15 years old by a modern wood central heating system.**

Wood – The Crisis-proof Solution

Approximately 50 % of Austria's territory is forested. Sustainability is of the utmost importance in this context, as the term has its roots in forestry. Over 300 years ago, it was recognised that wood is a renewable resource, provided that the amount harvested does not exceed the amount that grows back. Consequently, wood stocks have increased by 50 % since the 1960s. Firewood is sourced from managed forests as a byproduct which is not suitable for industrial processing. Approximately half of Austrian households utilise wood for at least part of their heating needs, either through central heating, auxiliary heating or district heating. Those who have experienced a power cut in winter will appreciate the provision of a wood-burning stove or fireplace.

Climate-friendly Concentrated Energy

Wood is the most efficient battery you could possibly imagine. Just 500 kilograms of wood can store as much solar energy as an 18-ton battery. This is enough energy for 3,000 kilometres of electric mobility and 250 warm showers. One of nature's most impressive feats is responsible for storing this energy: photosynthesis. This process produces biomass from water, carbon dioxide (CO_2), and solar energy. Since plants only release as much CO_2 when burned or decomposed as they absorb while growing, heating with wood is carbon-neutral. By replacing fossil fuels with biomass, we can reduce CO_2 levels in the atmosphere and help improve climate balance.

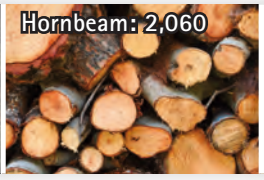
Heating With Wood Is Cost-effective

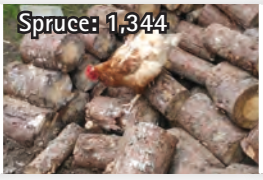
There's a wood heating system to suit every household and budget. Firewood is a stable and affordable alternative to fossil fuels. Even if you don't own your own forest, heating with a stove and firewood is a more cost-effective option. You get all the benefits of visible flames, radiant heat, and crackling wood. Modern wood heating systems are also really comfortable. You can get automatic control and ignition, combined devices with pellets or heat pumps, with or without integration into the central heating system – whatever you want. In terms of design, tiled stoves, fireplaces, or wood stoves are hard to beat and are present in almost every modern household.

Wood Fuels the Domestic Economy

The ‚buy local' concept is also applicable to the wood sector. A study conducted by the Austrian Energy Agency examined the regional value-added effects, which revealed that seven times more local jobs are secured with firewood than with the equivalent amount of heating oil. The value added remains in the country, benefiting the domestic economy. Unlike natural gas and oil, wood is reliably and safely transported to the consumer over short distances.

Types and Qualities of Firewood





Beech, Birch, Spruce – Types of Wood Compared

Beech: Excellent firewood for all types of stoves. Very suitable for stoves with viewing windows due to its flame formation. High calorific value, no crackling or sparking, long and even burn, produces a lot of embers.
Oak: High calorific value, but only suitable for closed fireplaces as it sparks. Contains tannins, so it must be very dry, otherwise the acids can attack the chimney.
Hornbeam: Even harder than beech, difficult to saw and split. Burns for a long time and has a similarly high calorific value as oak.
Birch: Excellent, decorative firewood with beautiful blue flames. Dries quickly, ignites easily and has a pleasant smell due to the content of essential oils.
Ash: Together with birch, it has the most beautiful flame formation. Comparable in calorific value and price to beech wood.
Spruce: Burns easily (good kindling) and quickly reaches high temperatures, pleasant smell. Not suitable for open fireplaces as it sparks and crackles due to its high resin content.
Fir: Lower resin content compared to spruce, resulting in fewer sparks during combustion.
Pine: Significantly higher calorific value than other softwoods due to its greater density, but lower than hardwoods. Tends to spark and produce soot due to its high resin content.
Poplar/Willow: Softwoods that burn quickly. Only suitable as firewood for summer when less heat is needed.

Hardwood and Softwood

Hardwood is denser than softwood (coniferous wood, poplar, willow) and consequently has a higher weight per unit volume. Therefore, hardwood has greater energy storage capacity than softwood of an equivalent volume. A cubic metre of spruce logs equals 135 litres of heating oil, while beech logs replace 193 litres. If the logs are of an equal weight, they will also contain approximately the same amount of energy, regardless of whether they are softwood or hardwood. When lighting a fire, it is advisable to use softwood as kindling, as it is easier to ignite. It is recommended that a variety of wood types be used in the stack, with soft, easy-to-split wood used for starting the fire and hardwood used to maintain the embers for an extended period.

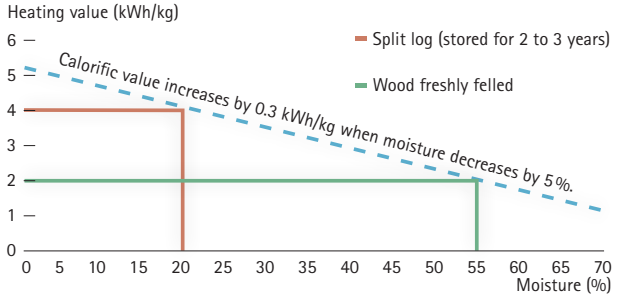
Dryness is Essential

The moisture content has a big effect on the calorific value. Air-dried wood with around 20% moisture will have double the calorific value compared to freshly cut wood. Moist wood is difficult to ignite and releases less energy, as some of it is used for water evaporation. Additionally, burning moist wood can lead to the formation of condensation, causing corrosion in the stove and chimney. Due to unburned wood gases resulting from low combustion temperatures, moist wood can produce smoke that affects the neighbourhood and the environment.

How Much Wood Do I Get?

Being fully informed is essential when buying firewood. It is important to agree on the sales measure in advance, whether it is a solid, stacked or bulk cubic metre. A solid cubic metre is defined as an imaginary cube of solid wood measuring 1 x 1 x 1 m. A stacked cubic metre of firewood is characterised by gaps between the pieces of wood, regardless of whether they are round or split logs, or short or long. If the firewood is not stacked neatly but is rather loosely piled, it is classified as a bulk cubic metre. A bulk cubic metre may contain only approximately 50% wood, the remaining half being air.

Lower Heating Value of Wood Depends on Moisture Level



Conversion of Units of Measurement, Reference Values

	cubic metre round timber	stacked split logs 100 cm	stacked split logs 33 cm	bulk split loose logs
1 cubic metre round timber	**1.0**	1.4	1.2	2.0
1 stacked split logs (100 cm)	0.7	**1.0**	0.85	1.4
1 stacked split logs (33 cm)	0.85	1.2	**1.0**	1.67
1 bulk split loose logs	0.5	0.7	0.6	**1.0**

Source: Heizen mit Holz, Waldverband Österreich, LFI

Solid cubic metre, stacked cubic metre and loose cubic metre: Firewood as round timber (left), stacked metre wood and loose split logs in stove length (right).

From Tree to Log

© FAST Traunkirchen

Work with a chainsaw is a dangerous activity, therefore a course in firewood processing is highly recommended for self-harvesters.

© FAST Pichl, FAST Traunkirchen

Forestry helmet, signal colors, cut protection inserts for pants and shoes, as well as work gloves are essential for forest work.

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A light chainsaw with fuel, a spark plug wrench, file, spare bar and chain should also be included.

© waermeaushholzat

With a tractor and a winch, the logs can be transported to the forest road, where they will be cut to size.

TIP **It's hard work and requires expertise to process firewood. If you don't have any experience with chainsaws and woodworking, it might be a good idea to take a course at a Forestry Training Centre, for example in Pichl, Traunkirchen or Ossiach. You'll get the lowdown on chainsaws, maintenance, operation, accident prevention and ergonomics.**

Firewood Warms Twice

Even if you do not own a forest, you can still make your own firewood. There is nothing quite like it for bringing you closer to nature. Processing firewood is a great way to get some exercise while also doing something meaningful that can save you money. Many forestry operations offer wood ‚on the stump', which means you can buy the standing tree and process it yourself. Some forest owners also offer the option of processing crown wood or damaged wood left over from timber harvesting. Your best bet is to check with forestry operations in your area.

Working With a Chainsaw

Adopting the appropriate approach when felling and transporting a tree is crucial. Failure to do so can be life-threatening. The weight of a single log can reach several tons. Safety must come first when working with wood. In addition to wearing the appropriate protective equipment, which includes a forestry helmet with ear and face protection, cut-resistant trousers, gloves, safety footwear and a first aid kit, it is essential to block off the felling area. A well-maintained chainsaw is a prerequisite for safe work. Powerful battery-powered chainsaws are now available, suitable for professionals. Not only do they have zero emission but they are also much quieter and vibrate less than gasoline models.

Felling and skidding

The optimal time for felling is during the winter months, when there is less snow accumulation and temperatures are below freezing. Wood has a lower moisture content in the colder months than during the growing season, and the frozen ground makes it easier to transport the logs. If you are working on sloping terrain or with small tree trunks, you may opt to transport the logs to the forest road manually. In the event that you are dealing with heavier logs or working uphill, it will be necessary to use mechanical skidding. In the absence of a tractor with a winch, a range of cable winches can be utilised. It is essential to ensure that the trees are not damaged and that new growth is not adversely affected during the felling and skidding process. The wood should be stored adjacent to the forest road to prevent interference with forestry machinery or congestion of the ditches.

Transport to the Wood Storage Area

When cutting logs in the forest, it is important to consider the length of the logs in relation to the heating system in use. As a general rule of thumb, 25 or 33 cm is an appropriate length for stoves, while 50 cm is suitable for central heating systems. The logs should be cut to multiples of this length. Metre pieces are ideal for transportation by car, while 5 m pieces are optimal for truck transport.

Storage of Firewood

Stacking the Metre Logs

For smaller amounts of wood, the logs can be cut to the desired length and split with an axe. For larger amounts, it is advisable to cut the logs into approximately 1-metre-long pieces, machine-split them, and dry them as metre-long logs. There are various devices available for splitting, which can be operated electrically or by a shaft on a tractor. Even smaller logs and tree parts should be split immediately, as the wood will not dry well otherwise. The shorter, the less bark, and the larger the surface area, the faster a log will dry. After two years of storage, the moisture content will have decreased to about 20 % and the wood can be used for heating.

Drying With Sun and Wind

If the space is suitable for laundry, it is also ideal for the wood pile. It is recommended that a large surface area be exposed to the sun and the wind while the whole pile stays protected from the rain. The optimal choice for rain protection is metal sheeting, due to its ability to collect heat and have few contact points with the wood. It is advised that the wood be loosely stacked to allow for ventilation. To prevent the wood from absorbing moisture from the ground, it is essential that it be placed on strong crosspieces or pallets with sufficient space in between.

Storing Wood

After drying, the wood is cut to a stove-ready length of 50, 33, or 25 cm. To cut the 1-metre logs to the correct length, a mitre saw or a firewood circular saw is usually used. For large quantities or in commercial settings, semi-automatic or fully automatic splitting machines are used, which automatically saw and split long logs, while for smaller quantities a chainsaw will suffice. Before storing it in the cellar, it is important to ensure that the wood is truly dry, as otherwise it may become mouldy and rot. Small measuring devices are available at the hardware store for this purpose. An ideal moisture content is below 20 %.

Shortcut: Buying Firewood

The most important quality features to consider are the wood species and moisture content, as well as the size and uniformity of the logs. Firewood can be delivered in a large bag, on a pallet, or loose with a trailer. For customers requiring smaller quantities, sacked goods are also available for purchase. Dealers with a „Ofen-Holz" quality seal („stove wood") guarantee proper storage, a maximum side length of 15 cm, and that the wood comes from Austrian forests. Those with ample storage space may find it cost-effective to purchase freshly cut wood and dry it in their garden. A typical single-family home with a previous heating oil consumption of 2,000 litres will require approximately ten cubic metres of beech firewood per year. A temporary storage area within the house helps to minimise the distance to the boiler.

TIP **The quality seal „Ofen-Holz" is awarded by the Austrian Forest Association (Waldverband) and certifies that the firewood meets the highest quality standards. www.waldverband.at/de/ofenholz**

© Jedinger

Logwood should be split as quickly as possible after harvesting for drying purposes. A variety of log splitters can be used for this.

© LK Steiermark

Split logs must be stored dry and airy.

© LK Steiermark

You can tell if the wood is dry enough for storage by measuring the moisture content.

© LK Steiermark

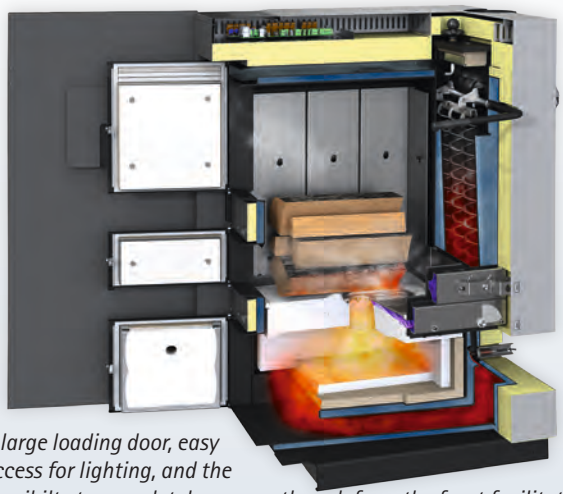
The firewood dealer will deliver it to you in big bags or on pallets, for example.

From Wood to Energy

Wood-burning Stoves: A Wide Variety

There are many options for heating with wood. The range includes the cost-effective, industrially produced wood stove, various forms of tiled stoves and cookers, as well as water heating stoves or central heating systems. The price range extends from a few hundred euros for a basic model to several thousand euros for a top-of-the-line device with all the technical refinements. Logwood central heating systems, including buffer storage and installation in the performance class of 20 to 40 kW, are available from EUR 20,000. A wood heating system stays with its buyer for decades. Therefore, you should pay attention to quality and compare products from different manufacturers.

TIP **Ovens and boilers that meet particularly high requirements for emissions, efficiency, processing quality, and manufacturer service are awarded the „Umweltzeichen" in Austria and the „Blauer Engel" in Germany.**



A large loading door, easy access for lighting, and the possibilty to completely remove the ash from the front facilitate the operation of a modern logwood central heating system.

Logwood-pellet combination boilers are ideal for those who have a lot of firewood but do not want to give up the convenience of an automatic heating system. Typically, there are two separate combustion chambers in one unit.

From Wood Stove to Combi-boiler

The **wood stove** is mostly used for visually pleasing additional heating, and keeps the house warm even during power outages or when oil or gas prices are unaffordable. The wood stove can be connected to the central heating system, relieving or replacing it. With the **cookstove**, cooking is the main focus, and it can also be connected to the central heating system.

The **tiled stove** has been a mainstay of alpine heating for 500 years, undergoing numerous technological advancements along the way. Modern tiled stoves can be combined with a variety of other heating systems, including pellet burners, heat pumps, and solar panels, to provide comprehensive heating for the entire house. **Log boilers** are a particularly popular choice in Austria, and modern controls and ignition devices have significantly enhanced their comfort. Combination boilers with pellet firing are also available, offering the benefits of automatic firing and firewood in one system.

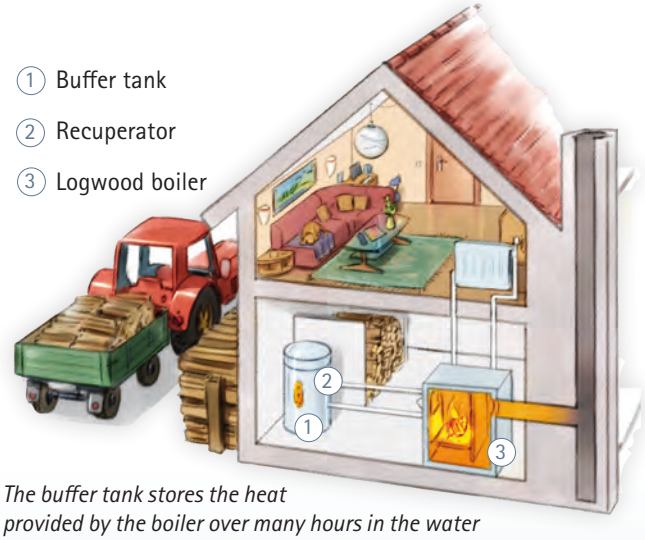
At the kitchen stove, you can cook and bake in a modern traditional way with the latest technology.

The tiled stove is the oldest and most popular form of heating with wood in Austria. Your stove setter will set it according to your wishes.

Wood-burning stoves are a classic choice among wood heating systems – it is not possible to heat cheaper.

A combination stove combines the crackling and radiant warmth of a log stove with the convenient operability of a pellet stove.

Clean Burning



The buffer tank stores the heat provided by the boiler over many hours in the water and continuously releases it into the heating system.

Wood-fired Boiler and Buffer Tank

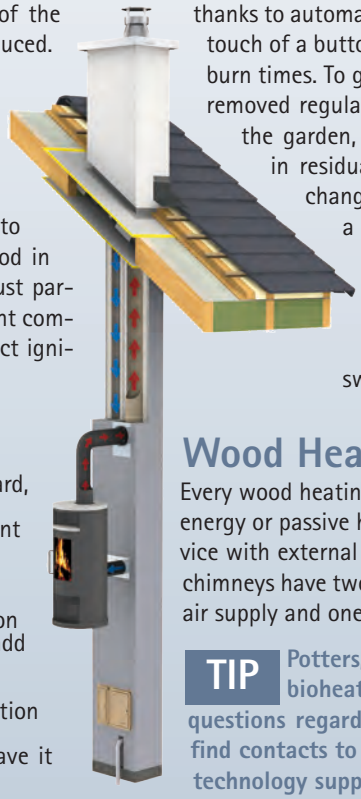
To ensure optimal combustion and superior burnout quality, manually loaded wood central heating systems should be operated at full load. This is ensured by the use of a sufficiently sized buffer tank. The heat-insulated steel tank is designed to store excess heat in water, providing a reliable means of heat storage. The stored energy can be utilised at a later time to heat living spaces or generate hot water, providing a convenient and reliable source of energy. This ensures that the entire wood load is burned with optimal efficiency.

Save Fuel and Particulate Matter

During almost all combustion processes, regardless of the fuel used (coal, oil, gas, wood), fine particles are produced. The primary source of these emissions is the so-called multi-fuel burner, an outdated design of logwood boilers. The replacement of old stoves and boilers with modern, electronically-controlled heating systems allows for a significant reduction in wood consumption, with fine particle emissions reduced by up to 90 %. It should be noted that the use of natural wood in wood stoves can result in the emission of harmful dust particles if the wood is too moist or if there is not sufficient combustion air. It is therefore evident that ensuring correct ignition and heating is of significant benefit to air quality.

Rules for Clean Heating

- ☐ Please refer to the instruction manual.
- ☐ Treated, coated, or painted wood, printed cardboard, and treated paper must not be put in the oven.
- ☐ Your wood heating system is not an incineration plant for waste.
- ☐ Only dry firewood is good firewood.
- ☐ Properly start a fire (igniting from the top).
- ☐ Consider reloading time, do not overfill the combustion chamber (Rule of thumb: Embers without flames - add more wood).
- ☐ Adjust the air supply according to the operating instructions, with automated combustion air regulation being the best option.
- ☐ Clean the firing system at regular intervals and have it maintained by a professional.



Lighting from the top for all systems with a top flue gas exit:
A) Stack firewood (max. 10 cm thick) on a clean grate, thicker at the bottom, thinner at the top. Place small logs and firelighters on top.
B) Open all air inlets on the stove completely and ignite the firelighters, then close the firebox door.
C) After a few minutes, bright, high flames should be burning – a good sign of sufficient air supply and optimal combustion.
D) Once the fuel is fully ignited, adjust the air regulators/sliders to the desired heat output level for burning wood at full load operation according to the operating instructions.

Properly Heating up

It is important to note that in many stoves, the wood pile should be ignited from the top to ensure effective combustion of gases. Additionally, logs should not be too large, as this can result in incomplete combustion. With proper installation, a wood stove will operate smoke-free within a few minutes. It is essential that the manufacturer or installer provides proper training for optimal operation.

Operation and Maintenance

Wood-fired boilers must be manually filled, usually once a day. Nevertheless, they continue to provide high levels of comfort thanks to automatic ignition and ash removal, cleaning at the touch of a button, and gasification technology for extended burn times. To guarantee optimal performance, ash must be removed regularly. Small amounts can be spread widely in the garden, but larger amounts should be disposed of in residual waste. It is advisable to clean heat exchangers on a regular basis in order to prevent a decrease in efficiency. It is recommended that modern boilers are checked annually by a qualified technician to prevent early component failure. It is essential to have the chimney cleaned regularly by a chimney sweep, as deposits can build up over time.

Wood Heating Requires a Chimney

Every wood heating system requires its own chimney. For low-energy or passive houses, a room-air-independent heating device with external combustion air supply is necessary. Modern chimneys have two passages for this purpose, one for the fresh air supply and one for the exhaust air (see figure on the left).

TIP **Potters, bioheat chimney sweeps and bioheat installers will assist you with all questions regarding heating with wood. You can find contacts to these experts as well as fuel and technology suppliers at: www.waermeausholz.at.**

Biowärme Installateur

Biowärme Rauchfangkehrer

Further Information

Manufacturers of Biomass Boilers and Stoves		Logwood boilers	Wood chip boilers	Pellet boilers	Space heaters	Large plants > 500 kW	Wood gas CHP
Agro Forst & Energietechnik GmbH	9470 St. Paul i. L.		•	•		•	•
Andritz AG	8074 Raaba-Grambach					•	
Austroflamm GmbH	4631 Krenglbach				•		
Bertsch Energy GmbH & Co KG	6700 Bludenz					•	
Binder Energietechnik GmbH	8572 Bärnbach		•	•		•	
Biotech Energietechnik GmbH	5303 Thalgau	•	•	•			•
Walter Bösch GmbH & Co KG	6890 Lustenau	•	•	•	•		
Burner Pioneers GmbH	3071 Böheimkirchen			•			
DUMAG GmbH	2352 Gumpoldskirchen					•	
ETA Heiztechnik GmbH	4716 Hofkirchen/Trattnach	•	•	•		•	
Fire Vision Austria GmbH	5325 Plainfeld	•		•	•		
Fröling Heizkessel- u. Behälterbau GesmbH	4710 Grieskirchen	•	•	•		•	•
Gast – Metallwaren GmbH & Co KG	4407 Steyr	•			•		
Glock ecotech GmbH	9112 Griffen						•
Guntamatic Heiztechnik GmbH	4722 Peuerbach	•	•	•		•	
Haas+Sohn Ofentechnik GmbH	5412 Puch bei Hallein			•	•		
Hallach GmbH	3040 Neulengbach				•		
Hargassner Ges mbH	4952 Weng	•	•	•		•	•
Hargassner Industry GmbH	4860 Lenzing					•	
HDG Bavaria GmbH	2871 Zöbern	•	•	•			
Herz Energietechnik GmbH	7423 Pinkafeld	•	•	•		•	•
Hoval Gesellschaft m.b.H.	4614 Marchtrenk			•			
HZA GmbH	5310 Mondsee		•	•		•	
Kesselbau Sutterlüty GmbH	6971 Hard a. Bodensee					•	
Kohlbach Energieanlagen GmbH	9400 Wolfsberg					•	
System Kurri – Marke der MSW GmbH	2700 Wiener Neustadt		•	•		•	
KWB Energiesysteme GmbH	8321 St. Margarethen/Raab	•	•	•			
Lohberger Heiz&Kochgeräte Technologie GmbH	5231 Schalchen	•			•		
Mawera Holzfeuerungsanlagen GmbH	6971 Hard a. Bodensee		•	•		•	
ÖkoFEN Forschungs- u. Entwicklungs GesmbH	4133 Niederkappel			•			
Olymp Werk GmbH	6430 Ötztal-Bahnhof	•	•	•	•		
Perhofer GmbH	8190 Birkfeld	•	•	•	•	•	
Pöllinger Heizungstechnik GmbH	3200 Ober-Grafendorf	•	•	•	•	•	
Polytechnik Luft- u. Feuerungstechnik GmbH	2564 Weissenbach		•	•		•	
RIKA Innovative Ofentechnik GmbH	4563 Micheldorf				•		
Santer Solarprofi GesmbH	6430 Ötztal Bahnhof	•	•	•			
Schmid energy solutions GmbH	8501 Lieboch	•	•	•		•	•
Solarfocus GmbH	4451 St. Ulrich/Steyr	•	•	•			
Sommatic Biowärme GmbH	5122 Hochburg-Ach	•	•	•			
Sommerauer SL-Technik GmbH	5120 St. Pantaleon		•	•			
Strebelwerk GmbH	2700 Wiener Neustadt	•	•	•	•	•	
SynCraft Engineering GmbH	6130 Schwaz						•
TM-Feuerungsanlagen GmbH	8271 Bad Waltersdorf		•			•	
Urbas Maschinenfabrik GesmbH	9100 Völkermarkt					•	•
VAS Energy Systems GmbH	5071 Wals-Siezenheim					•	
vee valuable ecological energy GmbH	6707 Bürserberg					•	•
Viessmann Gesellschaft m.b.H.	4641 Steinhaus bei Wels	•		•			
Windhager – Best Heating Technology GmbH	5201 Seekirchen/Wallersee	•	•	•			
WTI Wärmetechnische Industrieanlagen GmbH	3380 Pöchlarn					•	

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www.biomasseverband.at

Österreichisches Umweltzeichen Bildungseinrichtungen

Combating the Climate Crisis with Managed Forests