Energy Policy 105 (2017) 341–353

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

# European Union energy supply security: The benefits of natural gas imports from the Eastern Mediterranean

Isabella Ruble

*Department of Economics, Georgetown University, 37th & O Street NW, Washington, DC 20057, USA*

ARTICLE INFO

*Keywords:*
Natural gas
Energy security
Energy policy
European Union
Eastern Mediterranean

ABSTRACT

This paper analyzes the potential of Eastern Mediterranean offshore natural gas discoveries to increase EU natural gas supply security. It presents an overview of, the status quo of EU-28 natural gas import dependency, the efforts to increase energy security through various measures, and the challenges to supply diversification. It further provides an analysis of the energy and offshore resource sectors of Egypt, Israel, Cyprus and Lebanon. The paper presents projections of domestic natural gas consumption needs for the years 2012–2042 and results show that potentially large quantities will be available for exports. An empirical model is used to analyze the capital and transmission costs for exporting gas to Europe via the East Med pipeline. The East Med pipeline project is discussed in the broader context of other regional supply options as well as potential U.S. LNG exports to Europe. The paper concludes that the East Med pipeline, which has been classified as a project of Common Interest by the EU, should receive policy priority as its benefits in terms of security of supply go beyond those that can be captured in a competitive market, and the positive externalities that it provides justify a 'security premium'.

## 1. Introduction

Over the past decade worldwide recoverable reserves of natural gas have substantially increased and are currently estimated at around 6600 Trillion Cubic Feet (Tcf) or 187.1 Trillion Cubic Meters (Tcm). New discoveries of conventional and unconventional gas resources are scattered around the globe (see Fig. 1) leading to changes in market structure and questioning once more the doomsday rhetoric of Hubbert's peak oil/gas theory (Helm, 2014). The US, a major player on world gas markets, has transitioned from net importer to net exporter, removing market tensions that still existed just a few years ago. Slow global economic growth in recent years has weakened energy demand, growing at just 1% in 2015 (BP, 2016). The increased supply in combination with relatively low global demand for gas has led to lower prices, that if persistent, will eventually have its effects on supply (BP, 2016). Despite these developments, the major gas markets, North America, Europe and Asia remain more regional than for example the oil market and hence geopolitical considerations continue to play an important role.

The European Union's yearly natural gas consumption amounts to roughly 16 million TJ (Eurostat, 2014). Over the period 2010–2050 the EU-28's Total Primary Energy Supply (TPES) and production are expected to decrease while the share of natural gas in TPES stays constant at approximately 24–25% (EC, 2016a). Despite the steadily decreasing consumption levels, the decrease in primary energy production will exceed the decrease in consumption, mainly because of declining domestic reserves and the low probability of Europe significantly developing its unconventional resources (EC, 2016a). Natural gas import dependency in 2015 stands at 73%, corresponding to 317 Bcm and is projected to increase to 80% or more by 2035 (EC, 2014; Wood, 2016). In 2015 piped gas imports amounting to roughly 85% of total gas imports, originate from four countries with Russia accounting for 42% of these imports (Table 1). LNG accounts for 15% of total gas imports, with the main supplies coming from Qatar, Algeria, and Nigeria (see Table 1). LNG shipments arrive in Europe via Spain, UK, Belgium, France, Italy, Greece, Lithuania, Sweden, and in 2016 also via Poland, whereby Spain and the UK have the largest regasification capacities.

In light of increasingly difficult relations with Russia and the conflicts that emerged on the EU's northern and southern supply routes, natural gas supply diversification becomes ever more important (see for example Bilgin, 2009, 2011). One of the EU's strategies to improve supply security is to further develop the Southern Gas Corridor and a new gas hub in Southern Europe with additional quantities of natural gas coming from the Caspian, Central Asia, the Middle East as well as the Eastern Mediterranean (EC, 2016b).

The development of the offshore oil and gas discoveries in the Eastern Mediterranean countries of Egypt, Israel, Cyprus and Lebanon

*E-mail address:* economics.ir@gmail.com.

http://dx.doi.org/10.1016/j.enpol.2017.03.010
Received 4 November 2016; Received in revised form 26 February 2017; Accepted 3 March 2017

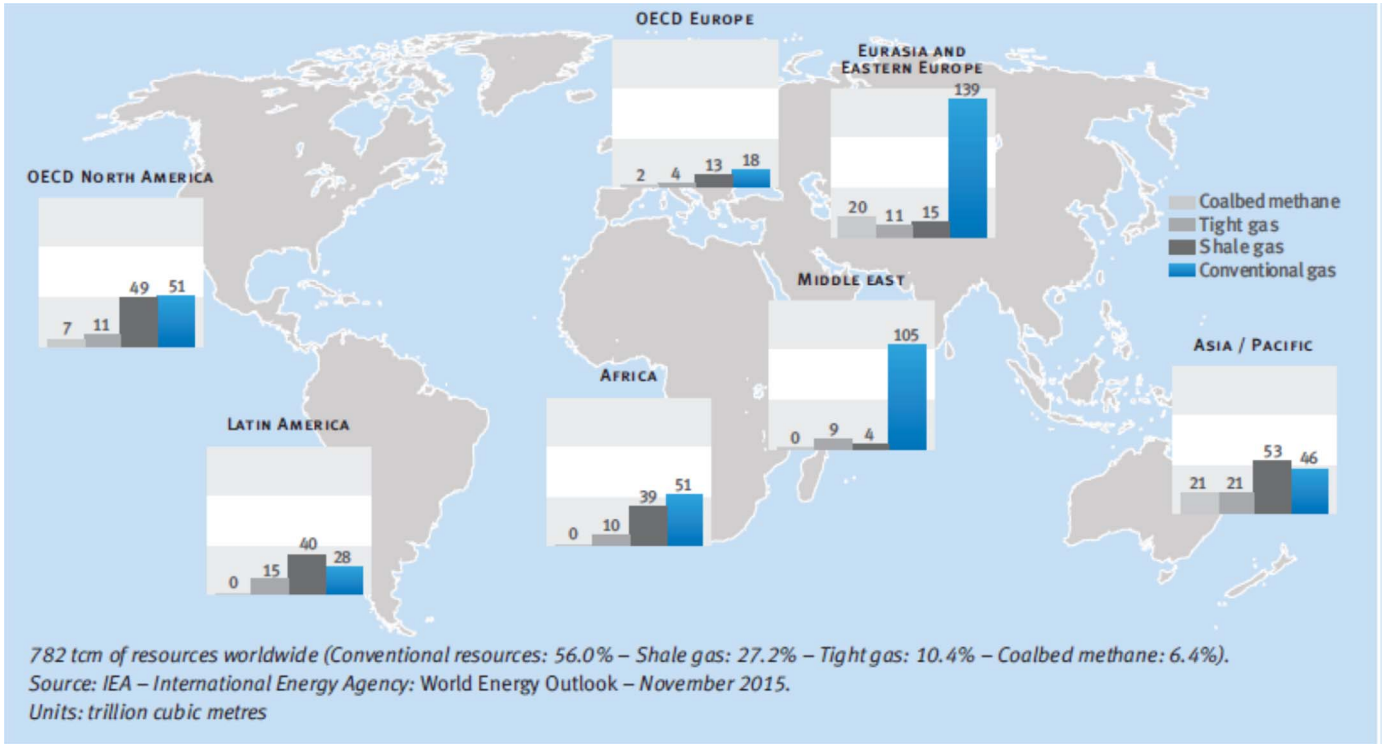


**Fig. 1.** Worldwide recoverable resources, end 2014.
(Source: Eurogas, 2015)

**Table 1**
EU LNG and pipeline imports in 2015.
Source: Adapted from Wood (2016).

| **Trade partner** | **Import volume** (Bcm) | **Percentage share** (%) |
|---|---|---|
| **Natural gas (pipeline) suppliers** | | |
| Russia | 133.25 | 42 |
| Norway | 109.55 | 35 |
| Algeria | 20.67 | 7 |
| Libya | 6.5 | 2 |
| **LNG suppliers** | | |
| Qatar | 26.10 | 8 |
| Algeria | 9.39 | 3 |
| Nigeria | 6.09 | 2 |
| Norway | 2.95 | 1 |
| Trinidad | 1.61 | 0.5 |
| Peru | 1.23 | 0.4 |
| Oman | 0.08 | 0.03 |
| Total | 317.42 | 100 |

(thereafter EICL) that has encountered various institutional, technical, and economic challenges, is witnessing a new momentum. The renewed dynamism in upstream explorations and field developments has been marked by the discovery of Egypt's Zohr field in 2015, which contains an estimated 30 Tcf of natural gas. Additionally, increased investments in other fields, such as for example BP's announced 12 billion USD investment in Egypt's Shorouk concession heightens the importance of the Eastern Mediterranean as a potential exporter. Furthermore, the so-called East Med pipeline has been classified as a Project of Common Interest (PCI) by the European Commission. PCIs are infrastructure projects that are considered essential to European energy policy and hence benefit from the possibility to receive financial support through the Connecting Europe Facility (EC, 2016c).

The increased interest in Eastern Mediterranean offshore oil and gas reserves has led to a growing literature on the topic. A full literature review is beyond the scope of this article, but some recent examples include Siddig and Grethe (2014), Ruble (2016), Ellinas et al. (2016) and Ratner (2016). This paper adds to the existing body of literature by analyzing the potential benefits that natural gas exports from the Eastern Mediterranean could have for the EU in its aim to increase natural gas supply security. It also provides some additional insights by forecasting domestic natural gas consumption needs in EICL for the years 2012 through 2042.

The paper is structured as follows. Section 2 presents an overview of the status quo of the EU-28's natural gas import dependency and its relationship to Russia. Section 3 analyzes the energy sectors of Egypt, Israel, Cyprus and Lebanon (thereafter EICL) including recent developments in the offshore oil and gas sector in these countries. Section 4 provides forecasts of potential domestic natural gas consumption needs in EICL for the period 2012–2042, and shows that substantial quantities of natural gas will be available for exports. Section 5 uses an empirical model to analyze the capital and transmission costs for exporting gas to Europe via the East Med pipeline. Section 6 presents a discussion of the results while Section 7 concludes the paper and provides policy recommendations.

## 2. The EU-28's natural gas import dependency and its relationship to Russia

### 2.1. The development of Europe's existing infrastructure

Europe's existing natural gas infrastructure stems from its long-standing relationship with Russia that developed in the middle of last century when Europe reduced its heavy reliance on coal and oil and introduced natural gas (Boussena and Locatelli, 2013). Natural gas from Russia was provided via pipelines, and the supplier-buyer relationship was based on long term contracts with 'Take Or Pay' (TOP) clauses and gas prices linked to oil. The transmission network