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Vietnam Wood Pellet Exports

Rapid growth and low prices. Can it last? What is the Future?

By William Strauss, PhD
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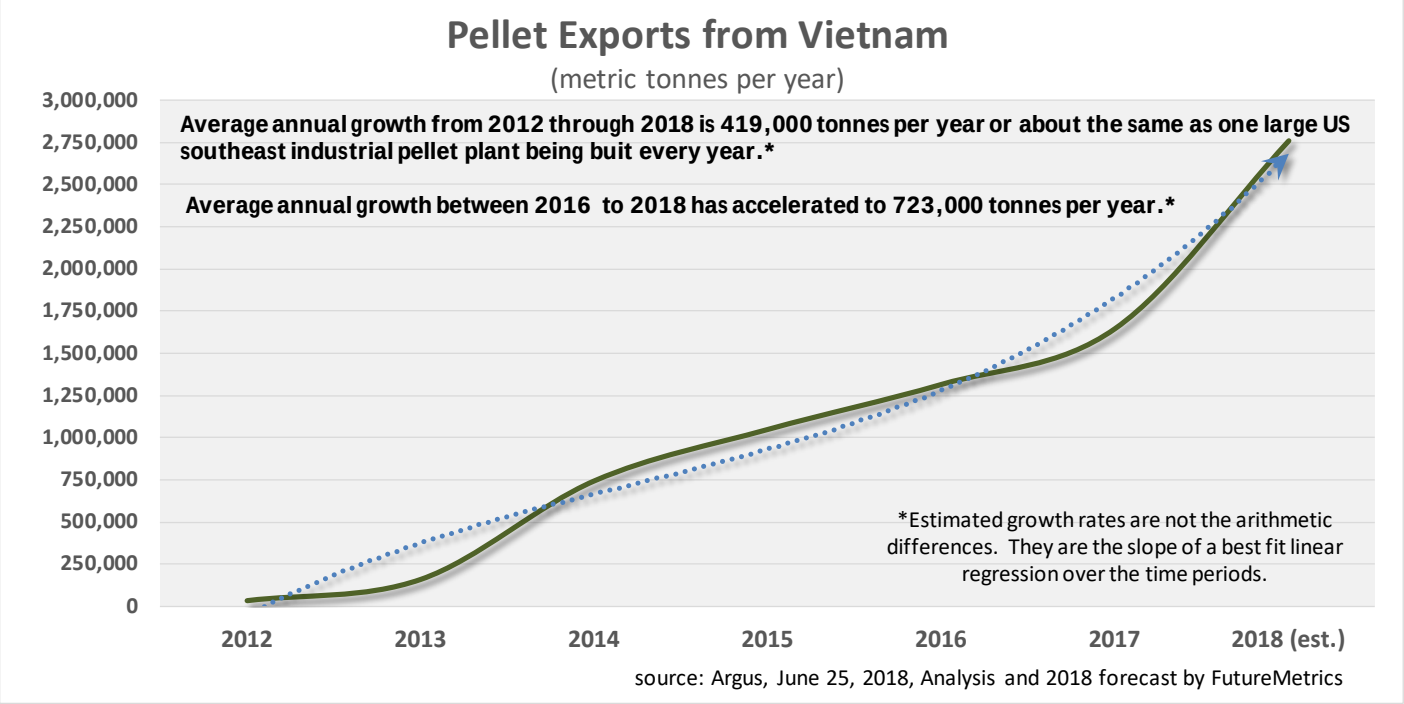
This brief white paper will explore the Vietnam pellet export sector. With growth in pellet exports from Vietnam going from nearly zero to about 2.75 million metric tonnes per year[1] over seven years, the obvious question is: What are the limits to growth for that country? A corollary to that question is: What will be future costs, and thus future prices, for pellets produced in Vietnam and shipped to South Korea and Japan?

This analysis is based on several sources including primary sources developed by FutureMetrics. FutureMetrics operations expert, John Swaan, has been providing design and equipment selection guidance for a new pellet mill in Vietnam. He will soon be leading the training of the operators of the new 120,000 tonne per year pellet factory. FutureMetrics' work in Vietnam has offered some insight into how the pellet manufacturing markets are developing. FutureMetrics has also drawn upon several sources of international trade data for this analysis.



source: Argus, June 25, 2018, Analysis and 2018 forecast by FutureMetrics

The Vietnam pellet industry has traditionally been based on the use of the by-products of furniture manufacturing. The saw and milling dust from the furniture factories is already dry and is often already of a

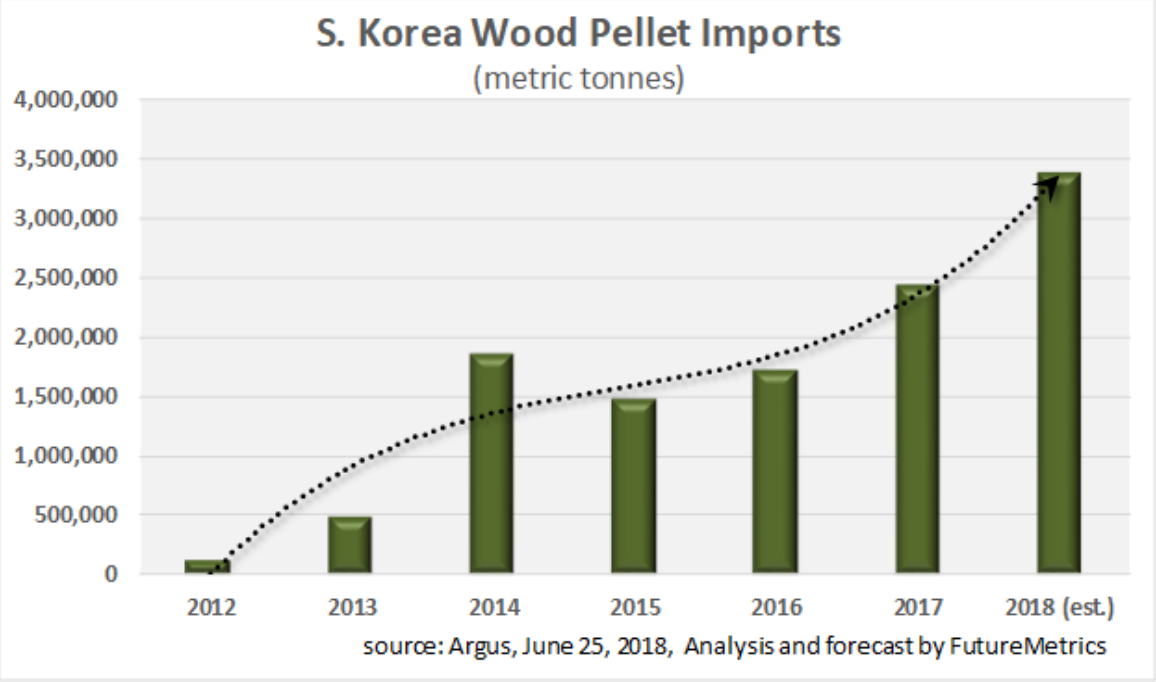
[1] 2018 export quantity is based on extrapolating from exports over the first four months of 2018. Vietnam does not report export data, so pellet export data are estimated from information from the major importers (South Korea and Japan).

small enough particle size to not require further size reduction by hammermilling. Many of the earlier Vietnamese pellet mills do not have dryers or particle size reduction equipment. Thus, they have lower capital costs and lower operating costs. Combined with low labor costs, the Vietnam pellet industry has a history of low cost production.

High volumes of incoming container shipments from South Korea and low volumes of container cargo from Vietnam to S. Korea has allowed pellet producers to take advantage of the excess empty containers with very low per-tonne shipping rates to S. Korea. Rates have traditionally been under $10/tonne and sometimes much less.

Vietnam Pellet Prices Delivered to S. Korea and Japan will Continue to Trend Higher

First, shipping costs are likely to rise. The rapid increase in demand for containers for pellet shipments from Vietnam to S. Korea has lowered the imbalance between incoming and outbound freight. As excess empties decline, the shippers gain more leverage in pricing. Given current bulk shipping rates, we expect that freight rates, particularly to Japan, will move above $20/tonne.



Second, the conditions for low-cost production in Vietnam are also changing. The availability of low-cost and pre-dried sawdust and milling dust from furniture factories is near or at its limit at the current level of furniture production and this has caused competition amongst pellet producers for the feedstock.

The furniture manufacturing sector in Vietnam has grown rapidly over the last decade: from exports of about $2.1 billion in 2006 to about $7.2 billion in 2016. That is an annualized growth rate of 13%[2]. Compare

[2] https://www.giiresearch.com/report/csi512742-furniture-industry-vietnam.html

that with the annualized growth rate of 61% for the Vietnamese pellet export industry from 2013 through the estimated exports in 2018 (from 160,000 tonnes to 2.46 million tonnes).

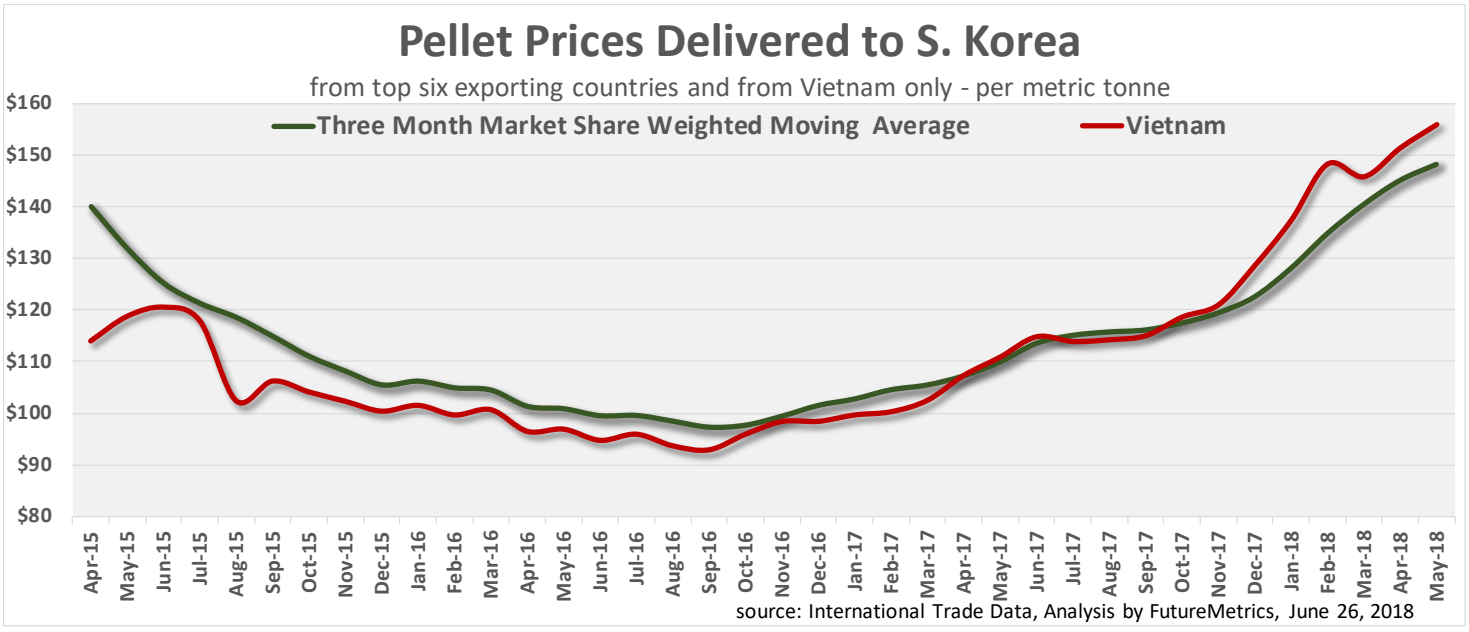
Demand for furniture manufacturing residuals has been growing many times faster than the industry that supplies those residuals.

As pellet production levels increase, Vietnam producers will increasingly depend upon forest residuals, forest thinnings, and other roundwood. Those sources of pellet feedstock are costlier to procure and require debarking, chipping, drying, and hammermilling prior to being densified into pellets.

As production in Vietnam increases, the cost to produce pellets in Vietnam will also increase.

The increase in Vietnamese pellet prices is already evident. FutureMetrics estimates the actual price of wood pellets imported into the major importing countries from international trade data[3]. Most of the exported Vietnamese pellets go to South Korea and Japan.

The first chart below shows two lines. It shows FutureMetrics' estimates of the market share weighted prices of pellets delivered to S. Korea from the top six suppliers (including Vietnam) as the green line, and the prices from Vietnam only as the red line. Because Vietnam dominates the S. Korean market share, Vietnam pellet prices also dominate the aggregated weighted average price. The market shares of the S. Korean suppliers are shown on the second chart.



[3] This is not the same as spot prices. The data is based all imports, the majority of which are trades based on contracts that are often different than the current spot price for pellets.

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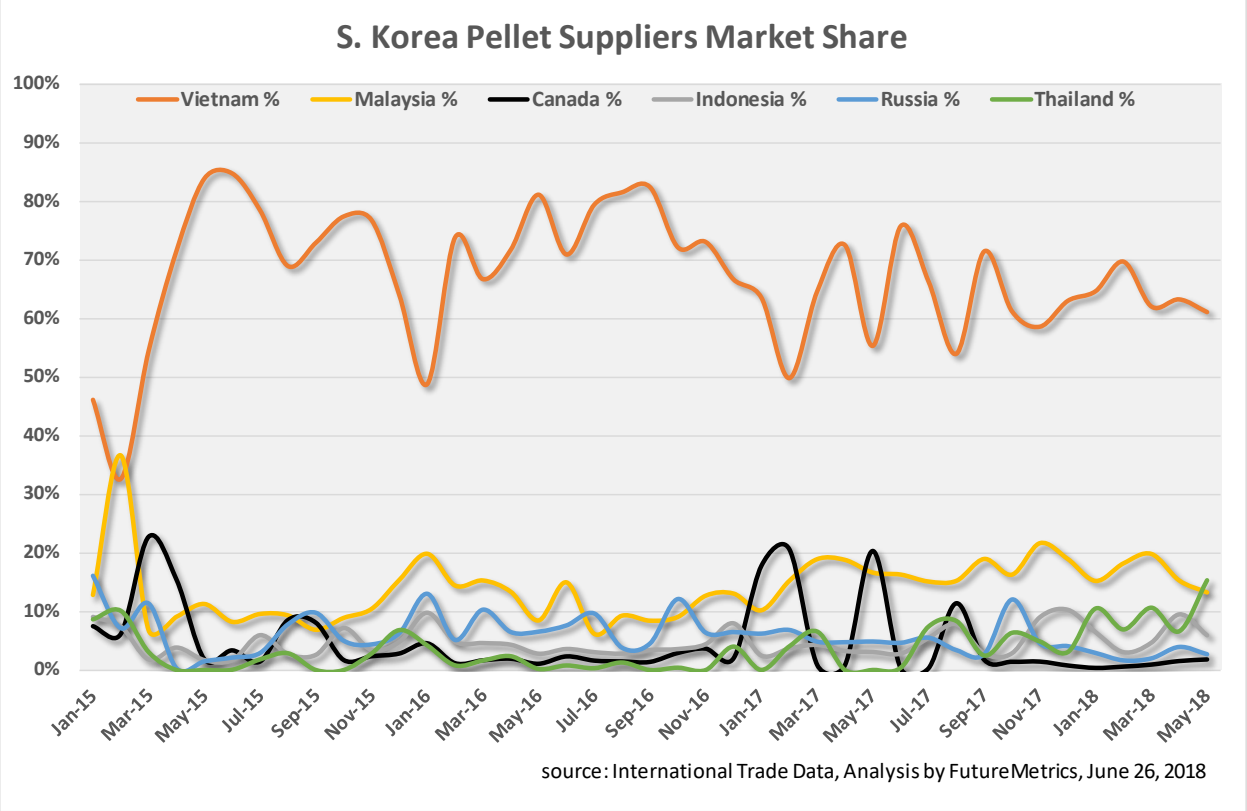

Vietnam dominates the S. Korean market with the other five suppliers' market shares 20% or less. As the chart above showing prices makes clear, the increase in Vietnam pricing is pushing up the average cost to S. Korean buyers. FutureMetrics expects to see the S. Korean pellet import market become more diversified as production costs in Vietnam converge on production costs in other jurisdictions that also have to produce pellets from roundwood; which means chipping, drying, and hammermilling the wood fiber prior to densification into pellets.

The Japanese import market also reflects rising Vietnam pellet prices.

Pellet imports into Japan are almost entirely from Canada and Vietnam. The chart below shows FutureMetrics' estimates of the market share weighted prices for pellets delivered to Japan from Canada and Vietnam, and from Vietnam only. Canada's market share of the Japan market, at about 65% to 70%, has been consistent over the period analyzed as is shown in the second chart.

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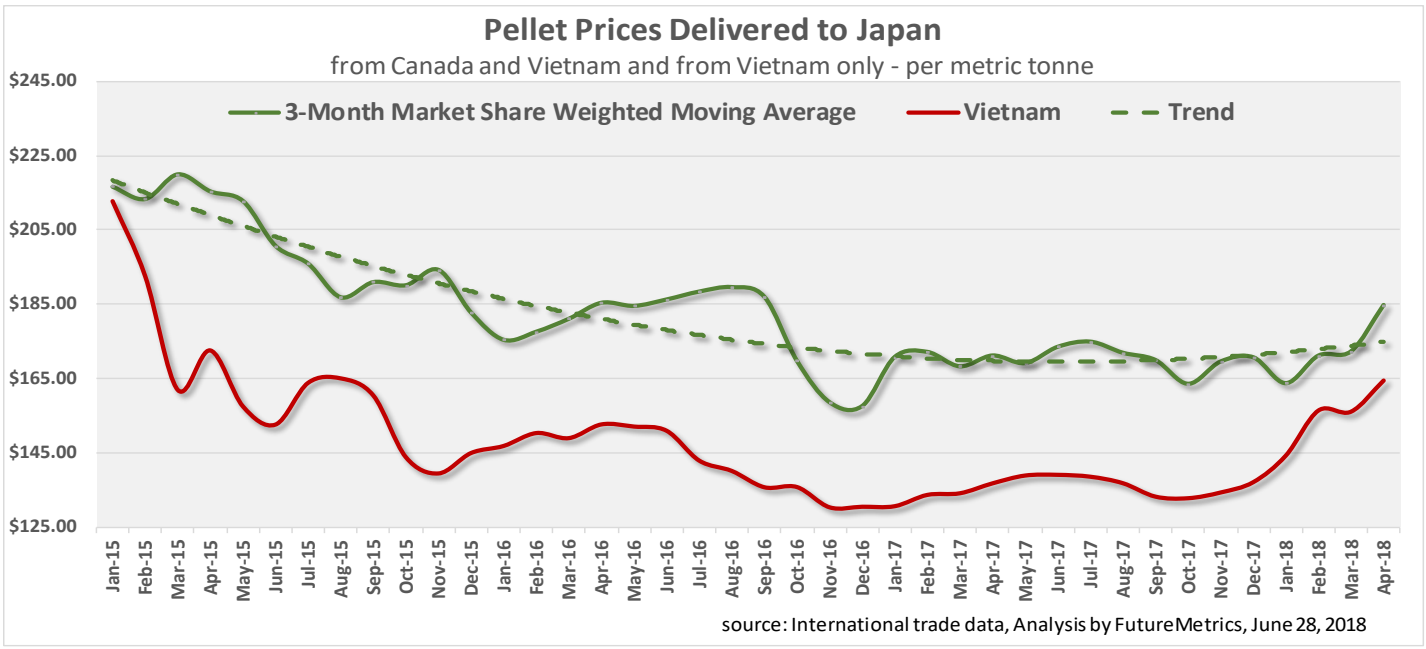

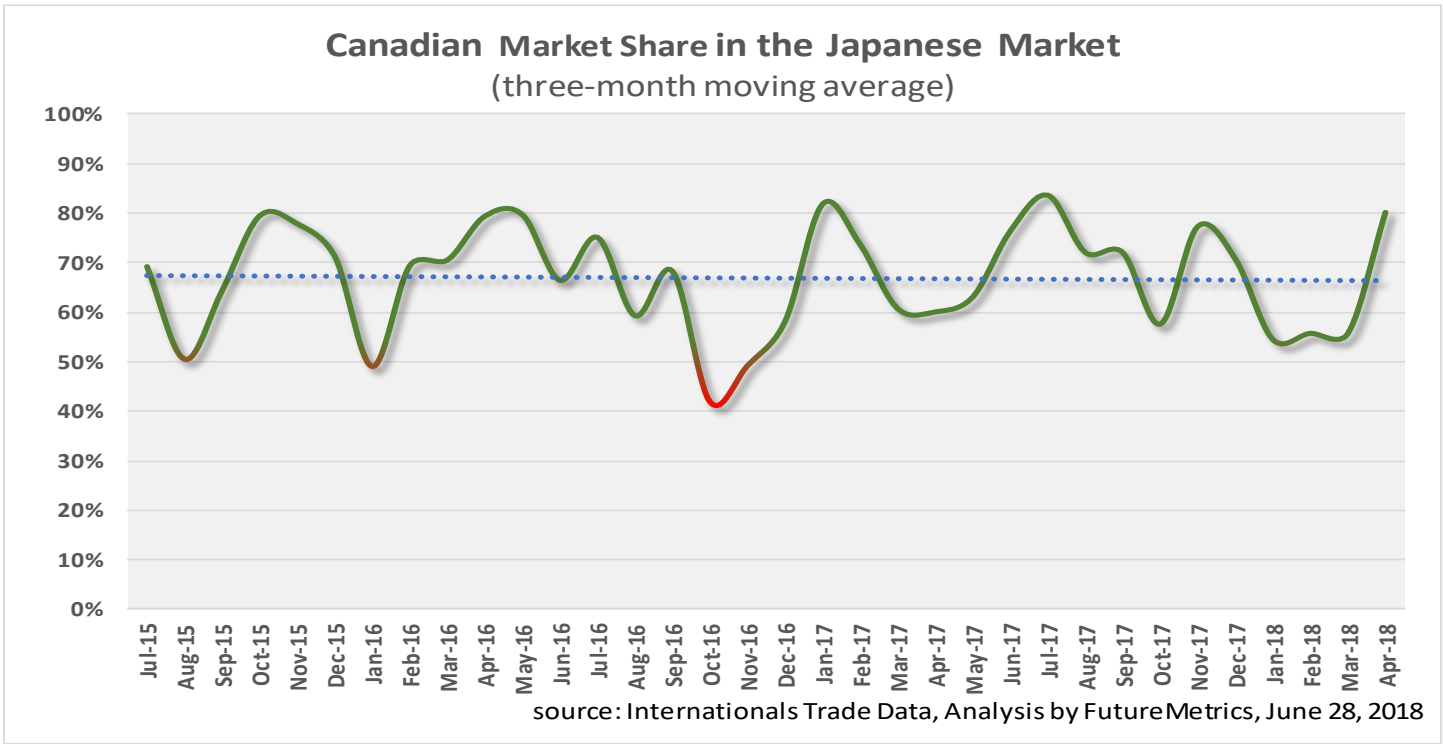

The data suggests that prices for Vietnam pellets delivered to Japan have bottomed. As noted above, as pellet production in Vietnam increases, the marginal cost of production will also increase. Just as in any

other pellet producing region, the intrinsic cost of producing pellets from green wood[4] is higher than producing from already dry material.

What are the Limits to Growth in the Vietnam Pellet Industry?

Quantifying the potential pellet production capacity of Vietnam's forest products sector would require a dedicated study and many assumptions about the markets for wood chips and furniture. At a high-level, FutureMetrics has produced metrics that shed some light on the potential limits to growth for Vietnams' pellet industry.

Simply looking at the size of Vietnam in square kilometers versus the total tonnes of pellet exports from Vietnam and comparing that to the two states in the US that produce the most pellets, Georgia and North Carolina, we can compare the relative intensity of production in Vietnam versus GA and NC.

As the table below shows, rapid growth in Vietnam this year has increased the intensity from 8.0 tonnes per square kilometer of land area to 13.4 tonnes per square kilometer.

Based on expected exports in 2018, Vietnam will have surpassed the 2018 intensity of Georgia and North Carolina combined[5].

		2017		2018 (est)	
	Square kilometers	Pellets (metric tonnes)	Tonnes/sq.km	Pellets (metric tonnes)	Tonnes/sq.km
Vietnam	205,804	1,649,000	**8.01**	2,763,000	**13.43**
Georgia	148,961	1,445,000	9.70	1,445,000	9.70
North Carolina	125,918	1,258,000	9.99	1,768,000	14.04
NC + GA Total	274,879	2,703,000	**9.83**	3,213,000	**11.69**

2018 includes Enviva's 600,000 tpy Hamlet, NC plant which will begin operations Q1 2019
Nameplate capacities for US plants adjusted to 85% capacity factor.
Source: American Forest and Paper Association and Argus. Analysis by FutureMetrics

Calculating production intensity based on the square kilometers in the state or country does not account for land is that is not forested or is not available for tree harvesting. Comparing the production levels to hectares of forestland potentially available to supply the forest product industries[6] yields the result below.

[4] Green wood refers to wood that has not been dried and has moisture contents of 35% to 55%. All wood is harvested "green". Sawdust from sawmills is green. Some residual materials such as the shavings from squaring lumber and milling dust from furniture production are dry with moisture contents well below 10%.
[5] The 2018 estimate for Georgia and North Carolina would the same as 2017's if we did not add Enviva's Hamlet, NC plant to the total. That plant, at 600,000 tonnes per year of nameplate, is not expected to produce pellets until the first quarter of 2019 but is included in the 2018 column.
[6] One hectare (100 square meters) equals about 2.47 acres. Available forestland estimates for GA and NC are based on data from the American Forest and Paper Association yielding an estimate of 15,250,000 hectares for Georgia and N.

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Tonnes of Pellets per Hectare of Available Forest		
	2017	2018 (est)
Vietnam	0.19	**0.33**
Georgia	0.16	0.16
North Carolina	0.20	0.28
NC + GA	0.18	**0.21**

By this measure of production intensity, Vietnam's wood pellet export sector has surpassed Georgia and North Carolina. This measure does not account for other industries within the forest products sector that may also be demanding forest feedstocks. A region with a high concentration of pulp and paper mills or engineered wood products mills (for example, OSB and MDF) may have a low pellet production intensity (based on pellets produced per hectare of productive forestland) because a significant proportion of wood is not available for pellet production. Conversely, an area in which other demanders for feedstock that is suitable for pellet production do not exist may have a high intensity based on this metric.

The table below shows US states' intensities with the green bars. None are as high as Vietnam.

	Export Mills' Nameplate	Hectares Available for Forest Products Industry	Tonnes of Pellets per Hectare of Available Forest	Total Land Area (square kilometers)	Percent of Total Land that is Forested
Georgia	1,700,000	8,993,927	0.16	148,961	**67.3%**
Alabama	655,000	8,652,227	0.06	131,167	**70.6%**
Mississippi	635,000	6,968,016	0.08	121,531	**65.0%**
Maine	-	6,571,660	-	79,881	**89.5%**
North Carolina	2,080,000	6,256,680	0.28	125,918	**59.7%**
Arkansas	600,000	6,112,146	0.08	134,773	**56.3%**
Texas	500,000	5,354,251	0.08	676,586	**24.1%**
Louisiana	975,000	5,195,142	0.16	111,896	**53.2%**
South Carolina	1,110,000	4,659,109	0.20	77,858	**68.2%**
Florida	720,000	4,550,607	0.13	139,402	**50.7%**
Total or Average =>	**8,975,000**	**63,313,765**	**0.12**	**1,747,972**	**48.1%**

North Carolina namplate includes the Enviva Hamlet mill that is due to start in Q1 2019.

Outputs are adjusted to 85% of nameplate.

Source: American Forest and Paper Association and Argus. Analysis by FutureMetrics

The list is sorted by the hectares potentially able to supply materials to the forest products sector. Those states with higher hectares of potentially available forests but with lower wood pellet production intensities

Carolina combined. The source for Vietnam's available forests yields an estimate of 8,500,000 hectares. Source at this link.

may already have high demand for wood fiber from other industries, may have logistical challenges, or they may be candidates for new export capacity. Note that Maine is included in the list[7].

As in any region, the locations for export oriented industrial pellet fuel factories that are the first to be developed are those that provide the best combination of delivered feedstock costs and mill-to-port logistics. As the industry grows, the new mills, whether in the US or in Vietnam, will likely have higher wood and/or logistics costs than the existing pellet mills. The major difference is that the US and Canada have a much larger area of potentially available forestland.

Conclusion - What does this Mean for the Future of the Vietnam Pellet Export Industry?

Continued growth in Vietnam, within the boundary of a country that is 75% the size of Georgia and North Carolina combined, will have to push the intensity of pellets produced per hectare of available forest much higher much faster. In 2018, it is estimated that Vietnam will produce about 86% of the tonnage as Georgia and North Carolina combined.

As more pellet projects are built in Vietnam, competition for feedstock amongst pellet producers in Vietnam will increase. As costs rise, the average price of Vietnam pellets will increase. As that price approaches a global market equilibrium price, the size of the Vietnam pellet export sector will stabilize.

The rising cost of production, already evident in the rising prices of Vietnam pellets, will transform the Vietnam pellet industry. We expect to see three trends.

> (1) There will be consolidation. Well-built and well-located plants will be acquired by a few dominant producers. Over time, less competitive plants will close.
>
> (2) New plants will be world-class in terms of design, equipment, and operations. They will produce high quality pellets from feedstocks with strong sustainability credentials.
>
> (3) Just as in the major western exporting countries, Vietnam pellet producers will match capacity against long-term offtake agreements. Either S. Korea policy will evolve to support long term supply agreements, or more Vietnamese production will eventually travel to Japan under long-term supply agreements.

The ultimate size of the pellet production industry in Vietnam is uncertain. However, it is probable that the intensity of production now is pushing the sector towards it limits at current market prices for pellets. But whatever the ultimate capacity, the sector will continue to mature into a world-class producer. And as with all the world-class producers, they will compete at a price level that represents the intrinsic costs of producing pellets within a competitive marketplace for feedstock.

[7] Maine is the most heavily forested state in the US in terms of percent of forest cover. Numerous pulp and paper mills that used millions of tonnes per year of softwood pulp chips have closed in recent years. Maine has deep water ports, but, as yet, the state exports zero pellets. Maine is where FutureMetrics' home office is located.