ENERGY TRANSITION

The first steps

Russia seems to be taking the first tentative steps towards the energy transition, with emphasis on opportunities in the hydrogen economy, writes *Joseph Murphy*.

Russia is looking to forge a key role for itself in the energy transition, as decarbonisation efforts gain momentum in some of the largest markets for its oil and gas. The country is the biggest oil and gas supplier to Europe, and also claims a major stake in many of the fast-growing energy markets in Asia. But some of its biggest customers are now taking meaningful strides towards decarbonisation, and this has caused Moscow no small amount of concern.

Russia continues to rely on oil and gas for a sizeable chunk of its export revenues. While the government does not envisage any significant changes to the country's energy mix in the years to come, it is exploring ways of benefitting from the energy transition taking place overseas.

Hydrogen focus

Hydrogen is touted by many as the solution for decarbonising areas of industry that would be difficult to make green and clean with renewable energy alone. Indeed, Russia is eager to position itself as a major supplier of the fuel in the future.

The European Commission unveiled its long-awaited EU hydrogen strategy last year, leading to a flurry of investment announcements. Many EU members have also published national strategies. If hydrogen lives up to expectations, it could potentially seize market share away from natural gas. This is a source of unease for Russia, which provides over a third of Europe's gas.

To hedge against this threat, Russia is looking to supply hydrogen of its own. Russia estimates it could obtain a 20–25% share of global hydrogen trading by 2035, according to Deputy Energy Minister Pavel Sorokin at a government meeting in mid-April, equating to somewhere between 1–7mn tonnes of annual supply.

Russia is hoping to leverage its close proximity to hydrogen markets in Europe, and also Asia, to make its hydrogen competitive. It could produce the fuel in several ways, although it is likely that the majority will be derived from the country's abundant natural gas reserves.

Hydrogen is classified as blue when it is produced from natural gas using methane reforming, with CO_2 emissions from the process captured and safely stored. Hydrogen can also be separated from methane using pyrolysis, which creates solid carbon as a by-product, in which case it is classified as turquoise. Pyrolysis is currently only used on a very small scale, however.

Gazprom has invested in blue and turquoise hydrogen research, and other Russian oil and gas companies have also expressed interest in branching out into the sector.

It has also been suggested that Russia could supply green hydrogen to Europe, produced from water through electrolysis, with the process powered by renewable energy. Alternatively, state nuclear group Rosatom is preparing pilot projects to produce yellow hydrogen, also from water using electrolysis, but with the process powered by atomic energy.

The next question is how Russia will send its hydrogen to foreign markets. The country is well connected with the European gas market via pipelines, giving it a clear advantage as a supplier. It is also now linked to the Chinese market via the Power of Siberia line, launched in late 2019. Hydrogen could be blended into the natural gas flowing through these pipelines.

Gazprom's older export routes could only handle small amounts of hydrogen, although newer pipelines such as Nord Stream 2 (see **Box**), Turk Stream and Power of Siberia to China, could carry a blend of up to 70% hydrogen and 30% natural gas, according to government estimates. This is assuming the hydrogen is produced in Russia. Alternatively, Russia could continue flowing gas to Europe and then convert it into hydrogen at plants located locally.

Russia's biggest gas customer is Germany and the two countries are eager to progress their relationship into hydrogen. The German and Russian governments signed a joint declaration of intent to co-operate in the field of sustainable energy on 20 April 2021, with hydrogen listed as one of the key areas of focus.

Russia's government has proposed establishing four main hubs for hydrogen production. Hubs in the north-west Leningrad region

The Russian and German governments signed a joint declaration of intent to co-operate in the field of sustainable energy on 20 April 2021, with hydrogen listed as one of the key areas of focus. Germany remains a strong supporter of the Nord Stream 2 pipeline, which could serve as a vital link between Russian hydrogen supply and the European market.

Photo: Nord Stream 2/Igor Kuznetsov

and the south-west of Russia would target markets in Europe, as well as providing supplies for domestic transport, power generation and energy-intensive industry. This would help offset a predicted decline in Russian hydrocarbon sales to the continent.

Hydrogen in Leningrad would be produced mostly from natural gas, given the abundant supply arriving there from Siberia en route to Europe. Hydrogen in the south-west, where many of Russia's solar power plants have been built, would be produced from water by electrolysis using renewable energy.

Another hydrogen cluster on the Far Eastern island of Sakhalin would target Asian markets, primarily Japan and South Korea, which both see hydrogen playing a major role in their decarbonisation plans. The final cluster will be across Russia's Arctic coast, primarily in the regions of Murmansk, Yamalo-Nenets and Kamchatka. In Murmansk, in Russia's far north-west, the fuel will be produced via electrolysis using wind power.

Carbon sinks

Russia could serve other roles in the energy transition. Russian officials and industry executives have talked up prospects for using the Taiga and other large national forests as commercial carbon sinks. Forestation initiatives in Russia could earn internationally recognised carbon certificates, which both domestic and foreign businesses could then purchase to cover emissions that they cannot avoid, helping to make their operations carbon neutral.

'Russia has 20% of global forests, so the international community must be fair in that respect,' Alexey Chekunkov, Russia's Minister for Development of the Russian Far East and the Arctic, said in an interview with Bloomberg in late March. 'We have the potential to turn them into a massive carbon capture hub.'

Russian President Vladimir Putin used his speech at the US-hosted Leaders' Summit on Climate on 22 April to promote the CO_2 absorption potential of Russia's forests, estimating that the country's ecosystems take in around 2.5bn tonnes of CO_2 emissions each year.

Domestic decarbonisation

While Russia seems to be embracing the energy transition on the international stage, changes to its own internal energy mix are expected to be limited in the decades to come.

Russia met 54% of its primary energy demand from natural gas in 2019, 20% from oil, 15% from coal, 7% from nuclear, and 3% from mostly hydroelectric but also other renewables as well as bioenergy. In its Stated Policies Scenario (STEPS), which reflects the impact of existing policies, the International Energy Agency (IEA) predicts that gas will retain the same 54% share in two decades' time. Oil will occupy an 18% share, coal 12%, nuclear 8% and hydroelectric, other renewables and bioenergy some 8%.

Russia has little incentive to make more drastic changes to its energy mix under the 2015 Paris Agreement, as its commitments under the treaty are so modest that it has already met them. This is because the baseline for emissions is their level in 1990, before the Soviet Union's collapse when the country's pollutants were at a record high. Indeed, the consensus is that Russia still views climate issues as a low priority.

'Russia often treats climate change as a subset of issues within the spheres of foreign or security policy,' a paper last year from the Bank of Finland Institute for Emerging Economies (BOFIT) states. 'Awareness and recognition of climate-related risks have increased in recent years, but climate issues still garner low policy priority.'

That said, Russia's oil and gas industry is nevertheless making meaningful efforts to improve its environmental impact. This is largely because environmental, social and governance (ESG) ratings have become an important metric for investors when they decide whether to invest in a company or not.

The progress by Russian producers was exemplified in December last year when Novatek, the country's biggest independent gas producer, had its ESG rating upgraded significantly from BBB to A. It was the first Russian company to receive such a high rating.

'It is unclear what the trigger for the upgrade was, but we know Novatek has been working diligently to improve its ESG score, as have, for that matter, other Russian oil and gas companies such as Rosneft, Lukoil and Gazprom,' analysts at BCS Global Markets wrote in a research note at the time.

Novatek's board approved a new list of climate goals last August, aiming to reduce per-unit methane emissions at its production, processing and LNG operations by 4% and air pollutant emissions by 20%. It plans to reduce greenhouse gas emissions at its upstream activities by 6% and its LNG production facilities by 5%, also boosting the rate at which it utilises associated petroleum gas (APG) to 99%, from 83.3% in 2019.

Other companies have also made such pledges, including Rosneft, Russia's biggest oil producer. But none have gone as far as to make commitments to net zero emissions, as have their counterparts elsewhere in Europe. ●

In the pipeline

The Nord Stream 2 pipeline will take German and Russian energy cooperation to another level, although there is dispute about when the pipeline will enter operation.

Nord Stream 2 was originally due to start pumping gas to Germany before the end of 2019. But construction fell behind schedule, firstly because of Denmark's delay in issuing the necessary permits, and later because the US imposed sanctions on the project, forcing Swiss pipelayer Allseas to abandon work on the line.

Construction was finally resumed in late 2020 following nearly a one-year hiatus, after Russia deployed its own pipelaying vessels to finish the job. The US sanctions threat led a number of European companies, including insurers and certifiers, to exit the project, casting doubt on the timeframe for its implementation.

Some senior politicians in Germany, which remains a strong supporter of Nord Stream 2, called for trilateral talks to be held with Russia and the US to decide the pipeline's fate.

President Biden's administration waived sanctions on 19 May 2021, in a bid to avoid souring relations with Germany. This move to limit penalties on Russian entities and ships involved in the pipeline construction has been welcomed by German Foreign Minister Heiko Maas; but the waiver has been heavily criticised by Republicans in US Congress. The Trump and Biden administrations had opposed the Russian energy supply route through the Baltic Sea as they felt it would hand Moscow too much influence while potentially destabilising Ukraine by cutting significant transit fees for gas transport through the country.

Nord Stream 2 is now due for completion by the end of this year, and could serve as a vital link between Russian hydrogen supply and the European market. ●