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February 20, 2025

Comments on the Demand for Pellet Fuel as a Result of the UK's Drax "Bridge" Policy

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Key takeaways

- There will be a significant reduction in aggregate demand for wood pellet fuel beginning in April 2027.
- Depending on the size, frequency, and duration of modulations in generation output, the wood pellet fuel supply chain may need significant intermediate buffer storage that does not currently exist.

The UK's Department of Energy Security and Net Zero (DESNZ) and the Drax power station have reached an agreement on the support for pellet generated power from the end of the current support policy in March 2027 until March of 2031. All four of the 650 MW Drax station units will be covered under the continuing terms of contract for difference (CfD) scheme[1].

However, the policy for the Drax power station sets a collar on the quantity of power that can be generated from pellet fuel and be covered by the CfD scheme. If the policy is finalized and approved by parliament, it is expected to result in an aggregate annual maximum output of about 6 TWh. The most recent data from Drax shows that the two years of highest output for the Drax station are about 14.1 TWh (in 2020 and 2021). The 6 TWh ceiling is 43% of those recent maximums. So far in 2025 Drax is on track to equal or exceed those previous highs.

The clear implication is that the total annual demand for pellet fuel by the four Drax units is likely to be significantly lower starting when the new policy kicks in on April 1, 2027. As Drax implements bioenergy carbon capture and storage (BECCS) it is likely that they will increase demand for pellet fuel. Even with the ramp up of BECCS, pellet demand will probably be significantly lower than current levels until BECCS is fully deployed well into the 2030's.

At a typical assumption for pellet net energy density (4.9 MWh/tonne) and assuming 40% efficiency for the generating units, the annual pellet demand at 6 TWh of output would be around 3 million tonnes. Drax's annual demand has been over 7 million tonnes in higher output years.

[1] The CfD scheme sets a guaranteed price for the sale of power. That price is adjusted annually. The current strike price for the Drax unit #1 is £138.16/MWh. Currently only unit #1 is under the CfD policy.

What does this mean for the markets? ➔There will be excess capacity.

In an oversupplied market, there could be a temptation by the buyer (Drax Power) to only engage in short-term fuel supply tenders (one year or less like the South Korean model) to cause competition and create a race to the bottom on prices. This is highly unlikely, and it would be ill advised for the following reasons.

If producers have a high uncertainty on whether or not they will be selling pellets next year, they may not invest in needed maintenance and improvements. Plant productivity and possibly safety would degrade.

But there is another critical reason.

The primary forest products industry converts the high-value portion of trees to lumber, flooring, cabinetry, and furniture. As logs are processed into those products, between 35% and 55% of the log becomes residual by-products (chips and sawdust). A portion of that material finds its way into the wood pellet factories. There are other residuals from the primary log harvests (tops, limbs, crooked stems, rotten centers) that may also find their way to pellet factories.

Unlike the coal supply chain, which is a direct supply from mine to end user, the wood pellet supply chain begins with a flow of feedstock that is independent of the demand for fuel. Pellet manufacturing business models depend on a secure supply of woody biomass, and their suppliers depend on a more or less consistent and reliable outlet for their residuals.

To ask an export pellet factory to operate for 12 months, and then not operate would require them to be willing (and able) to significantly stress their business model and degrade their relationship with their raw material suppliers. In a diversified pellet supply market, the less competitive suppliers may be forced to stop production altogether.

A significant drop in production capacity for supplying The Drax power station is still likely and some current supplier may not enjoy renewed offtake agreements; but not because Drax will following the "South Korean" model.

The fuel supply desk at Drax would likely prefer fuel security (quantity and quality) at a reasonable price over lowest price and potential upstream uncertainty. That would suggest offtake agreements over the term of the bridge policy.

That is the more likely scenario over the four-year policy extension.

Also, note that four years of offtake is an insufficient length of time for project financing. Therefore, it is unlikely that any new white pellet production capacity will be built for supplying the UK and EU markets unless other new sources of significant pellet demand emerge.

Drax owns upstream pellet production assets. Those in western Canada that remain operating in a few years, and their new plant in Washington State in the US, will likely focus more on the Asian markets as this decade proceeds. Drax's US southeast production assets will likely supply a significant proportion of the reduced fuel demand.

The microeconomics 101 outcome of a drop in the quantity demanded against a given supply curve is a fall in prices. But wood pellet prices can only fall so far. As with any manufacturer, there is a breakeven price floor that is based on the cost of production. A bottom-up cost build-up for pellet production shows that the single most costly part of the process of upgrading woody residuals to wood pellets and delivering them to the power station is the cost of the woody feedstock that enters the pellet factory.

After the new policy starts, the higher cost producers (higher wood and/or conversion costs[2]) may no longer be part of the Drax fuel supply chain.

Depending on Drax's reliance on their vertically integrated north American pellet factories for supplying their UK power station, some one to two million tonnes per year (and possibly more!) of current suppliers may be looking for new markets.

What Variable Generation Output Means for the Supply Chain

Drax has publicly stated that it will seek to generate more when the UK grid needs electricity the most:

> "Under this proposed agreement, Drax Power Station can step in to increase generation when there isn't enough electricity, helping to avoid the need to use more gas or import power from Europe. When there's too much electricity on the UK grid, Drax can reduce generation, helping to balance the system."[3]

On a day-to-day basis it is impossible to predict the total supply of wind and solar power that sits on top of nuclear baseload, and therefore the need for additional generation other than from natural gas. On a more seasonal level, it would seem likely that the winter months will be when "there isn't enough electricity".

There is some rationale for distributing the policy-limited Drax output into the winter months when electricity demand is higher. Power demand in the UK is, on average, almost 50% higher in the winter than in the summer. The three charts below, based on minute-by-minute data, show UK power demand, wind generation, and solar generation over all of the year 2024 (summer months are in the middle of the x-axis).

[2] FutureMetrics provides operations optimization services that can significantly improve conversion costs. Please visit https://www.FutureMetrics.com to learn more. See a FutureMetrics one pager on the topic HERE.
[3] https://www.drax.com/support-mechanism-for-dps/

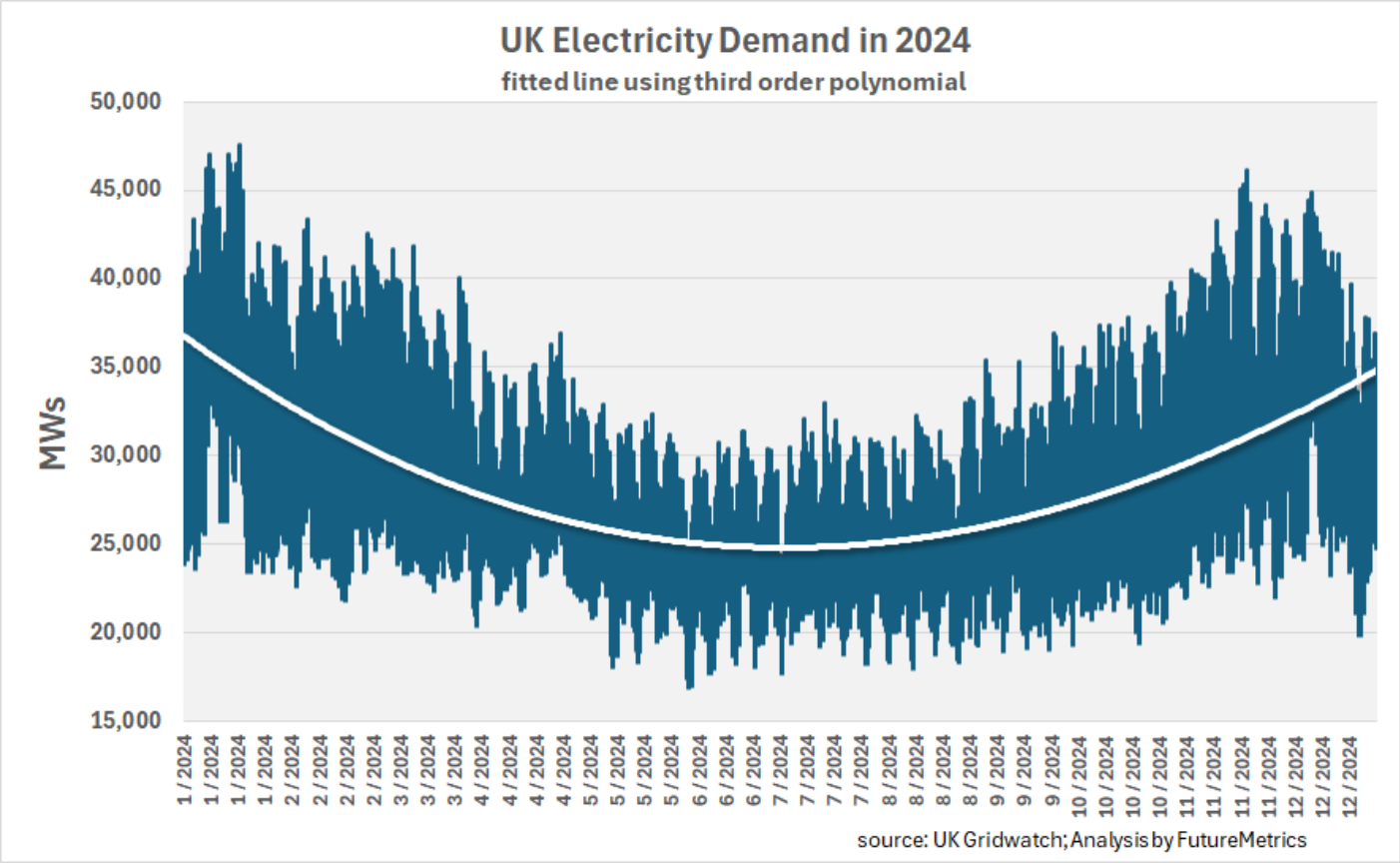

Figure 1 - UK Power Demand over 2024

UK solar generation is higher in the summer (see Figure 2 below). The chart's data it too tightly packed to show that solar generation is zero at night and highly curtailed in the winter months when the days are short and the sun angle is low.

Wind generation is a much larger contributor to the UK's electricity supply. It is thousands of MWs higher in the winter when UK demand is also higher (see Figure 3 below).

Both are highly variable and suffer from intermittency.

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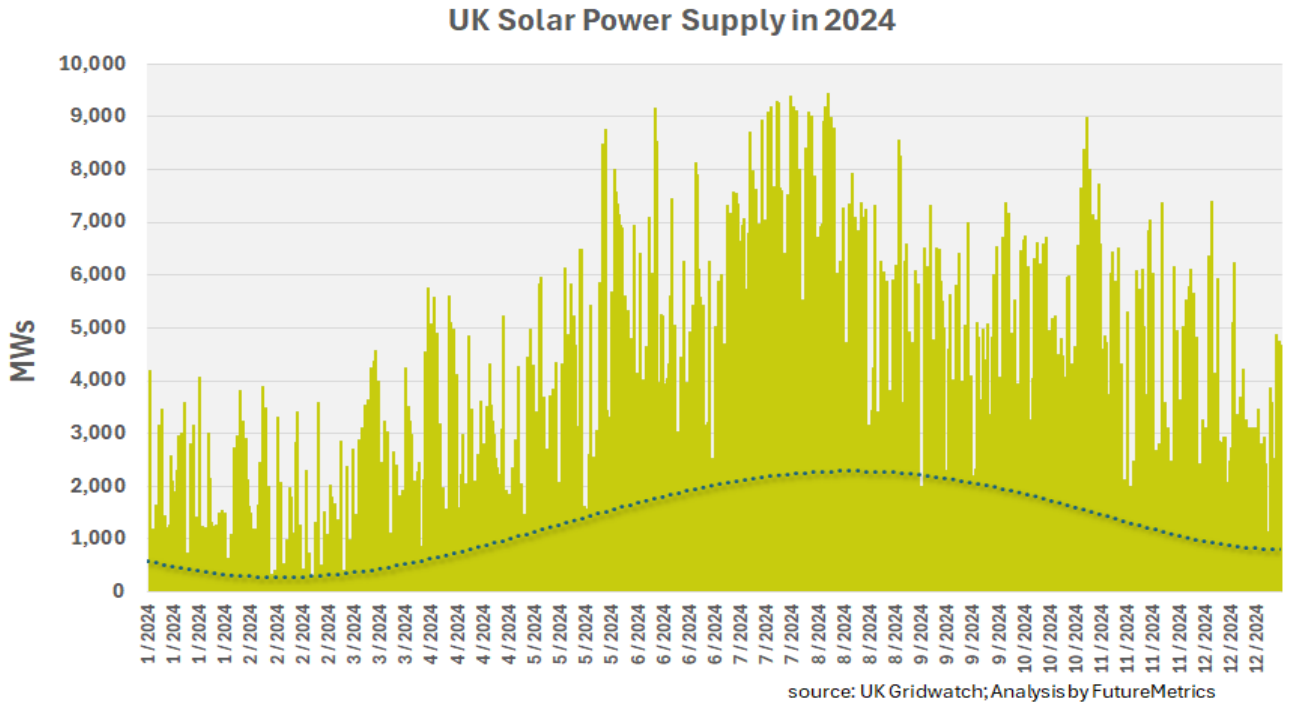

Figure 2 - UK Solar Generation over 2024

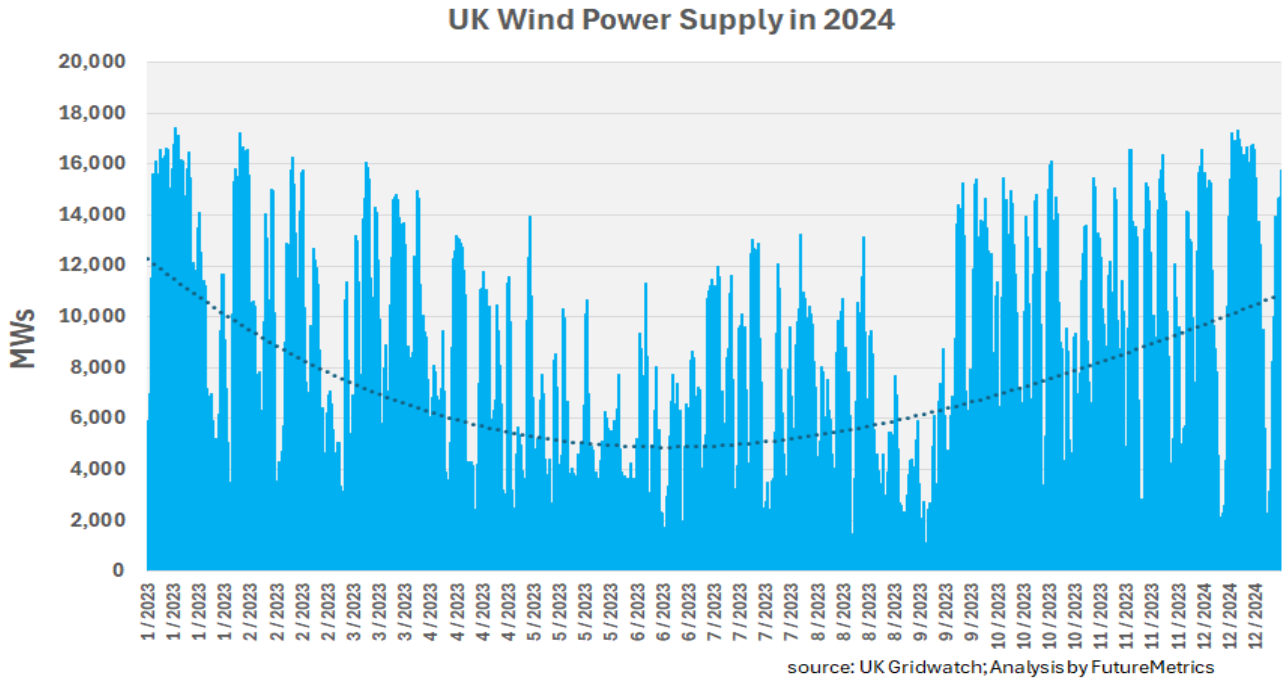

Figure 3 UK Wind Generation 2024

If Drax indeed generates less in the summer and more in the winter, this raises the challenge of managing pellet fuel inventory when the rate of production does not more or less match the rate of consumption. Pellet fuel suppliers, as noted above, want to produce as continuously as possible. If the end user has variation around the average consumption level, buffers are required.

The typical solution to seasonal mismatches with agricultural commodities is physical storage. In the agricultural markets, supply is variable and intermittent while demand is more or less constant. The supply and demand mismatch is reversed for pellet fuel markets. However, physical storage is still the solution.

But there are limited volumes of pellet storage.

Some trading companies have some storage capacity that they use to buffer variations in demand. There is storage at export terminals that hold at least a shipload but not much more. There is storage at the power stations, but no more than the required buffer in fuel supply.

The demand for additional buffer storage will depend on how Drax chooses to modulate its output. If there is a large and persistent change in output from summer to winter, there will need to be large intermediate storage to soak up production in the summer and release it in the winter.

There are currently no major depots (warehouses, domes, or silos) that can absorb that additional quantity of pellet fuel.

To gain a sense of the possible scale needed, a FutureMetrics dashboard may be helpful. Figure 4 below is a screenshot of one of the tabs on the dashboard that is set at parameters that may proxy the reduced capacity factor of one of Drax's units[4].

Based on the admittedly far from perfect proxy for the Drax storage challenge that is used in the dashboard example, the buffer storage needed for one Drax unit with about a 50% difference in summer versus winter pellet fuel demand could be nearly 700,000 tonnes. That would require an additional nine domes the size of the four 75,000 tonne capacity domes already at the Drax station. And that would be for only one unit!

[4] The control setpoints are totally arbitrary and do not represent the actual Drax generation strategy. The dashboard was not designed for this set or considerations. It was designed to look at winter peaking plants that do not generate at all during non-winter months. However, it is instructive as to the potential scale of the fuel storage problem.

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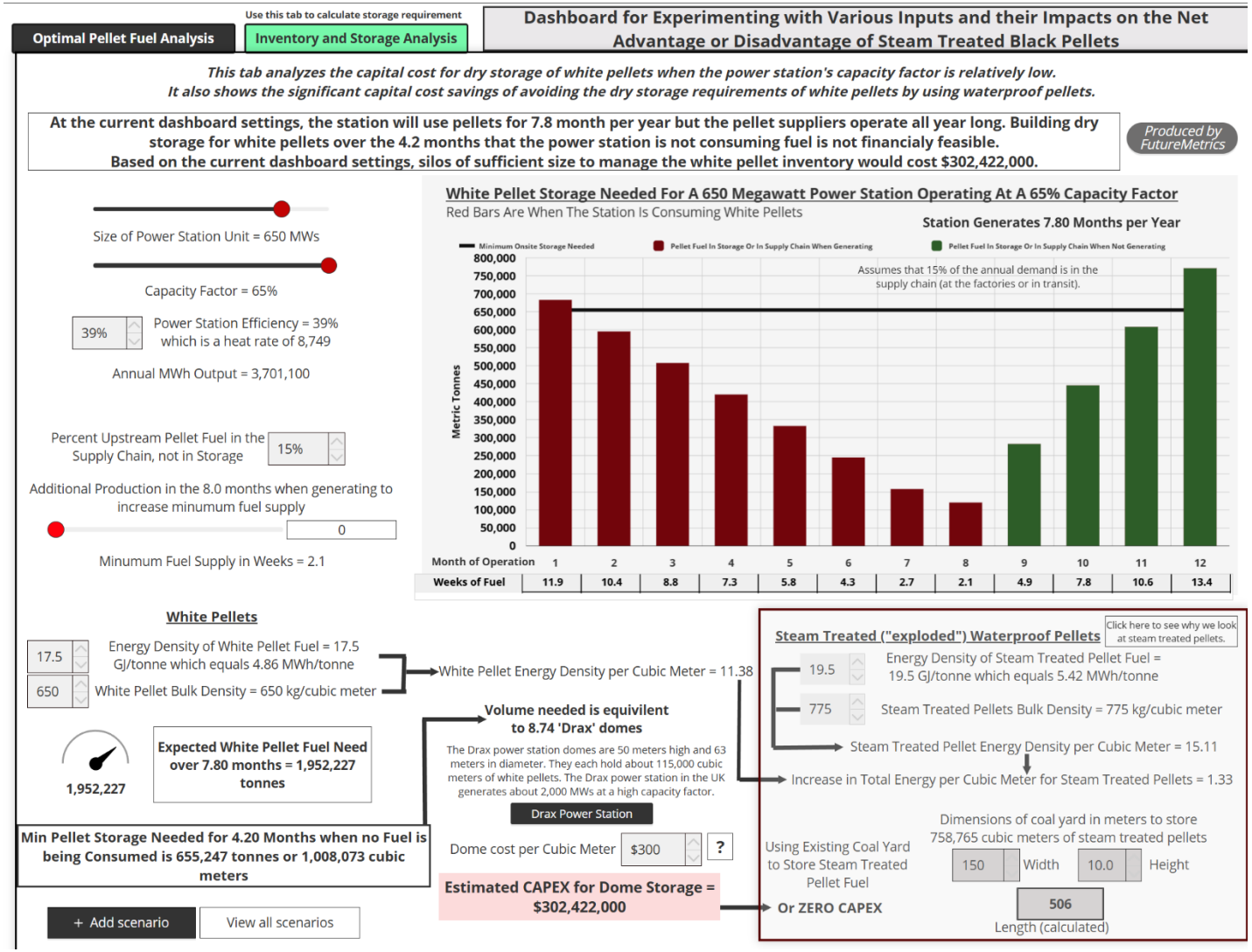

Figure 4- Storage Analysis (dashboard is HERE)

If there is a need for large buffers between continuous pellet production and intermittent or variable power generation, the costs associated with building storage solutions could be many hundreds of millions of dollars. Recouping the investment in the storage solutions would require a fee per stored tonne that would add to the final delivered cost of the fuel.

It is too early to predict what the actual buffer storage needs will be. It depends on the size, frequency, and duration of changes in power output from Drax as they conform to the UK policy.

Conclusion

The likely bridge policy for Drax will result in a significant drop in pellet demand. Higher cost producers that currently supply the UK power station with pellets may not enjoy renewed offtake agreements after 2027 arrives.

And the policy response by Drax will likely create a need in the fuel supply chain for intermediate buffer storage. This need is already fulfilled on a smaller scale by several companies that trade in pellets.

Which way will the sum of these upward and downward pressures impact the price paid for pellets and the cost of pellet fuel delivered to the power station? Modeling and simulation can reveal probable outcomes now, and in several years the markets will tell the real story.