

LNG as Part of the Expanded South Corridor

Athens University History Museum

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FOR SOUTH EAST EUROPE

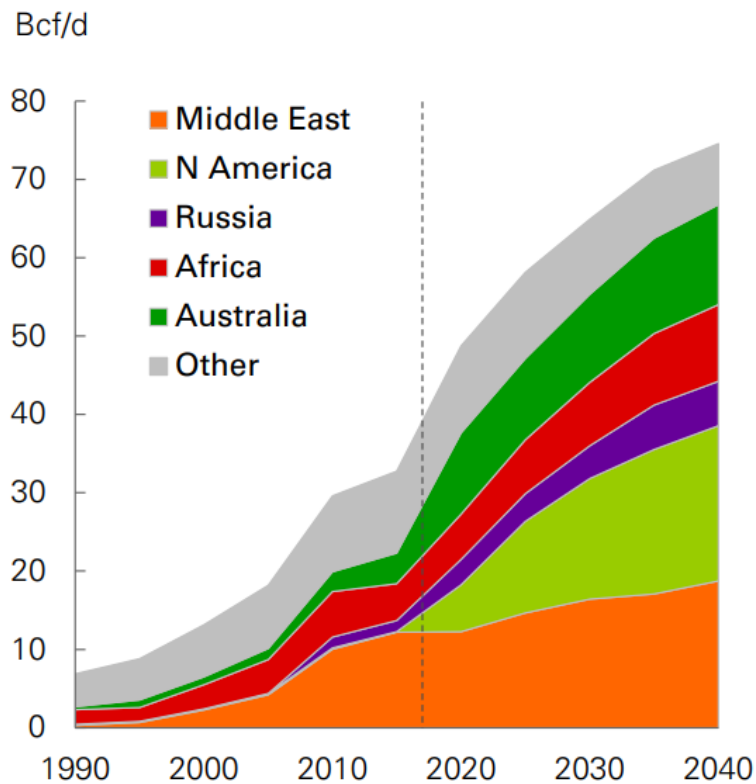


Presentation Outline

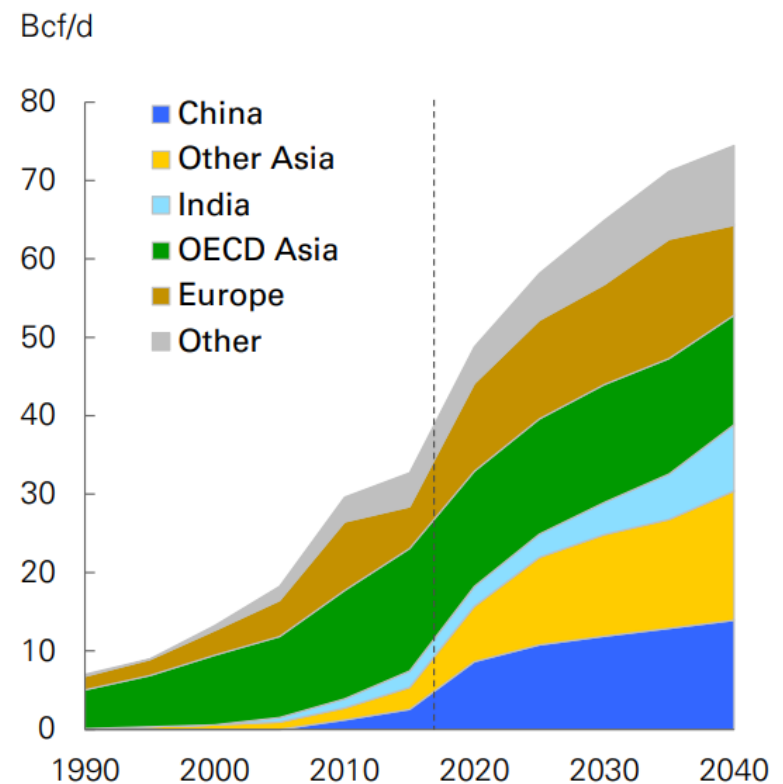
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Global LNG Trade (1990-2040)

LNG exports

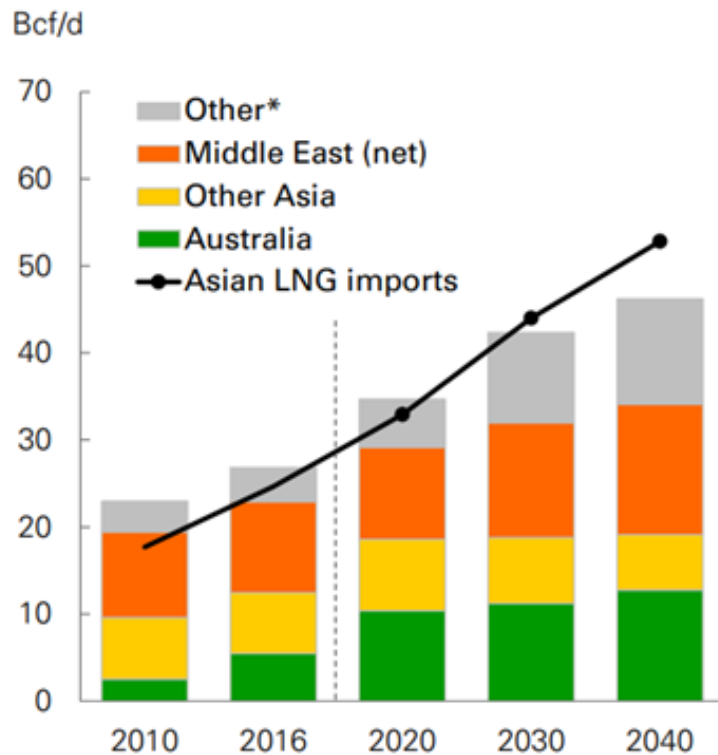


LNG imports



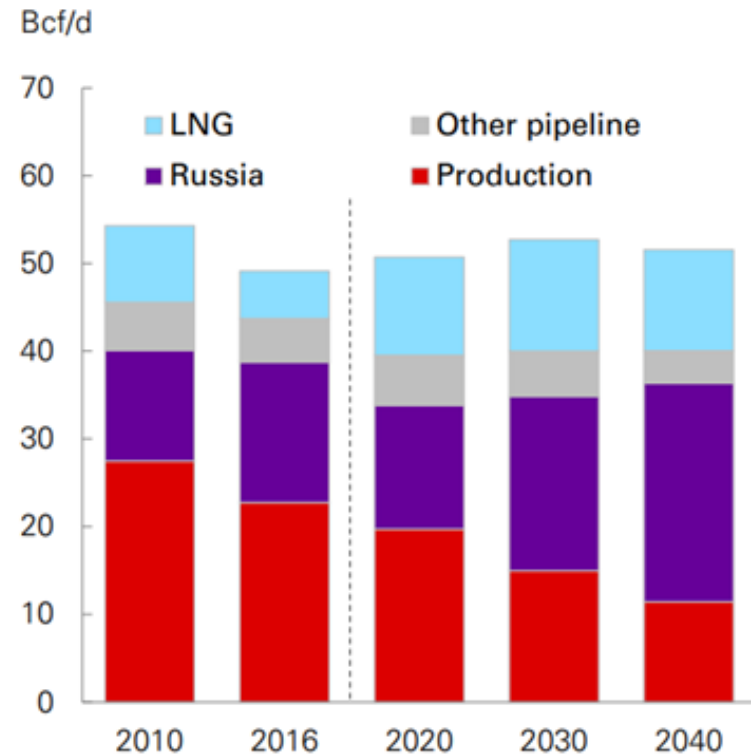
Asian LNG Trade and Gas Supply to Europe (2010-2040)

Asian LNG imports and LNG exports of regions 'close' to Asia

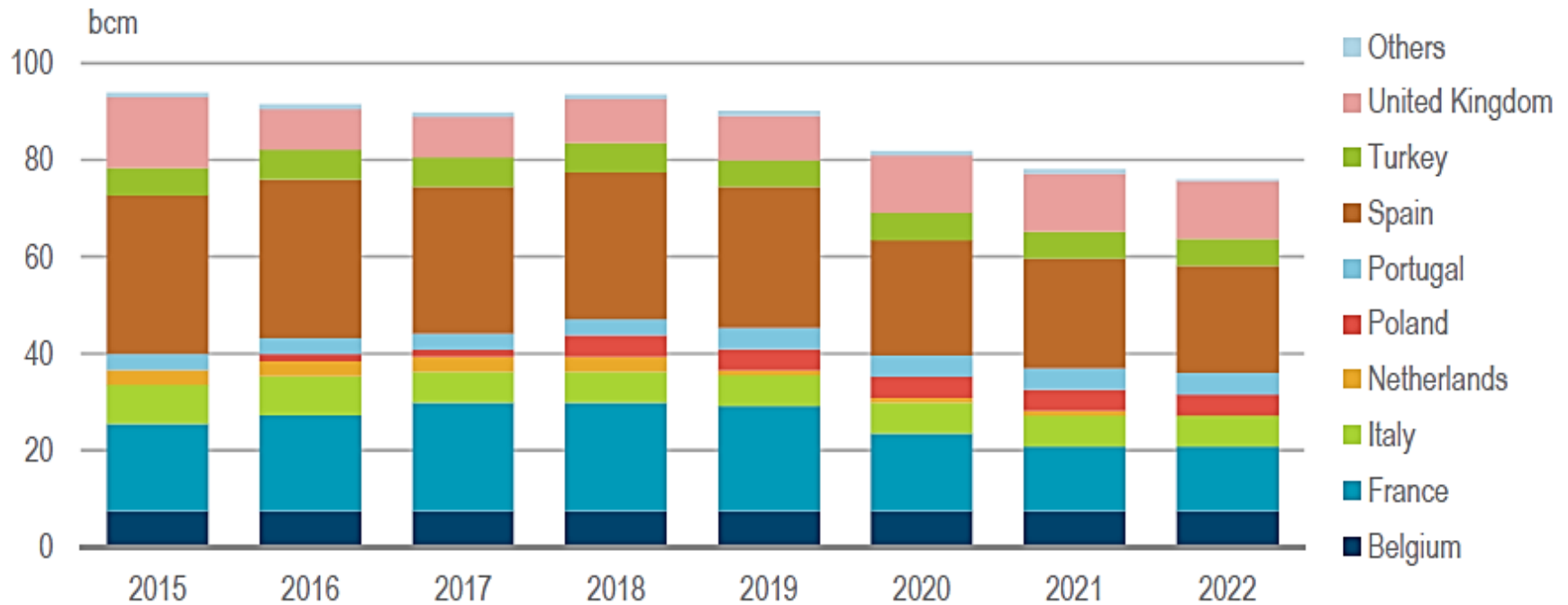


*Other includes Peru, Canada, East Africa, Angola, parts of West African and Russian gas supplies

Gas supply to Europe



LNG Contracted Volumes in Europe over 2015-22



Source: IEA Gas Market Report 2017

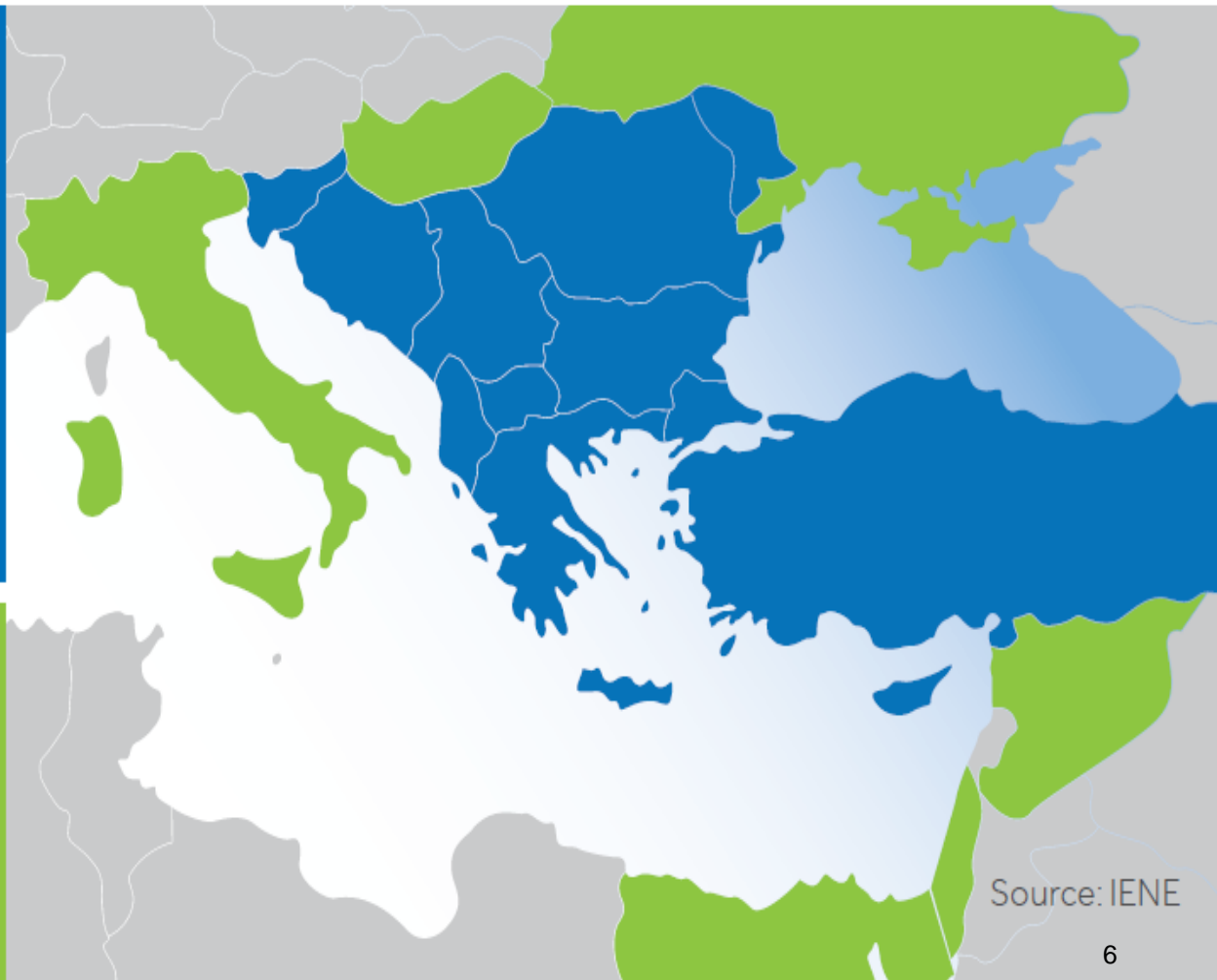
The SE European Region Defined

Core Countries

- Albania
- BiH
- Bulgaria
- Croatia
- Cyprus
- FYROM
- Greece
- Kosovo
- Montenegro
- Romania
- Serbia
- Slovenia
- Turkey

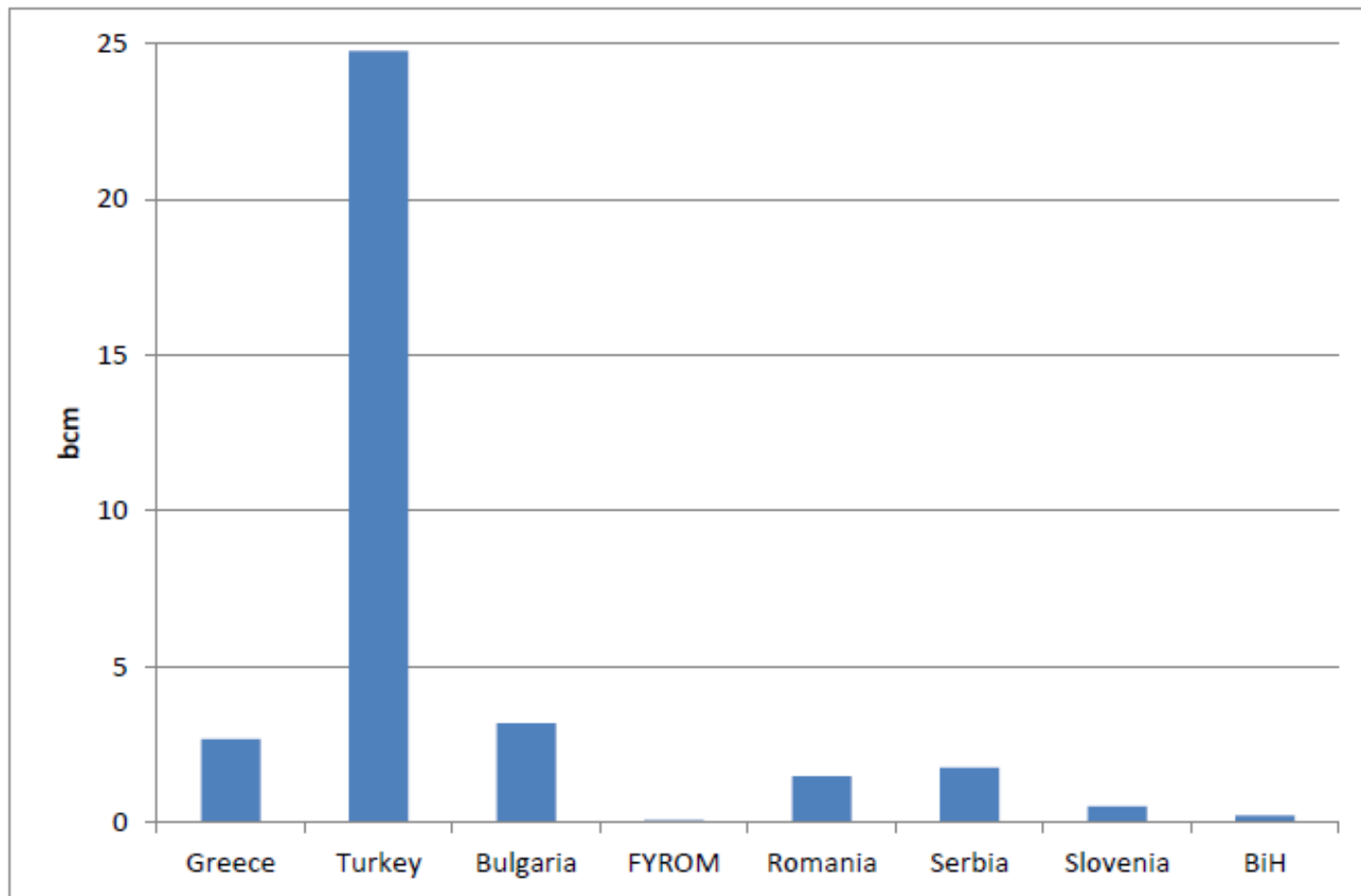
Peripheral Countries

- Egypt
- Hungary
- Israel
- Italy
- Lebanon
- Moldova
- Syria
- Ukraine



Source: IENE

Russian Gas Supplies to Selected SE European Countries (2016)



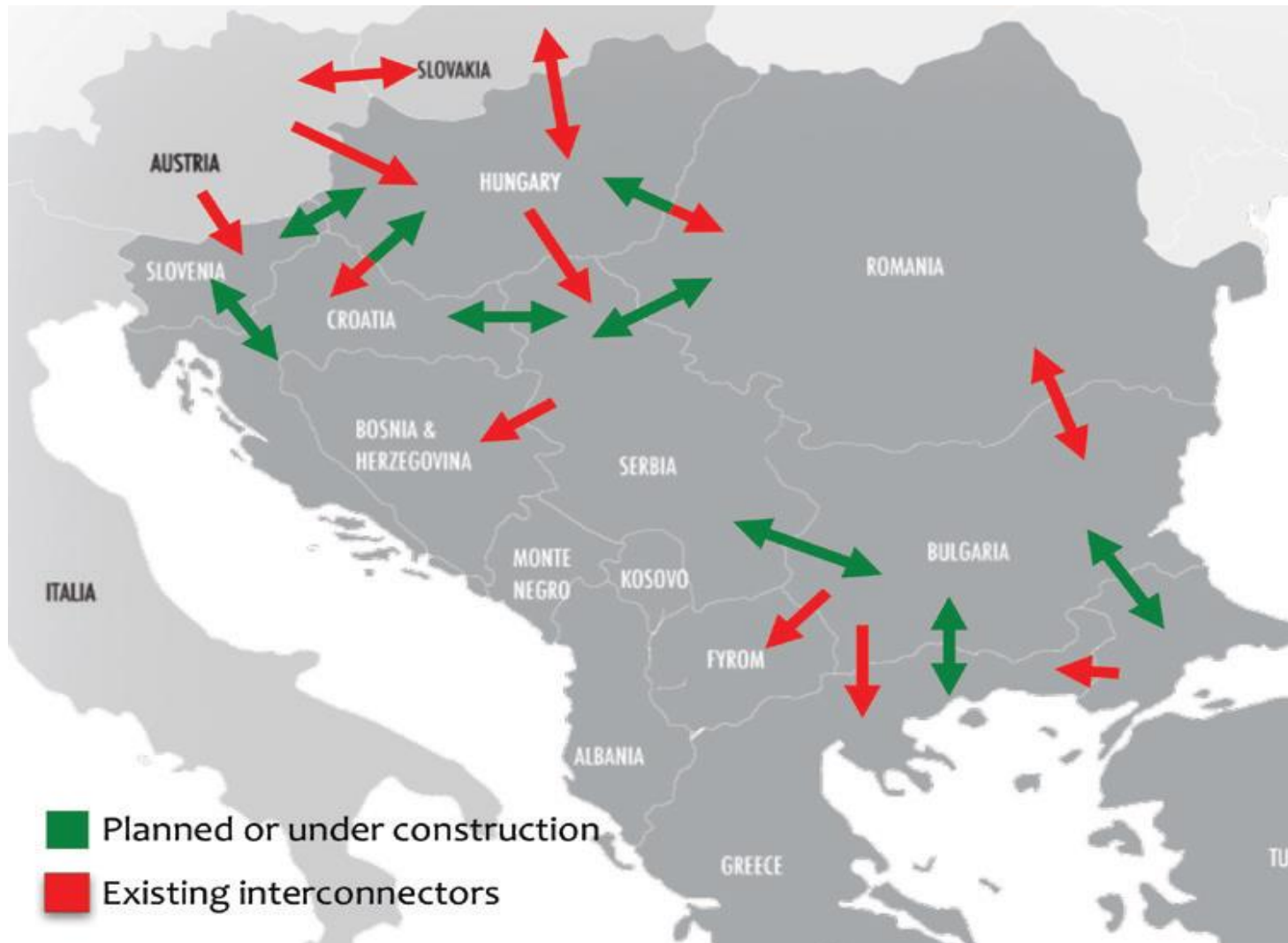
Note: Albania, Montenegro, Kosovo and Cyprus do not produce, import or consume natural gas.

Source: Gazprom

Natural Gas Production and Consumption in SE Europe (2008, 2015 and 2025e)

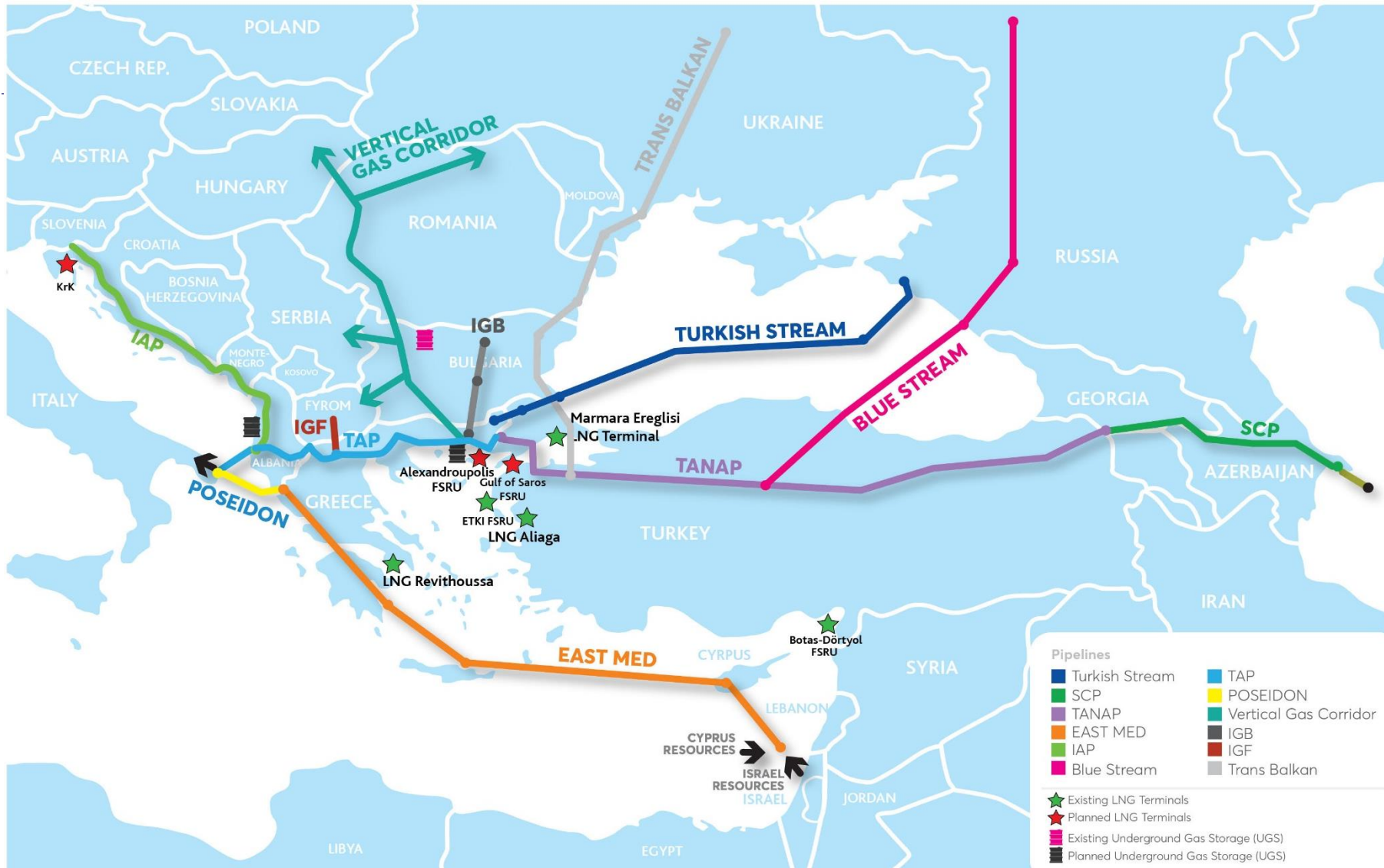
Country	2008		2015		2025e	
	Gas production (bcm/y)	Gas consumption (bcm/y)	Gas production (bcm/y)	Gas consumption (bcm/y)	Gas production (bcm/y)	Gas consumption (bcm/y)
Albania	0.02	0.02	0.0	0.0	0.01	0.22
Bosnia and Herzegovina	0.0	0.31	0.0	0.3	0.0	0.45
Bulgaria	0.31	3.5	0.1	3.1	0.21	4.3
Croatia	2.03	3.1	1.75	2.48	1.52	3.3
Cyprus	0.0	0.0	0.0	0.0	0.0	0.0
FYROM	0.0	0.05	0.0	0.13	0.0	0.6
Greece	0.0	4.25	0.009	3.2	0.0	6.0
Kosovo	0.0	0.0	0.0	0.0	0.0	0.0
Montenegro	0.0	0.0	0.0	0.0	0.0	0.0
Romania	11.2	16.9	10.46	10.6	10.02	14.1
Serbia	0.25	1.92	0.54	2.08	0.51	2.8
Slovenia	0.0	0.51	0.0	0.8	0.0	1.07
Turkey	1.03	36.9	0.37	46.9	0.73	56.0
Total	14.84	67.46	13.23	69.59	13.00	88.84

Gas Interconnections in SE Europe



Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

An Expanded South Gas Corridor



NB.: The TANAP and TAP gas pipelines as well as Turkish Stream are under construction, with IGB at an advanced planning stage with FID already taken. The IAP, the IGI Poseidon in connection with East Med pipeline and the Vertical Corridor and the IGF are still in the study phase. Blue Stream and Trans Balkan are existing pipelines.

The Growing Importance of LNG in SE Europe

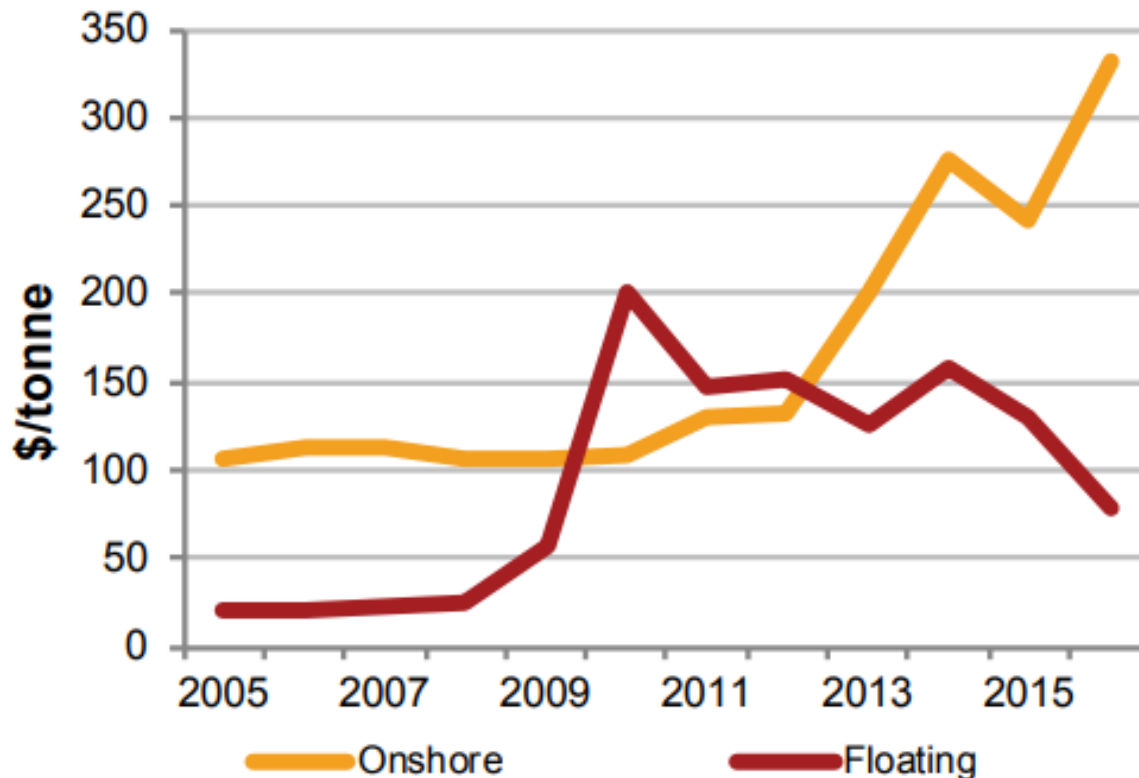
- Today, there are **5 LNG importing terminals in operation** across SE Europe:
 - 2 land based in Turkey (Aliaga and Marmara Ereğlisi)
 - 1 land based in Greece (Revithoussa)
 - 2 FSRUs in Turkey (ETKI and Botas-Dortyol)

- By 2020, a number of **new LNG terminals** will be added:
 - 1 FSRU (Gulf of Saros) in Turkey
 - 1 FSRU (Alexandroupolis) in Greece
 - 1 FSRU (Krk Island) in Croatia

LNG Terminals in SE Europe

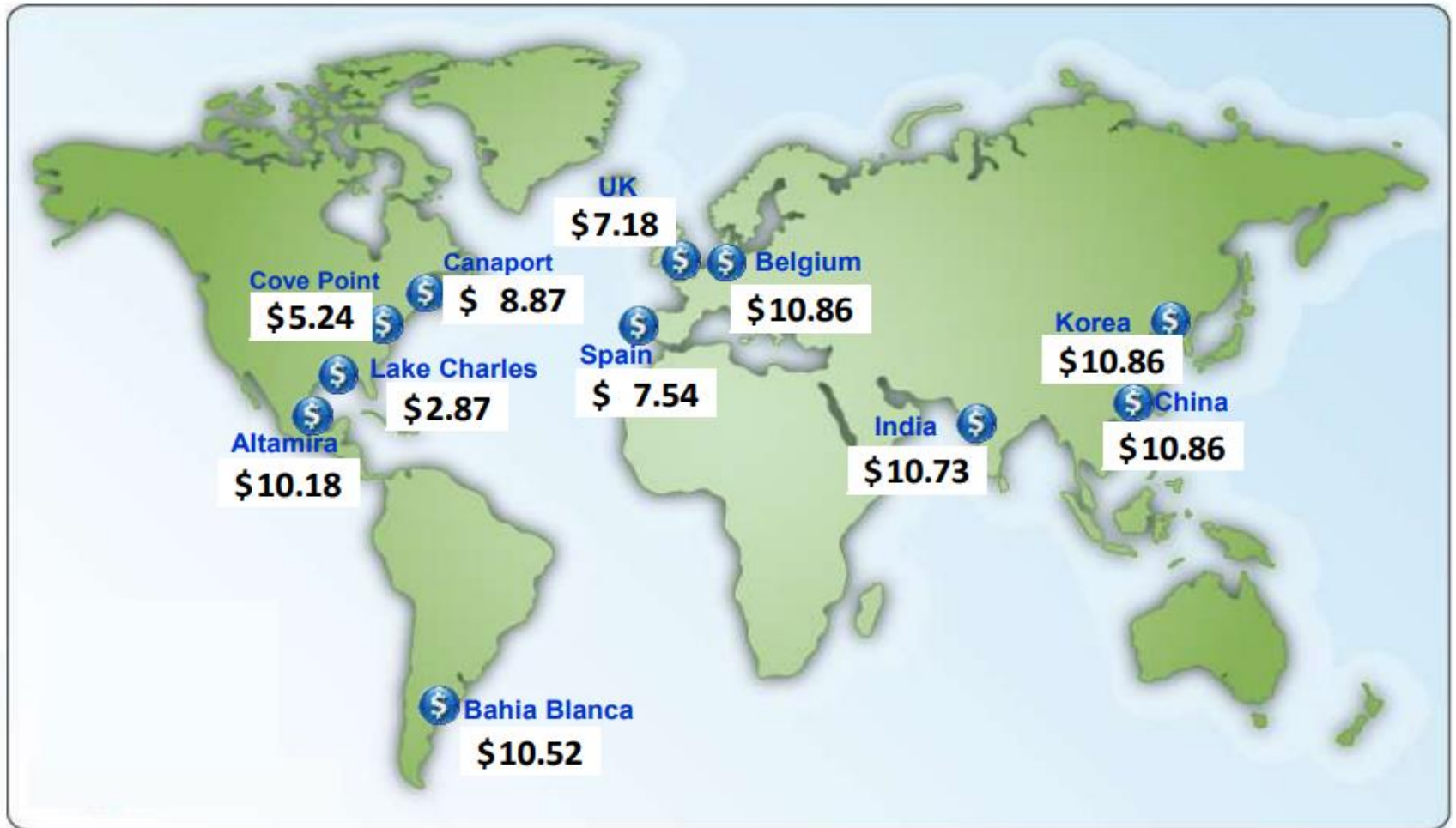


Regasification Costs based on Project Start Dates, 2005–2016



**Indicates the size of onshore storage relative to onshore terminal capacity.*

World LNG Estimated Landed Prices: January 2018



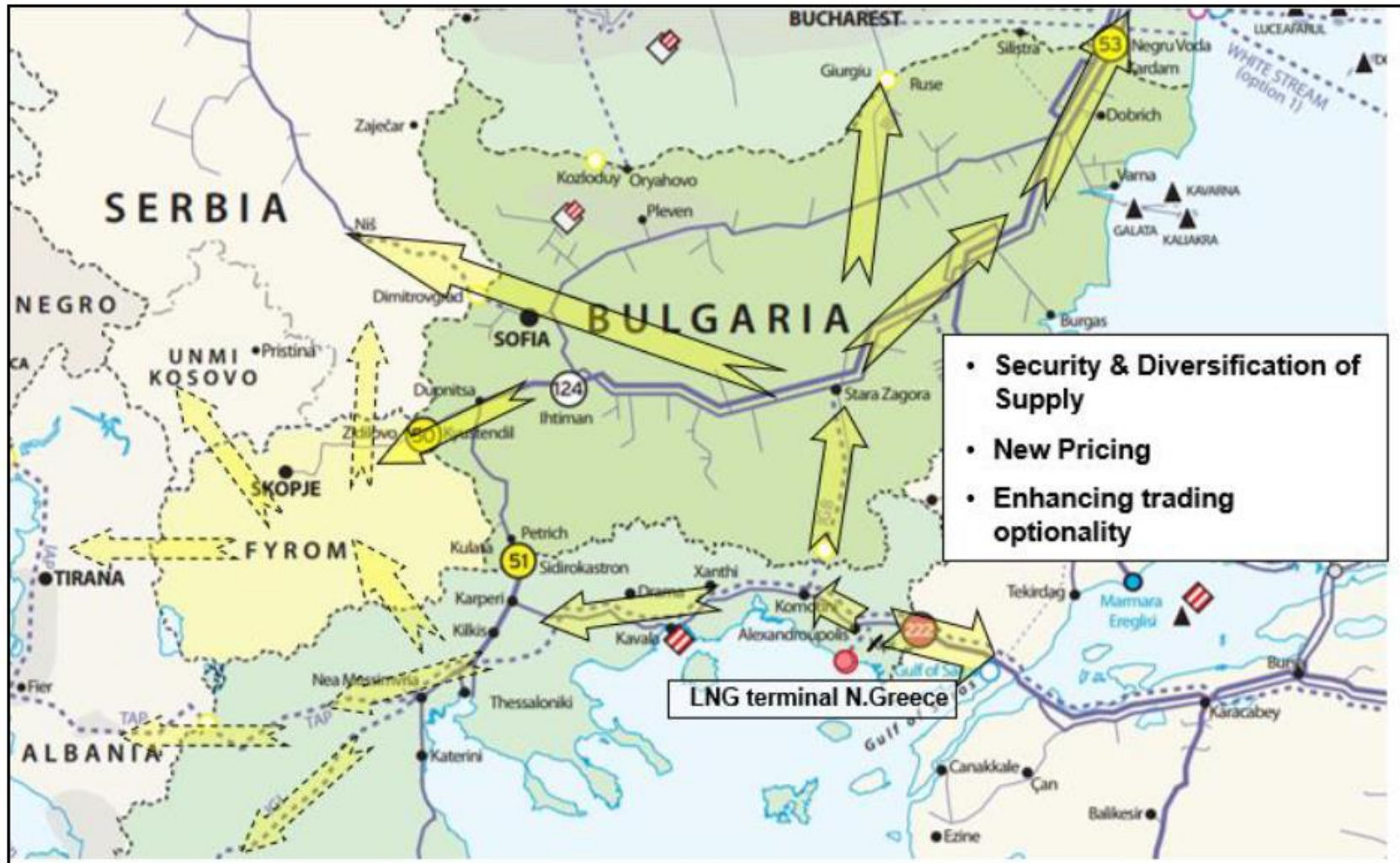
Source: *Waterborne Energy, Inc.* Data in \$US/MMBtu.

Note: Includes information and Data supplied by IHS Global Inc. and its affiliates ("IHS"); Copyright (publication year) all rights reserved. Prices are the monthly average of the weekly landed prices for the listed month. Landed prices are based on a netback calculation.

Updated: Feb-18

Source: FERC

The Alexandroupolis FSRU Project



The Alexandroupolis FSRU as Part of the Expanded South Corridor

- ❑ The selection of Alexandroupolis is **not random**. It takes into consideration:
 1. the **increased gas liquidity** in Northern Greece with the existing 296-km ITG
 2. the under construction TAP
 3. the planned IGB, IGI and
 4. the potential UGS in South Kavala
- ❑ The Alexandroupolis FSRU project:
 - can early be termed as a **new gas gateway to Europe** and an **important component** of the aforementioned Expanded South Corridor concept.
 - will be close to targeting markets with **rising gas demand**, including Greece, Bulgaria, Serbia, FYROM, Turkey, Romania, Hungary and Ukraine.
 - can facilitate the city of Alexandroupolis to emerge as a **significant regional gas hub** due to the lack of other similar gas interchange in SE Europe.
 - will be the **only new gas infrastructure project** in SE Europe which will not rely on Turkey as a transit country (TANAP/TAP system, Turkish Stream, new quantities from Iran, Caspian, etc.).

Poseidon Med II LNG Bunkering Project



Source: DEPA

Sources of Finance vs Country Risk (I)

- The **main sources of finance** for planned LNG projects in SE Europe include:
 - Government/own resources
 - International Financial Institutions (IFIs)
 - European Commission
 - European Bank for Reconstruction and Development (EBRD)
 - European Investment Bank (EIB)
 - World Bank
 - German government-owned development bank KfW
 - European Western Balkans Joint Fund (EWBJF)
 - International Development Association (IDA)
 - Commercial banks/private investors

Sources of Finance vs Country Risk (II)

- However, the implementation of LNG projects in SE Europe may be hindered by the **high Country Risk** of several SEE countries and the **increased cost of capital**.

Country	Moody's ratings	S&P ratings	Fitch ratings
Albania	B1 (August 2017)	B+ (February 2016)	n.a.
Bosnia and Herzegovina	B3 (February 2016)	B (March 2012)	n.a.
Bulgaria	Baa2 (May 2017)	BB+ (June 2017)	BBB- (June 2017)
Croatia	Ba2 (March 2017)	BB (September 2017)	BB (July 2017)
Cyprus	Ba3 (July 2017)	BB+ (September 2017)	BB (October 2017)
FYROM	n.a.	BB- (May 2013)	BB (August 2017)
Greece	Caa2 (June 2017)	B- (July 2017)	B- (August 2017)
Montenegro	B1 (September 2017)	B+ (October 2017)	n.a.
Romania	Baa3 (April 2017)	BBB- (May 2014)	BBB- (July 2017)
Serbia	n.a.	BB- (December 2016)	BB- (June 2017)
Slovenia	Baa1 (September 2017)	A+ (June 2017)	A- (August 2017)
Turkey	Ba1 (March 2017)	BB (January 2017)	BB+ (July 2017)

Key Messages (I)

- ❑ The **global gas market** continues to evolve rapidly.
 - ❑ The shale revolution shows no sign of running out of steam, and its effects are now being amplified by a second revolution, caused this time by rising supplies of LNG.
- ❑ **New liquefaction capacity**, mostly from the US, Qatar and Australia, **is coming online at a time when the LNG market is already well supplied.**
- ❑ Europe sees an important opportunity to meet its energy needs by **developing the Expanded Southern Gas Corridor.**
- ❑ Europe currently has a **huge excess of LNG import capacity**, which is unevenly distributed between Western and SE Europe and Central Europe.
- ❑ SE Europe will play a significant role in **expanding LNG trade** in Europe by 2020 through the construction and operation of several new LNG regasification projects such as the FSRU unit that is planned to be located offshore in Alexandroupolis.

Key Messages (II)

- ❑ The selection of Alexandroupolis is **not random** and the project can be characterized as a new gas gateway to Europe.
- ❑ The **Alexandroupolis FSRU project** will be the only new gas infrastructure project in SE Europe which will **not rely on Turkey as a transit country** (TANAP/TAP system, Turkish Stream, new quantities from Iran, Caspian, etc.).
- ❑ **Greece and Turkey** are the only SEE countries that currently possess LNG gasification terminals which are well linked and integrated into their national gas systems.
 - ❑ The **spare capacity** of the existing LNG terminals in both countries has on many occasions been used for **transshipment purposes**, which shows the **dual role** that LNG gasification terminals can play in the region.
- ❑ **LNG prospects in SE Europe** and the East Mediterranean in particular, **are far better placed than five years ago**.
 - ❑ The development of a **small scale LNG market** is feasible in SE Europe.

Key Messages (III)

- ❑ **Geopolitical factors** play an important role in gas infrastructure projects in the SE European region.
- ❑ The **geopolitical importance of the Alexandroupolis FSRU project has grown** as a result of the Ukraine crisis, the abandonment of the South Stream pipeline and Russia's decision to discontinue transit flows through Ukraine as of 2019.
- ❑ The development of a **regional gas trading hub in SE Europe** would be a positive outcome for the rest of Europe as it would facilitate **flexibility, efficiency and transparency**.
- ❑ An important parameter is the **country risk factor**.
- ❑ **No significant technical and non-technical obstacles** in pursuing the implementation of current plans for the expansion of major gas infrastructure projects, at national and regional level.

Study Cover



Gas Supply in SE Europe and the Key Role of LNG



An IENE Study Project (M46)

Final Report

Athens, December 2017



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FOR SOUTH-EAST EUROPE

**Thank you for
your attention**

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