Recent Developments in the South Korean Industrial Wood Pellet Markets.

July 29, 2019

By William Strauss, PhD

As noted in our white paper published May 11, 2017 titled “Why the South Korean Utilities May Never Engage in Long Term Offtake Agreements”, the S. Korean RPS system does not provide a stable foundation for forecasting future demand for industrial wood pellets. Adding to the uncertainty of the level of financial support that the policy will provide to generators was the potential for the S. Korean government to make meaningful changes to the RPS policy. Both of those concerns have proven to be correct.

This brief white paper will discuss the recent evolution of the S. Korean market for imported wood pellets. Accompanying this white paper is a dashboard that allows the user to see the impacts of policy changes in S. Korea on cash flows for S. Korean power plants. The dashboard is described in more detail in the user manual. Links to the dashboard and user manual are on page 9.

Since the white paper referenced above was published over two years ago, S. Korean policy had changed. The number of renewable energy certificates (RECs) that can be accrued per megawatt-hour (MWh) has been redefined and the schedule for the ramp up in the percentage of renewable energy that major utilities have to produce has been revised. The revised ramp up schedule is shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous</td>
<td>2.0%</td>
<td>2.5%</td>
<td>3.0%</td>
<td>3.5%</td>
<td>4.0%</td>
<td>5.0%</td>
<td>6.0%</td>
<td>7.0%</td>
<td>8.0%</td>
<td>9.0%</td>
<td>10.0%</td>
<td></td>
</tr>
<tr>
<td>Revised</td>
<td>2.0%</td>
<td>2.5%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.5%</td>
<td>4.0%</td>
<td>5.0%</td>
<td>6.0%</td>
<td>7.0%</td>
<td>8.0%</td>
<td>9.0%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

The more significant changes are to the REC weightings per MWh. The table on the next page shows how the REC weightings have changed. The cells with red shading indicate a lowering in the number of RECs per MWh. The new weightings came into effect at the end of June 2018.

**Growth in co-firing, which has been the mainstay of the past growth in the S. Korean wood pellet markets, is no longer supported.** Wood pellets in general are less supported by the new REC weightings. Support for woody solid recovered fuel\(^1\) (SRF) is significantly lowered. Support for domestic wood pellets, which have a very limited supply, has been increased. Palm kernel shell (PKS) REC weightings have also changed. But to date, PKS has been a relatively minor part of the S. Korean imports. Because PKS is not suitable for use in the large utility pulverized coal (PC) boilers, PKS is not shown in the table below.

---

\(^1\) Woody SRF pellets are produced from construction and demolition debris.
The net effect of the policy changes is to dampen current demand for imported wood pellets and to significantly lower expectations for growth in future demand. Since Vietnam is the major supplier to S. Korea (see market share chart on the following pages), this has led to an oversupply of pellets in Vietnam and that has caused a significant decline in the spot FOB prices of pellets from Vietnam.

The charts on the following pages show the historical monthly imports of wood pellets into S. Korea from Vietnam, the historical spot price of pellets FOB Vietnam, the historical REC prices in S. Korea, and FutureMetrics’ estimates CIF prices into S. Korea and market share into S. Korea by the major supplier countries.
South Korean Pellet Imports from Vietnam - Monthly - Metric Tonnes

source: Argus, July 2019; Analysis by FutureMetrics

FutureMetrics LLC
8 Airport Road
Bethel, ME 04217, USA
Wood Pellet Spot Price - FOB Vietnam

27 Jun 2018, $146.14

24 Jul 2019, $76.44

source: Argus, July 2019; Analysis by FutureMetrics
S. Korean REC Prices

Average, High, Low
<= Won -- Dollar=>

At 1,180 Won to the Dollar

source: KPX South Korea as of July 26, 2019; Analysis by
Pellet Prices Delivered to S. Korea

US$ per metric tonne

S. Korea Pellet Suppliers Market Share

source: International Trade Data, Analysis by FutureMetrics, July 2019

FutureMetrics – Intelligent Analysis, Operations Guidance, and Strategic Leadership for the Pellet Sector - 6
The fall in REC prices is in part due to the changes in REC weightings. The decision to use wood pellets as a substitute for coal in large utility PC boilers depends on the REC revenues being sufficient to compensate the utility for the higher cost of pellet fuel.

A further dampening effect comes from the utilities fulfilling their renewable portfolio standard obligation by purchasing low priced RECs instead of co-firing wood pellets.

The impact of lower REC prices on Vietnam FOB spot prices per metric tonne is direct and powerful. The scatterplot below shows the relationship between Vietnam FOB spot prices per tonne and REC prices. The correlation coefficient is 0.94.

How S. Korean policy will evolve is unknown. But under current policy, it is likely that the growth in demand for wood pellets will be dampened with respect to some of the forecasts from a year or two ago.

FutureMetrics’ forecast from March 2017 is shown in the chart below. The lower band in the chart reflects our concern over the uncertainty of REC prices when that forecast was made more than two years ago.
How REC prices will change going forward depends on how the major utilities comply with the RPS. But regardless of utility decisions, the uncertainty of REC prices will continue to disallow the contemplation of long-term offtake agreements for wood pellets. As short-term tenders unwind, we would expect to see the estimated actual CIF prices shown in the chart on page 6 continue to fall. This will impact Vietnam’s pellet sector negatively. Production will be curtailed in some mills and some mills will cease production. Some may go out of business.

S. Korean utilities can at any time in the future find themselves unable to generate sufficient revenues due to low REC prices combined with low REC weightings. It is impossible for long-term commitments to be made for the purchase of pellets. Furthermore, at only half a REC per MWh for dedicated new builds using pellets and zero RECs per MWh for new pellet co-firing, growth in demand will be muted.

Low REC prices, low REC weights, and the RPS obligation to generate from renewable sources put S. Korean power stations in a difficult position. If the revenue from power sales plus RECs is insufficient to cover the cost of generation, the utility will either lose money on every MWh generated or they will lower or eliminate the use of relatively expensive pellet fuel (compared to coal). The power station could purchase RECs or,
depending on the cost of pellets and REC prices and weights, they may simply pay the penalty of 150% of the average REC price and still have a better cash flow situation than if they use pellets.

FutureMetrics has developed an interactive dashboard that allows the user to experiment with many different inputs and to see, in real time, when a power station may decide to stop using wood pellets when net cash flows are negative. The dashboard is free to use for several months.

The free online version does not include the ability to save scenarios and does not allow for manual input of annual parameters. The manual input functions are explained in the user manual.

The dashboard and the user manual can be downloaded from the FutureMetrics website. As an added feature, the dashboard also allows analysis of the Japanese wood pellet markets under the feed-in-tariff (FiT) support scheme.

It is recommended that the user manual be read first as the dashboard has many inputs and several ways to view the results.

The dashboard is HERE.

The user manual is HERE.

Conclusion

The South Korean RPS policy may result in the desired increase in the share that renewables have in the generation mix. However, as the policy currently stands, industrial wood pellets will have a less prominent role that was envisioned a few years ago.

Building production capacity for industrial pellets without a secure long-term offtake contract to support the financing structure of the project and the expected return on investment is risky. As FutureMetrics noted in its original paper about S. Korea a few years ago, S. Korean policy does not provide a foundation for secure long-term contracts. This white paper has shown that reality has unfortunately proven that conjecture correct.

Vietnam producers who have rapidly built up production capacity over the past 5 years based primarily on S. Korean demand, but without long-term commitments for volume and pricing, are facing a very challenging period. Falling demand and falling prices will put pressure on producer cash flows and, in some cases, may cause some businesses to fail.

Diverting production into Japan is an option. But concerns about quality, sustainability, and consistency will be a limiting factor to Vietnam producers will find a pathway into that market; particularly after Japan implements formal sustainability rules (see the recent FutureMetrics white paper on this topic).