Paris Energy Club Spring Meeting
Wednesday 13 April 2022

Summary of Discussion

Session 1: The road towards a low-carbon energy system: what role for CCUS?

New technologies are vital if the world is to achieve global decarbonization targets. Carbon capture, use, and storage (CCUS) is one of the technologies to decarbonize hard-to-abate sectors, offset their emissions and support a faster transition.

At the global scale, 40 million tonnes of CO_2 are already captured and stored each year, but a change of scale of up to 100 by 2035 is required according to IEA's sustainable development Scenario which set target of 4 Gt of CO2 to be captured by 2035.

Developing clusters, as witnessed in Europe and elsewhere, will help to capture CO_2 from different industrial sites to reach more significant volumes thus achieving cost reduction of CO_2 transport and storage.

Storing CO_2 remains a challenging component of the CCS chain. According to a study conducted by Clean Air Task Force in Europe, the lack of sufficient CO_2 storage projects will translate into a gap of 15 million tonnes of CO_2 in 2025, a gap that could rise to 40% in 2030. The cost of CO2 capture, transport, and storage ranges anywhere between 20 € to 180 € per tonne of CO_2. At today's value of CO_2 (80 € in Europe), several projects could be launched provided that other issues are properly addressed, among which the lack of appropriate regulation that covers some critical aspects such as long-term monitoring, making CCUS deployment faster and smoother.

Indicating that there is globally more emphasize on capture technology than on storage, one participant underlined the urgency of addressing the CO_2 capture related issues, including sites resilience over the years, capacity availability, responsibility of stakeholders involved, etc. The audience was also reminded that delays in implementing storage capacities (it takes from 5 to 10 years to develop a CO_2 storage site) have also to be shortened.

On storage availability, one participant indicated that Europe "has the geology" to capture CO_2 over one century at 2019 level, and that not all suitable sites have been identified yet.

Another barrier to CCS deployment is the lack of public support to CCS projects, which are very often seen as providing a solution to the extension of the world reliance on oil and gas resources to meet the future global energy needs. At the local level, CO_2 storage projects do not provide benefits for the population living in the vicinity of CO_2 storage facilities and face opposition from local communities (not in my backyard attitude).

One participant was wondering whether there are lessons to be learnt from the way nuclear industry managed public acceptance at the start of nuclear energy production in the 70's.

Another participant highlighted the inconsistency of using CCUS to prolong the inefficient and old coal power plants, such those in Europe. There is probably a room for coal in the power sector if CCS is coupled with coal power plants using the latest and the most efficient technologies.

The session also tackled the other technology that complement the extraction of CO_2 from industry and electricity generation processes: Direct Air Capture. While such technology provides many advantages, such as the possibility of being deployed anywhere and not necessarily in connection with industrial sites or power plants, DAC technology – despite some successful examples - is complex and still very costly.

Session 2: European energy security: what lessons can be driven from the Ukrainian crisis?

The energy crisis that the world and Europe are facing today is a potential threat to both energy security and economic stability. It also hampers the energy transition.

Such crisis was already looming well before the Russian invasion as reflected in last year's spot gas prices which were multiplied by a factor of six between March 2021 and December 2021. Strong economic recovery in China witnessed in 2021, rising natural gas demand for power generation in South Korea, lower than expected pipeline gas supplies to Europe and reduced availability of hydropower in Latin America have contributed to a significant increase in global LNG demand.

On the supply side, the United States recorded a significant surge in exports and has become Europe's leading LNG supplier, overtaking Qatar's position.

Asian buyers – notably Chinese NOCs and independent importers – played a leading role in securing new term purchases from the US, Qatar, and Russia. The year 2022 exhibits a different shape with a looming price volatility exacerbated by the Russia/Ukraine conflict.

Gas markets development is creating short term as well as long term challenges. In the short term, all sources of additional gas will need to be tapped, including pipeline gas sources. New gas volumes are unlikely to be found in Europe, where domestic production is declining at a rate of around 8 bcm per year, with limited room to increase pipeline gas supplies from Europe's historical pipeline gas suppliers is limited. As a result, most of the volumes will need to come in the form of LNG.

While LNG can greatly contribute to reduce the dependence on one major supplier (Russia), the scale of the challenge and the tight timeframe in which the measures will have to be implemented will require additional policy support to achieve the desired outcomes. To replace 50 bcm of Russian gas by the end of 2022, the EU needs to source from other suppliers the equivalent of South Korea's LNG consumption.

In 2022, hardly 30 bcm of additional nominal liquefaction capacity will be brought online – mostly from the United States. But not all these resources will reach Europe (over the last three years, China has absorbed around 50% of all new energy volumes available to the global market).

The competition between Europe and Asia for LNG cargos will be even higher in the longer term. Today, substantial new liquefaction projects are being proposed in North America and Qatar. However, projects already under construction may prove insufficient to keep up with demand growth. Between 2016 and 2020, around 40 bcm per year on average of new nominal liquefaction capacity has been added to the market. Between 2021 and 2024, the rate of additions will drop to less than 20 bcm per year. Therefore, given the necessary lead times, developing adequate supply

chains to meet future demand will require to kick start new liquefaction shipping and receiving projects at the earliest.

To accommodate additional volumes, Europe, will also need to expand its receiving capacity – notably through the development of additional floating regasification terminals. Several projects have been proposed already in North-West Europe, the Baltic Sea, Italy, and South-East Europe. However, despite recent proactive moves from European governments, infrastructure alone does not guarantee that new supply will be available; nor that it will be affordable.
In a global and competitive market, governments alone cannot command LNG to come to European shores. Ultimately, Europe's ability to attract more volumes will continue to depend on price signals based on inter basin price differentials and on commercial choices made by private companies.

Russian's war with Ukraine also seems to have temporarily shifted the EU's focus from sustainability to security and affordability. Redirecting LNG cargoes to Europe is likely to have an adverse effect on global decarbonisation – by leading to a slowdown in coal to gas switching in Asia Pacific.

In a world characterized by growing electrification, gas fired power plants will be needed to provide additional flexibility as electricity generation becomes increasingly variable. Gas storage pipelines and LNG terminals will provide the stability of energy supply at national, but also regional, level. For residual emissions which remain difficult to avoid or reduce, carbon offsetting schemes provide an additional means to compensate the greenhouse gas footprint of LNG. Since 2019, more than 30 cargoes associated with carbon offsets have been traded – most of them delivered to Northeast Asia.

Now, whereas different alternative solutions are being proposed to decarbonize the energy sector, none of them is ready to be rolled out at scale yet but LNG is ready to be deployed now while other new fuels are being tested and developed. By enabling the use of existing infrastructure to accommodate alternative fuels – such as bio-LNG and synthetic LNG – LNG provides a viable pathway to decarbonization while making use of the existing infrastructure.

Session 3: Geopolitics of the energy transformation: old approaches and new realities

From geopolitical point of view, it is often thought that location for natural resources provides a very useful tool to understand international relations among large players, consumers and producers alike. However, other factors such as technology can play a critical role in redrawing interdependencies. For instance, fracking technology fuelled shale gas and oil revolution to free new resources which, 20 years later, led the US to become the biggest oil producer, thus significantly reshaping the map of global energy geopolitics; role of Middle East, relation to China and Russia, etc.

The criticality of raw materials (nickel, cobalt, copper, scandium, graphite, lithium, …) for the ongoing energy transition across the board, and their geographical distribution appeared to become a matter of concern for policy makers. Some countries have already taken actions by adopting a specific strategy in this regard; a domestic strategy on the critical raw materials (CRMs) was shaped by the United States as early as 2010.

The pressure on critical raw materials demand over the last 3 to 5 years translates into escalating prices, and the recent geopolitical development, i.e., Russia-Ukraine war, is adding to such pressure given Russia's endowment in terms of CRMs. Sanctions on Russia put importers of nickel at risk of losing access to one of the cheapest nickel deposits in the world, Norilsk Nickel, and to nickel production in the Kola peninsula.

Like oil and gas security of supply, diversification of CRMs sources of import is an important way of mitigating supply disruption risks. For instance, Canada could become a quite important nickel alternative, but it may take 10-15 years to bring Canadian nickel deposits to markets.

While silver (an important material for electric cars) enjoys a quite diverse distribution across the globe, silver prices (25$ compared to 50$ ten years ago) need to get to structurally higher level to bring many mines to profitability and encourage investment.

Given the importance of CRMs to the ongoing transformation of mobility systems, one participant asked whether car makers have a new thinking in terms of strategies to secure access to CRMs. Some big players in the mobility sector may consider engaging directly in CRMs mining to secure the CRMs they need for batteries manufacturing, while others may wish to continue relying on mining compagnies through some form of strategic partnership.

On public policies front, one participant expressed surprise not to see CRMs security of supply on the top of the European political agenda, despite the tension witnessed on the supply of some CRMs such as nickel. Developing CRMs emergency stocks was mentioned as a mean to mitigate CRMs markets disruptions associated risks. Some countries (US, Japan, ...) have implemented specific rules on CRMs use and export. Domestic by nature, the scale of such initiatives remains however too limited to have an impact on CRMs global markets. One participant reminded the audience about the need, as expressed by some experts, for a CRMs dedicated international organisation with the mission of holding CRMs stocks and manage their release when needed (prices spikes, embargoes, etc.).