

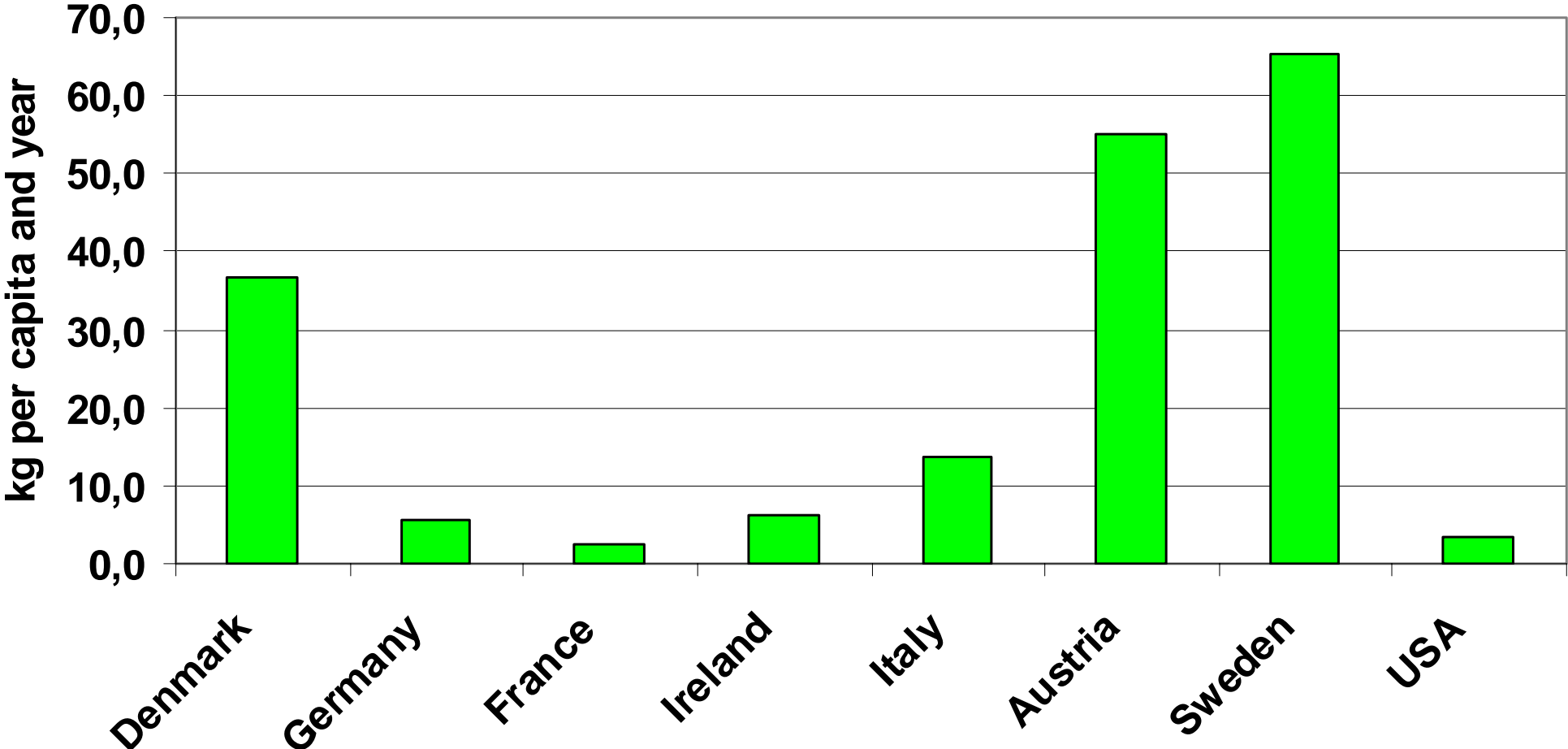
Current developments & potential of pellets from a European perspective

Christian Rakos, proPellets Austria

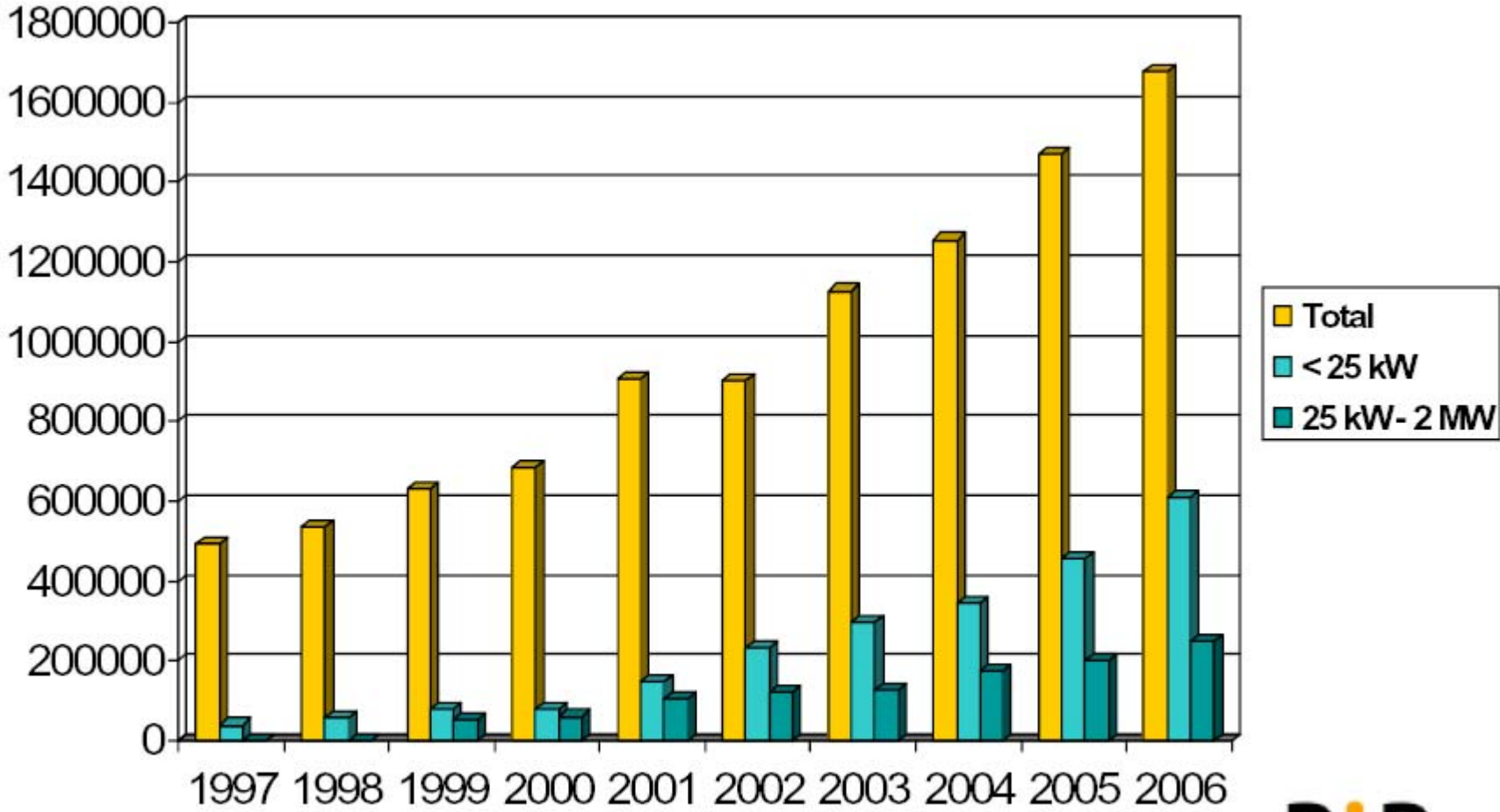
3 focal points of pellet market development (heat)

- » Sweden, Denmark: large scale use & pellet burner strategy
- » Austria: pellet boilers
- » Italy: pellet stoves

**per capita use of pellets as fuel
for residential heating**



Pellet sales in Sweden (t)



Most commonly used in Sweden: pellet burners

- » Used to retrofit for existing oil boilers
- » Wide range of power
- » Low cost
- » Lower efficiency
- » High maintenance requirement



Austria: dedicated pellet boilers

- » automatic fuel feeding, ignition and cleaning of heat exchangers
- » Ash removal 1-4 times per heating season
- » > 90% efficiency & extremely low emissions

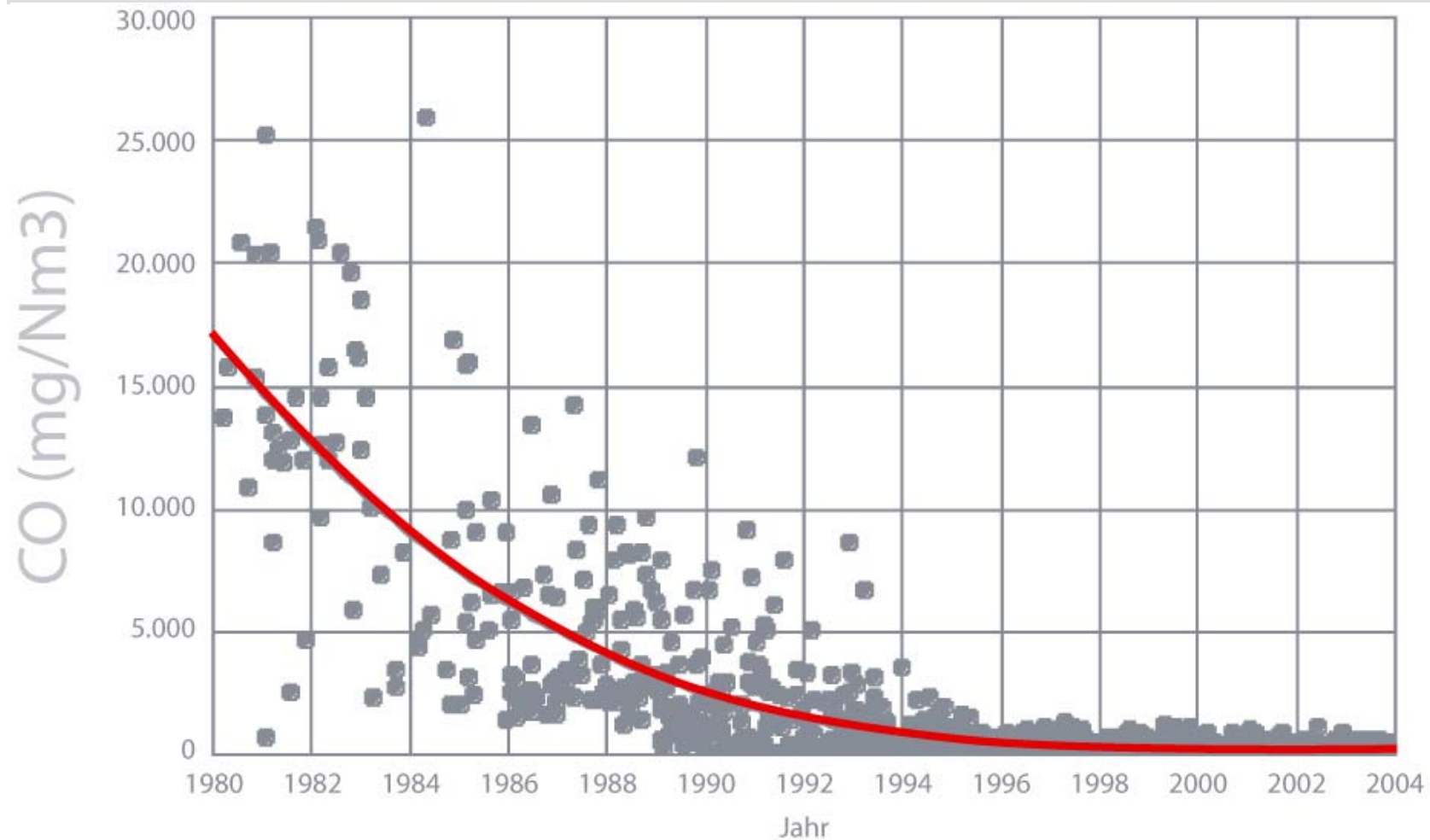


State of the art pellet stove / boiler

- » Hot water for central heating & tap water
- » Automatic cleaning of heat exchangers
- » Automatic ash densification
- » Automatic fuel feed from bulk storage
- » 94% efficiency,

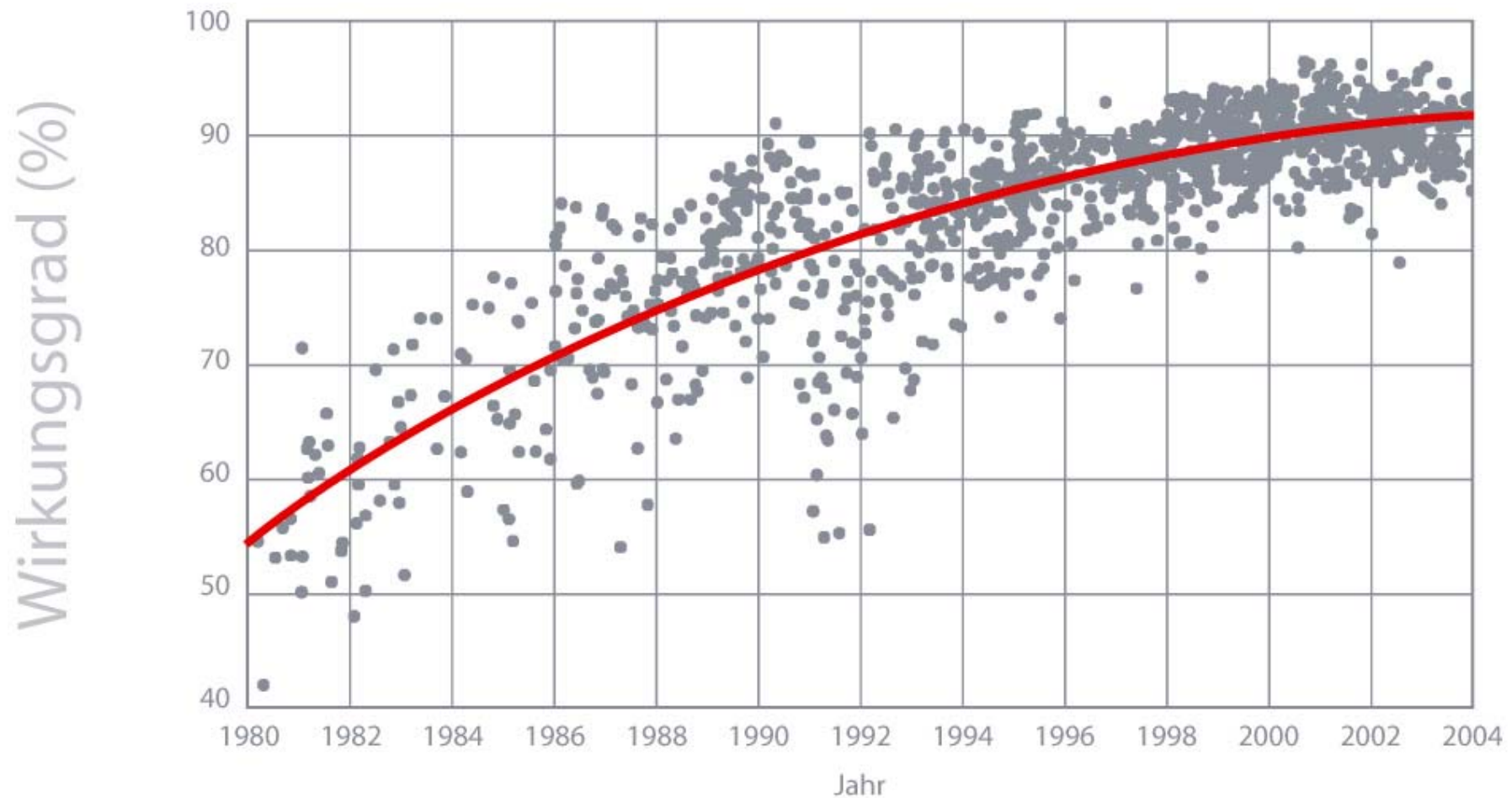


30 years of wood combustion research – the results



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 93% in 2004



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

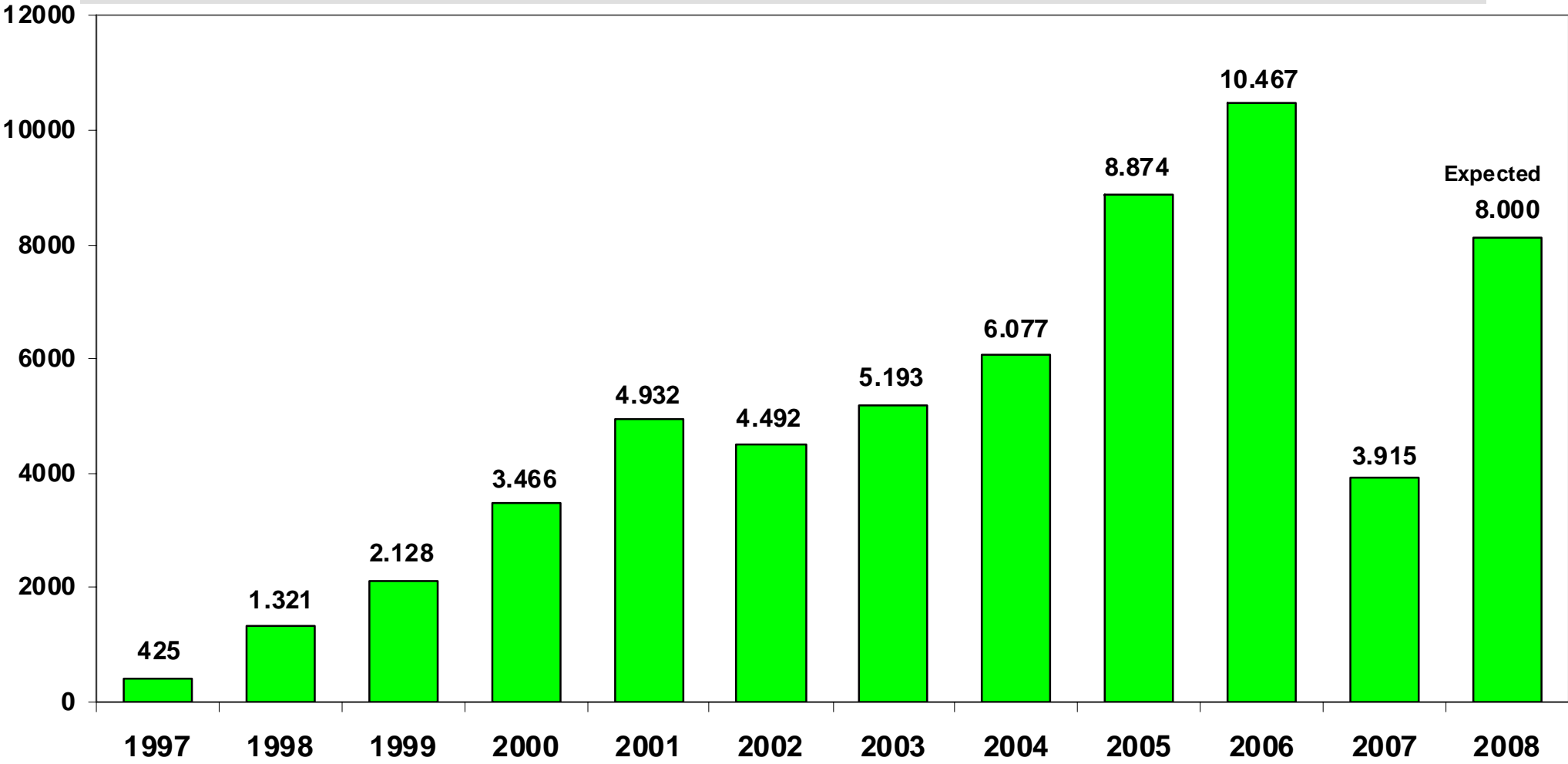
**Pellet boilers work like oil boilers:
automatic fuel feeding from storage**



Bulk pellet delivery with trucks – pellets are blown into the storage



Annually installed residential pellet boilers in Austria



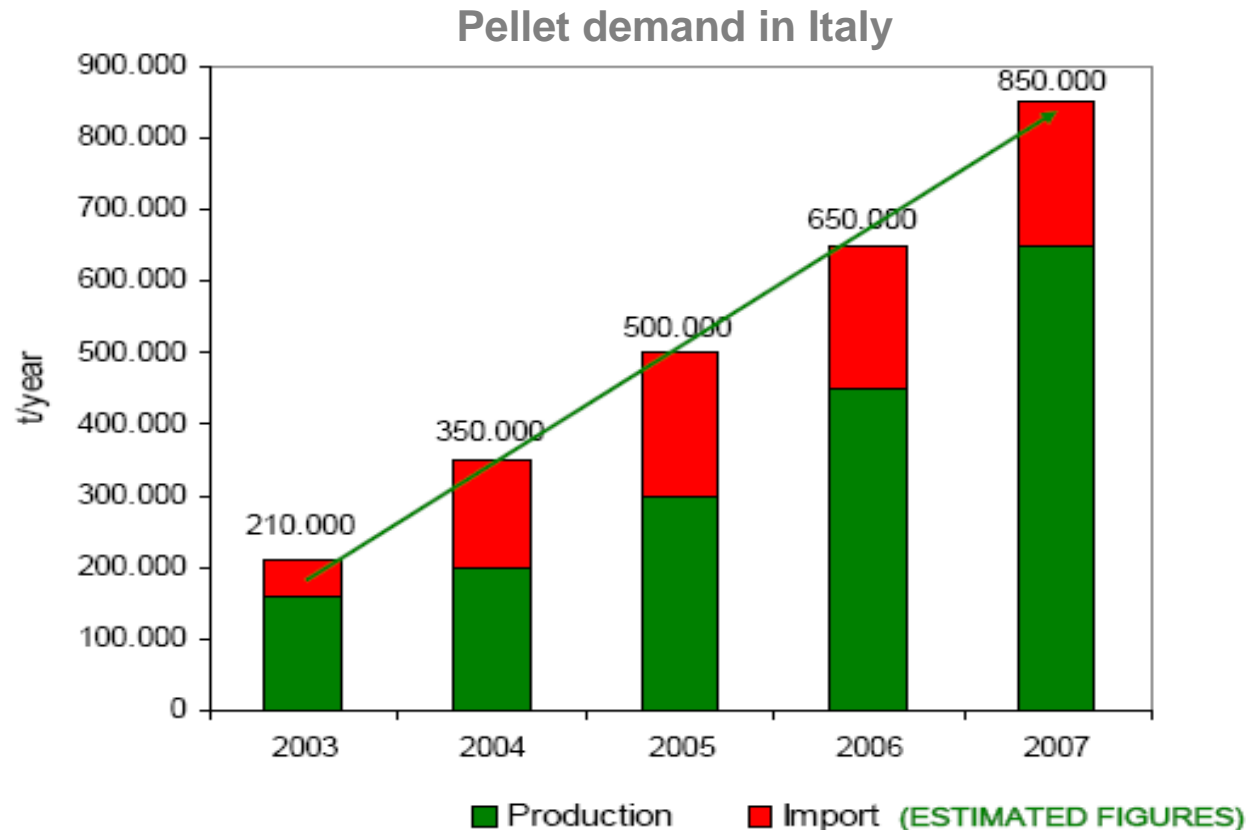
Quelle: proPellets Austria, Mai 2008

**Strongly growing in Austria:
commercial use of pellets as fuel**



- » Container solutions including boiler, fuel storage & solar
- » 50 - 600 KW
- » Easy & fast installation
- » Leasing contracts
- » www.energycabin.com

Italy: a dynamic pellet stove market



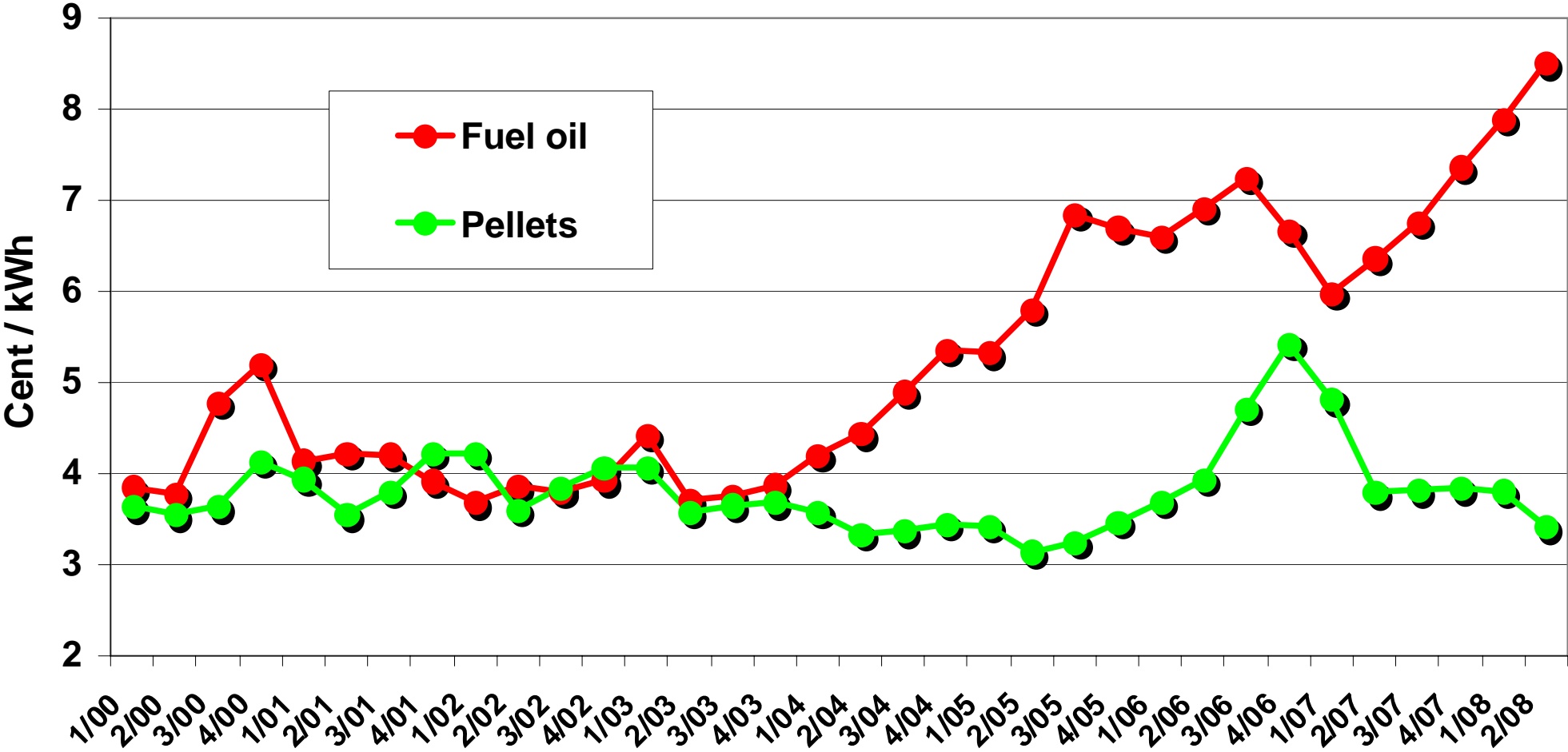
2003 - 2007
INCREASE OVER
300%

Pellet Producers
Rise from 37 to 87
(+ 135%)
heterogeneous for
production and size

Source: Annalisa Paniz, AIEL, 2008

Pellet stove sales 2006: 270.000 units !

Pellet and heating oil prices (cent / kWh) in Austria



Source: proPellets Austria, IWO; May 7th, 2008

Pellet standards in Europe

- » ONORM M7135: most influential standard for residential heating
- » DIN, DIN plus: similar
- » Various quality brands: e.g. „pellet gold“ have similar requirements
- » EU standards will be established briefly based on the ONORM specifications

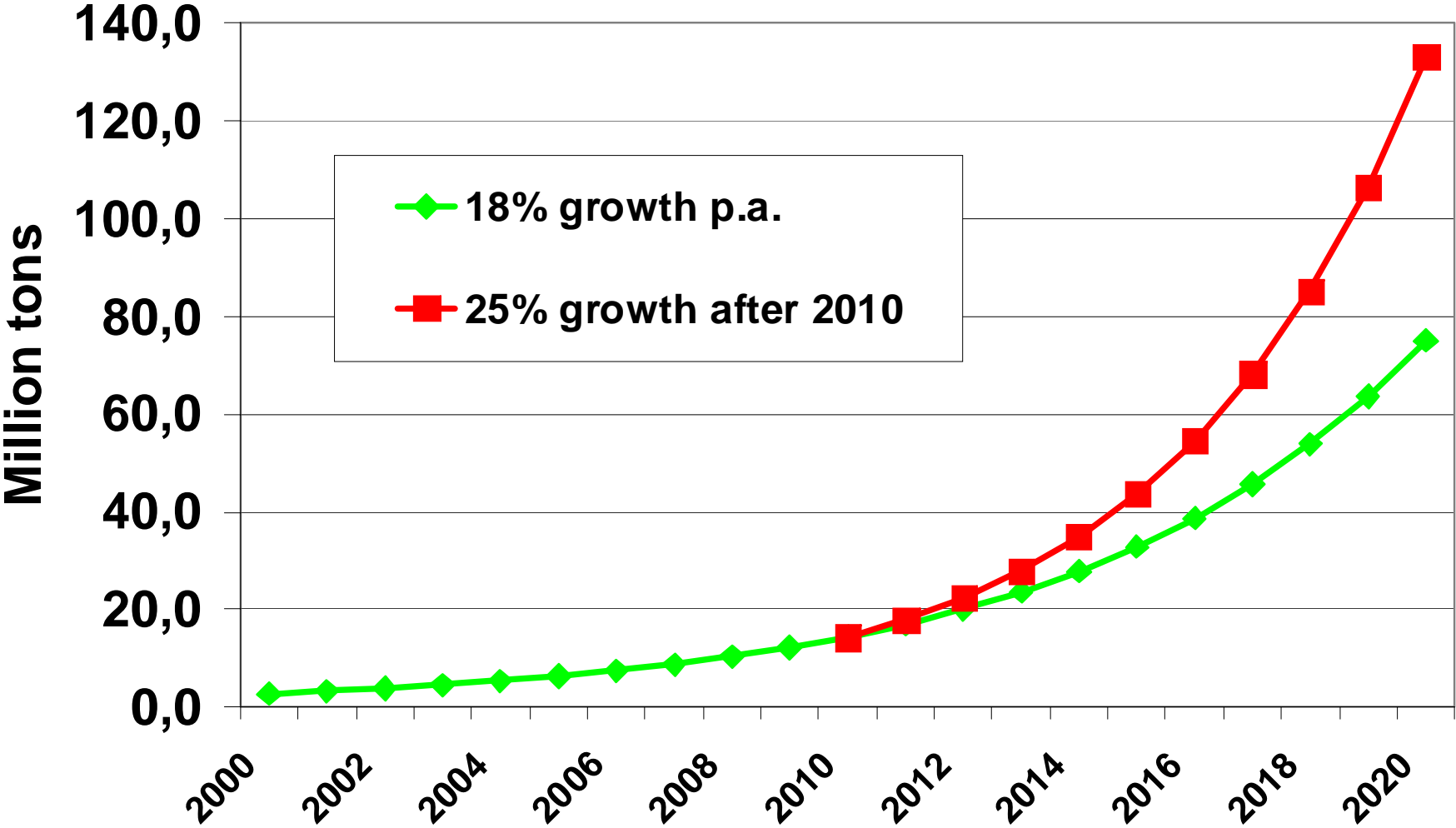
Specifications of ONORM M 7135

- » 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 $< 0,02 \%$

Most recent trends in Europe

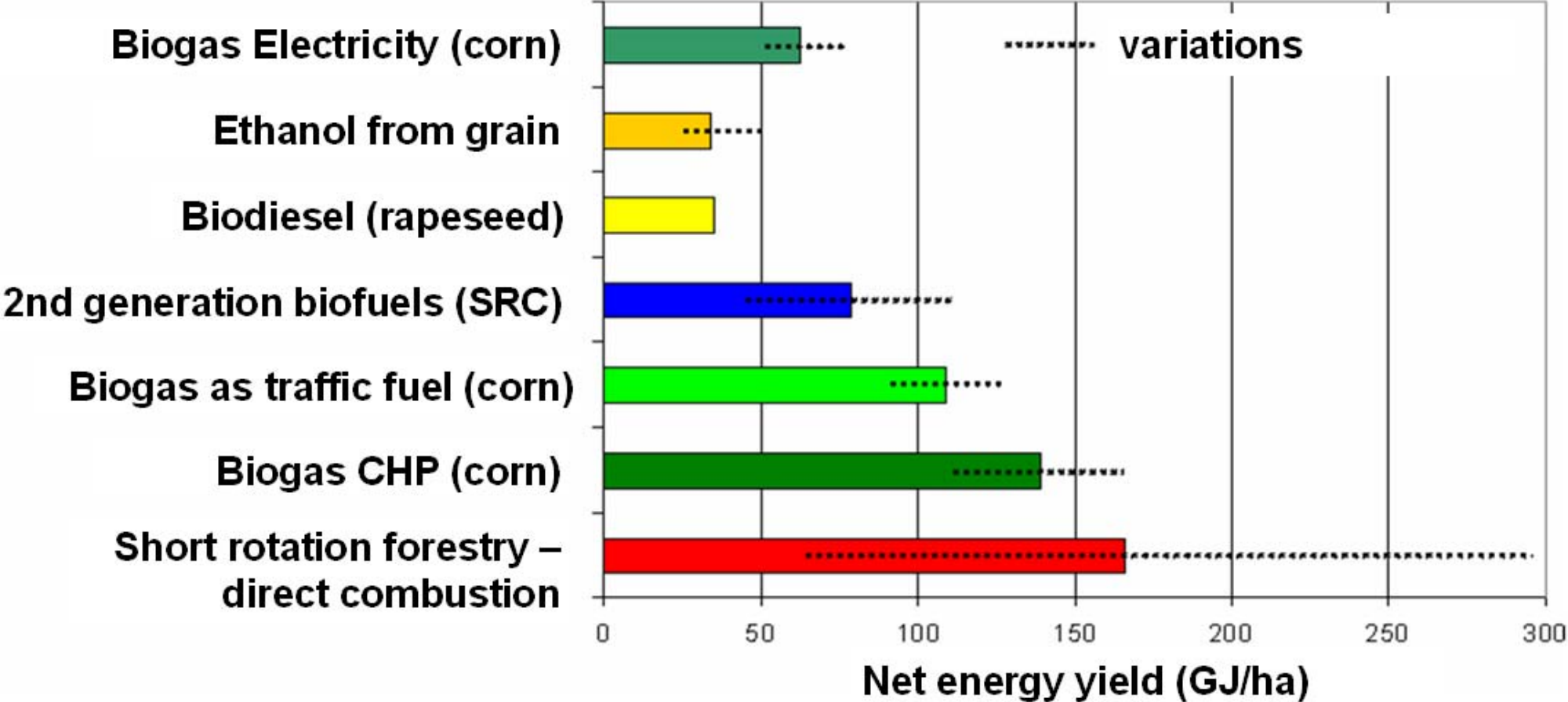
- » Investors and large scale fossil fuel companies are entering the pellet market
- » Very strong increase in production volumes
- » Very strong demand increase from power plants
- » Heating market startup in many countries
- » Booming heating market expected

Szenarios for global pellet production



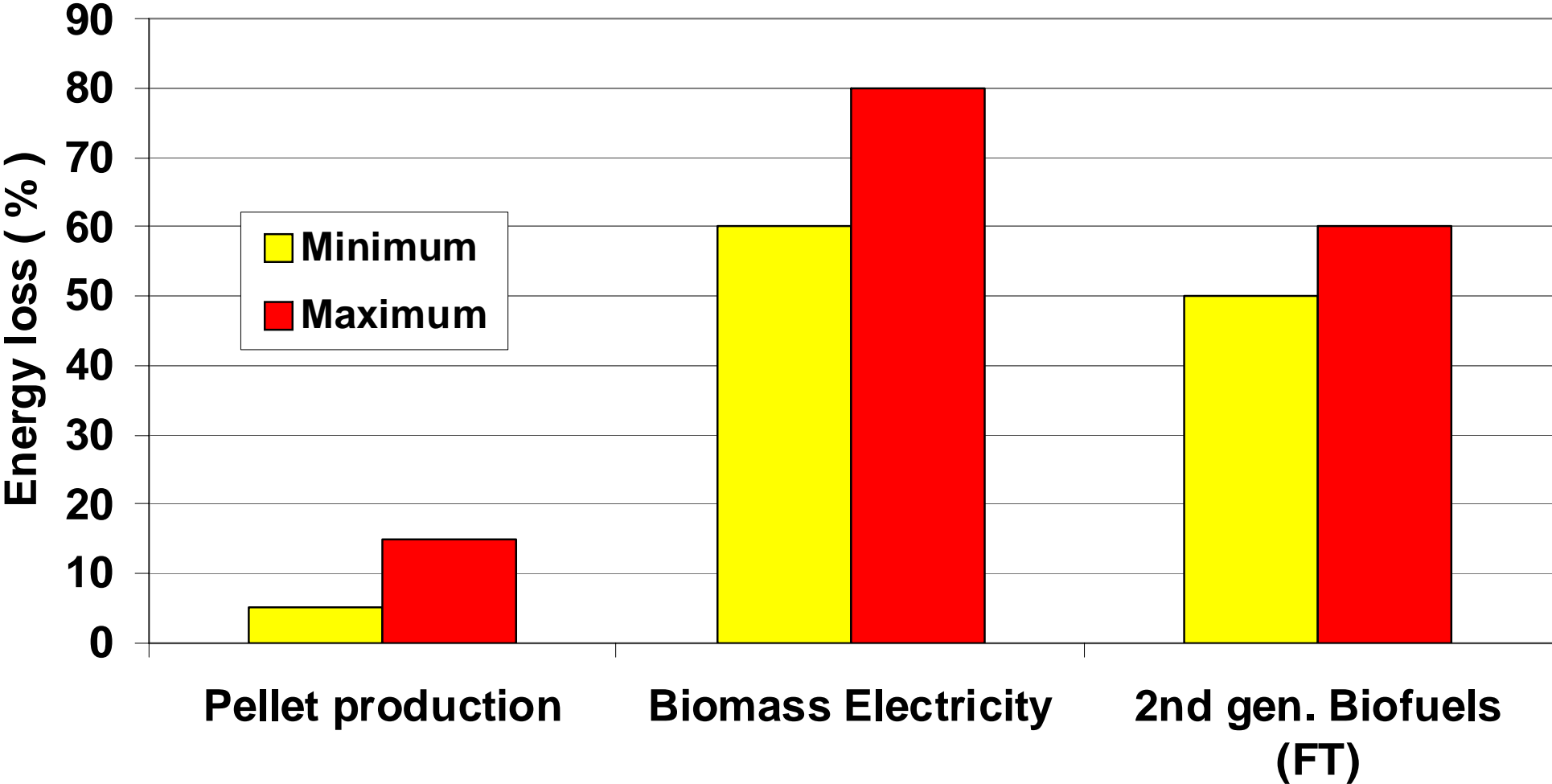
Why will pellets be the most common way to use biomass for energy?

Net energy yield for different biomass utilisation pathways

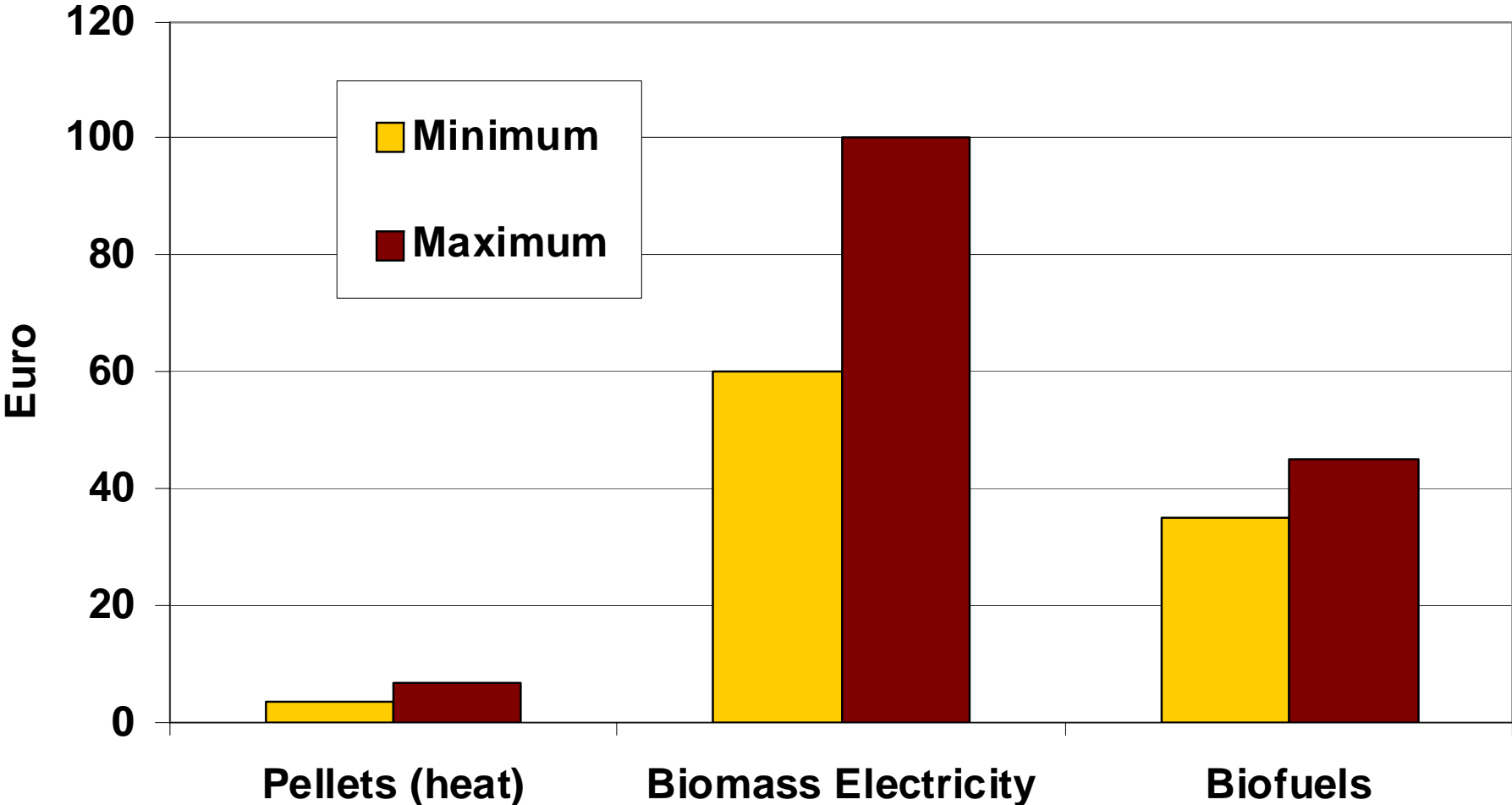


Source: German Expert Panel for Environmental Issues 2007

Energy loss of different conversion technologies for woody biomass



Subsidy requirement per MWh of energy



Policy framework

- » energy crisis ahead
- » full scale policy support will become available
- » **IF we communicate the potential of pellets to policy makers**
- » **IF we do our homework**
 - fuel supply
 - quality of products & services
- » EU directive for renewable energy: 20% RES mandatory for 2020

Homework #1: sound pellet supply system

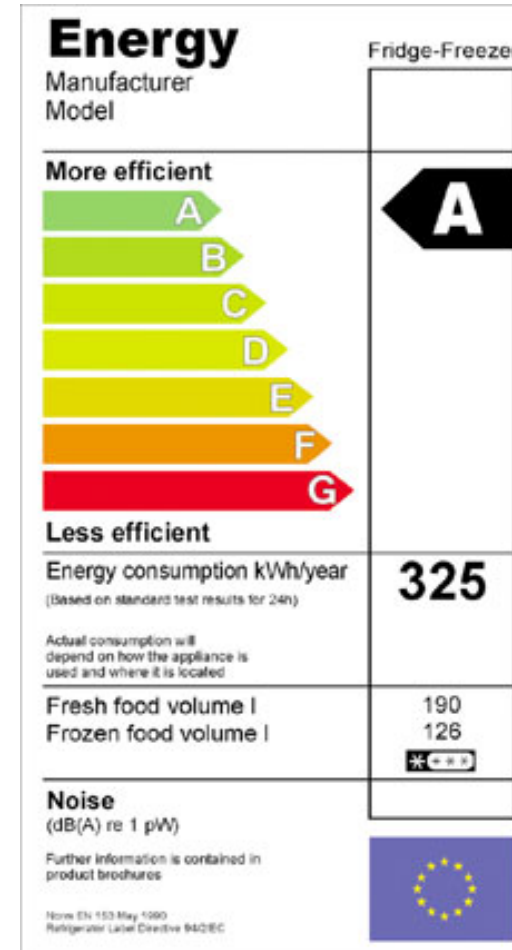
- » standardised qualities
- » bulk delivery
- » developed logistics
- » market monitoring
- » 100% supply security
- » legal storage requirements

Homework #2: quality of products

- » efficiency: > 90%
- » emissions: CO < 20 mg/m³, Dust < 20-30 mg/m³
- » fuel flexibility
- » grid independent operation
- » customer comfort
 - Automatic cleaning of heat exchangers
 - ash management

Quality labeling

- » obligatory in the EU for most electric appliances
- » Will be introduced for heating appliances
- » will be related to energy efficiency & emissions
- » subsidy schemes will require A label



Homework #3: quality of services

- » throw away culture will not continue in a resource constrained world – long product life & possibility to repair will be issues
- » trained maintenance & repair technicians indispensable
- » trained installers & planners indispensable
- » complexity of building energy systems will increase: massive improvements of efficiency, integration of solar & biomass

What we can offer: technology cooperation

- » Direct cooperation with Austrian manufacturers
- » proPellets can act as facilitator
- » Austrian Bioenergy Centre: R&D center that designs & optimises boilers & stoves für industry
- » Contact person: walter.haslinger@abc-energy.at

What we can also offer

- » Cooperation at the level of associations
- » Share experiences in market development
- » Share policy strategies
- » Come over & visit us!

A final remark

- » Fundamental changes and huge opportunities are ahead
- » An active professional interest organisation has a key role to play
 - Lobbying
 - Public relations
 - Standards & technical issues
 - Communication platform for industry & intl. Cooperation
- » Substantial funding for such an organisation is the best possible investment into your business