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Unsustainable jet fuel transition

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*By Irina Slav**

Sustainable aviation fuel, an alternative to regular jet fuel made from waste oils and fats, has been identified as an essential element of the European Union's decarbonisation effort. Aviation, after all, accounts for 2.5% of global carbon dioxide emissions. Yet the shift to SAFs has been struggling to take off, as it were, and may well remain grounded forever.

Shell earlier this month announced it would shelve a project for the construction of a SAF production plant in Rotterdam. The company motivated its decision with the following: "As we evaluated market dynamics and the cost of completion, it became clear that the project would be insufficiently competitive to meet our customers' need for affordable, low carbon products."

In other words, Shell had discovered the Rotterdam plant's output would be too costly to make a profit—despite mandates instituted by Brussels on blending SAFs with jet fuel to reduce emissions from aviation.

The European Union has mandates requiring airlines to blend at least 2% of SAF into their fuel — a percentage that should rise to 6% in five years and to as much as 70% by 2050. If there is enough SAF being produced, that is. Right now, there isn't. With Shell's shutdown of the Rotterdam facility—whose construction was paused last year, by the way—production growth, and, more importantly, local production growth in the EU, becomes even more problematic.

The warnings signs were there from the start. The reason was and continues to be quite simple: cost. Sustainable aviation fuels cost three to four times as much as jet fuel to produce. This is because of the complicated process involved in turning waste oils and fats into aviation fuel and because of the limited supply of feedstock. In short, the world is not producing enough waste oils and fats, and turning the available oils and fats into jet fuel is expensive.

These problems are fundamental and unrelated to the pace of scale-up, as so many proponents of various so-called climate tech ventures like to argue—scaling brings the costs down, the argument goes, so all we need is scaling. Apparently, this does not hold for climate tech that requires feedstock and there's too little of it.

The exorbitant cost of SAFs is naturally limiting demand. Last year, Energy Intelligence calculated that SAF mandates were going to add 8 billion euro, or $8.8 billion, to airlines' fuel bills in 2030. The calculations were based on a report by the European Union Aviation Safety Agency with official mandate figures. Eight billion euro is quite a lot, to put it mildly, and in this context airlines' unwillingness to commit to spending that kind of money is quite understandable.

It is little surprise, then, that SAF producers are feeling the pinch. The biggest one among them, Neste, saw its stock price plummet by 60% last year because after it "spent nearly $10bn transforming itself from an oil refiner into a leader in green fuels, […] it found that the market had failed to grow as expected."

Even more telling was the estimate that Shell put on its decision in 2024 to pause construction at the Rotterdam facility. The company calculated its loss from that decision at between $600 million and $1 billion. Still, in light of its final decision to shut down the project entirely, that loss has been accepted as the lesser of two evils.

None of this bodes well for the EU's sustainable aviation fuel mandates. To enforce mandates, you need to have the means to do that. If there are not enough SAF volumes being made, the mandate to blend a certain percentage of them into jet fuel cannot possibly be enforced—unless penalties enter the stage at levels higher than the price of SAFs.

It would not be the first time the EU energy policy leadership has enforced compliance with certain regulations by making non-compliance prohibitively expensive. Hydrocarbon energy generation is a case in point, with emission permit costs adding a heavy burden to generators' bill. Yet this mechanism is flawed, as evidenced by the slowdown in alternative energy investments in the EU—because of exorbitant electricity costs resulting, in large part, from those very same emission permit costs.

In other words, with SAFs the EU is throwing yet another boomerang that will eventually hit it on the figurative head. SAFs are way too expensive to be commercially viable at the scale that the EU believes they are needed. The raw materials necessary

for their production are limited in a way that does not offer any options for a change in the status quo, since one cannot mandate higher oils and fats consumption. The blending mandates would need to be revised to avoid that hit, just like the ICE car ban was revised when a reality check from car manufacturers showed it would be a very risky gamble with one of Europe's strongest industries.

**** Irina Slav is an Energy Journalist and Contributing Editor, IENE Newsletters***

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3, Alex. Soutsou Str. 106 71 Athens, Greece, T: +30-210 3628457, 3640278, F: +30 210 3646144,
marketing@iene.gr, www.iene.eu