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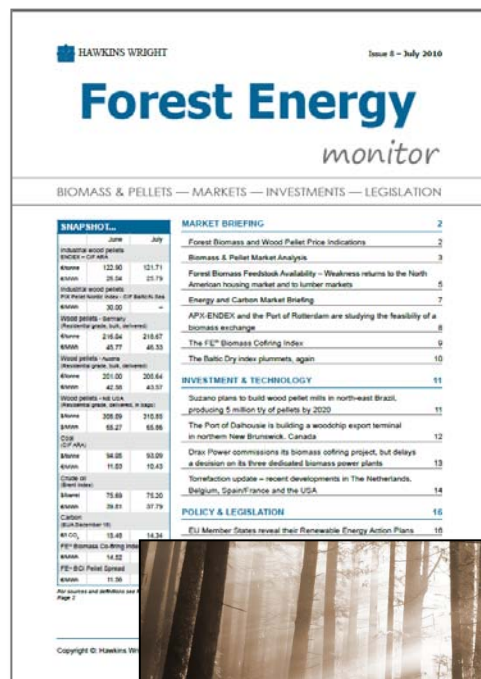
The outlook for European wood pellet and biomass demand

Europulp/Utulp Seminar

Brussels

15 September 2011

Hawkins Wright's woody biomass services



The Supply Chain Economics of Biomass Torrefaction

The opportunities and challenges of emerging torrefaction technologies for biomass fuel suppliers and utilities

A multi-client proposal

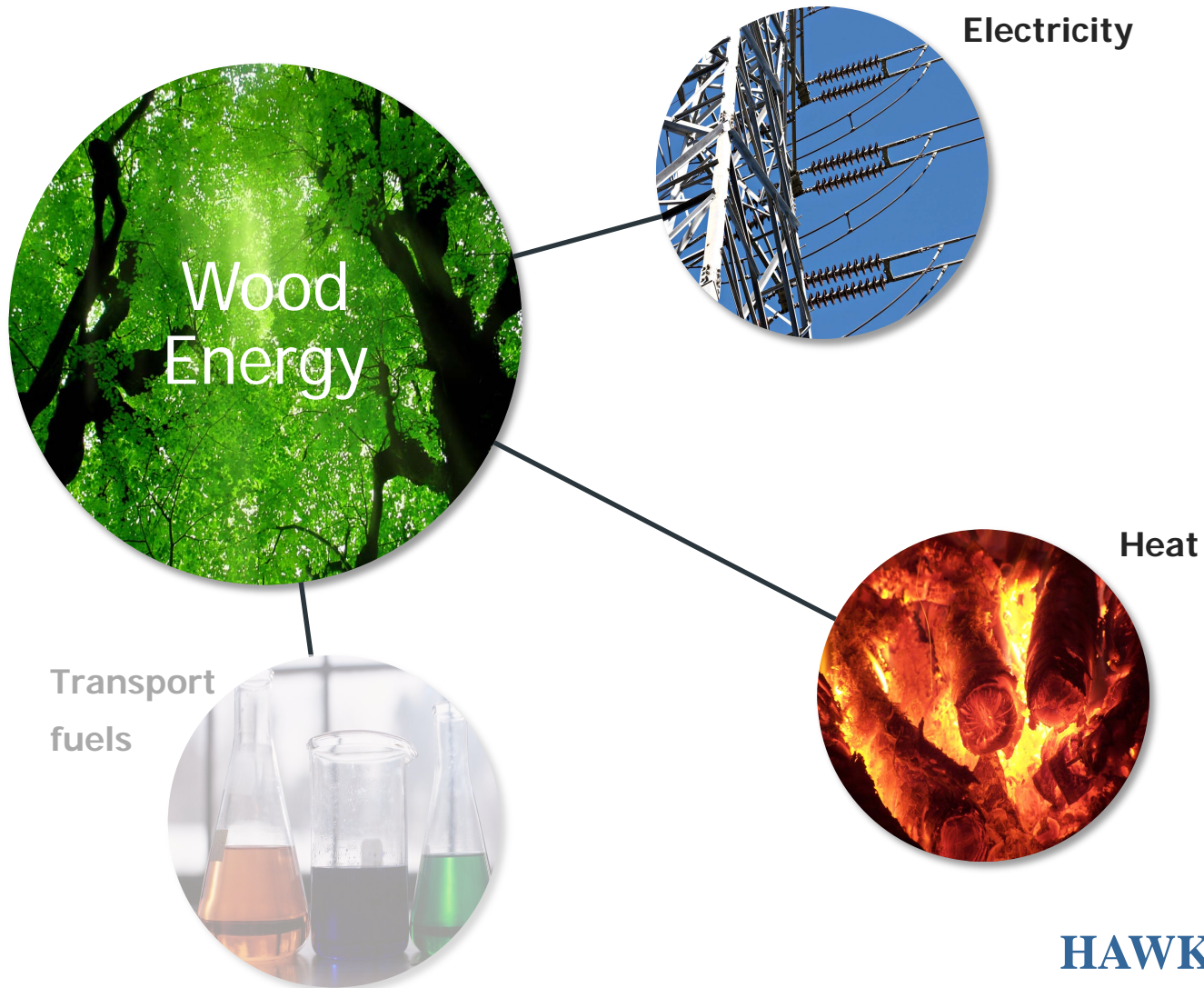
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- Forest Energy Monitor
 - > Published six times a year covering developments in international woody biomass and pellet markets
- Consulting
 - > Strategic advice
 - > Feasibility studies
 - > Market due diligence
 - > Feedstock demand and supply
 - > Price forecasting
- Multi-client studies
 - > 'A strategic assessment of UK investments in biomass power'
 - > 'Energy from Forests'
 - > 'Supply Chain Economics of Biomass Torrefaction' (Autumn 2011)

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Energy from wood...



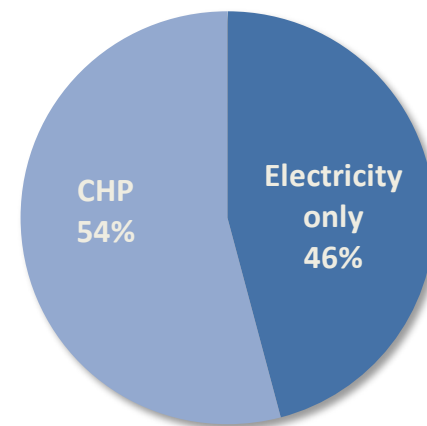
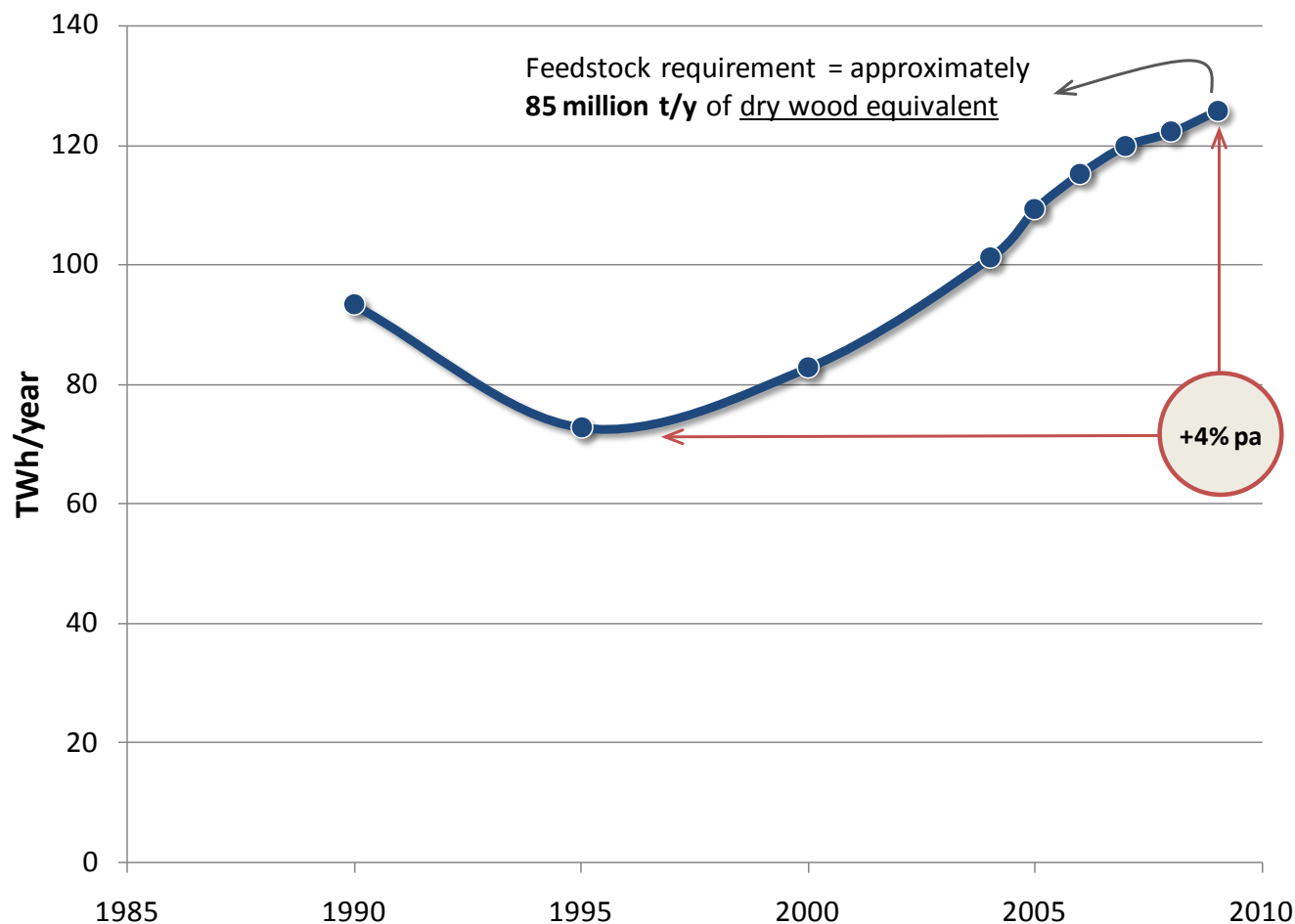
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Agenda



- The scale of existing biomass energy in the OECD
- What's driving renewable energy policy in the EU
- The EU's renewable energy targets and what they mean for biomass and wood pellet demand
- The wood buying competitiveness of wood pellet v market pulp suppliers

Electricity generation from solid biomass* in the OECD



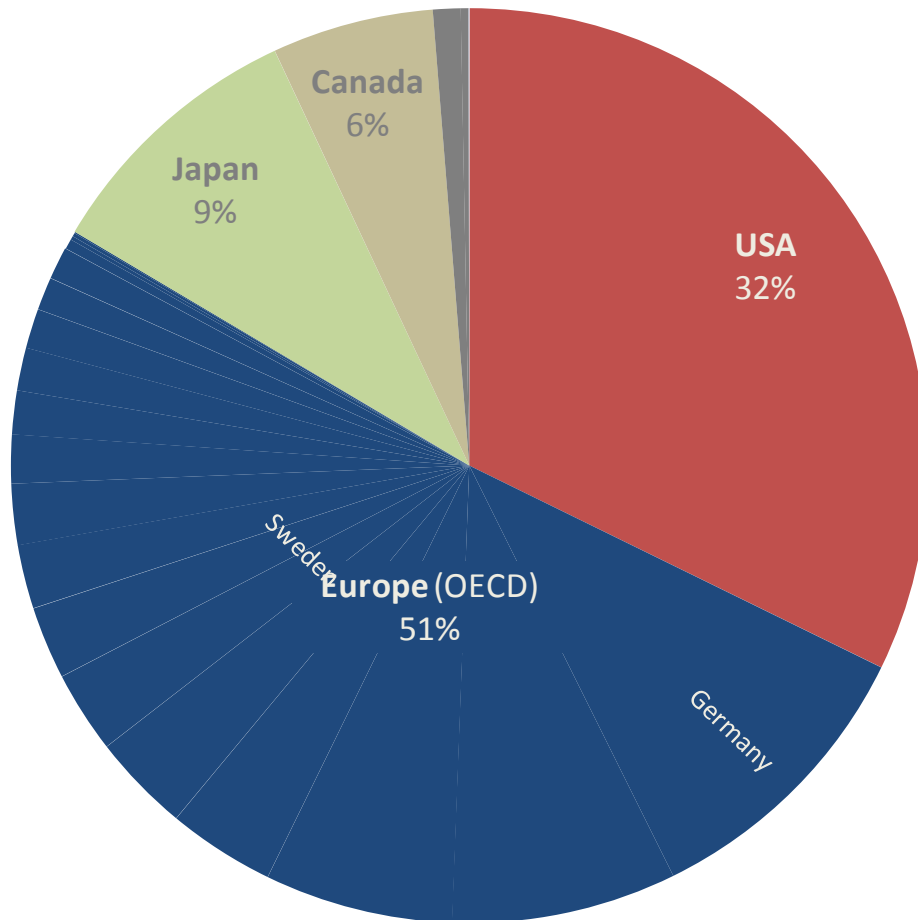
* Solid biomass includes wood and wood waste (incl. black liquor), animal waste materials and charcoal.

Source: IEA (Feedstock requirement is a Hawkins Wright estimate)

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Electricity generation from solid biomass*

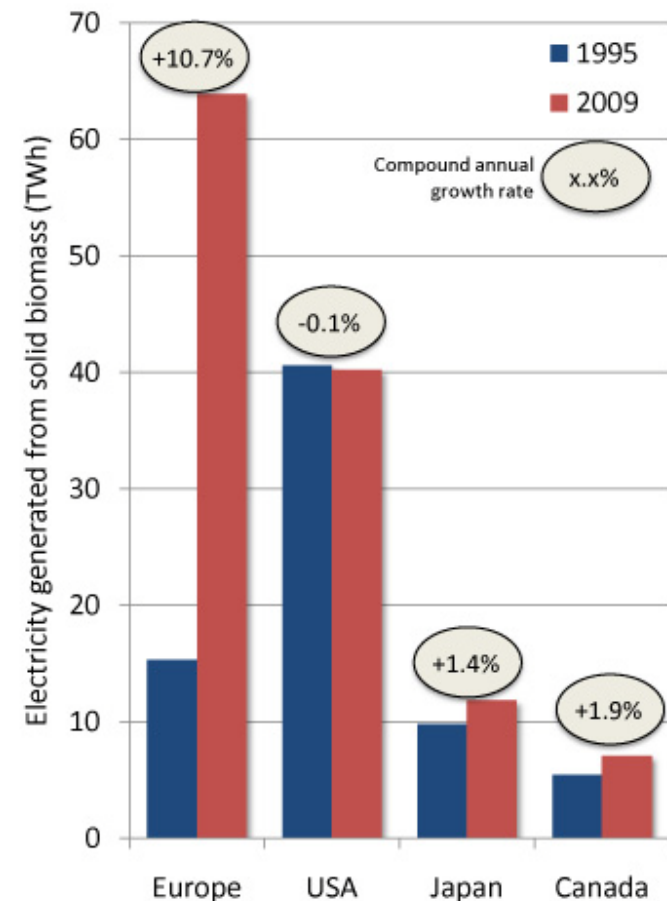
percent of the OECD total



* Solid biomass includes wood and wood waste (incl. black liquor), animal waste materials and charcoal.

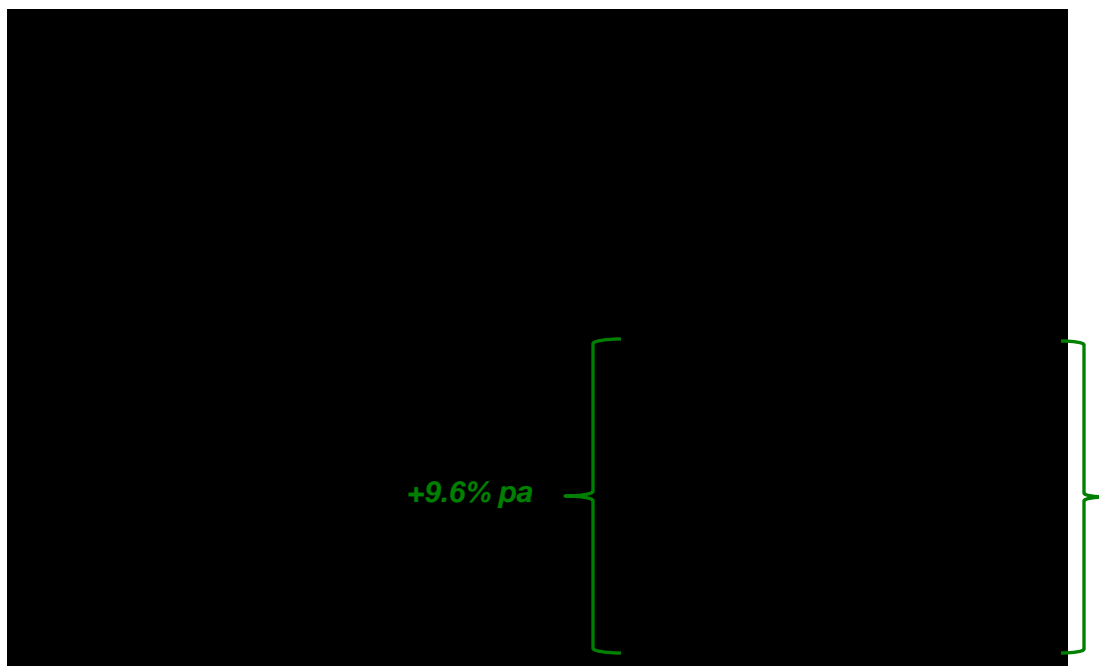
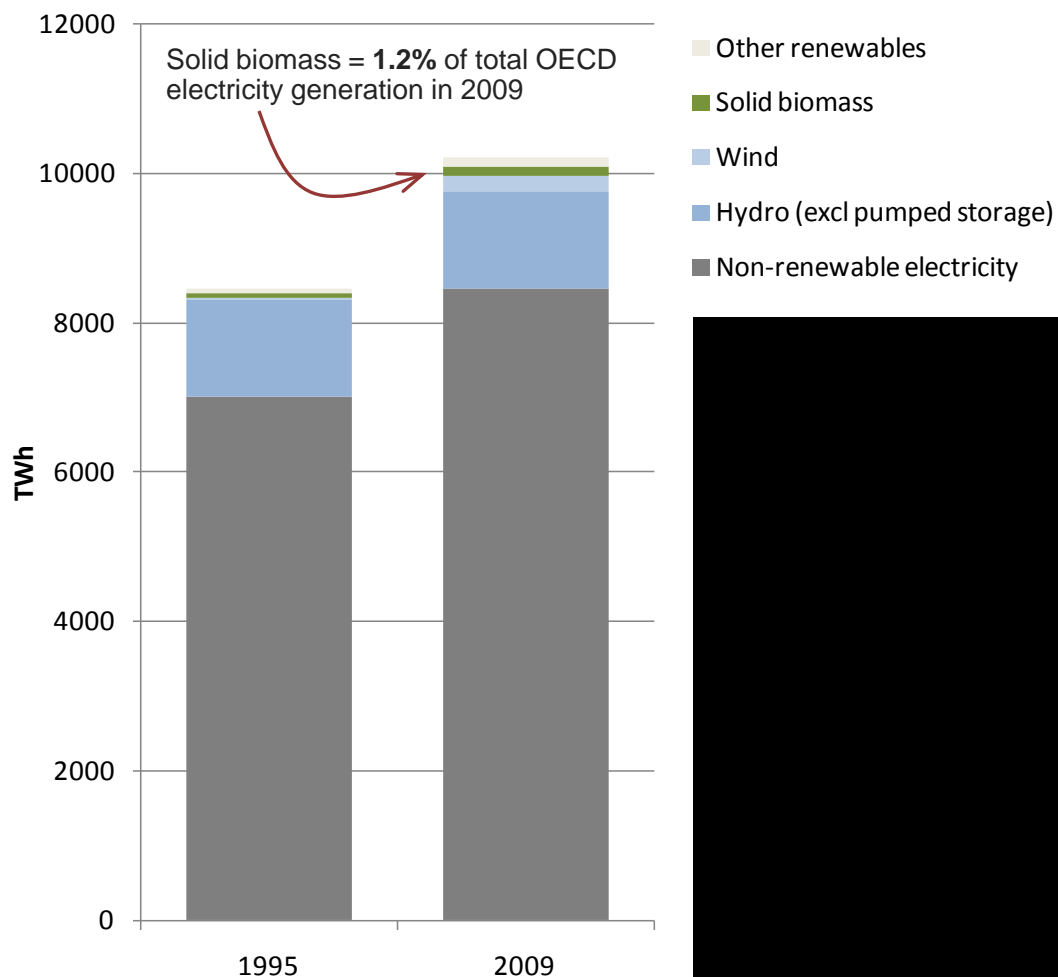
Source: IEA

Electricity generation from solid biomass: 1995 and 2009



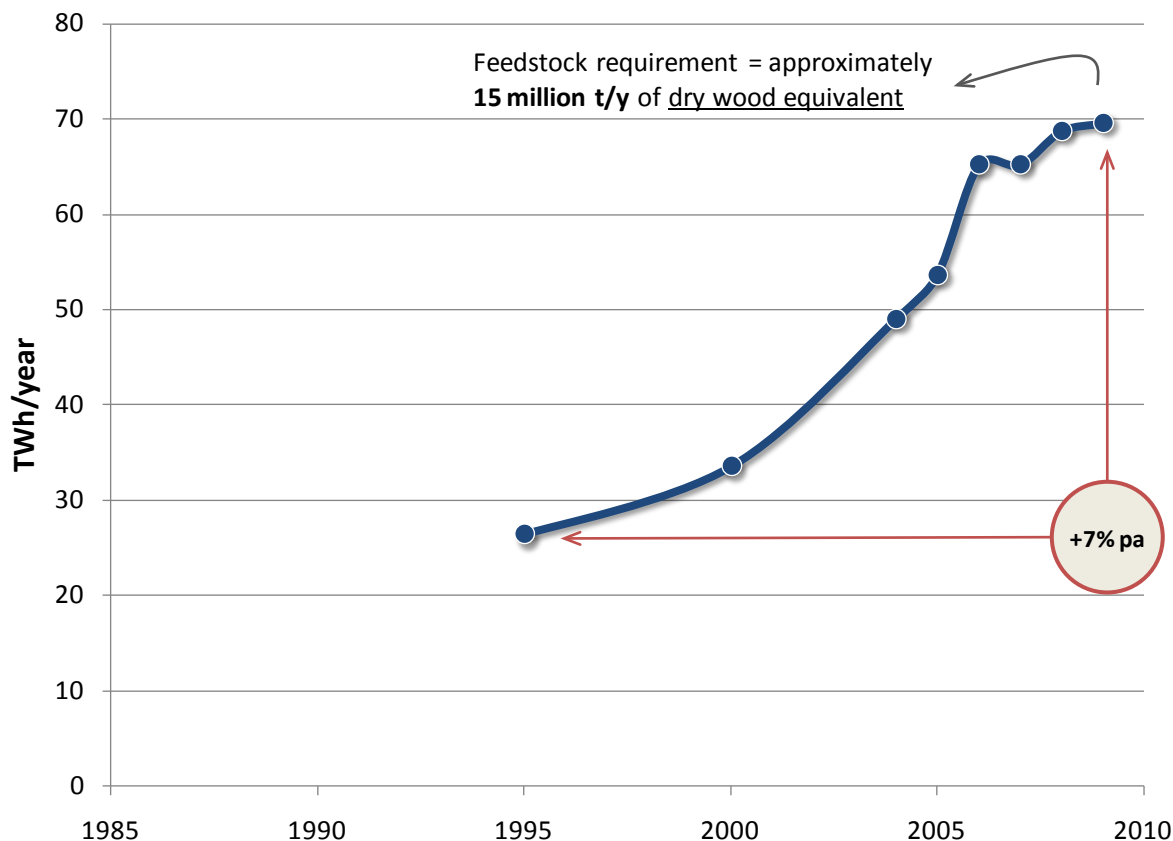
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Electricity generation by fuel source in the OECD



Heat generation from solid biomass*

in the 'transformation' sector in the OECD



* Solid biomass includes wood and wood waste (incl. black liquor), animal waste materials and charcoal.

Source: IEA (Feedstock requirement is a Hawkins Wright estimate)



- **Tackling climate change**

- > A high degree of political commitment, even if public support is lagging some way behind

- **Energy security**

- > Worries about Europe's increasing dependence on imported energy, particularly (Russian) natural gas, and Middle Eastern oil
- > The need to replace obsolete electricity generating capacity (coal, oil and now, in Germany, nuclear)

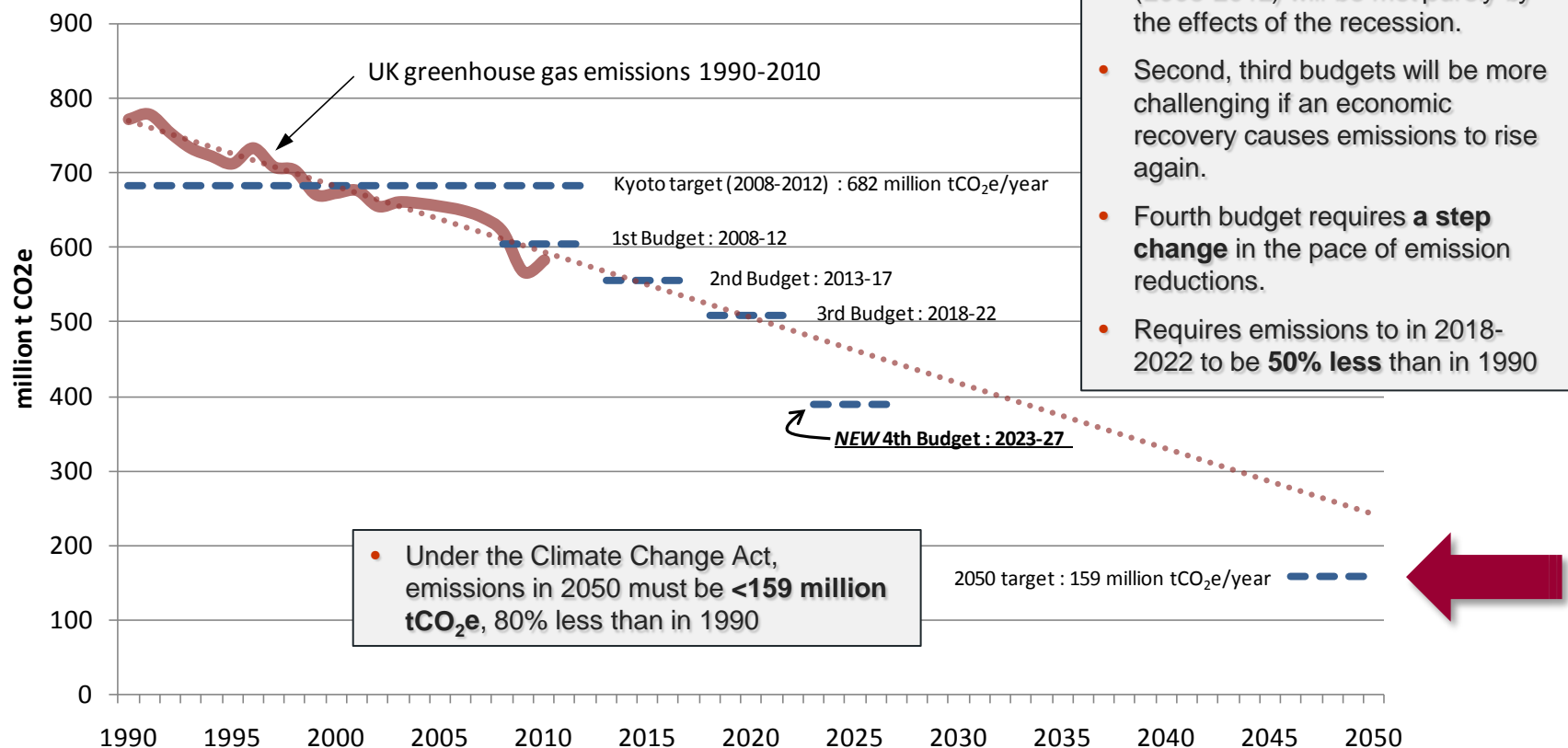
- **Energy prices**

- > Recent events (floods, earthquakes, relentless increases in Chinese demand) have emphasised our economies' vulnerability to the rising cost of conventional energy sources

European renewable energy policy drivers



Meeting greenhouse gas emission targets in the UK...



Source: Hawkins Wright research

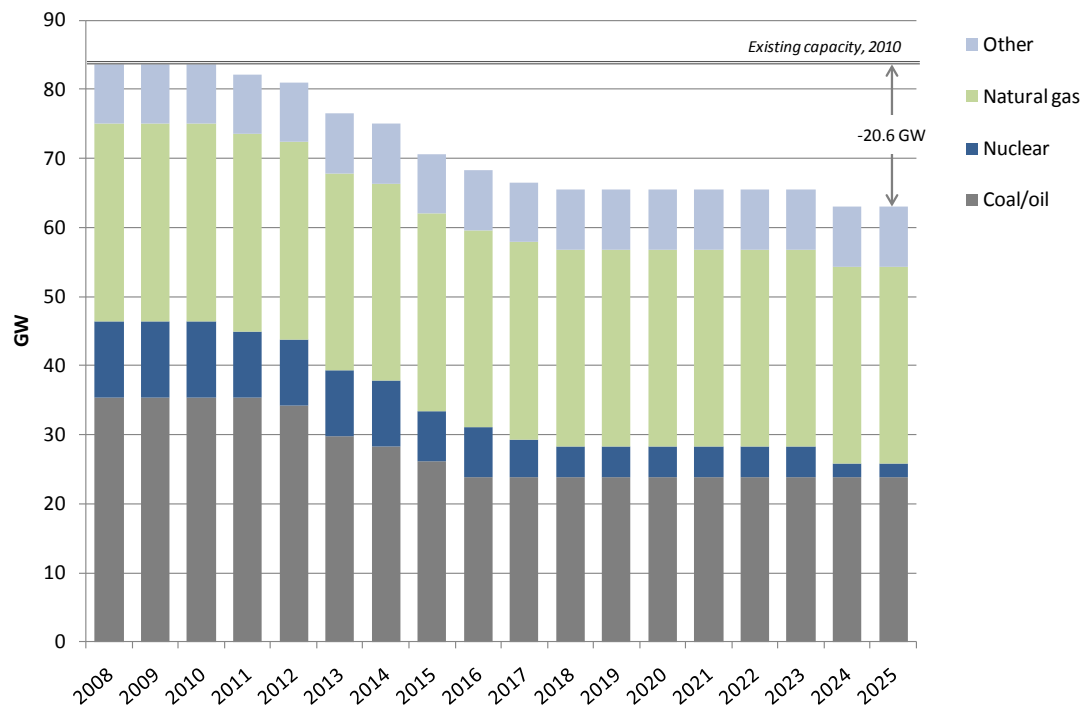
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European renewable energy policy drivers



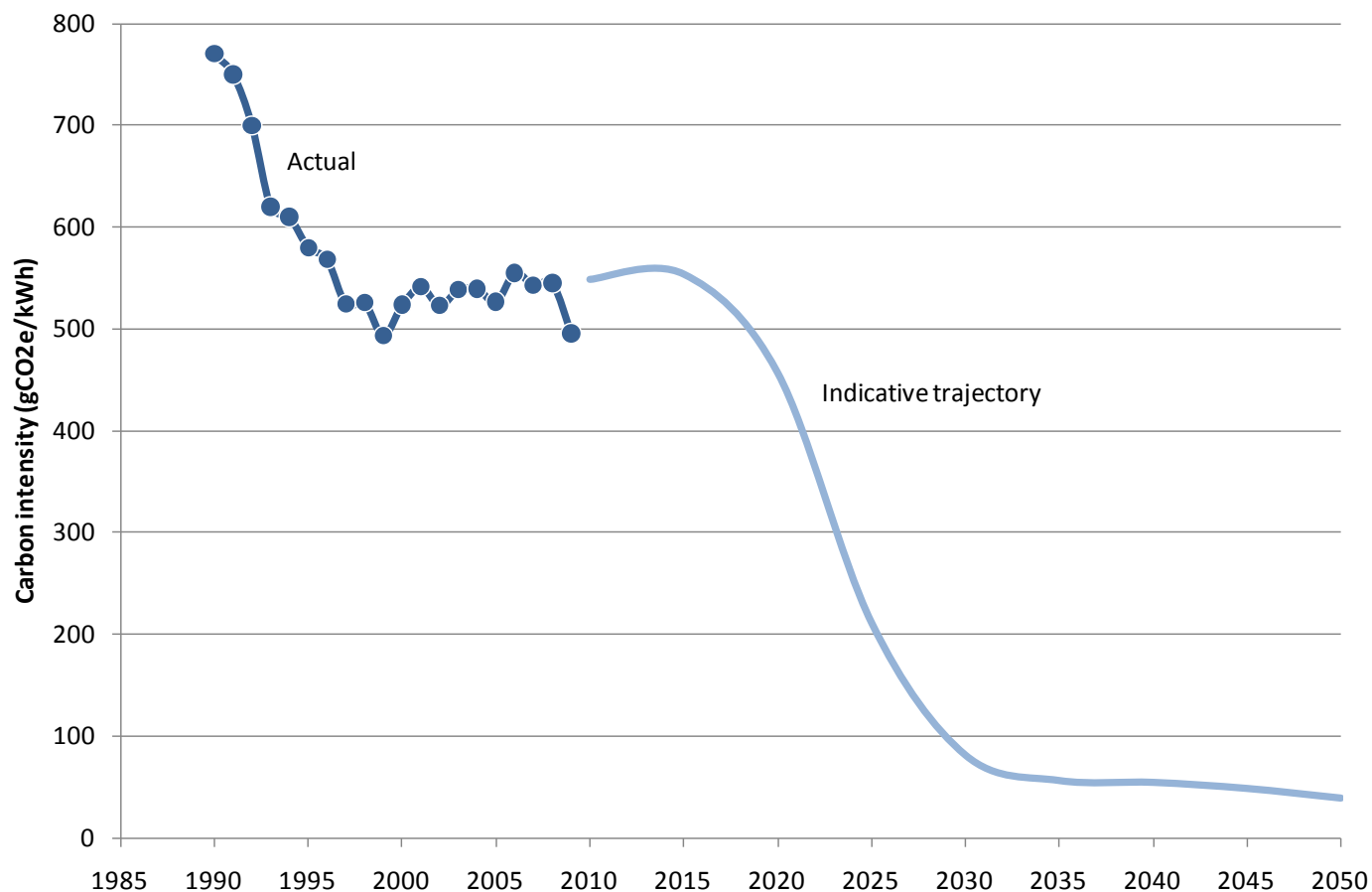
Filling an emerging energy gap...

Electricity generating capacity from existing UK plants



- A quarter of the UK's generating capacity is due to close by 2025
- 21GW of new generating capacity will be required by just to maintain capacity at current levels

Carbon intensity of UK electricity generation

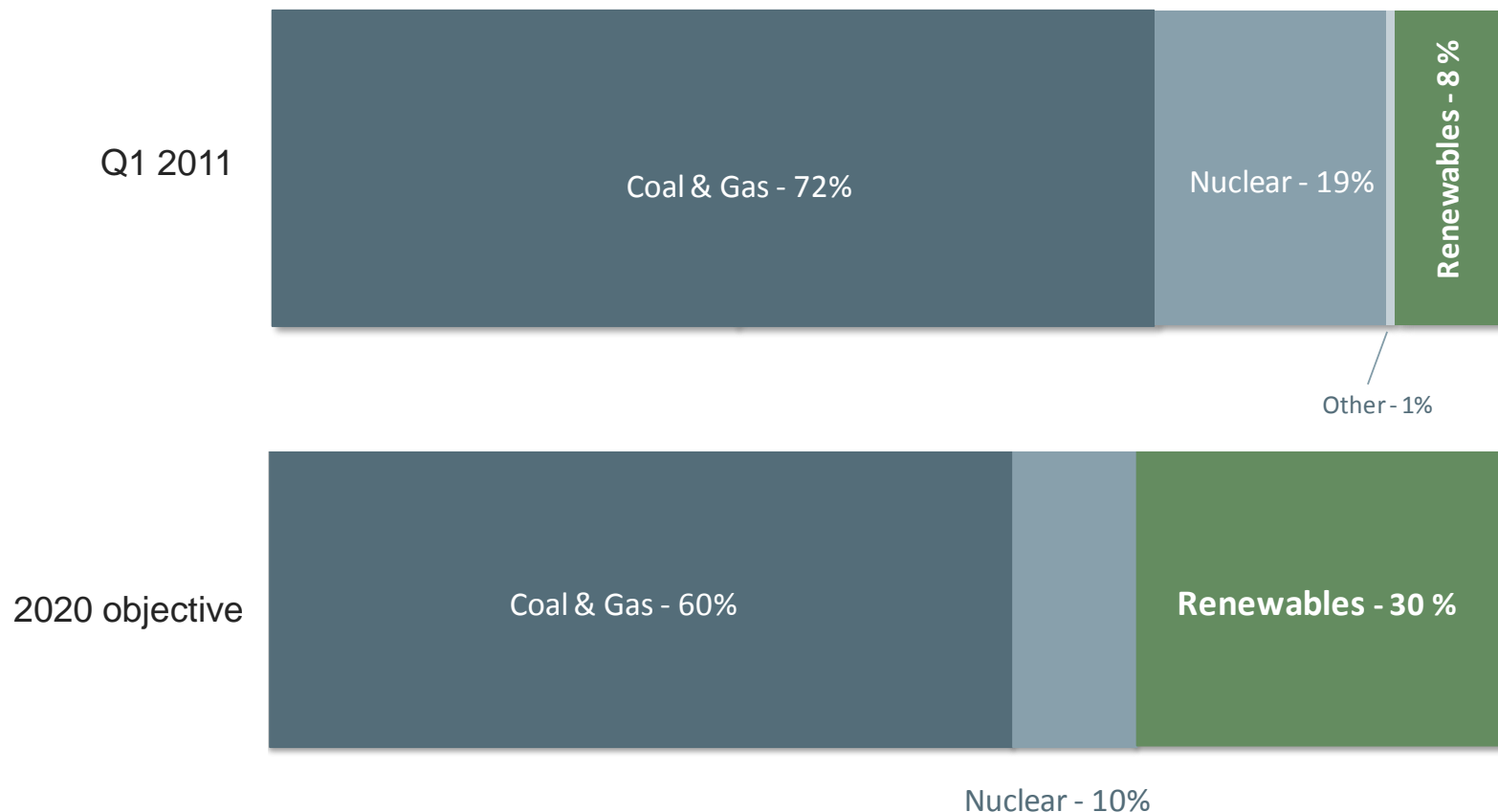


Source: Committee on Climate Change, 2010

UK electricity generation mix

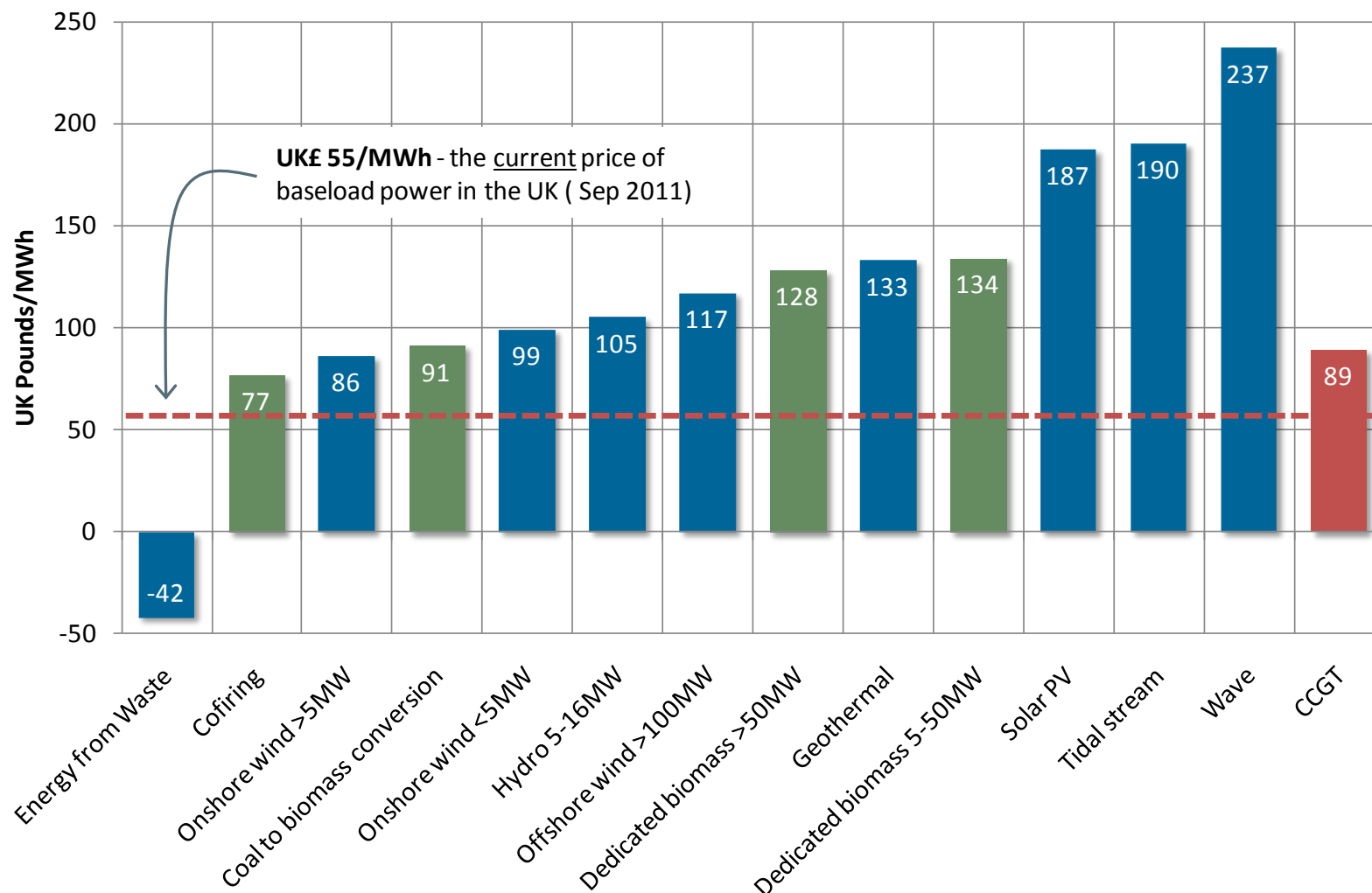


To meet the 2020 target, the UK's renewable electricity output needs to grow by 15% pa over the next decade



Levelised costs of electricity technologies

'Medium' scenario 2020 projections



Source: Arup and DECC (2011)

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EU's Renewable energy targets



- The EU's Renewable Energy Directive (The 20-20-20 targets)
 - > **reduce EU greenhouse gas emissions by at least 20%** compared to 1990 levels; i.e. unilaterally extending the EU's 8% Kyoto obligation *
 - > 20% of the EU's final energy consumption to come from **renewable sources** by 2020
 - > reduce primary energy use by 20% compared with projected levels; to be achieved by **improving energy efficiency**

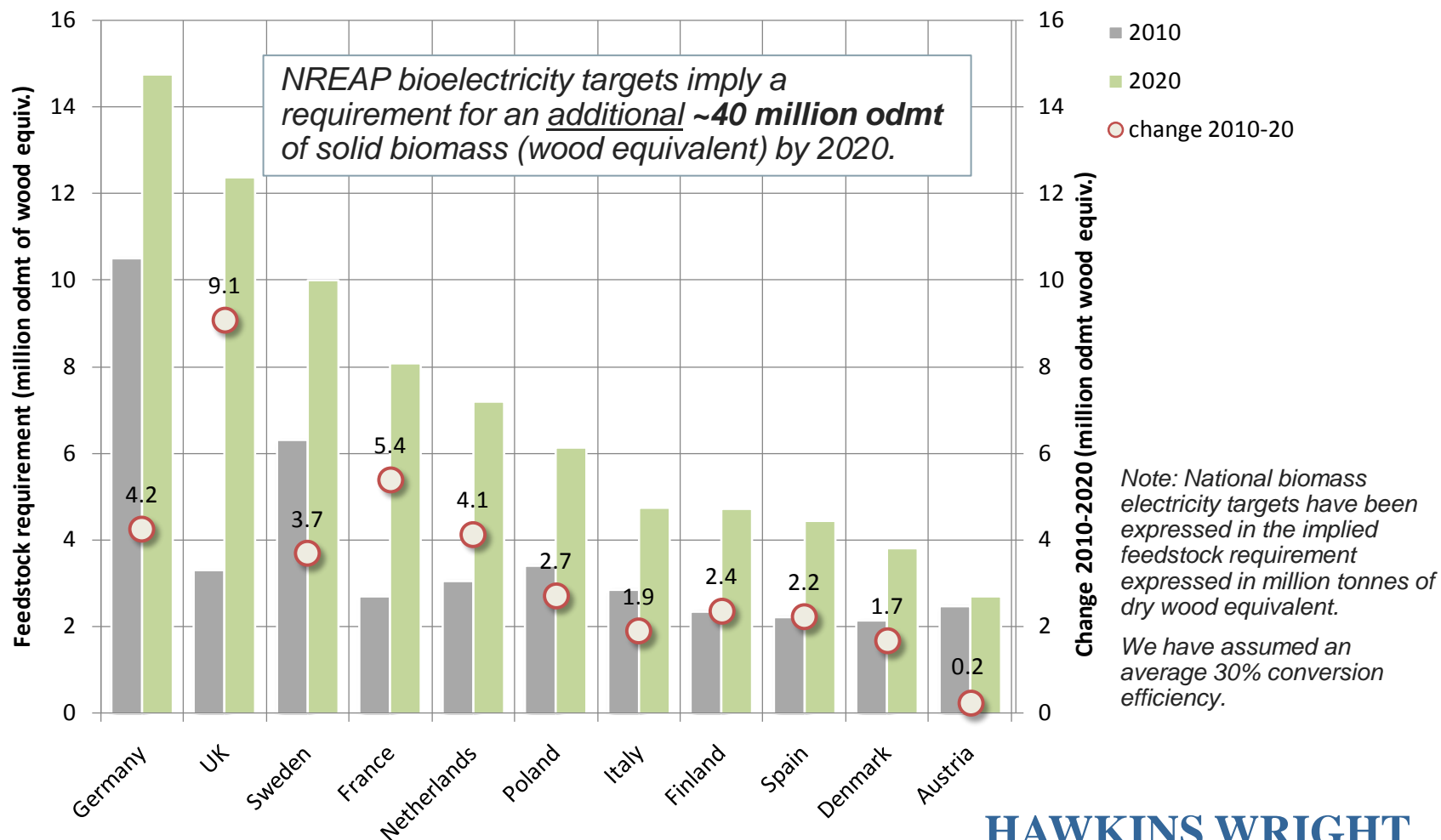
* Some EU leaders have offered to increase the EU's GHG emissions reduction target to 30% if other major emitting countries committed to do their 'fair share' under a global climate agreement. Still being discussed... (don't hold your breath!)

How countries plan to meet their targets

National Renewable Energy Action Plans (NREAPs)



Electricity generated from solid biomass – 2010 & 2020

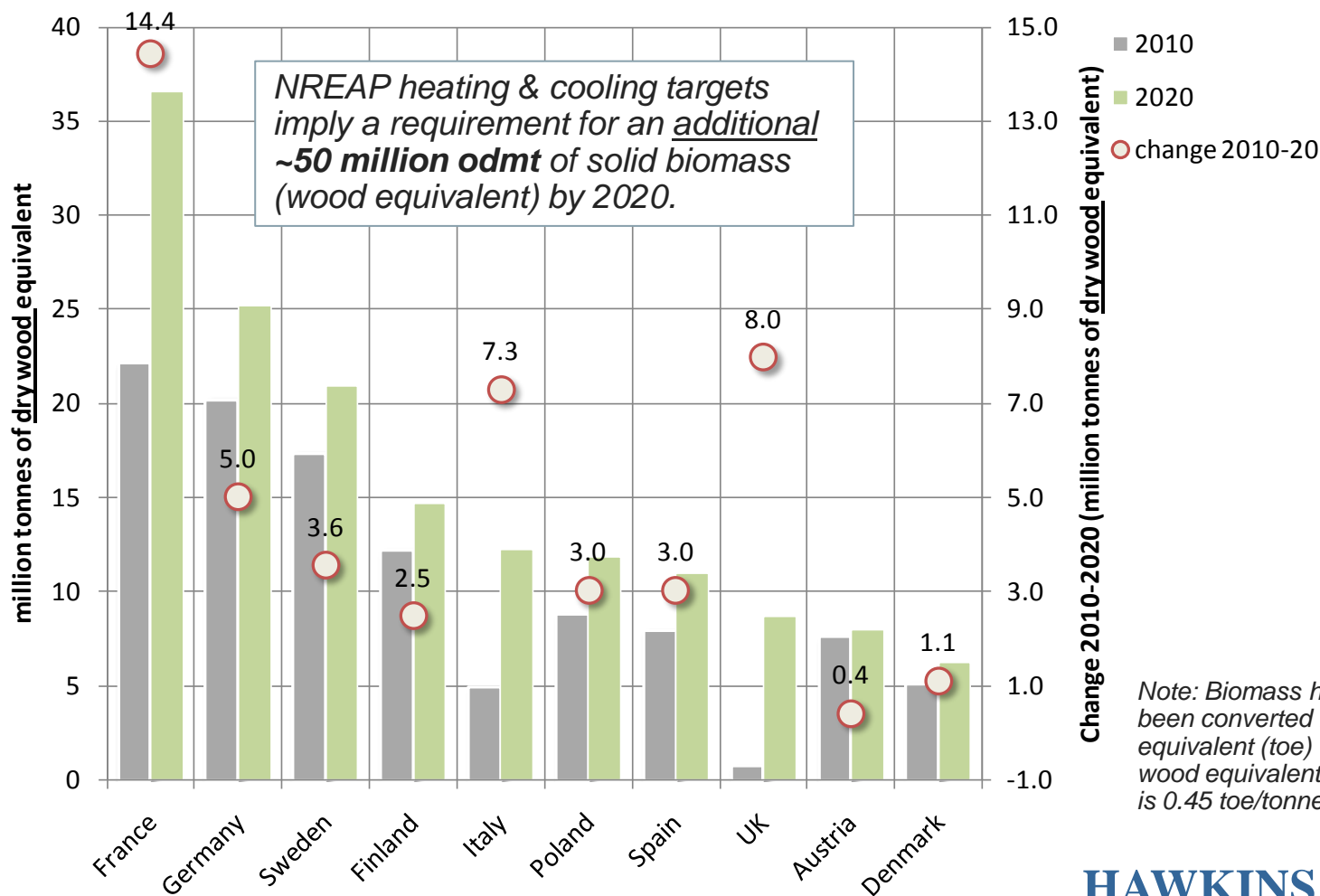


How countries plan to meet their targets

National Renewable Energy Action Plans (NREAPs)



Heating & cooling from biomass – 2010 & 2020

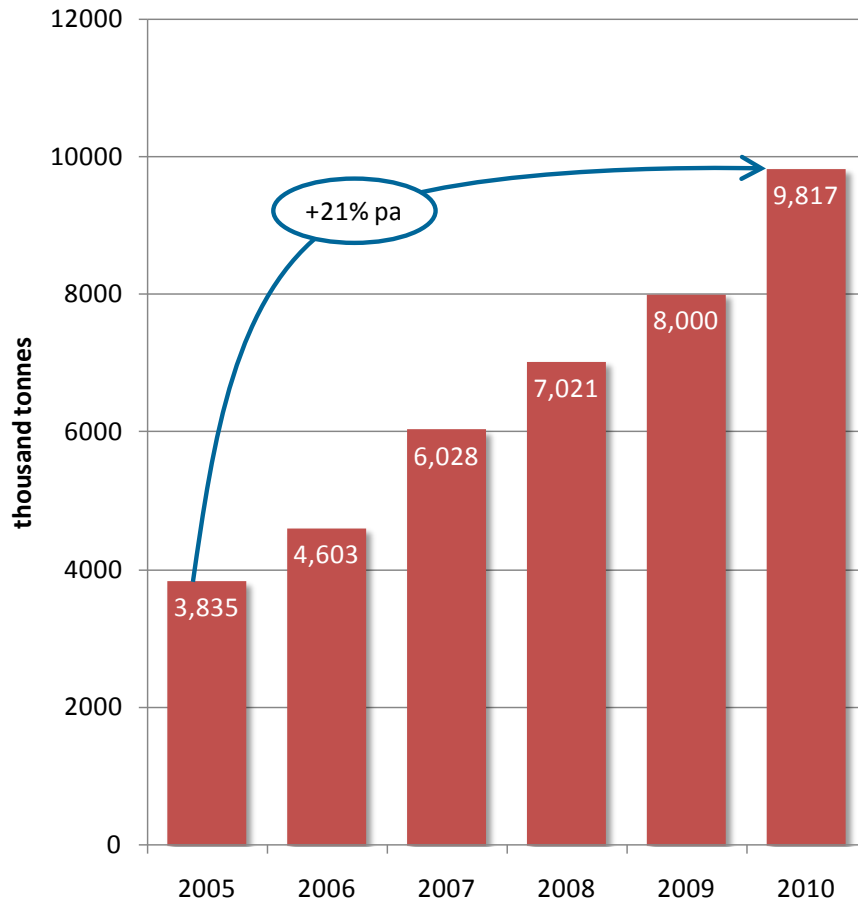


Note: Biomass heat demand has been converted from tonnes of oil equivalent (toe) to tonnes of dry wood equivalent, assuming that there is 0.45 toe/tonne of dry wood.

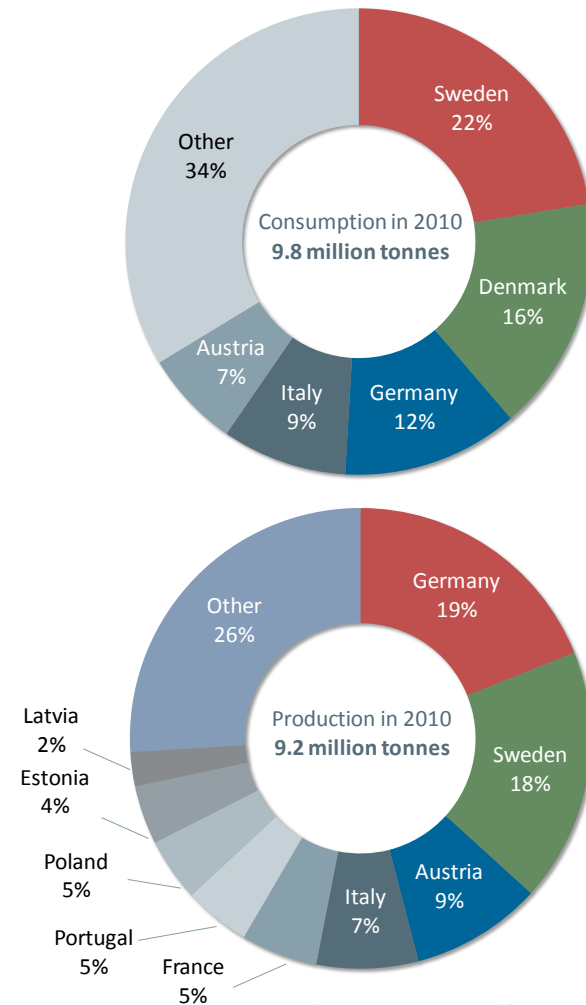


European wood pellet markets

Wood pellet consumption, growing by 21% pa



Source: AEBIOM

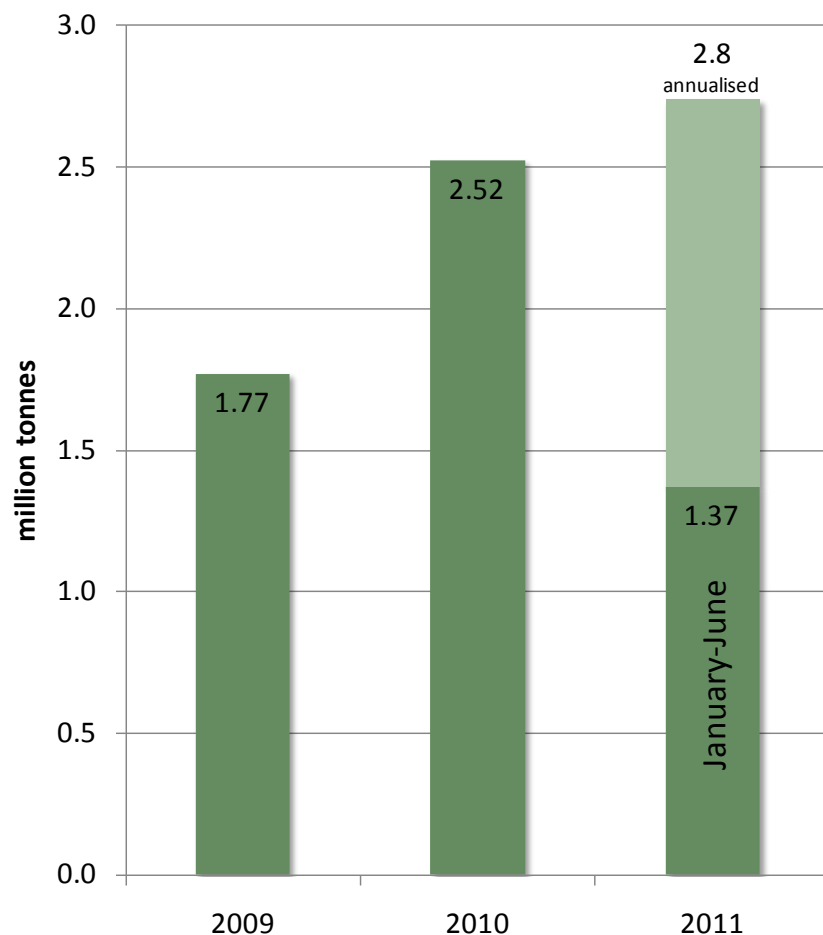


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EU imports of wood pellets from non-EU countries



Wood pellet imports, growing by 26% pa



Source: Eurostat, Hawkins Wright



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Wood pellet trade matrix – Jan-June 2011

Imports of pellets by selected EU countries by origin



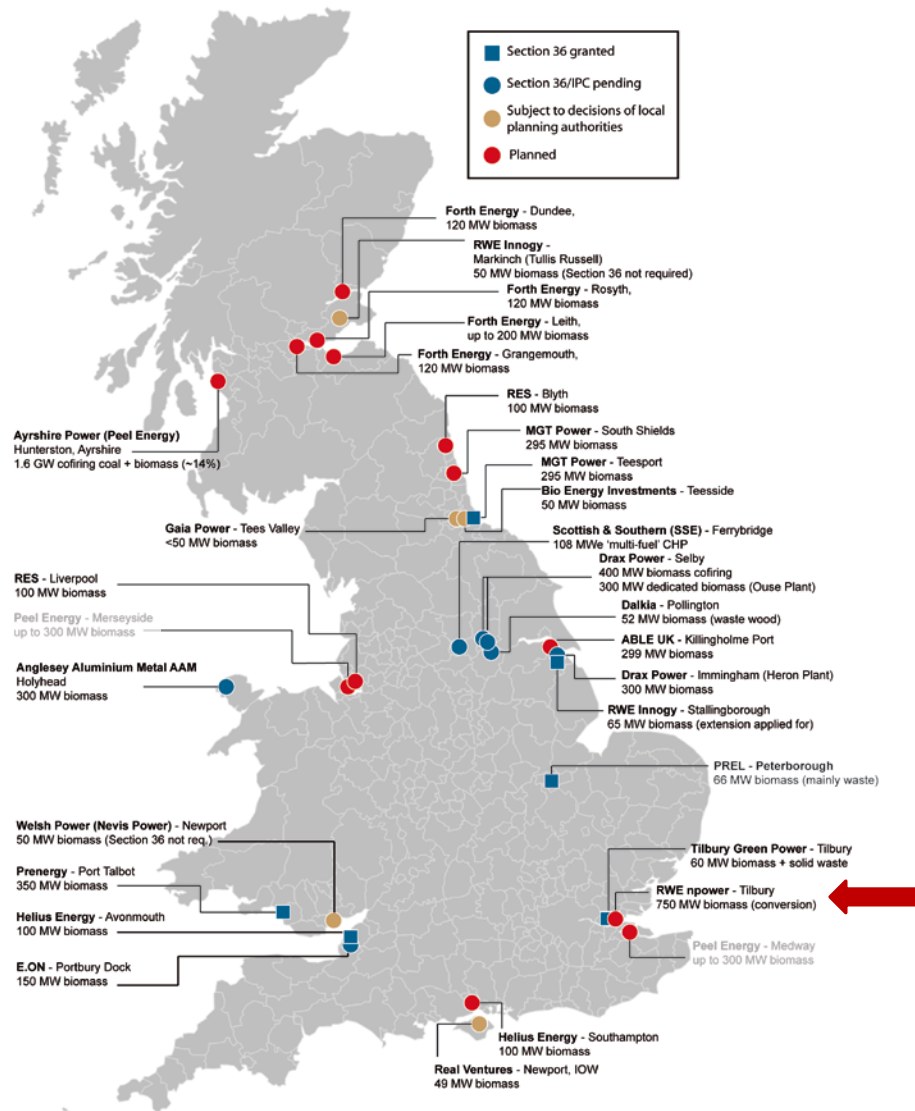
thousand tonnes		COUNTRY OF ORIGIN						TOTAL H1 2011	TOTAL H1 2010	% change
	Canada	USA	Russia	Belarus	Australia	South Africa	Other non-EU27			
UK	240	110	1	-	-	3	13	367	125	+194%
Netherlands	222	114	3	-	14	10	1	364	486	-25%
Sweden	26	28	86	-	-	-	5	145	102	+42%
Denmark	6	33	90	9	-	-	6	144	165	-13%
Belgium	83	27	-	-	-	-	1	111	132	-16%
Italy	23	8	4	1	-	-	66	102	55	+85%
Poland	-	-	3					47	11	327%
Germany	1	-	2					16	56	-71%
Finland	-	-	7					7	5	+40%
Other EU27	1	-	4					67	48	+40%
TOTAL H1 2011	602	320	200	40	14	13	181	1,370	1,185	+16%
TOTAL H1 2010	430	382	190	44	22	9	108	1,185		
% change	+40%	-16%	+5%	-9%	-36%	+44%	+68%	16%		

- North America accounts for two thirds of EU import supply
- Six EU countries account for 90% of EU import demand

Source: Eurostat

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Snapshot of UK investments in biopower



- There are about 30 biomass power projects in the UK with a capacity >50 MWe whose feedstock includes wood and/or waste wood. Total capacity is about 5.1 GWe
- Perhaps >30 smaller power and CHP projects with capacities of 5-50 MWe are at various stages of development.
- In total, possibly 6-7 GWe of biomass power capacity is being considered with varying degrees of seriousness by UK investors

Wood paying capability (WPC)

Pellets v pulp



The wood paying capability of a pulp producer exceeds that of a pellet producer in the southern US. The price that a typical pellet producer can pay for wood before they incur a loss is around \$28/green tonne, compared to about \$66/t for a market pulp producer.

Wood pellets

US\$/tonne pellets

A : Industrial pellet price (cif Rotterdam) \$ 181

less:

Depreciation & interest

Freight (domestic & ocean)

SG&A

Maintenance

Labour

Energy (elec & heat)

B : Sub-total (supply cost excluding wood) \$ 134

C : Wood paying capability per tonne pellets (A - B) \$ 47

D : Wood paying capability per green tonne over bark **\$ 28**

Wood pulp

US\$/tonne pulp

A : NBSK pulp price, net (cif NW Europe) \$ 760

less:

Depreciation & interest

Freight (domestic & ocean)

SG&A

Maintenance

Labour

Energy

Chemicals

B : Sub-total (supply cost excluding wood) \$ 464

C : Wood paying capability per tonne of pulp (A - B) \$ 296

D : Wood paying capability per green tonne over bark **\$ 66**

The price of market pulp would need to drop to <\$600/t before the wood paying capability of a pulp producer in the US South matched the current WPC of a wood pellet producer

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Wood paying capability (WPC)

Pellets v pulp



The affordability of wood for a pulp producer v a pellet producer in the southern US: the price that a typical user can pay for wood before they incur a loss, based on estimated total costs of supply, including capital.

Wood pellets

US\$/tonne pellets

A : Industrial pellet price (cif Rotterdam) \$ 181

less:

Depreciation & interest

Freight (domestic & ocean)

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Maintenance

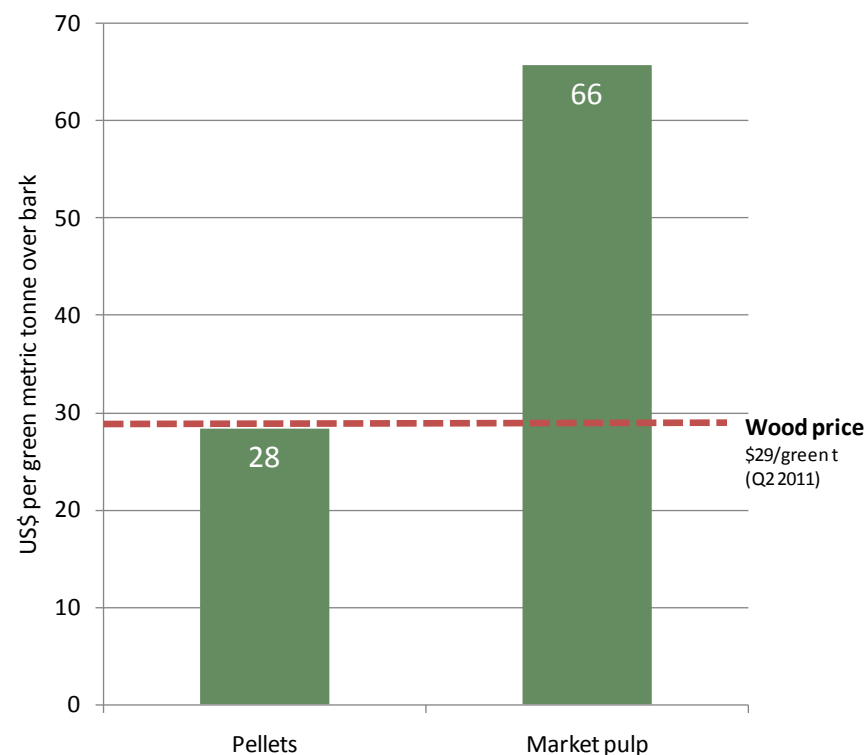
Labour

Energy (elec & heat)

B : Sub-total (supply cost excluding wood) \$ 134

C : Wood paying capability per tonne pellets (A - B) \$ 47

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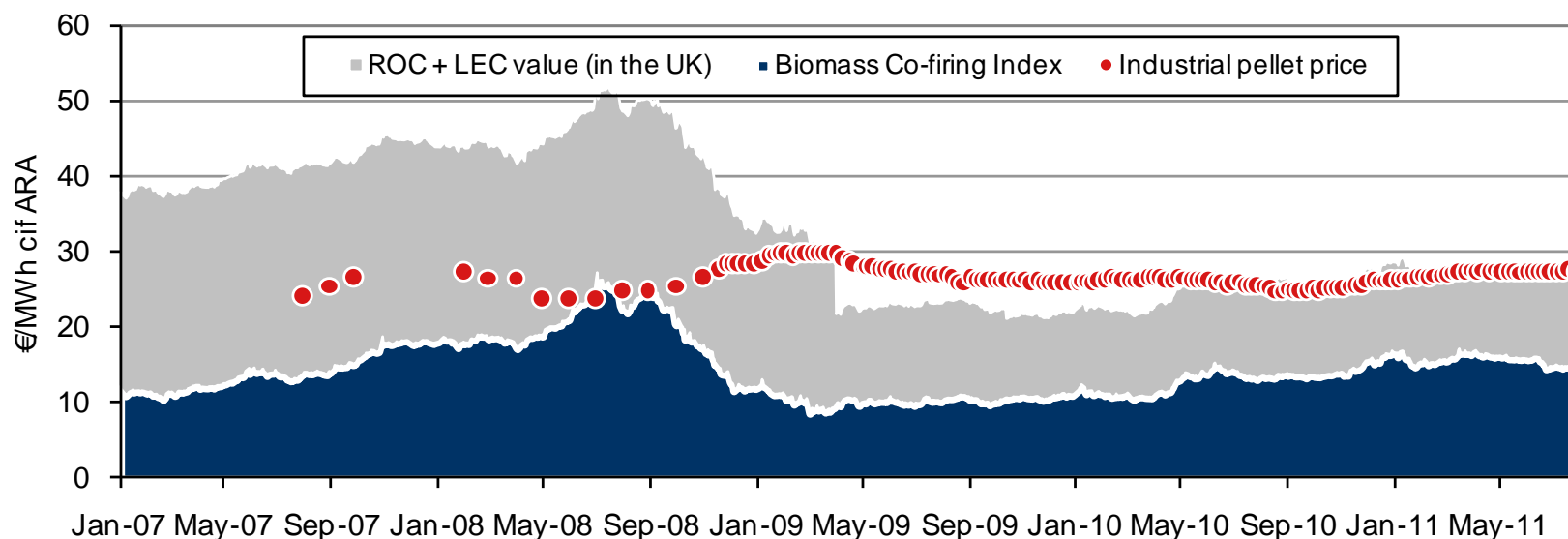
Wood paying capability of biomass power...



The affordability of wood pellets for a power producer wishing to co-fire biomass is largely determined by the cost of coal and the price of CO₂ allowances.

The Biomass Co-firing Index (BCI) (the blue area in the chart below) tracks the competitiveness of co-firing biomass, relative to burning coal, in a typical European electricity generating plant, excluding

In the UK, the value of renewable energy incentives (the grey area) bridges the gap – but currently no more – between BCI and the price of pellets.



Source: Hawkins Wright (Forest Energy Monitor)

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Thank you...



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