

Comparing different wood fuels – which types of wood fuels fit to which heat markets?

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What types of wood fuels are used for heating ?

- » **Logwood:** for traditional heating, also with modern logwood gasification boilers
- » **Wood briquettes:** for traditional stove heating
- » **Woodchips:** for automatic heating of wood,
50 kW – 10.000 kW: commercial heating, district heating
- » **Wood pellets:** for automatic heating of wood for residential heating, commercial heating
5 kW – 1000 kW

Logwood: for residential use

- » Established and well known technique
- » Low cost
- » BUT: low efficiency in conventional heating stoves!
- » High emissions of smoke
- » SOLUTION: efficient modern boilers and stoves



Wood Briquettes

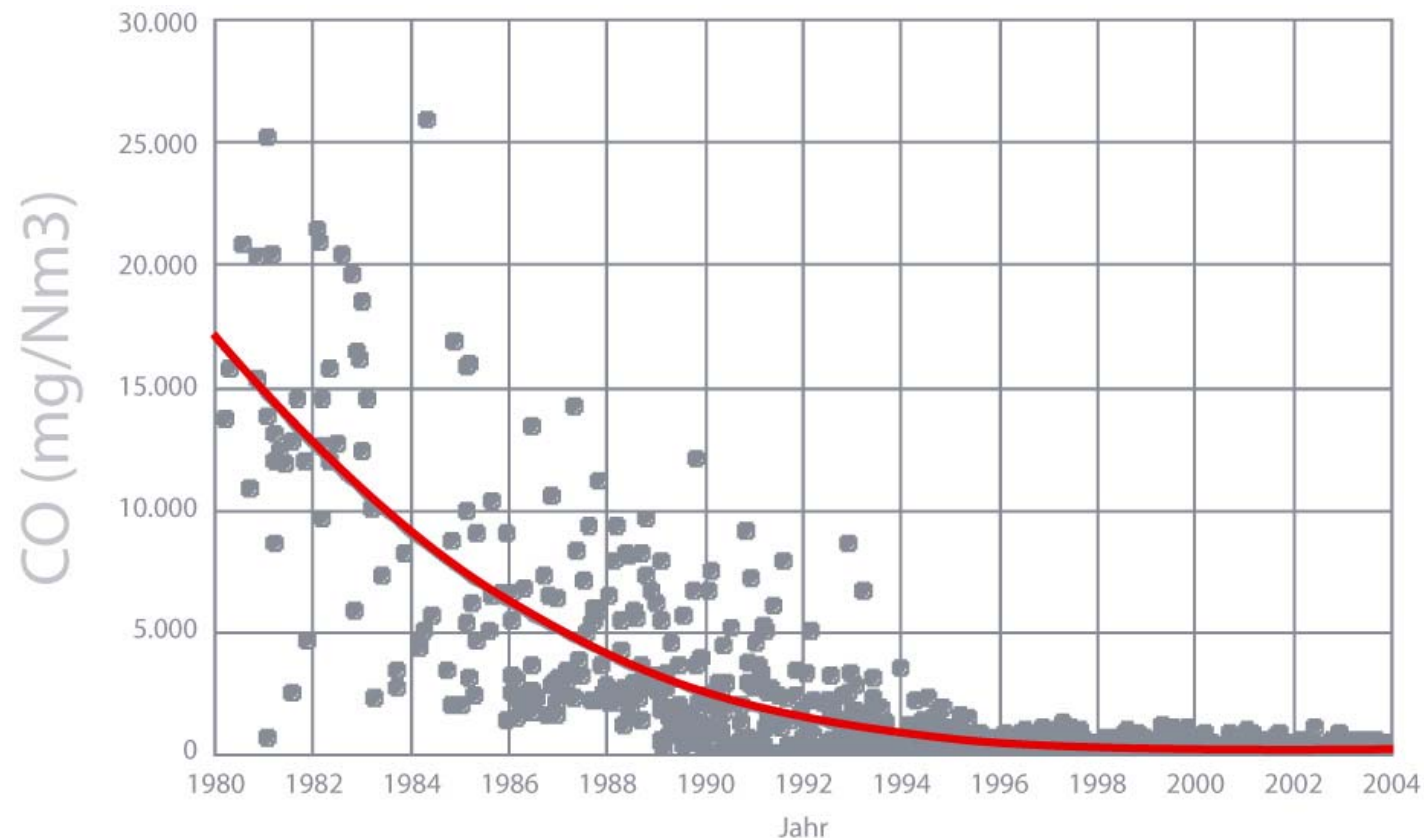
- » Have been a traditional way of upgrading sawmill wastes before pellets
- » Simple production process
- » Very dry, good burning properties
- » Can be an alternative to logwood for small stoves or fireplaces



Modern Logwood heating systems

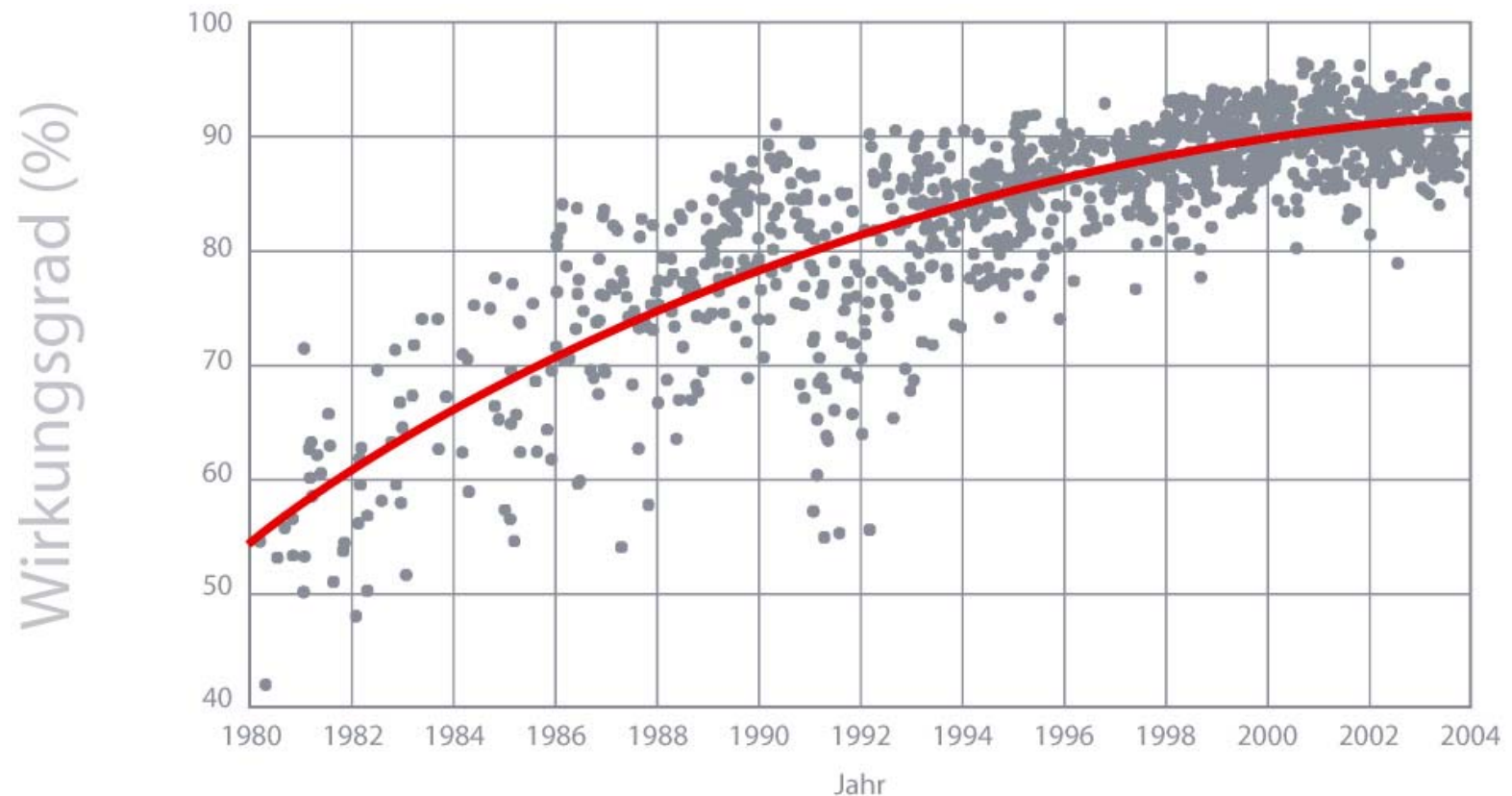
- » **Logwood gasification boiler:** 20 - 70 kW
- » Efficiency > 90%
- » Very clean combustion
- » Producers: Fröling, Köb, Herz, Windhager, Hoval ...
- » **High Efficiency wood stoves:** e.g. Tiled stove
- » Contact: Österr. Kachelofenverband:
www.kachelofenverband.at

Improvement of combustion by technology development in Austria – emission reduction



Entwicklung der Emissionen von österreichischen Holzfeuerungen, gemessen an der Bundesanstalt für Landtechnik Wieselburg (BLT), 2005

**Average efficiency of wood boilers increased
from 50% in 1980 to 92% in 2004**



Wirkungsgrad von österreichischen Holzfeuerungen gemessen an der Bundesanstalt für Landtechnik
Wieselburg (BLT), 2005

Wood chips

- » From sawmill residues or from forestry wood
- » Can be used in automatic boilers
- » Very low cost fuel
- » no consistent quality: varying humidity & wood quality
- » Low density



Where can wood chips be used

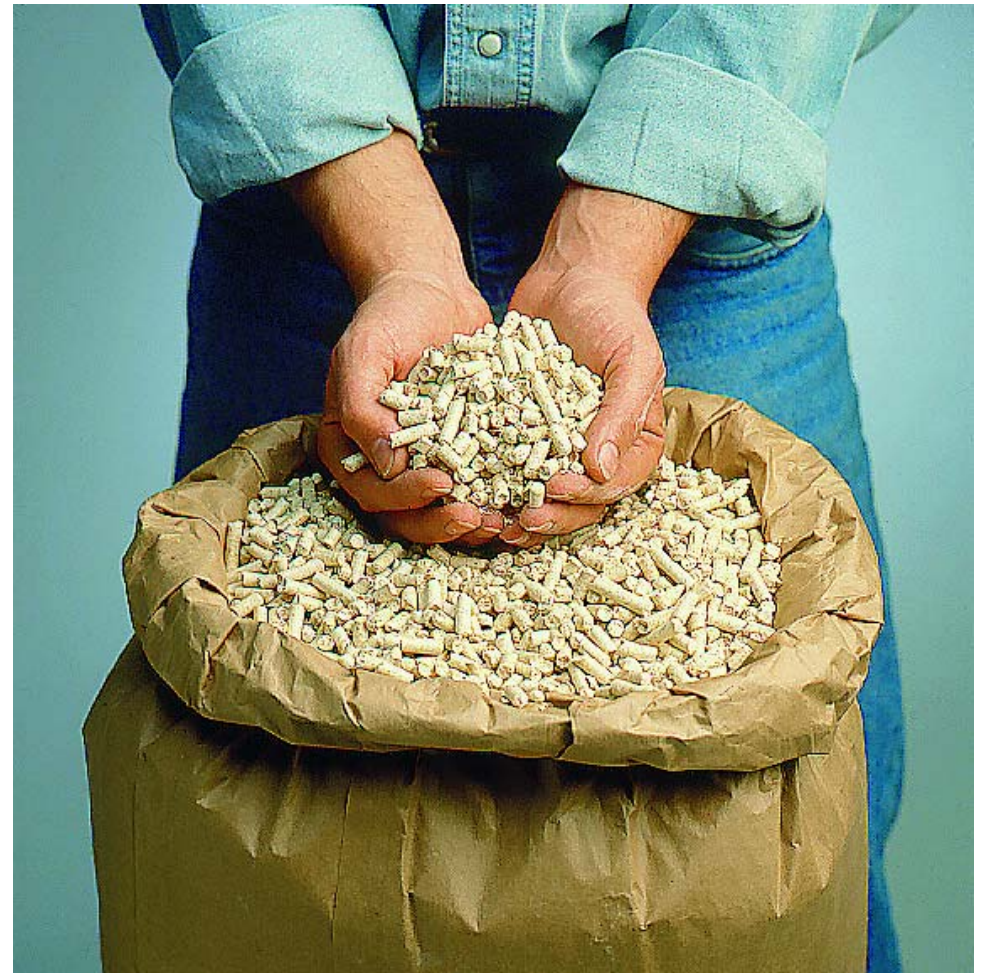
- » In large boilers constructed for high humidity fuel
- » Commercial use in sawmills for heat production
- » Use in small to medium scale district heating (500kW-20 MW) in Austria (>1000 projects!)
- » Possible for smaller residential projects (100-500 kW). www.regionalenergie.at
- » For Farm heating

Preconditions for wood chip use in smaller units

- » Quality control of chips (humidity, size !)
- » Heat plant operation by fuel supplier
- » Large storage space or closeby suppliers

Wood pellets

- » Made from sawmill byproducts
- » High density
- » Clearly defined quality
- » Can be used in small scale and medium scale heating



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%	

Key advantages of pellets

»» High energy density

- Easy transport
- Small storage volumes

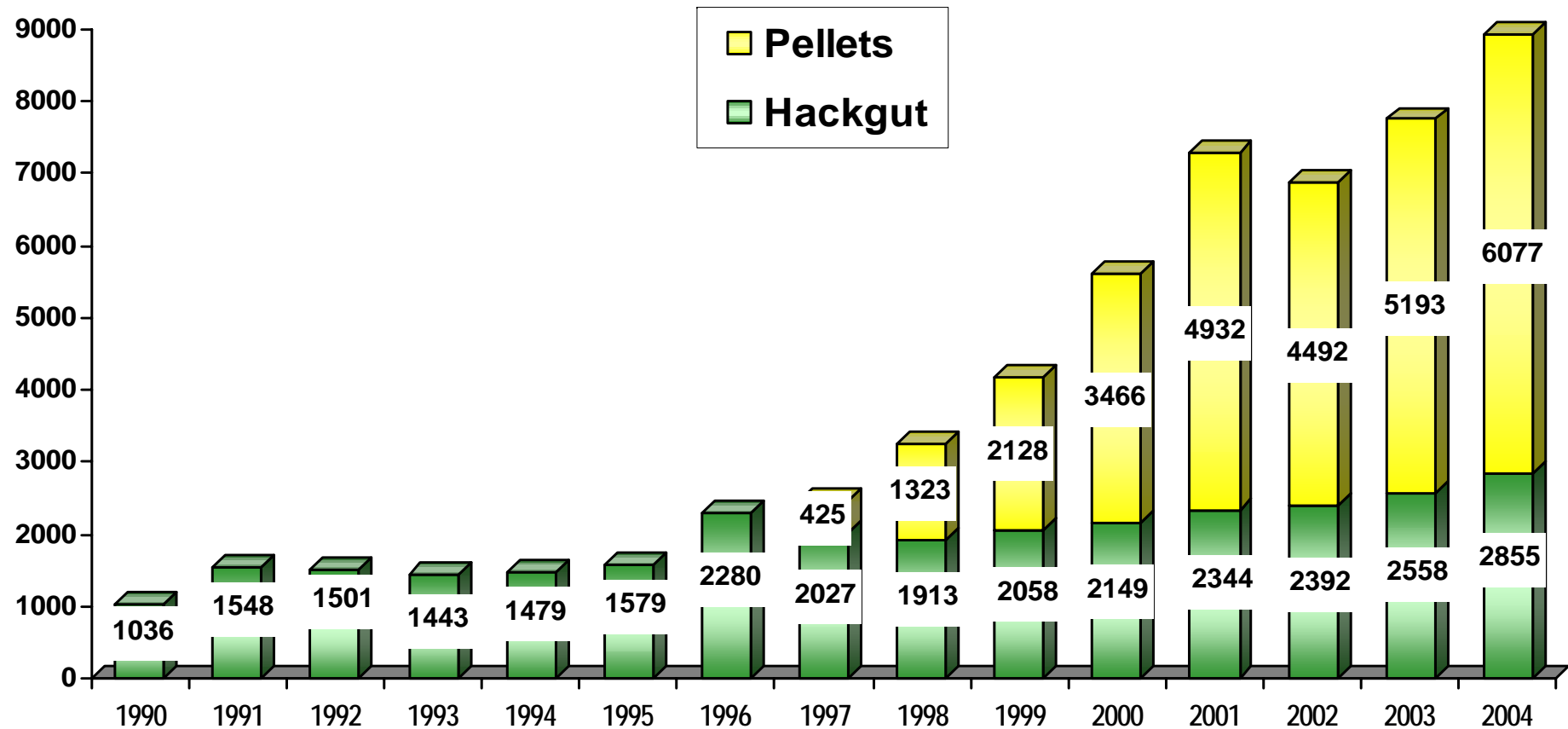
»» Homogenous quality: high operating security

»» Can be used in households

»» Very clean fuel (handling, combustion)

Anually installed pellet and chips boilers <100 kW

Zuwachs an Heizanlagen pro Jahr



Source: NOE Landeslandwirtschaftskammer 2005

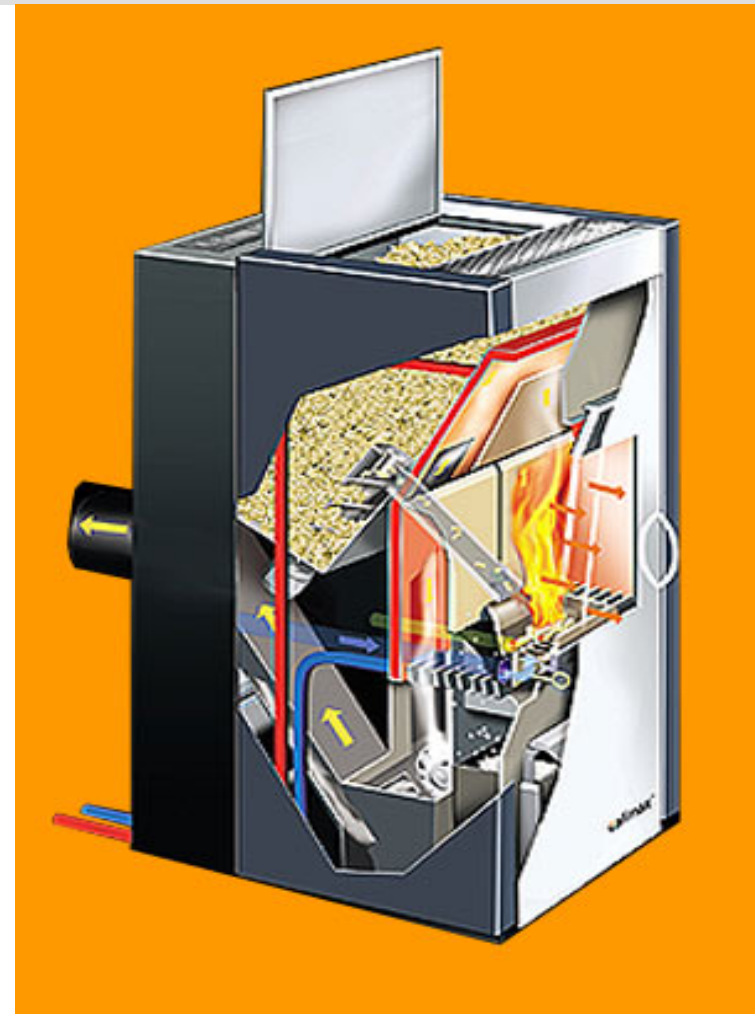
Pellet Stoves

- » filled with bagged pellets
- » Electric ignition
- » fully automatic operation, 90% efficient
- » Ash removal every 2 weeks
- » Costs > 1500€
- » Also as central heating device



Pellet stove with central heating function

- » Heat exchanger for water
- » approx. 12 kW
- » For central heating and hot water preparation
- » Best combined with solar
- » Stands in the living room
- » Costs approx. 5.000,- €



Pellet boilers for domestic heating in single family houses

- » 10 - 30 kW
- » automatic feeding, ignition and ash removal
- » > 90% efficiency
- » very low emissions
- » Investment: approx. 10.000 €



Pelletburner: for existing oil boilers



Low cost: > 3.000,-€

Disadvantage: frequent manual cleaning, lower efficiency

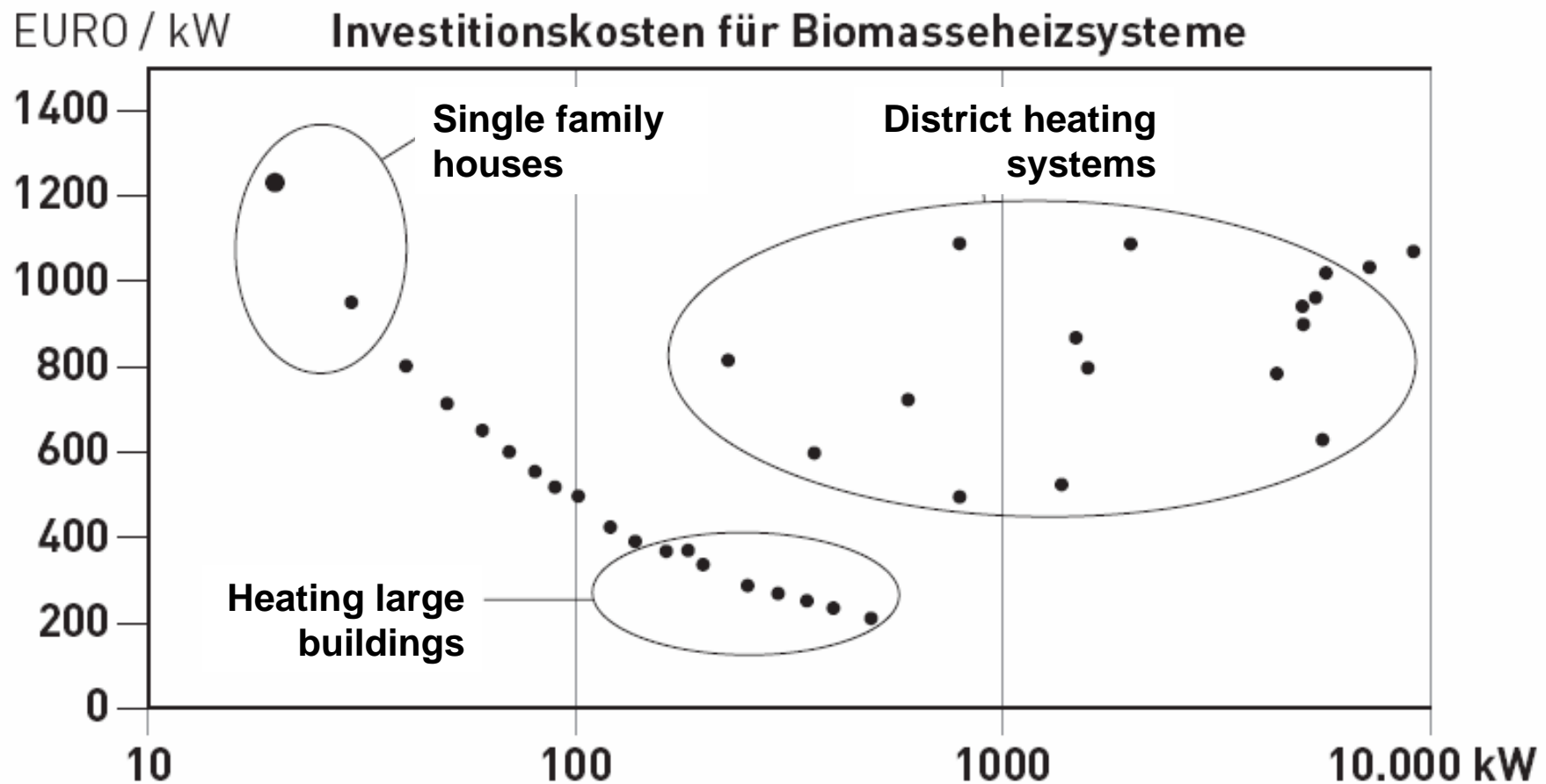


Fully integrated renewable energy system: Energy Cabin

- » pellet boiler & storage
- » flat plate solar collector
- » Storage tank for hot water
- » For individual houses, groups of houses or large buildings
- » All integrated in a container
- » www.energycabin.com



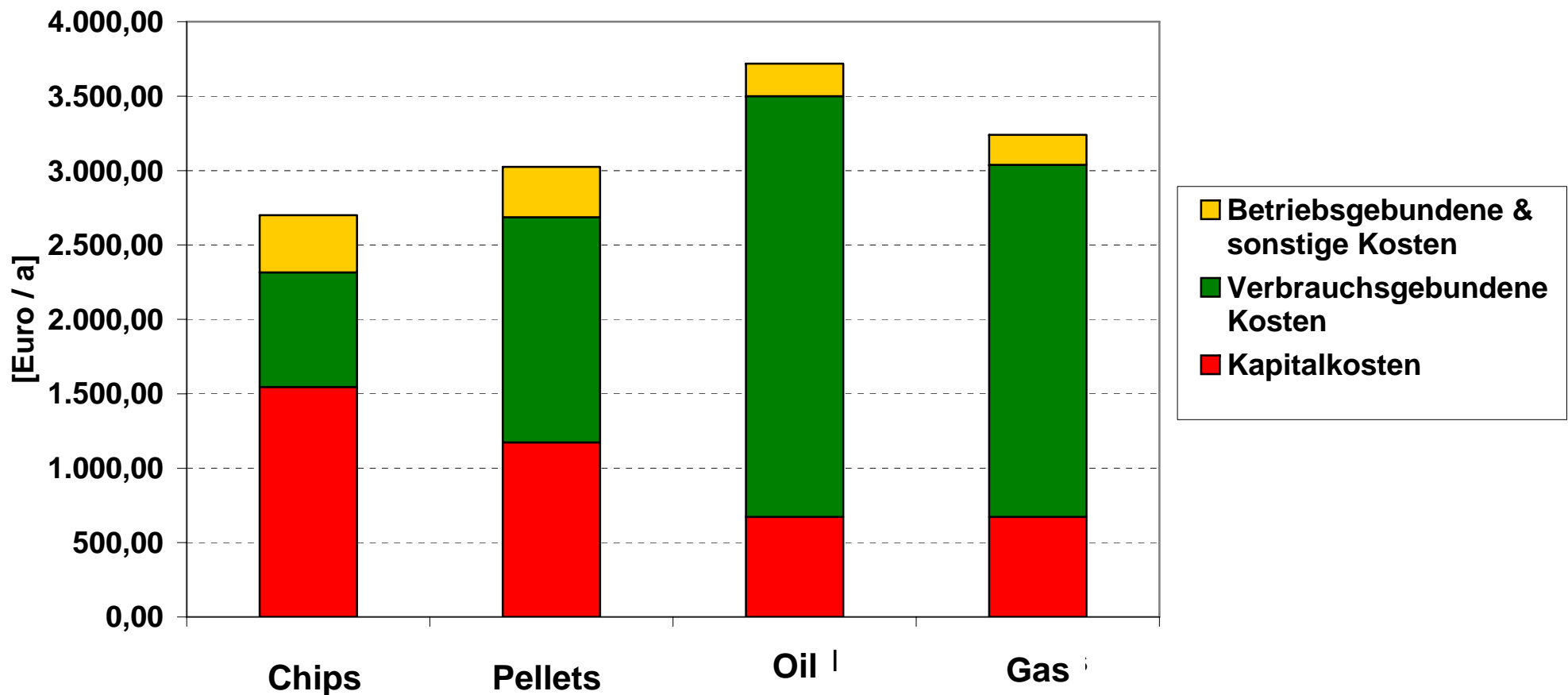
Specific investment costs of biomass heating systems



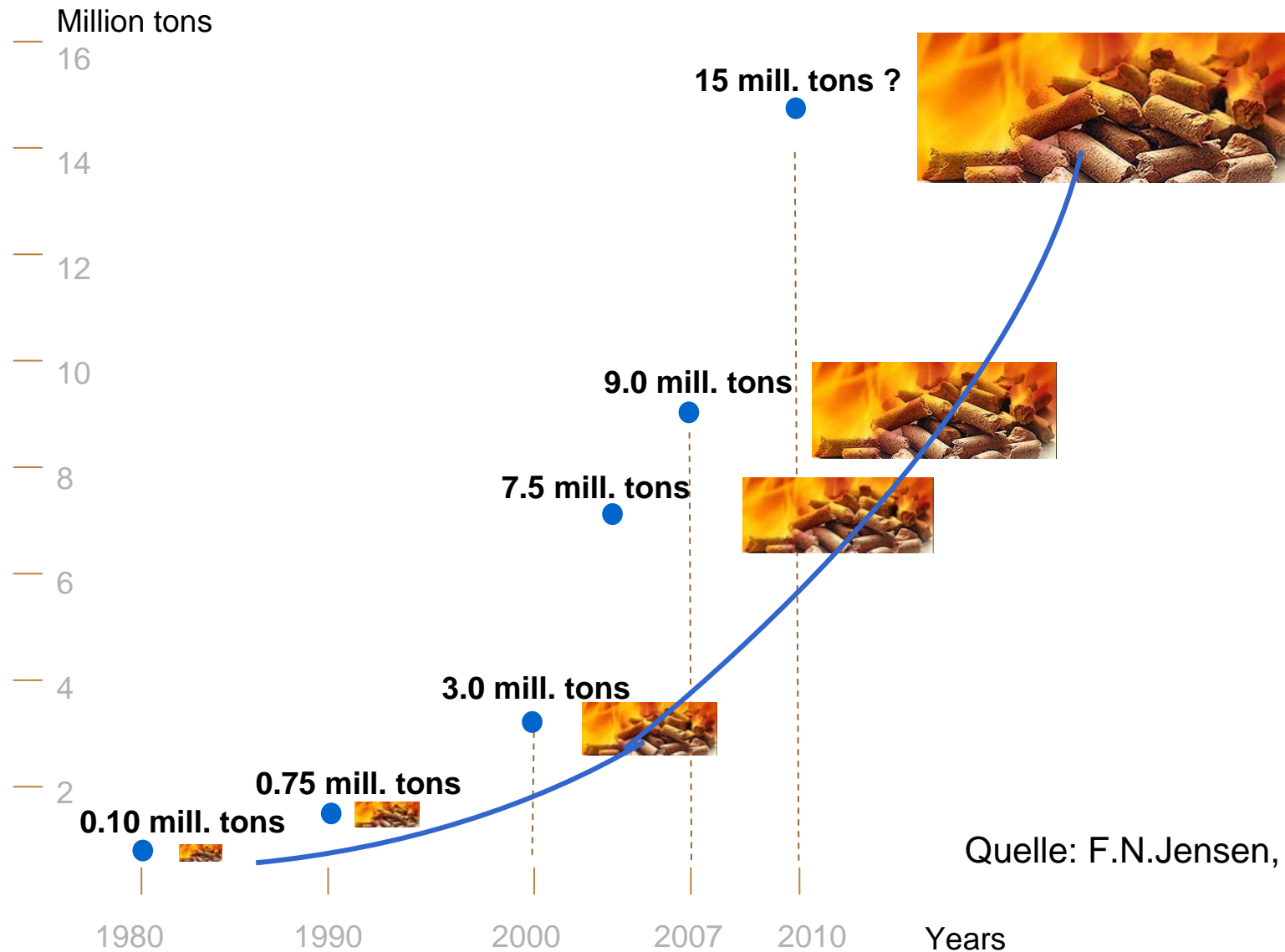
Quelle: Steirische Landwirtschaftskammer 1998, E.V.A. 1999

**Full cost comparison of heating a single family house
with chips, pellets, oil and Gas (current fuel prices)**

Annual Costs



Development of worldwide pelletproduction



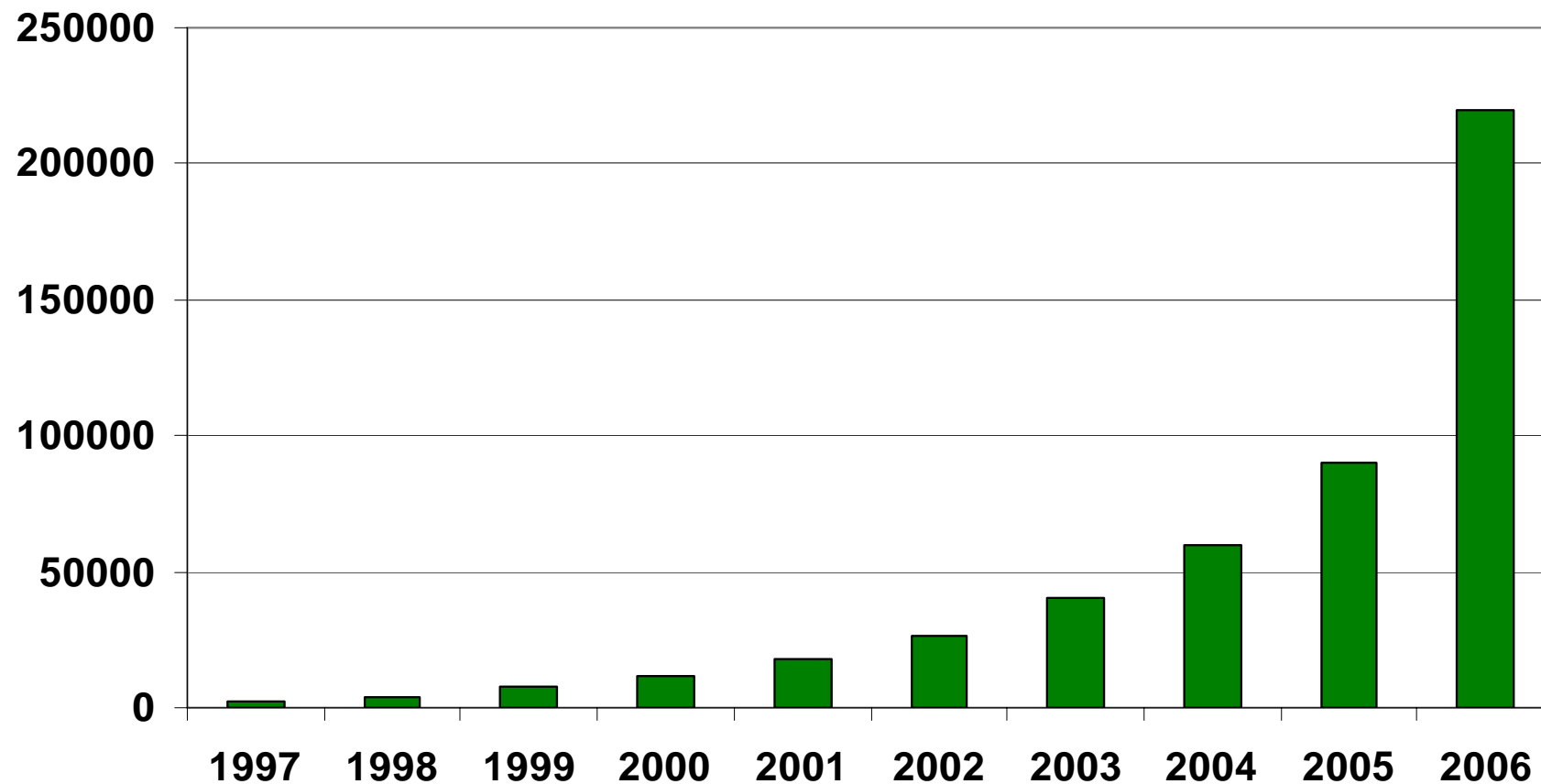
Europe is the centre of global pellet production

» **Global production
2006: 8,3 Mio.
Tonnen**

» **European
production 2006:
6,3 Mio. Tons**



**Pellet use can grow very quickly:
sales of pellet stoves in Italy**



Outlook

- » Global oil production is starting to decline**
- » Wood fuels are a very important opportunity to substitute oil**
- » Austria has technology and experiences for efficient use of wood fuels**
- » We are happy to cooperate with you!**

Thank you for your attention

Wir sind
pro»pellets