

Does bioenergy contribute to more stable energy prices?

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Motivation:

- Common argument:
Renewable energy leads to more stable energy prices due to ...
 - ... diversification of resources
 - ... substitution of highly price volatile fossile fuels
 - ... independence of world markets and speculation

- But: Recent years have shown partly substantial price fluctuations of bioenergy.
- ⇒ Is the common argument valid also for bioenergy?
- ⇒ Under which conditions and for which bioenergy carriers and bioenergy systems is it valid?

Research questions and structure of this paper

Does bioenergy contribute to more stable energy prices?

- To what extent are the volatilities of bioenergy prices relevant for macro-economic indicators and balances?
- Have prices of biomass fuels been less volatile than fossil fuel prices in the last years and decades?
- What are the system and market linkages between oil and bioenergy prices?
- What are the strategies leading to more stable bioenergy prices and – finally – to more stable prices of energy services?

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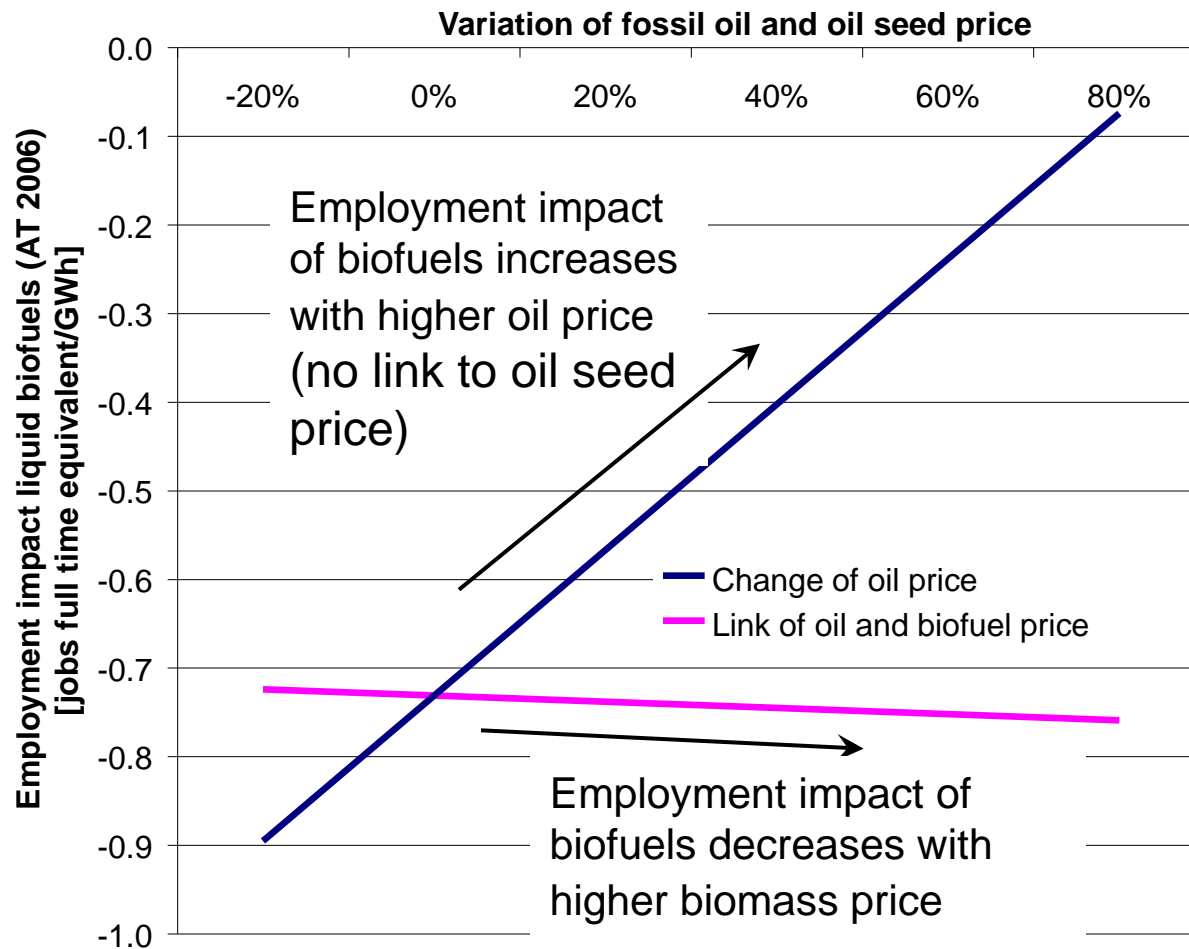
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Macroeconomic impact of bioenergy prices (1)

- I/O-Analysis
 - Taking into account direct, indirect, secondary, substitution, public and private budget effects
 - Bioenergy systems compared to fossil reference systems
 - Exemplary results for Austria: net value added and net employment impact
 - Analysis of price sensitivity of these results
- ⇒ Strong impact of private and public budget effects!
- ⇒ They depend strongly on the price difference of bioenergy and fossil energy systems.

Employment impact of biodiesel, subject to price fluctuation (AT, 2006)



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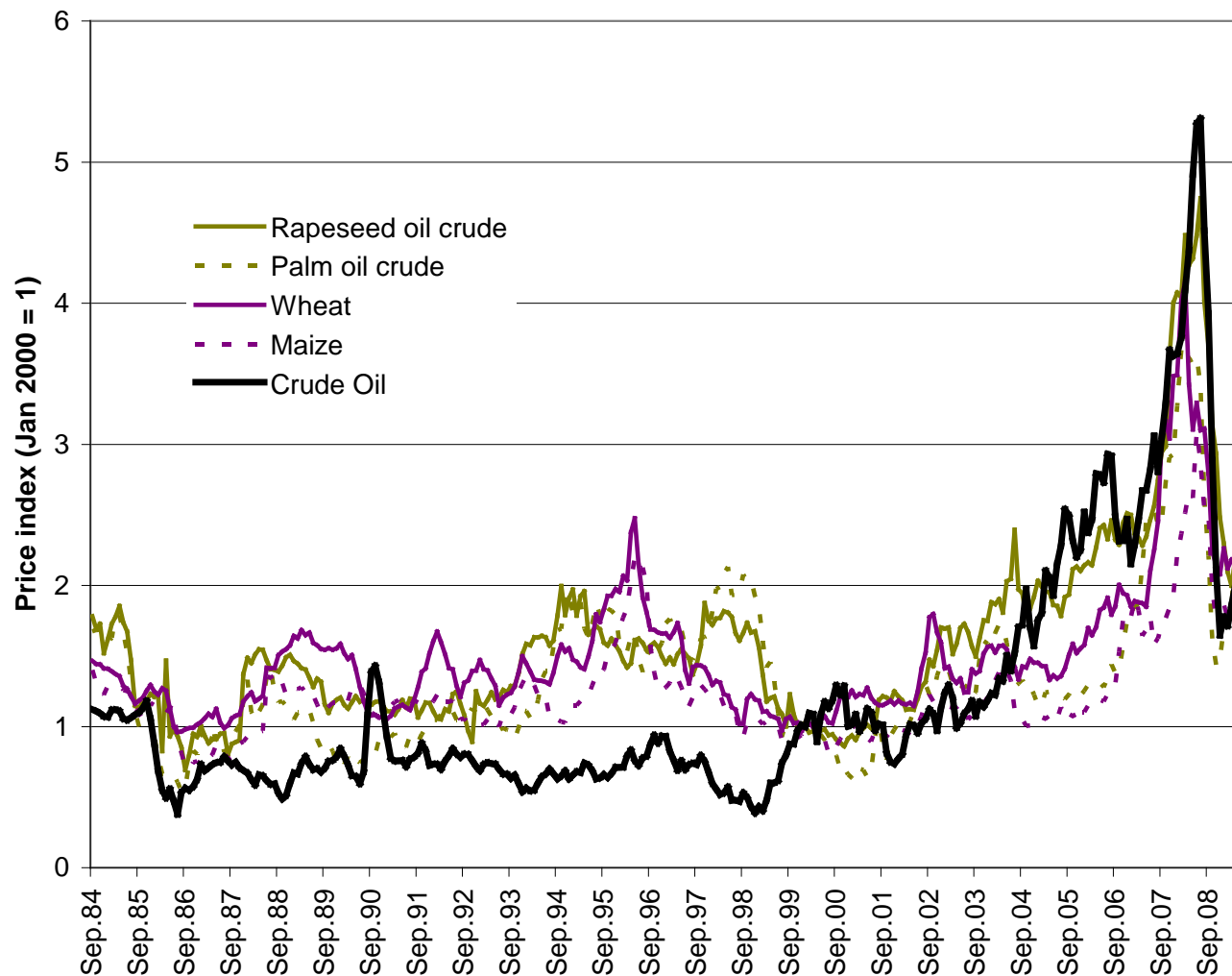
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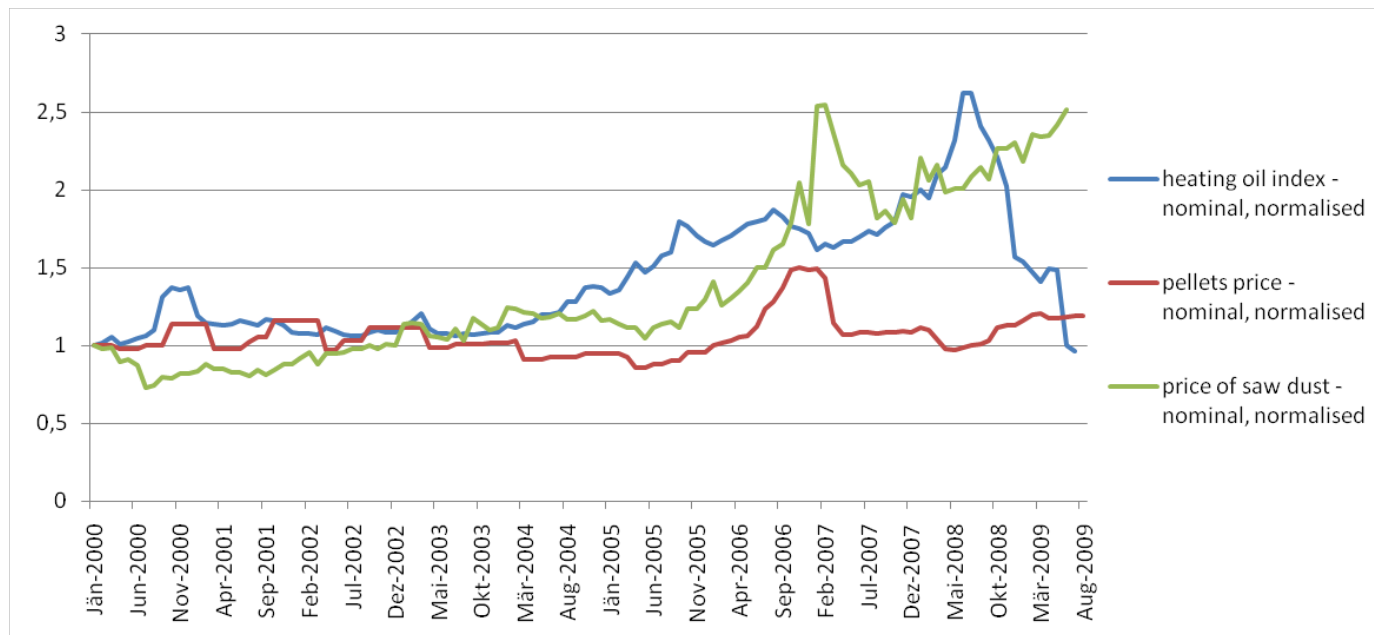
Price development of different bioenergy fractions

- Selected bioenergy carriers and commodities:
 - Agricultural commodities: oil seeds, cereals,
 - Pellets, wood log
 - Wood chips and saw residues
- Data base:
 - International monetary fund
 - www.indexmundi.com
 - Propellets
 - Statistics Austria
 - Forst-Holz-Paper Österreich

Agricultural commodities (world market prices)

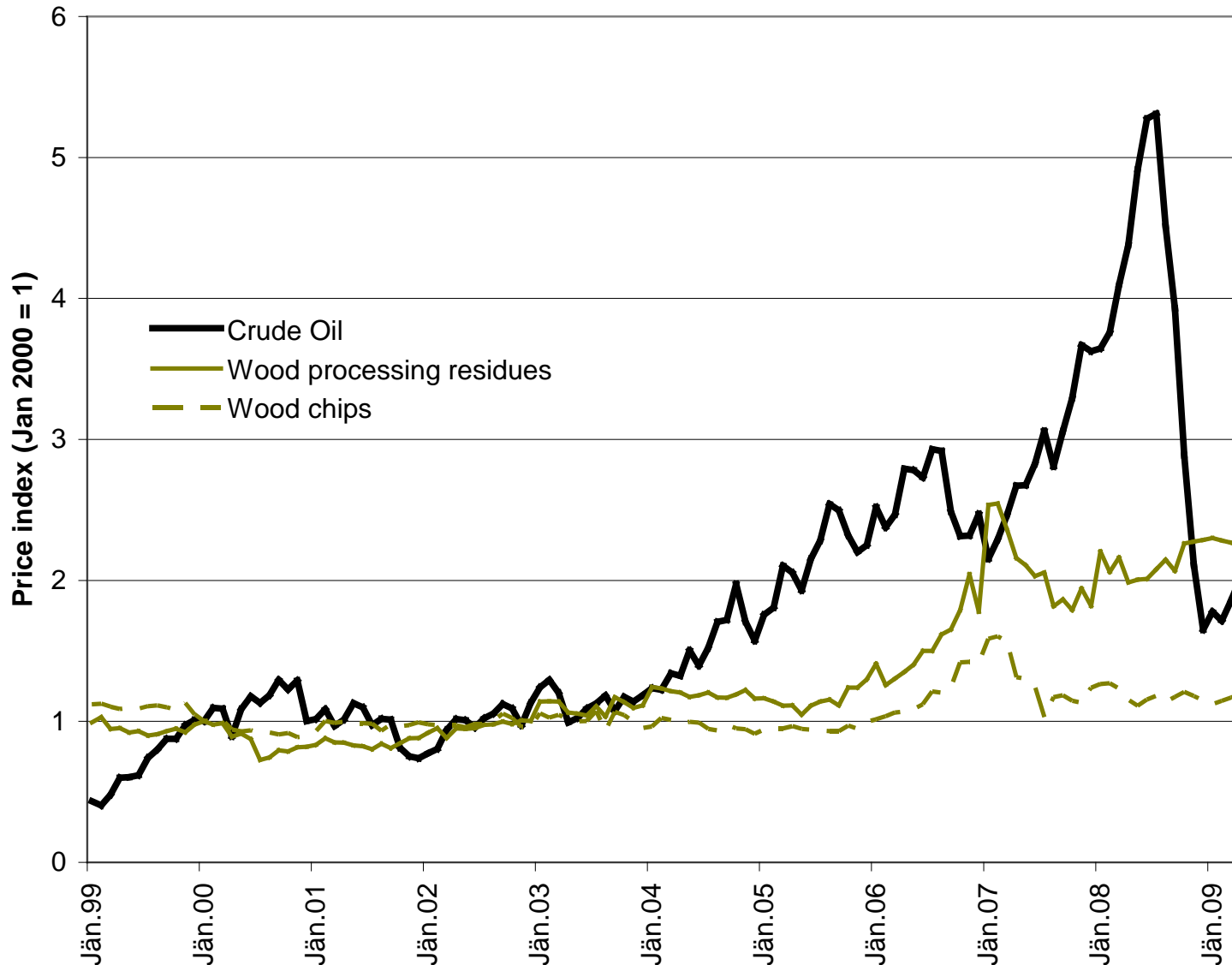


Pellets (AT)



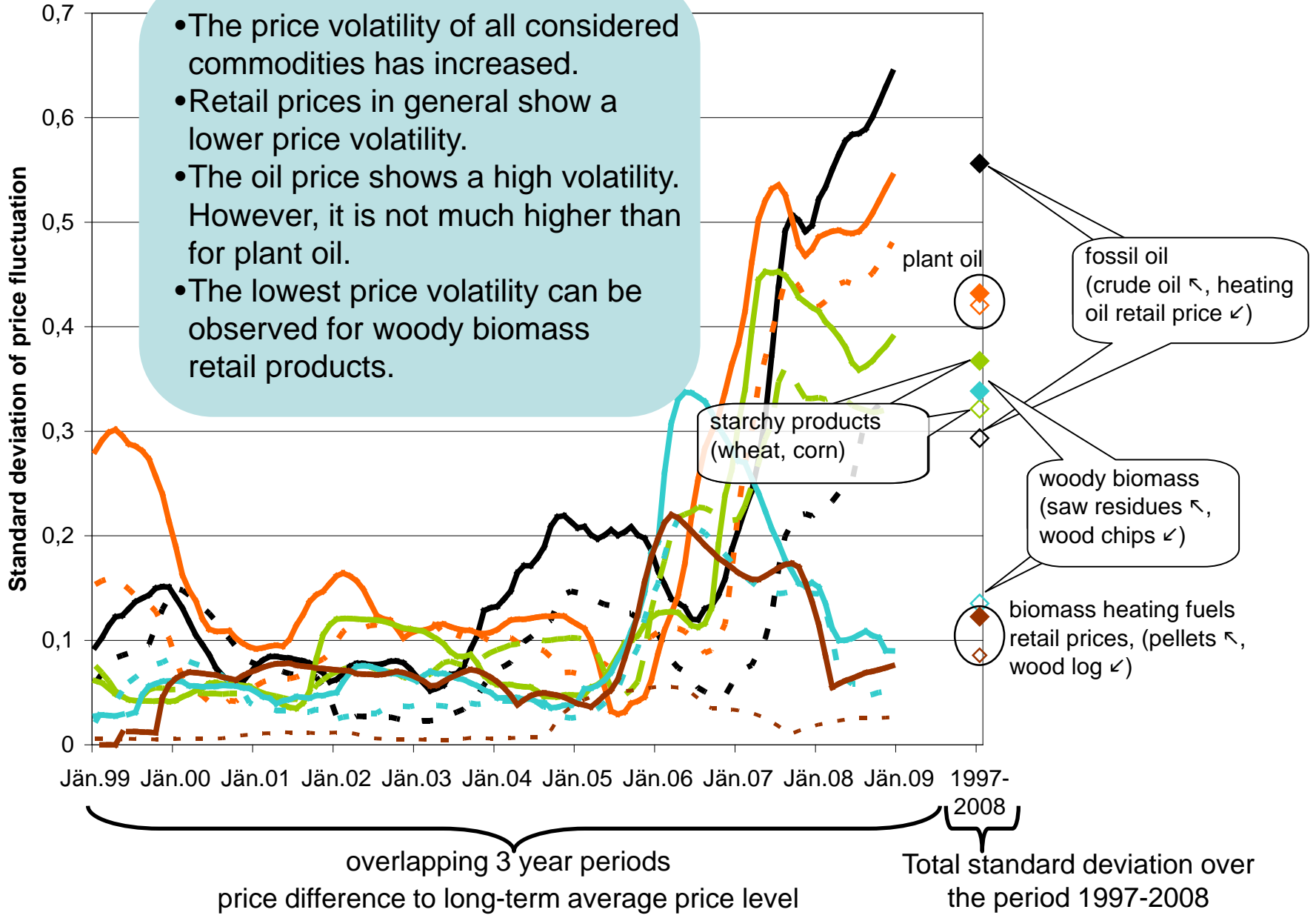
- Source: crude oil price: US Energy Information Administration 2009; Saw dust price: FHP - Kooperationsplattform Forst Holz Papier 2009; pellet price: proPellets, Pellets@las database 2009

Wood chips and saw residues (AT)



Comparison of price volatility

- The price volatility of all considered commodities has increased.
- Retail prices in general show a lower price volatility.
- The oil price shows a high volatility. However, it is not much higher than for plant oil.
- The lowest price volatility can be observed for woody biomass retail products.

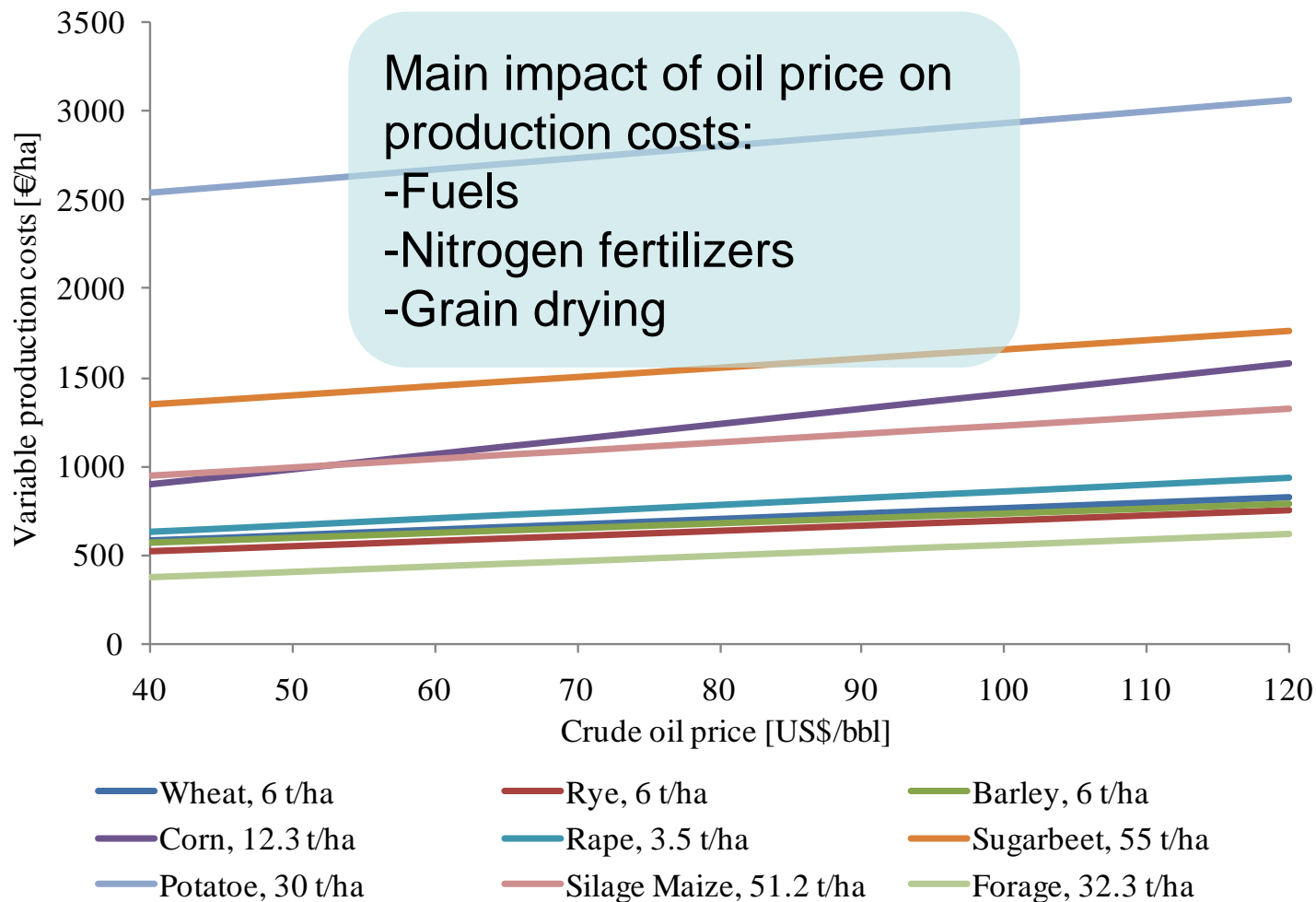


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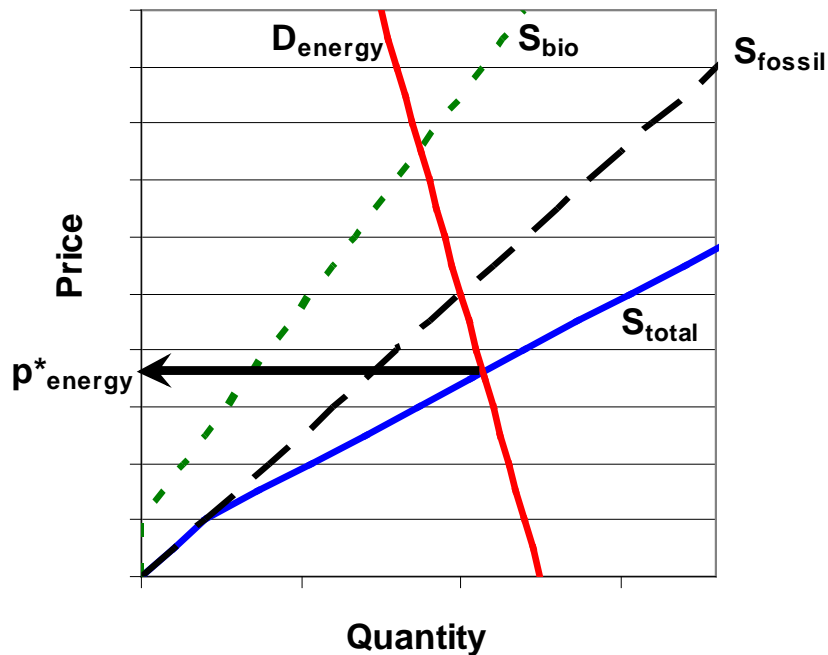
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Oil price influences input prices of agriculture

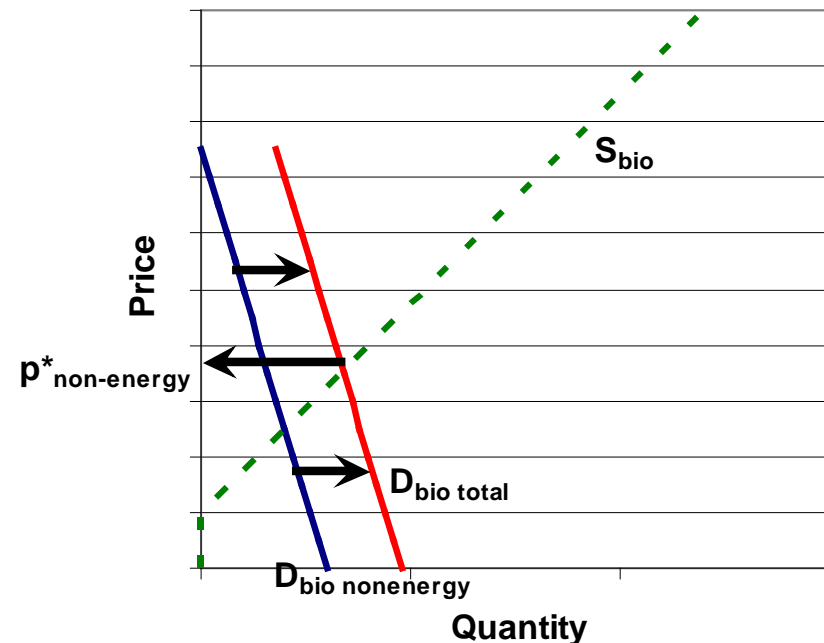


Oil price influences output prices of agriculture

Energy

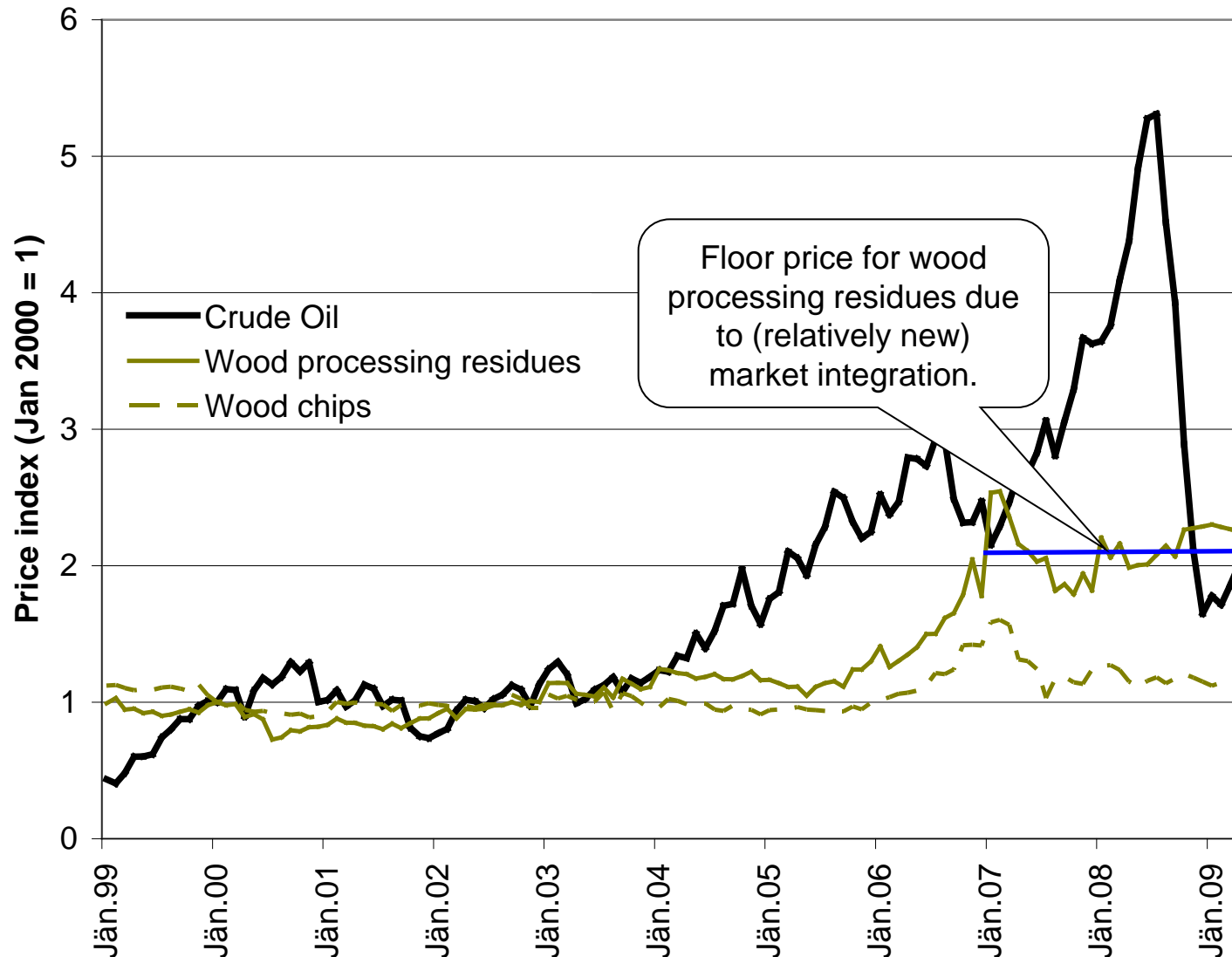


Non-Energy (e.g. Food, Wood products)

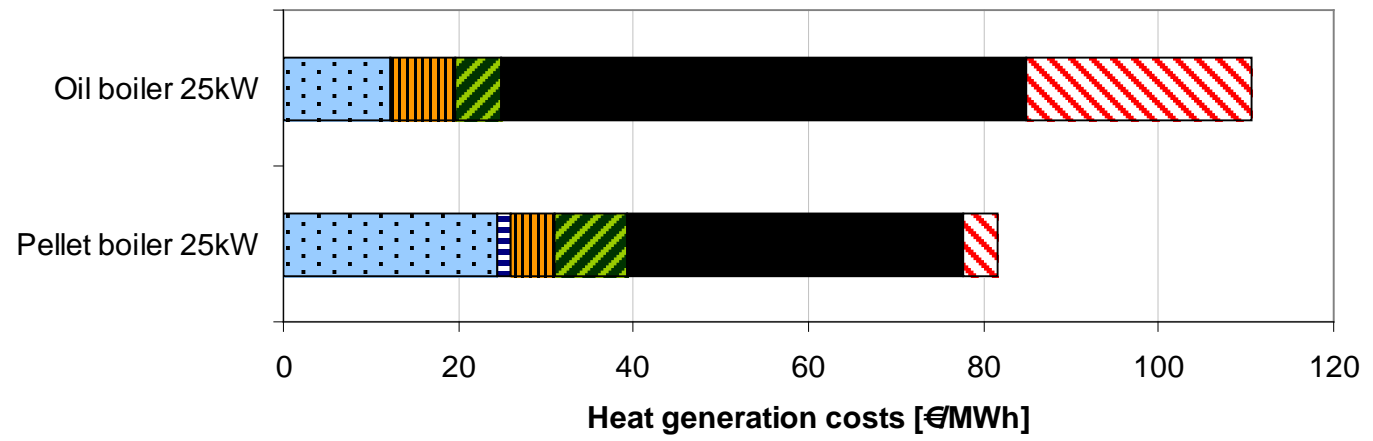


- Fossil prices create a floor price for biomass products (if markets are completely integrated).
- Fossil prices create an upper price cap for biomass products (if the amount of biomass in the energy market is high enough).

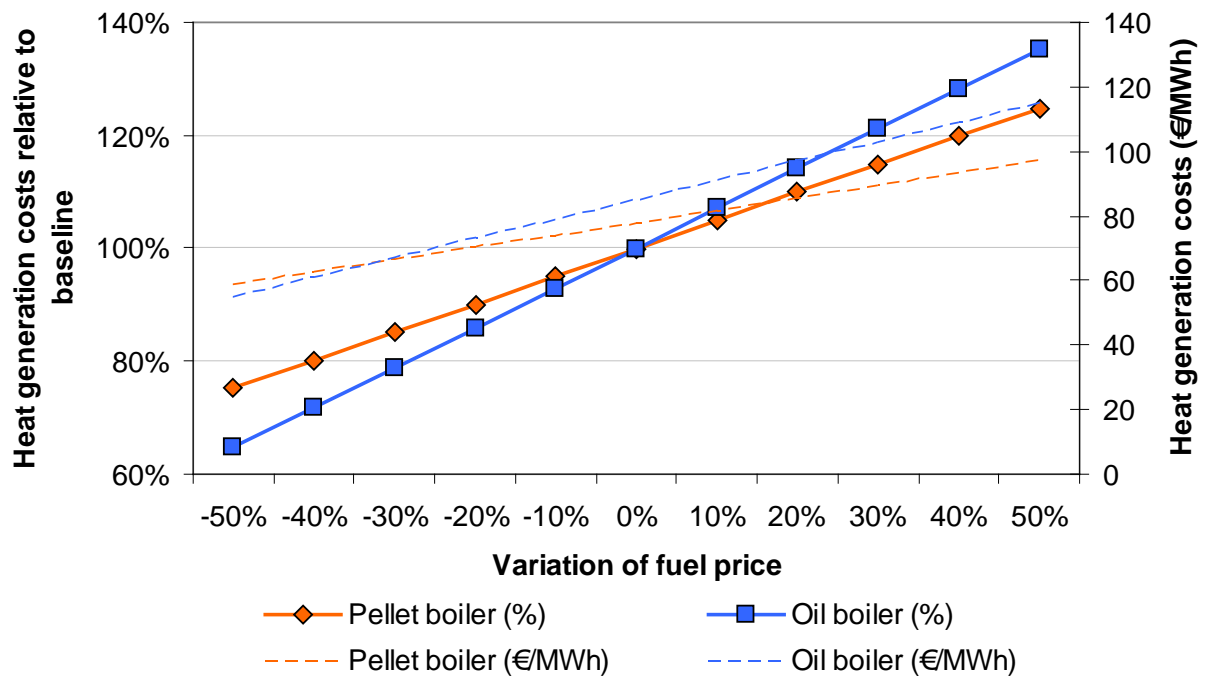
Wood chips and wood processing residues (AT)



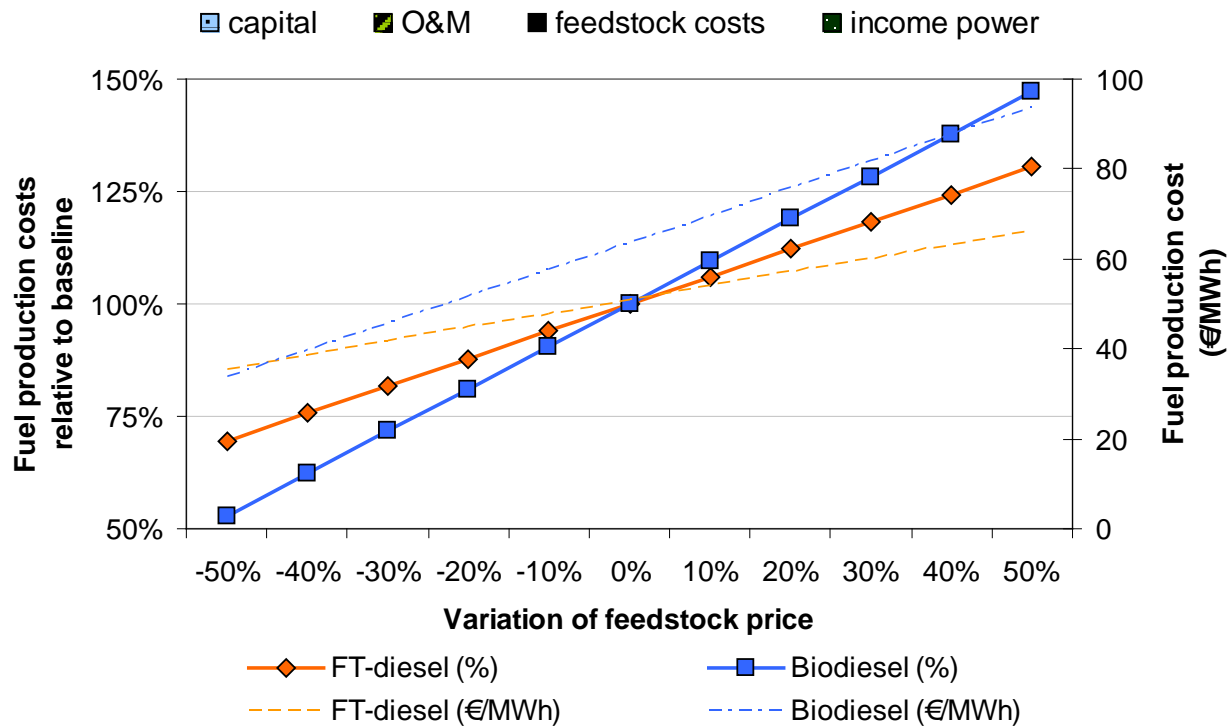
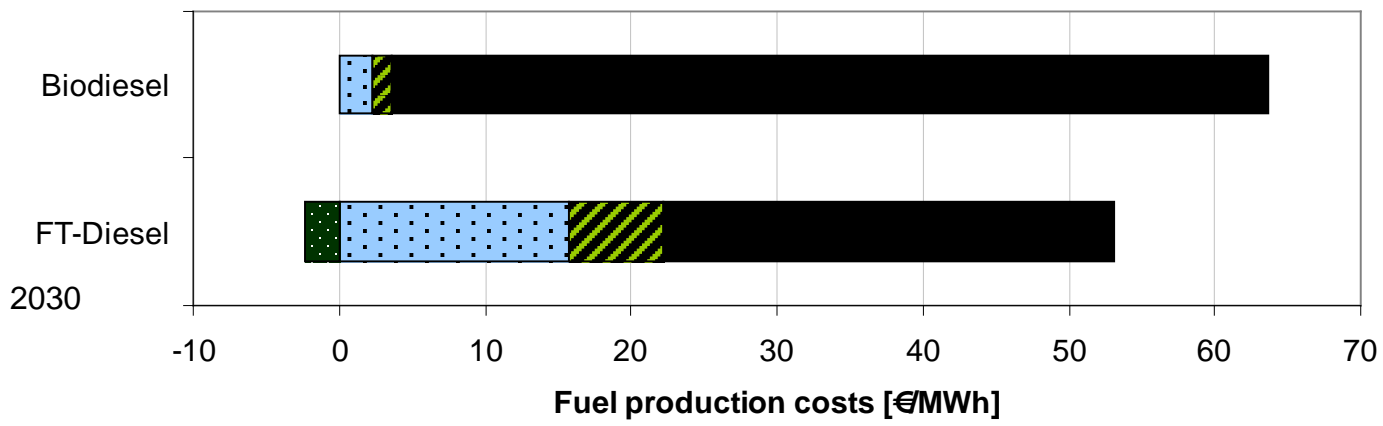
Sensitivity of energy systems to price volatility (heating)



■ capital boiler
 ■ capital thermal storage
 ▨ capital fuel storage
 ▨ O&M
 ■ fuel costs
 ▨ taxes



Sensitivity of energy systems to price volatility (liquid biomass transport fuels)



- Increasing the share of bioenergy in the energy mix leads to more diversification of energy sources. However, in terms of energy price stability part of it is offset due to the correlation of bioenergy prices with oil prices.
- Major reasons of price volatility of bioenergy:
 - Link of agricultural input factor price to volatile oil price
 - Link of agricultural output price to volatile oil price
 - Speculation
 - Natural phenomena (bad harvest due to drought etc)
 - ...
- Price volatility differs considerable between different bioenergy fractions. (plant oil high, wood log low)
- Price sensitivity differs considerable between different (bio)energy systems. (1st generation biofuels high, heating systems lower)

- ⇒ Promote biomass fractions with low price volatility.
- ⇒ Promote biomass systems with low price sensitivity.
- ⇒ Support methods and strategies for dealing with bioenergy price volatility (e.g. storage capacities for bioenergy as a means of national energy security).
- ⇒ Need for more biomass resources? => Biomass fractions with higher price volatility. => Without reducing energy consumption bioenergy will not necessarily lead to more stable energy prices.
- ⇒ Bioenergy can only contribute to significant higher energy price stability if it is combined with a correspondingly high level of energy conservation.