

Range of fuel types for wood and their characteristics

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proPellets Austria – an Industry Association

- » **Members:** 55 companies – the main actors of the Austrian pellet economy: pellet producers and traders, producers of pellet boilers and stoves, a.o.
- » **Aims:**
 1. A common representation outwards (Lobbying, PR)
 2. Communication and coordination within the sector
 3. Information platform for the sector
 4. Realisation of studies and market surveys
 5. International cooperation

The Typical 3 Ways of Heating with Wood

» Logwood

- Fireplace
- Stoves
- Boiler

» Wood Briquettes: an alternative to logwood

» Wood Chips

- Automatic Boilers for medium and bigger scales

» Pellets

- Stoves
- Domestic Boilers (8 – 50 kW)
- Commercial Boilers (50 kW – 1 MW)

Log Wood and its Characteristics

1 m³ spruce/fir.....1.330 kWh

1 m³ beech/oak.....1.870 kWh

water content < 20%

→ Drying for 2 years

Heating value.....3,7 kWh/kg

Ash content.....1 %



A fireplace brings atmosphere in your home

- a stylish furniture
- individual, expensive construction
- makes comfortable radiant heat
- a good place to warm
- saves the heat for many hours
- needs good dried beech or oak
log wood
- must be fired manually
- ash and wood in the living room
could be bothersome



A modern log wood boiler

- Logwood gasification boiler 20 – 70 kW
- Efficiency > 90%
- very clean combustion
- filled and fired manually
- a buffer store necessary
- Combination with solar thermal collectors recommended



Wood Briquettes

- » Have been a traditional way of upgrading sawmill wastes before pellets
- » Simple production process
- » Very dry, good burning properties
- » Can be an alternative to logwood for small stoves or fireplaces



Wood Chips and its Characteristics

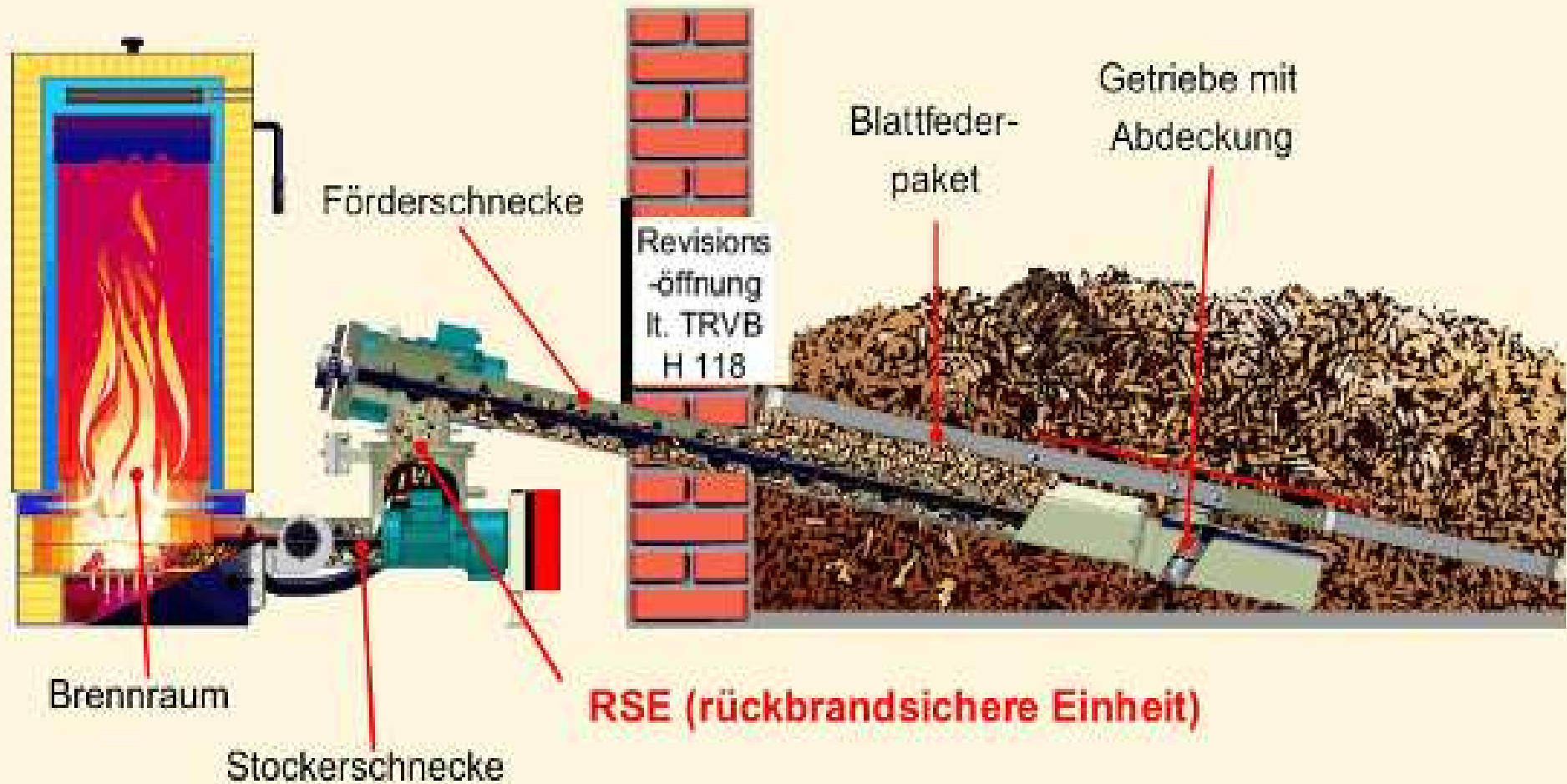
1 m³ spruce/fir..... 750 kWh
1 m³ beech/oak.....1.057 kWh

Water content usually between
20 and 30 %

Produced from sawmill residues or from
forestry wood



Wood chips boiler system



Pellets and its Characteristics

1 cubic metre3.267 kWh
1 ton.....4.900 kWh
1 ton.....1,5 m³

- High density
- Made from sawmill byproducts
- Delievered in bulk by tank trucks
or in bags (15 kg) on pallets
- Well-defined quality standards:
e.g. water content < 10%



Differences between Chips and Pellets

		Pellets	Chips	
Heating Value	per kg	4,7	3,7	kWh/kg
Heating Value	per m3	3077	750	kWh/m3
Water content		8%	25%	
Density		650	200	kg/m3
Ash content		0,50%	1%	

Advantages of Pellets

- » Pelletising is a simple and efficient process for the production of a standardised fuel
- » Pellets can be transported and stored easily
- » Pellets can be handled like a liquid fuel
- » Sawdust is dried, milled and pressed with high pressure (- 120 bar) through the boreholes of a die

The Pelletproduction

- » 2 pelletpresses produce 8 t woodpellets/hour
- » Energy usage for pelletising: about 2% of the energycontent of the pellets
- » Pelletising is a fully automatical process, which needs inspection by one person



The Core of the Pellet Press: the Die



Specifications of the Austrian Pellet Standard: ÖNorm M 7135

- » Only from untreated wood or bark
- » Diameter: 4-10 mm
- » Length: $< 5 \times D$,
max 20% $< 7,5 \times D$
- » Net calorific value: $> 18,0$ GJ/kg
- » Density $> 1,12$ kg/dm³
- » Water content $< 10,0\%$

- » Ash content $< 0,5\% - 0,8\%$
- » Abrasion max. 2,3%
- » pressing aids: $< 2\%$
- » Sulphur $< 0,04 \%$
- » Nitrogen $< 0,3 \%$
- » Chlorine $< 0,02 \%$

Pellet Stoves

- » filled with bagged pellets
- » Electric ignition
- » fully automatic operation, 90% efficient
- » Ash removal every 2 weeks
- » Predominant markets: Italy, USA, countries with mild climate
- » As additional heating to existing heating systems



Pellet stoves operating as central heating systems

- » Stove for central heating and hot water preparation
- » Power up to 12 kW
- » Automatic pellet feeding from bulk storage possible



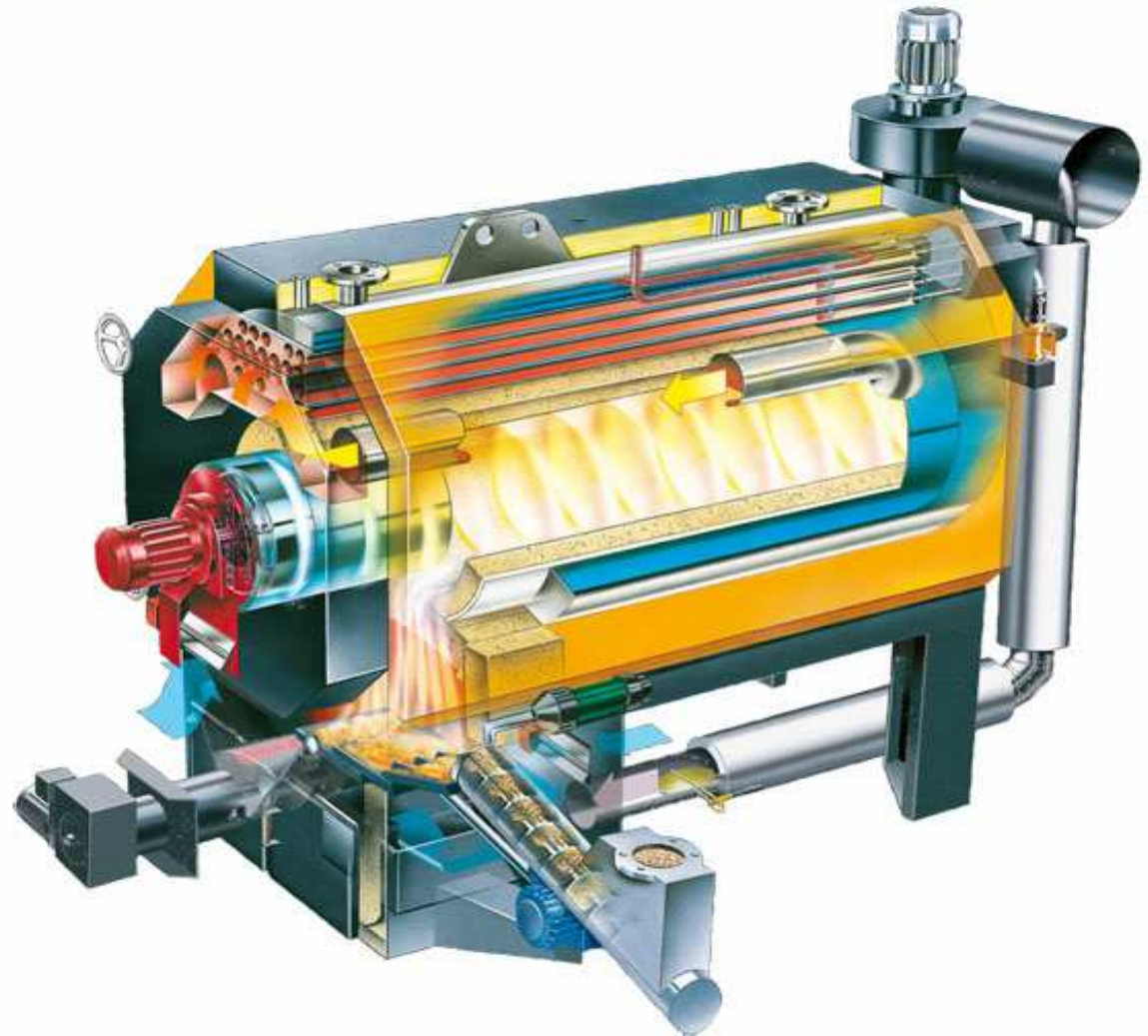
Pellet furnaces for domestic heating in single family houses

- » automatic feeding,
ignition and ash removal
- » > 90% efficiency
- » very low emissions



A medium scale boiler

- 90 – 480 kW
- heats both:
dry wood chips
AND pellets
- high efficient
- low emissions



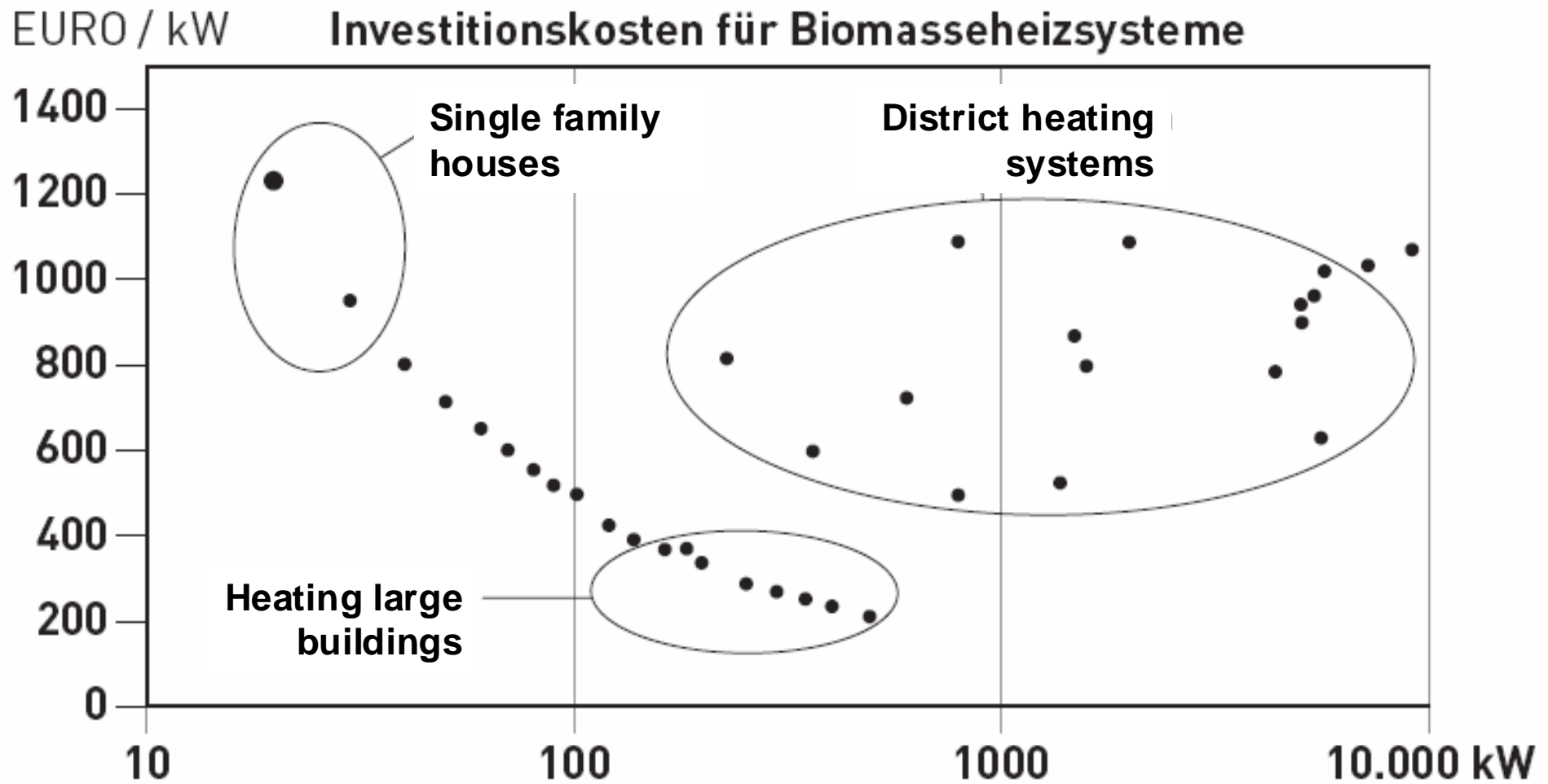
Use of Wood Fuel in District Heating

- » In Austria more than 1.000 villages are heated with district heating from wood chips
- » Important for economic success: high density of heat demand (short heating pipelines)
- » Technical quality of district heating system is critical

Heating of large Buildings or Businesses

- » Particularly attractive, very short payback period with current oil prices
- » Planning, investment and operation of the biomass boiler can be offered by contractors; consumers just pay for the heat
- » Medium scale boilers (50 kW – 1 MW) can heat both: wood chips and pellets

Specific investment costs of biomass heating systems



Quelle: Steirische Landwirtschaftskammer 1998, E.V.A. 1999

2 Examples from Austria

Hubelmatt: 2004;

about 40 houses connected with a micro network are heated by a 400 kW pellet boiler.

Annual energy demand:
650 – 700 MWh (without warm water) –
150 -180 tons of pellets



Castle Frauenthal: (including a school, Styria) **2006**;
2.000 m² living space;
300 kW for wood chips



The cost for the different types of wood in Austria

Energy costs for wood

	€	unit	kWh/ unit	Cent/ kWh	
Log wood	75,0	m ³	1 870	4,01	beech/oak
Wood chips	22,0	m ³	750	2,93	30% water
Pellets	180,0	ton	4 900	3,67	Önorm M 7 135

Balance I: Pros and Cons **Logwood**

- » Fireplaces bring atmosphere in living rooms
- » Local availability
- » Even for boilers no automatical operation
- » Laborious handling
- » High ash accumulation
- » Costintensive (in case of buying the logwood)

Balance II: Pros and Cons **Wood Chips**

- » Local available
- » Only for boilers
- » Competitive and economic energy source
- » Higher investments for boilers
- » Bigger storage room
- » No constant quality available
- » Higher ash accumulation

Balance III: Pros and Cons **Wood Pellets**

- » For stoves and boilers in all sizes
- » Automatical ignition and operation
- » Constant and defined quality
- » Comfortable handling: transport and storage filling
- » Small storages

Thank you for your attention !

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