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BIOENERGY MARKETS FOR SOUTHERN YELLOW PINE FORESTRY IN THE US SOUTH

Assessment and Outlook for Global Industrial Wood Pellet Markets and the Implications of Evolving
Subsidy Schemes for Commercial Southern Yellow Pine Forestry in the US South

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Abstract:

This paper discusses the current state of the industrial wood pellet markets in Europe and Asia, their outlook over the coming decades, and their growing influence in the dominant forest products economy in the US South. Bioenergy is an embattled but growing segment of the renewable energy portfolios of various states across the globe. Even in a global energy economy focused on the development of so-called “free” energy production from wind, solar, tidal, and geothermal sources, it is evident that bioenergy has a significant role to play in the next century as the global economy curbs its reliance on fossil fuels and carbon emissions, though not without significant support and subsidization from state actors in the form of direct subsidies, incentives, and tax breaks. This paper examines the general effects of governmental energy subsidies in various foreign markets on the creation and future prospects of wood pellet manufacturing in the US South. The agricultural industry in the United States has long benefited from the economic backing and support of the federal government through a variety of subsidy programs. Corn production is heavily subsidized to provide feedstock not only for meat production and food, but also bioenergy production in the form of corn based ethanol. The US industrial wood pellet market is subject to similar governmental support, but unlike corn, this support comes in the form of foreign governmental subsidies of the use of the end product in overseas energy production. It is important to understand the general impact that subsidies have on both market creation and competition. The US South’s pellet production industry illustrates the power that governmental regulation, requirements, and subsidies can have on “free” market practices. Additionally, the possibility of major changes in subsidy policy in Europe, driven by decentralization and Brexit, could severely disrupt wood pellet manufacturers in the United States. Questions surround the validity of the claim that wood energy is cleaner than coal energy. A growing chorus of detractors on both sides of the Atlantic rejects the science of the “carbon neutrality” that has encouraged wood pellet use as bioenergy in Europe, and there are currently proposals with the European Commission to close what many see as a loophole that allows for the release of comparable, or even greater levels of greenhouse gases. If foreign subsidy programs in Europe are significantly altered or allowed to expire, the outlook for wood pellet manufacturing in the US South may be grim, indeed. Pellet producers in the region are undergoing dramatic shifts in operating structure to attempt to drive costs down to offset the impending loss of certain subsidy schemes in the world’s largest market in the United Kingdom already. The news is not all bad, however, as the expected growth in pellet demand in two of the world’s largest energy economies, South Korea and Japan, may not only open up more opportunity for pellet sales to European consumers, as demand currently filled from the Pacific Northwest and British Columbia shifts to Asia, but also new shipments through the Panama Canal across the Pacific from ports in the US South. While these developments are exciting for optimistic pellet producers and feedstock growers, it is important to recognize the comparatively small amount of biomass actually harvested (as a percentage of total volumes harvested) in the US South for overseas industrial wood pellet market, and the unavoidable truth that without significant financial support through subsidies, the entire industry is currently unsustainable.

Global wood pellet markets are a small but growing force in the forest products sector in the Southeastern United States. Around the globe, particularly in Europe, governmental attention on renewable energy sources has led to steady growth in global demand for wood pellets for both residential heating and industrial power generation purposes. This growing demand facilitated rapid development of a robust wood pellet production market in the Southern United States. Forestry sector and governmental stakeholders alike insist the use of woody biomass for electrical generation is a positive step in the global fight against carbon emissions. Alternatively, several NGOs and international think-tanks contend that those arguments are intentionally misleading and denounce bioenergy as a bane for carbon emission reduction.

On all sides of the discussion, stakeholders must recognize the small fraction of total harvest levels that are represented by wood pellet production in the US South. According to FAO records for 2016, consumption of low quality virgin pine fiber, analogous in the markets to pulpwood (small diameter or defective tree stems traditionally sold for pulp and paper products) for wood pellets accounted for only 3% of the total volume of pulpwood harvest for the region. (FAOSTAT, 2016) While those opposed to the use of industrial wood pellets as a renewable energy source talk about the degradation or destruction of forest resources in the US South by the wood pellet market, the extremely limited harvest level for pellet production seems to indicate that these opinions are emotionally driven and lack basic understanding of the history and scope of commercial forestry practices in the region.

Conversely, pellet producers and consumers alike tout the incredible opportunity pellet-mills offer for underserved rural

communities abandoned by pulp and paper mills throughout the US South (a result of the well documented and decades long decline in demand for paper products in a digital age). While pellet mills can generate much needed capital infusion for these communities, the effects are limited to the immediate “procurement zone” around the mill. The input-cost restrictions being implemented across the supply chain, in response to declining subsidy support abroad, will likely result in even less impact to communities that may become home to new pellet mills in the future. To be sure, in some communities, like those served by Drax Biomass in rural Louisiana and Mississippi, the influx of logging and trucking jobs, as well as mill operator positions, were highly praised and much needed. (Madden, 2018) The economics of industrial pellet production, however, are likely to limit such effects in new locations, as Drax, and others, seek new ways to increase efficiency and drive down production costs.

This paper examines and analyzes current thought on the effects of subsidies in natural resource based energy production (specifically, pellet production in the US South), the scientific validity of the carbon neutrality definition of biomass that drives these subsidies, and the potential effects of their inevitable decline and eventual removal from the market in coming decades.

Renewable energy policy and the birth of an industry

Since the fall of the Iron Curtain in 1991, the European continent has worked tirelessly and collaboratively to lead the world in social and environmental progress. In the 2000s, with a global recession and skyrocketing energy costs, the European Commission passed sweeping legislation and regulations to limit

greenhouse gas emissions and to promote the production of renewable, carbon-neutral energy. In the following decades, hundreds of billions of Euros have been invested across the continent in renewable energy projects like wind and solar.

Ultimately, the interpretation of commercial forest products as carbon-neutral has led to the regulatory construct that the burning of wood-based biofuels is itself carbon-neutral. The concept of continuous forest production posits that any carbon released by the burning of wood fiber harvested in any given year would be sequestered by trees continuing to grow as a part of the sustainable commercial forestry industry practices that have been established in the US South for more than a century.

In Great Britain, the conversion of major coal burning power production facilities to wood pellet fuel is evidence of massive subsidization in that country's economy. Why would a government so obviously act against its economic best interest to support a controversial and arguably unsustainable energy source? Unlike their North American allies, European governments see their interests best served by aggressively supporting innovation in renewables, regardless of the cost to consumers, rather than generating the greatest economic value or return on taxpayer investments (an outcome that flies directly in the face of basic economic principles). Through massive spending programs, Europeans have essentially created a \$5 billion/year industry that would not exist without it.

Optimism in the US forestry industry, coupled with the basic drive of market economics (providing a product for which a market exists, and supply is limited), has resulted in a variety of positive outcomes for the forestry sector. Communities in which pulp and paper manufacturers have closed have seen wood pellet producers open shop, and

reinvigorate depressed pulpwood markets, provide jobs, and put loggers and truck drivers back to work. So long as the social and economic positives so obviously benefit producers in the US South, pellet mills will continue to operate, and perhaps even expand.

Challenges for bioenergy markets in the US and abroad

While most industry analysts point to European policy and expected growth in Asia as positive markers for pellet production in the US South, there remain some potentially significant challenges that could hinder expansion in the coming years. Oversupply in industrial markets has led to a sharp drop in price in recent years, and warmer winters in Europe could see more premium pellets being dumped into the industrial market as a result. The US South, with its unique political climate, can also be a challenging place to do business as a bioenergy manufacturer, as many right-leaning citizens tend to view the technology with indifference or disdain. Finally, and most importantly, global media and renewable energy NGOs have come together in a loud and unified voice that refutes and rejects the claims of the carbon emissions benefit realized by burning biomass instead of coal for power generation.

Falling prices have plagued wood pellet manufacturers in the US for a few years now, though increased capacity in Belgium and Holland, accompanied by a bitterly cold winter in 2017-2018 are offsetting the oversupply in the market. There are many factors that contributed to this sharp decline which drove many smaller scale pellet producers in the US out of business. The outpacing of markets by the manufacturing sector led to a consistent oversupply of industrial pellets in recent years, and pressure from storage facilities to turnover inventory to create room for new shipments drove down spot prices repeatedly. (Bourne, 2016) Additionally, warm winters in Europe and

the US, along with falling fuel oil prices, caused a significant amount of premium pellet spillover into the industrial market, forcing prices even lower. While there is reason to believe that demand growth in the next few years will outpace the oversupply problem, warmer winters and a robust premium pellet market in Europe could mean competition for manufacturer's in the US South (Strauss, 2017).

Finally, in recent years there have been challenges to the idea of woody biomass carbon neutrality when used for generating bioenergy. A February 2017 report from an internationally respected NGO think-tank, concluded that the use of biomass released more carbon into the atmosphere than coal, per MWh produced, and that ultimately, increases in demand would destroy the forestry industry in the US South. (Brack, 2017). Even the UK's Department of Energy and Climate Change has presented a paper outlining 29 counterfactual arguments against the benefits of biomass for electricity. (Stephenson and McKay, 2014) Alternatively, analysts and scientists in favor of bioenergy have done extensive modelling and analysis to confirm that not only does biomass save carbon, but also that sustainable forestry operations in the United States are the only viable source of this resource to ensure sustainability. (Sikkema et al., 2010) (Jonker et al., 2014)

The Trump administration's withdrawal from the Paris Agreement has had an equally significant impact on negative perceptions of woody biomass as an energy source in recent months. With a renewed international focus on carbon emission policy in the press, driven by the widely publicized withdrawal of the US from international talks, many powerful media outlets have taken a strong stand against the use of southern yellow pine fiber as a bioenergy feedstock. While many of these outlets cite think-tank publications and scientific data, their ultimate conclusions are derived from a rather disingenuous fallacy. Their argument is driven

by the idea that a standing pine tree, allowed to grow indefinitely, will result in carbon sequestration (or removal of CO₂ from the atmosphere), whereas a tree cut and burned will not only contribute its own carbon to the atmosphere, but also the carbon produced through the industrial production of the end product (i.e. diesel from harvesting equipment and trucks, electricity used in pellet manufacturing, etc.) (Brack, 2017).

This position ignores the fact that commercial southern yellow pine production exists as an economic enterprise, regardless of the existence of wood pellet markets. The pine trees in question are grown in the US South for the purpose of harvest and end product manufacturing. A tree not harvested for wood pellets will inevitably be harvested for some other economic enterprise. In short, a southern yellow pine tree on a commercial plantation will not remain on the stem to sequester carbon in *any* economic reality. Additionally, plantation managers invest in forestry as a perpetual enterprise, requiring predictable and steady annual cash flows to offset administrative costs and tax burdens. While no forests are specifically and exclusively grown for the generation of wood pellets in the US South, many are managed for pulpwood, which is functionally the same feedstock. If a forest manager harvests X amount of volume in a given year, he must produce the same amount of volume in the remainder of his forest every year, in perpetuity, to meet his cash flow needs. He must also, immediately after harvest, begin the process of reforestation of any harvested area, so as to regulate his forest in such a way to be sustainable. This concept of a regular forest is a core tenet of sustainable forestry management in the US South (and many other regions globally), and is a guiding principle behind the fiscally and environmentally responsible production of wood products.

As markets evolve, and the demand for traditional paper products like printing and writing papers continues to decline, new markets for low value wood, produced during healthy forest tending practices (i.e. thinnings, salvage harvests, stand health improvement harvests, etc.) must be conducted to maintain the financial incentives for active forest management. In recent decades, private landowners across the US South have responded to these market forces by converting forest land to agricultural uses, as evidenced by the significant growth in blueberry production in the state of Georgia. On public lands, decreased governmental budgets for land management, accompanied by contracting markets for wood products have led to poorly managed public forests across the entire continent. When large forests are left unmanaged, they become an increasing danger to themselves and the communities in and around them through increased wildfire risks (due to decades of downed woody debris on the forest floor), and density related disease outbreaks. When management is financially incentivized through wood product markets for *all* timber products, regular maintenance and upkeep of forestlands in the US South provide optimal ecosystem services and help meet the consumptive needs of a global society. There is little evidence that wood pellets are the panacea that will protect America's forests in perpetuity, but they do provide incentives for management, and management creates healthier forests for everyone.

The voting public, as well as political activists in Europe, however, are either unaware or unconvinced of this basic reality, and negative public opinion of woody biomass for energy production is likely to increase sharply in the next few years (Strauss, 2018). The European Commission has already begun drafting regulatory changes that will cut back on wood pellet subsidization, and it seems more and more likely that these regulations will pass

in the coming decade. Wood pellet manufacturers in the US South must begin to acknowledge this reality if they hope to be positioned for success in the future.

The Loss of Subsidies and Emerging Markets

To be sure, it seems evident that the current model of subsidization of wood pellets in the European energy sector seems untenable at the least (and, more realistically, doomed). Simple financial analysis of the situation indicates that the status quo is unsustainable, and without major innovation and improvement in supply chain efficiency, it seems unlikely that the argument that woody biomass is carbon-neutral will hold up against public and media opinion for much longer. Hundreds of millions of dollars are spent annually to support Drax Power's procurement and conversion projects, and there are loud and concerted voices in the British media gaining support for the abandonment of these schemes. Were this to happen in the short term, the reliance on European markets would inevitably dismantle the manufacturing sector in the US South nearly overnight. Alternative uses and products (i.e. cat litter or residential heating fuel) for industrial wood pellets are incredibly limited and niche markets in North American. Without subsidies, European energy producers could not afford to continue purchasing pellets from American manufacturers. Without this market, pellet mills in the South would fail almost immediately.

Current plans in the UK, by far the world's largest consumer of industrial pellets, call for the phase out of biomass subsidies by 2028, which has driven efforts across the production sector to cut production costs and overhead to ensure their business models can survive without governmental subsidization. The largest producers in the US South believe this can be accomplished with supply chain optimization and co-locating other wood using

mills with their pellet mill facilities to eliminate transport costs of their most efficient feedstock. (Madden, 2018) Questions remain, however, about the potential effects of Brexit. Producers in the US fear that the conservative push driving this movement may lead to a pull-back of most renewable energy subsidy schemes on a faster time scale than what is currently forecasted. Supply gluts in recent years forced spot prices to their lowest levels for industrial pellets. With many manufacturers being kept afloat by long-term supply contracts negotiated before the price drops, and with those contracts nearing their expiration, another oversupply situation could push producers with undiversified customer bases out of business quickly (Strauss, 2017).

Europe, however, may not be the only outlet for American wood pellets in the next few years. South Korean demand has seen small but steady gains for several years now, and growing controversy over the unsustainable forest management practices of their primary supplier, Vietnam, and history making developments with long time enemy North Korea, leads some to believe a Korean outlet for North American pellets may be in the horizon. Additionally, a growing interest in woody biomass in the Japanese energy sector, largely resulting from a closure of nuclear facilities after the Fukushima disaster, may be the biggest contributor to industrial wood pellet market growth in the next decade. (Wu, 2017)

While Japanese imports of wood pellets totaled only 350,000 tonnes in 2016, analysts and industry groups expect a massive expansion in capacity over the next decade. Over 80 new biomass using energy projects have been approved by the trade ministry since 2010, and the Ministry of Agriculture, Forests, and Fisheries have plans for more than 300 “biomass town” plants that provide important resources and services to smaller local communities and utilize woody biomass in a

variety of ways, including energy generation. (MAFF, 2015) Most important to industrial pellet production in the US South, however, is the Feed-in-Tariff (FIT) scheme, which guarantees fixed prices for renewable energy inputs for electricity generation for Japanese producers on a long term contractual basis (usually 20 years) (IEA, 2018). According to pellet industry experts, if the FIT scheme persists on its current trajectory, and the Trade Ministry approved projects are completed, Japanese demand for pellets could potentially grow 30-fold to over 15Mt annually. (Strauss, 2018) Much of this demand is expected to come from the western United States and British Columbia, though there are significant questions about the region’s ability to adequately and sustainably meet the demand in the long run, even with the expected influx of pellets from Asian producers (METI, 2012).

For the US South, this creates two possible opportunities, which ultimately depend on a wickedly complex set of future circumstances that are as yet unclear. If the Pacific Northwest (PNW) and B.C. can in fact meet the North American demand for wood pellets in Japan, then current volumes shipped from these regions to Europe would be absorbed by producers in the South. Additionally, if, as this author suspects will be the case, PNW and B.C. production is inadequate or unsustainable, investment in port infrastructure across the US Gulf coast region could create an opportunity for larger ships transporting pellets generated in the region through the Panama Canal and across the Pacific. The most likely outcome is a combination of these two scenarios, as European demand fluctuates and different companies weigh the value of the required investments to make trans-Pacific shipment cost effective, creating opportunities for pellet exports across both oceans.

Conclusions

Wood pellet manufacturers and their supporters have relied heavily on the assumption that European subsidies for wood pellets would continue for several more decades, and upon examination of actual carbon emission requirements in European regulation, it would seem accounting for wood pellets as carbon neutral and expanding their use would be the only realistic way to meet these goals. However, a shift in public opinion in the media and public in Europe have cast doubt on the likelihood of such heavy subsidization continuing for much longer. It seems possible, and perhaps even likely, that European politicians will receive growing pressure to transition the use of these funds to other renewable energy production, a process that will likely be driven by a change in the interpretation of wood pellets as “carbon neutral.”

Current opinion among the US forest products industry is that wood pellet demand will grow significantly in the next few years, and many projects have been proposed or begun to meet that demand. However, if subsidies in Europe decrease or disappear, oversupply issues and shrinking demand will kill many of these projects. Even well-established large scale pellet manufacturers in the US South must begin to contend with the possibility that European environmental policy is likely to reduce the financial incentives they have relied upon to this point in the coming years. Scientific evidence for the carbon neutrality of wood pellets may be convincing to foresters, but few outside the industry share that conviction. Think-tanks and nonprofits regularly attack both the production and consumption industries of wood pellets as agents of deforestation and GHG emissions (Anderson and Powell, 2018) (Brack, 2017). Without overwhelming, indisputable, and repeatable evidence to support wood pellets’ advantages over coal as an energy source, public

opinion will continue to shift away from supporting their use.

If these markets can be sustained, and potentially grow with increased demand in Asia, then there is potential for a meaningful impact on the wood products manufacturing sector in the US South. Already home to the world’s largest industrial pellet mills, which have created hundreds of jobs and generate over \$100 million in profits annually, the US South is well positioned to meet the consumptive needs of international industrial wood pellet markets. While the well-being of our forests are often the most emotional talking point for opponents of the industry, the simple reality is that without economic incentive, our forests would likely not remain forests for long. Income generation through commercially managed timberlands provides important capital for the tending and regeneration of forestland in the region, including non-commercial forests. As wood products and energy markets evolve, industrial wood pellets provide an opportunity to keep the US South forested.

However, in the marketplace of ideas, the loudest and most unified voices are often the victors in our current global society. As stewards of forestlands for centuries, timberland managers are heavily invested in the future health of our global environment. NGOs and enthusiastic supporters of carbon free “free energy” solutions are well-orchestrated, well-funded, and passionate about their causes, and want financial support, and even government tolerance, of bioenergy eliminated.

Wood pellet manufacturers and energy producers who are reliant on these subsidies must aggressively support, pursue, and publish scientific evidence of woody biomass based energy in the near term if they hope for their mills to remain open in the long term. Even with the most optimistic assumptions about Asian demand for pellets in the next 10 years,

the economics of shipping wood pellets across either ocean from Gulf Coast ports are unsustainable without further innovation, cost-reduction, and financial support. While some hypothetical markets for industrial pellets (i.e. cellulosic biocrude and ethanol conversion) could create massive domestic demand, the technologies required face serious regulatory and funding challenges and are likely decades away (Peplow, M., 2014).

Finding sustainable and long term solutions for renewable energy is arguably the most important undertaking mankind will ever face. Centuries from now, it seems obvious that technological advances in energy capture and

usage efficiencies will make the burning of biomass, or any carbon emitting energy source, obsolete and unnecessary. In the meantime, however, we must power our society and our technological advancements with the resources we can renewably and reliably produce. Forests in the US South have met the needs of the global economy for centuries, and through improved practices, will almost certainly continue to do so well into humanity's future. Time, and the industry's ability to market itself correctly to the public, will tell if wood pellet production plays a significant role in the coming decades.

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