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Global Industrial Wood Pellet Markets – Future Demand and Future Prices

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This brief white paper has estimates for tonnage demand and prices for industrial wood pellets.

The tonnage estimates are based on optimistic scenarios in which Japan, Korea, the US, and Canada develop significant demand for co-firing or full-firing of wood pellets in large utility pulverized coal power plants.

The price estimates are based on a model of industrial wood pellet price behavior. As with all models that attempt to forecast the future, the model is dependent on past patterns to predict future outcomes. The model is also dependent on assumptions about future critical price influencing factors and the supply and demand relationships in the wood pellet markets.

The forecasts in this white paper, as with all forecasts, will not match what the future brings. However, the forecasts do provide an indication of a potential set of future conditions.

Demand for Industrial Wood Pellets

The industrial wood pellet markets are driven by policy. Policies for the mitigation of carbon emissions, or a more broadly defined mandate to generate power with renewable energy, enable a menu of compliance pathways. One option is to replace coal with sustainably produced low-carbon wood pellets in power plants. FutureMetrics has articulated the efficacy of co-firing or full-firing in a number of white papers that are freely downloadable.

Policy has driven, and continues to drive, the traditional markets in Europe and England. However, growth in those markets is expected to plateau by 2021. Where will the growth in demand be in the next decade?

Demand in Japan could exceed 10-15 million tonnes per year by 2030 under plausible scenarios. FutureMetrics has published a recent white paper on the Japanese markets describing those scenarios.

Korean demand could become significant also if the policy defining the proportion of power from renewables persists and wood pellets are permitted to be used to offset coal demand. If the Korean policy persists, demand could be close to 8 million tonnes per year by 2024.

Canada has the potential to become a significant demander of industrial wood pellets. Canada recently announced a national carbon pricing scheme what will price carbon at \$50/tonne by 2023. Alberta has legislated that coal power generation will cease by 2030. Alberta currently produces about half of its power from coal and two of Alberta's pulverized coal (PC) power plants are very new¹. Some of the older plants that will be phased out in 2030 may co-fire to avoid the carbon tax. The new plants are strong candidates for full conversions similar to those at Drax and Lynemouth in the UK.

¹ Data on generation mix from the Alberta Utilities Commission. The 495 MW super critical PC Power station Keephills 3 is five years old. An almost identical 495 MW station, Genesee 3, is eleven years old. [For more on Alberta](#), see the recent presentation given in Calgary [HERE](#) (4.5 MB).



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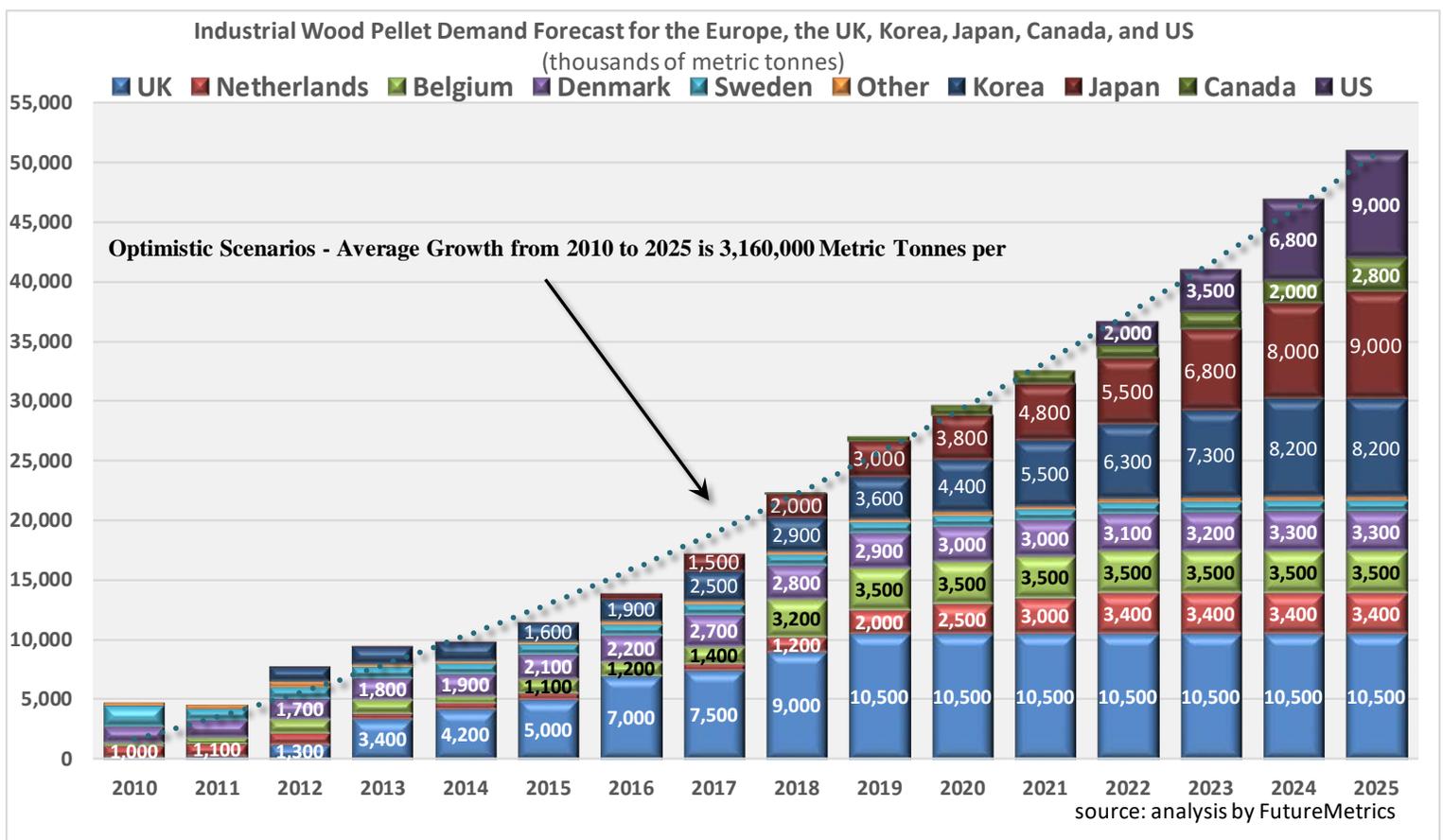
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A US industrial wood pellet market will be enabled by the Clean Power Plan if that policy survives current challenges. FutureMetrics has written several papers on this topic and they are available from the FutureMetrics website.

We do not include China in this analysis. If China turns to wood pellets for power, its demand would be very large. If that occurs, Russian production would likely fill some of the demand.

Sustainability and preservation of the working forest resources is the absolute limit to the size of the industrial wood pellet market. Again, FutureMetrics has several papers articulating how those limits can be defined and how that is the foundation of a carbon accounting that supports the use of wood pellets for lowering carbon emissions in power plants.

Combining those potential optimistic scenarios (excluding China) yields the following forecast.



Note that most of the potential growth after 2021 is from Japan, Korea, the US, and Canada. If those markets do develop, demand for industrial wood pellets could approximately triple from the present to 2025 with an annualized average growth rate from 2010 to 2025 of more than three million tonnes per year.

There are many reasons why some or even all of those four countries would not reach the levels shown in the chart. But if the policies are durable and the support schemes needed to provide dispatchable non-intermittent thermally generated renewable power are put into place, the industrial wood pellet sector could follow that trajectory.



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The Prices for Industrial Wood Pellets

The cost to produce a tonne of wood pellets is strongly connected to the average cost of the woody biomass feedstock. The cost of delivered biomass feedstock is strongly connected to the cost of transportation which is significantly driven by diesel fuel cost. Delivered cost per tonne varies by location, and by harvest and transport infrastructure. Over time, production costs per tonne of pellets fluctuate primarily with changing wood costs (diesel fuel, and demand for the same feedstock in the region around the pellet plant) and the moisture content of the incoming wood (higher moisture content yields lower output of densified dried pellets per tonne of input).

The cost of wood pellets delivered to the end-user power plant depends on the cost to produce plus the cost of pellet transportation (truck/rail/shipping/handling).

Most industrial wood pellets are produced for a specific buyer. These offtake agreements typically have negotiated prices that are sustainable for both parties. That is, prices that are not too high so as to destroy the generator's margins and not too low so as to disallow profitable operation by the producer. The contracts typically include price adjustors and terms defining currency risk. The adjustors provide a mechanism for mitigating risk for both the producers and buyers from changes in critical inputs such as wood costs and shipping costs. Each pellet mill and offtake agreement will have unique characteristics and different pricing arrangements.

Although most pellets are currently traded through bi-lateral contractual agreements and trading for industrial wood pellets on the spot markets is limited, the spot price does provide information on supply and demand relationships and foreign exchange effects. For example, when the markets are oversupplied, prices on the spot market are lower.

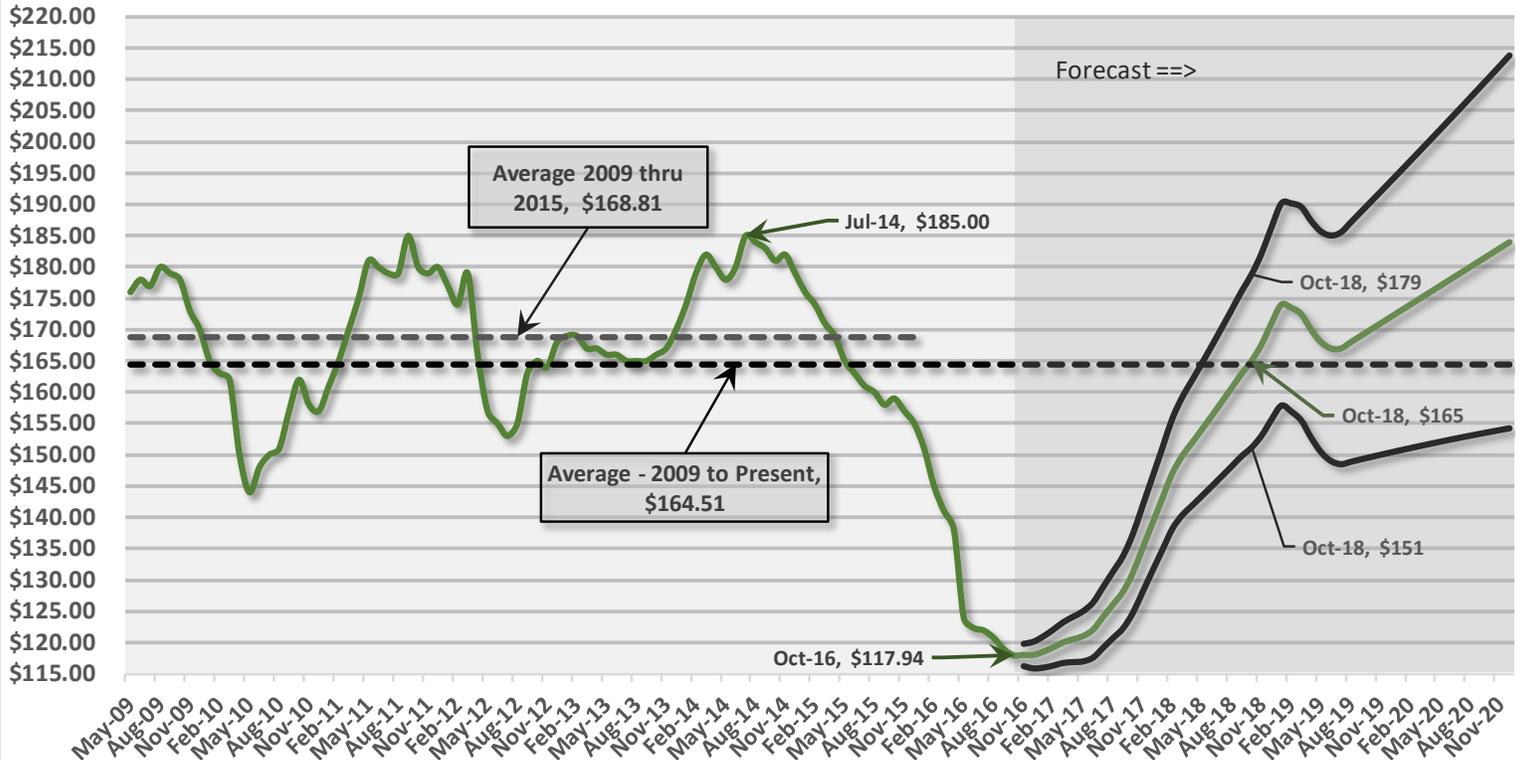
The chart below shows the historical and forecast spot prices delivered to Amsterdam, Rotterdam, or Antwerp in US dollars at exchange rates to the Euro calculated for each month in the series. The recent fall in spot prices is due to excess production capacity in the industrial pellet markets and, to some degree, to dampened demand for heating pellets due to several warm winters and therefore some heating pellet production available to the industrial sector. It has also been a function of a strong dollar versus the Euro and pound.



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Industrial Wood Pellets Spot Price in US Dollars (CIF ARA)



source: Argus Biomass Report, forecast and analysis by FutureMetrics

The forecast assumes that the supply/demand disequilibrium that currently exists is corrected after several large pellet consuming projects come on line. Lynemouth, MGT, Langerlo, and Drax unit #1 going to full firing are expected to consume about 4.15 million metric tonnes per year by 2019 or so. The forecast also assumes that production capacity, at normal capacity factors, will not exceed demand and that the heating markets absorb normal quantities (i.e., normal winter temperatures).

The forecast assumes that the market will return to prices associated with production costs in the major producing jurisdictions and that the dollar/Euro/pound exchange rates converge to values defined by purchasing power parity². Historically that price in terms of CIF ARA has been between \$155 and \$175 per tonne. The forecast also assumes inflation at 1.5% per year and that ocean shipping rates will increase over current rates by about 2.0% per year from now to 2020.

There are many assumptions behind the forecasts for both demand and spot prices. Many will not come true! No one knows where exchange rates will be in four years. Supply could exceed demand or visa versa. It is quite probable however that spot prices will increase in the coming years and more likely than not that they will return to around the long-run average by 2019-20.

The spot market matters because if the industrial pellet market has aspirations of becoming a true commodity market, spot and forward prices have to support producers and satisfy buyers.

² https://en.wikipedia.org/wiki/Purchasing_power_parity