

Introduction

Policy makers around the globe continue to grapple with issues related to energy security, energy affordability, and an expected increase in demand for all energy sources. At the same time, concerns about global climate change and reducing greenhouse gas emissions remain in focus as the world struggles to define the path to a sustainable energy future. Regarding it as an abundant, affordable, and clean-burning fuel, many countries around the world are increasingly looking to natural gas to play a key role in powering the future. The prospects for natural gas are so promising that the International Energy Agency (IEA) has suggested that the 21st century could be the “Golden Age of Gas” with demand for natural gas projected to increase by more than 50 percent from 2010 levels and account for over 25 percent of the world’s energy supply mix by 2035.

Along with the increased demand for natural gas comes a corresponding increase in international trade in natural gas, with most of the increased trade expected to be in the form of liquefied natural gas or LNG. LNG is natural gas that has been cooled to approximately $-161\text{ }^{\circ}\text{C}$, at which point it condenses to a liquid that can then be shipped via LNG tanker anywhere in the world. Since the majority of natural gas reserves are located away from key demand markets, LNG offers an important solution for the global gas markets in terms of moving natural gas to markets where it is most needed.

In recent years, the significant increase in interregional LNG trade has led many to question whether the gas markets were “globalizing” and whether LNG would someday trade as a global commodity. Though this issue will be discussed in more detail in Chapter 6, the general consensus that seems to have emerged is that while LNG markets are “globalizing” in terms of the increase in trade and the number of countries now involved in LNG trade, LNG is still not likely to become a global commodity anytime soon for lack of a single pricing structure. Nonetheless, there is widespread recognition that LNG is the “glue” linking global gas markets and, indeed, the Golden Age of Gas would not be possible without LNG.

Energy for the 21st Century explores the growing role of LNG as the “glue” linking global gas markets and identifies the key opportunities and challenges for the LNG industry in the context of a number of competing

drivers, including economic development, energy security, and climate change. Going forward, the pace and scale of demand growth for all forms of energy, including natural gas and LNG, ultimately will rest on the climate and energy policies adopted by countries, the global economic recovery, and industry investment. Perhaps the most difficult to predict is global energy policy since decisions about energy policy are inextricably linked to economic, environmental and national security policy, and have significant consequences in all three areas.

Though the pace and scale of the global economic recovery remain uncertain as this book goes to print with energy policies in a state of flux in most regions around the world, this book takes the long-term view that, over time, demand for natural gas and LNG will continue to increase as more countries look to meet rising demand for energy with lower emission fuels. Accordingly, it seems likely that LNG will play an increasingly large role in the world's energy future.

While there are countless opportunities for LNG in markets around the world, there are also numerous challenges that must be confronted by the industry going forward. This book explores both the opportunities and the challenges for LNG in the current contextual reality wherein energy law and policy are increasingly intersecting with environmental law and geopolitics. The book navigates the myriad of legal, policy, and environmental issues facing the LNG industry and provides the reader with a thorough understanding of the critical issues:

- the role of natural gas and LNG in the 21st century (Chapter 1)
- the entire LNG value chain, including a discussion of the liquefaction process, LNG shipping, the regasification process, and the complicated world of natural gas and LNG measurements (Chapter 2)
- the evolution of LNG markets including the history of LNG and an overview of the three major LNG markets – the Asia-Pacific LNG market, the European LNG market, and the North American/ Atlantic Basin LNG market (Chapter 3)
- a description and overview of key LNG supply projects around the world (Chapter 4)
- the primary markets driving LNG demand around the world (Chapter 5)
- the increased globalization of LNG markets and whether LNG could someday trade as a global commodity (Chapter 6)
- the numerous safety and environmental issues that have been raised in the context of constructing LNG projects as well as the environmental sustainability of LNG as a fuel for the future (Chapter 7)

- an overview of current LNG mega projects around the world (Chapter 8)
- a discussion of the new LNG players and LNG projects around the world (Chapter 9)
- an in-depth analysis of the shale gas revolution (Chapter 10)
- the potential impact of shale gas on global gas markets including the prospects for North American LNG exports (Chapter 11)
- an overview of some of the key emerging issues in the LNG industry including whether North America will become a major LNG exporter, the potential impact of the Panama Canal expansion project on LNG trade, the growing role of floating LNG (FLNG), the potential influence of the Gas Exporting Countries Forum (GECF) to act as a “Gas OPEC,” and the emergence of LNG as a shipping and vehicle fuel to aid in emission reduction efforts around the world (Chapter 12).

Accessible and non-technical in nature, this timely book will serve as an essential reference for practitioners, government officials, energy professionals, academics and anyone interested in 21st-century energy solutions.