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Pillsbury's New Hydrogen Practice Attorneys on the Viability of Clean Energy

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BY KENNETH ARTZ

Pillsbury Winthrop Shaw Pittman launched its hydrogen practice in September to assist clients with the many new opportunities being presented as the United States transitions from oil and gas to renewables, most notably, hydrogen-based energy technologies.

The newly formed multidisciplined group of lawyers is believed to be one of the first launched by an AmLaw 100 firm at a time when many projects within the hydrogen industry are lifting off in Texas, such as the Mitsubishi Hitachi joint agreement to construct three energy storage projects in Texas.

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Tell us about your practice area and the new hydrogen practice group at Pillsbury:

Sheila Harvey: My practice has been focused on energy and environmental regulations and the implications of those regulations on commercial transactions and liability management and resolution. The new hydrogen practice group at Pillsbury is an outgrowth of our energy industry group efforts. Those efforts have lately been focused on the energy transition as the industry seeks to respond to various pressures, including cost, efficiency and reliability issues, the development of new energy technologies and the growing concerns about the need to respond to the threats of climate change and to implement plans for decarbonization. The hydrogen practice has more than 40 members from a variety of practices in the firm, including the projects (including renewables, carbon capture and energy storage), intellectual property, regulatory, trade, energy, corporate, finance, transportation and litigation practices.

Are traditional energy companies embracing hydrogen? What about nuclear?

Elina Teplinsky: Yes. In accordance with some studies, the proportion of oil and gas companies intending to invest in the hydrogen economy doubled from 20% to more than 40% in 2020. This growth is facilitated in part by the COVID 19-induced drop in oil prices, but also a growing recognition of the global energy transmission–a movement away from fossil fuels and to low-carbon resources in energy, transportation and industry. Further, utilities are increasingly looking to hydrogen as a way to meet their net-zero goals, address renewable energy storage issues and leverage participation in grid services, such as for reserves and grid regulation. This includes collaborating with global power generation and energy storage companies on project development and technology solutions towards low-carbon hydrogen production.

Hydrogen production through nuclear power presents an opportunity to significantly reduce the cost of hydrogen production, while creating a potentially immense nonelectric market for nuclear reactors. Nuclear energy is clean and baseload and conventional nuclear power plants can produce hydrogen with no GHG emissions through low-temperature electrolysis. There are several U.S. utilities currently undertaking pilot projects, with backing of the U.S. Department of Energy. Further, because nuclear power generates heat, nuclear technologies—especially advanced reactors, which are being developed and demonstrated today—can produce hydrogen more efficiently and cheaply using high-temperature electrolysis as well as potentially direct thermochemical processes (which don't require electrolyzers but require very high temperature reactors).

What are the various color stages of hydrogen?

ET: There are three main colors of hydrogen:

- Gray hydrogen, produced from fossil fuel sources such as natural gas through the process of steam methane reforming (SMR).
- Blue hydrogen, which is gray hydrogen paired with carbon capture and storage.
- Green hydrogen, produced from zero-carbon sources such as renewable energy and nuclear.

There is also turquoise hydrogen, generated from natural gas but using pyrolysis where the gas is passed through molten metal, producing solid carbon as a byproduct.

Why is hydrogen going to be important to the nation's energy future?

Mona Dajani: Although Hydrogen was discovered in the 1700s, it is gaining renewed and rapidly growing attention globally. Twelve countries have aspirations to become "hydrogen societies" by 2050, including Germany, France, Japan and South Korea. Especially with COVID-19 shocking our energy demand over the coming years, the underlying trends driving demand growth are likely to reassert themselves. Investment in hydrogen technology to scale as well as driving costs down, are key for the net zero energy transition and our future. Through new solutions and the case for Hydrogen has accelerated, many countries and companies have also recognized how the use of hydrogen is essential to decarbonize and meet carbon neutrality commitments. It is not difficult because Hydrogen has many applications—it can be used as a feedstock, a fuel or an energy carrier and storage, and use for transport, power and buildings sectors. All of the foregoing data points makes hydrogen essential towards a cleaner, more sustainable future for stakeholders by limiting carbon emissions from electric power generation.

Are there any real-time efforts to get hydrogen off the ground in the transportation industry?

MD: Yes, there are some efforts in place now from a variety of sources—public companies and governments alike. Building up hydrogen in the transportation sector requires a full value chain approach. The production of hydrogen from renewable or low-carbon sources, the development of infrastructure to supply hydrogen to the end-consumers, and the creation of market demand go in parallel, activating a virtuous circle of increased supply and demand for hydrogen. It also requires reduced supply costs—through declining costs for clean production and distribution technologies and affordable costs of renewable energy input, ensuring cost competitiveness with fossil fuels.

Off-grid renewable hydrogen production is a further option in this context. In transport, hydrogen is also a promising option where electrification is more difficult. We are helping clients with launching early adoption of hydrogen in captive uses, such as trucks, city buses, commercial fleets (e.g. taxis) or specific parts of the rail network, where electrification is not feasible. Hydrogen refueling stations can easily be supplied by regional or local electrolyzers, but their deployment will need to build on clear analysis of fleet demand and different requirements for light- and heavy-duty vehicles. We are also helping clients with hydrogen fuel cells for use in heavy-duty road vehicles, alongside electrification, including buses, special purpose vehicles and long-haul road freight given their high CO2 emissions.

For inland waterways and short-sea shipping, hydrogen can become an alternative low emission fuel. Scaling up fuel cell power from one to multiple megawatts and using renewable hydrogen for the production of synthetic fuels, methanol or ammonia—with higher energy density—are required for longer-distance and deep-sea shipping. Hydrogen can become in the longer-term an option to decarbonize the aviation and maritime sector, through the production of liquid synthetic kerosene or other synthetic fuels. These are "drop-in" fuels that can be used with existing aircraft technology, but implications in terms of energy efficiency have to be taken into account. In the longer-term, hydrogen-powered fuel cells, requiring adapted aircraft design, or hydrogen-based jet engines may also constitute an option for aviation. The key limiting factor for the use of hydrogen in industrial applications and transport is often the higher costs, including additional investments into hydrogen-based equipment, storage and bunkering facilities. Furthermore, the potential impact of supply chain risks and market uncertainty are amplified by the tight margins for final industrial products due to international competition. Demand-side support government policies will therefore be needed in the United States.

Are there any legislative or regulatory hurdles that will need to be removed in order for hydrogen to advance as a viable form of energy?

Rob James: One of the biggest obstacles, besides massive scale-up demand as well as cost declines in transport and storage technologies, is the lack of hydrogen-specific policies in the United States at the federal or state level supporting both supply and demand. Absent incentives akin to the EU's Hydrogen Alliance, some strategic investors are hesitant and some research and infrastructure are delayed. In turn, at least in the United States, the development of end uses in the transportation and industrial sectors is not as fast paced as in Europe and Asia. Government incentives, mandates or taxes are advocated to promote the green hydrogen economy. At the state level, renewable portfolio, LCFS and other zero-emission standards can help. Safety programs for the hydrogen supply chain, and regulations dealing specifically with hydrogen storage and transmission, are also in order. For the industry to immediately scale up in the United States (unlike the case with certain countries in Europe and Asia), the demand needs should be supported with comprehensive policy coordinated across government, and the roll-out of around $150 billion of cumulative United States subsidies to 2030. If supportive but piecemeal government policy is in place, along with strong investment in production, end use equipment, storage and transport infrastructure, it has been estimated that annual sales of hydrogen would be $700 billion, with billions more also spent on end use equipment.

What about Texas, which has enormous supplies of oil and natural gas—is the state ready to embrace hydrogen energy?

RJ: Some Texas companies and universities think hydrogen is poised for growth. The Lone Star State is home to energy players already using hydrogen in their industrial processes, though the current production method, steam methane reformation, results in significant carbon emissions. Texas has deployed the kinds of carbon capture and storage facilities needed for blue hydrogen, though projects founded on enhanced oil recovery have been stymied by low crude prices. The state also has large amounts of wind and solar generation, and power not supplied to the grid can produce green hydrogen—for example, there is an H2@Scale electrolysis pilot project sponsored by the University of Texas.

The state can leverage its extensive pipeline and port infrastructure for hydrogen uses, including in the transportation sector. Texas certainly has the potential to lead the way on deployment, but blue and green hydrogen are costly at present and a focused program of research and investment incentives for generation and applications will be required.

Do you have any other observations you'd like to share about hydrogen energy?

SH: Some observe that hydrogen has been the fuel of the future for several decades, suggesting that hydrogen will always be just a future aspiration. Hydrogen is not just coming to be used as a fuel and a medium for energy storage—hydrogen is here. Its importance to the energy transition is significant and will be key to reducing the greenhouse gas emissions associated with the parts of the energy sector which will be the most difficult to decarbonize. Hydrogen has come far enough to have its own national holiday: Oct. 8, National Hydrogen Day!