

Too much and not enough – Taking stock of the transition

Trading the Transition + more

Analysts

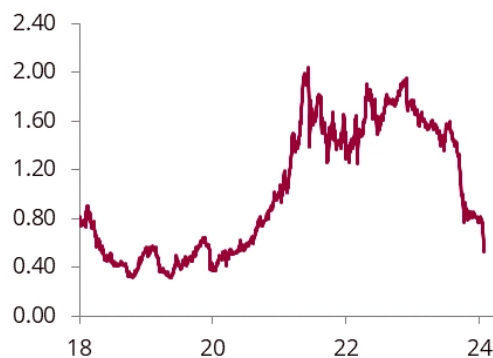
New York | Robert Campbell

- Plenty of challenges with offshore wind; biofuels and hydrogen struggling.
- Renewable power additions smashing records, EV sales surge.
- Net-zero industry also boosted by CCS projects reaching FID.

Depending on your point of view, 2023 was either a good year for the energy transition or a bad one. Offshore wind struggled with numerous high-profile project cancellations, but European wind and solar installations smashed records. Automakers warned on electric vehicle (EV) sales, yet they rose by nearly 50% y/y in the US. Some things are clearly moving in the right direction for net zero, but others are not.

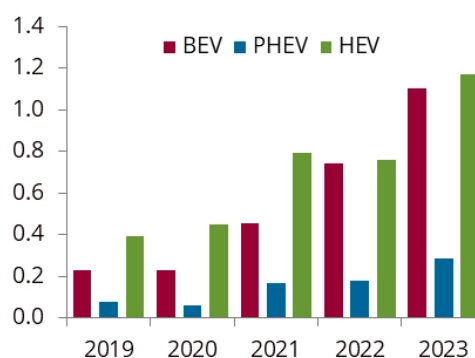
Even in sectors where the direction of travel is at least consistent with the spirit of the Paris Agreement, there is clearly insufficient investment. EU draft documents reportedly acknowledge that the pace of investment needs to be stepped up, perhaps to as much as €1.5 trillion per year after 2030, if global warming is to be limited to 1.5°C. This dwarfs the €360 billion per year the EU believes must be spent to reach its 2030 targets.

Fig 1: D4 RIN prices, \$/RIN



Source: Argus Media Group, Energy Aspects

Fig 2: US EV sales, millions



Source: ANL, Energy Aspects

In a similar vein, investment in biofuels capacity has jumped but excess capacity in key markets is now weighing on prices. US advanced biofuel RINs prices have plunged to the lowest in three and half years [amid fears of a glut of renewable diesel](#) as two oil refinery conversions in California near completion. California LCFS credits have also crashed due to an oversupply of low-carbon credit production from EVs and renewable diesel.

Yet, the price plunge will likely undermine investment in new capacity that would be needed to meet US climate aspirations—such producing 3 billion gallons per year of sustainable aviation fuel (SAF) by 2030, as well as meeting demand for renewable diesel in road transport in the US and [Canada](#).

Hydrogen hype starts to fade

Similarly, governments, particularly in Europe, continue to tout hydrogen as a key piece of the toolkit needed to reach net zero. Yet, firm commitments to buy and use hydrogen [are few and far between](#) as buyers are balking at high prices and a lack of scale in the industry. Sectors such as steelmaking are seen as an obvious candidate for hydrogen due to their need for extreme heat and hydrogen's potential to replace coking coal in the reduction of iron ore. But just 7% of announced hydrogen production capacity for 2024 is operational or in progress, largely due to a lack of commitments from prospective hydrogen users. Notably, European steelmakers are mostly still on the sidelines when it comes to retrofitting blast furnaces to run on hydrogen, opting instead to get out of primary steelmaking and reorient their operations to using scrap steel in electric arc furnaces.

Without firm demand for hydrogen, it will be difficult to get larger projects off the ground. Without a market, use cases such as trucking may also struggle. Even trucking is seeing momentum possibly shifting to EVs as the potential high cost of hydrogen as a fuel is steering some users towards electric trucks, despite concerns about hauling capacity due to battery mass or recharging times. Cement maker Holcim's order for 1,000 Mercedes-Benz eActros heavy-duty electric trucks that will be used to haul heavy building materials such as cement and steel could be the first blow to the last remaining major use case for hydrogen in road transport—long-distance heavy-goods haulage. Mercedes-Benz claims its trucks will be able to travel 500 km without charging and should be able to cover 1,000 km with charging during legally mandated breaks.

Fatigue or market maturation?

What in many cases looks like fatigue, however, is actually a more realistic transition. The case for hydrogen, for instance, has often rested on unrealistic assumptions about the cost of electric power or the ease of dealing with intermittent supplies of renewables. Similarly, adding renewables to power grids remains an obvious way to decarbonise, particularly as solar, wind and battery costs continue to decline. The bigger challenge is going to be dealing with balancing loads with supply peaks and finding ways to keep the lights on when the sun isn't shining and the wind doesn't cooperate. Investment needs to be pulled as much into these solutions as new generating capacity.

The scale of investment required is likely to be huge. Dow Chemical's planned Path2Zero steam cracker in Alberta, Canada, is expected to cost over \$6 billion and will be backed by a grant of CAD\$1.2 billion (\$900 million) from the province of Alberta as well as \$400 million in federal tax credits. The project will eventually enable the supply of about 3.2 Mtpa of low-carbon ethylene. The global ethylene market is over 150 Mtpa today, so the scale of investment that would need to come into the sector to get to net zero and meet demand growth is enormous.

Efficiency the only path given timetables that have been proposed

A key differentiator in many cases is efficiency or cost. Where renewable technologies make sense in those regards, with or without subsidies, the investment is flowing. Where they don't make sense, even with subsidies, investment is stalled. The political calendar in many countries means policy changes are less likely this year, so 2024 may end up looking a lot like 2023. If so, that could lead to much more serious introspection in 2025 as progress against the Paris Agreement targets remains well behind what countries have committed to.

In this respect, this is the key advantage of electrification. Many net-zero solutions require vast inputs of energy to effectively "run thermodynamics in reverse" but electrification is one of the few pathways where energy consumption can be made radically more efficient. While two-thirds or more of the heat content of fossil fuels is often lost as waste combustion heat, most electricity put into a heat pump or electric motor is converted into useful work. For instance, economies would not need a one-for-one replacement of the primary energy currently used in combustion applications.

Where electrification is impractical, such as aviation, shipping and high-heat industrial processes, further help is required. It is far from clear whether the coming year will see a realignment of incentives to get investment into the areas that most need it, such as power market balancing, electricity storage and industrial heat. The cost of green policies is likely to be in the crosshairs of some Western politicians this year as discontent with the current cost of the energy transition bubbles up.

