US Heating Markets:

Why the use of Wood Pellets for Heat will Continue to Grow

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FutureMetrics

Globally Respected and Award Winning Consultants in the Wood Pellet Sector

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FutureMetrics Services:

Expert advice, analysis, and strategic guidance for the wood pellet sector.

We combine data driven analysis with a depth of knowledge from wood supply and wood yard optimization to pellet making and logistics.

Selection of Current and Recent Clients
FutureMetrics LLC

Pellet manufacturing project development
Operations optimization
Expert advice / Due diligence
M&A / Valuation / Investor representation
Early-stage feasibility studies
Financial modeling
Risk and decision analysis
Economic impact analysis

Six Scenario Monte Carlo Simulation

2019 Estimated EBITDA (all simulations)

2014-15 North American Pellet Production Capacity

- Current Export Production
- Current Domestic Heating Market Production
- North America Capacity Under Construction
- For Export
- For Domestic Heating Market Use

The chart shows production capacities not actual production.

Source: BBI pellet mill database, analysis by FutureMetrics
Award Winning Team Members

Dr. William Strauss, President, FutureMetrics

Recipient of the 2012 International Excellence in Bioenergy Award

John Swaan, Senior Associate, FutureMetrics

Recipient of the 2014 International Founders Award
What is the Future of the Industrial Pellet Markets?

About 20 million tonnes per year increase!

source: Data - RISI, 2014 Global Pellet Outlook; Some additional forecast and analysis by FutureMetrics
What is the Future of the Heating Pellets Markets

About 5 million tonnes per year increase
Global Wood Pellet Production (metric tonnes)

<table>
<thead>
<tr>
<th>Region</th>
<th>2012 Production</th>
<th>2013 Production</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>8,000,000</td>
<td>11,000,000</td>
<td>37.5%</td>
</tr>
<tr>
<td>Asia</td>
<td>1,000,000</td>
<td>1,200,000</td>
<td>20.0%</td>
</tr>
<tr>
<td>Americas</td>
<td>7,000,000</td>
<td>7,000,000</td>
<td>0.0%</td>
</tr>
<tr>
<td>Rest of World</td>
<td>4,000,000</td>
<td>4,000,000</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Total 2012 Production = 19,469,000
Increase of 13.5% \(\Rightarrow\) Total 2013 Production = 22,096,000

Source: Data from Food and Agriculture Organization of the United Nations, Analysis by FutureMetrics
US Demand and Forecast

About 1.8 million tons of new demand.
North American Capacity

The chart shows production capacities, not actual production.

Modest growth in the heating sector.

Source: BBI pellet mill database, analysis by FutureMetrics
Top Ten Countries End-Use Consumption 2013, in millions of metric tonnes (excluding Asian importers)

Source: Hawkins-Wright, 2015
Why there will be growth in the pellet heating markets
Having bottomed out in the second quarter of 2014, global oil demand is steadily rising.
Wood pellet demand growth continues as long as heating oil and propane prices remain above the breakeven level of cost per unit of energy.

(source: EIA, 2014; Demand estimates by FutureMetrics; 2015 forecast based on various crude oil forecasts; Analysis by FutureMetrics)
What does the drop in crude prices mean for the pellet heating markets?

The correlation between crude prices and heating oil prices is very high.

The data also shows that heating oil prices are very close to the “indifference” point at which the cost of a unit of energy from heating oil is the same as the cost of a unit of energy from wood pellets.
Annual Heating Oil and Pellet Fuel Cost
Delivered to the Average Home in the Northeast
(for the equivalent heat from a central heating system)


Will heating oil again become cheaper than pellets?

If so, what will be the impact on the wood pellet sector?

We predict a temporary slowdown in demand.

There could be a rapid switching in the US!
Low fossil fuel prices make the benefits of using wood pellets less obvious.

The following example shows why homes should spend the money to convert to wood pellet heating systems BEFORE they spend money on upgrading insulation.
While tightening homes will lower fuel usage, it will not protect homeowner from the impacts of higher heating fuel costs. If heating fuel costs rise enough all of the savings from upgraded insulation are eliminated.

What happens to the homeowner’s heating bill if they insulate? They experience a drop in the number of gallons needed and, at current prices for heating fuel, they save money.

For example, if the insulation project results in a 30% drop in heat losses, the home that uses 1000 gallons of heating oil per year will use 700 gallons per year.

<table>
<thead>
<tr>
<th>Annual Cost with Oil at $2.25/gallon</th>
</tr>
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<tbody>
<tr>
<td>Cost NO insulation</td>
</tr>
<tr>
<td>Cost WITH insulation</td>
</tr>
<tr>
<td>Savings WITH insulation</td>
</tr>
</tbody>
</table>
However, if heating oil prices increase from $2.25/gallon, that $675 per year savings declines.

When heating oil prices increase and pellet prices remain stable (as they have historically), the savings to those homeowners that switched from heating oil to pellets (even without the benefit of insulation) increase.
As heating oil prices increase, the homeowner’s savings from insulating their home decreases as the total cost to heat the home trends toward the annual cost before upgrading the insulation.

At about $3.20/gallon, the homeowner’s savings go to zero and at any price above $3.20/gallon the homeowner is worse off than before upgrading insulation in terms of the total cost per year to heat the home.
At heating oil costs above $2.00/gallon, the homeowner that converted from heating oil to wood pellets saves money relative to the cost to heat with heating oil. At heating oil prices above about $2.55/gallon, the homeowner using pellets without an insulated home saves more money than the homeowner using heating oil in the insulation upgraded home.

If heating oil reaches the average price seen in 2014, the pellet fueled home without upgraded insulation saves $1,890 more per year than the insulated home that uses heating oil.
The positive economic impacts of an insulation program on a state’s economy only work if heating oil prices remain low.

As soon as heating oil passes about $3.20/gallon, there is no net benefit to the state’s economy or to the homeowners.
From those savings, the homeowner can then afford to tighten their homes.

Switching from heating oil or propane to regionally made pellets for home heating allows the homeowner to have the benefit of saving on their annual heating bill no matter how high the cost of heating oil goes.

That strategy assures that the homeowner will not see their annual heating bill increase with heating fuel price increases, and it will provide significant positive economic benefits and job creation for the states that follow this strategy.
While the market will drive people to use pellets, policy matters.
Thank You!

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