Chapter 13
Natural Gas:
A Solution to Sustainable Energy Issues – Safe Methods for Sustainable Environment

Meenakshi Sharma
https://orcid.org/0000-0002-6958-8741
University of Petroleum and Energy Studies, India

Mukul Kumar Rana
University of Petroleum and Energy Studies, Dehradun, India

ABSTRACT

According to current estimations, natural gas can be found in many parts of the world in sufficient amounts to provide energy for human activities for about 250 years. Natural gas accounted for around 21 percent of the total revenue generated by the global energy sector in 2011, trailing only coal and oil in terms of importance. That corresponds to hundreds of billions of dollars in financial terms each year. The purpose of this essay is to compare the utilization of various fuels to that of natural gas. The results would aid the government, business leaders, and decision-makers in deciding whether to switch from gasoline and diesel to natural gas. There is a need for more research to be done in this field by academics and scholars.

1. INTRODUCTION

A sustainable energy transition is defined as a shift toward a high-efficiency energy system that is well-managed to balance environmental and social costs, risks, and benefits such that the shift is deemed to be sustainable (Chen et al., 2019). The transition also includes the shift from utilizing fossil fuel to exploiting renewable energy sources in energy generation and the evolution from centralized to decentralized energy systems (Guidolin and Alpcan, 2019). A fossil fuel that developed deep within the earth's crust is natural gas. Numerous distinct chemicals can be found in natural gas. Petroleum resources are still regarded as a major asset for the provision of energy. Enhancing the extraction of oil from the underutilised reserves is required to meet the rising demand for energy. (Mariyate & Bera, 2023)Petroleum also falls under the

DOI: 10.4018/978-1-6684-8117-2.ch013

category of traditional energy source. Hence, once these energy sources have been used up and are no longer available, they cannot be reused. The significance of sustainability in the production of energy is now apparent. Sustainability is the concept of creating and utilising items in accordance with demand while keeping in mind the needs of future generations. Natural gas also contains trace amounts of non-hydrocarbon gases including carbon dioxide and water vapour, as well as natural gas liquids (NGL), which are also hydrocarbon gas liquids. Natural gas is mostly used for heating and producing power, but other consumer sectors also use it for other purposes. Natural gas is used in the electric power sector to create useful thermal output and generate electricity. In reality, according to BP's "Rapid" future scenario, natural gas will have a bright future and contribute 22% of primary energy by 2050, compared to renewables' 45%. Similar to what DNV predicts, gas prices will remain stable between 2020 and 2050. The spot market and the futures market are the two separate marketplaces for natural gas. Natural gas is regarded as pure because, in contrast to other gases, it releases very few byproducts into the environment that are pollutants. As a result, the air we breathe is kept pure. Natural gas is less expensive than other burning fuels, making it economical.

Economic challenges in sustainable utilization of natural gas include capital intensity, financing, and returns on investment of the natural gas pipelines and LNG projects within the region (Sovacool, 2009). It is important to seek cost-optimal pathways for sustainable natural gas utilization, which includes electricity generation, transmission, and storage to maintain robust economic growth within the region. There is a dearth of studies that analyse natural gas, oil, gold,

exchange rate, and stock market simultaneously. In the context of India, there is only one study (Kumar et al., 2019) which tends to explore the dynamic relationship among oil, natural gas, and stock market prices.

When oil enters the environment, one of the biggest detrimental effects is harm to lands and waterways. Being exposed to harmful petroleum products generally causes lower reproduction rates, organ damage, and mortality in wildlife caught in an oil spill. For the sake of the nation and society at large, it is therefore necessary to assess the situation and decide whether to switch from an oil-based to a gas-based economy. (Salisu et al., 2023)Researchers working to offer investors and decision-makers technical support to help them make judgements have continued to pay attention to the growing concern over climate change and the risk it entails. The behaviour of the energy market, which is distinguished by massive emissions with more severe implications on climate change than most of the other non-energy sectors, further emphasises the necessity for this study.

2. LITERATURE REVIEW

Since energy is unavoidable source in production process, the rapid increase in oil price leads to several economic problems such as security of energy supply, rising foreign-dependency, increase in energy bills, current account deficit and a decrease in economic growth (Kesikoğlu & Yıldırım, 2014). A better quality of life is dependent on access to energy from any energy resource, and almost 1.6 billion people, 20% of the world's population, do not have access to modern energy services (Safari et al., 2019). On empirical front, studies have evolved to analyze the possible nexus between climate change and the volatility of resources prices. Examining the out-of-sample predictive value of climate-risk factors for the realized volatility of returns of some precious metals, (Gupta and Pierdzioch 2022) employ OLS and shrinkage estimators and find that climate-risk factors forecast the realized variance of returns of metal