K&L GATES

The H_2 Handbook

Legal, Regulatory, Policy, and Commercial Issues Impacting the Future of Hydrogen

INTRODUCTION

Hydrogen—the smallest molecule, but one that holds the potential to be an energy superhero and to play a significant role in reducing carbon emissions and slowing climate change. It is the most abundant element in the universe and can be produced from an impressive list of resources that could truly manifest an "all of the above" energy economy. It can be combusted, compressed, liquefied, stored, used to store electricity, and used to produce electricity. While modifications are needed to address its unique attributes, hydrogen also can be transported via pipeline (either on its own or as part of a commingled natural gas stream), by truck, rail, or vessel.

Companies ranging from utilities to manufacturers and automobile companies, high tech, and even oil supermajors, are recognizing hydrogen's potential and taking an active role in the development of the nascent global expansion of this industry. Which countries participate in the initial stages of a hydrogen economy likely will depend on politics, the abundance and accessibility of natural resources, and availability of modes of transportation and distribution sufficient to match scale. Countries like Australia, Canada, China, Germany, India, Japan, and South Korea, as well as the European Union already have drafted or are drafting national level strategies for hydrogen—including government incentive programs and goals for stimulating demand and production. Other countries, like the United States and the United Kingdom, do not yet have a national strategy for hydrogen, but particular initiatives and strategies at the state and local levels are emerging.

Like other sources of energy, commercial-scale hydrogen will require clear, informed, and transparent regulatory regimes at the local, national, and international levels. These regimes will need to balance hydrogen's unique features and a desire to build out a robust hydrogen infrastructure that facilitates the penetration of hydrogen as a major global energy source.

While hydrogen already is used in limited applications, commercial factors and the development of global commercial standards undoubtedly will play a role in hydrogen's expansion into a global

commodity as well. Cleverly and usefully, the industry has standardized a color-scheme nomenclature to identify the resource base used to produce hydrogen. The generally used colors are:

- Brown: Hydrogen produced from coal gasification;
- Grey: Hydrogen produced from natural gas (methane) via steam methane reformation, without the use of carbon capture and sequestration;
- Blue: Hydrogen produced from natural gas (methane) via steam methane reformation, coupled with carbon capture and sequestration; and
- Green: Hydrogen produced via electrolysis from renewable or other zero-emissions power source.

Agreement on a currency for international hydrogen trade also will be an important step. While U.S. dollars have been used for global energy commodities like petroleum, the United States' lack of a serious national hydrogen strategy in the near term may leave open the potential for other countries or jurisdictions to establish a particular currency as the standard for hydrogen transactions globally. But, regardless of the ultimate currency used, establishing a global hydrogen economy will require participation and coordination of multiple countries and jurisdictions.

The Hydrogen Handbook provides a summary of the regulatory, commercial, and policy issues that we believe hydrogen will face on its path to becoming a global commodity and a significant part of the energy mix. The issues facing the development of a robust, global hydrogen economy unsurprisingly differ by country and we have therefore organized this resource guide in that manner. We have chosen to kick-off *The Hydrogen Handbook* with coverage of Australia, the European Union, Germany, Japan, the United Kingdom, and the United States. Our global team of lawyers and public policy professionals who compiled *The Hydrogen Handbook* have drawn on their extensive experience in global energy markets and in particular disciplines. We intend to provide stand-alone updates, including written alerts and podcasts, to supplement *The Hydrogen Handbook* as matters develop. Visit our **Hydrogen Emerging Issues website page** regularly for new content.

We hope you find *The Hydrogen Handbook* to be useful and of course please contact us if we can be of assistance.

KEY CONTACTS

AMERICAS

DAVID WOCHNER

Practice Area Leader - Policy and Regulatory
Washington, D.C.
+1.202.778.9014
david.wochner@klgates.com

AUSTRALIA

CLIVE CACHIA

Partner
Sydney
+61.2.9513.2515
clive.cachia@klgates.com

ASIA

ERIC SEDLAK

Partner
Tokyo
+81.3.6205.3616
eric.sedlak@klgates.com

EUROPE, MIDDLE EAST, AND AFRICA

JONATHAN BLANEY

Counsel
Dubai
+971.4.427.2705
jonathan.blaney@klgates.com

JAMES GREEN

Partner
London
+44.(0)20.7360.8105
james.green@klgates.com

MÉLANIE BRUNEAU

Partner
Brussels
+32.(0)2.336.1940
melanie.bruneau@klgates.com

DR. ANNETTE MUTSCHLER-SIEBERT, M.JUR. (OXON)

Partner
Berlin
+49.(0)30.220.029.355
annette.mutschler-siebert@klgates.com

GIOVANNI CAMPI

Policy Director
Brussels
+32.(0)2.336.1910
giovanni.campi@klgates.com

PAWEL PIOTROWSKI

Partner
Doha
+974.4424.6109
pawel.piotrowski@klgates.com

K&L Gates is a fully integrated global law firm with lawyers and policy professionals located across five continents. For more information about K&L Gates or its locations, practices, and registrations, visit klgates.com.

21546