# 18th National Energy Conference
# "Energy & Development 2013"

## The East Mediterranean as a Potential European Energy Supplier

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INSTITUTE OF ENERGY
FOR SOUTH EAST EUROPE

## Presentation Outline

- European oil and gas dependence
- The outlook for European energy demand
- Present and future European gas suppliers
- East Med gas discoveries (Israel, Cyprus)
- Can East Med gas be exported?
- Volumes and national policies
- Methods and routes
- The LNG option(s)

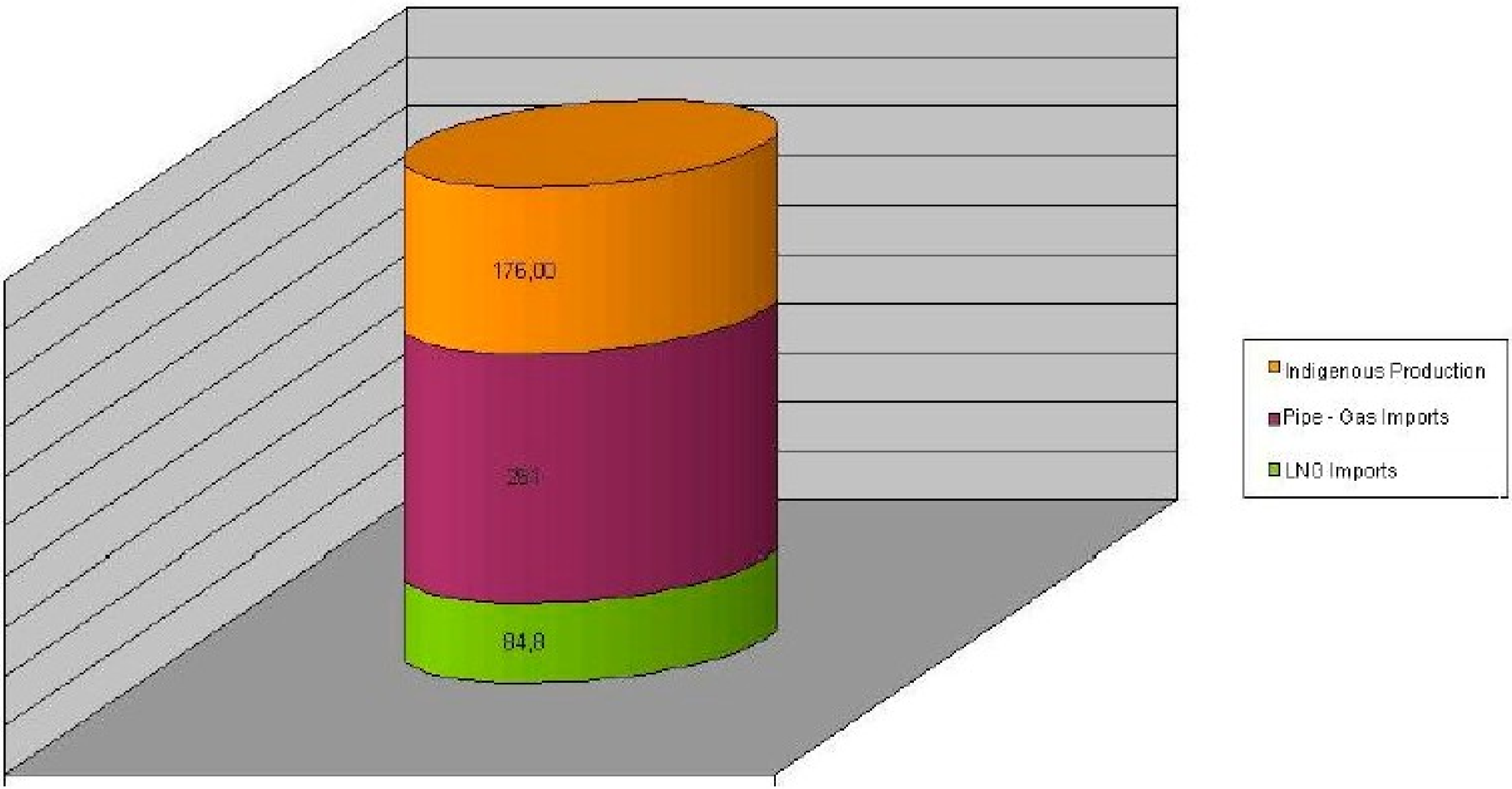
## Presentation Outline (continued)

- The gas pipeline option(s)

- The Cyprus - Greece route
- Israel – Turkey
- Israel – Egypt
- Persian pipeline

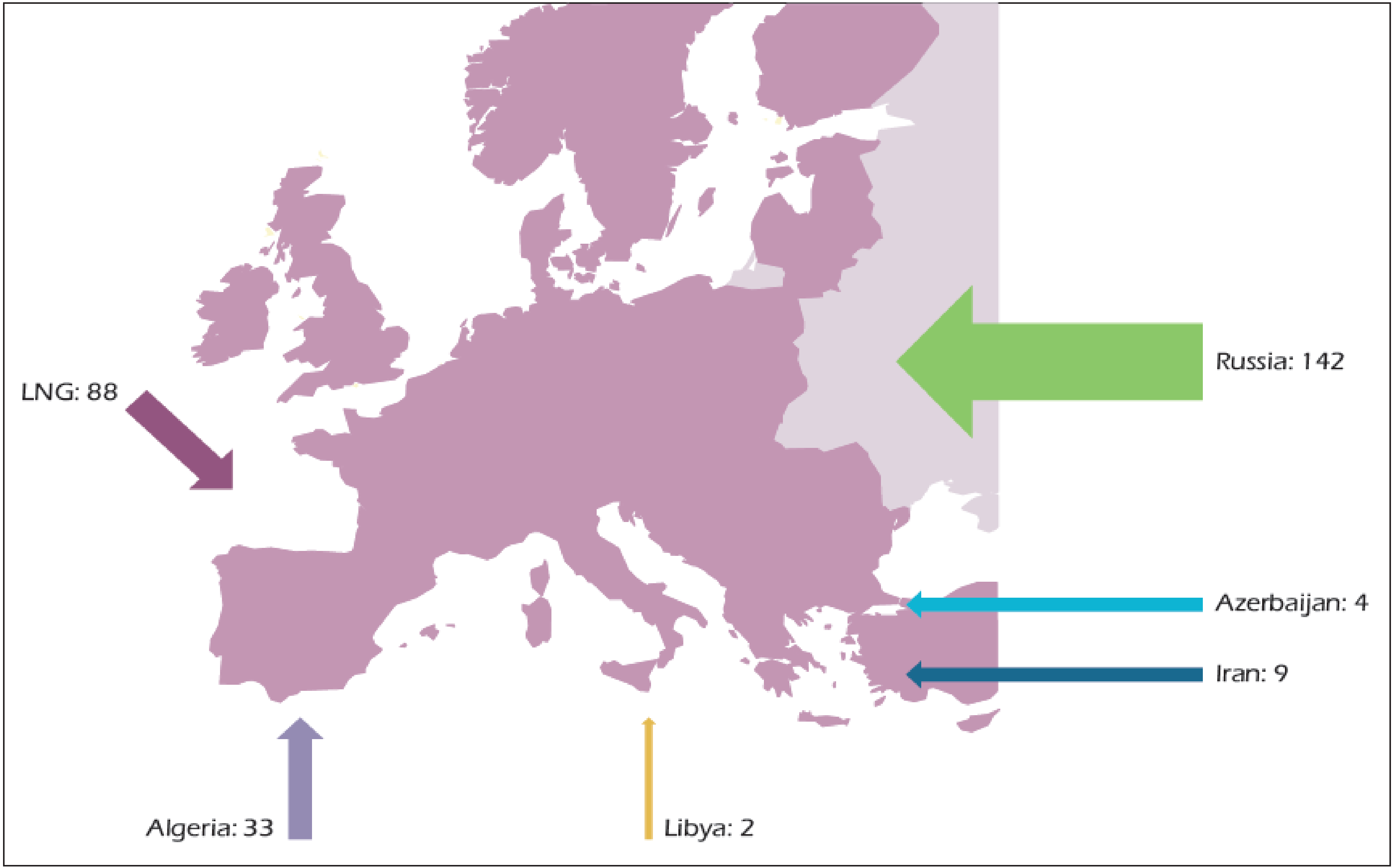
- Exporting electricity from Israel – Cyprus to Europe
- What next?
- EU promotes the East Med supply alternative via Projects of Common Interest (PCI)
- The emergence of East Med as a major energy supply area and geopolitical implications

*Natural Gas Consumption in Europe in 2010, including E-27 and other European countries (in bcm)*

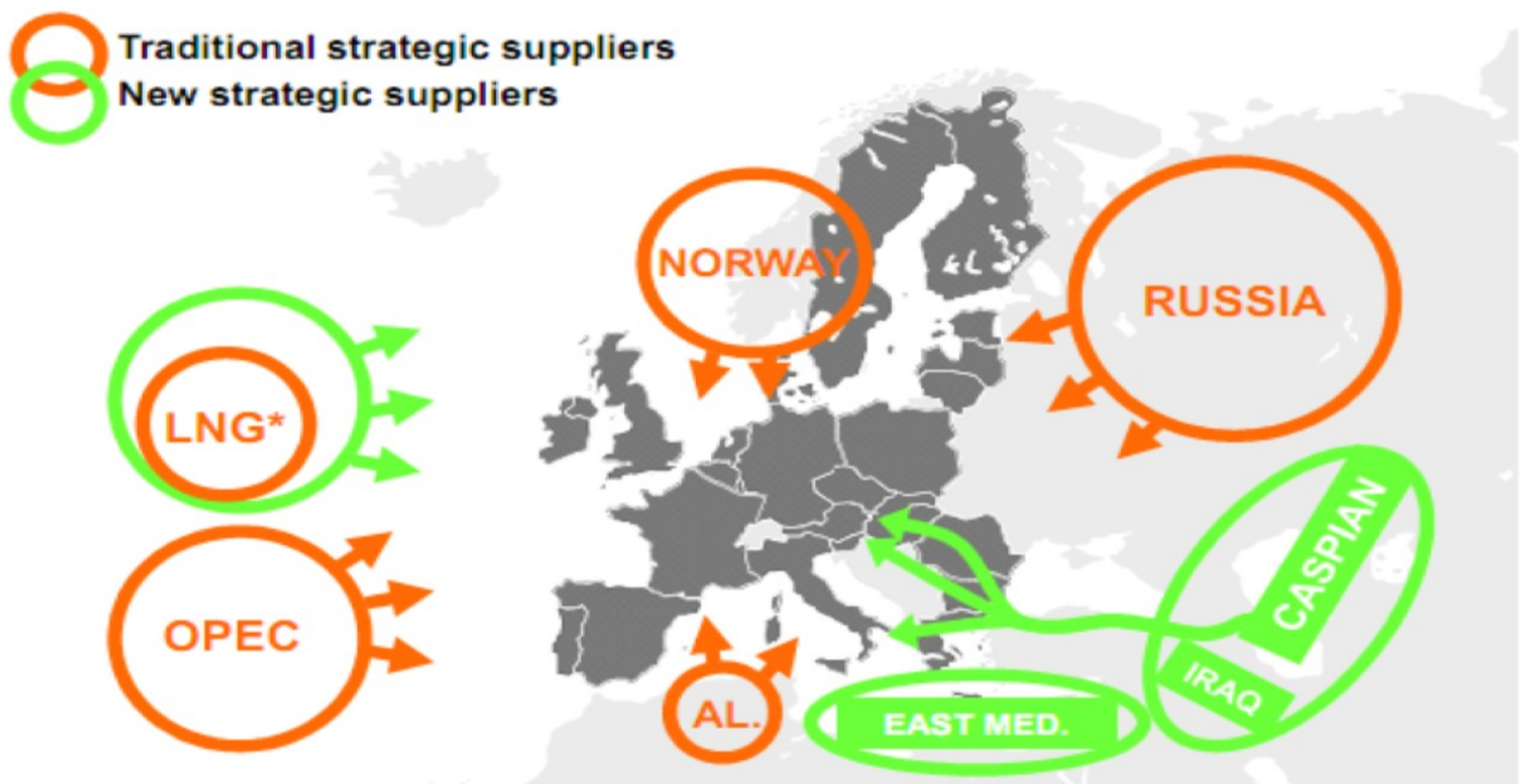



Total European Gas Consumption in 2010: 522 bcm

# Gas Imports to Europe, 2011 (bcm)



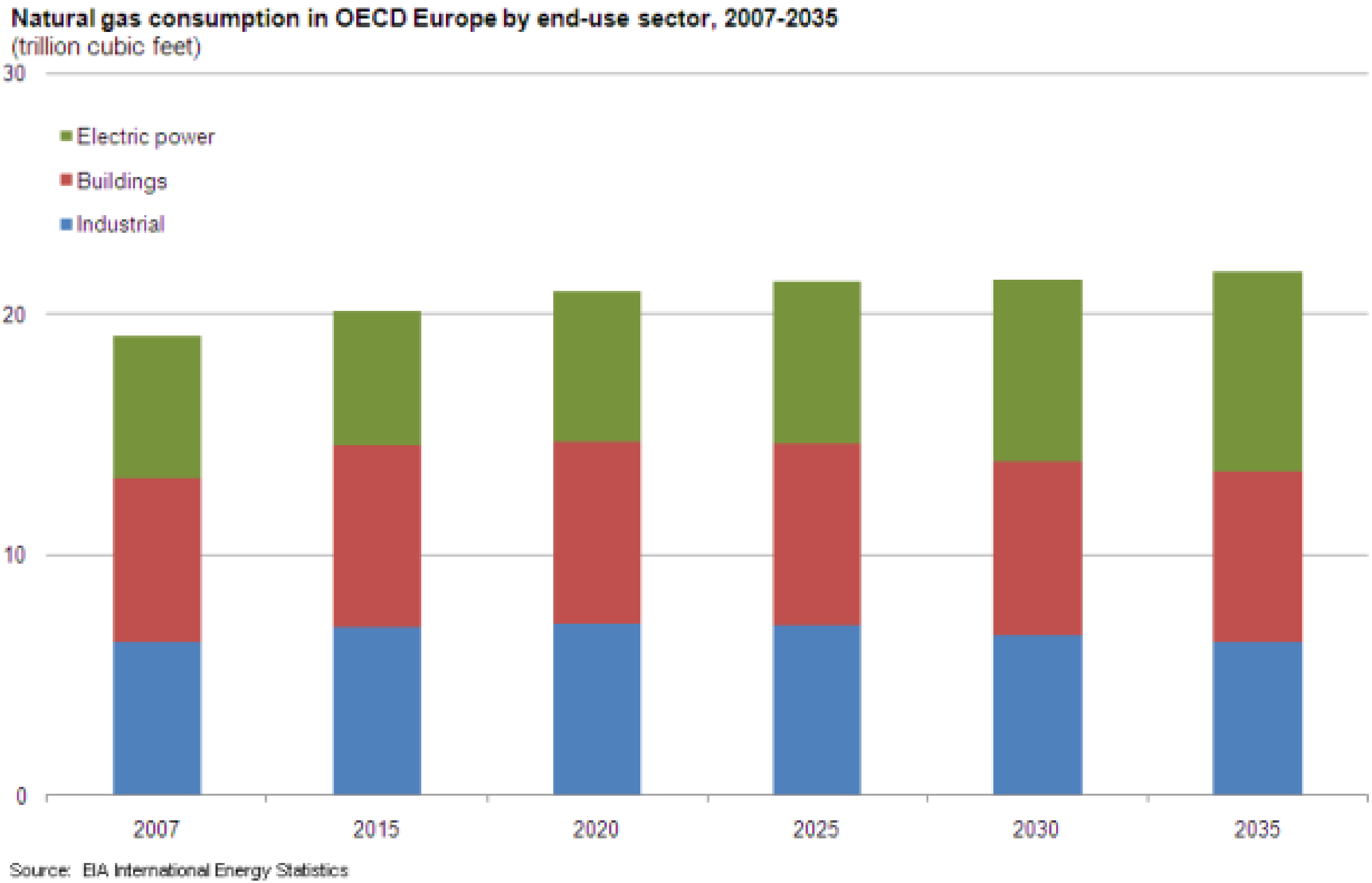
# Traditional and New European Gas Suppliers



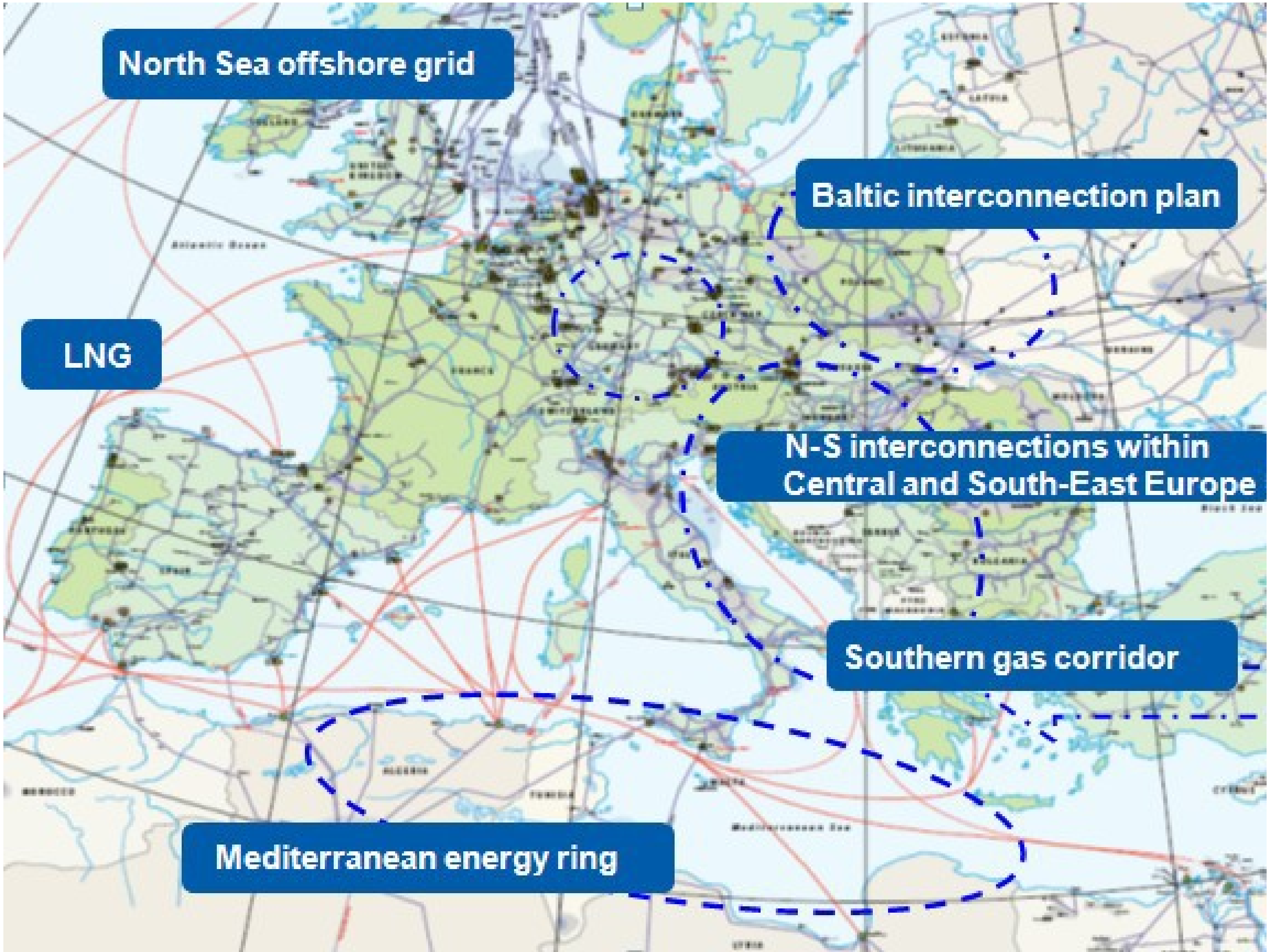

* LNG: Liquefied natural gas (Qatar, Algeria, Nigeria, etc.)

# Global and Regional Gas Demand

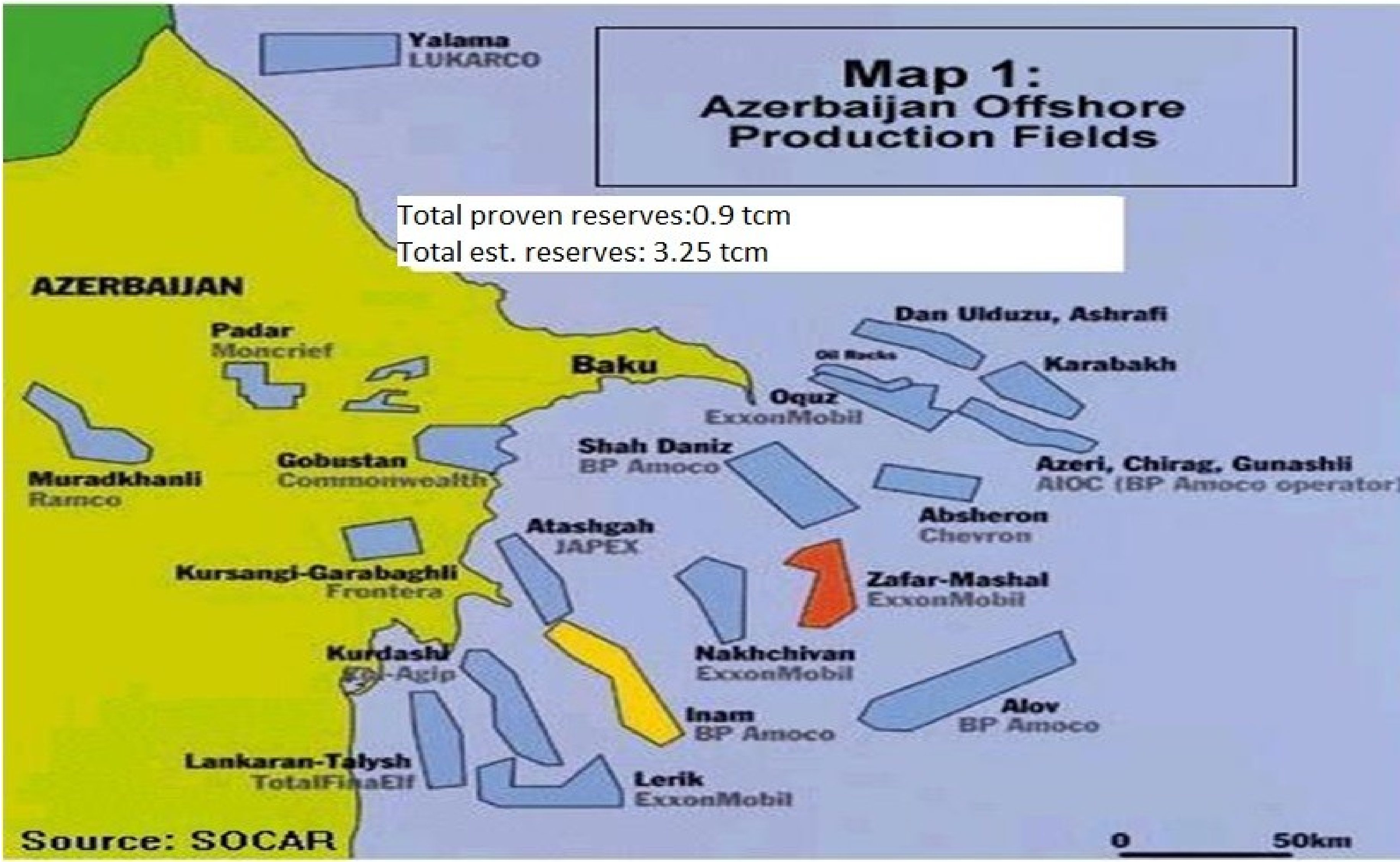
- Global gas demand is projected to grow marginally between 2012 – 2017, at 2.7% per year
- Natural gas has emerged as a dynamic energy commodity on which almost all European countries are dependent with demand becoming more robust after 2018.
- Russia is expected to keep its leading role as the main gas supplier to the European Union with South Stream expected to have a big impact on SE European gas markets when it becomes operational in 2018
- Russia will continue to control and manipulate as much as possible gas flows, originating from Central Asian countries
- Asia will be by far the fastest growing region, driven primarily by China, which will emerge as the third-largest gas user by 2013. China and South Asia will try to ensure more gas quantities from the Caspian region
- Global and regional LNG market will continue to experience strong demand growth
- The shale gas boom in US could channel some gas export quantities to Europe as early in 2015
- Azerbaijan has key role to play as supplier and prospective regional hub for European gas supply
- The TAP - TANAP pipeline system, the East Med corridor, Planned Floating LNG terminals (FSRU), Gas interconnectors (IGB, IGI, ITB), can contribute in strengthening the geopolitical role of both Greece and Turkey


Natural gas consumption in OECD Europe by end-use sector, 2007-2035
(trillion cubic feet)
30
20
10
0
Electric power
Buildings
Industrial
2007
2015
2020
2025
2030
2035
Source: EIA International Energy Statistics

# Proposed European gas corridors and gas rings



# Azerbaijan's gas resources are not the only alternative to Russian gas



# Factors that will hinder future gas flow from Azerbaijan to European markets

- Currently existing fields have limited capacity
- Azerbaijan's Shah Deniz II (estimated reserves 1.2 tcm) will export 16 bcm of gas upon the development of the field. Turkey has secured 6 bcm and the rest will flow to European markets.
- Azerbaijan has the potential to produce and export more gas beyond SD II the earliest by 2025.
- Production could climb up to 39 bcm to 48 bcm by 2030, and exports could reach 27 bcm to 38 bcm by 2030; not very big numbers given European gas demand

**BUT**

- The availability of deepwater drilling rigs, as many more wells need to be drilled, may delay the development of new fields for many years
- Availability of transportation capacity
- Growing gas demand in Azerbaijan
- Growing gas demand in Turkey

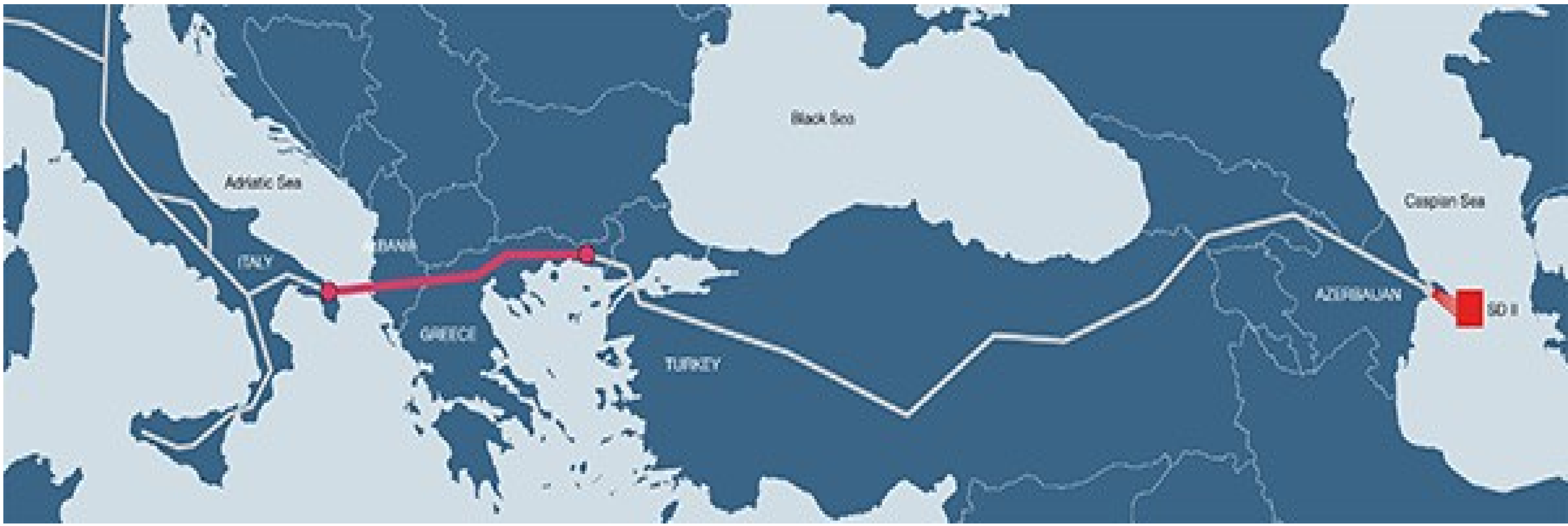
# Caspian region: Rich in gas but hardly accessible

- Central Asia is estimated to hold more than 11% of world proven gas reserves, primarily in Turkmenistan, which is lagging behind Kazakhstan and Azerbaijan in attracting outside investments.

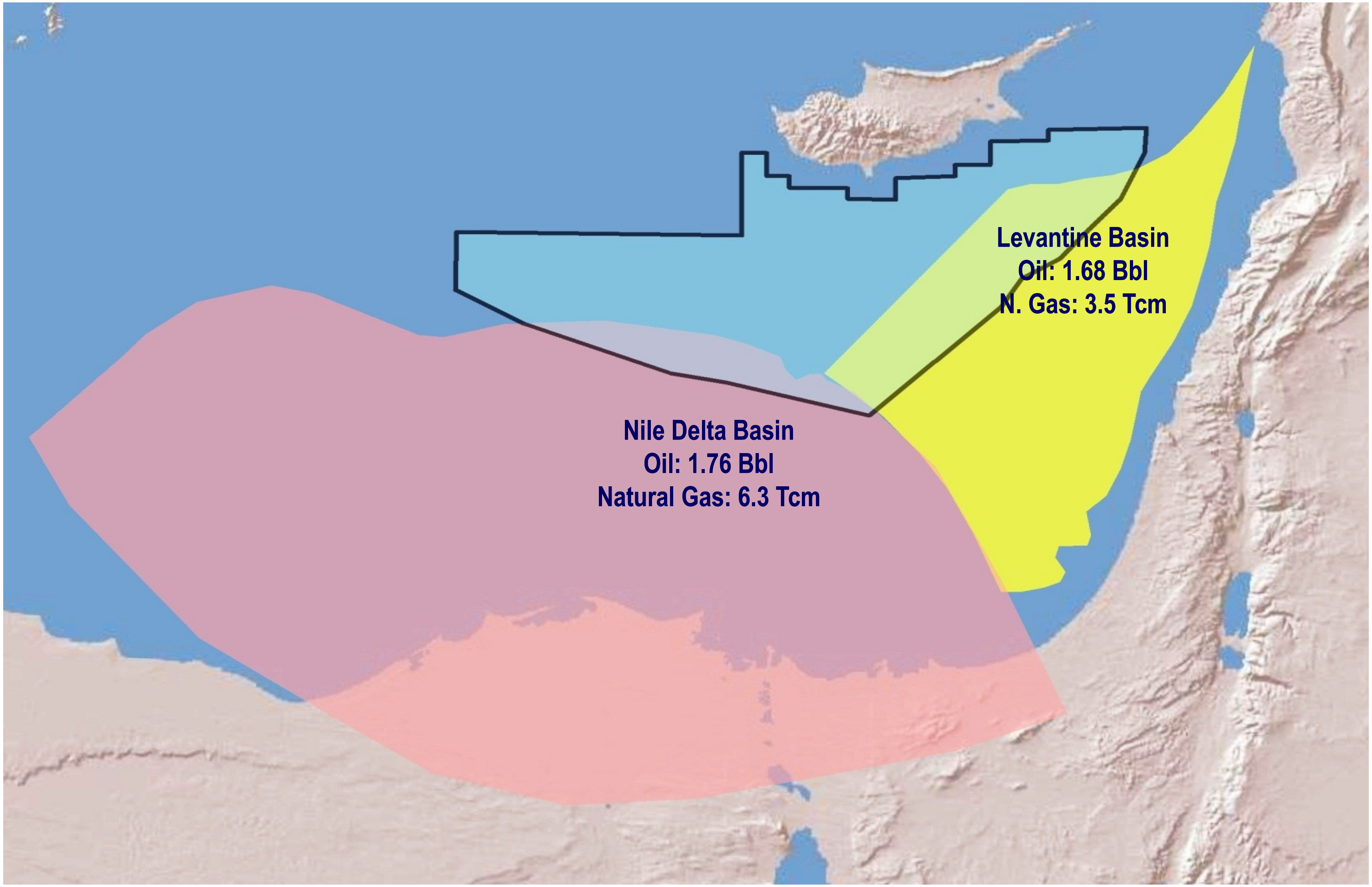
**BUT**

- Central Asian countries are mostly focusing on China and South Asia (e.a. TAPI project)
- China is moving swiftly to source supplies from Central Asian states of Turkmenistan, Kazakhstan and Azerbaijan
- Several political and diplomatic obstacles. Russia, Iran, Azerbaijan, Kazakhstan and Turkmenistan located clockwise around the Caspian Sea. All these actors and their behaviour made the scope of Caspian more complex and complicated.
- Russian influence - Caucasus has been an integral part of the Russian sphere for 160 years
- As more gas flows from Asia to Europe Turkey’s role as a transit country is reinforced
- Because of Turkey’s growing gas demand (10% growth) more gas from central Asia will flow to this country

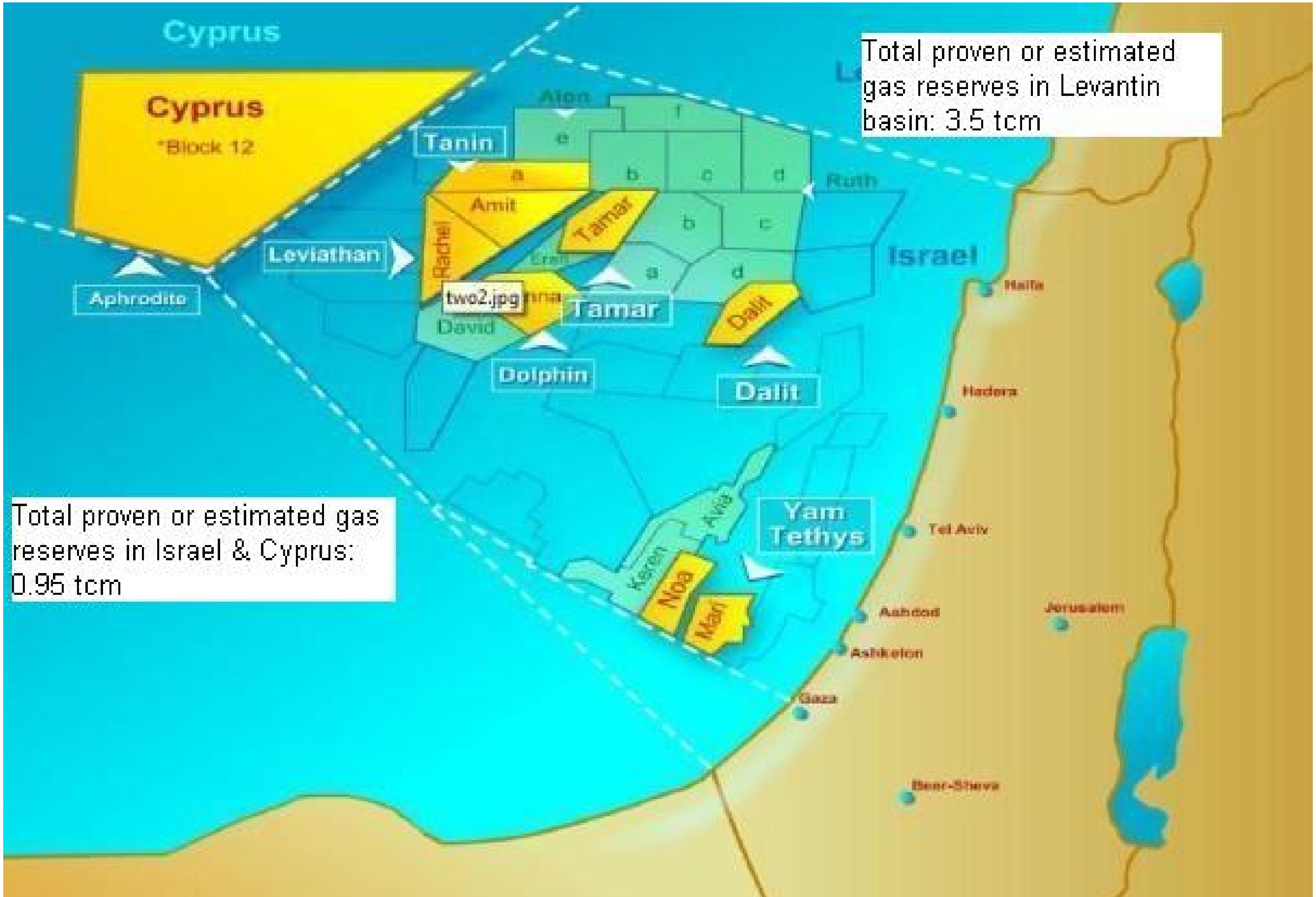
# TANAP – TAP route is expensive and will provide limited diversification to Russian gas supply



# South East Mediterranean estimated gas and oil reserves



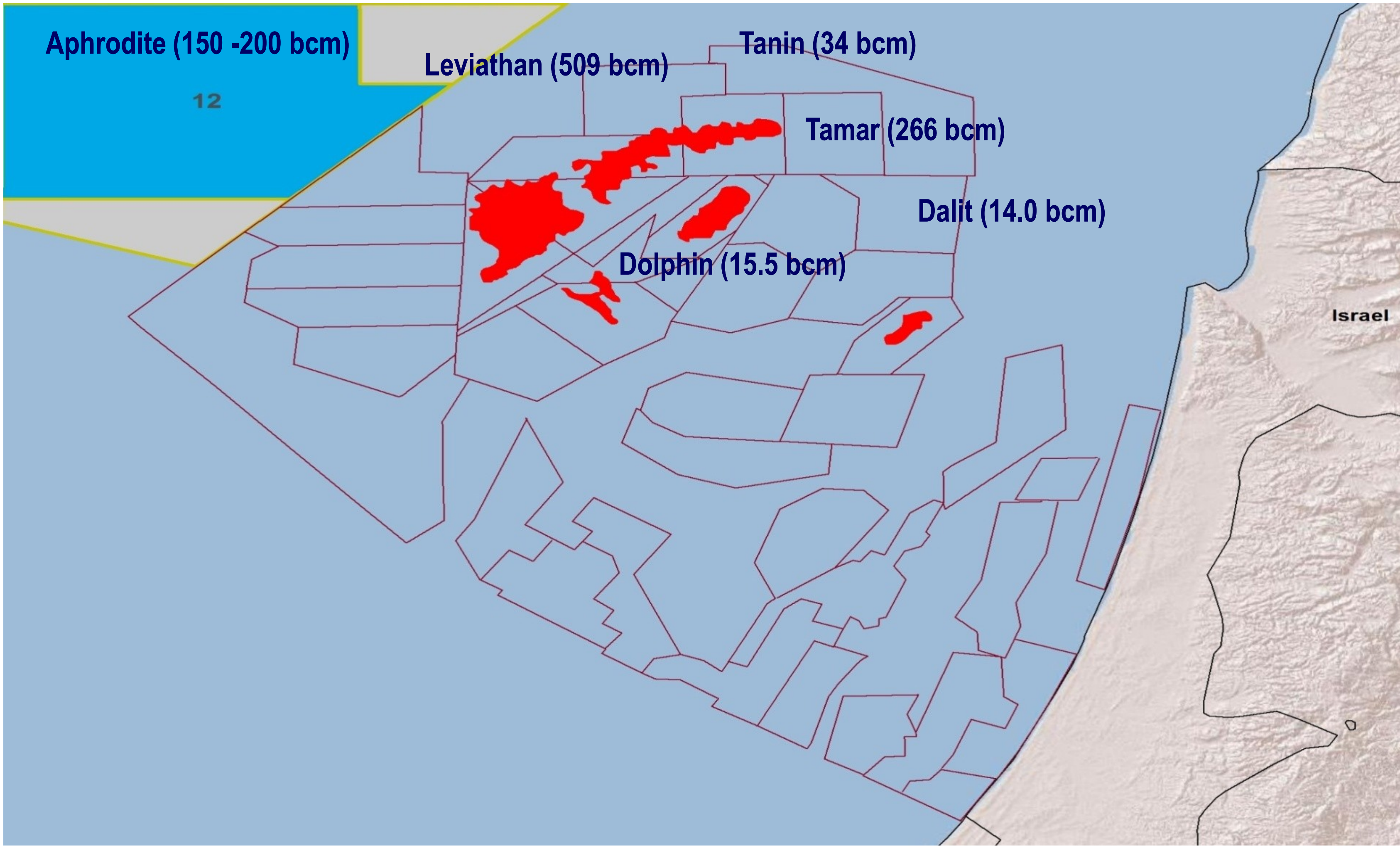
# The Levantine basin – An alternative gas supplier

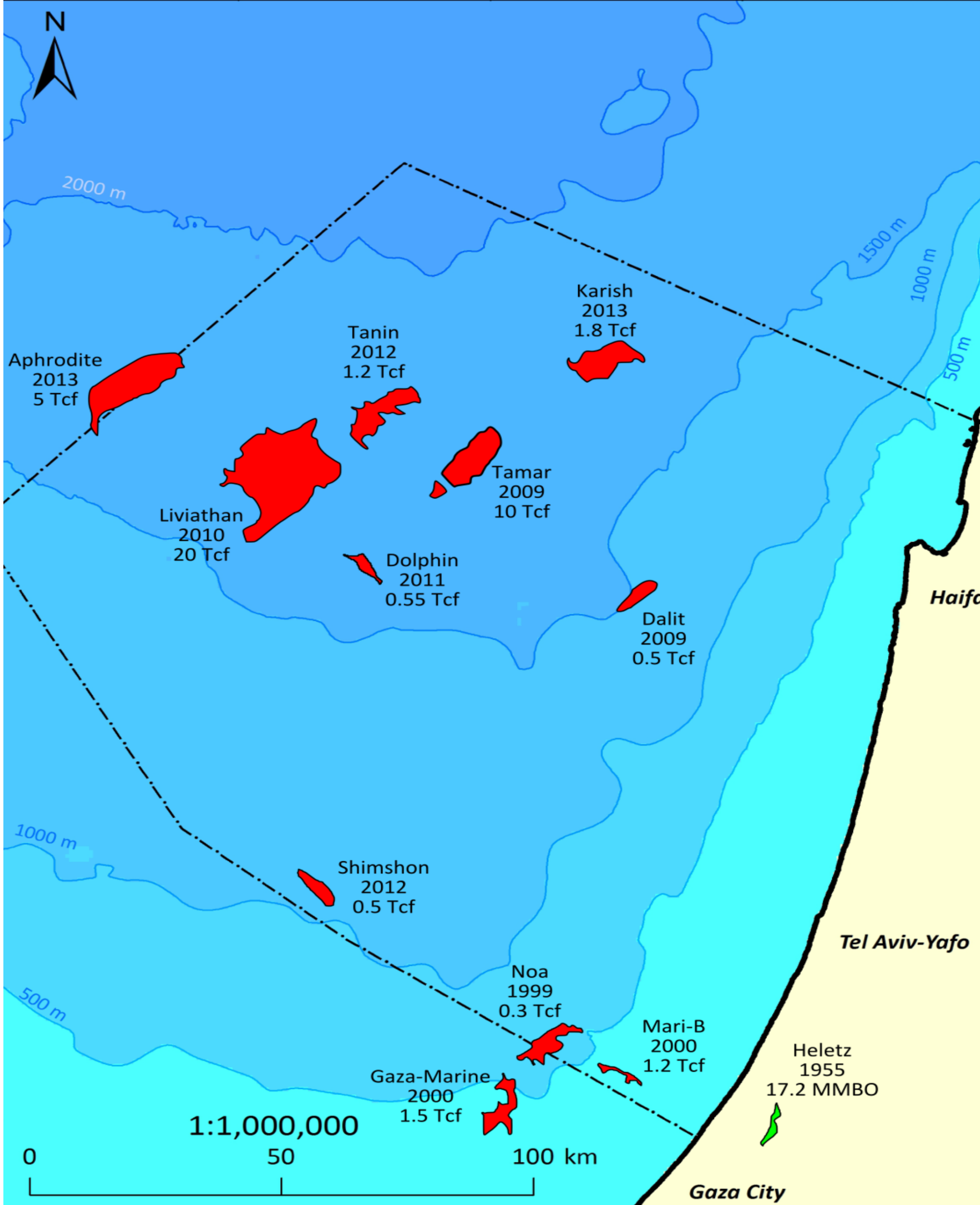



Total proven or estimated gas reserves in Levantin basin: 3.5 tcm

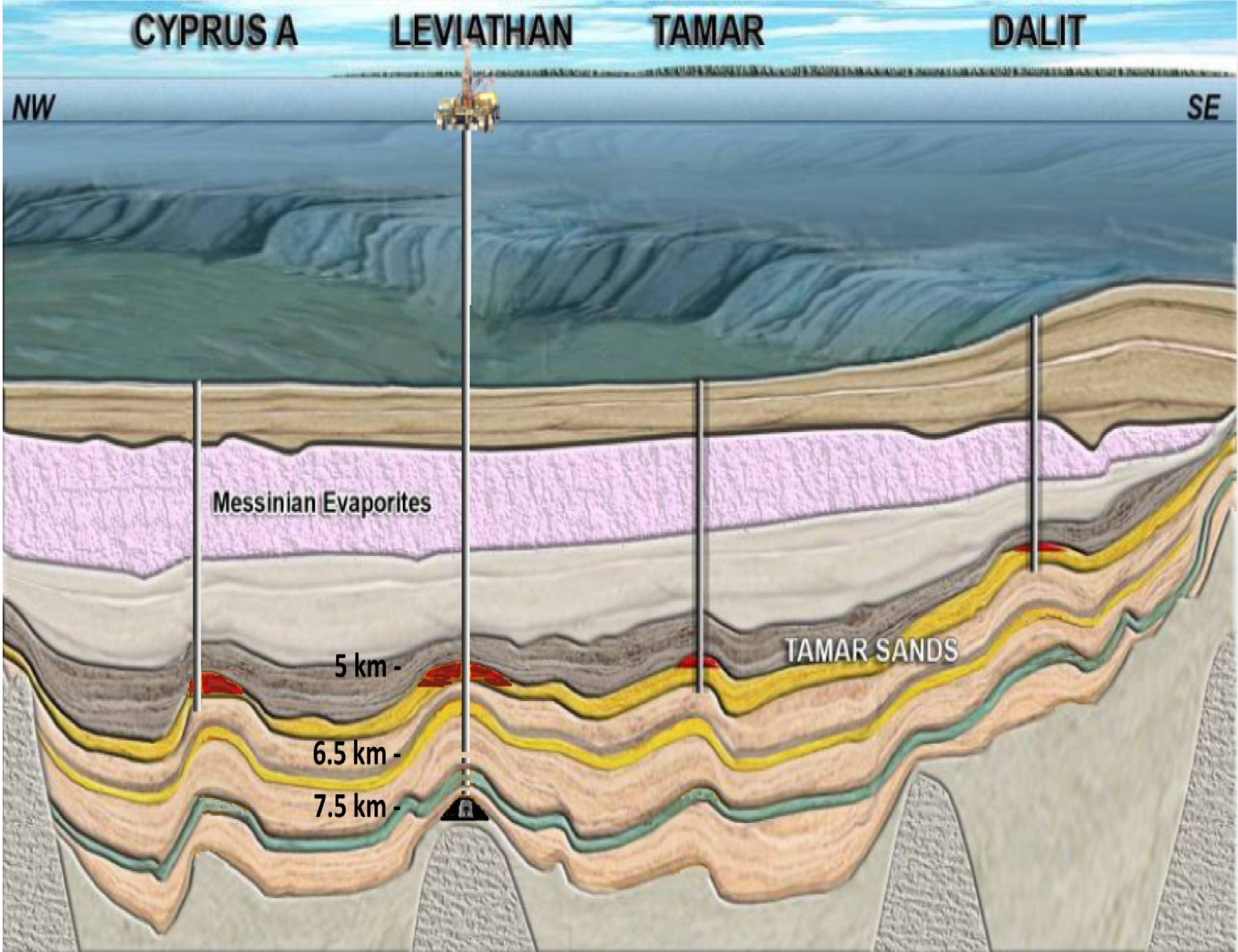
Total proven or estimated gas reserves in Israel & Cyprus: 0.95 tcm

# Total Gas Reserves in Israel (838.0 bcm) and Cyprus (150 – 200 bcm)

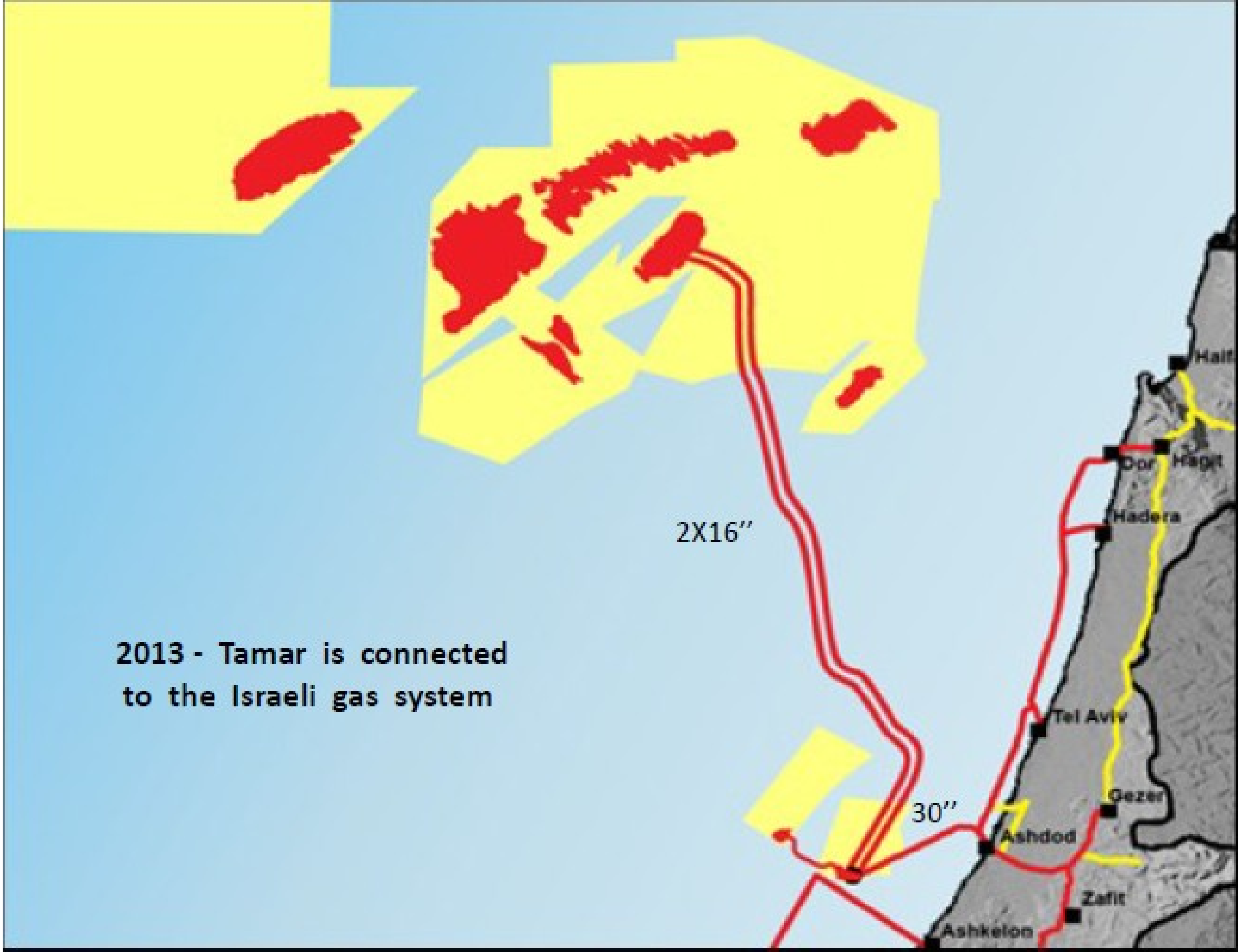





# Proven Natural Gas Reserves in Israel and Cyprus


CYPRUS A
LEVIATHAN
TAMAR
DALIT
NW
SE
Messinian Evaporites
TAMAR SANDS
5 km -
6.5 km -
7.5 km -

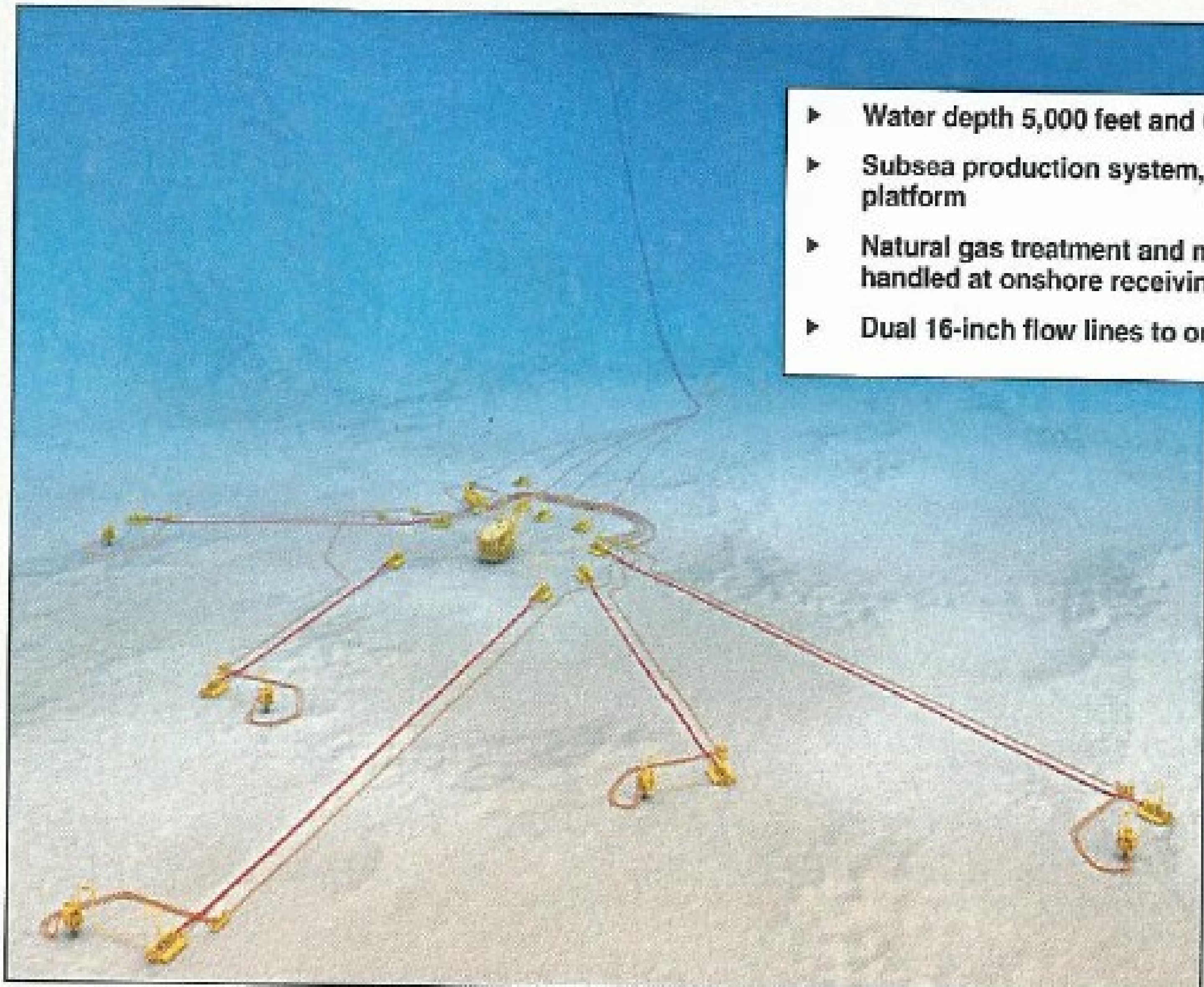

2010
The discovery well
Leviathan – 1


2013 - Tamar is connected to the Israeli gas system
2X16''
30''
Dor
Hagit
Hadera
Tel Aviv
Gezer
Ashdod
Zafit
Ashkelon

# Tamar Field Layout

## *Phase 1 with 850 MMcf/d deliverability*

- Water depth 5,000 feet and 60 miles offshore
- Subsea production system, no production platform
- Natural gas treatment and measurement handled at onshore receiving terminal
- Dual 16-inch flow lines to onshore terminal




Several export options from Leviathan gas field and tomorrow from Cyprus's fields

# The East Med Pipeline Project

# Eastern Mediterranean gas Reserves

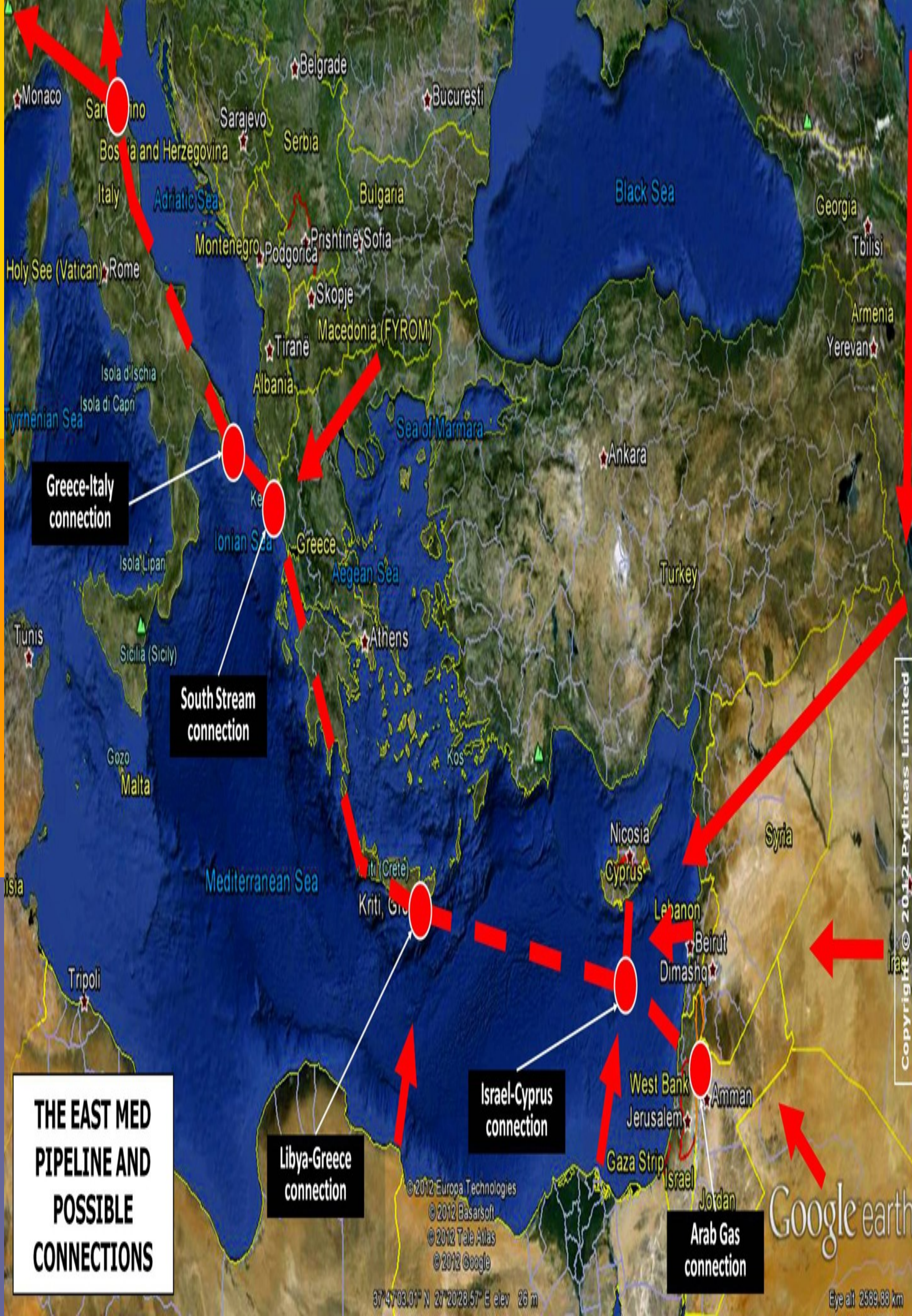
Tamar, Leviathan and Block 12 are three of the top five world's largest discoveries of the decade.

| | | | |
|---|---|---|---|
| Tamar | 2009 | Israel | 257bcm |
| Leviathan | 2010 | Israel | 481bcm |
| Block 12 | 2011 | Cyprus | 198bcm |

According to the USGS (United States Geological Survey) total reserves at the Levantine basin could be three times more than what has already been discovered.

And there may be even more gas in Greece south of Crete.

Estimates are that more than 16 bcma will be exported, which necessitates exports both in LNG form and through a pipeline.


THE EAST MED PIPELINE AND POSSIBLE CONNECTIONS
Greece-Italy connection
South Stream connection
Libya-Greece connection
Israel-Cyprus connection
Arab Gas connection
Monaco
Belgrade
Bucuresti
Sarajevo
Serbia
Bosnia and Herzegovina
Italy
Adriatic Sea
Bulgaria
Black Sea
Georgia
Tbilisi
Montenegro
Podgorica
Prishtine
Sofia
Holy See (Vatican)
Rome
Skopje
Armenia
Tirane
Macedonia (FYROM)
Yerevan
Albania
Isola d'Ischia
Isola di Capri
Tyrrhenian Sea
Sea of Marmara
Ankara
Ionian Sea
Greece
Aegean Sea
Turkey
Isola Lipari
Tunis
Athens
Sicilia (Sicily)
Kos
Gozo
Malta
Nicosia
Cyprus
Syria
Mediterranean Sea
Lebanon
Beirut
Dimashq
Tripoli
West Bank
Amman
Jerusalem
Gaza Strip
Israel
Jordan
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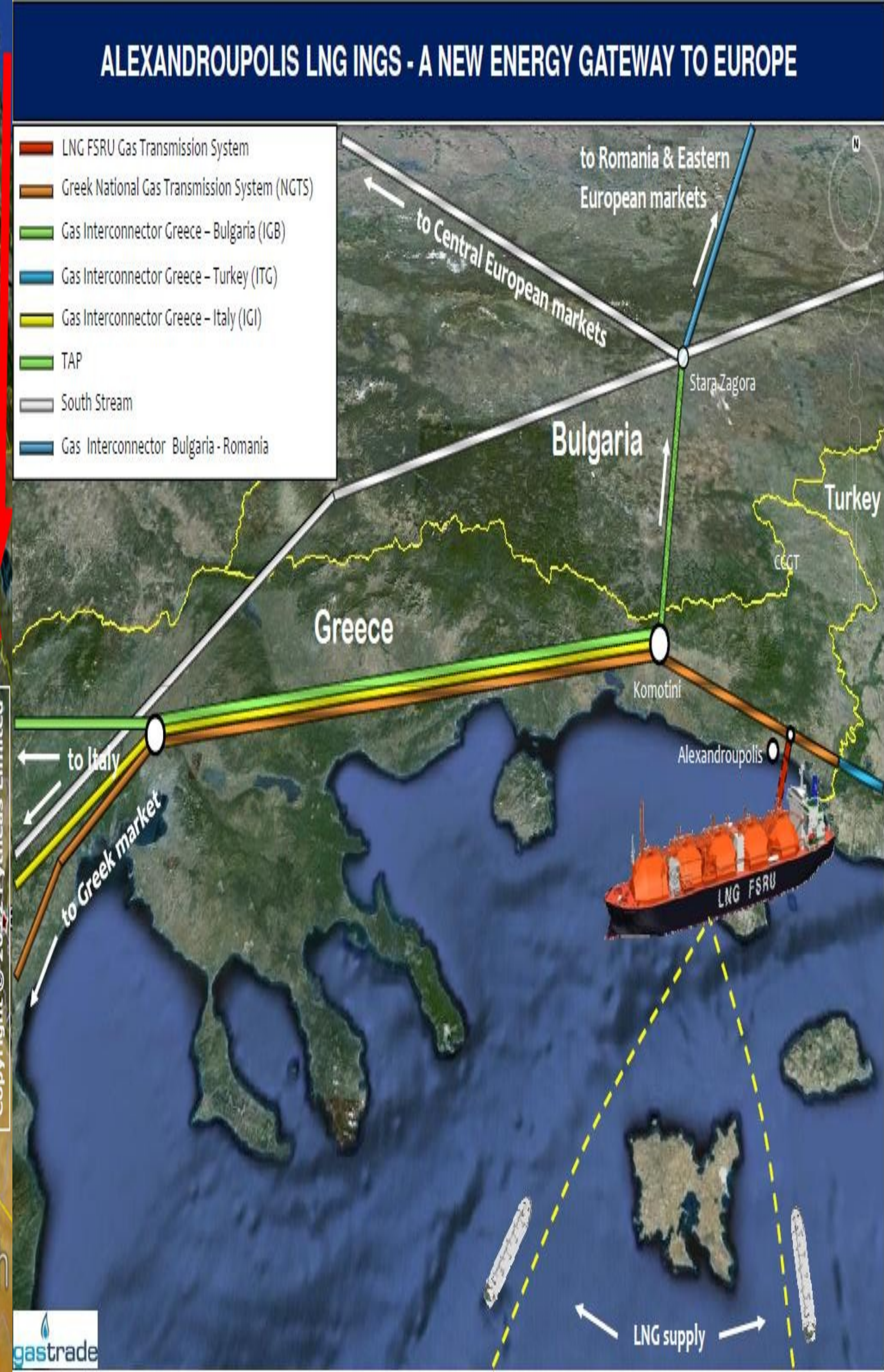
ALEXANDROUPOLIS LNG INGS - A NEW ENERGY GATEWAY TO EUROPE
LNG FSRU Gas Transmission System
Greek National Gas Transmission System (NGTS)
Gas Interconnector Greece – Bulgaria (IGB)
Gas Interconnector Greece – Turkey (ITG)
Gas Interconnector Greece – Italy (IGI)
TAP
South Stream
Gas Interconnector Bulgaria - Romania
to Romania & Eastern European markets
to Central European markets
Stara Zagora
Bulgaria
Turkey
Greece
Komotini
Alexandroupolis
to Italy
to Greek market
LNG FSRU
LNG supply
gastrade

# The East Med Energy Corridor to Include also Electricity Interconnector (EuroAsia Interconnector)

# The Importance of East Med Gas Supply

- An important paradigm shift is in progress as major oil and gas reserves are for the first time being developed outside the OPEC – Arab embrace, yet within the Middle East space
- East Med's proximity to European continent to provide relatively easy access to energy supplies
- Development of East Med hydrocarbon resources in line with stated EU energy  policy of diversifying energy supplies in an effort to lessen dependence on Russian gas
- East Med oil and gas reserves shall strengthen European hydrocarbon resources as Cyprus and Greece are full EU members and Israel belongs to the European Economic Area
- Greece is likely to emerge as the next potential oil and gas region in SE Europe, complementing Israel and Cyprus

# East Med Gas Supply – Geopolitical Implications (I)

- Can East Med be seen as a threat to Russian gas dominance?
- Is Turkey going to claim exclusive rights for East Med gas transmission?

(i) Not necessarily since Turkey is primarily interested to cover its own growing gas needs from East Med gas supplies

(ii) A brand new gas route will have to be built in addition to TANAP to take the extra gas from the East Med region via the Turkish mainland through TAP and/or through a new East Balkan pipeline to Europe. This requires major investments in gas transit routes but with uncertain quantities at this stage

# East Med Gas Supply – Geopolitical Implications (II)

- Can Greece seize the opportunity to become a vital new gas supply route to Europe? Not likely since Greece, geographically may be in a privileged position but practically the country is bankrupt with a weak government which is to become even weaker in the months ahead and therefore incapable of long term planning. It is no accident that none of recent major energy projects has been realized despite firm EU support and bilateral agreements, i.e. Burgas – Alexandroupolis oil pipeline, the ITGI, gas pipeline, the Helios Project, Oil and gas Exploration in West Greece, Aegean islands electricity interconnections etc.
- Exploration and development of East Med gas reserves should be seen as an opportunity for increased regional co-operation and hence contribution to regional political stability
- In a Middle East which has been in turmoil over the past two years East Med oil and gas exploration offers an opportunity for stability and growth with several countries benefiting from impeding investments (i.e. Greece, Turkey, Syria, Lebanon, Israel, Egypt, Cyprus)

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# Thank you for your attention

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