Paris Energy Club – Virtual Meeting
Tuesday 30 March 2021

Summary of discussion

About the Webinar

The meeting comprised two sessions: one to discuss hydrogen role as vector for EU decarbonization strategy (session 1) and another focusing on the local and global implications of China's carbon neutrality target by 2060 (session 2).

Session 1: Hydrogen as a driver for an EU decarbonization strategy

Hydrogen is enjoying unprecedented political and business momentum, with the number of policies and projects around the world growing rapidly. Further acceleration in the adoption of hydrogen policy visions and in the announcement of international agreements was recorded in 2020. Despite the COVID-19 pandemic and its impact on state budgets, more than €25 billion in public funding has been announced in recent months.

Hydrogen projects are increasingly ambitious in their scope and scale, and many are already aiming for large-scale production. While hydrogen supply has attracted most of the attention, increasing demand is necessary to secure an outlet for hydrogen projects. Sectors such as industry, power, transportation and buildings are targeted in many countries. Countries with hydrogen supply potential that exceeds domestic needs are aiming to make exports the primary driver of their hydrogen strategy.

While green hydrogen is central to all strategies, blue hydrogen is expected to play a role in a transition period before 2050. Given the magnitude of hydrogen demand needed to decarbonize the energy mix under a net-zero plan by 2050, both types of hydrogen need to be harnessed. Indeed, the expansion of clean electricity generation will not be in position to satisfy both the electricity needed for hydrogen production and the demand for electricity in the rest of the economy.

Referring to the findings of a model-based analysis, one participant indicated that the most cost-effective option for hydrogen deployment is first to develop blue hydrogen in industries that are already using hydrogen, while the use of green hydrogen could be expanded gradually as the price/value of CO_2 increases. In fact, hydrogen industry players are deploying both strategies, either by opting directly for green hydrogen or by developing blue hydrogen supply systems according to local circumstances.
Net-zero targets by 2050 announced by many countries and companies are important drivers for clean hydrogen. Net zero by 2050 requires unprecedented efforts over the next decade, with unprecedented contributions required from energy companies, citizens and investors. According to IEA, to achieve net zero by 2050, hydrogen supply in 2030 would need to be around 40 Mt (up from 0.45 Mt in 2020), electric car sales would need to reach 50 million (up from 2.5 million in 2020) and investment in electricity would need to be four times higher in 2030 ($1.6 trillion) than in 2020.

EU has ambitious targets for green hydrogen capacity; 6 GW by 2024 and 40 GW by 2030. Connecting supply sources to consuming centers is critical for achieving this goal. The northwest European hydrogen infrastructure and other emerging clusters in southern European countries (Italy, Spain) can play a key role in establishing a north-south hydrogen corridor over the period 2030-2035, leading to a European hydrogen backbone in 2030-2040. To this end, existing European natural gas pipelines can be repurposed (at cost that is equivalent to 10 to 30% of the investment cost of new pipelines) to transport hydrogen, thus speeding up the emergence of an European hydrogen market.

On a global scale, green hydrogen (wind and solar sourced) and blue hydrogen (natural gas sourced) are geographically complementary, allowing international value chains and new global hydrogen trade routes to emerge. Some countries are already on track to become net importers (Japan, South Korea, etc.) while others will be net exporters (e.g. Chile and Australia). If the hydrogen economy takes root, it will likely contribute – together with other carbon-free energy sources – to creating a new geopolitical landscape.

The issue of cost was raised frequently throughout the Club meeting. Participants agreed that technological advances and increased demand (economy of scale) will help reduce the cost of hydrogen supply. One participant felt that cost reduction will be faster for green hydrogen than for blue hydrogen because the cost of CCUS will be difficult to reduce, especially the cost associated with storage.

Reducing transportation cost is necessary to foster the emergence of regional markets and the development of international trade. Given the cost of transporting hydrogen, one participant suggested locating energy-intensive industries (petrochemicals, steel, etc.) in places/countries where hydrogen, or green renewables, can be produced economically. The comparative advantage created by the development of hydrogen and green renewables could lead to a relocation of energy intensive industries.

Participants agreed on the importance of having transparent, market-determined prices at the regional level to capture specific market situations. One participant felt that lessons can be learned from the natural gas markets, in which take-or-pay contracts are used to give investors confidence and ensure the bankability of projects.

Importance of the hydrogen pricing mechanism will help hydrogen industry players to develop strong and sustainable business models. According to one participant, there should be no differentiation between green, blue or other types of hydrogen in the markets (future markets should trade hydrogen contracts without reference to "color") with carbon content being handled through carbon specific markets, such as ETS in Europe. The suggested scheme is similar to the one used in electricity markets where electrons are sold regardless of their source (renewables, nuclear, fossil fuels, etc.) with carbon markets handling carbon pricing.

A common assessment of the carbon footprint of hydrogen production is an important step in the development of hydrogen markets and transparent pricing for hydrogen. The International Partnership on Hydrogen Economy is developing a mutually acceptable methodology for determining the greenhouse gases associated with hydrogen production; this methodology aims to facilitate market assessment and international trade in 'clean' hydrogen by recommending a common approach established by several countries.

Achieving and maintaining public acceptance of energy projects is increasingly difficult. This is true for both conventional and renewable energy projects and hydrogen is no exception in particular for the CCUS component of the blue hydrogen supply chain. While onshore CO_2 storage are more likely to face local opposition, offshore CO_2 storage is less exposed with projects such as Porthos being on track to store, starting from 2024, an annual 2.5 million tons of CO_2 from the industry in empty gas fields beneath the North Sea.

The safety of hydrogen production, transportation, storage and distribution is also an important element of public acceptance. One participant reminded the audience that the safety aspect is absent in most of the reports on hydrogen. However, hydrogen industry players are aware of the importance of this aspect and are working to establish common safety standards. One participant felt that these players should also promote the exchange of information on incidents to mitigate risks and share best practices.

The widespread use of hydrogen as part of global energy transitions faces several challenges, and many important underlying conditions are still being developed (policy and support schemes, regulation, certification, pricing, taxation, infrastructure, etc.). The emergence of a global hydrogen economy requires focused, short-term action to further overcome barriers and reduce costs.

Session 2: Local and global implications of China's carbon neutrality target by 2060

The session discussed China's announced goal of peaking CO_2 emissions by 2030 and achieving carbon neutrality by 2060. The discussion focused on the underlying conditions for such a strategy to succeed and reviewed potential obstacles to its deployment.

China has been the world's leading importer of oil since 2013, will soon become the leading importer of liquefied natural gas, and is the world's third largest importer of coal. The country has embarked on a massive program to develop and deploy renewable energy and electric vehicles. China is also a leading manufacturer of solar photovoltaic cells, the world's largest producer of electric vehicles, and is considering hydrogen fuel cell technology.

Given the scale of its energy consumption, China must mobilize all means to reverse the trend of domestic carbon emissions without harming economic growth. With the emergence of local environmental concerns, China's focus on energy security now also encompasses environmental security concerns according to one participant.

President Xi Jinping recently proposed to build China's modern energy system that aims to ensure China's green and low-carbon development, with the goal of achieving peak carbon emissions by 2030 and making China carbon neutral by 2060. The 2030 target is to reduce CO_2/GDP by over 65% compared to 2005 levels, increase the share of non-fossil fuels to 25%, increase afforestation by 6 billion cubic meters, deploy 1200 GW of solar and wind power capacity and peak CO_2 emissions by 2030.

One participant recalled that China's targets on all these dimensions (CO_2 intensity of the national economy, share of non-fossil fuels in the energy mix and afforestation) have been steadily increased since Copenhagen Accord in 2009 ; the share of non-fossil fuels increased from 15% in Copenhagen to 20% in the Paris agreement (2015) to reach 25% in the set of new targets recently announced by the Chinese leader.

In mature OECD economies (US, EU, Japan), energy-related CO_2 emissions have already initiated a decline following a long period of stagnation. The situation is different in China where economic development continues to be driven by energy-intensive sectors and CO_2 emissions are still rising. Therefore, achieving China's targets and carbon neutrality will raise immense challenges.

To reverse the path of its CO_2 emissions, China will have to deal with the costly transformation of its energy mix and associated infrastructure, inertia in public consumption behavior, low public awareness of the impacts of climate change, lack of preparedness among businesses, and regulatory barriers such as those affecting the power sector. In addition, China's path to carbon neutrality will add to the ongoing tension affecting the supply of scarce materials.

However, the underlying changes needed to achieve peak carbon and subsequent neutrality will be easier to implement because of a large domestic market that allows for testing new technologies and provides the economies of scale needed achieve cost effectiveness. In addition, political stability and policy continuity, as set out in recurring five-year plans, inspire investor confidence, according to one participant.

Among the trends that will drive China's energy development, demand is expected to play greater role through energy savings and improved management. China is expected to see faster decarbonization in its energy supply sector. Given the increasing electrification of the economy (digitalization, electric vehicles, etc.), a transformation of the power sector is needed with power distribution playing a key role. China's future energy development also aims at enabling rural areas to play a more active role as energy providers. Additional efforts are expected on the research and development front to provide solutions for carbon neutrality in areas such as carbon reduction and recycling, energy storage technologies, and so on.

CCUS is expected to play an important role in China's negative emissions program. One participant noted that the country intends to focus more on CO_2 use than its storage, however; another participant stressed the importance of conducting life-cycle analysis to assess CO_2 reduction, as some of the CO_2 used to manufacture certain products may end up being released into the atmosphere when those products are "destroyed".

Carbon pricing remains a key tool in a policy-makers toolkit to deter the use of carbon-intensive fuels and encourage cleaner technologies. In this regard, it is important to point out that China officially launched the first phase of its national ETS in February 2021. The scheme allows provincial governments to set pollution caps for coal- and gas-fired power plants for the first time, allowing them to buy the right to pollute from others with a lower carbon footprint. China's ETS is expected to cover one-third of China's emissions when fully operational, eclipsing the EU as the world's largest ETS.

China's decarbonization initiatives provide major opportunities to accelerate technology innovation and industrial upgrading and further strengthening its economy. However, China's new goals are ambitious ; realizing them remains a major challenge but will certainly inspire others countries to take act with similar ambition.

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Agenda

14:00 – 14:15 Welcome Remarks & Introduction
Pierre-Franck Chevet, CEO IFPEN, President Paris Energy Club
Said Nachet, Director, Paris Energy Club

14:15 – 15:45 Session 1: Hydrogen as vector for EU decarbonization strategy

Momentum gathers every day around hydrogen's potential to be the cornerstone of the clean energies transition. However, numerous challenges are still to be addressed to scale up to reduce costs, replace high-carbon with low-carbon hydrogen in current applications and expand hydrogen use to new applications.

Session 1 will take stock of hydrogen development in Europe and other regions, discuss required conditions for hydrogen deployment (technological progress, costs reductions, infrastructure, renewable energy generation, CCUS contribution, demand expansion, government support, etc.)

Framing remarks:
Noé van Hulst, Chair, International Partnership for Hydrogen and Fuel Cells in the Economy

Moderator:
Pierre-Franck Chevet, CEO IFPEN, President, Paris Energy Club

Questions to be addressed include:

- *What are the key technical and commercial challenges that need to be addressed to scale up hydrogen production?*
- *What can industry players achieve rapidly within the present energy context (technology options, infrastructure and economics) to put the hydrogen sector on track for fast and massive development?*
- *In what aeras government support is required/desirable?*
- *Can CCUS widespread use in blue hydrogen production scheme be taken for granted? If not, what barriers should be over comed to bring such use to fast reality?*
- *Will future renewable electricity capacity required to produce green hydrogen be brought in line on time? If yes, what are the implications for local and regional electricity grids?*
- *How can EU energy security be reassessed against the backdrop of hydrogen projected deployment? What role for neighboring countries in Africa and Middle East?*
- *Can the lessons learnt in developing other markets for other energy products apply to support hydrogen trade at global scale?*

15:45 – 15:50 Break

15:50 – 16:50 Session 2: Local and global implications of China's carbon neutrality target by 2060

China has been the world's leading oil importer since 2013, will soon become the leading importer of liquefied natural gas, and is the world's third-largest coal importer. The country has embarked on a massive program of renewable energy and electric vehicle development and deployment. China is

dominant in solar photovoltaic cell manufacture, the world's largest producer of electric vehicles, and is looking to turn its attention to hydrogen fuel cell technology.

President Xi Jinping has recently proposed to build China's modern energy system that aims at ensuring China's green development and low-carbon development, with the objective of achieving peak carbon emissions before 2030, in order to make China carbon-neutral by 2060.

This session will look into China's announced energy strategy for the years ahead, discuss underlying conditions for such strategy to succeed, review potential obstacles to its deployment and analyze repercussions within and outside China.

Framing remarks:
Xavier Chen, President, Beijing Energy Club

Moderator:
Saïd Nachet, Director, Paris Energy Club

Questions to be addressed include:

- *What does it take for China to achieve its target of carbon neutrality by 2060 (sectors upgrade, companies' adaptation, carbon removal measures such as CCUS, regulation, etc.)?*
- *How can such strategy position China as an innovation powerhouse and technology provider for decarbonization around the world?*
- *What are the implications on other regions and global energy markets of China's objective of achieving carbon neutrality by 2060?*
- *How can the US-China manage their convergence on climate change mitigation goals in parallel with their confrontation on various fronts (trade, technology transfer, etc.)? How can relations between these two major players evolve during Biden Administration?*
- *If yes, how may such rivalry impact the implementation of China's energy strategy?*
- *What bilateral partnerships and multilateral agreements may help China to deploy its future energy strategy?*

16:50 – 17:00 Closing Remarks

The Paris Energy Club is a forum of energy experts from the energy industry, governments, international organizations, financial institutions and consultancy firms, who engage in in-depth discussion on current energy-related issues.

Club meetings are conducted under the Chatham House Rule.

The views expressed by participants of the meeting do not necessarily represent the opinions of the organizers.