The 3rd APEC Oil and Gas Security Network Forum

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Natural Gas Security in APEC

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What is the importance of Gas Security?

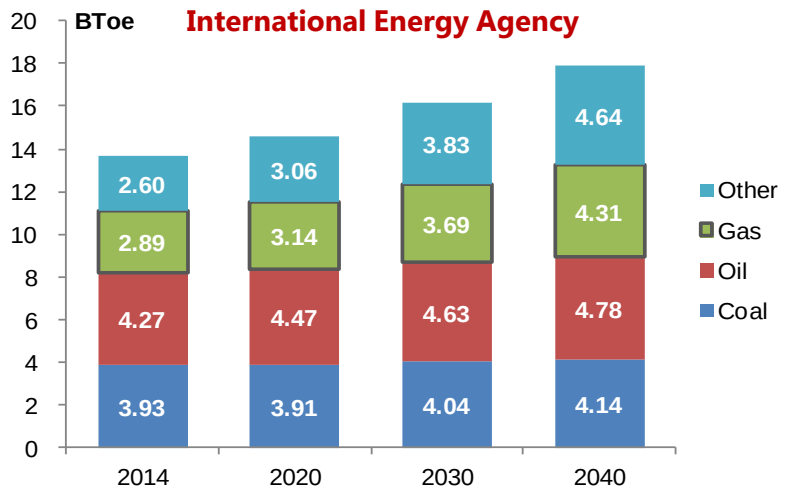
Why gas security is becoming increasingly important in the natural gas markets of the Asia-Pacific region?

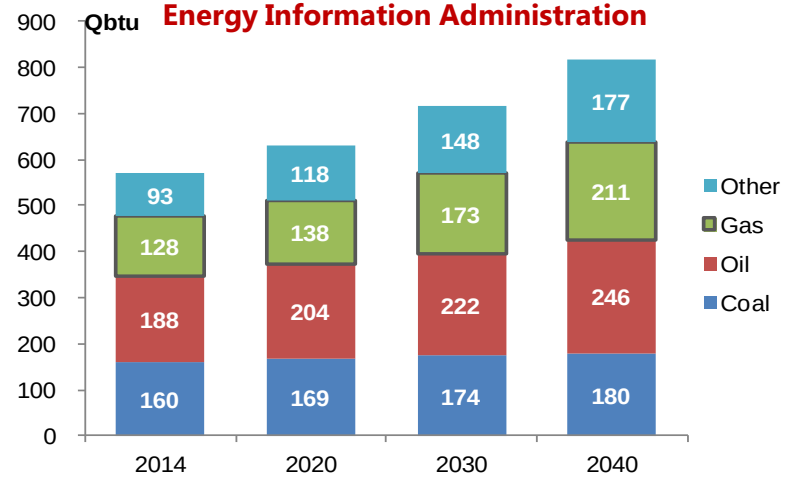
Four reasons:

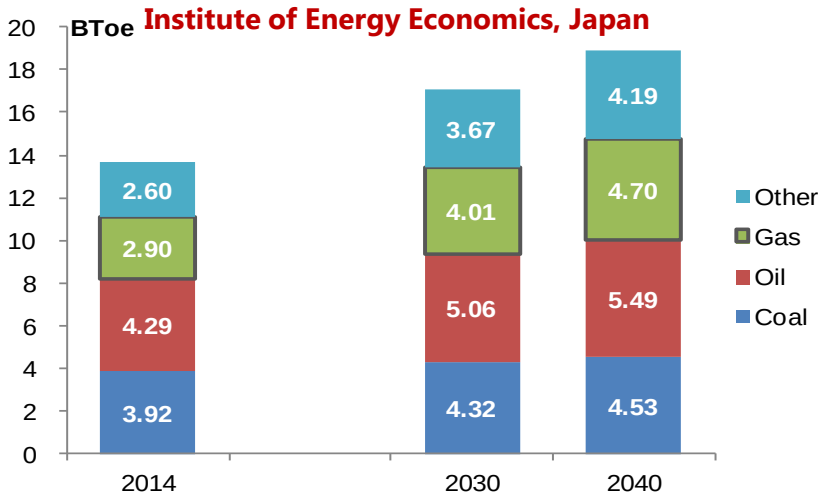
- Growth in demand.
- Increase in trade volume.
- Occurrence of supply interruption.
- Slowdown in investment.

Forecast of global primary energy supply

Natural gas would become the second most important energy source after oil by 2040

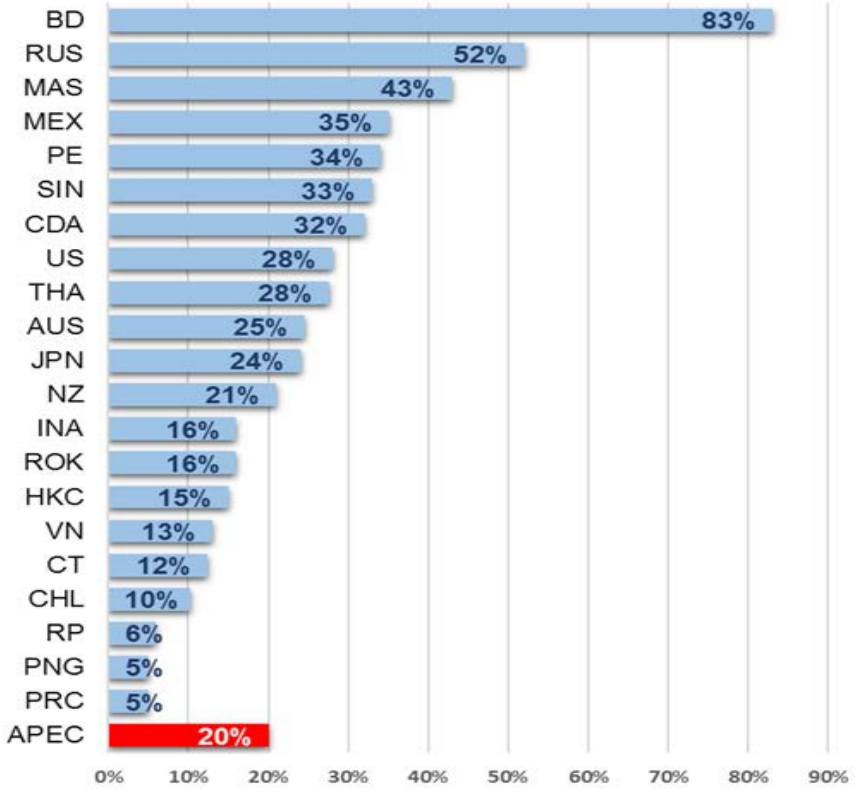




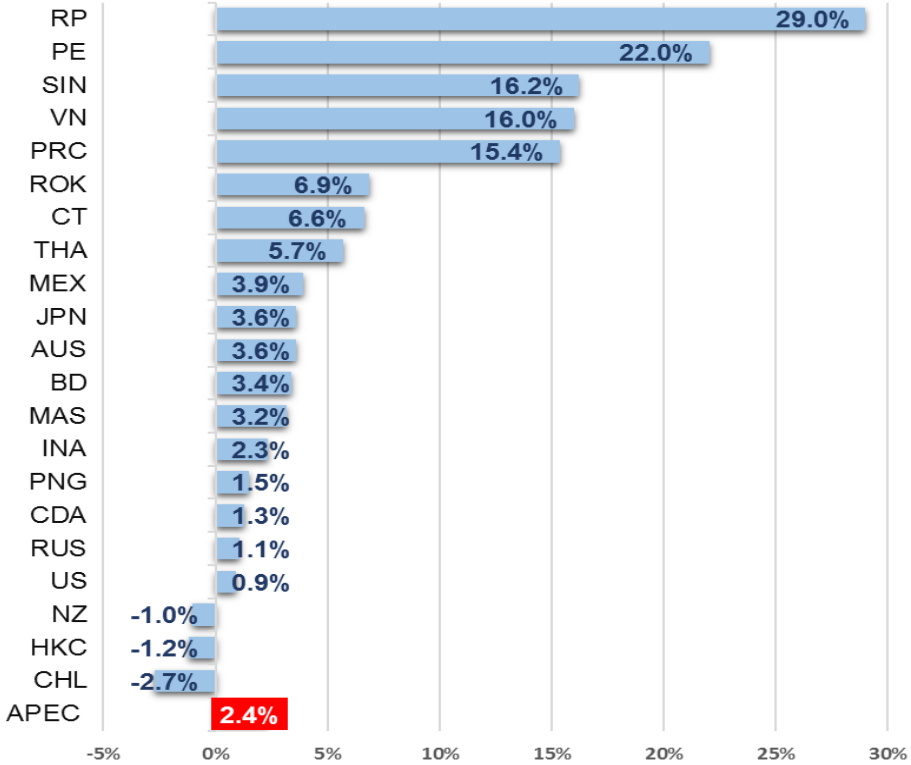


Growth in demand

Natural gas has become a popular fuel for most of the APEC economies as a viable option to diversify energy supply.



Share to PES (%), 2014



AAGR (%), 2000-14

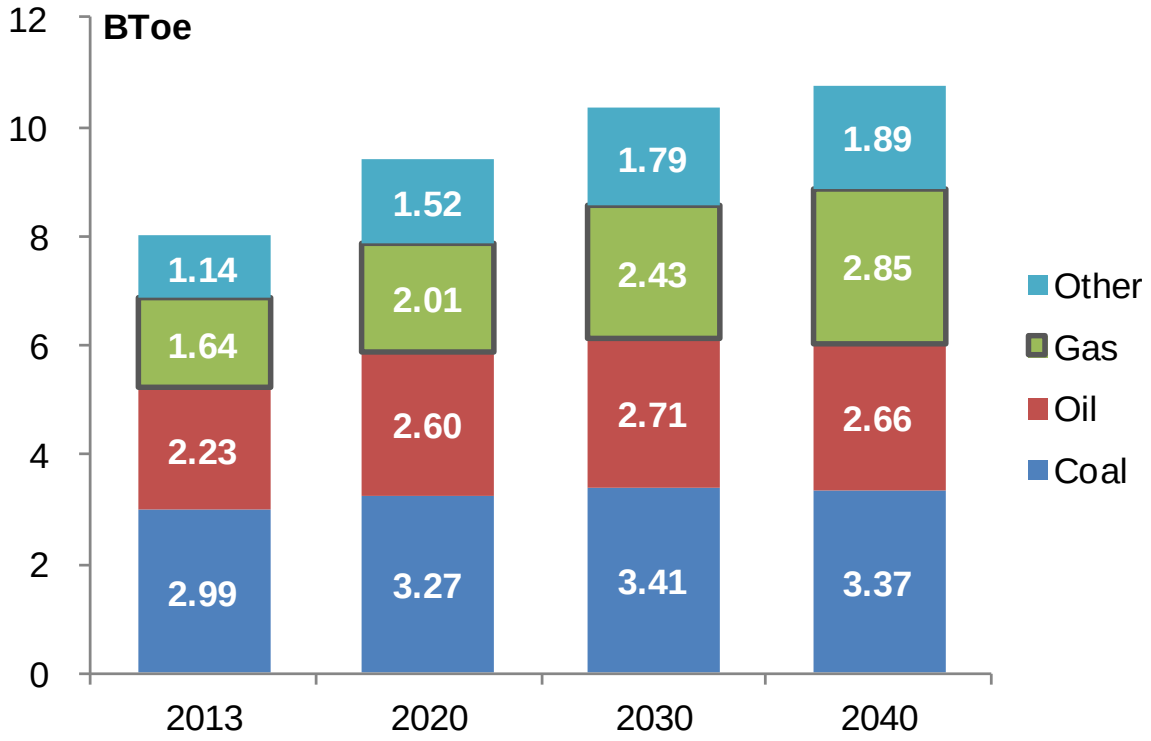
From 2000-2014, the region's primary energy supply increased annually at 2.4%, on average, with natural gas supply requirement grew at the same rate and much faster than oil (only 1.0%).

Forecast of primary energy supply in APEC

Significant growth of energy demand in the region, specifically from emerging economies such as China and the economies in ASEAN and South Americas

Increase in gas demand

- **Heightened interest in environmental issues.**
- **Rapid increase in the quantity of resources brought about by the shale revolution.**
- **Growing use of Floating Storage and Regasification Unit (FSRU) in consuming economies and FLNG in producing economies**
- **Natural gas flexibility in complementing other fuels.**

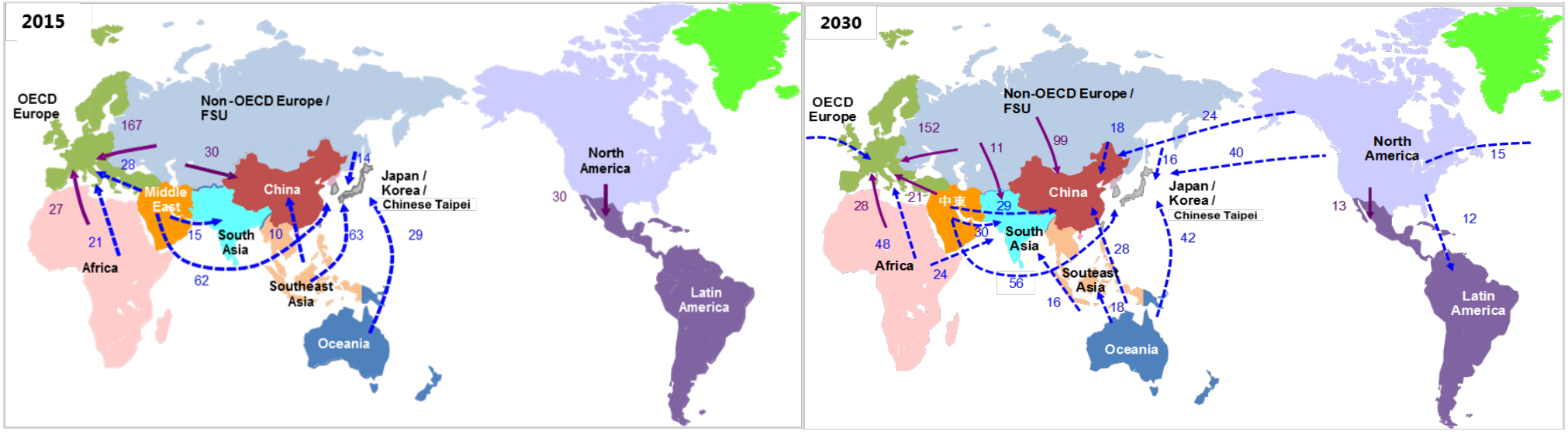


Source: APERC

Gas supply requirement will grow at 2.1% annually, higher than coal (0.4%) and oil (0.7%).

Increase in trade volume

Trade volumes for natural gas in key regions of the world in 2015 and the forecast in 2030



Source: IEEJ

The increase in trade volume in the APEC region is the reason behind the growing concern on gas security.

Trade volume along the primary natural gas trade routes in the Asia-Pacific region is expected to increase by around 1.8 times from 2015 to 2030, from 238 Bcm to 426 Bcm.

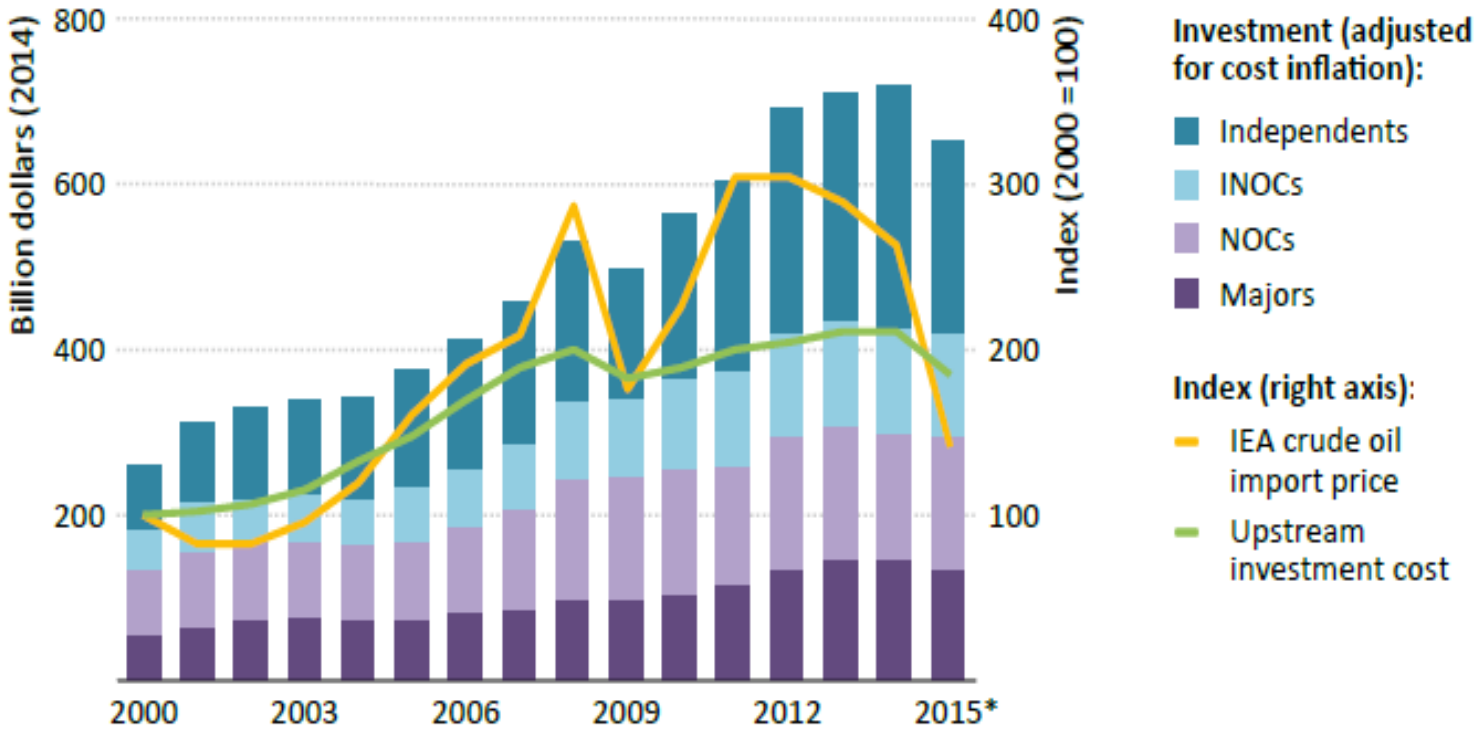
Gas supply interruption

Two gas supply-related interruptions that caught the international attention on gas security

- **Cut in natural gas supply from Russia to Ukraine, which occurred in January 2006 and January 2009.**
  - **Russia is the largest natural gas supplier to Europe.**
  - **Much of the supply is exported through third-party arrangement with some economies using pipeline networks (like with Ukraine) before reaching the end-consumers in Europe.**
- **Rapid growth in LNG Demand in Japan after the Great East Japan Earthquake.**
  - **Increased in gas-fired power plants operating rate, from 319 TWh in 2010 to 388 TWh in 2011, and 420 TWh in 2014.**
  - **The volume of LNG import increased from 70 million tonnes (MT) in 2010 (before the earthquake struck) to 87.31 MT in 2012, and thereafter continued to increase to 88.51 MT in 2014.**

Decline in investment

Global investment in upstream sector



Source: IEA

Investments in the upstream sector have declined rapidly across the world after 2014 when oil prices began to fall.

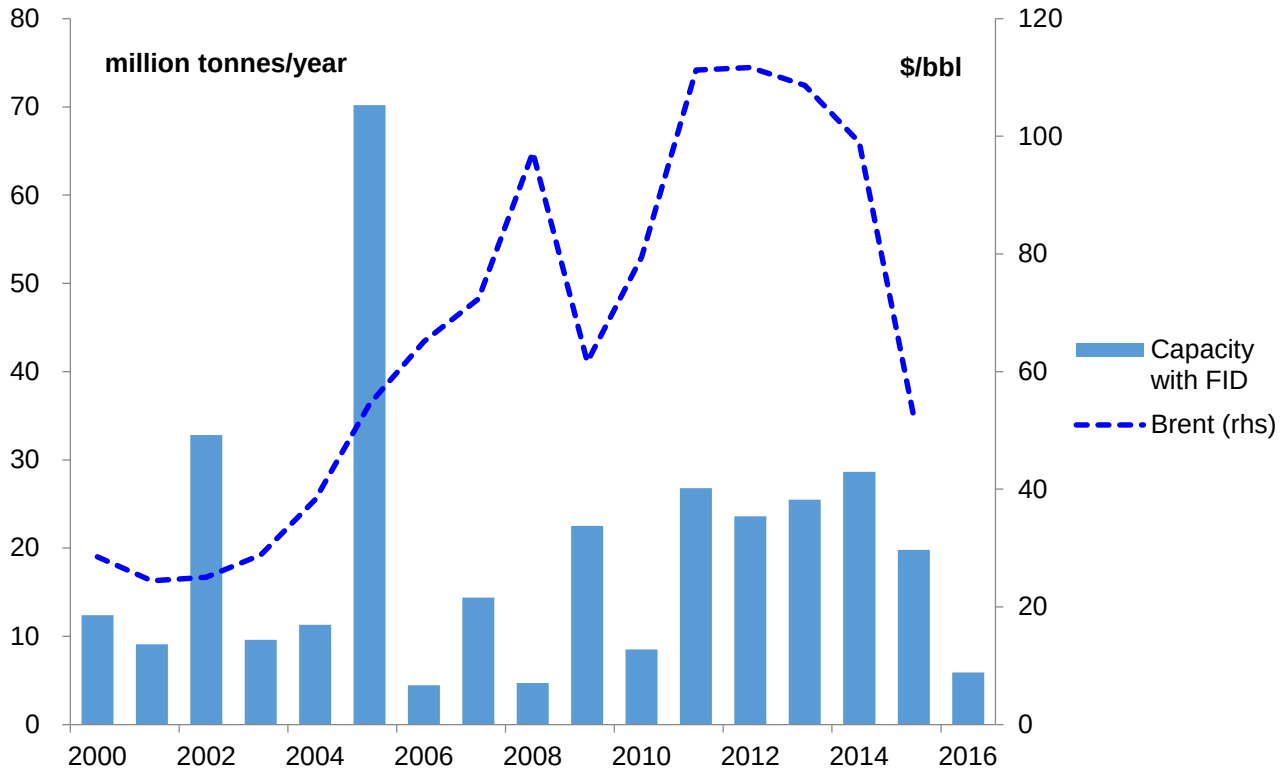
It is highly possible that a supply and demand imbalance will occur and cause problems in securing supplies of natural gas at stable prices in the future if investment in the upstream continues to shrink.

Decline in investment

Global investment in LNG

FIDs for a number of LNG projects have already been deferred or totally shelved as the price of LNG could not cover the capital costs of putting up a new LNG plant.

In 2016, the only LNG-related investment carried out was the Tangguh Project in Indonesia.



Source: IEEJ

Many experts assess that the current liquefaction facilities will still be enough to cover global LNG demand until 2020.

In 2014, global LNG liquefaction stood at 291 million tonnes per annum (MTPA) of which around 40% was located in the APEC region.

Characteristics of gas security

- **Physical Properties of Natural Gas**
  - Development of pipelines, liquefaction and regasification facilities.

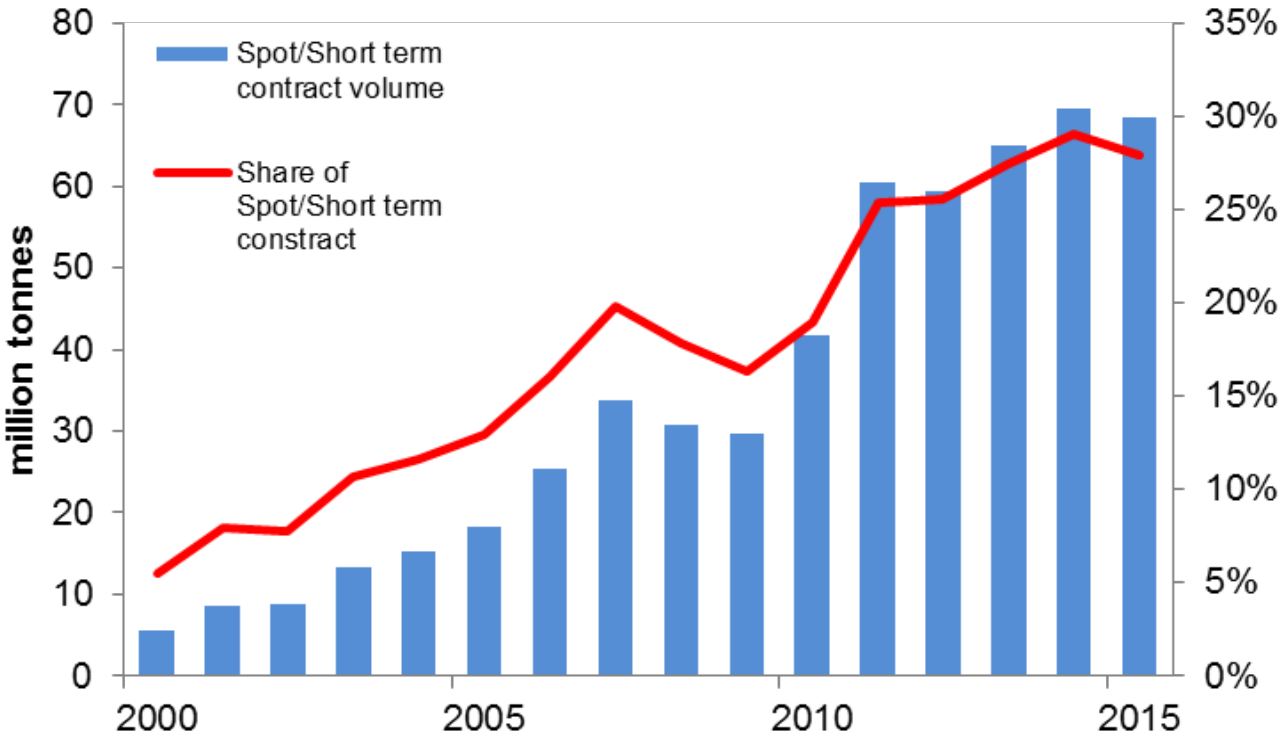
- **Need for huge investment and smaller redundancy in supply**
  - Investments for infrastructure development to transport gas.
  - Investors will only make investment decision that only able to meet certain demand.
  - Redundancy of supply capacity tend to be small.

- **Inadequate Market Liquidity**
  - Natural gas calls for the heavy investment. There are many cases where the natural gas is traded with fixed customers through long-term contracts in order to secure the funds required for the production investment.

- **Better supply and demand diversity**
  - Location of the gas production plays an equally important role in ensuring stable supply.
  - Diverse range of sectors that can utilize gas.

LNG international trade

Short-term / spot trading volume in international LNG market, 2000-15

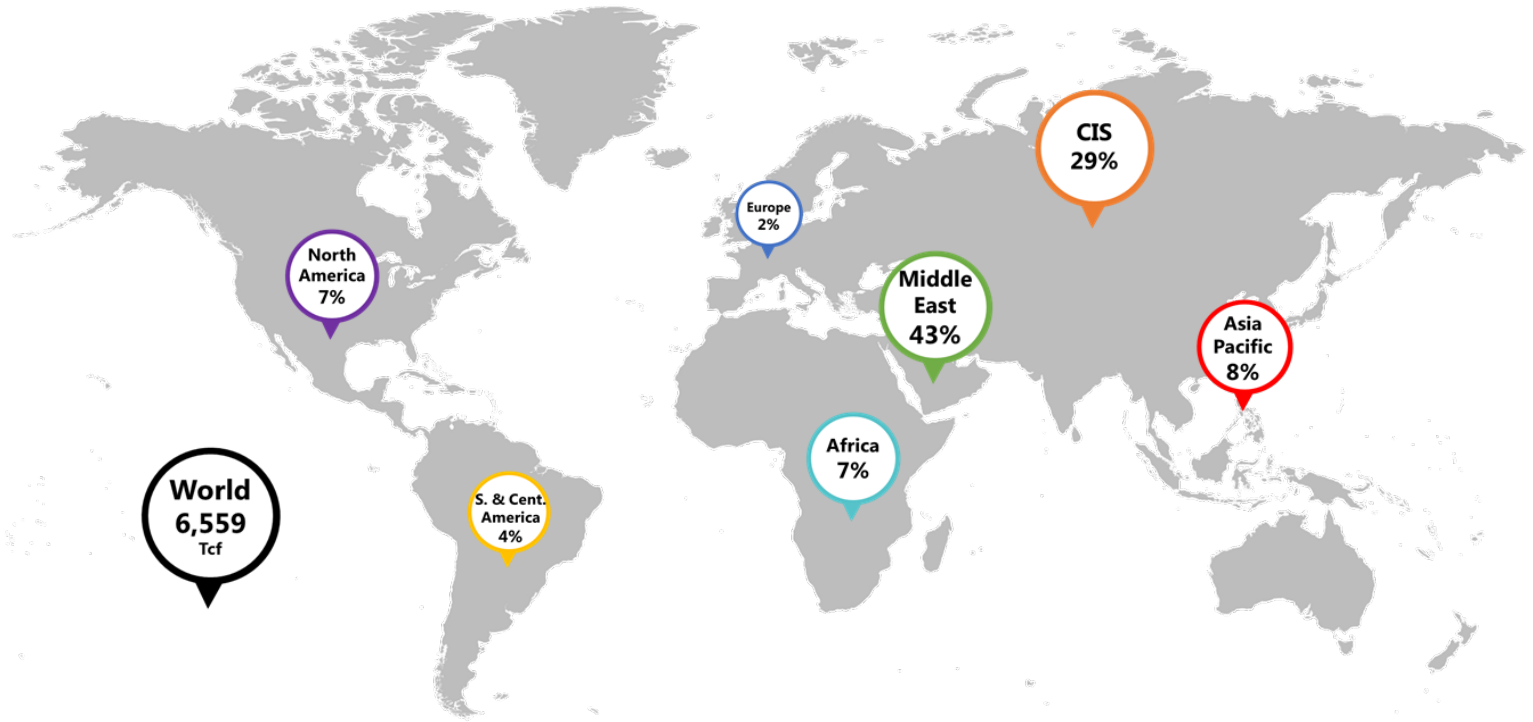


Source: GIIGNL

Trading based on formats other than long-term contracts have been gradually on the rise recently. Close to 30% of the LNG is traded through spot trading or short-term contracts.

Global gas reserves

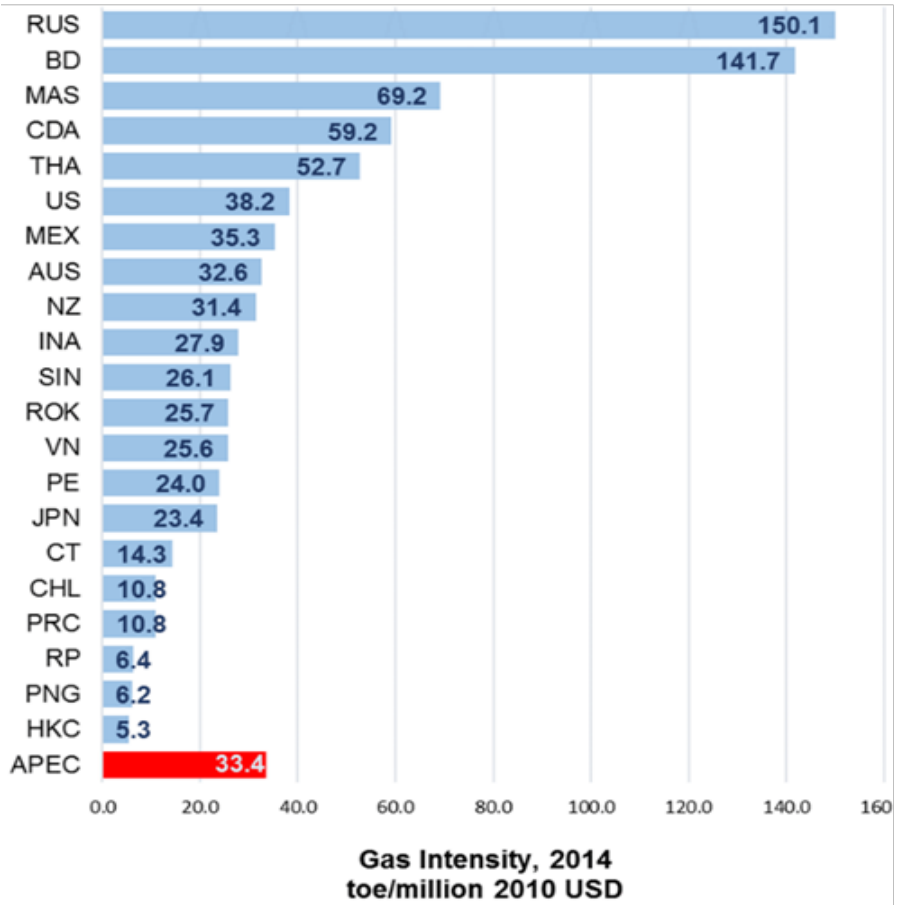
Natural gas reserves in regions of the world, 2016

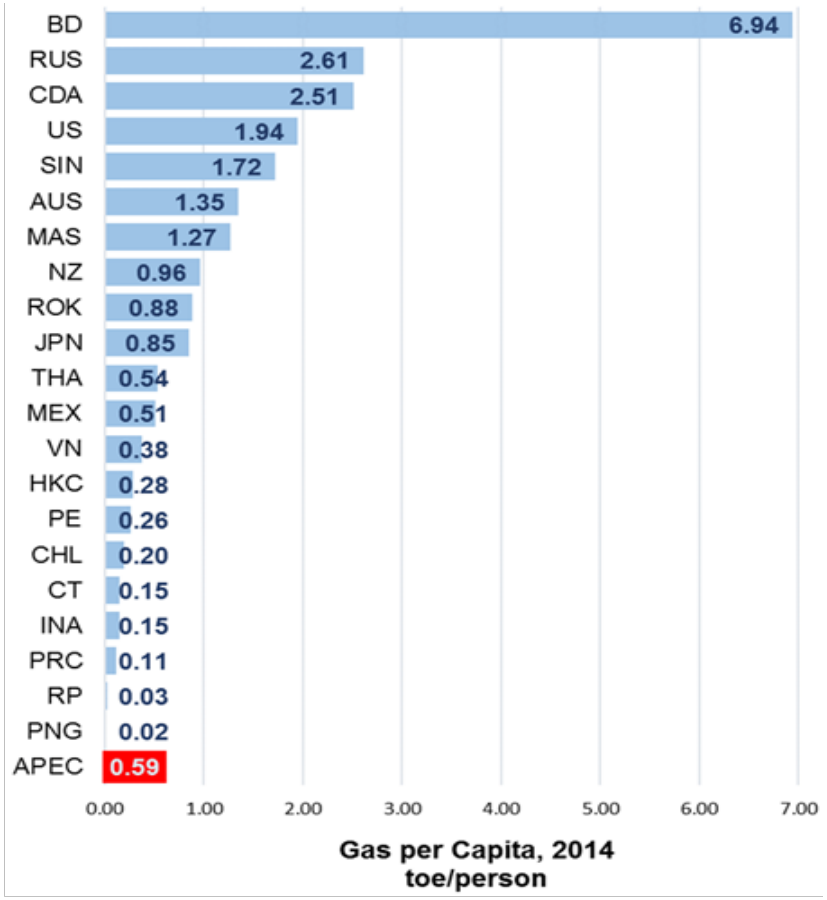


Although 43% of the world's gas reserves are in the Middle East region, gas resources is also found in former Soviet Union region (Commonwealth of Independent States - CIS). As a result of the shale revolution, North America has an increasing amount of reserves.

APEC's Gas Security Overall

APEC gas intensity and per capita, 2014



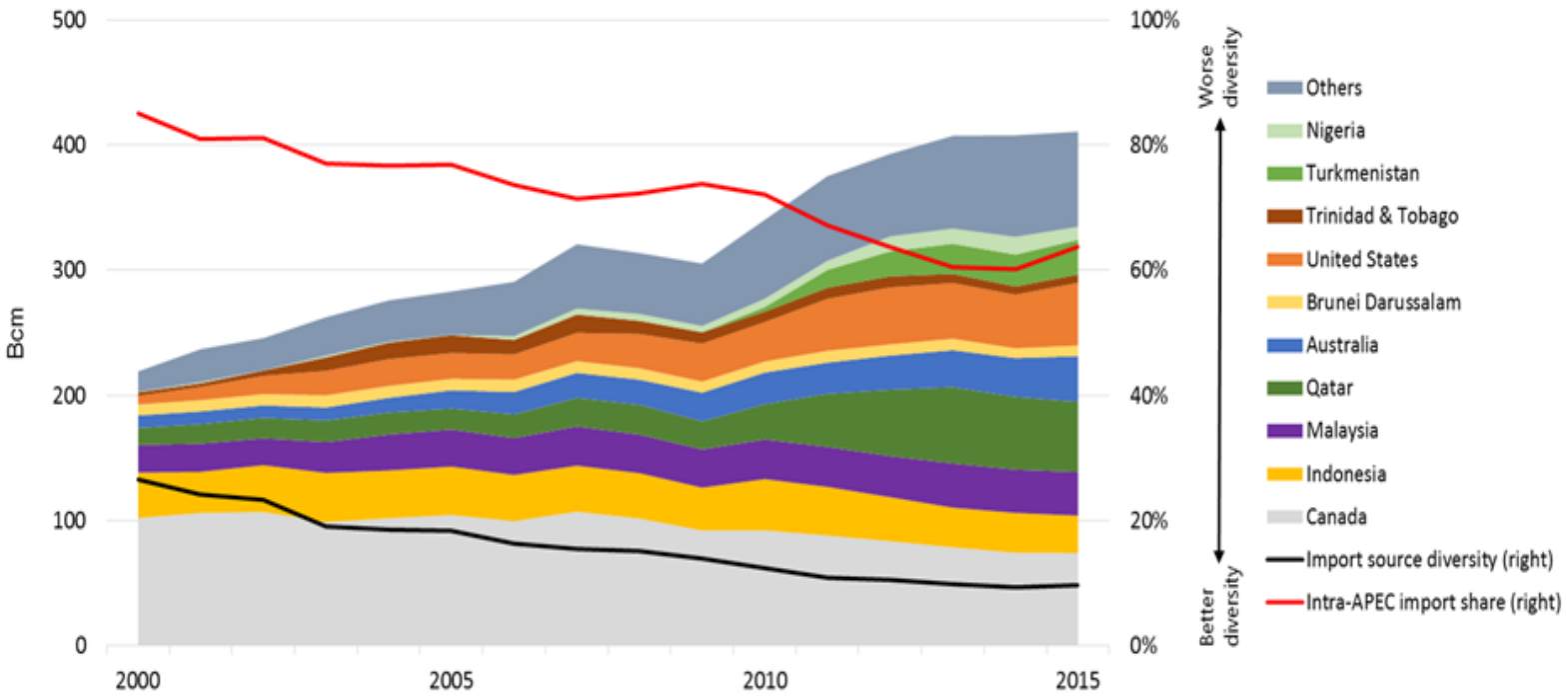


Although gas intensity in the APEC region declined by 1.4% annually from 2000-2014, gas per capita increased by 1.5%

APEC's Gas Security Overall

Natural Gas Import Sources and Diversity Index, 2000-2015

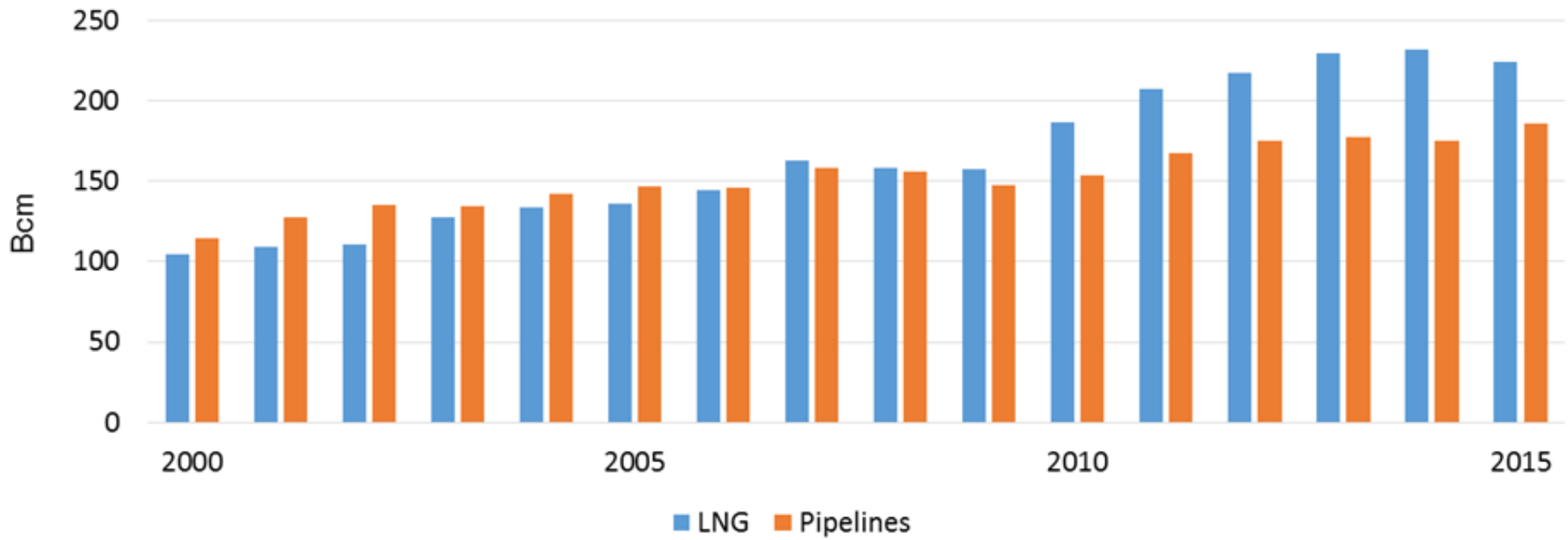
Gas import sources of the APEC region more than doubled reaching 36 economies (including from APEC economies) from only 17 economies in 2000.



Six APEC economies almost constantly appeared as top import sources for the APEC region – Australia, Brunei Darussalam, Canada, Indonesia, Malaysia, and the United States. In 2000, these major import sources supplied 82% of gas import, but gradually declined to 55% in 2015.

APEC's Gas Demand and Supply

LNG vs pipelines exports to APEC, 2000–2015 (Bcm)



In 2007, LNG surpassed piped-gas as main source of gas import. The gap widened post 2010 due to higher gas production in the United States that subsequently reduce gas import through pipelines and the Fukushima incident that happened in 2011

Progress in liberalisation to secure gas supply

Natural gas market has become increasingly liberalised in Asia in recent years

- **China is planning to unbundle the supply chain of the domestic gas market.**
- **Japan has been undergoing market liberalisation in phases since 1995.**
- **Korea is now drawing up plans to liberalise the domestic gas market currently monopolised by the Korea Gas Corporation.**
- **Indonesia and Malaysia plan to open up gas market by introducing various regulations such as Third Party Access (in Malaysia).**

Policy Recommendations

- **Establishing a framework that can maximize the benefits of the market mechanism by improving flexibility in market trading and improving market liquidity to enhance gas security.**

- **Formulating a policy measure to promote investment related to the stable supply of natural gas to develop infrastructure with adequate production capacity.**

- **Accelerating the development of international networks which can offer more response options in situations of unexpected supply disruption of demand and supply fluctuations.**

- **Maximizing the merits of LNG by developing more receiving infrastructure, as well as FSRU. Creating a spot market where active trading takes place constantly like in the international oil market or international coal market will ensure greater liquidity.**

- **Formulating objective standards and indicators on gas security.**

- **Establishing regional cooperation framework on gas security and enhancing intra-APEC trade.**

Thank you

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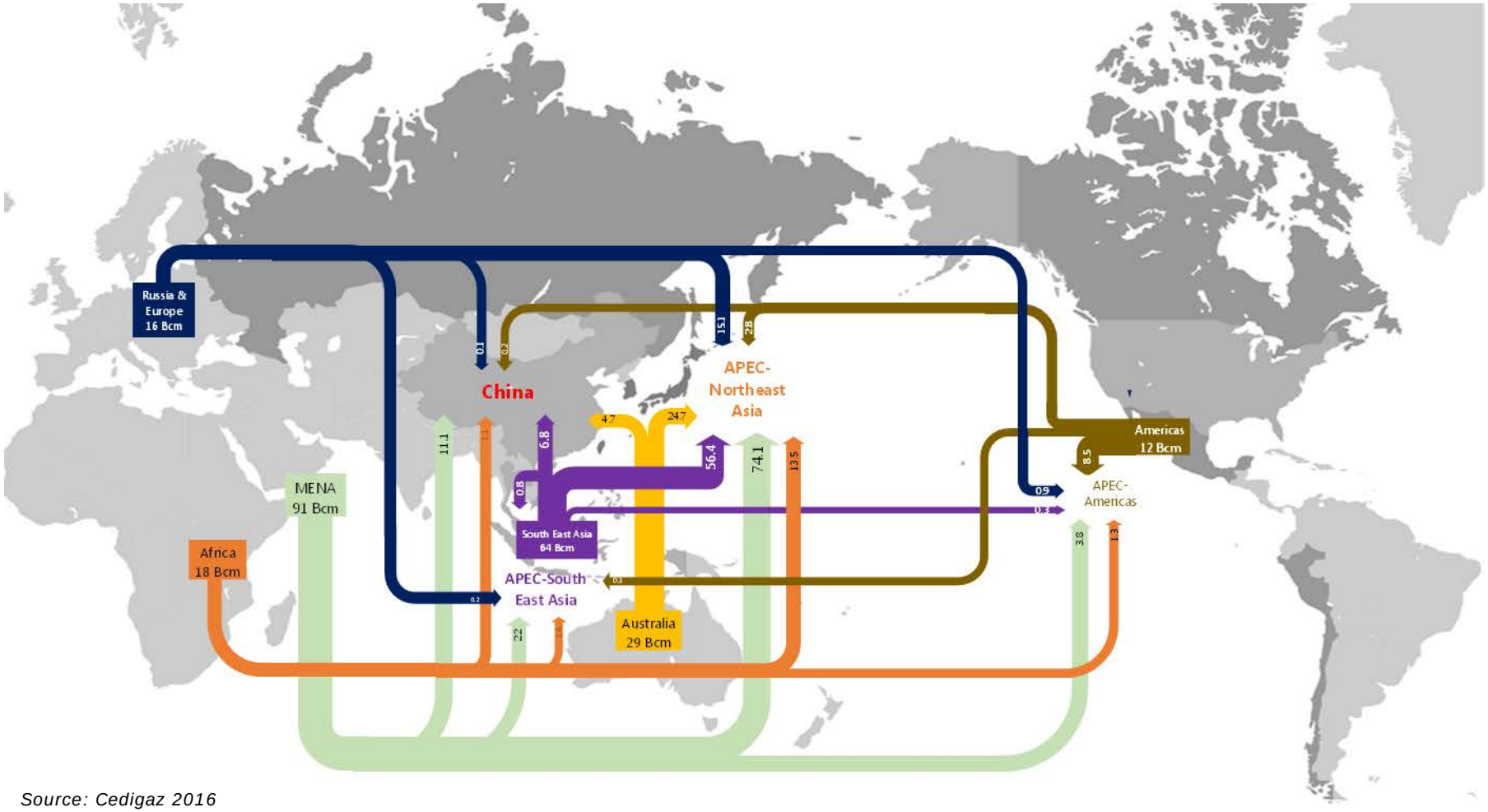
APEC Gas Trade, 2013



Source: Cedigaz 2016

MENA and SEA have been the main sources of gas import for most APEC members (in LNG form).