Wood Pellet Industry Update

Timberland Investment Group

January 2018

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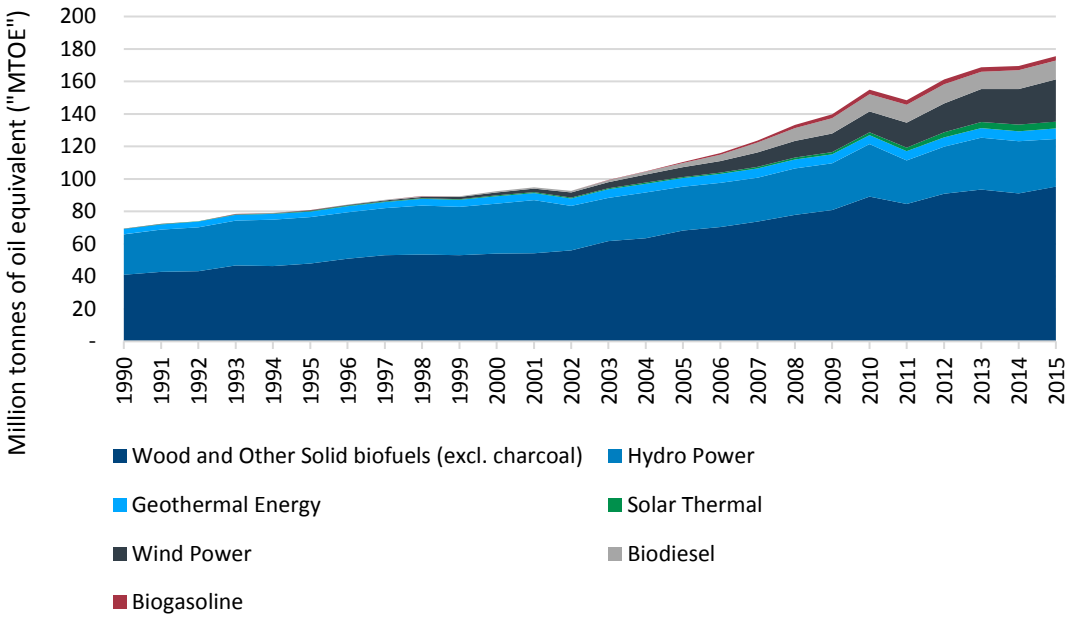
Background

Renewable energy has grown in importance given, among other reasons, an increasing focus on environmental, social and governance ("ESG") factors, and as global population and growth continue to expand. In particular, wood pellets are an important renewable energy source that are created out of sawdust and other residual wood materials, or through chipping small diameter pulpwood. This material is then dried, sieved, pelletized, ultimately cooled, and turned into pellets that vary from 6 millimeters to up to 38 millimeters in length. Wood pellets have gained importance as a sustainable material used by utilities around the globe to co-fire alongside traditional coal and also serve as a significant source of residential heating in many countries.

In 2015, the consumption of Biomass / wind / geothermal / solar power, in which wood pellets are included, saw its share of total energy consumption increase to 6% from 2% in 2006. Thus far, this growth has come at the expense of other renewables such as traditional biomass, which has seen its market share decline. As such, there is the potential for wood pellets to gain further share, particularly against fossil fuels. Importantly, wood pellets are a form of baseload energy (as are coal and nuclear) – consistently able to generate electrical power needed to satisfy minimum demand – and hence are more reliable than solar and wind, which are non-baseload (less reliable) given their dependence on the sun and wind, respectively.

Similarly, between 2006 and 2015, global wood pellet production increased significantly, growing at a compounded annual growth rate ("CAGR") of nearly 15%. In addition, since 1990, wood and other solid biofuels (fuelwood, wood residues and by-products, bagasse, black liquor, other vegetable-based materials, residues and animal waste) have increased their market share of global renewable energy production, especially in the European Union ("EU-28") (Figure 1).

Figure 1: Primary Production of Energy from Renewable Sources in the EU-28



Source: Eurostat

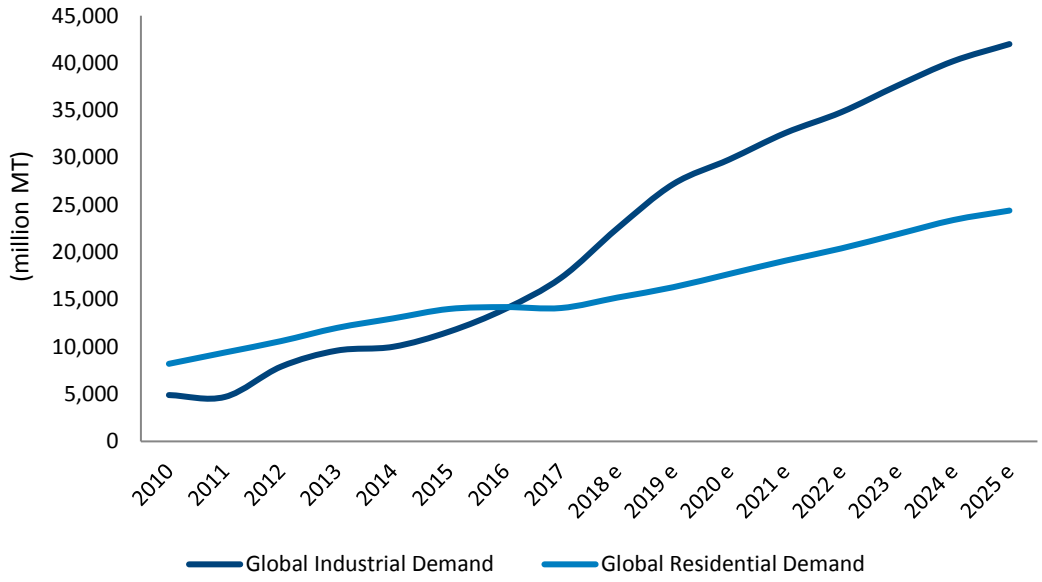
In the past decade, global wood pellet production has steadily increased given increasing residential heating demand and as utilities, primarily in the EU-28 and incentivized by government subsidy regimes, have made concerted efforts to reduce greenhouse gas ("GHG") emissions and other pollutants and increase their use of renewable energy sources. Aside from growing EU-28 demand, wood pellet usage should continue to increase in geographies such as Japan and South Korea as they both have increased their targets for renewable energy consumption. Further, there is the potential for wood pellet consumption to accelerate in China given an increasing focus on environmental and resource sustainability. Meanwhile, in North America, wood pellet consumption is largely driven by residential heating pellets, primarily in the Northeast, with little industrial pellet demand given a current lack of government incentives and low cost energy alternatives (e.g. oil, natural gas). That said, North America is still one of the largest producing and exporting regions of industrial wood pellets globally, with most North American exports originating from the US Southeast and shipped to Europe.

Global Wood Pellet Market

The global wood pellet market is divided into two distinct markets: industrial and residential, both of which currently consume roughly 14 million metric tonnes ("MT") annually. Industrial pellet demand is driven by electricity generators and utility-scale combined heat and power ("CHP") plants whereas residential/commercial demand is driven by home/office heating. In the industrial sector, pellets are co-fired in traditional power plants to reduce greenhouse gas emissions. In the residential sector, pellets are used for heating in automatic stoves and boilers. As a result, pellets targeted for the industrial sector tend to be mass-produced while pellets used in the residential sector are primarily high quality and produced on a smaller scale.

Demand growth in the broader pellet market has been primarily driven by growth in industrial pellets given renewable energy targets and government renewable energy subsidies. Meanwhile, residential/commercial pellet demand has grown more modestly given an absence of government subsidies and the availability of affordable heating alternatives. Since 2010, industrial pellet demand has increased at a CAGR of 20% while residential demand has increased at a CAGR of 8% (Figure 2). Between 2018 and 2025, global industrial pellet demand is expected to grow at a CAGR of 9% while global residential pellet demand is expected to grow at a CAGR of 7%.

Figure 2: Global Pellet Demand



Source: Argus Biomass Direct Data, EPC, FutureMetrics

On a continental basis, Europe and Asia are expected to experience the strongest industrial pellet demand growth increasing at CAGRs of 13% and 35%, respectively, between 2016 and 2021 due to the attainment of upcoming renewable energy targets and the development of new renewable energy subsidies[1]. While wood pellet consumption in Europe is almost evenly split between residential and industrial (51% residential and 49% industrial), the industrial market is the primary recipient of government subsidies, which has helped spur consumption. In North America, domestic industrial pellet demand is projected to remain flat at around 100,000 MT per annum, as the domestic market is largely residential.

Meanwhile, global residential pellet demand is growing at a more modest pace due to the general lack of government subsidies for residential pellet use and the availability of affordable heating alternatives. Residential pellet demand in Europe and Asia is forecast to grow at CAGRs of 4% and 8%, respectively, between 2016 and

[1] Enviva Presentation June, 2016; Hawkins Wright

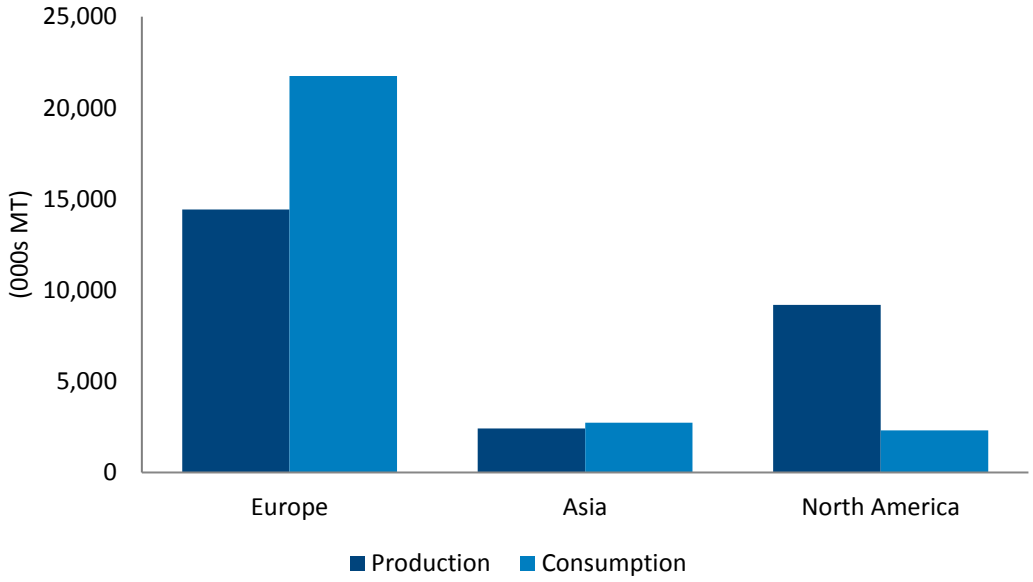
2021. The difference in growth rates is due to the fact that Europe already has a well-established residential pellet market whereas the Asian residential pellet market is in its infancy. Residential pellet demand in North America is expected to grow at a CAGR of 3% from 2016 to 2021.

Production and Consumption

In 2016, global pellet production was around 29 million MT, a 58% increase from 2012's production of around 18 million MT. Global consumption was almost 28 million MT in 2016, an increase of 62% from around 17 million MT in 2012.

On a regional basis, the EU-28 was the largest producing region with around 14.4 million MT in 2016 followed by North America at 9.2 million MT and Asia at 2.4 million MT (Figure 5). North America accounts for 32% of global wood pellet production and nearly 7% of global wood pellet consumption (Figure 3).

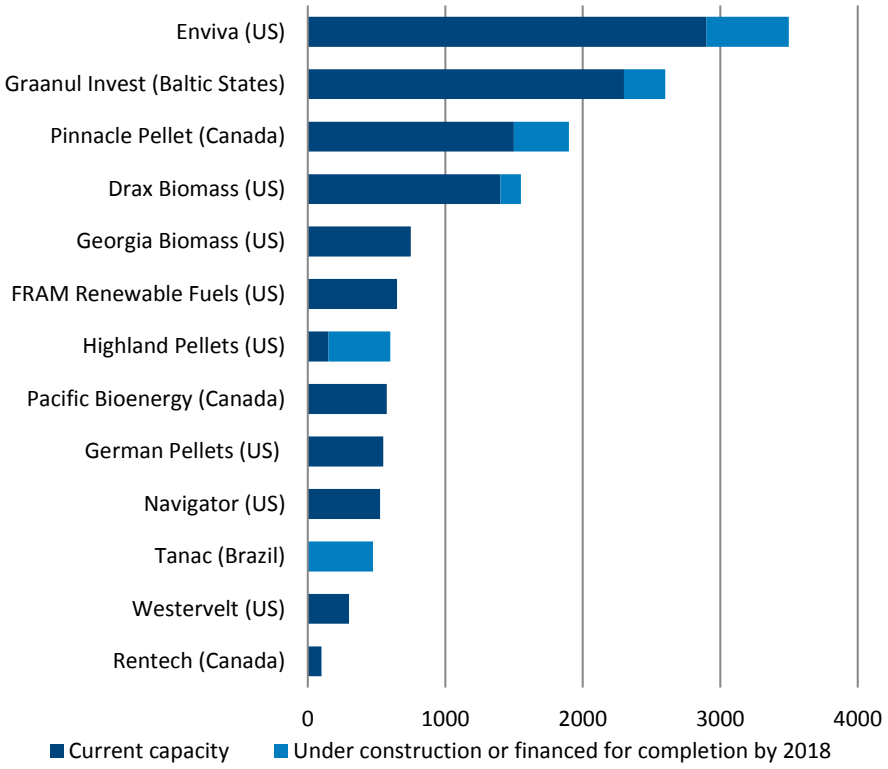
Figure 3: Regional Production and Consumption



Source: FAO

Figure 4 illustrates the largest global wood pellets producers. Enviva, based out of the United States, is the largest global producer with close to 3.5 million MT of current and proposed capacity. Graanul Invest from the Baltics is the second largest producer with over 2.5 million MT of current and proposed capacity.

Figure 4: Worldwide Industrial Wood Pellet Producers (000s MT per year)



Source: Enviva May 2017 Investor Presentation; (1) German Pellets is in bankruptcy and has successfully auctioned its Louisiana pellet facility to Drax. However, the auction process for its Texas pellet plant has been postponed; (2) The Navigator Company has agreed to sell its US pellets business to Enviva for US$ 135 million.

European Union

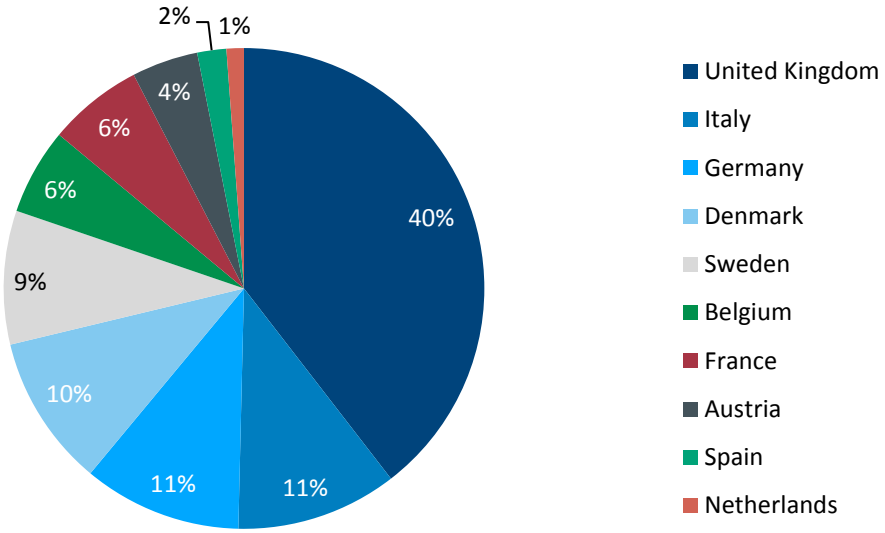
Regionally, the EU-28 was the largest wood pellet producing and consuming region in 2016, accounting for over 14 million MT or 50% of global production and almost 22 million MT or 78% of global consumption. Consequently, the EU-28 produced around 66% of what it consumed in 2016. Compared to mills in North America, most European processing plants are small to medium-size.

As mentioned previously, global wood pellet consumption has increased primarily due to increasing EU-28 residential heating demand and government subsidy regimes that encourage industrial wood pellet consumption by EU-28 utilities. Specifically, EU-28 energy policy prescribes renewable energy targets for each EU-28 member country to achieve by 2020. While each EU-28 member country has its own individual targets, for the EU-28 as a whole these policies must result in a 20% reduction in greenhouse gases, a 20% increase in renewable energy, and a 20% increase in energy efficiency. In addition, each country must achieve a 10% share of renewable energy in the transport sector. In 2015, the EU-28 had already achieved its greenhouse gas emissions target, with

emissions down 22% compared to 1990 levels. The goal of the EU-28 now is to maintain or improve upon that percentage, particularly as it looks to achieve its other renewable energy targets for 2020.

On a country-level basis, the United Kingdom ("UK") is the largest consumer of wood pellets (7.5 million MT; primarily for industrial use) followed by Italy (2.1 million MT; primarily for residential use), Germany (2.0 million; primarily for industrial use), Denmark (1.9 million MT; both industrial and residential use), and Sweden (1.7 million MT; primarily for industrial use). Figure 5 shows the breakdown of the top wood pellet consuming countries in the EU-28.

Figure 5: Top EU-28 Pellet Consumers 2016



Source: FAO

In the UK, wood pellet consumption is expected to increase as the government, in mid-2016, extended its contract for difference ("CfD") incentives for low-carbon energy projects to 2026 from 2020. (A Cfd is a contract between a low carbon electricity generator and the Low Carbon Contracts Company ("LCCC"), a government-owned company. The electricity generator is paid the difference between the "strike price" – a price for electricity reflecting the cost of investing in a particular low carbon technology – and the "reference price"– a measure of the average market price for electricity in the local country market.[2]) Concurrently, the UK government lowered the amount of total monetary incentives in the second CfD allocation round to reflect the longer incentive period and a reduction in technology generation costs. Overall, monetary incentives in the second CfD allocation round

[2] United Kingdom Department for Business. Energy & Industrial Strategy- https://www.gov.uk/government/publications/contracts-for-difference/contract-for-difference

declined to £290 million for delivery years 2021-2023 from £315 million in the first CfD allocation round for delivery years 2015-2019.

Looking forward, it will be important to monitor the UK's upcoming exit ("Brexit") from the European Union. As part of the EU-28, the UK was able to receive significant funding for renewable energy projects through the European Investment Bank, which is funded by the member states of the EU-28. Following Brexit, the UK will have to self-fund those projects. However, there is reason to be hopeful. Recently, the UK's Secretary for Environment, Food and Rural Affairs announced that post Brexit, UK farmers will receive the same amount of subsidies from the UK government that they are currently receiving from the EU Common Agricultural Policy for a number of years, until a new environmental protection subsidies system is enacted.

Meanwhile, Energetický a Prumyslový Holding ("EPH"), a Czech utility, is currently in the process of converting its Lynemouth Power coal fired power plant in the UK to biomass. Under its prior owner RWE, one of the leading European power-generation companies headquartered in Germany (40,000 megawatts ("MW")), the plant received approval for the CfD subsidy, getting a fixed income of £105 per megawatt hour ("MWh") over ten years regardless of the electricity spot price. Once converted, the plant will consume almost 2 million MT of wood pellets per year.

In December 2016, Drax Power Limited received EU-28 approval of the CfD through 2027 for its third 660 MW biomass unit, which is expected to consume more than 2 million MT of wood pellets per year. Drax also indicated that it could convert its three remaining coal-burning units to biomass under the right circumstances.

Further, MGT Power Limited, an independent United Kingdom company focused on large-scale biomass projects, which use sustainable forestry as fuel supply, is in the process of constructing its Teesside Renewable Energy Plant. The plant, projected to be the largest in the world, is expected to be operational in 2020 and will consume almost 3 million MT of wood pellets and chips per year. Enviva is expected to supply the plant with nearly 1 million MT of wood pellets per year from 2019 through 2034.

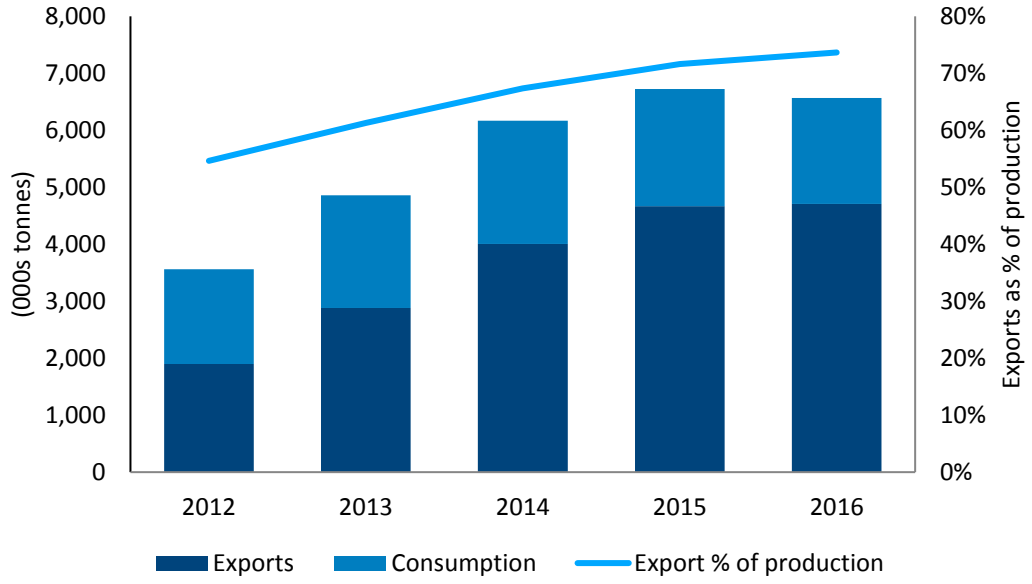
In Denmark, DONG Energy, the country's largest power producer, entered into an agreement in mid-2017 with Novo Nordisk, Novozymes and district heating customers in Kalundborg to supply them with green energy from its Asnaes mill. DONG Energy will convert the Asnaes CHP facility, the largest coal-fired power station unit in Denmark, to biomass by the end of 2019. The company already has two facilities burning wood pellets, which are each expected to consume around 2 million MT of wood pellets per year at full capacity. Ultimately, the Asnaes mill will consume around 2 million MT of wood pellets, achieving DONG's goal of completely phasing out coal-fired power.

In the Netherlands, the government increased the budget for renewable energy projects, which includes biomass, to €12 billion in 2017 from €9 billion in 2016. After the Netherlands agreed to provide subsidies to RWE totaling up to €2.6 billion over eight years, the company announced its intention to co-fire biomass at its 1,500 MW Eemshaven and 600 MW Amer coal-fired power plants. In total, both plants will consume almost three million MT of wood pellets annually. If both plants fully converted to biomass, they would consume more than 8 million MT of wood pellets annually.

North America

Overall, North America accounts for 32% of global wood pellet production and nearly 7% of global wood pellet consumption. Within North America, the US produced around 6.4 million MT in 2016 (Figure 6), while Canada produced around 2.8 million MT.

Figure 6: US Wood Pellet Statistics



Source: FAO

In the US, wood pellet production has accelerated as European governments have incentivized the consumption of wood pellets and given the readily available, low cost wood in the US South (please refer to Exports section below). Meanwhile, US wood pellet consumption has languished, as it is mainly geared towards residential heating pellets, a small market, with little industrial pellet demand given a current lack of incentives and the availability of low cost energy alternatives (e.g. oil, natural gas). While Renewable Portfolio Standards ("RPS") in the US mandate production of renewable electricity, wood pellets are rarely used given subsidies allotted to hydro, wind, and solar power.

In Canada, a similar situation exists whereby most domestic pellet production depends on demand from international markets. However, there is the potential for future domestic wood pellet consumption to increase, particularly as the Canadian government recently announced plans to phase out coal-fired electricity by 2030 as part of a clean-energy strategy. The country's ultimate is goal is to increase its share of total electricity generation from renewable energy sources to 90% from a current 80% (of which hydro accounts for 59% and wind accounts for around 4%). One important point of clarification: the above is specifically referring to electricity generation. At present, renewable energy sources account for around 19% of Canada's total primary energy supply.

Asia

At present, Asia accounts for 8% of global production and 10% of global consumption with Vietnam and China being the largest producers and Japan and South Korea being the largest consumers. In Asia, primarily Japan and South Korea, wood pellet demand is expected to increase due to new subsidy regimes implemented over the last several years. China also seems to be in the early stages of increased biomass consumption.

In 2012, Japan implemented a Feed-In Tariff ("FIT") scheme to encourage the use of renewable energy following an earthquake and subsequent Fukushima nuclear power plant seepage in 2011. As part of this arrangement, the Japanese government is targeting 6.0-7.5 gigawatts ("GW") of biomass-fired capacity by 2030, equating to roughly 15-20 million MT of biomass per year. Tokyo Electric Power recently commenced co-firing biomass with coal at its 1,000 MW Hitachinaka power plant. Additional potential co-firing initiatives include: Kansai Electric Power's potential conversion of its Aioi power plant to wood pellets under a joint venture with Mitsubishi Corporation Power; Chubu Electric's plan to build a new co-fired unit with capacity of around 1.0 GW at its Taketoyo power facility; and Electric Power Development Company's plan to co-fire biomass at all seven of its coal-fired plants (Electric Power Development Company is Japan's largest electricity wholesaler).

In 2012, South Korea established its own RPS, which requires power utilities (state-owned and independent power producers) with installed capacity of over 500 MW to generate 10% of their energy from renewable sources by 2023. In 2017, these utilities were required to generate 4% of their energy from renewable sources and will have to increase their renewable source usage by 1% each year until 2023 in order to reach the mandated 10% target. Recently, some South Korean policymakers have proposed requiring that large energy companies source at least 28% of their power from renewable sources by 2030, up from 10% in 2023.

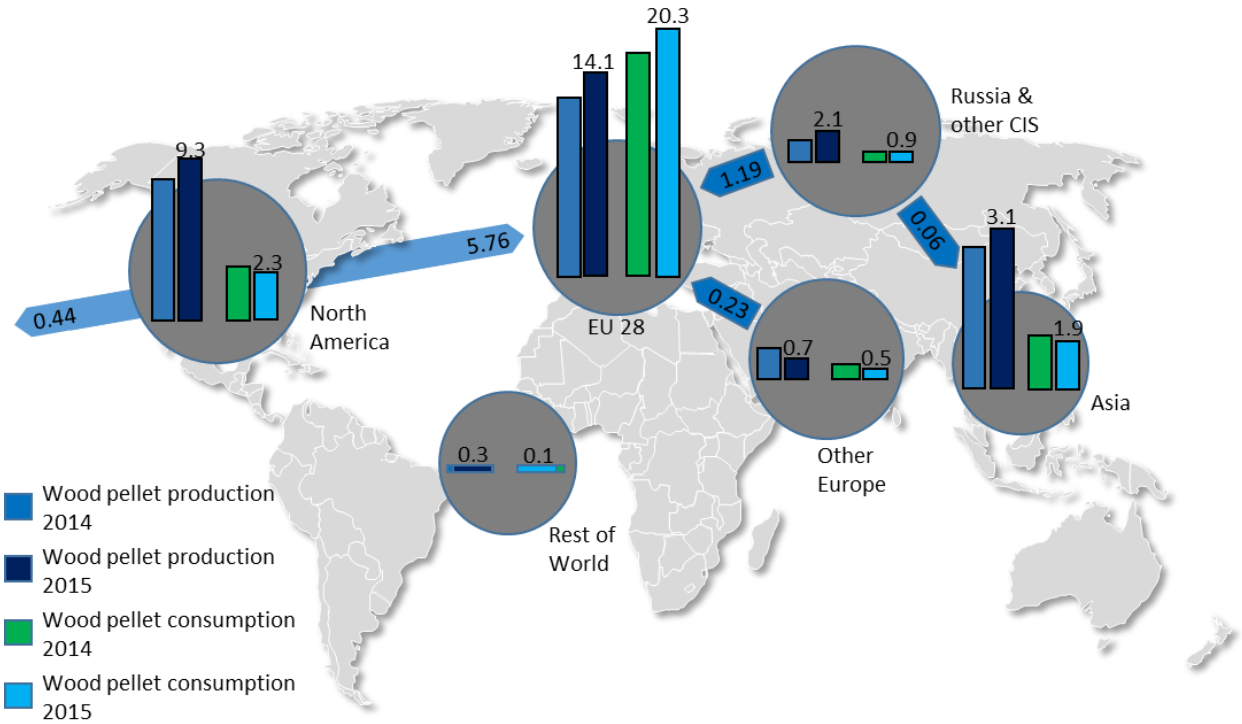
Given South Korea's focus on renewable energy, a number of companies are planning on co-firing or fully converting to wood pellets. Koen, a state-controlled utility, is fully converting two of its coal-fired plants in Yeongdong to biomass, requiring around 2 million MT of wood pellets per year, with one line beginning in July 2017 and the other beginning in late 2020. Komipo, another state-controlled utility, is planning a new dedicated biomass-fired power plant in Gunsan, which is expected to consume up to 800,000 MT of wood pellets per year when it begins in 2020. Meanwhile, construction company Hanyang and state-controlled nuclear power producer KNHP are planning to build a dedicated biomass electricity plant in the southern port city of Gwangyang, which is estimated to consume 800,000 MT of wood pellets per year. Lastly, Korea South-East Power has announced the full conversion of a 125 MW unit at one of its coal-fired power plants, and the intention to convert another unit, to biomass fuel. It is important to note the difference between dedicated biomass plants and conversion biomass plants. Both types of biomass plants use various types of solid biomass including, but not limited to, wood pellets. That said, dedicated biomass power plants solely use solid biomass as feedstock and not fossil fuels. Conversion biomass plants originally used fossil fuels as feedstock and not biomass, but have since converted to co-firing solid biomass feedstock alongside fossil fuels.

Separately, in January 2017, China's National Energy Administration announced that it has plans to spend US$ 360 billion through 2020 on renewable power sources, potentially opening up an additional demand avenue for wood pellets. China is also aiming to increase biomass-fired generation capacity from around 10 GW in 2015 to 15 GW by 2020.

Global Trade

Wood pellets have become an increasingly traded global commodity as local sourcing has proven challenging in many countries. Around 49% of global wood pellet production is exported to the EU-28 as European demand has increased at a faster pace than domestic production in recent years given renewable energy mandates. The US, Canada, and Russia are the most significant exporters to the EU-28 (Figure 7).

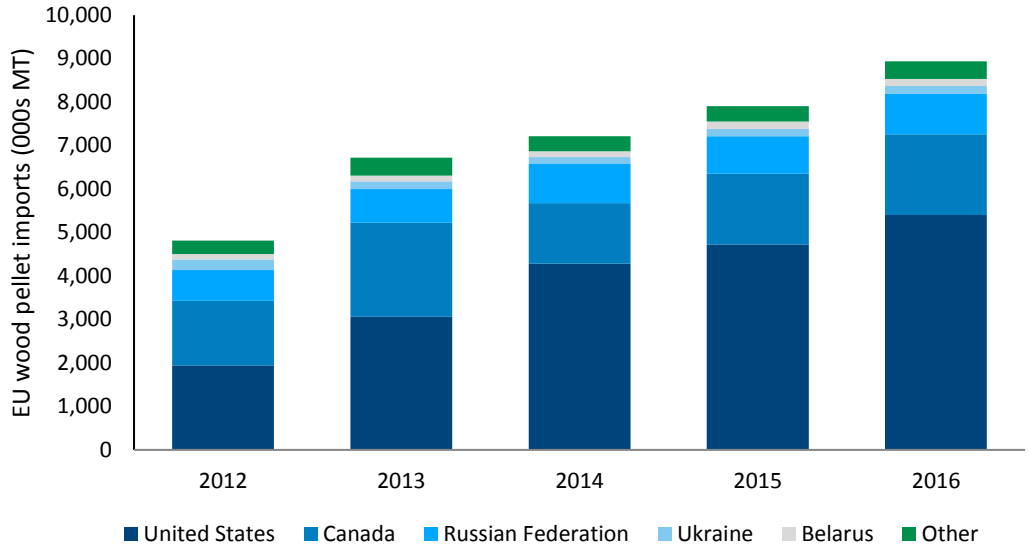
Figure 7: Global Pellet Trade Flows (millions of MT)



Source: AEBIOM

Specifically, the US has been able to capitalize on its favorable fiber position in the US South (cheap, abundant wood supply with relatively low transportation costs) by playing a leading role in the export of pellets. Given a glut of sawtimber inventory in the US South, a number of timberland owners have shifted to shorter rotations that produce proportionately more pulpwood, the primary furnish input for wood pellets, to generate more immediate cash flow. In 2016, the US exported 5.4 million MT of wood pellets to the EU-28 (primarily delivered under longer-term supply agreements) equating to 61% of the EU-28's total 8.9 million MT of wood pellet imports from outside the EU-28. Meanwhile, Canada exported 1.9 million MT of wood pellets to the EU-28 (21% of imports from outside the EU-28) while Russia exported 0.9 million MT of wood pellets (10% of imports from outside the EU-28). Figure 8 shows the breakdown of the EU-28's top external wood pellet suppliers.

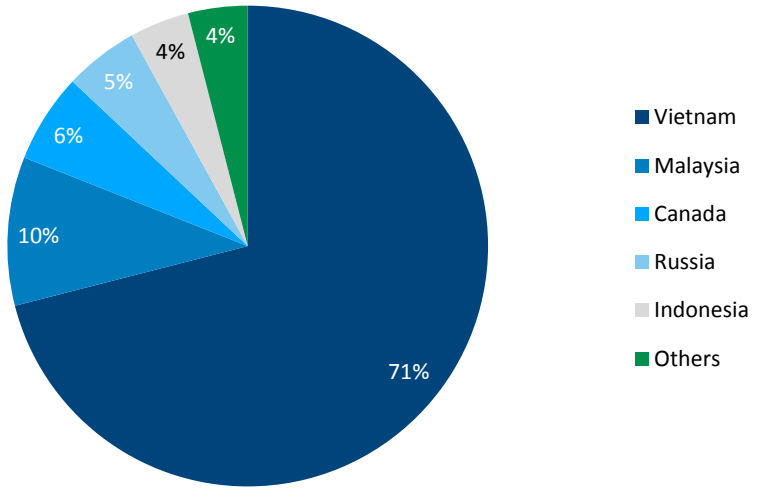
Figure 8: Main External Suppliers to the EU-28



Source: European Commission

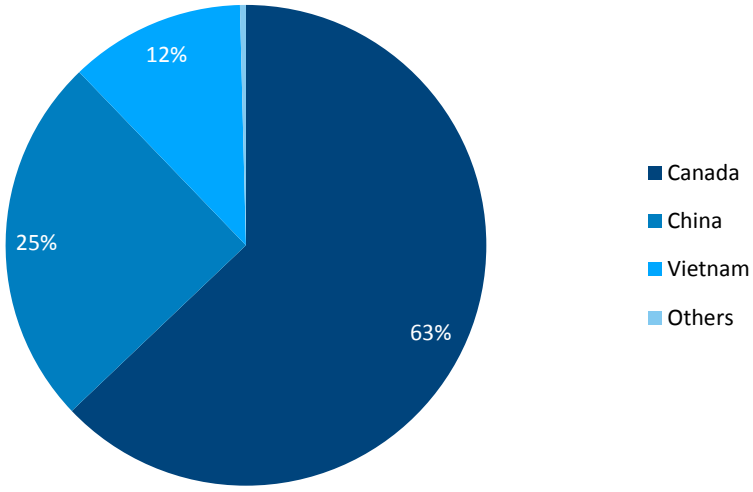
Canada (primarily British Columbia) and Southeast Asian pellet-producing countries such as Vietnam and Malaysia have largely dominated wood pellet exports to large Asian importers such as Japan and South Korea. More recently, China has also emerged to become a more significant exporter of wood pellets to both South Korea and Japan. In 2015, Vietnam supplied 71% of South Korea's wood pellets while Malaysia supplied 10% and Canada supplied 6% (note: China was the third largest supplier of wood pellets to South Korea in 2014; however, Chinese wood pellet exports to South Korea dramatically declined in 2015 given increased competition from Vietnam) (Figure 9). In 2015, Canada supplied 63% of Japan's wood pellets while China supplied 25% and Vietnam supplied 12% (Figure 10).

Figure 9: 2015 South Korean Wood Pellet Imports by Country of Origin



Source: IEA Bioenergy

Figure 10: 2015 Japanese Wood Pellet Imports by Country of Origin



Source: IEA Bioenergy

At present, US wood pellet exports to South Korea are around 19,000 MT per year. However, there is the potential for the US and other regions to increase volumes of wood pellet exports to Asia as Japan transitions

away from nuclear and traditional power sources, as South Korea increasingly focuses on renewable energy, and given an inability of Asian wood pellet suppliers to meet future incremental demand given a lack of capacity. Meanwhile, Canada's role as a significant wood pellet exporter to Asia could diminish in the future given the pine beetle infestation in British Columbia and, more recently, wildfires, both of which have negatively affected Canada's merchantable wood supply.

Wood Pellet Capacity Increases

Wood pellet supply is growing as evidenced by a number of newly established and soon-to-be established projects. Overall, the US comprised around 32% of global wood pellet capacity in 2016, amounting to 13.2 million MT of wood pellets per year. In the next several years, US capacity is expected to increase by over 2 million MT:

- Enviva began production at its new pellet plant in Sampson, North Carolina (500,000 MT per year) in 2017 with capacity expected to increase to 600,000 MT beginning in 2019;
- Enviva is building a new facility in Hamlet County, North Carolina (around 600,000 MT per year) with construction expected to be completed in late 2018;
- Highland Pellets began production at its new pellet plant in Pine Bluff, Arkansas (600,000 MT per year) in 2017;
- Colombo Energy, a subsidiary of The Navigator Company, an integrated forest, pulp, paper and energy company based in Portugal, began production at its Greenwood, South Carolina facility (500,000 MT per year) at the end of Q316. (As mentioned earlier, The Navigator Company is in the process of selling Colombo Energy to Enviva for US$ 135 million).

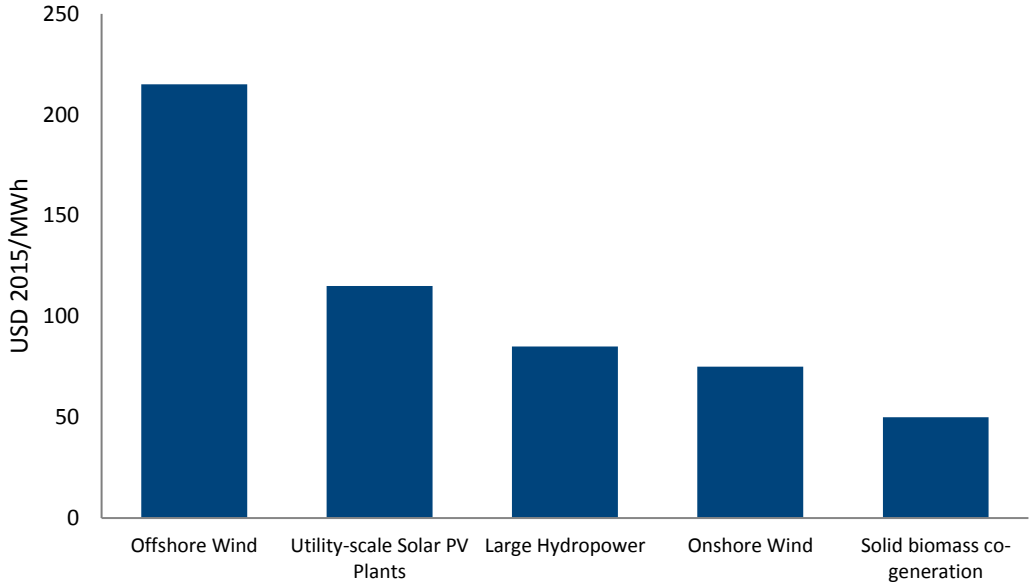
Elsewhere, wood pellet capacity is growing, but at a more modest pace. While Canadian producers have proposed expanding wood pellet capacity by around 1.6-1.7 million MT, only around 500,000 MT are actually likely to materialize. SY Energy, a South Korean energy company, was expected to start production on a new 300,000 MT wood pellet facility in Jincheon, Chungcheongbuk-do province by late 2017, significantly adding to the country's current wood pellet capacity of 85,000-100,000 MT per year.

Cost Competitiveness

When comparing wood pellets and biomass against other renewables, it is important to compare total costs (investment, construction, operating, etc.) and not just focus on fixed and variable operating and maintenance ("O&M") costs. For example, if fuel cost was the only component used for comparison, then wind and solar would theoretically provide free electricity. A significant portion of the total cost of generating electricity from solar and wind is the cost of building the generating facility, especially given their low capacity factors (ratio of actual power production to theoretical, nameplate power production).

One of the primary metrics for analyzing the cost competitiveness of different energy generating technologies is the levelized cost of electricity ("LCOE"). LCOE, which relativizes the costs of different energy sources, reflects the total per-kilowatt-hour cost in discounted real terms of building and operating an energy generating facility over an assumed financial and technical life cycle.[3] LCOE takes into account a variety of costs including facility construction, fuel cost, and O&M amongst other factors. As Figure 11 illustrates, solid biomass co-generation plants have a cost advantage against more established renewable energies like solar and wind.

Figure 11: Cost Competitiveness of Biomass vs. Other Renewable Technologies



Source: IEA Medium-Term Renewable Energy Market 2016; Solid biomass co-generation is calculated at a 70% load factor (actual kilowatt hours divided by total possible kilowatt hours)

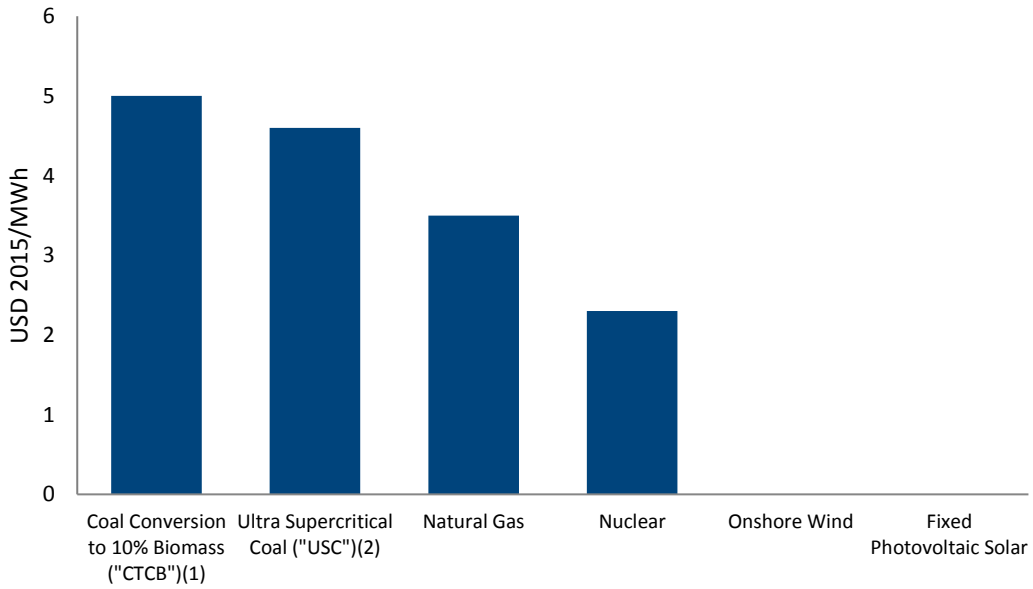
One of the main reasons that solid biomass co-generation (wood pellets are primarily co-fired with coal in utility plants, with such plants using between 10-20% wood pellets) has a lower LCOE relative to solar and wind relates to the fact that it is a baseload energy. LCOE makes the assumption that all plants run continuously and does not account for the intermittency associated with renewables such as solar and wind. Solid biomass co-generation facilities can operate without interruption, allowing for greater fixed cost absorption, thereby generating a lower LCOE.

Further, the aforementioned calculation of LCOE does not factor in subsidies. If subsidies were included in the LCOE, the overall costs of solar and wind would decline given that subsidies for wind and solar are more widely prevalent than subsidies for solid biomass co-generation.

[3] US Energy Information Administration - https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf

Finally, solar and wind have more favorable variable operating costs as compared to solid biomass co-generation as they both require no material purchases (e.g. fuel) and minimal, if any, maintenance costs. As illustrated in Figure 12, solid biomass co-generation facilities have some of the highest variable O&M costs among both renewable and traditional energy technologies.

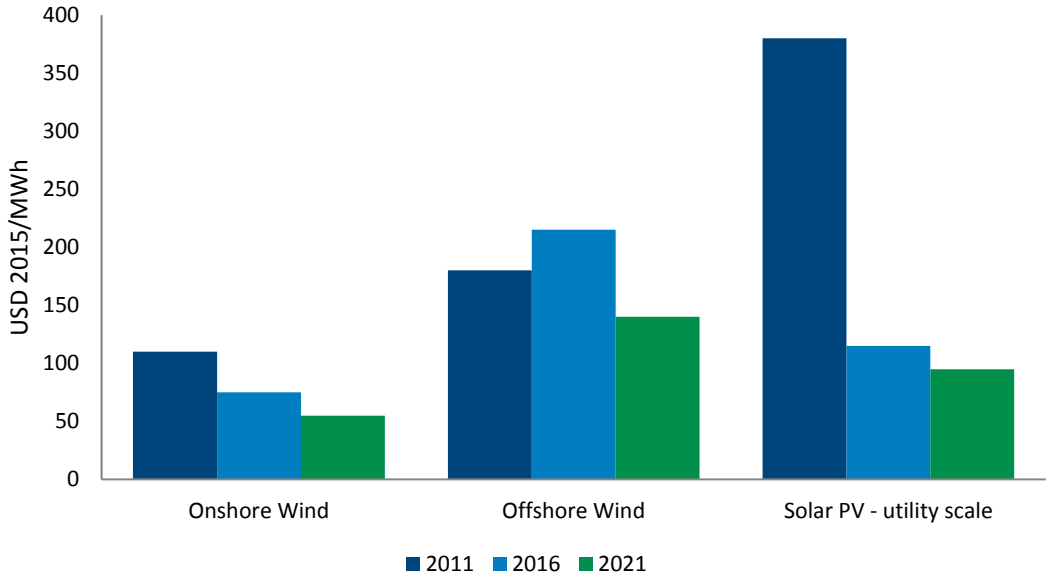
Figure 12: Variable Operations & Maintenance Costs of Renewables vs. Traditional Energy Sources



Source: EIA Capital Cost Estimates for Utility Scale Electricity Generating Plants, 2016; (1) Wood pellets are primarily co-fired with coal in utility plants with the above chart showing 10% co-firing; (2) Ultra Supercritical Coal facilities burn coal to produce steam in a boiler, which is expanded through a steam turbine to produce electric power.

Looking forward, there is an opportunity for the cost of biomass to further decline as biomass gains greater acceptance, expands into new markets with better resources, and becomes more driven by the private sector (which should result in increased competitive pressure), similar to what has occurred with solar and onshore wind. As Figure 13 shows, solar and onshore wind costs have declined and should continue to decline given improving technology costs (e.g. prices of batteries are declining rapidly leading to increased sales of solar and wind systems), sustained policy support, and market expansion.

Figure 13: Declining Costs of Wind and Solar Energies



Source: IEA Medium-Term Renewable Energy Market 2016

Benefits

The use of wood pellets derives multiple benefits including ESG factors. With respect to ESG, wood pellets are capable of replacing coal, to some degree, as a means of heat and electricity production. Wood pellets are more sustainable than coal as trees can be immediately replanted whereas coal regeneration can take millions of years. Wood pellets are carbon neutral because the amount of carbon dioxide ("CO_2") emitted from the burning of wood pellets can ultimately be recaptured over time through the planting of new trees (carbon sequestration).

One frequent criticism of the wood pellet industry is the amount of transportation (land and ocean) necessary to ship pellets from where they are produced to where they are consumed (e.g. from the US South to Europe). However, many European countries monitor the sustainability of wood pellets throughout the entire supply chain. For example, the UK closely follows the wood pellets it consumes, including distribution, to ensure that the pellets meet its sustainability criteria. The criteria consist of two components: a GHG lifecycle analysis and a land analysis. To satisfy the GHG lifecycle criteria, the energy source must achieve a 60% reduction target of 285 kilograms of CO_2 emitted ("$kgCO_2e$") per MWh while the land criteria restrict the sourcing of feedstock from land with high carbon stocks or high biodiversity value.

Wood pellet demand has also benefited pulpwood log demand. As mentioned previously, one of the processes for creating wood pellets involves chipping pulpwood logs. This process has taken hold given constraints around the availability of residual chips due to less sawmill residuals (e.g. sawmills still not running close to capacity) and competing demand from Oriented Strand Board and pulp/board mills. Therefore, as

demand for wood pellets has increased, there has been a corresponding increase in demand for pulpwood logs (particularly in states that have wood pellet facilities).

Lastly, biomass / wood pellets could serve as an important source of baseload power as compared to other renewables such as wind and solar, which are non-baseload and less reliable.

Risks

There are also a number of risks associated with the global wood pellet market that could mute its growth trajectory. Most importantly, industrial wood pellet consumption is largely dependent on national policy (especially around subsidies), which is challenging, if not impossible, to predict. For instance, the Conservative Party became the majority in the UK's House of Commons in 2015, and subsequently eliminated the Climate Change Levy exemption for renewable electricity use, thereby removing an important incentive used to encourage companies to switch to renewables.

Depending on how governments allocate resources, there is also the risk that biomass could fail to gain appropriate governmental support or could be replaced by other renewable energies. As part of the UK's 2017 CfD subsidy, only 2 dedicated biomass projects in total were awarded the CfD subsidy for both the first and second round allocations as compared to 20 wind projects, 11 solid waste conversion projects, and 5 solar projects. This compares to 2015 in which no dedicated biomass projects were awarded the CfD subsidy versus 17 wind projects, 2 solid waste conversion projects, 3 advanced conversion technology projects, and 5 solar projects. While the 2017 allocation is somewhat positive given an increase in the number of biomass projects receiving the subsidy, the absolute number of CfD subsidies given to biomass is still well below the number of CfD subsidies awarded to other renewable energies.

Another significant risk is the decline in costs for other renewable energy sources such as solar and wind. As noted previously, solar and wind costs have dramatically declined and are forecasted to further decline, which could continue to drive their use while disincentivizing the use of wood pellets. Meanwhile, prices of traditional fuel sources such as oil and natural gas remain somewhat low. Given a global abundance of oil and natural gas, prices for these commodities have plummeted and are trading at low levels (West Texas Intermediate Crude Oil is down 30% from its 2014 peak), creating less pressure to find alternative and renewable sources of energy.

Country-specific factors such as weak grid infrastructures, lack of affordable financing, and regulatory and administrative barriers also pose important risks to the acceptance of wood pellets.

Specific to residential pellets, weather is the primary risk as warmer than normal winter weather translates into lower wood pellet consumption. In 2014, market sales of residential wood pellets in Europe declined 9% to 10 million MT from 11 million MT in 2013 given an uncharacteristically warm European winter, which resulted in boiler sales declines in Germany and Austria and stove sales declines in Italy and France.

Conclusion

We expect global wood pellet demand, specifically industrial wood pellets, will continue to increase in the medium-term as more countries look to utilize renewable energy and reduce emissions. While the EU-28 will continue to be the largest consuming region of wood pellets, pellet-consuming countries such as Japan and South Korea should become more prominent because of an increasing focus on renewable energy. Moreover, there is the potential for wood pellet consumption to accelerate in China given an increasing focus on the environment. Meanwhile, given the amount of readily available, low-cost wood situated in the US South and a lack of appropriate domestic incentives encouraging domestic industrial wood pellet consumption, we expect the US to remain the largest global exporting region of industrial wood pellets to the EU-28.

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