The greening of hydrocarbons

A lower-carbon future will still involve fossil fuels

The energy transition has become the hottest topic of conversation today in the energy industry. Most of the publicity on the transition centres on how to 'decarbonise' the global economy, with a major focus on the shift to non-hydrocarbon energy sources (NHES) such as solar, wind and hydrogen.

Another key component of the energy transition that gets less attention, but is equally important, is identifying and implementing methods of reducing, or even eliminating in some cases, air emissions from the production and use of hydrocarbons, which remain the most accessible, economically viable and reliable method of producing energy in most countries.

In 2020, various surveys concluded that roughly 80pc of the world's energy continues to be sourced from fossil fuels, despite increased pressures and efforts from governments and investors over the last few decades to move to more environmentally friendly NHES. While investments in projects for the development of NHES have increased dramatically, shifting to those sources of energy from hydrocarbons is often costly and less reliable relative to the continued use of hydrocarbons.

In many cases, projects to develop NHES are economically viable only with substantial government subsidies, typically in the form of tax credits. In addition, external and uncontrollable factors such as the amount of wind or sunshine, as well as energy storage issues, affect the reliability of certain NHES.

As a result of these considerations, and despite the considerable efforts and pressure to move to NHES, the reality is that a complete transition from hydrocarbons to NHES will be challenging and will likely take decades to accomplish. This is particularly true in the developing world, where many countries simply do not have the economic resources to subsidise the development of NHES and are more focused on finding cost-effective, reliable sources of electricity for their citizens.

> One of the most critical aspects of the energy transition will be developing greener methods of producing electricity

Consequently, in order to accomplish the ambitious environmental goals set at Cop26 and, more generally, by countries and companies around the world, it will be critically important to develop and implement methods of 'greening' hydrocarbons to reduce the environmental effects of continued hydrocarbon use in the coming years.

Two of the most important of these greening methods are (i) shifting from coal and oil to natural gas in the production of electricity and (ii) the reduction of carbon emissions from hydrocarbon production and use through carbon capture, utilisation and storage (CCUS) projects.

1) Coal and oil to gas shift

Global demand for electricity continues to increase, particularly as developing countries expand their economies. And the continuing shift to electric-powered vehicles will create further demand for electricity.

Therefore, one of the most critical aspects of the energy transition will be developing greener methods of producing electricity. Gas is broadly recognised as the cleanest of the hydrocarbon energy sources. In the US and in many other countries around the world, there are abundant supplies of gas that can be efficiently produced and transported through existing pipeline infrastructure.

In addition, because of continuing improvements in liquefaction, transportation and regasification technologies, it has become much easier to move LNG around the globe from major gas-producing regions to markets with high gas demand but less indigenous gas sources. Gas-fired power plants, particularly those that employ technologies to capture carbon emissions, as discussed below, will be a key part of the supply chain to produce this 'greener' electricity.

Consequently, a critical part of implementing the energy transition will be to create additional incentives to encourage a global shift from coal- and oil-fired power plants to more environmentally friendly gas-fired power plants. Commentators on the energy

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transition often refer to gas as a 'transition fuel' to NHES. Given the length of this energy transition and the other macroeconomic and technical challenges discussed above, it seems more likely that gas (though increasingly becoming a greener fuel), will play a major role in the world's energy equation for the foreseeable future.

2) CCUS

Another major focus for the greening of hydrocarbons is the development of CCUS projects, where major sums are being invested in technologies to reduce the environmental effects of the production and use of hydrocarbons through the capture and sequestration of carbon emissions.

It will be critically important to develop and implement methods of 'greening' hydrocarbons

These projects include extraction of carbon from specific plants, referred to as 'point source emitters', as well as direct air capture projects to extract carbon directly from the atmosphere.

These CCUS projects, while still facing certain technical and economic challenges, have the potential to materially decrease the impact of hydrocarbon production and use on the environment.

In conclusion, while the increasing use of NHES is clearly a central part of the energy transition, similar attention and focus should also be directed to the efforts to incentivise and implement the greening of hydrocarbons. The achievement of the world's environmental objectives will require both. ■