

# Development of biomass fuel in Austria as the dominant heating fuel

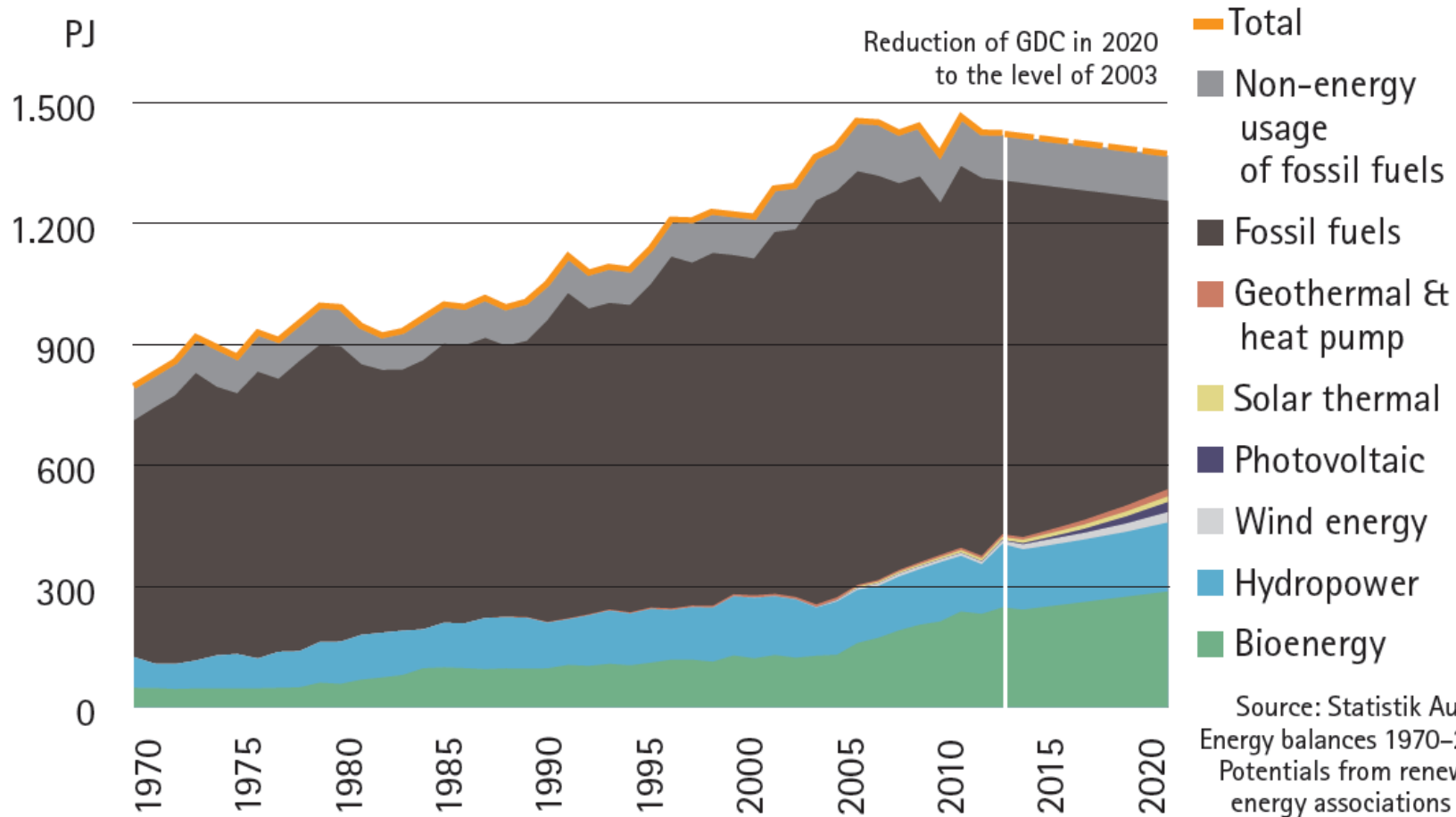
Dr. Horst Jauschnegg



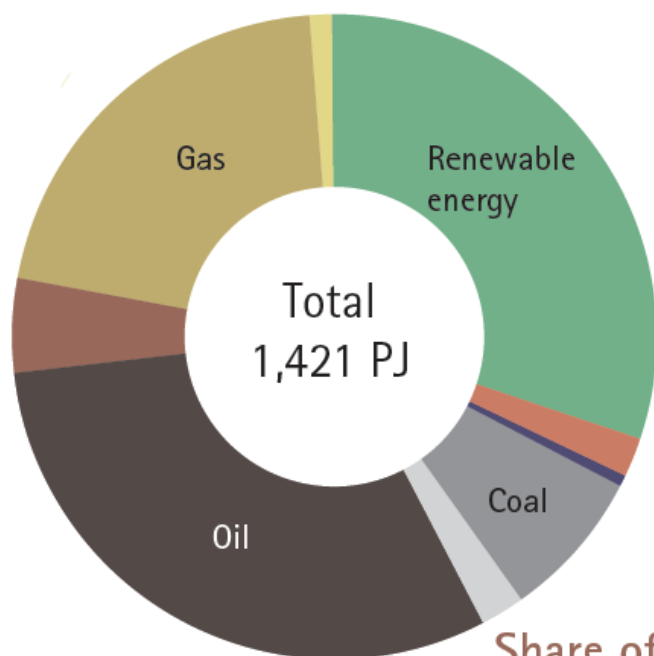
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BIOMASSE-VERBAND  
AUSTRIAN BIOMASS ASSOCIATION

# **The Austrian energy system**

# Gross Domestic Consumption of energy in Austria (1970 - 2012) and potentials till 2020



# Gross Domestic Energy Consumption in Austria (2012)

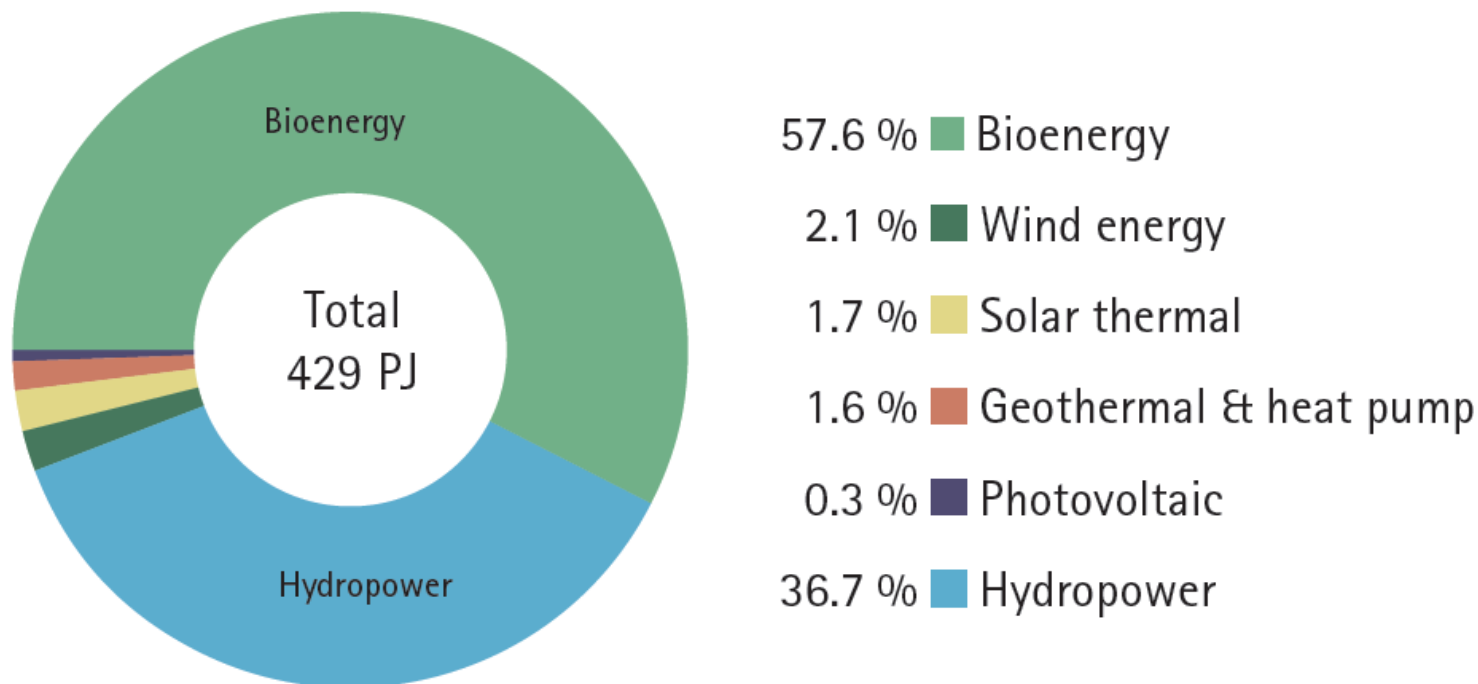


Share of Wood: 14.1 %

Source: Statistik Austria, Energy balances 1970–2012



# Gross Domestic Consumption of renewable energy in Austria (2012)

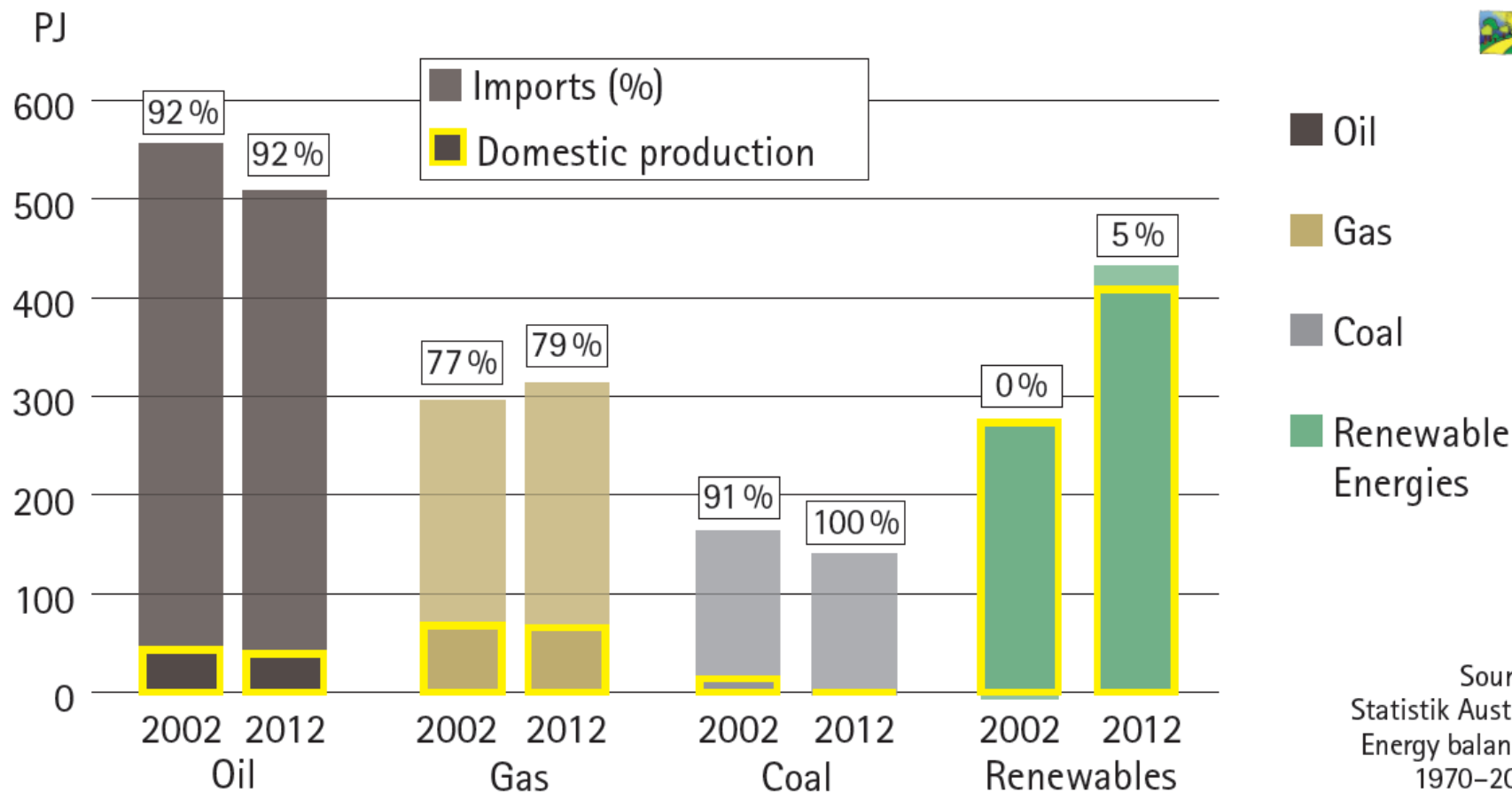


Share of Wood: 46.5 %

Source: Statistik Austria, Energy balances 1970–2012



# Share of domestic energy production in Austria (2002, 2012)

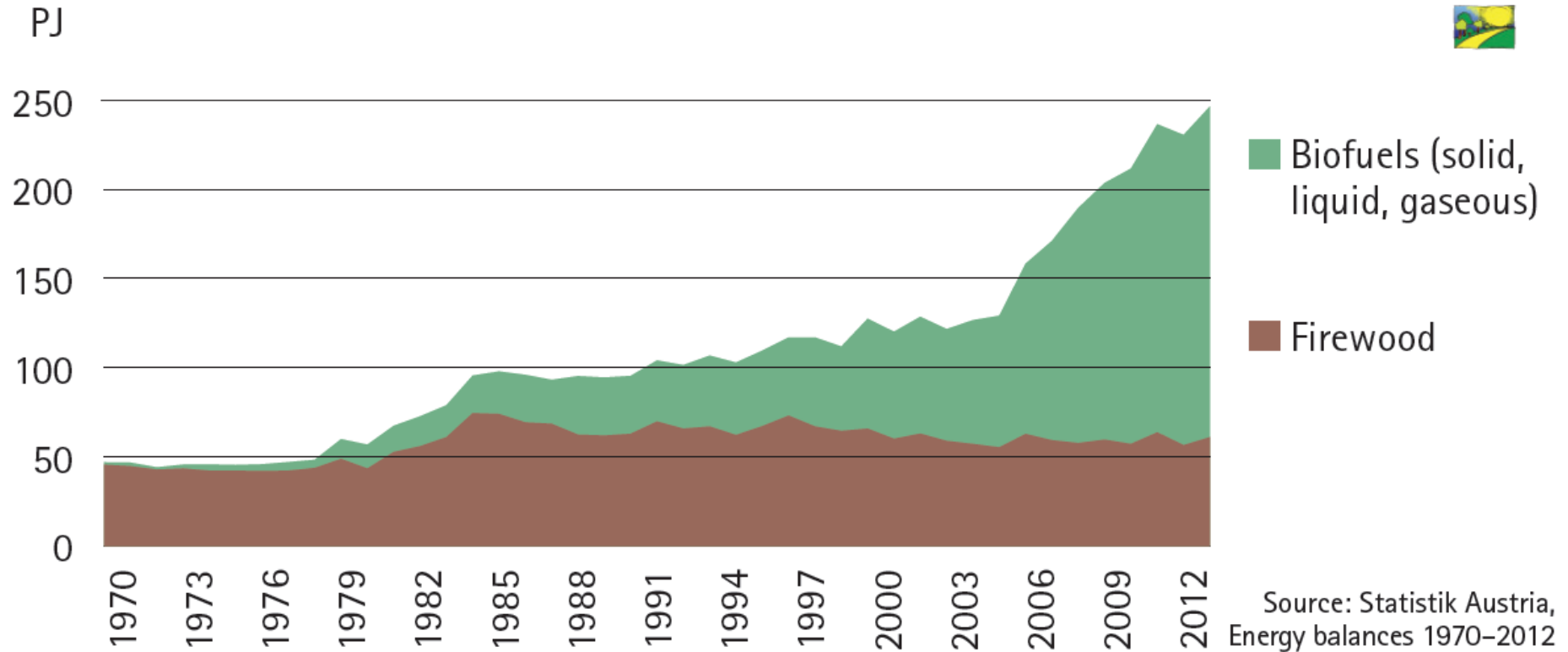


Source:  
Statistik Austria,  
Energy balances  
1970–2012

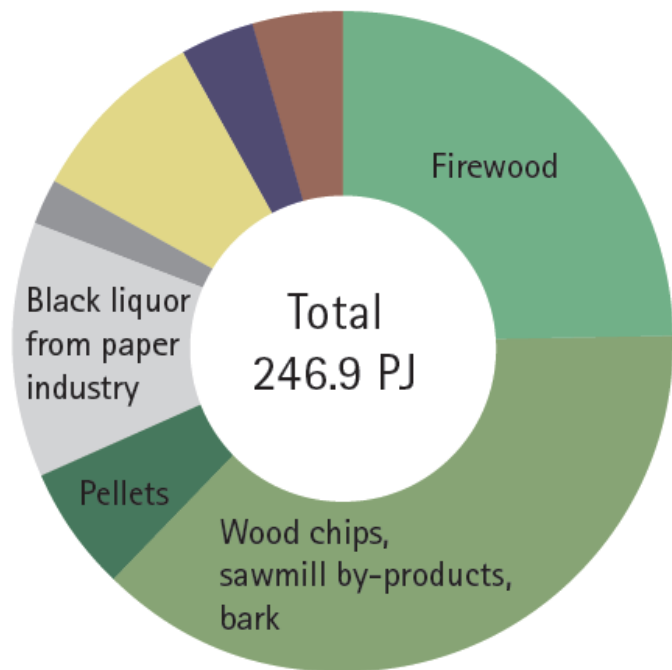


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# Gross Domestic Consumption of bioenergy in Austria [1970-2012]



# Gross Domestic Consumption of bioenergy in Austria 2012



**Wooden Bioenergy: 80,9 %**

Source: Statistik Austria, Energy balances 1970–2012





# **Biomass resources in Austria**

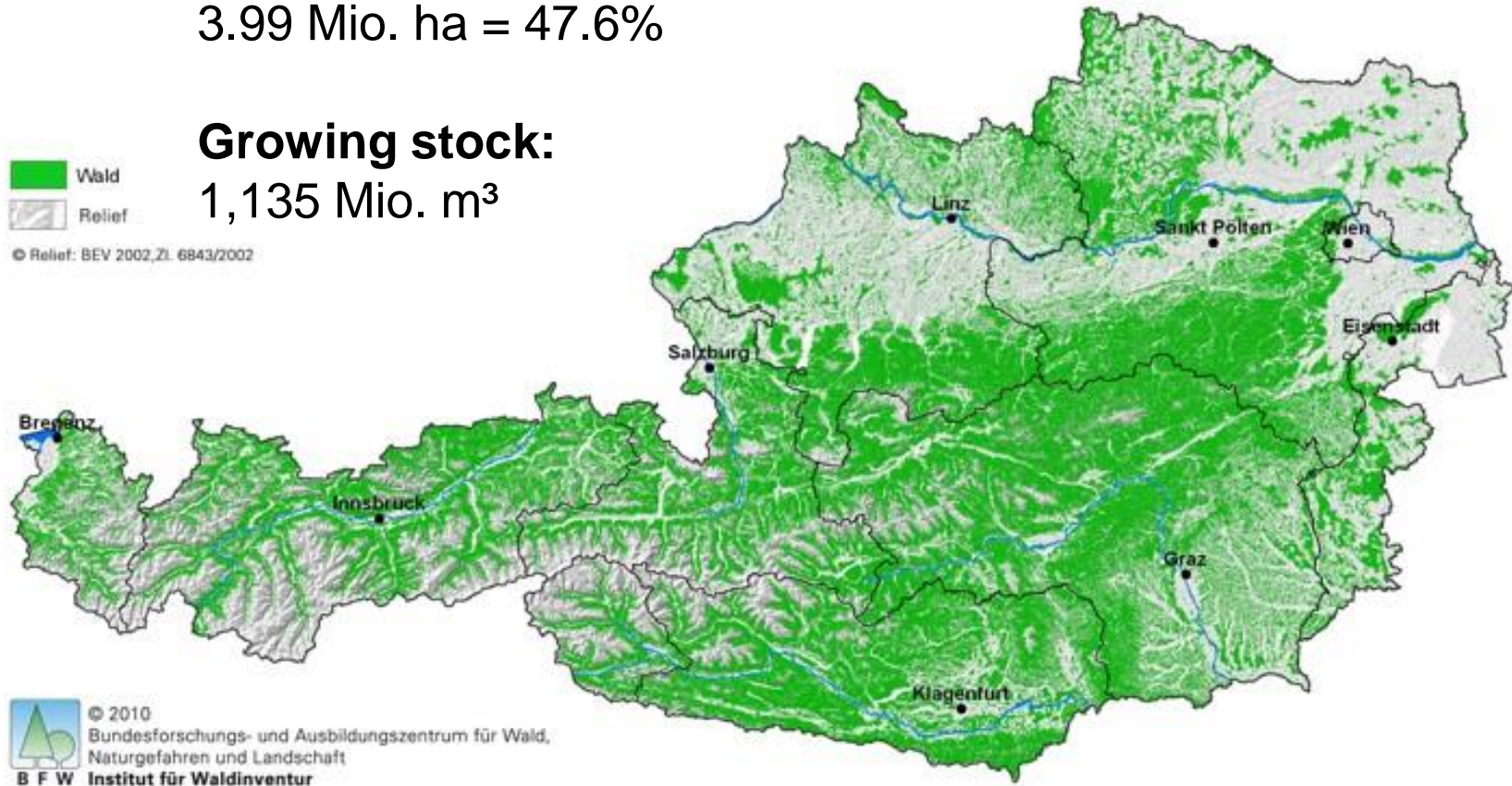
# Main Source for Biomass: the Austrian Forest

## Forest area:

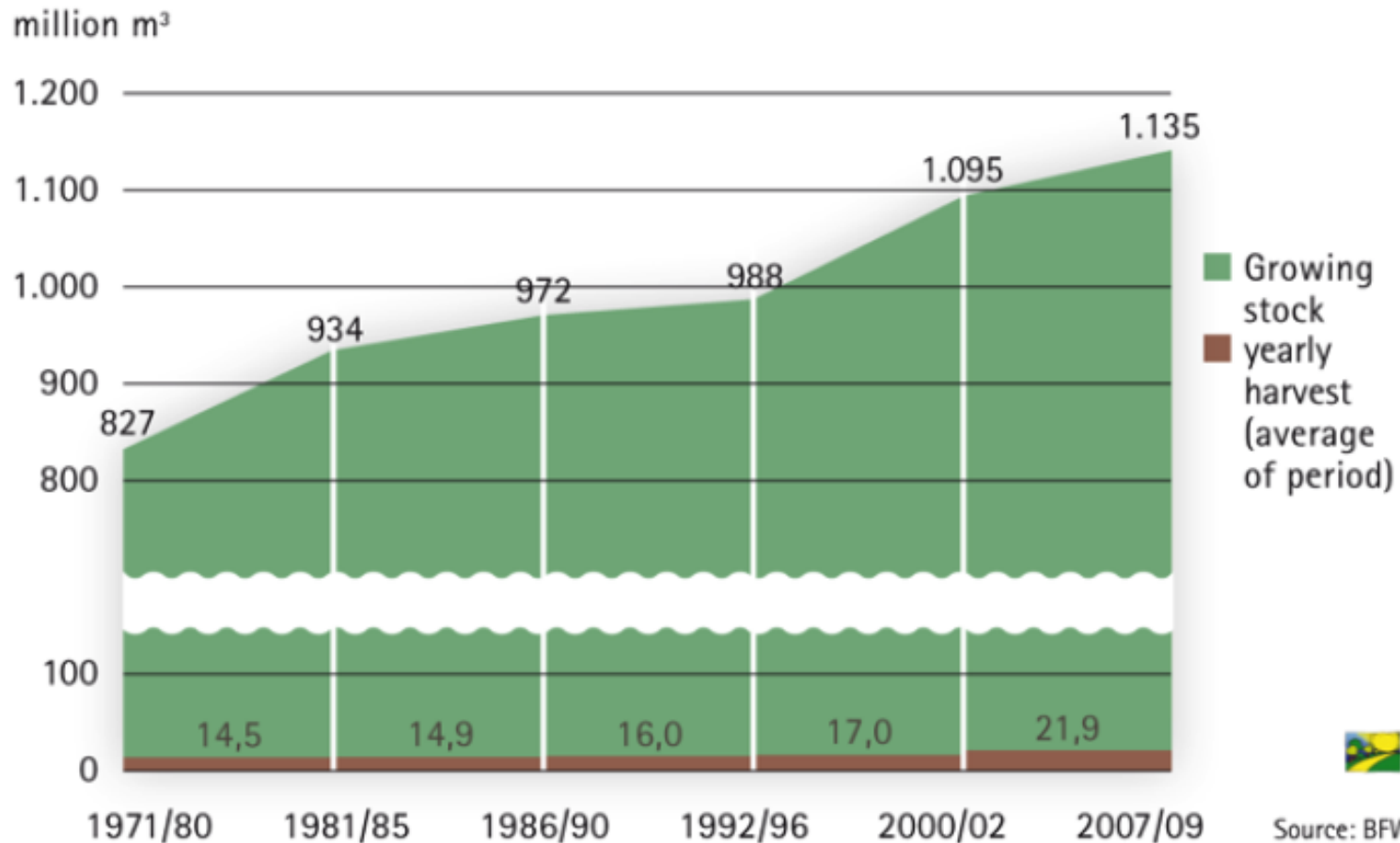
3.99 Mio. ha = 47.6%

## Growing stock:

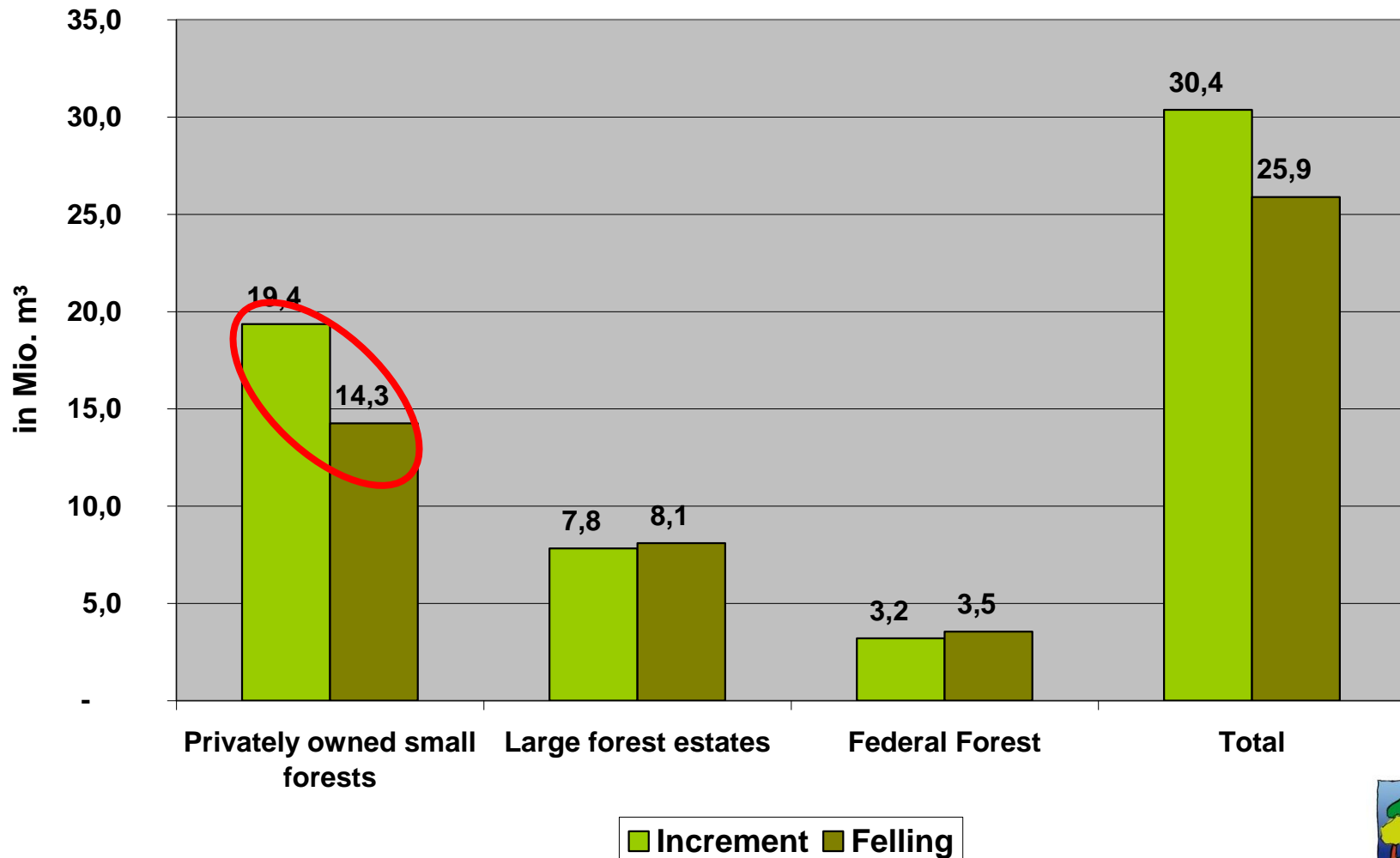
1,135 Mio. m<sup>3</sup>



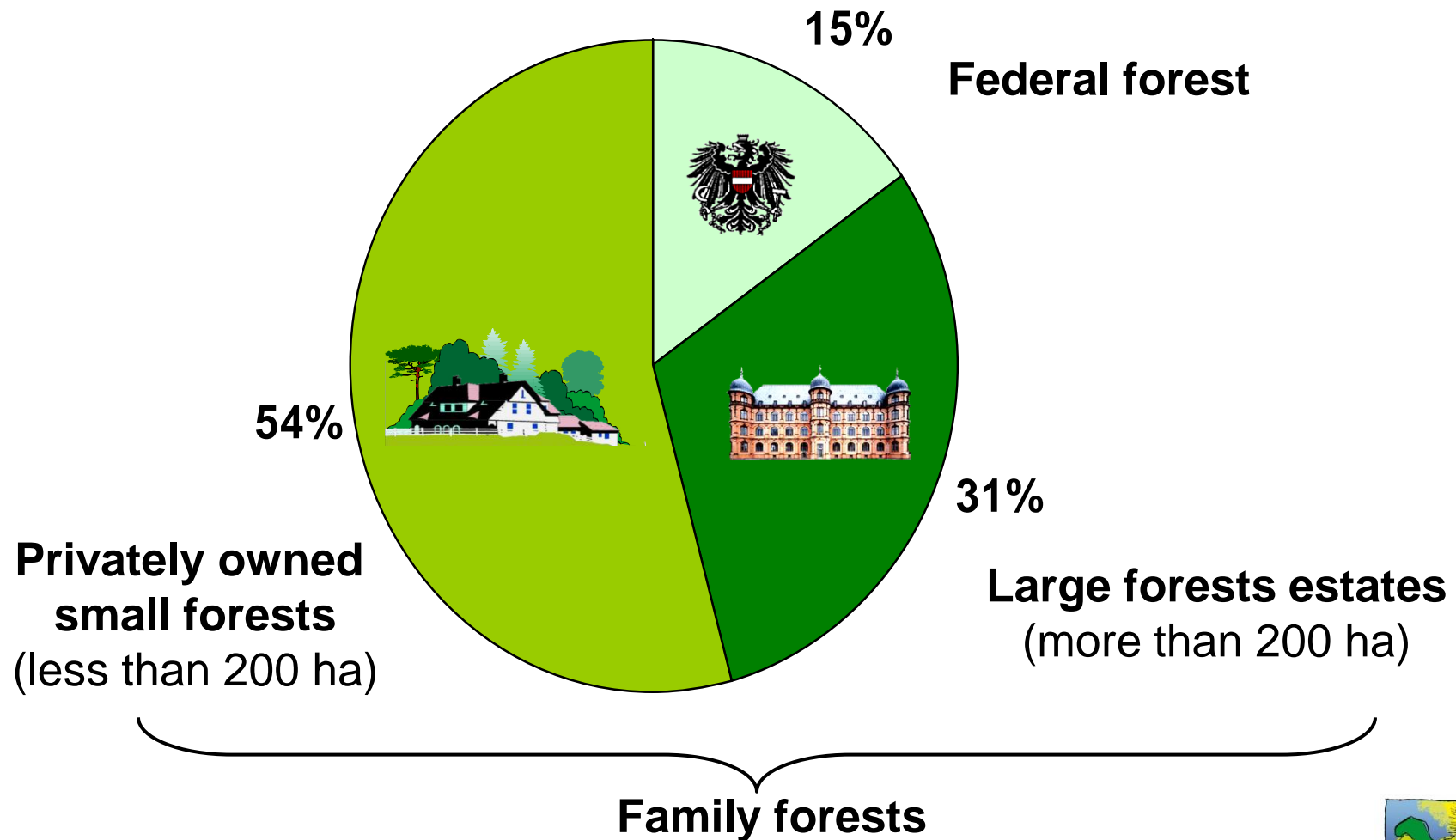
# Growing stock and yearly harvest in Austrian forests



# Annual felling and increment in Austrian forests



# Who owns the Austrian forest?





# Biomass Trade Centre





# Perennial energy crops in Austria

## Short rotation forestry



2010: 1,100 ha  
2020: 15,000 ha (potential)  
(80 % on arable land,  
20 % on grassland)

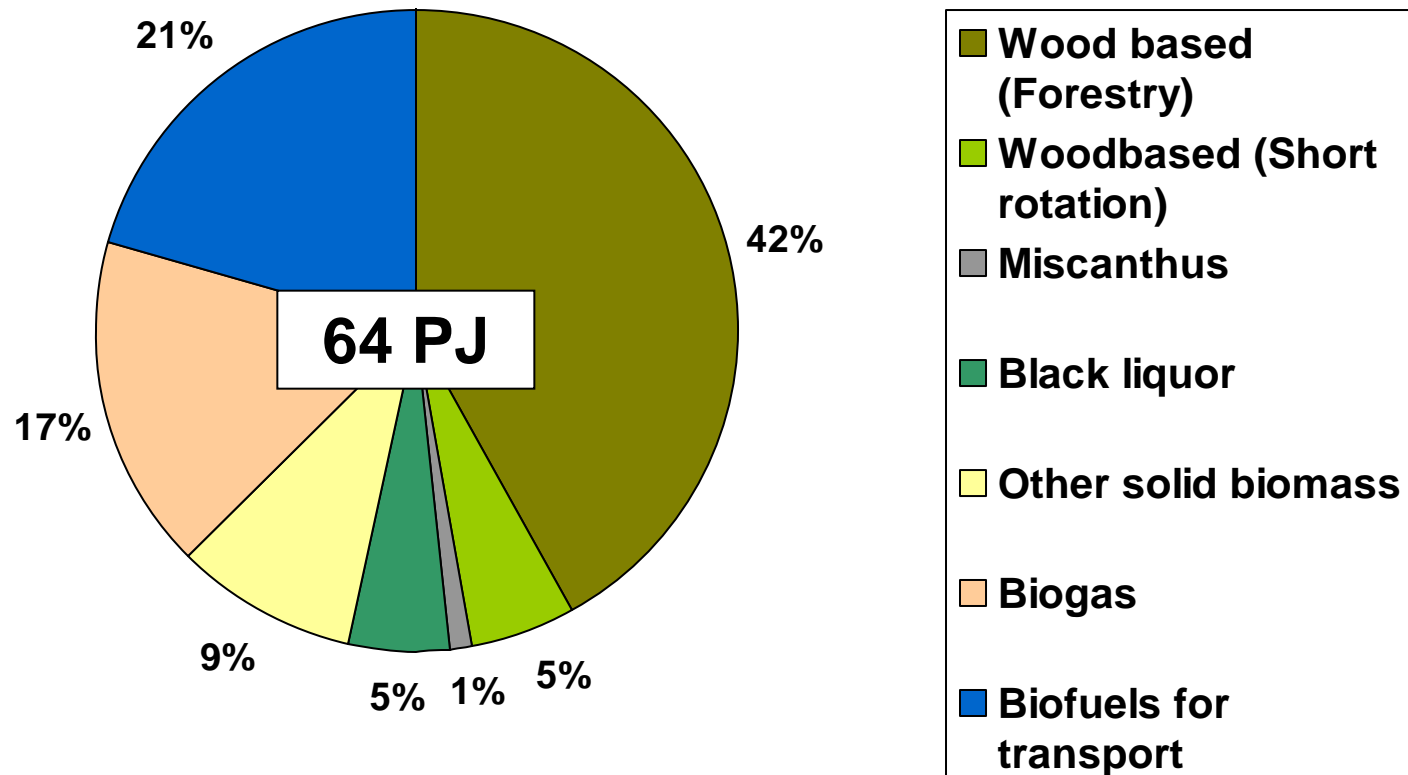
## Miscanthus



2010: 800 ha  
2020: 3,500 ha (potential)  
(100 % on arable land)

**Potential 2020: 1.1 % of arable land and  
0.2 % of grassland for perennial energy crops**

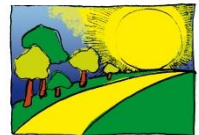
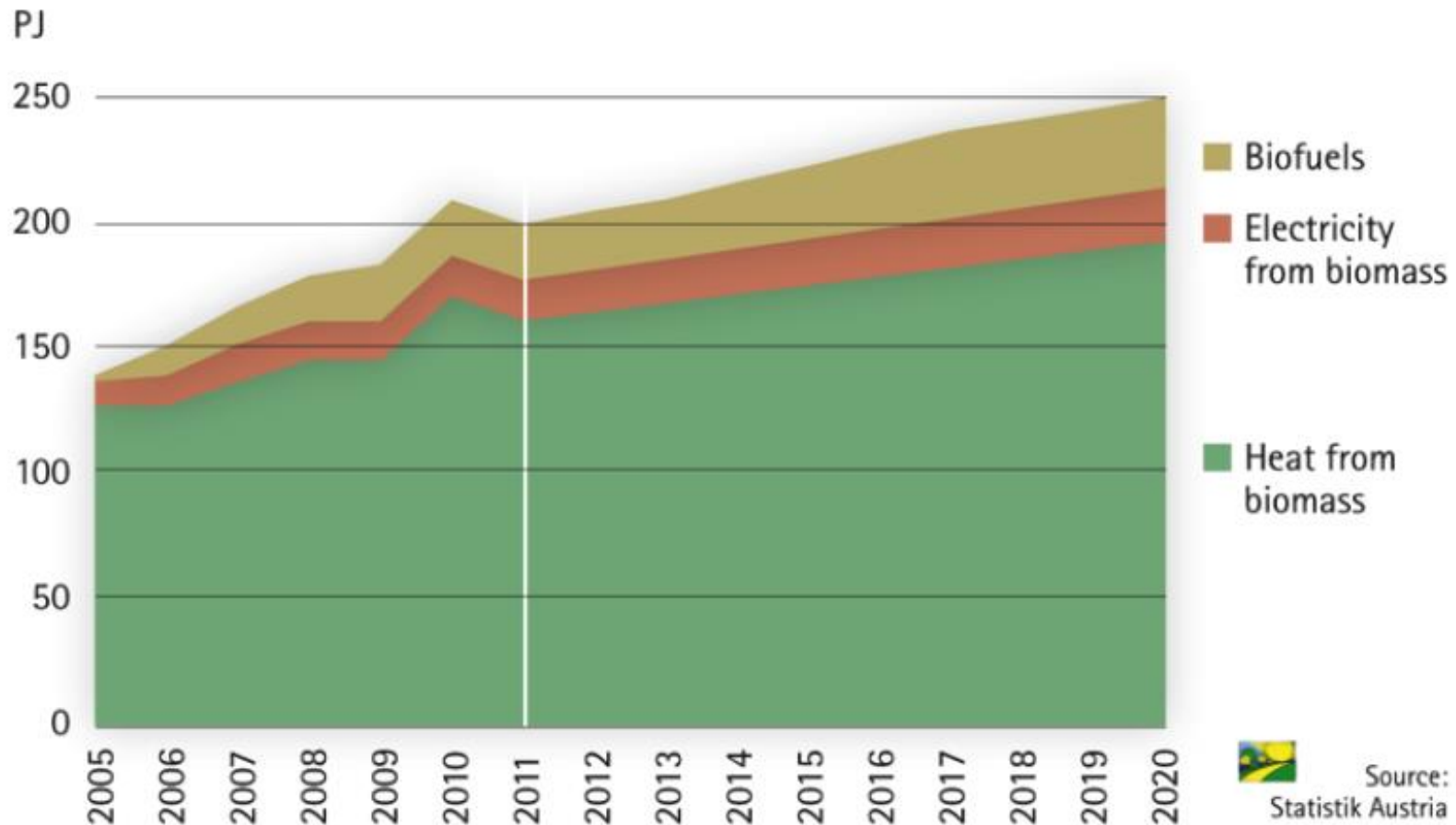
# Additional biomass potential in Austria till 2020





# **Bioenergy markets in Austria**

# Final bioenergy consumption 2005 - 2011 in Austria and potential till 2020



# Austrian Approach to develop biomass based energy systems

- **Public support for development of biomass sector**
  - Investment subsidies for biomass heating systems
    - Farmers and forest owners (20 – 40 %)
    - Private investors (up to 25 %)
    - Companies (up to 30 %)
  - Green electricity law with feed-in tariffs for electricity from biomass
- **Integration of the agricultural and forestry sector** into the energy market not only as biomass supplier but also as energy supplier in the sectors:
  - Heat
  - Electricity
  - Transportation fuels

# Key drivers for the development of bioenergy in Austria

## Bioheat:

- Investment subsidies for small scale heating systems (logwood, woodchips, pellets) and biomass district heating plants
- 700-1,100 MW installed per year

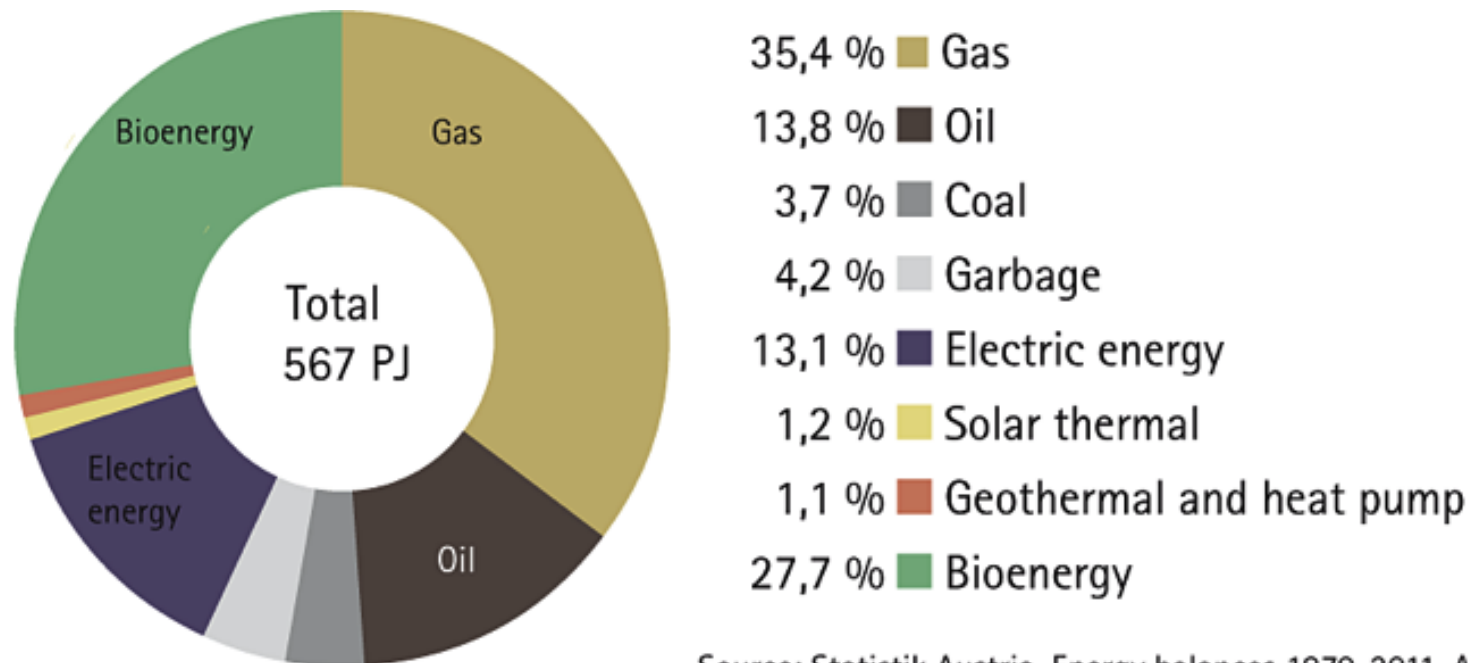
## Bioelectricity:

- Green electricity law with guaranteed feed-in tariffs
- Boom between 2003 and 2007; since 2007 collapse of the market
- Between 2003 and 2012 the following CHP plants capacity were installed:
  - Solid biomass: 320 MW<sub>el</sub>
  - Biogas: 78 MW<sub>el</sub>

## Biofuels for transportation:

- Obligated minimum share of biofuels (7% in 2009 reached)
- Fossil diesel and petrol has a higher mineral oil tax than blended fuels

# Final Energy Consumption for heat in Austria 2011



Source: Statistik Austria, Energy balances 1970-2011, Austrian Energy Agency



# Heating with Bioenergy in Austria

## Modern single house systems

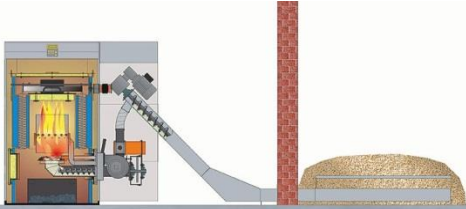
- Woodchips boilers  $\Rightarrow$  for farmers, commercial enterprises, private households
- Logwood boilers  $\Rightarrow$  for farmers, private households
- Pellet boilers  $\Rightarrow$  for private households, commercial enterprises

## Heat contracting

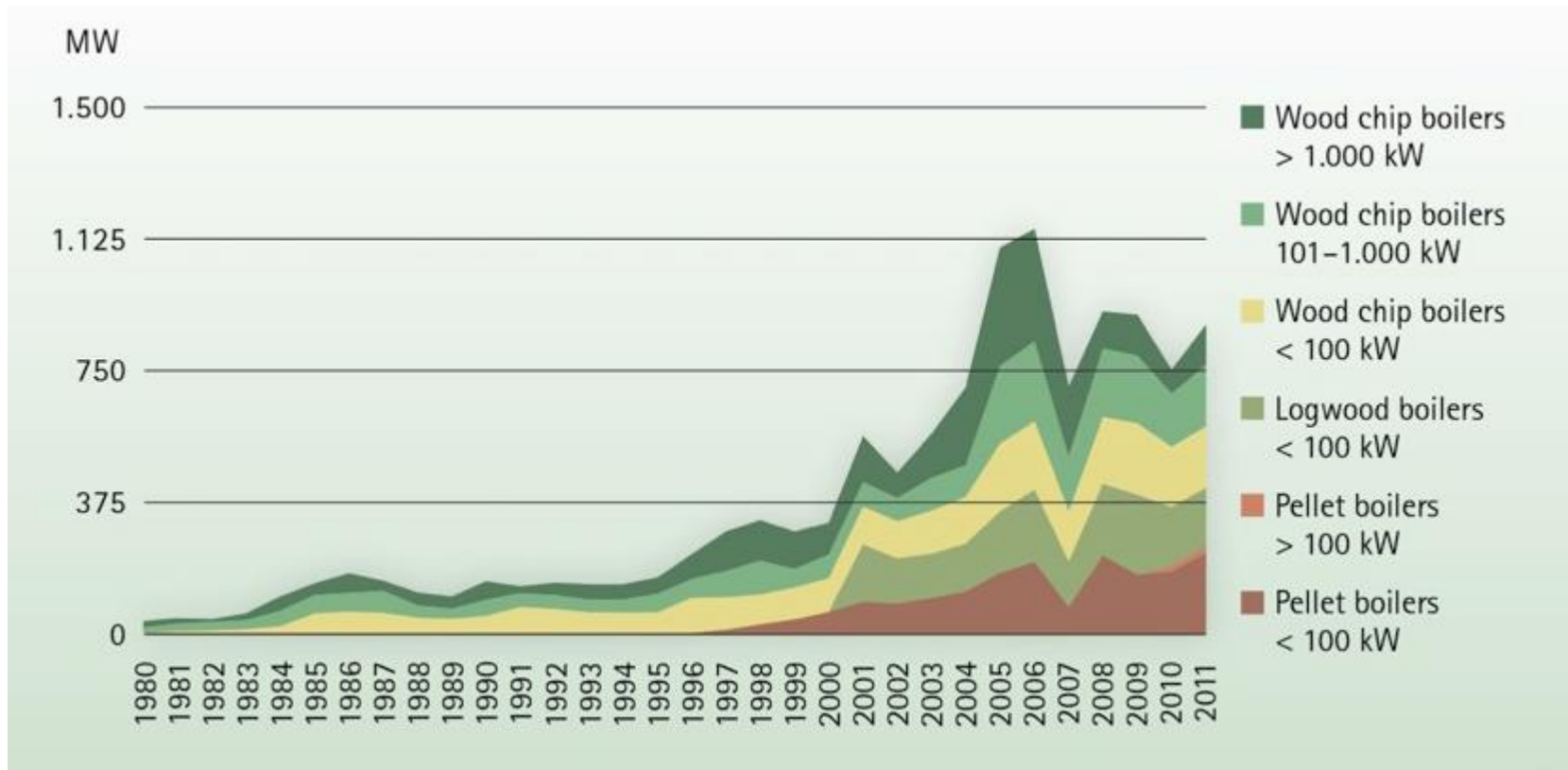
- (50-250 kW)  $\Rightarrow$  based on woodchips or pellets
- for public buildings, residential buildings, commercial enterprises

## Biomass district heating

- ( $> 250$  kW)  $\Rightarrow$  based on woodchips, sawmill by-products (bark, industrial woodchips,...)
- for villages and small cities (public buildings, residential buildings, commercial enterprises)



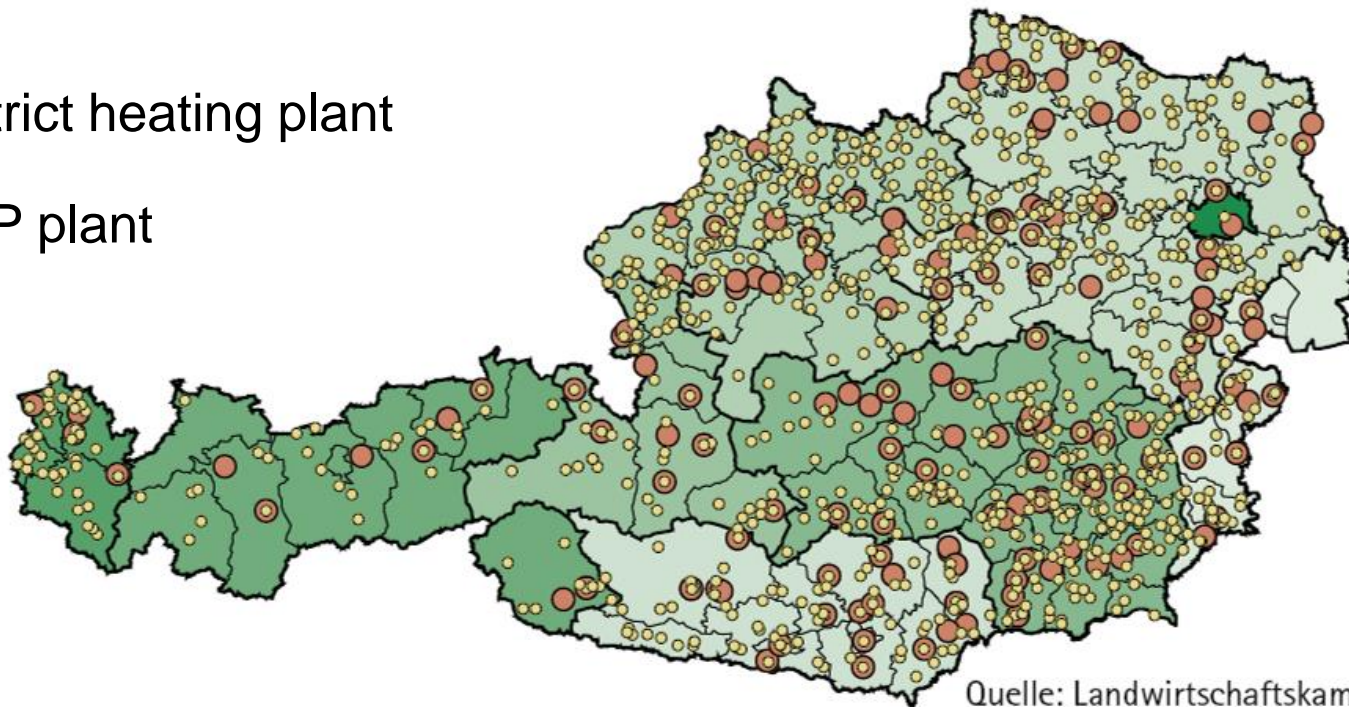
# Capacity of annually newly installed Biomass Boilers in Austria





# Biomass district heating and CHP plants in Austria [2010]

- District heating plant
- CHP plant



Quelle: Landwirtschaftskammer Niederösterreich

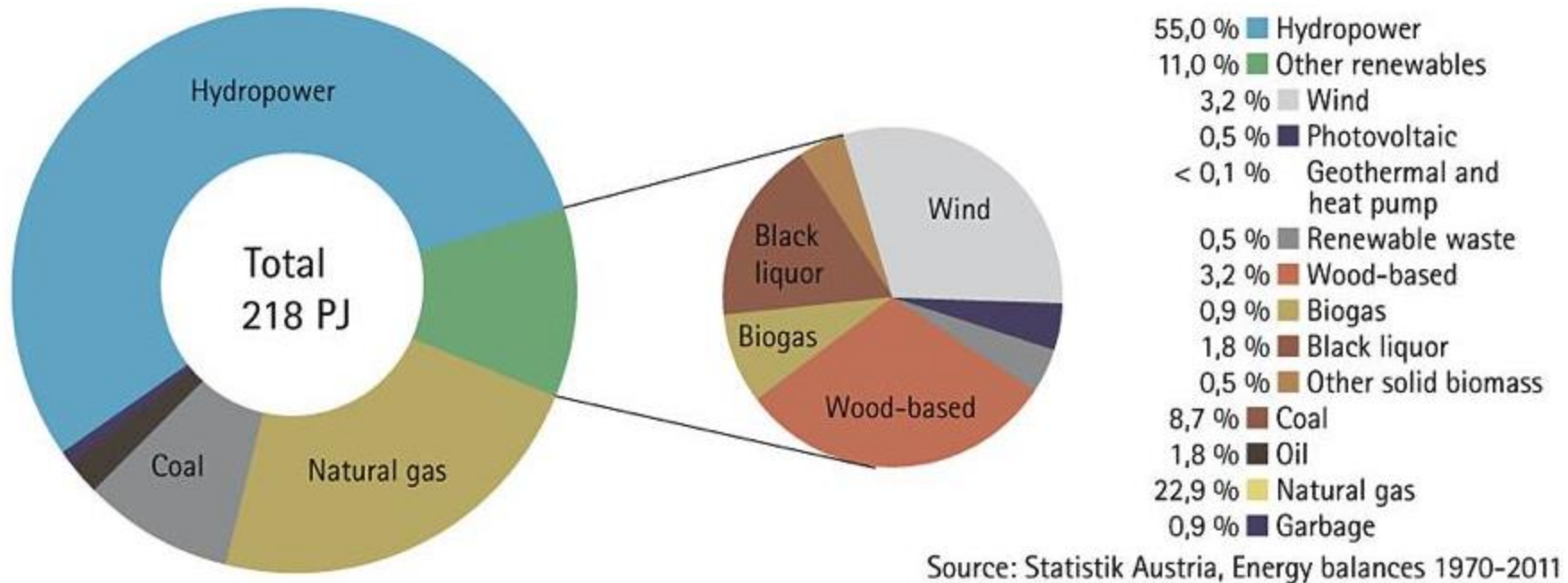
> 2,000 biomass district heating plants (1,350 MW)

115 biomass CHP plants, 310 MWe, 1.400 MWth





# Electricity generation in Austria 2011



Total share of bio-energy: 7.3 %

# Development of Biomass-CHP in Austria



## Solid Biomass (Wood etc.)

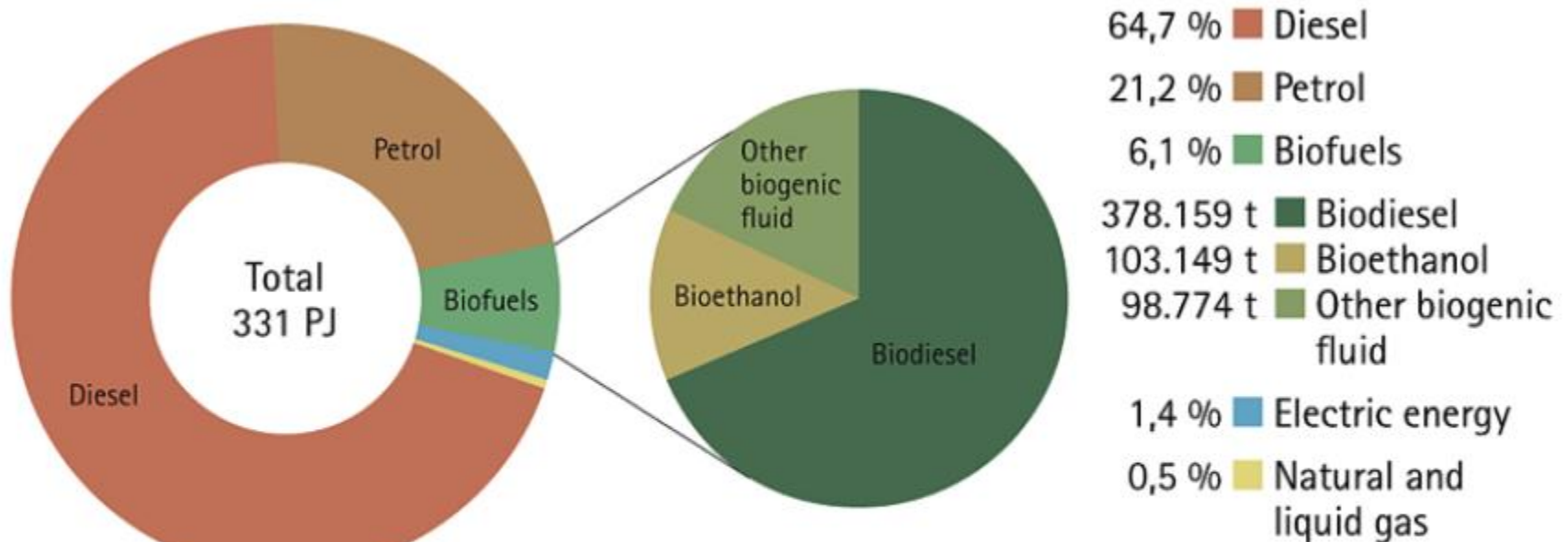
- Especially larger projects are realised
  - by wood processing industry and power companies
  - in most cases farmers are only woodchips suppliers
- Only a few smaller projects are realised, which are operated by farmer cooperatives
- Feed-in tariffs guaranteed for 10 - 15 years

## Biogas

- Plants operated by farmers
  - based on liquid manure, maize and grass silage, maize, other energy plants)
- Plants between 100 and 1.000 kW<sub>el</sub>
- Feed-in tariffs for 10 - 15 years

# Biofuels in Austria 2011

## Energy consumption in the traffic sector 2011



Source: Statistik Austria , Energie balances 1970-2011

- Total share of **bioenergy**: 6,1 %

# **Challenges for future development of bioenergy in Austria**

# Mobilisation of biomass resources

## Forestry biomass

- Mobilisation of the sustainable available timber resources especially from small private forest owners
  - Expansion of infrastructure in forests (e.g. forestry roads)
  - Intensification of education, training and consulting
  - General promotion of wood as a resource for materials as well as for energy use

## Energy crops and residues from agriculture

- Promotion of energy crops(short rotation forestry, miscanthus) and agricultural residues (straw, corn cobs, hay,...)
- Implement support schemes to mobilise agricultural biomass potential within CAP 2014-2020

# Further expansion of bioenergy in the heat market

## Biomass district heating

- Increase efficiency of biomass district heating networks
- Focus on micro-grids and heat supply for public buildings and industry

## Biomass single house heating systems

- Replacement of fossil heating systems and old-fashioned small scale biomass heating systems by modern biomass heating systems
  - Substitution of 475,000 fossil heating systems by modern pellet, woodchip and logwood boilers
  - Renewal of 140,000 old fashioned solid fuel heating systems (renewal saves biomass for 45,000 new biomass boilers)
- Development of technologies for burning new agricultural resources
- Promotion of technological development of stoves for passive houses

# Further expansion of bioenergy in the CHP market

## Solid Biomass

- Focus on the development of small scale CHP systems with local biomass supply and efficient use of heat
  - Enhancing research and development and promotion of pilot and demonstration plants (e.g. small scale gasification in the range from 5 to 500 kW<sub>el</sub>)
  - Diversification of biomass resources (e.g. short rotation wood, corn cobs)

## Biogas

- Increase efficiency of existing biogas plants (e.g. optimise heat use)
- Diversification of biomass resources (e.g. corn straw)
- Focus on small scale agricultural biogas plants based on manure and agricultural residues





**We can spent our money to support projects  
in Dubai?**





**Our we can spent our money to support projects  
in our regions?**



# Sustainable forestry and biomass use reduces CO<sub>2</sub>-emissions and creates local jobs



# Economic and environmental effects of biomass use in Austria

- **21,000** sustainable **jobs** in the Austrian bioenergy sector
- **2.8 billion Euro annual turnover** within the bioenergy sector
- **Without bioenergy** use Austria would have to spent **additionally 2.8 billion Euro** for importing fossil fuels
  - 2013 Austria spent already more than 13 billion Euro for importing of oil, gas and coal
- **9,8 million tons of CO2-emissions** are **saved**





# Thanks for your attention!

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