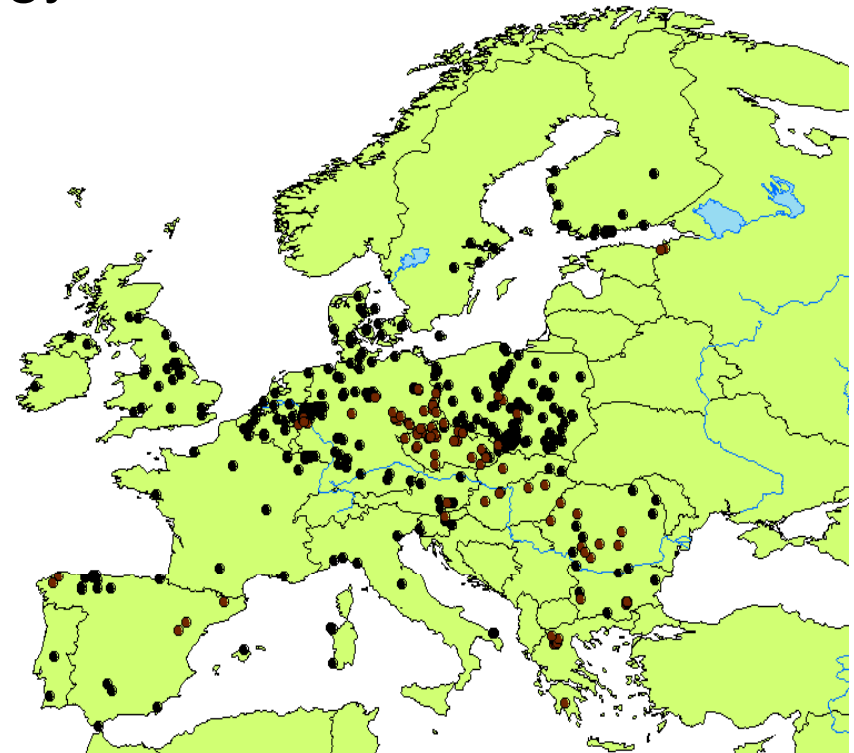


WP6: Biofuels and lignocellulosic markets

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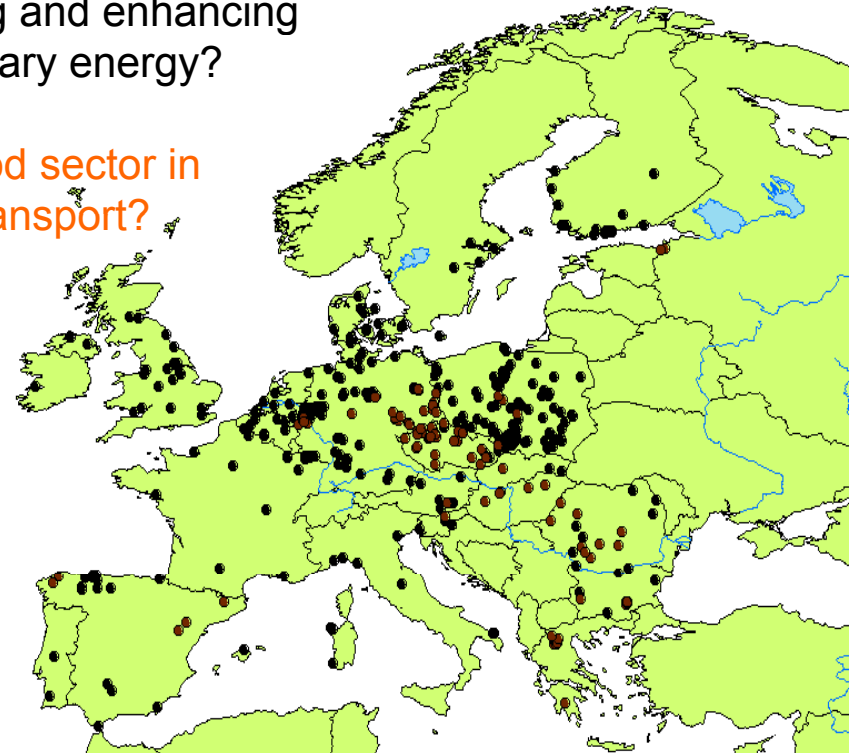
Overarching questions for WP6

How may biofuel policies – including their specific instruments such as obligatory targets – influence other (stationary) energy markets for lignocellulosic biomass?

Conversely, how can stationary energy development influence – in positive and negative ways – the prospects for 2nd generation biofuels?

Can policymakers improve conditions for capturing and enhancing synergies between biofuels production and stationary energy?

Can stationary energy sector compete with the food sector in the same way as has been seen for biofuels for transport?



The quick-and-dirty summary of findings

- How large is the stationary sector?
 - **LARGE!**
- How much can it pay for the biomass?
 - **A LOT!**
- Will it outcompete biofuel producers?
 - **IT DEPENDS...**
- Can policy influence how things develop?
 - **OH YES!**

Summary of findings

- Biomass competition may arise between stationary and transport energy uses

- modeling indicate that biofuel obligations may distract from the most cost effective biomass use for climate change mitigations

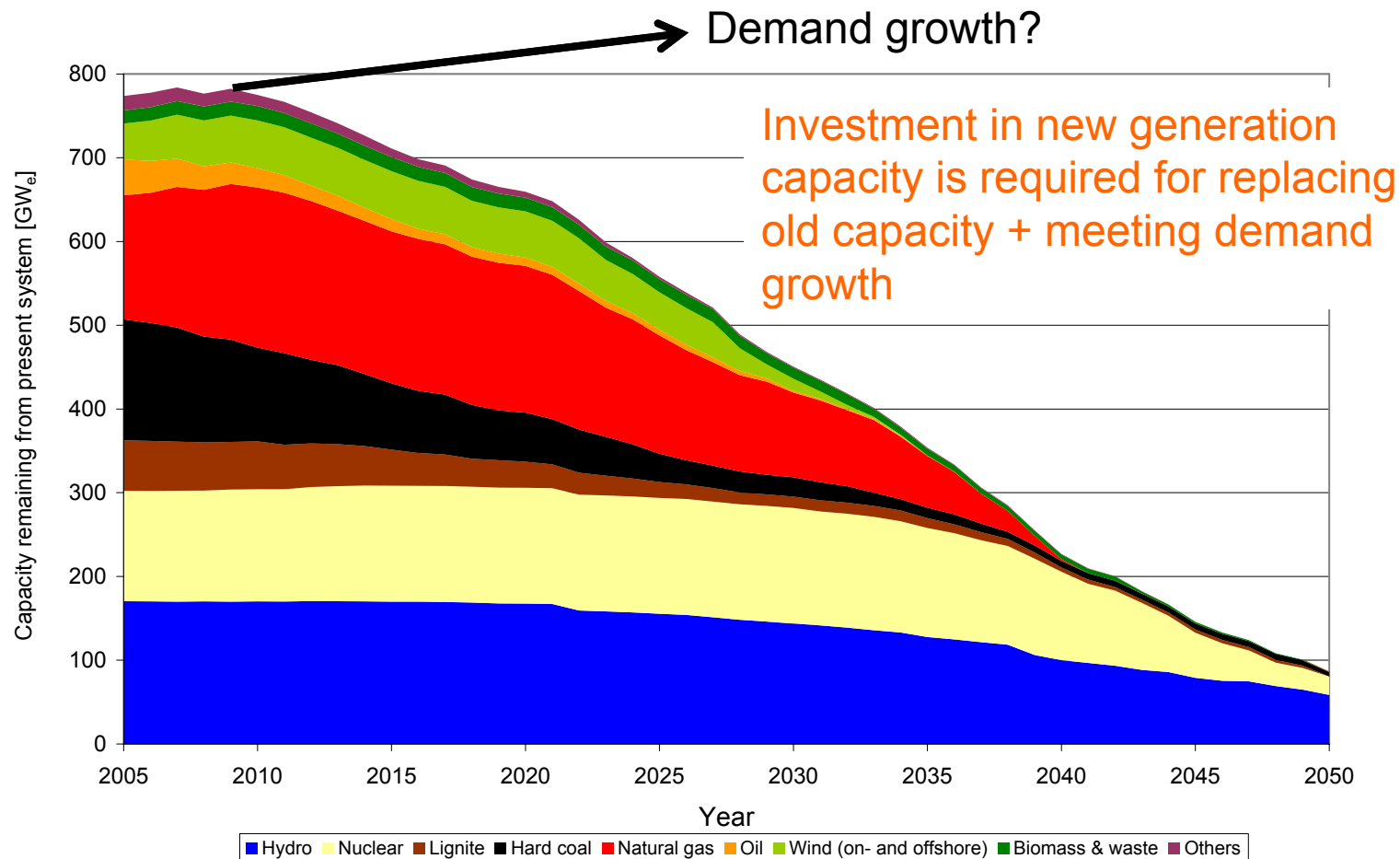
- increasing importance of polygeneration plants that produce a range of products – biofuels, materials, heat and electricity – may place intersectoral biomass competition in a different context (**example given later**)

- non-bioenergy technology development as well as public acceptance and other non-technical aspects can also influence biomass demand in the two sectors; **CCS development may be critical determinant**

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- Stationary energy sector may become a large user of biomass

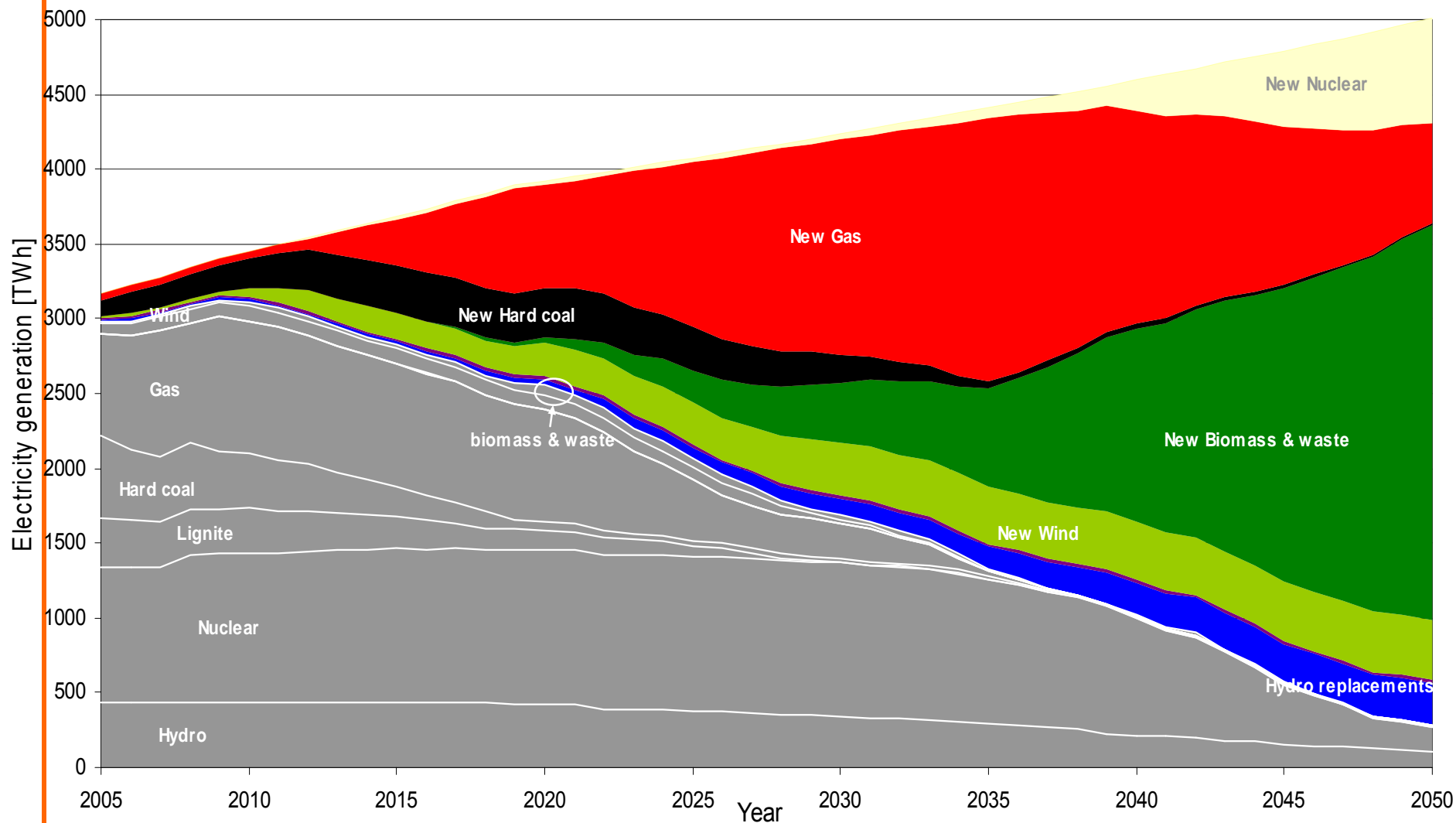


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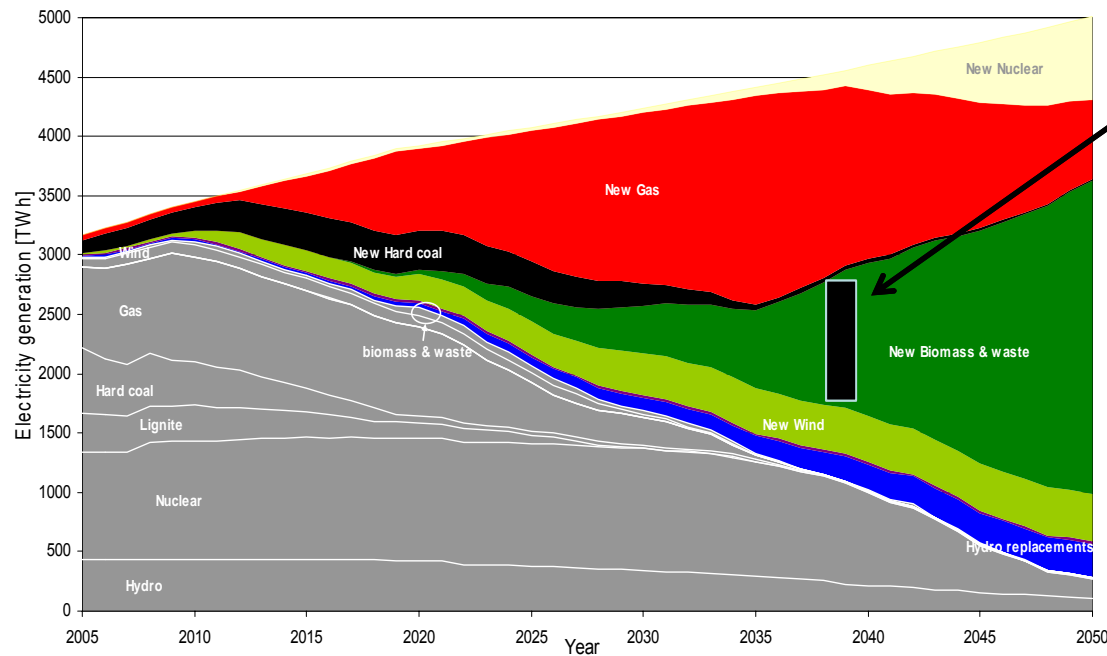


No CCS – Pathway for EU-27 (plus Norway)

30% CO₂ emission reduction by 2020 and 85% by 2050



Magnitude implications...



1000 TWh requires about 9 EJ of biomass at 40% conversion efficiency

Comparison:

- EU25 ind. roundwood: ca. 6 EJ
- EU 25 cereals: 4-5 EJ
- Agri residue pot: 3-4 EJ
- 10 ton dm/ha on 60 Mha: 12 EJ

Summary of findings

- integration of biofuel production in energy/industry combines can improve overall efficiency and economic performance
 - Heat sinks provided by district heating systems can support a large scale establishment of biofuel/heat/power polygeneration plants
 - competitiveness against CHP production crucial determinant of prospects for biofuel/heat/power polygeneration plants
 - restrictions on third party access to district heating networks can be a barrier against implementation

- District heating systems are significant heat sinks in EU
 - an ethanol production plant can also serve the function as heat sink and solid biofuel production plant in energy/industry combines; co-siting with coal power plants suitable for co-firing can be an attractive option

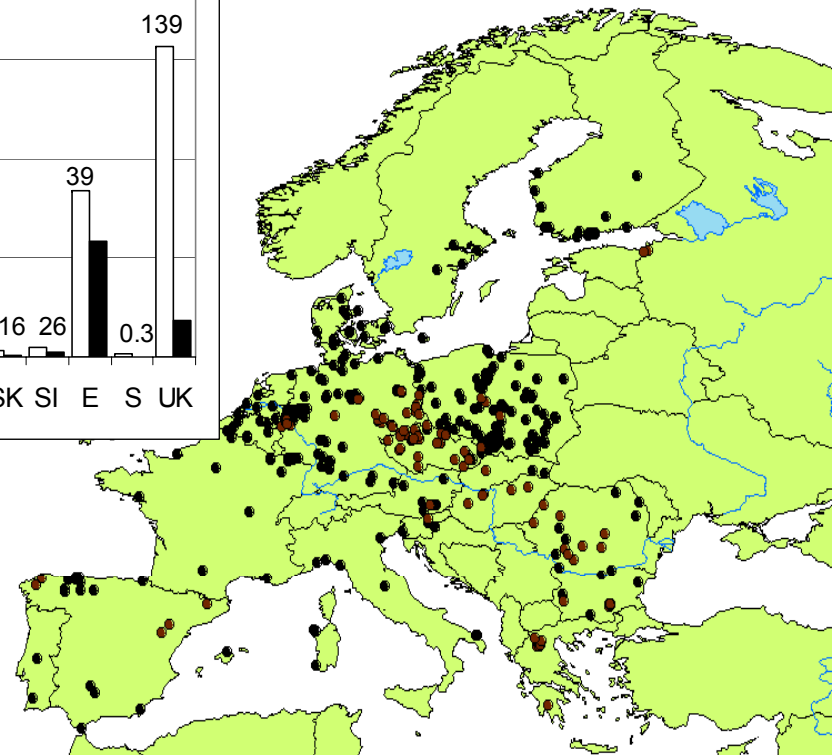
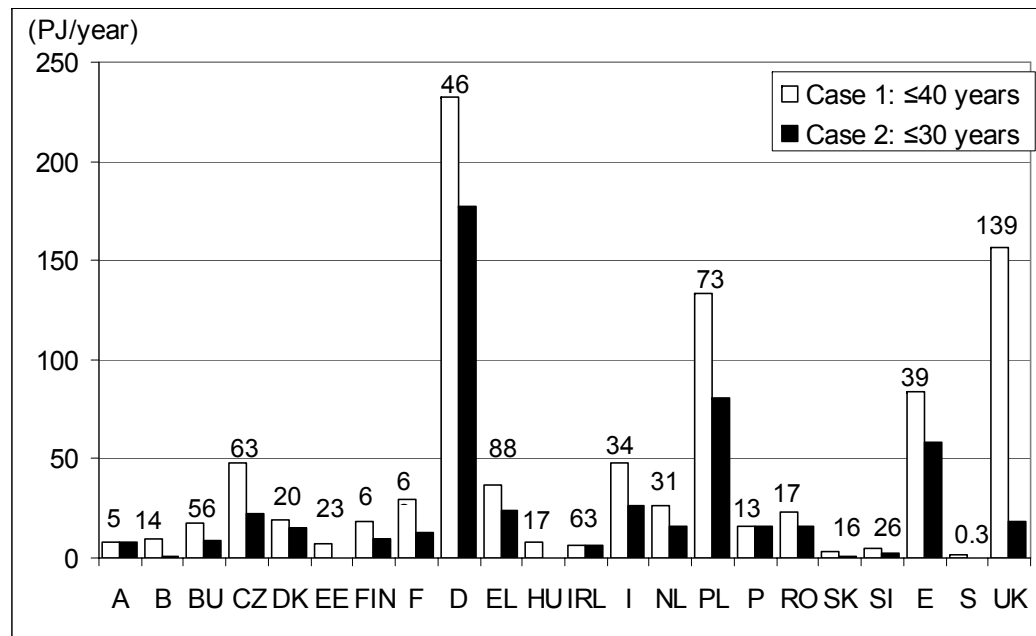


Summary of findings

- Stationary energy most important near term market for lignocellulosic biomass
 - but may contribute to 2nd gen biofuels development by inducing earlier development of the supply infrastructure for 2nd gen biofuel feedstocks
 - biomass co-firing appears to be an attractive early option with longer term prospects depending of C price, CCS availability and attainable biomass share in the fuel mix
 - in case biomass co-firing cannot remain competitive, expansion of 2nd gen biofuel production can benefit from an established feedstock supply infrastructure
 - many power plants can import their biomass: specific instruments may be required for linking co-firing with domestic biomass production

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- Co-firing can be a significant market for lignocellulosic biomass in many MS

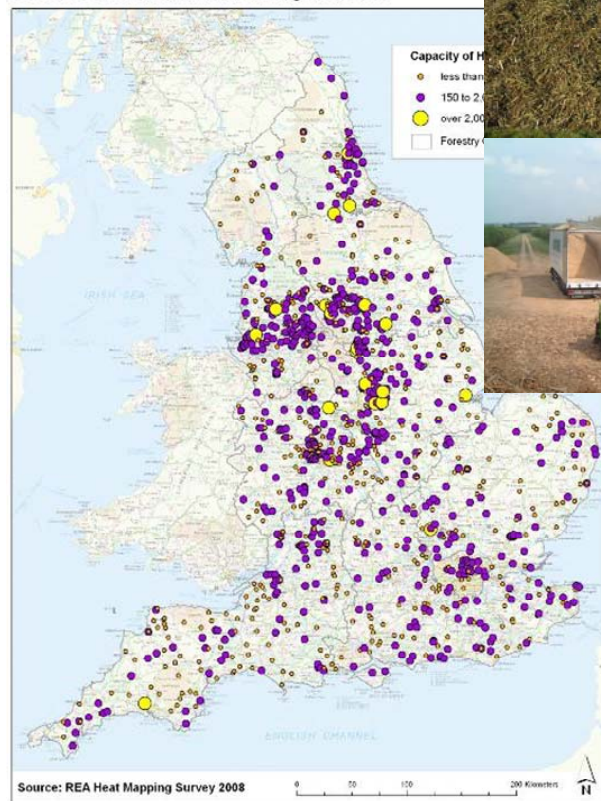


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- Co-firing can be a significant market...

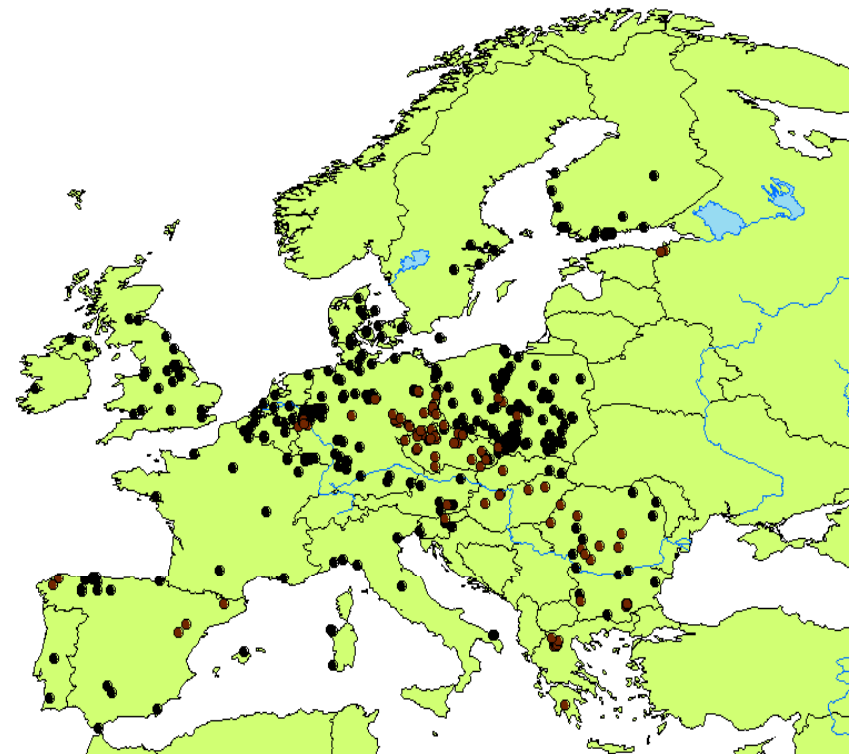
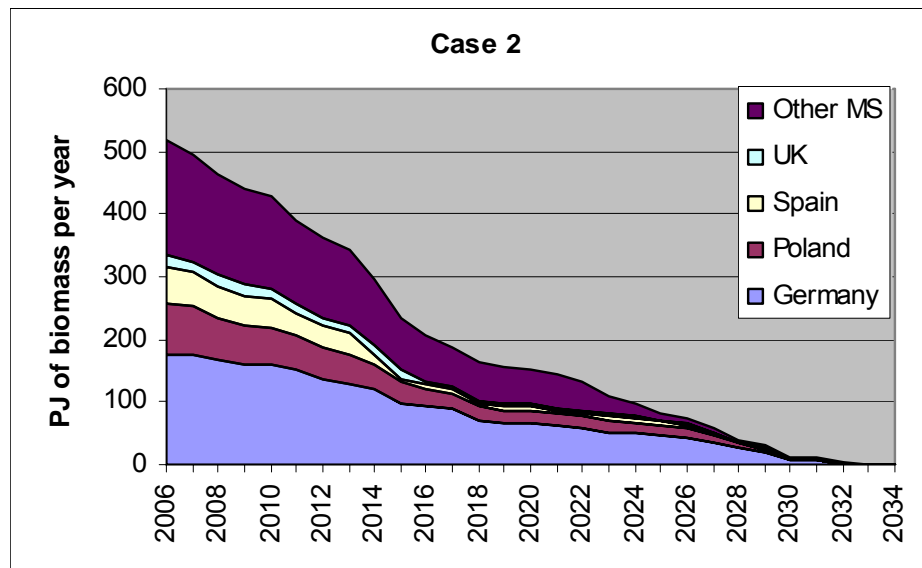
- co-firing complementary to smaller scale (heat) markets
- contrasting business logics: small scale supply vs. large end use

Biomass Heat Installations in England, 2008



Map produced by Corporate Planning, Forestry Commission, England 16/10/2008.
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- Co-firing can be a significant market...and bridging option
 - 2nd gen biofuel production can exploit the established supply infrastructure as co-firing is phased out



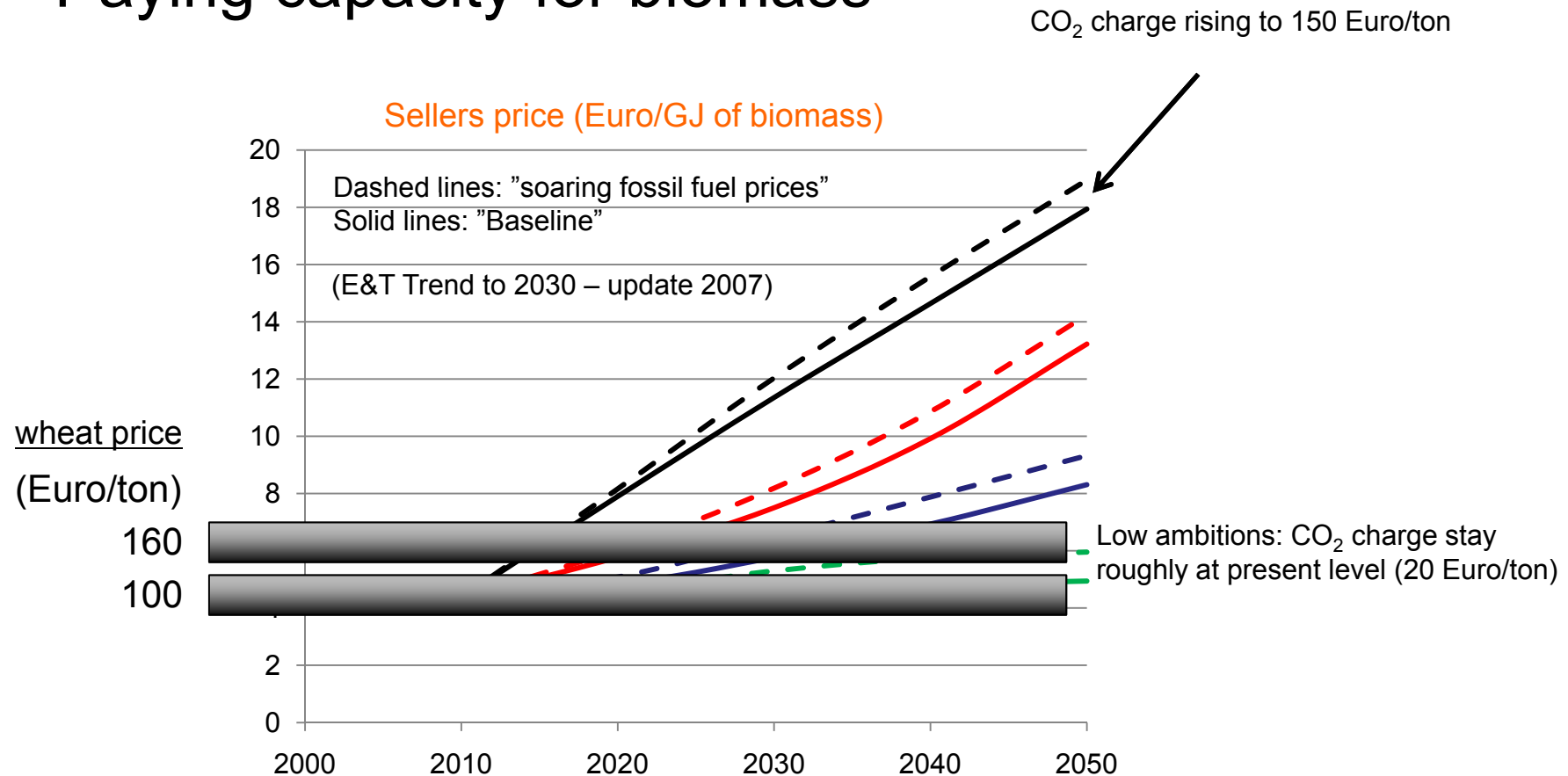
Summary of findings

- Paying capacity for biomass can become very high

- food prices may increase due to competition for feedstock as well as for land

- climate/energy policies affecting stationary energy sector can drive food and land prices in the same way as obligatory biofuel targets – if development is slow for non-bioenergy alternatives in stationary energy

Paying capacity for biomass



For consideration

- Stimulation of domestic biomass production may need linking to early markets, but it is not obvious that imports should be discouraged
 - international biofuel trade is also an activity where learning and connected institutional development need to take place
- Biofuel companies may not be able to make productive use of their surplus heat unless rules make it possible for 3rd parties to get access to district heating networks.
- *Directive on promotion of cogeneration*: promotion of CHP based on useful heat demand is not the only option for saving primary energy, reducing GHG emissions and contributing to the security of energy demand

For consideration

- An energy tax on bioenergy can be one way to keep down food prices
- A carbon tax on meat/dairy production may make more land available for energy crops production

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