HAWKINS WRIGHT

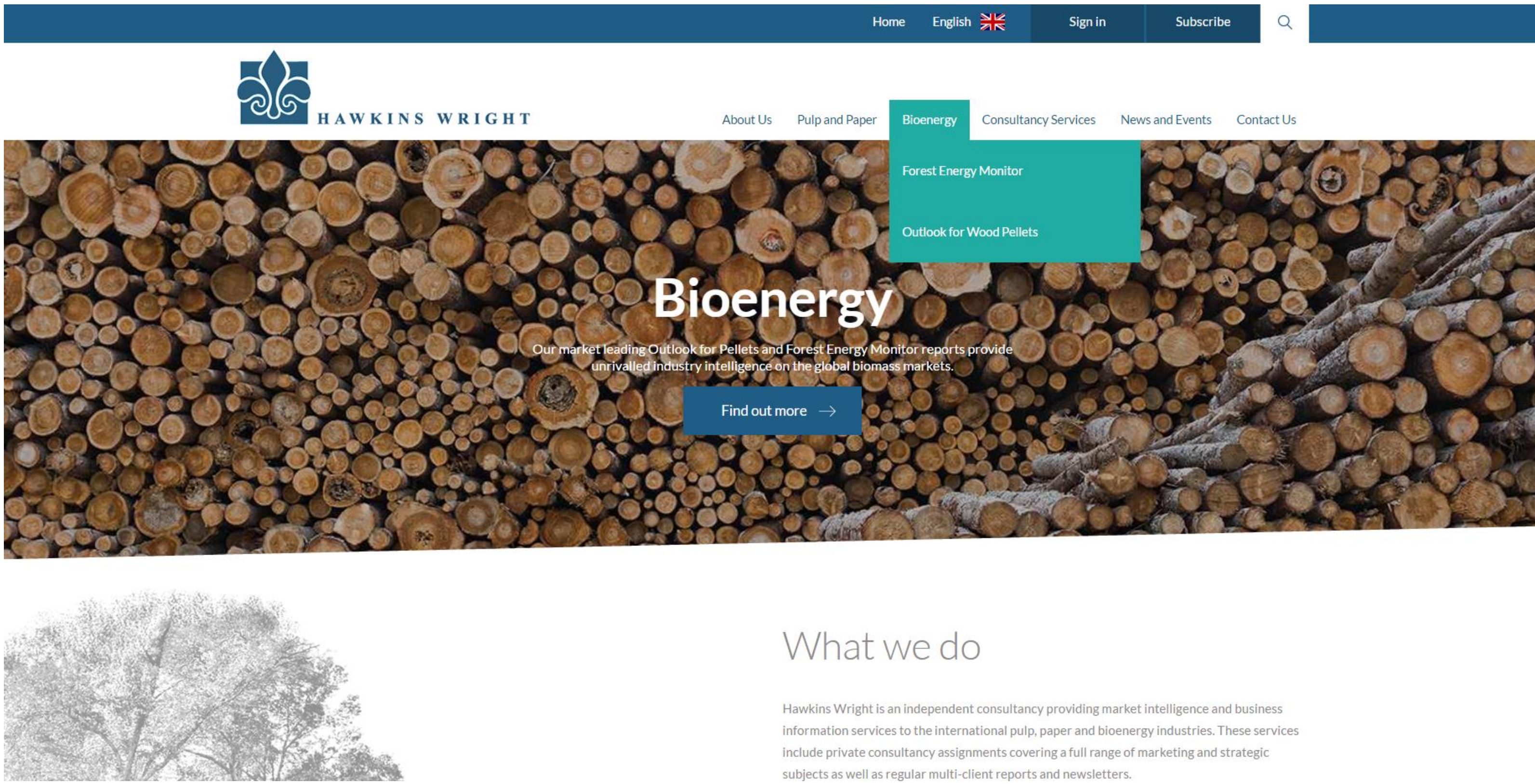
Wood pellet market update

Nordic Baltic Bioenergy Conference

Helsinki, 30 March 2017

Louisa Blair

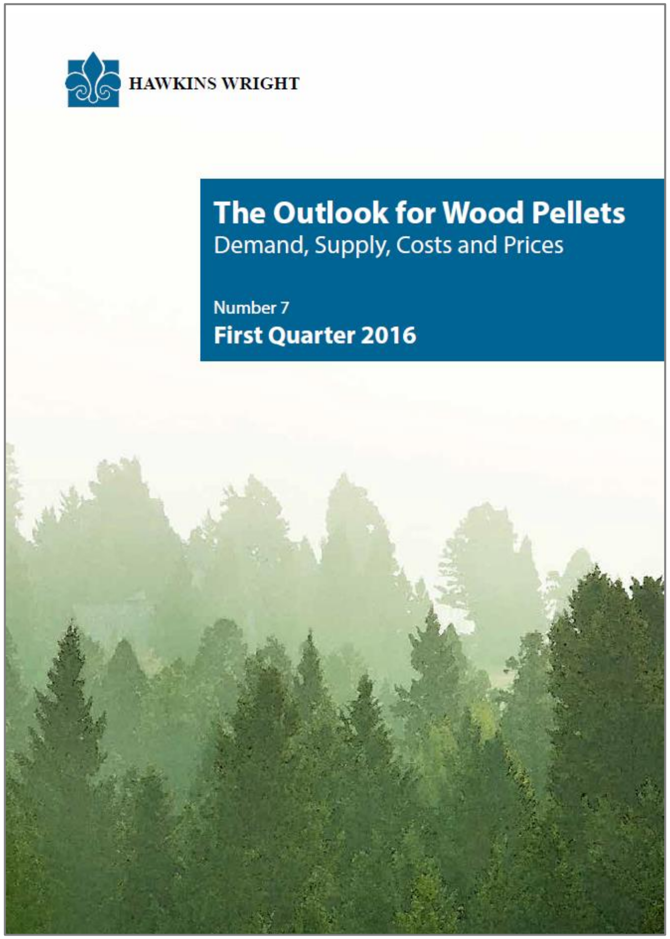
Independent consultants to international pulp, paper & bioenergy industries



www.hawkinswright.com

HAWKINS WRIGHT

Bioenergy multi-client research reports



HAWKINS WRIGHT

Issue 62 – **May 2016**

Forest Energy *monitor*

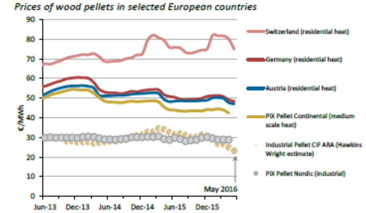
BIOMASS & PELLETS — MARKETS — INVESTMENTS — LEGISLATION

German heating pellets regain competitive advantage over heating oil in May

German ENplus A1 pellet prices fell to €228.18/t in May, a reduction of -1.9% month-on-month and the lowest level recorded since April 2012, according to German pellet association DEPV. This was in conjunction with a +9.5% (€4.24/MWh) increase in German heating oil prices, which allowed wood pellets to regain their competitive advantage over heating oil for the first time in six months. The margin between the fuels remains tight, at just 1.1%, but pellet prices are unlikely to rally over the summer months and heating oil prices look set to rise further. If this trend continues then the German heating pellet industry could be in a comparatively strong position by the beginning of the next heating season, improving the outlook for pellet boilers and stove sales over the coming year. Nevertheless, the 2015/16 heating season has undoubtedly been another warm one, in line with the 2014/15 heating season in Europe with 2015 being the warmest year on record.

Austrian heating pellets also strengthened their competitive margin against heating oil to 18.6% as prices slipped to €222/t, a decrease of -1.33%. Heating oil prices in the country increased +8.2% to €57.77/MWh. However heating oil prices in Germany and Austria remain, on average, -22.7% cheaper than May 2015 and are significantly lower across all European countries.

Prices of wood pellets in selected European countries



Sources: See the footnotes beneath the price indications table, page 3.

www.forestenergymonitor.com

www.hawkinswright.com

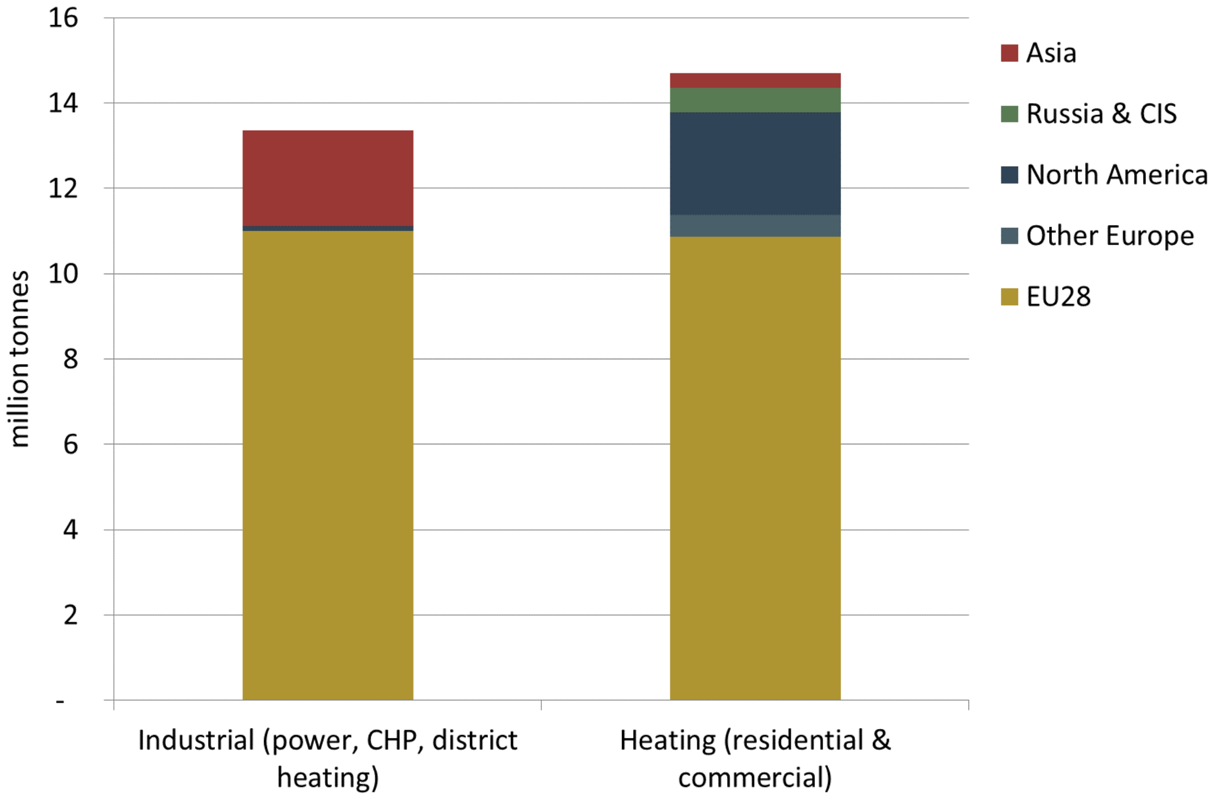
HAWKINS WRIGHT

Global market overview

HAWKINS WRIGHT

Global wood pellet demand

In 2016 = 28Mt (industrial = ~13Mt, heating = ~15Mt)



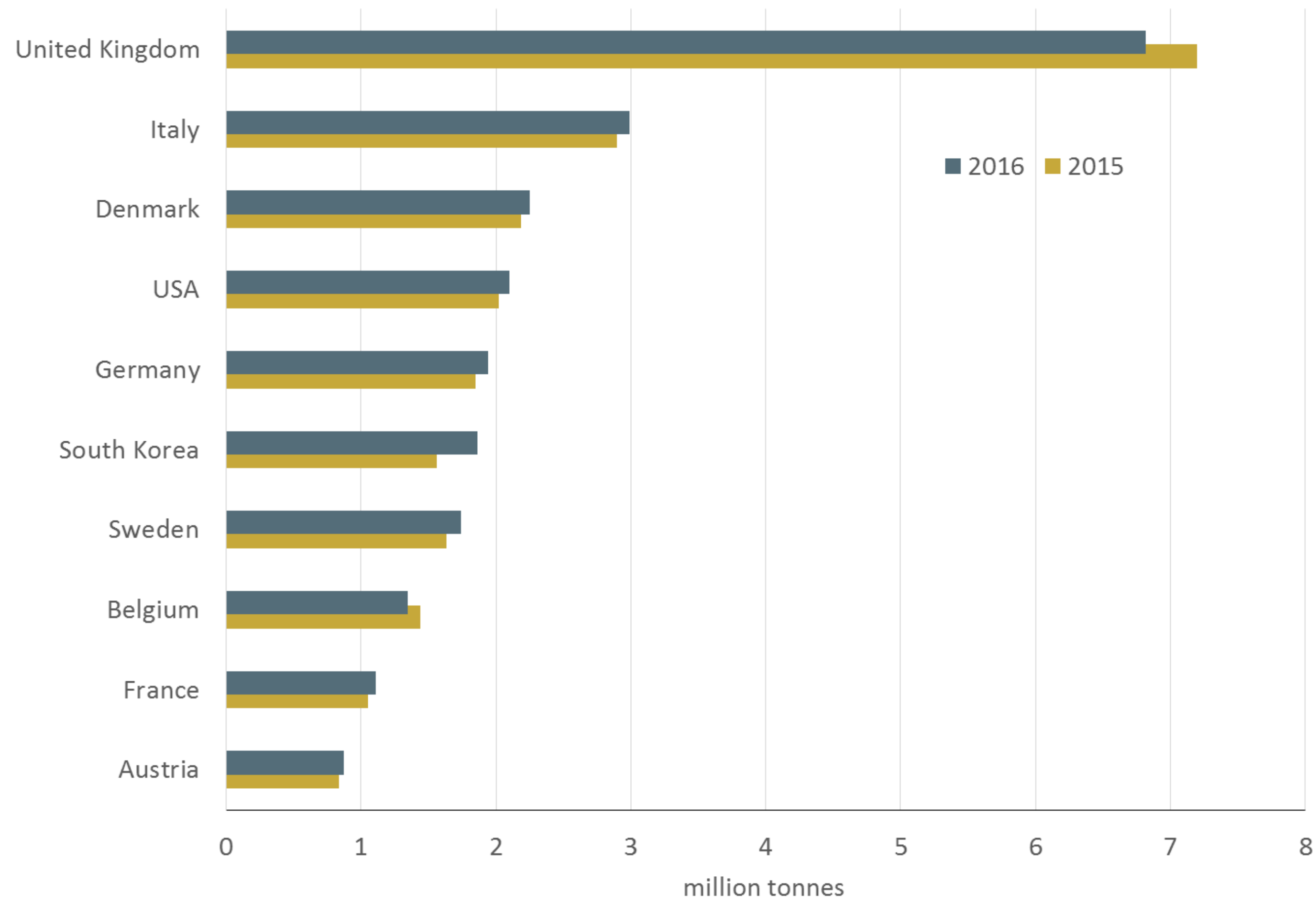
- Total market growth +4% in 2016
- Industrial demand growth slowed dramatically in 2016, increasing just +0.3Mt (3%) to 13.4Mt
- European industrial demand fell by -0.2Mt compared with 2015
- Offset by growth in Asia demand (+0.5Mt)
- Heat market demand increased by +0.6Mt, mainly in Europe.

Source: Hawkins Wright, the Outlook for Wood Pellets

HAWKINS WRIGHT

Top ten wood pellet consuming countries

2016 vs 2015

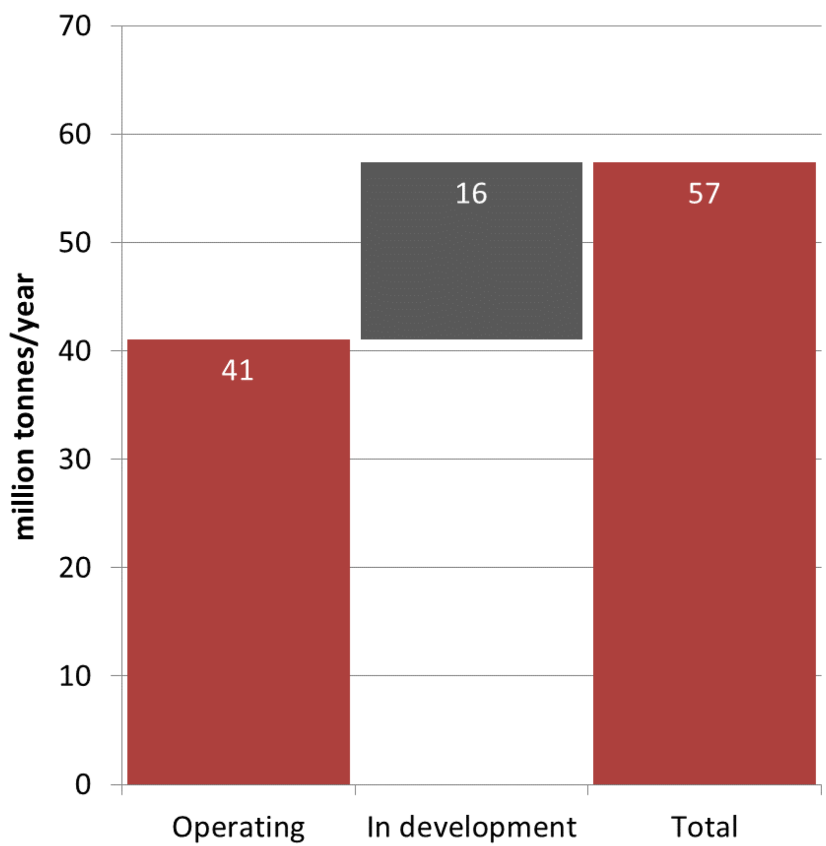


Source: Hawkins Wright, the Outlook for Wood Pellets

HAWKINS WRIGHT

Global existing wood pellet capacity

= 41Mt/y at the end of Q4 2016 (~19Mt/y industrial)

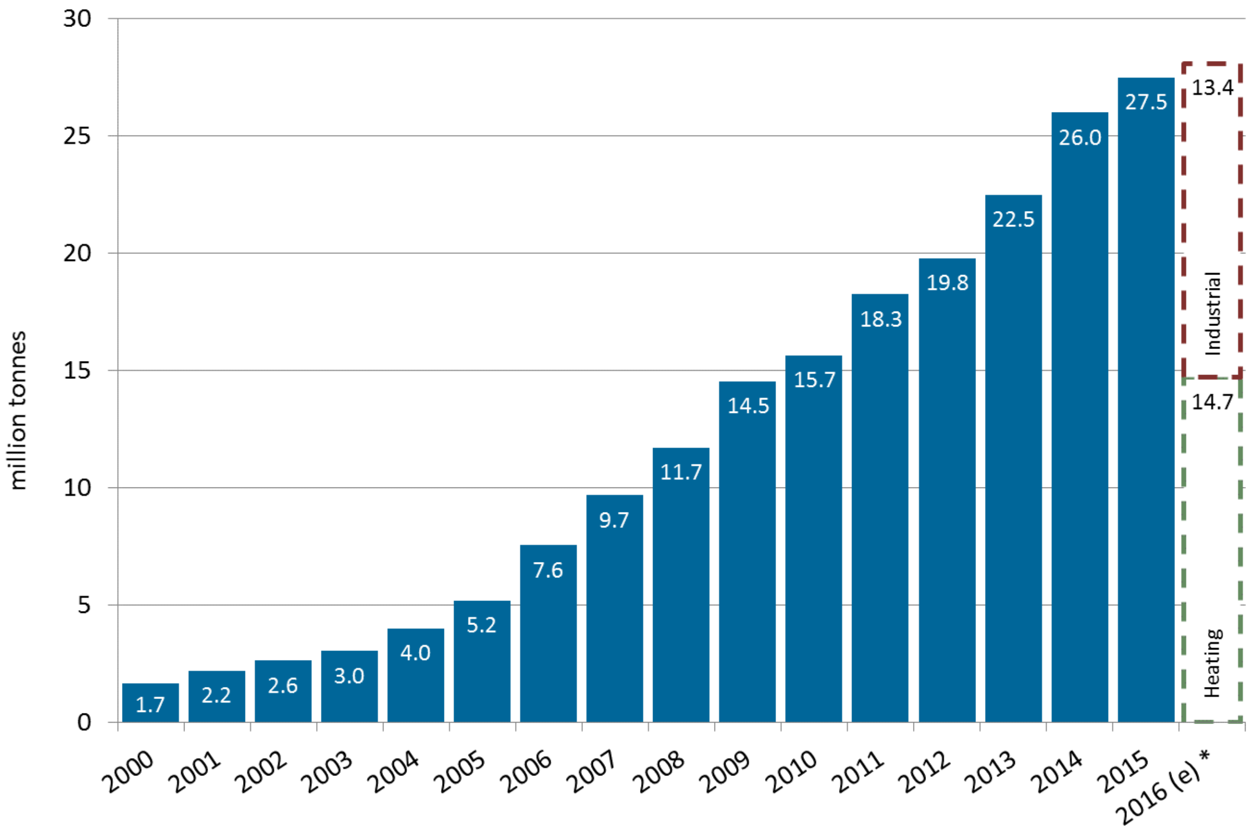


- Net capacity additions have slowed in the past year
- Several recent capacity closures or reductions – we have identified around ~3Mt/y of idled or underutilised capacity in the industrial sector alone
- Investment environment challenging: fewer projects reaching financial close
- From 2018, further volumes will need to be sought to meet industrial demand forecasts – either via transfer from heating pellet market or through new industrial-focused capacity additions

Source: Hawkins Wright, the Outlook for Wood Pellets

HAWKINS WRIGHT

Global wood pellet production



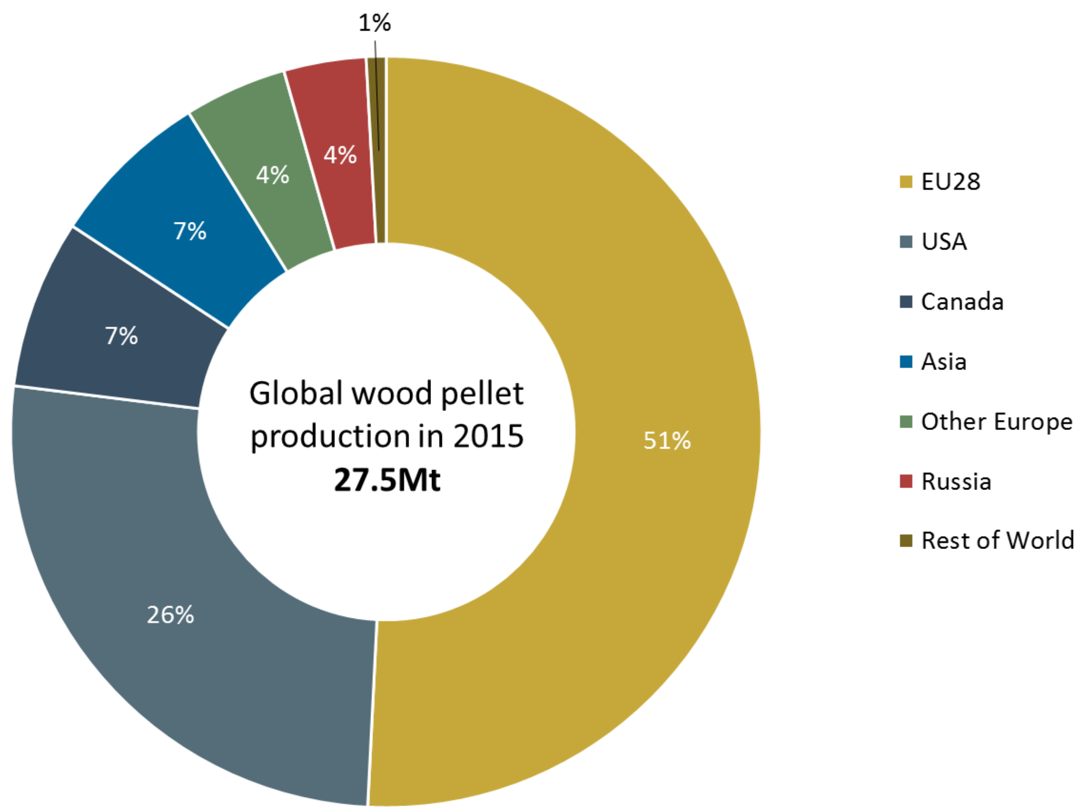
- Year-on-year production growth expected to have slowed last year
- 2016 estimate of demand = 28Mt
- Limited demand growth in 2016 resulting in closures and low capacity utilisation among production facilities

Sources: REN21, FAO, AEBIOM and Hawkins Wright

**2016 figures show Hawkins Wright estimate of demand*

HAWKINS WRIGHT

Europe remains the largest market for wood pellet production and consumption



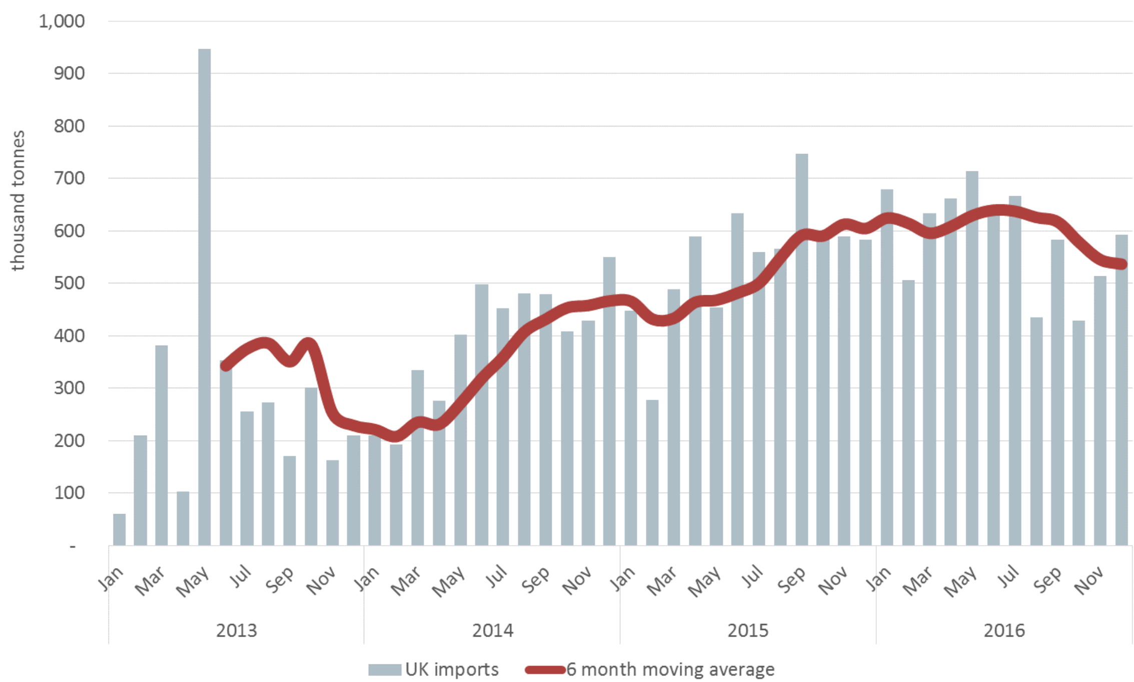
Sources: FAO and Hawkins Wright

HAWKINS WRIGHT

2016 Global snapshot: pellet trade

- EU28 imports: ***+2% y/y*** ***(+16% Jan-June; -11% in July-Dec)***
- Japan imports: ***+49% y/y***
- South Korea imports: ***+17% y/y***

UK imports, Jan-13 – Nov-16



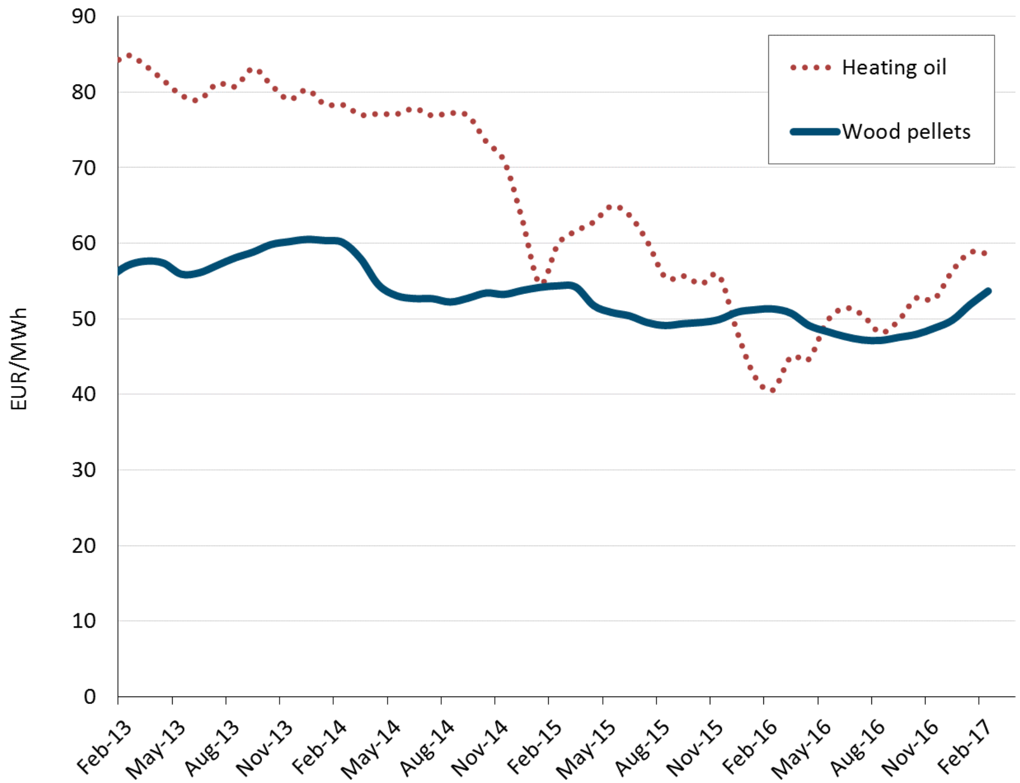
Source: Eurostat

HAWKINS WRIGHT

Rebalancing an oversupplied market

European heating market looks to be rebalancing more quickly than anticipated

Prices of heating oil vs pellets in Germany



Analysis based on delivered (retail) prices of heating oil and wood pellets, including taxes.

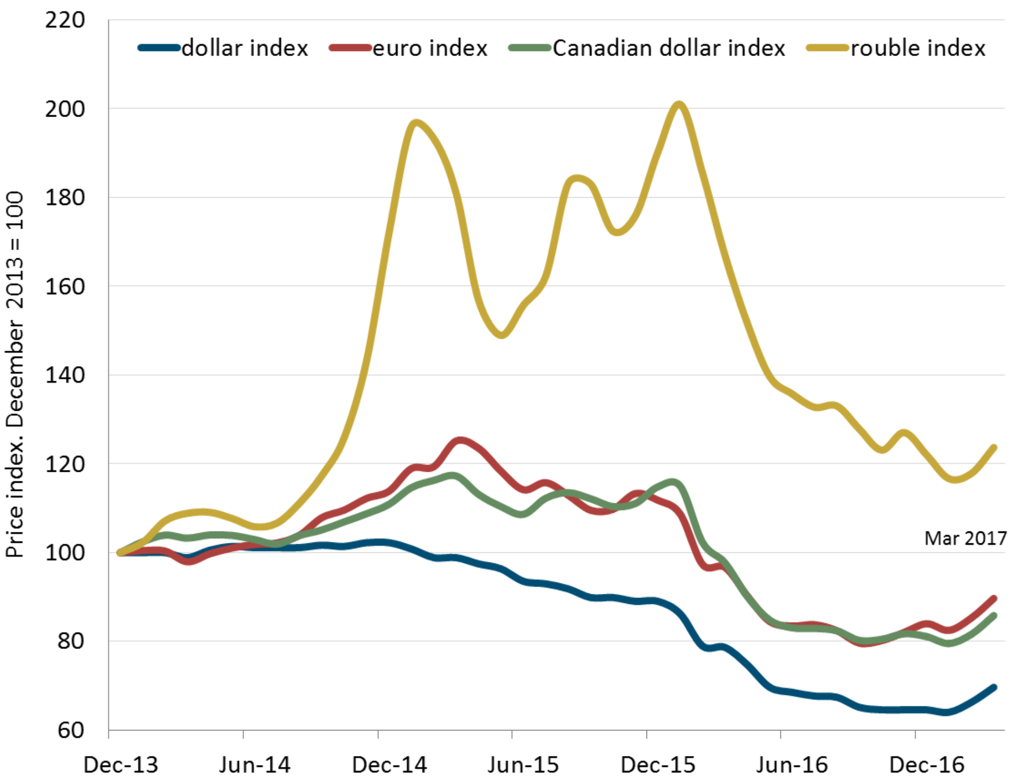
Sources: DEPV (pellets); EU Energy Portal (heating oil)

- Colder weather in late 2016 and early 2017 rapidly increasing pellet demand for heating in Europe
- Despite rising pellet prices, price advantage of pellets vs heating oil has increased, and much more favourable than in Feb-16 and Feb-15 in Germany
- Recent rise in oil prices has contributed to this
- Low stocks and relatively little transfer from industrial market has seen heating pellet prices continue to rise throughout Q1 2017
- Germany March 2017 = €255/t (+€2/t)

HAWKINS WRIGHT

Industrial market also now starting to change

Indices of industrial pellet prices in different currencies



Analysis based on delivered (CIF ARA) spot prices of industrial-grade wood pellets in US$ with currency conversion

Sources: Hawkins Wright, Forest Energy Monitor

- In contrast, industrial spot pellet prices remain depressed, with little trans-Atlantic trade
- Delays in new demand-side capacity growth, as well as reduced demand in UK in 2016
- Exchange rates disadvantaging US producers, while Russian producers benefitting from low manufacturing costs and comparatively weak currency
- BUT – we now have the go-ahead for several important demand-side projects
- Momentum building in Asia
- CIF ARA industrial prices +$6/t in March

HAWKINS WRIGHT

Industrial market outlook to 2020

HAWKINS WRIGHT

United Kingdom

New industrial wood pellet demand by 2020 (compared to 2016)				
Project	**Capacity**	**Pellets (Mt/y)**	**Start-up**	**Status**
Lynemouth Power (conversion)	450 MW	+1.6	early-2018	Under construction
MGT Power (biomass CHP)	299MW	+1.0	2020	Fully financed (Macquarie)
Drax Power (full conversion of unit #1)	630MW	+0.4	2017	Full conversion now CfD given state aid approval
TOTAL		**+3.0**		

Outlook…

- BREXIT: Article 50 triggered yesterday (29 March 2017) – process of exiting EU has started
  - Great repeal bill (being published today) supposed to adopt current legislation and then unpick from EU directives - complex
  - Carbon budgets more relevant to UK legislation than EU directives
  - Long-term consequences harder to forecast
- Extension of RHI beyond 2020? Potential for industrial heat
- Drax fourth unit conversion? - Consultation on further support for conversions under CfD
- Spring budget 2017 - New set of controls to replace LCF and government remains committed to carbon pricing

HAWKINS WRIGHT

Belgium

New industrial wood pellet demand by 2020 (compared to 2016)

Project	Capacity	Pellets (Mt/y)	Start-up	Status
Langerlo NV (Graanul Invest)	440 MW	+1.6	2018	Financing
TOTAL		**+1.6**		

Outlook

- Extension of support for Engie's 205MW Max Green and Les Awirs biomass power plants?
- New biomass CHP capacity in Wallonia - tender for 200MW of new capacity. Pellets, chips or waste wood?
- Supply security. (Ageing nuclear plant and low interconnector capacity with neighbours)

HAWKINS WRIGHT

Netherlands

New industrial wood pellet demand by 2020 (compared to 2016)

Project	Capacity	Pellets (Mt/y)	Start-up	Status
RWE/Essent Amer 9 (cofiring)	600MW	+1.8	2017/20	Awarded SDE+ support
RWE/Essent Eemshaven (cofiring)	1,600MW	+0.8	2018	Awarded SDE+ support
Uniper Maaslavkte (cofiring)	1,100MW	+0.6	2018	Awarded SDE+ support
Engie Rotterdam 1 (cofiring)	800MW	+0.2	2018	Awarded SDE+ support
TOTAL		**+3.4**		

Outlook

- Support now awarded under SDE+ for approximately 3.4Mt/y across 4 projects
- Await forthcoming election and government position on coal phaseout/sustainability verification protocol before FIDs taken
- Amer 9 expected to begin co-firing before end-2017
- Industrial heat and biochemical opportunities, not subject to 25PJ cap

HAWKINS WRIGHT

Denmark

New industrial wood pellet demand by 2020 (compared to 2016)				
Project	**Capacity**	**Pellets (Mt/y)**	**Start-up**	**Status**
Dong Energy (Avedore #1 conversion)	250MW	+0.4	Q4 2016	Operational - full year's consumption in 2017
Dong Energy (Studstrup conversion)	350MW	+0.3	Q4 2016	Operational - full year's consumption in 2017
TOTAL		**+0.7**	*This is based on average consumption in a "normal" year*	

Outlook

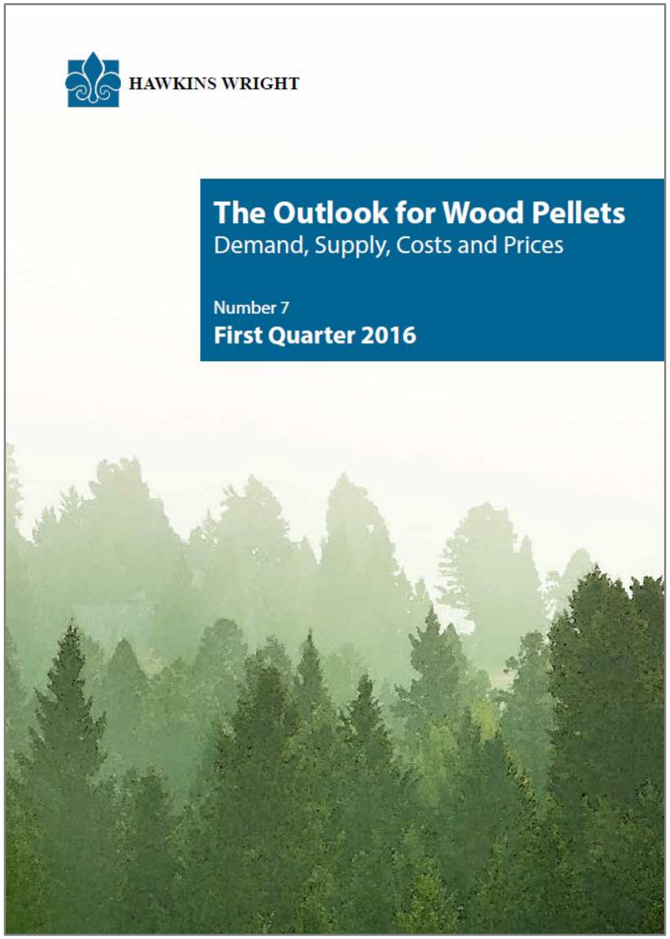
- Biomass's role is mainly to displace coal in district heating networks. Mix of pellets & wood chips
- Pellet consumption therefore more seasonal and temperature dependent than elsewhere.
- Eg. Dong's annual consumption may vary between 1.4Mt and 2.3Mt.
- Opportunities for further deployment of biomass/pellet CHP in many small district heating networks

HAWKINS WRIGHT

Forthcoming policy changes to watch

- UK – Brexit process
- US – 28 March Trump signed bill to scrap coal mining moratoriums – further attacks to Obama’s climate change mitigation policies expected
- EU – Clean Energy for all Europeans process of adoption into law
- China – implementation of five-year bioenergy plan: could be a game changer

…Thank you for listening



CONTACT
W: www.hawkinswright.com
E: louisa.blair@hawkinswright.com
T: +44 20 8747 5840

HAWKINS WRIGHT