WEC Energy Vulnerabilities in Europe

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"Meeting Demand, Supply and Gas Market Integration Challenges in SE Europe"

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- Current challenges for the gas industry
- Gas demand in SE Europe
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Current Challenges for the European Gas Industry

The European gas industry is currently faced with a number of challenges across the value chain, mainly connected to:

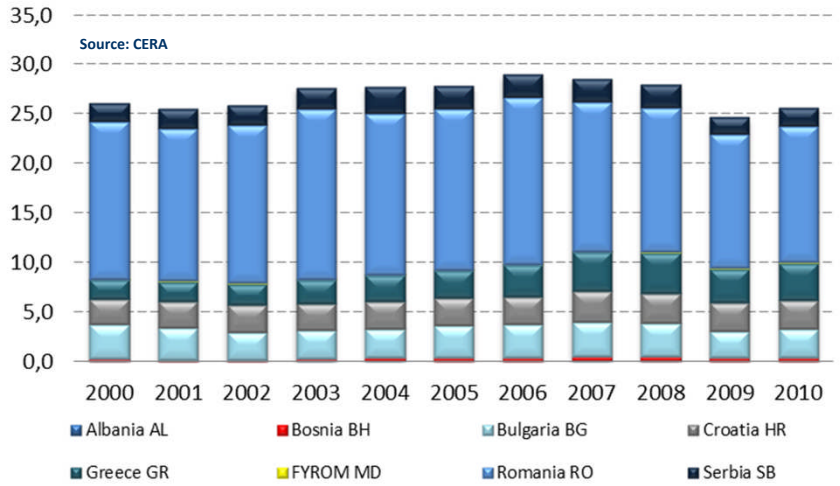
- Increasing dependence on imports
- Security of supply
- Critical infrastructure investments
- Market liberalization/integration
-
- Climate change and energy sustainability

Gas Demand in SE Europe

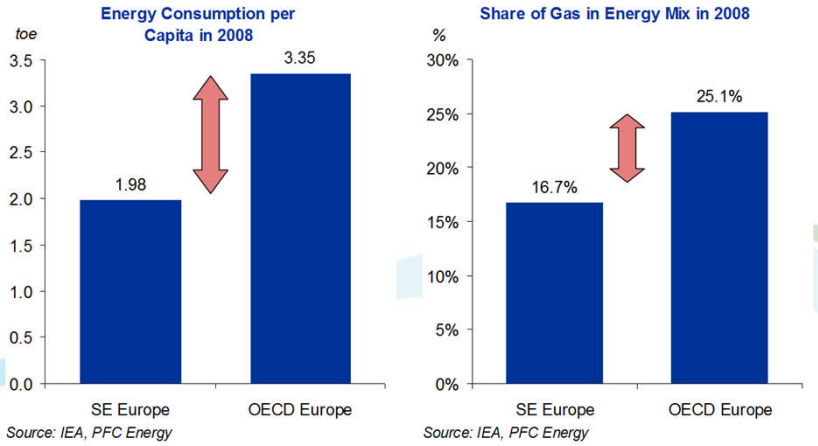
Natural Gas Demand Context Across SEE

- **Substantial regional market of ~ 25 bcm in 2011 (excl Turkey)**
  - Historical data reflect turbulent political and economic history.
  - Ongoing demand recovery in some countries but still below pre-crisis levels.
  - Romania accounts for more than half of total market.
- **Low energy demand per capita and gasification trend**
  - Current energy demand per capita in South Eastern Europe is very low, thus there is room for significant improvements.
  - Gas share is low and gasification is seen as means of enhancing efficiency and helping meet EU-mandated environmental targets.
  - Focus on power generation, industrial, and on residential sectors; this can also offer necessary anchor loads to investors.

Natural Gas Demand in SE Europe 2000 - 2010 (bcma)



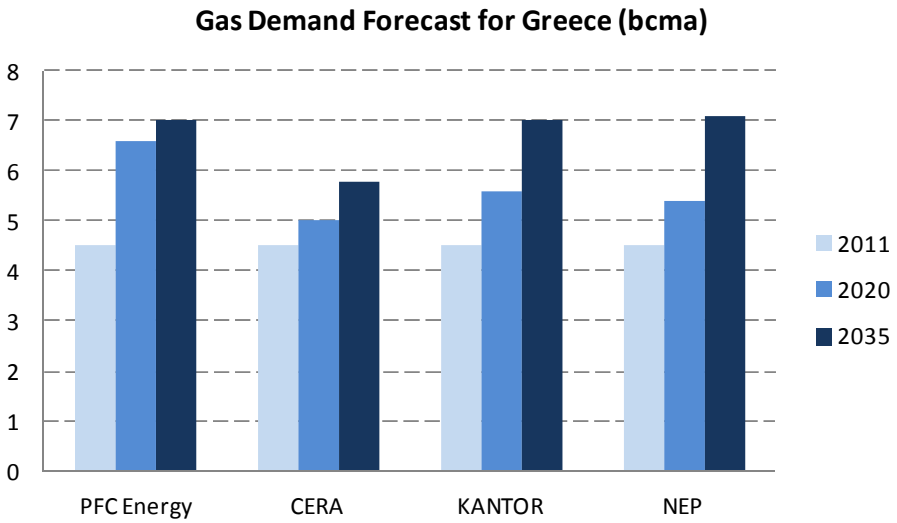
Energy Consumption and Gasification in SE Europe in 2008



Independent Views of GR and SEE Prospects

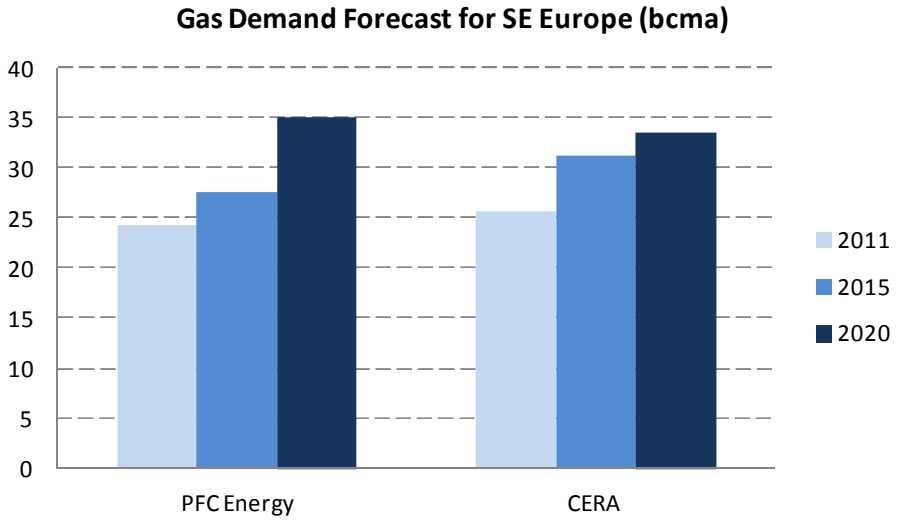
Strong gas demand growth envisaged for Greece

- Greek gas demand was 4.5 bcm in 2011 and expected to be 4.2 bcm in 2012 (12% of the Greek energy mix)
- Gas demand in the county to exceed 5 bcma by 2020, and even be as high as 6.5 bcma if economy recovers.
- Penetration of the fuel set to continue in the longer term, with consensus view of ~7 bcma of demand by 2035.
- Power generation offers bulk demand outlet in Greece, but there are other important demand drivers as well.



Similar positive gas trends across the SEE region

- Broad consensus also on the dynamism of the broader South East European (SEE) natural gas market.
- Incremental gas needs in the region seen as standing at between 8 and 11 bcma by the end of this decade.
- Average year-on-year demand growth for natural gas in the SEE region of roughly 3% to 4% during 2011-2020.



However Gas Demand in the Region Could Negatively be Affected by …

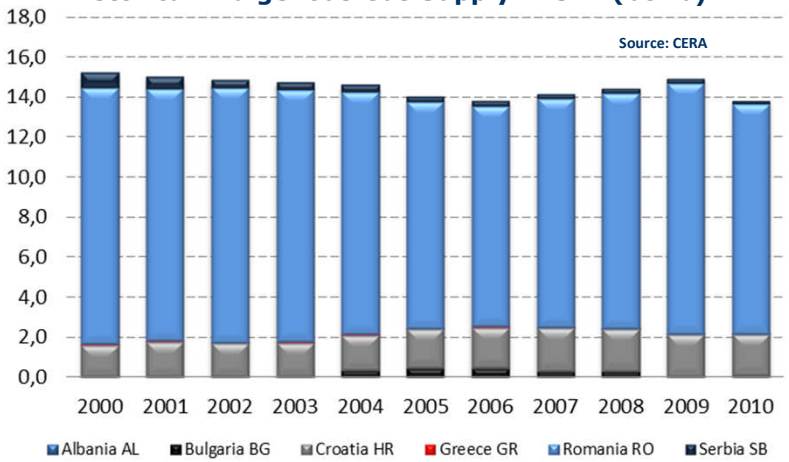
- Deeper economic recession
- Energy efficiency improvements and high RES penetration
- Persisting high gas prices
- Absence of gas-to-gas competition
- Lack of adequate supply capacity and of access to alternative gas sources
- Gas availability to Europe (and consequently to SEE)
- High import dependence (especially on a single or very few gas suppliers)
- Geopolitical, regulatory and financial uncertainties

Gas Supply Challenges in SEE

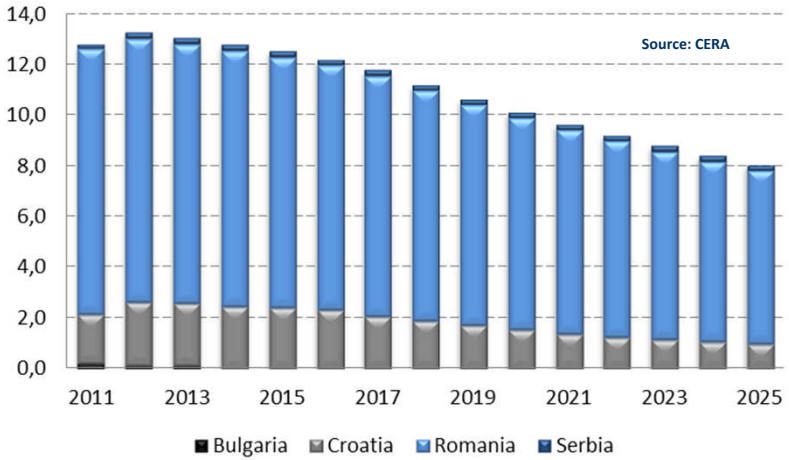
SEE Gas Supply Context: Local Production

- **Indigenous natural gas production unable to meet regional demand**
  - Local production >14 bcm in 2010, compared to almost 26 bcm demand.
  - Bulk production exists in Romania with 11.5 bcm (83% of total SEE).
  - Croatia is the only other significant producer with some 2 bcm/a, while Serbia and Bulgaria have some marginal production (some 100-200 mcm each).
- **SEE gas production to decline in all countries in the coming decade**
  - Indigenous production of natural gas to fall to only some 8 bcma by 2025.
  - This represents an average 3.5% Y/Y decline between 2011-2025.
  - All SEE producers are expected to be affected by this trend.
  - Only unconventional gas could reverse it in the 2020s.

Historical Indigenous Gas Supply in SEE (bcma)

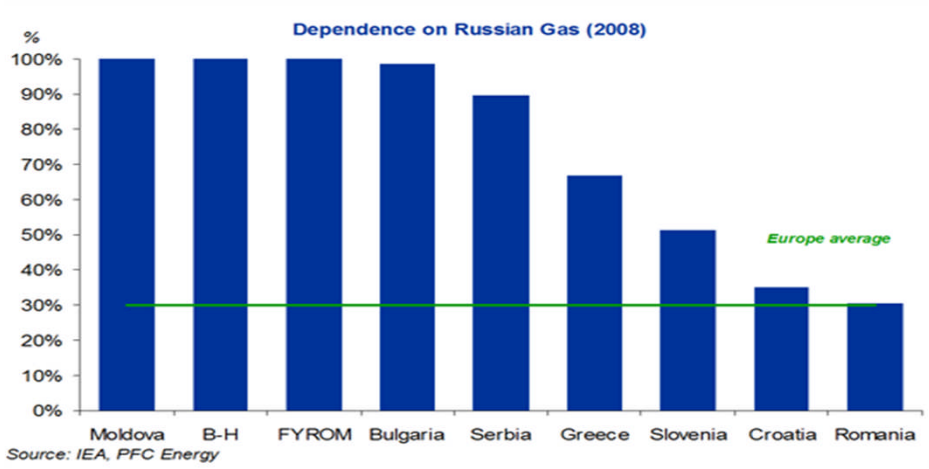


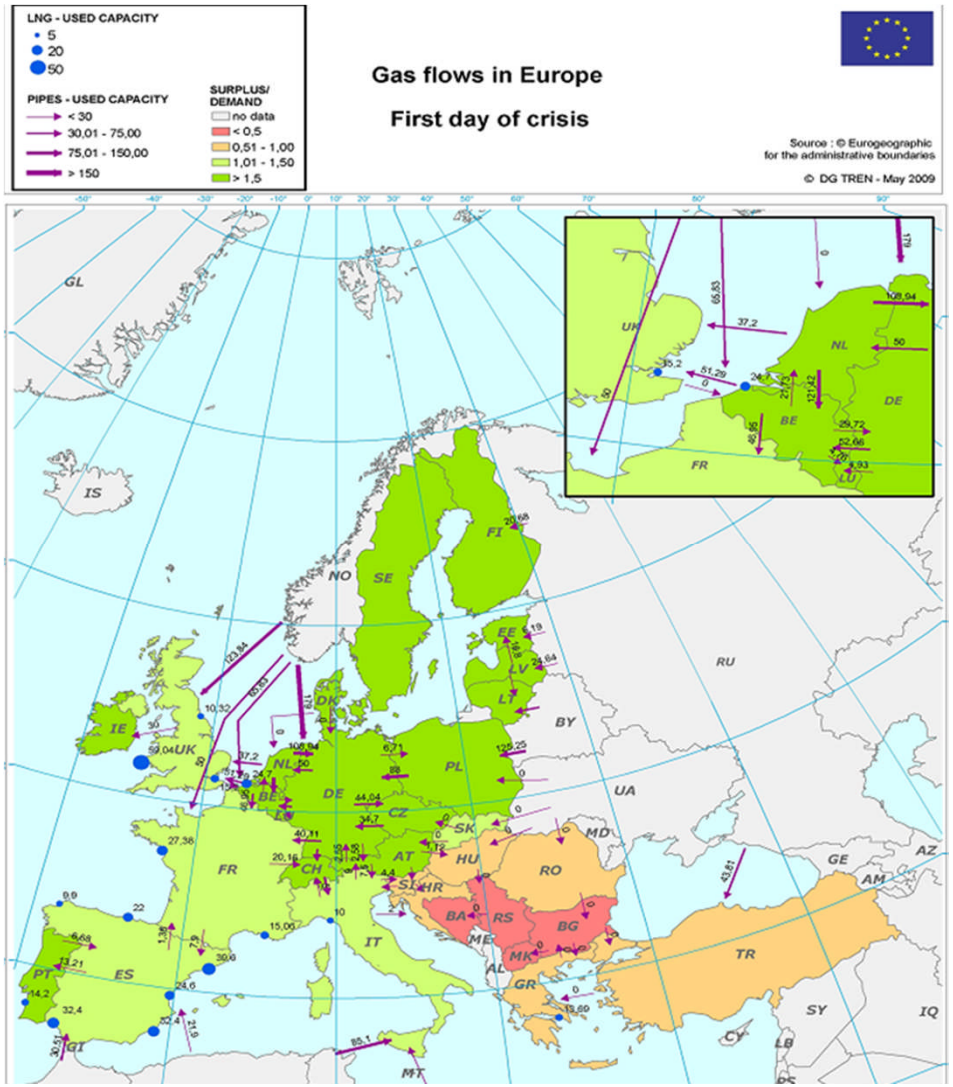
Forecasted Indigenous Gas Supply in SEE (bcma)



SEE Gas Supply Context: High Import Dependency

- **Non-direct Russian pipeline inflows dominate gas supply in SEE**
  - Two major pipeline routes from Russia, which pass through Ukraine
  - Non-Russian supply limited to Greece → LNG and ITG pipeline
  - And since 2011 also to Croatia → ITA through SLO (and HU)
- **Gas supply vulnerability of SEE painfully evident in January 2009**
  - Bosnia and Bulgaria most affected, but also FYROM and Serbia
  - Heavy toll on local economies and even humanitarian crisis
  - Greece coped best thanks to its LNG import capabilities

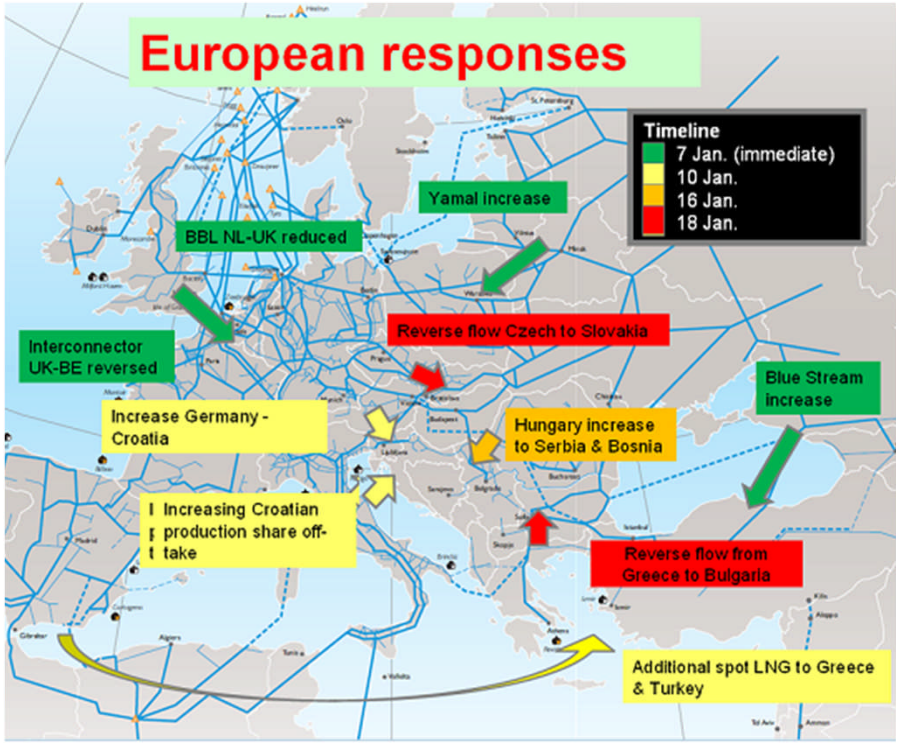




SEE Gas Supply Context: Interconnections

- **Limited integration exacerbated impact of supply cuts in 2009**
  - Lost volumes in Jan 2009 could have been replaced relatively easily.
  - Insufficient SEE/CEE gas integration and lack of reverse flow links.
  - Thus available regional resources could not be easily accessed.
    - *For example, emergency supplies from CEE and NWE*
    - *Natural gas storage and production in Romania*
    - *LNG infrastructure in Greece and Turkey*
- **EU push for security of gas supply (including diversification)**
  - Regulation 994/2010 of the EU Parliament and of the Council.
  - Requirement for 30-day (normal) gas supply guarantee.
  - SEE region includes current and candidate members.

European Union Response to the Gas supply Crisis of Jan 2009



Source: Analysis of gas crisis presented to Gas Coordination Group by IEA, cited in European Commission, *The January 2009 gas supply disruption to the EU: an assessment*, p.23, July 2009, http://eur-lex.europa.eu

SEE Gas Supply Context: LNG and UGS

LNG infrastructure in SEE is currently available only at Revithousa, Greece (and at Marmara, Turkey)

- Owned/operated by DESFA with some 2 bcm/y (5 bcm/y planned).
- Planned Aegean LNG terminal of up to 6.8 bcm/y (by DEPA).
- A number of other LNG terminals have been proposed in the region
- New interconnections necessary to improve flows.

Supply from UGS failing to make any substantial contribution

- Total UGS operational capacity in SEE stands at only 4,2 bcm (2,8 bcm in Romania), equivalent to 48 days of wider demand
- Other UGS in Croatia, Bulgaria (Serbia under development).
- Planned South Kavala UGS with ~600 mcm capacity.
- New interconnections needed to improve flows.

LNG infrastructure and planned gas interconnections

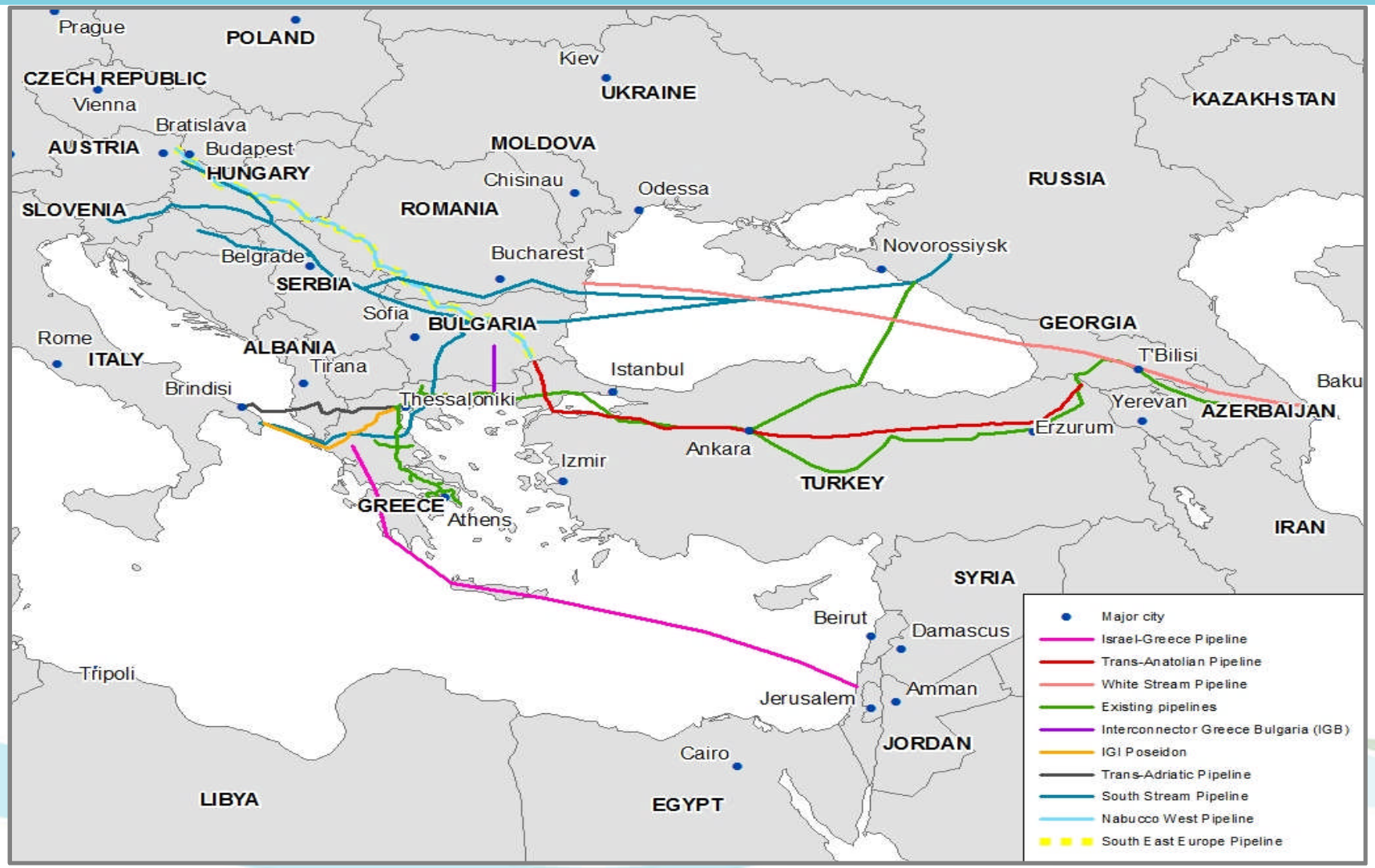
Source (left): OIES

Source (right): www.energy-community.org

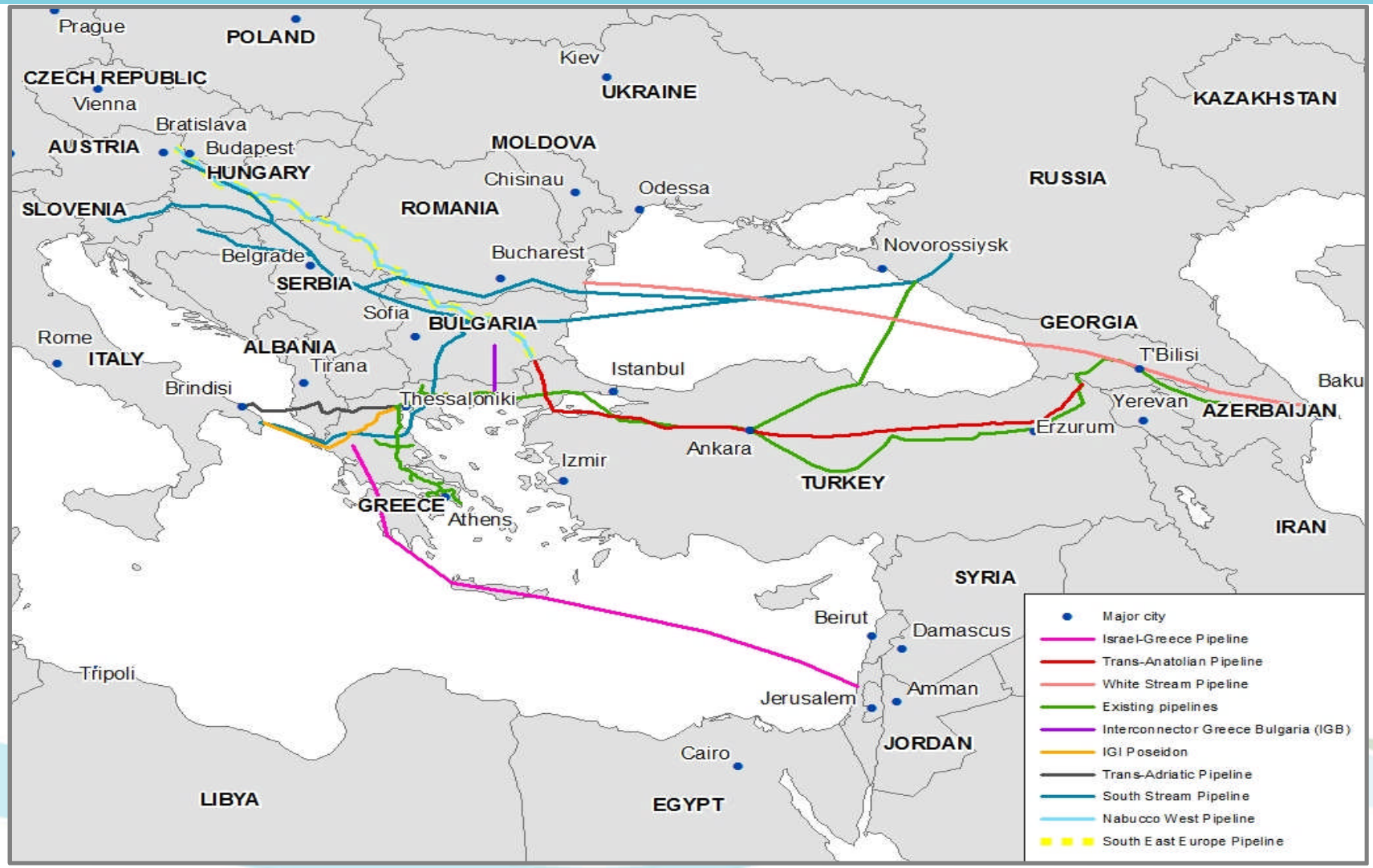
Existing Gas storage in SEE and in its Immediate Periphery

New Gas Supply Infrastructure of European and Regional Interest

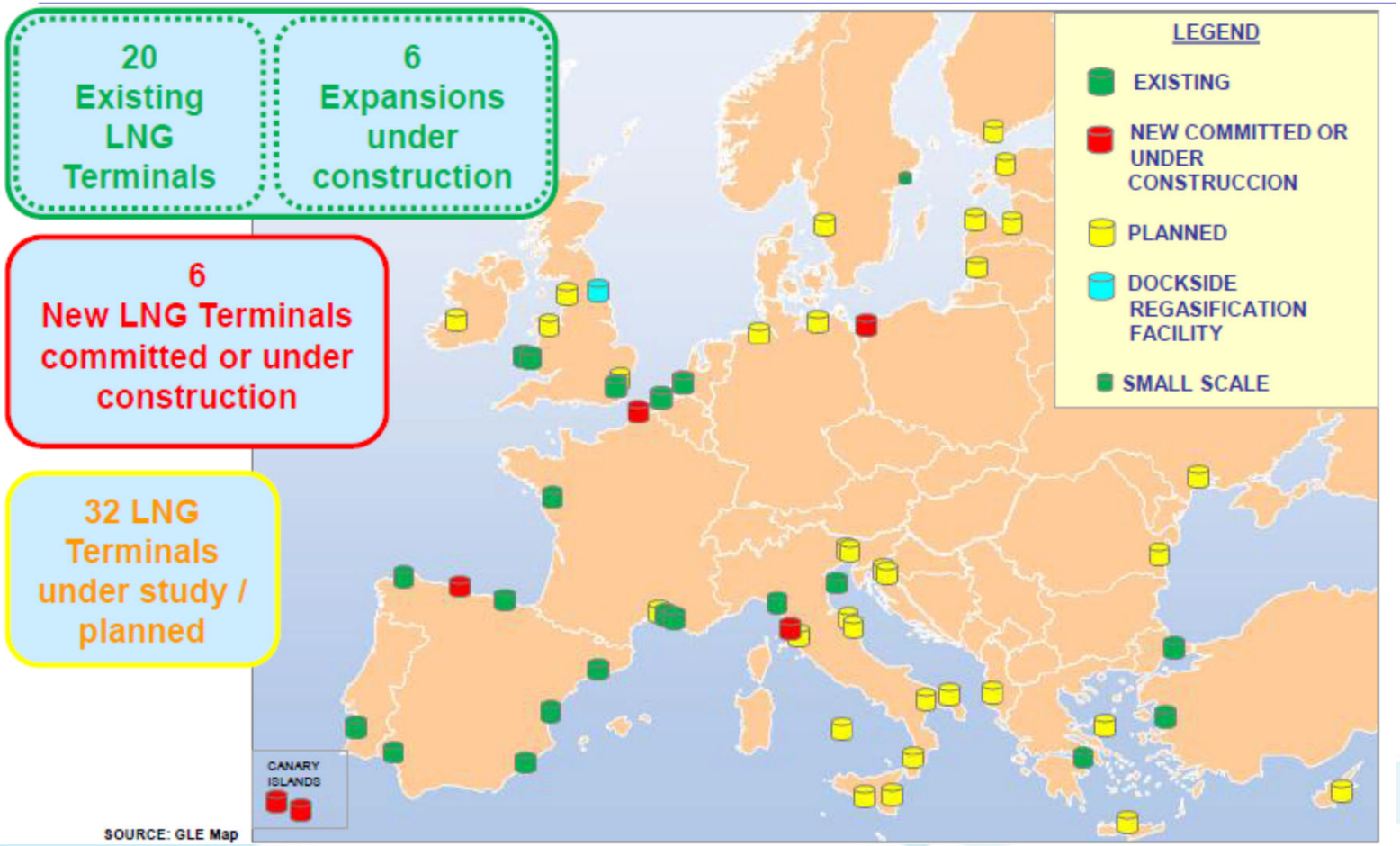
Gas Pipeline Projects of Regional and European Interests



Gas Pipeline Projects (cont)



LNG Facilities in Europe



What will Define Gas Supply Choices in SEE?

Is gasification of the wider SEE region moving forward as planned?

-Multi-billion euro investment is needed in order to develop efficient gas-fired infrastructure and to provide anchor loads.

-Greater connectivity of the region is necessary as a natural gas demand multiplier which legitimises upfront investment costs.

-But gasification is not an absolute priority in SEE if no FDI, support from IFIs, and (EU-mandated) greener policies.

What is the added value of LNG to wider region's energy mix?

- LNG could be one of the main contributors to the planned diversification of natural gas supply in the wider SEE region
- But in the longer-term it will have to face stiff competition from non-Russian pipeline gas including Caspian supplies
- How will LNG flexibility and potential to allow imports from new producers and producers farther afield be perceived?

Are gas import prices in line with SEE downstream markets?

•Large sections of the population in SEE may be unable to bear burden of (non-subsidised) international natural gas prices, especially under the today's economic conditions .

•Planned liberalisation of retail prices to cost-reflective levels expected later in the decade but could erode support for gas.

•Gasification not an absolute priority in SEE if natural gas prices are not competitive to cheaper energy alternatives (e.g. coal).

Are LNG prices competitive to pipeline gas and other fuels?

- Are LNG producers in the Atlantic Basin and even further afield willing to offer LTCs for LNG at regionally affordable prices?
- Will offered prices and / or diversification premium give Buyers an incentive to drop pipeline LTCs in favour of new LNG ones?
- Will LNG be appropriately priced to pre-empt and/or stave-off competition from other flexible supplies (e.g. production, UGS)?

Greece's and DEPA's Role Towards a Secure and Integrated Gas Market in SEE

Public Gas Corporation of Greece (DEPA) S.A.

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- The main player in the Greek gas market and surely one of the most successful business stories in Greece the last 25 years
- DEPA enjoys healthy financial position and offers strong profitability to its shareholders
- At a corporate level, the Group has a turnover of about 2 bio Euros and EBITDA that exceeds 200 mio Euros
- The Group plays a key role towards:

✓ the development of the Greek gas infrastructure/market and

✓ the diversification of SE Europe's gas supply sources and transport routes

DEPA's Strategic Objectives

Ensure long-term leadership in a competitive market and capture growth both in Greece and the wider region

- √ **Achieve competitive, diversified and flexible supply of natural gas**
- √ **Remain the gas market leader in GR and capture its growth**
- √ **Play key role in SE Europe infrastructure development & gas supply**
- √ **Optimize wholesale margins**

- **Contribute to the creation of a green and efficient domestic energy market (infrastructure, energy mix and market)**
- **Build a fit-for-purpose organization to win in a competitive gas market**

SOURCE: DEPA's 2010-2015 Business Plan

Our vision is to Create a Secure and Integrated Regional Gas Market

… and to establish Greece as a Gas Hub in the Region

Conclusions

- SE Europe currently faces a number of challenges and vulnerabilities affecting gas demand/supply equation, regional energy security and market integration and functioning
- Countries in the region should increase their cooperation in the energy sector and seek ways to effectively balance wariness for increasing gas import dependence and interest to gain access to alternative gas sources and transport routes.
- Greece (and DEPA) has a key role to play towards diversification, security of supply and gas market integration in SE Europe
- By virtue of its position, Greece is well prepared and thus able not only to transit significant quantities of gas from the Caspian, Middle East and Eastern Mediterranean through the ITGI, but also to provide gas from other sources to the broader region through the planned Aegean LNG and the IGB

Thank you for your attention