
# Potential Markets for Alaskan LNG

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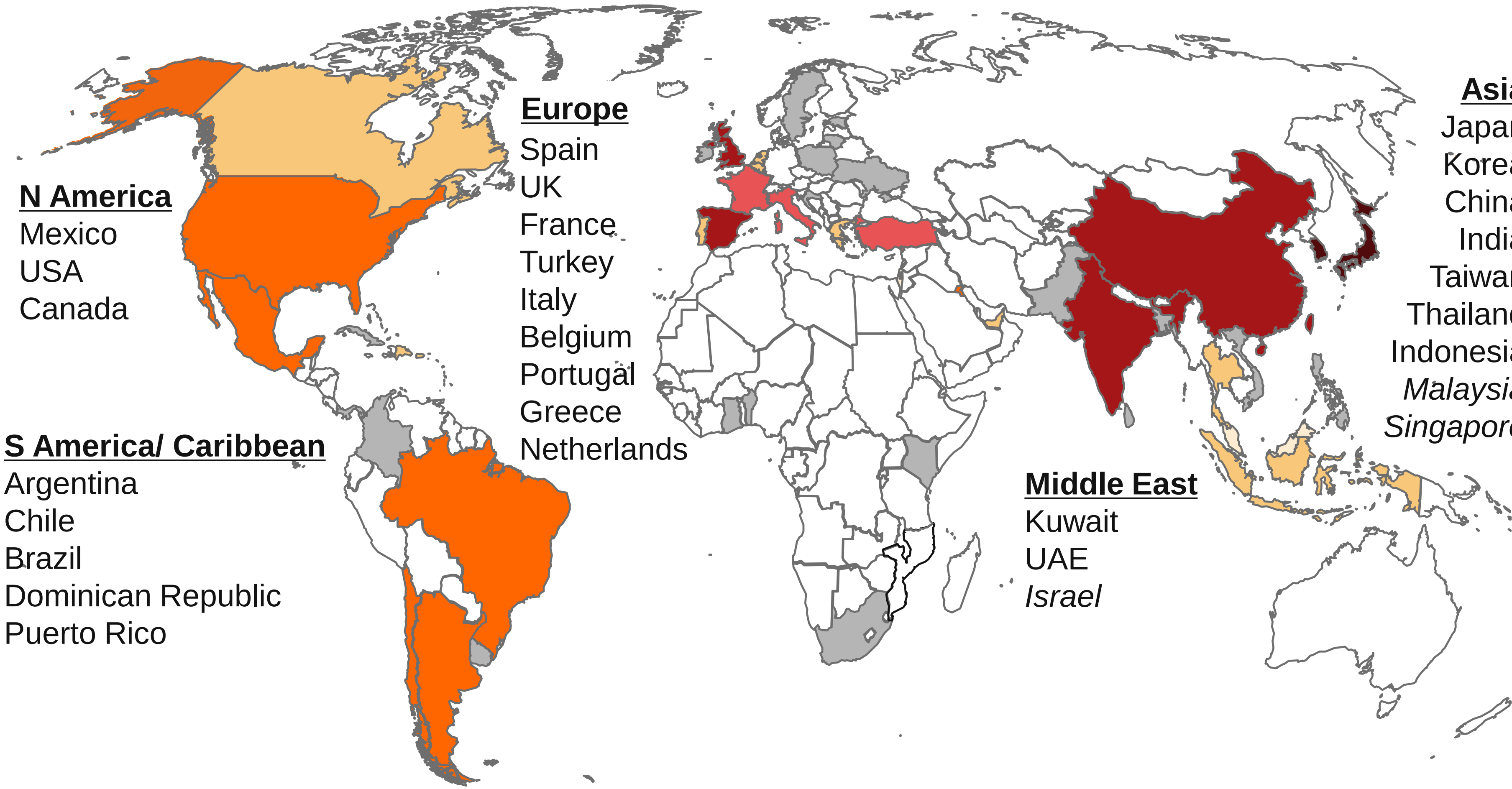
# Markets for Alaskan LNG

- Strong Growth From Most Regions
  - LNG driver different by market
- LNG Gaining in Popularity
  - Higher demand from existing markets
  - Numerous proposed markets
  - Floating Storage and Regasification Unit (FSRU) offers lower-cost solution
- Asia Will Be Target Market for Alaska
  - Geography
  - Market Size and Growth
- Opportunities Available Elsewhere, But More Limited
  - South America
  - Europe
  - Middle East and Africa

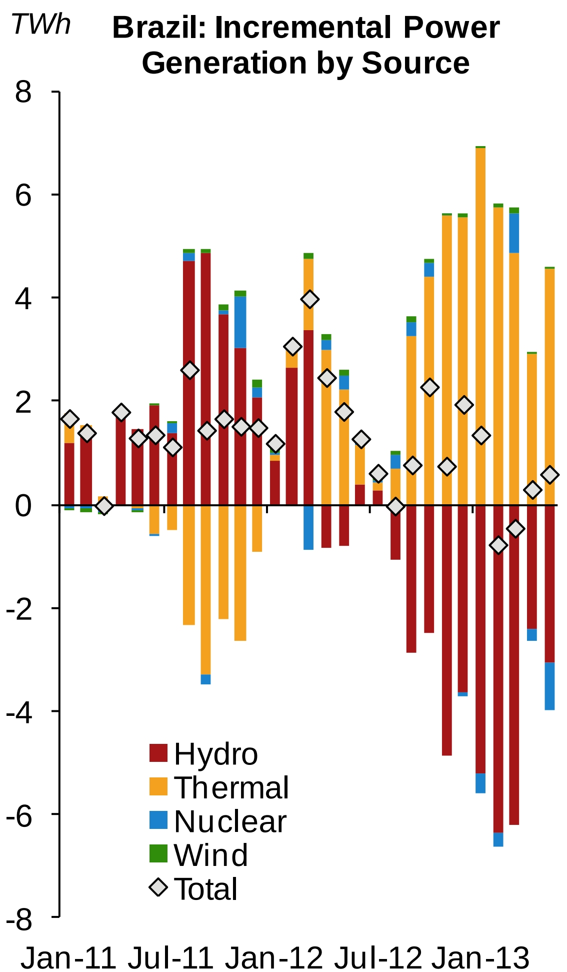
# 27 Importers (2012) and Counting



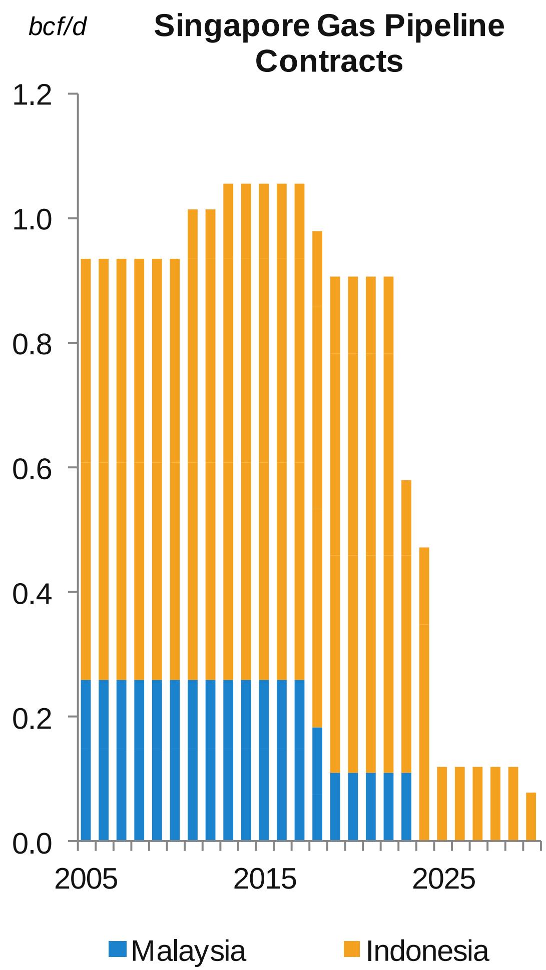

**2012 Imports (mmt)**

35+ | 10 -15 | 5-10 | 2-5 | 0-2 | Start 2013 | Proposed

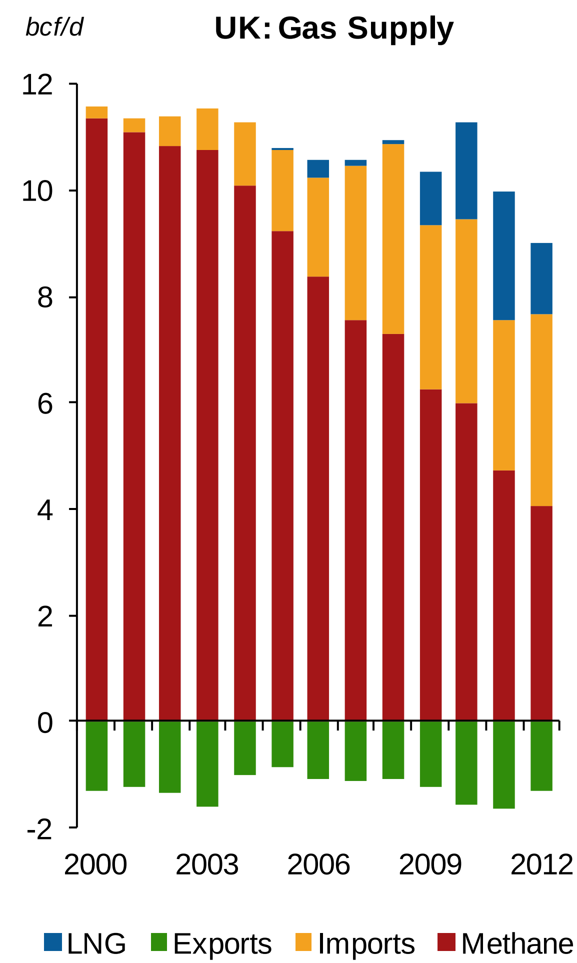
# Why LNG? Three Examples




**Brazil: Offset Hydro**




**Singapore: Diversify Gas Supply**




**United Kingdom: Declining Production**



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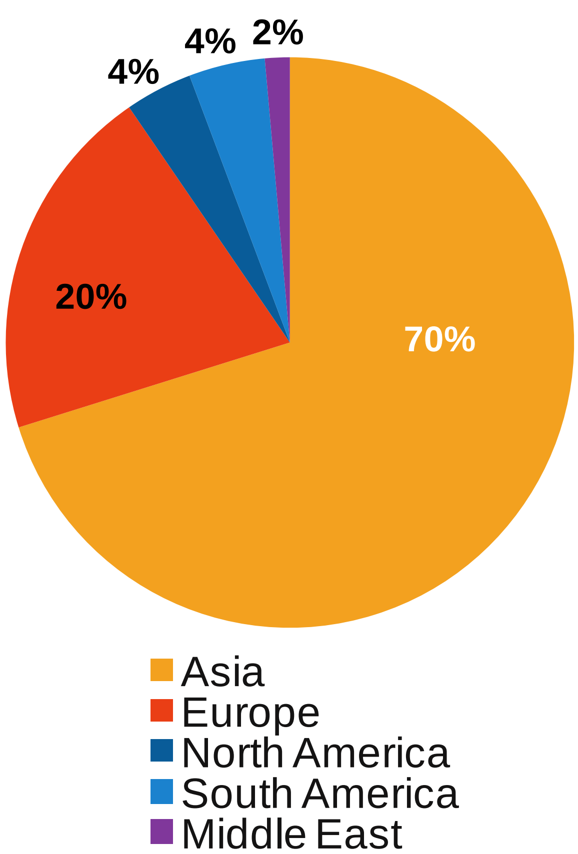
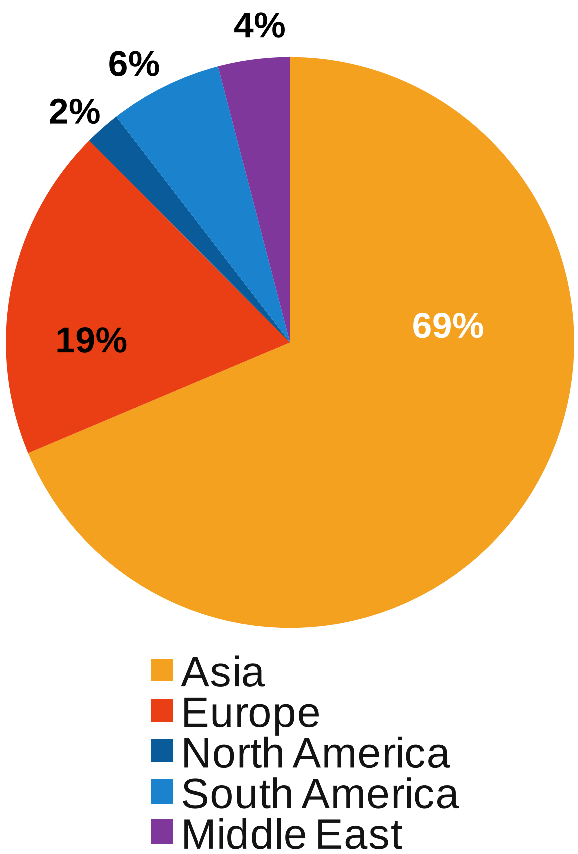
# Demand Pull Greatest from Asia

LNG Demand by Region, 2012




LNG Demand by Region, 2030



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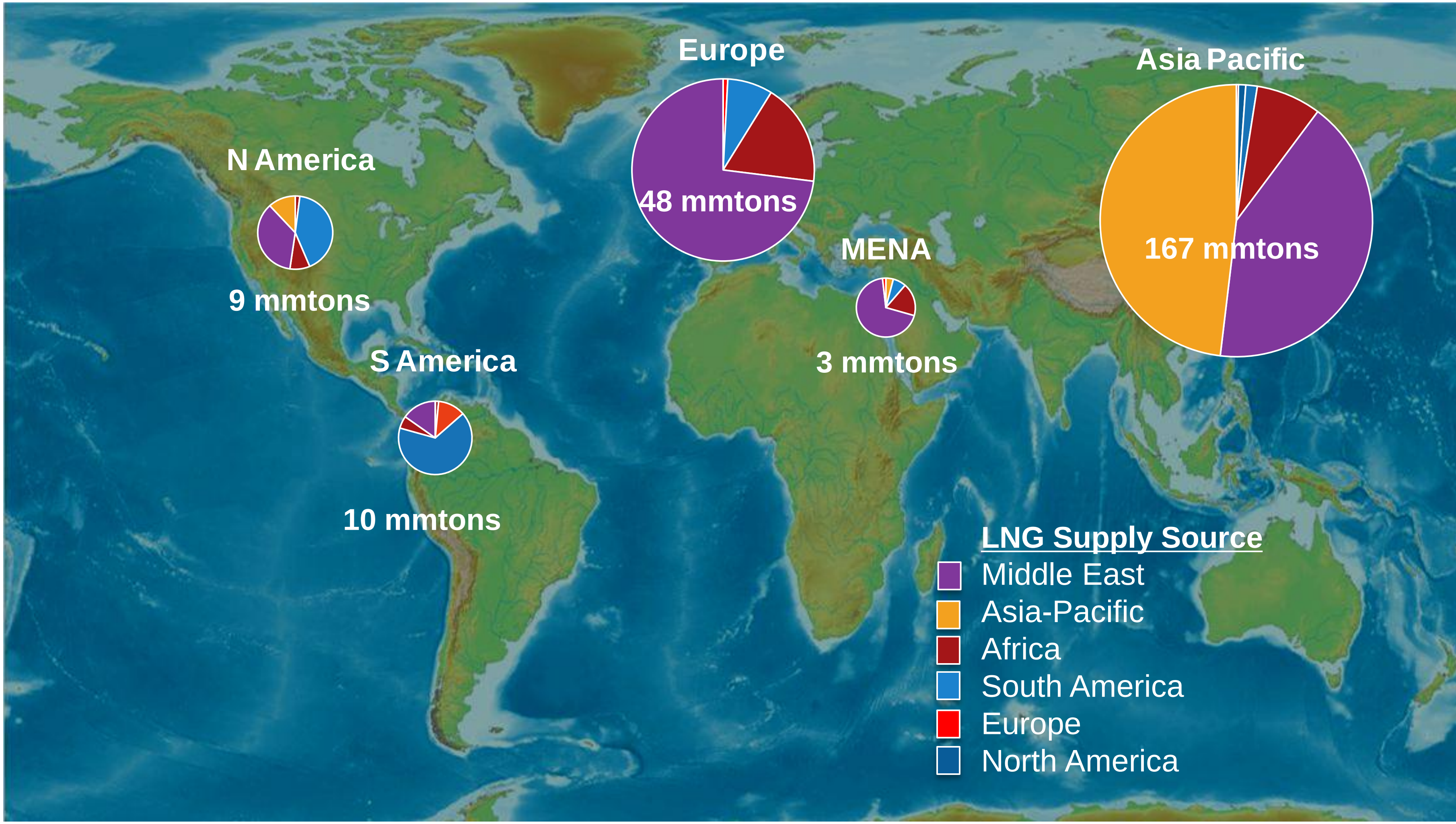
# Proximity Matters




Asia main destination for Asia-Pacific supply



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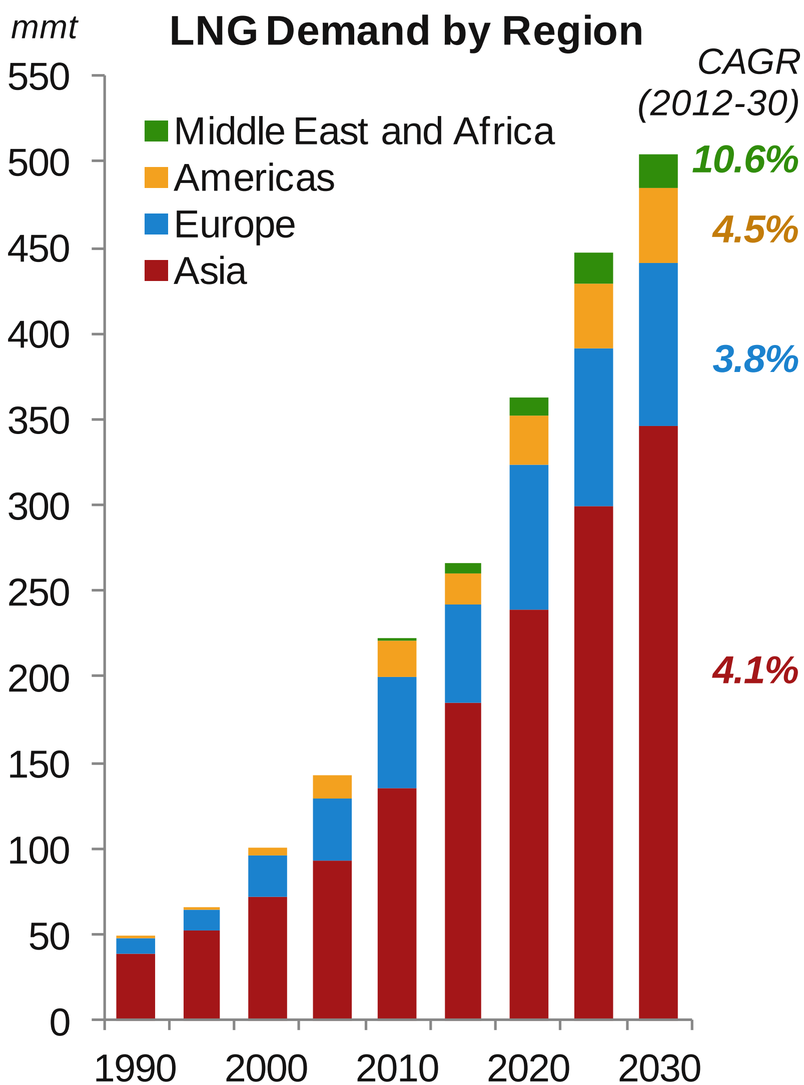
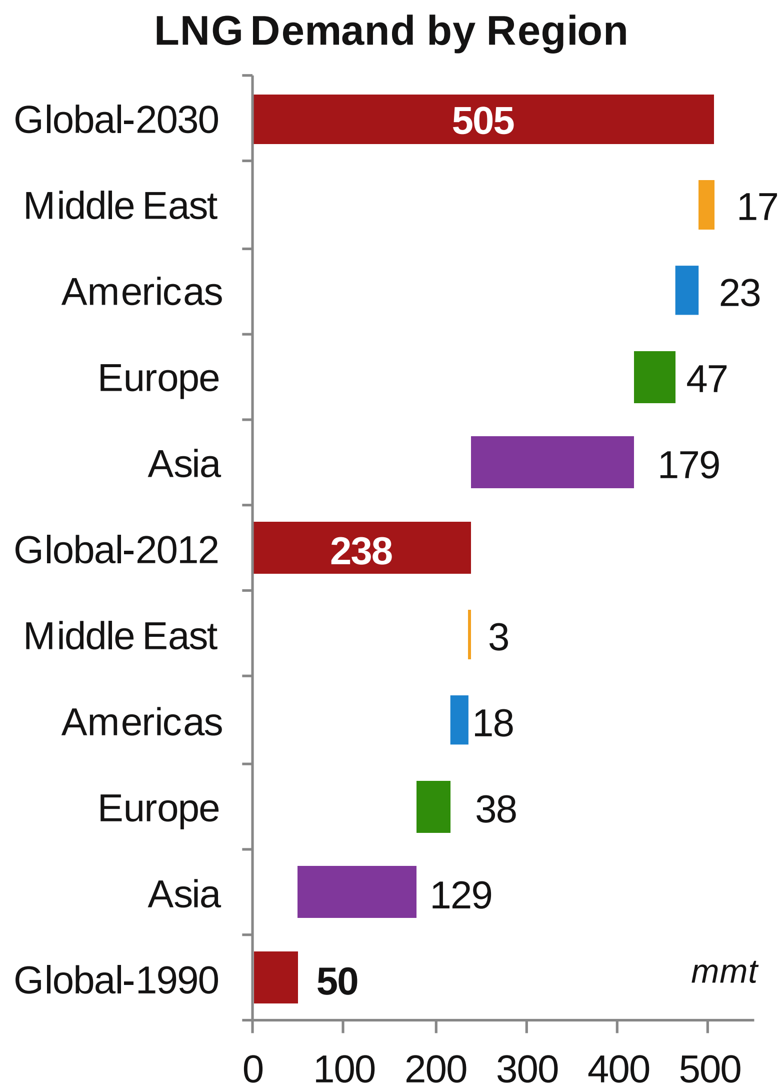
# Asia Drives LNG Demand Growth



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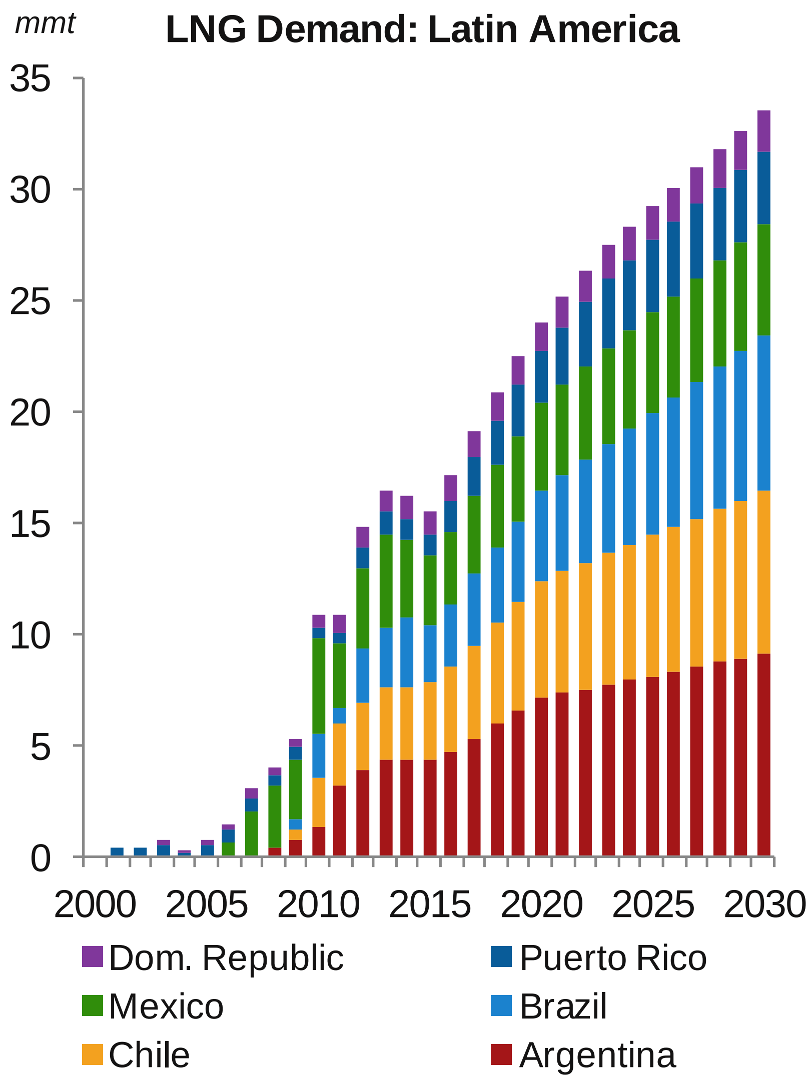
# LNG Demand Outlook: South America

- Growth of 4.5% p.a. from 2012-2030
- Mexico
  - LNG offsets falling production
  - But competes with imports from US
- Brazil
  - Diversification from Bolivia
  - Important during droughts
- Argentina:
  - Declining production & reserves
  - Insufficient gas to meet seasonal peak
- Chile
  - Replace pipeline imports from Argentina
- Puerto Rico & Dominican Republic
  - Gas-fired power generation
- Proposed New Importers
  - Jamaica, Uruguay, and Colombia



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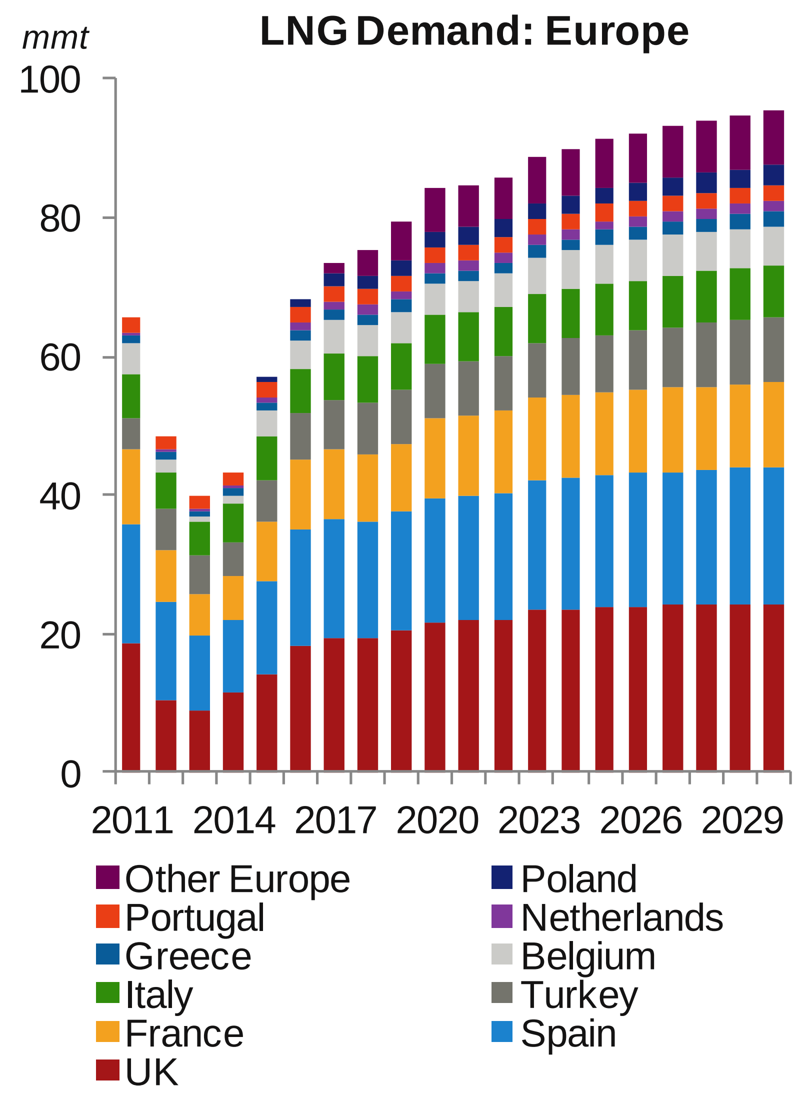
# LNG Demand Outlook: Europe

- Lower growth region for LNG at 3.8% from 2012-2030
  - Large share of this is recovery: LNG peaked at ~66 mmtons in 2011
  - Moderating energy intensity per GDP (Energy efficiency and demographics)
- Sharp LNG decline from 2011-13
  - LNG diverted to higher-priced markets
  - Lower demand due to economy, coal, renewables, hydro
  - Pipeline gas replaced LNG
- LNG Growth Driven by
  - Declining production (UK, Netherlands)
  - Energy security (supply diversification)
  - New Importers: Poland, Lithuania
  - Proposed Importers: Sweden, Croatia, Estonia, Ukraine, Finland, and Ireland



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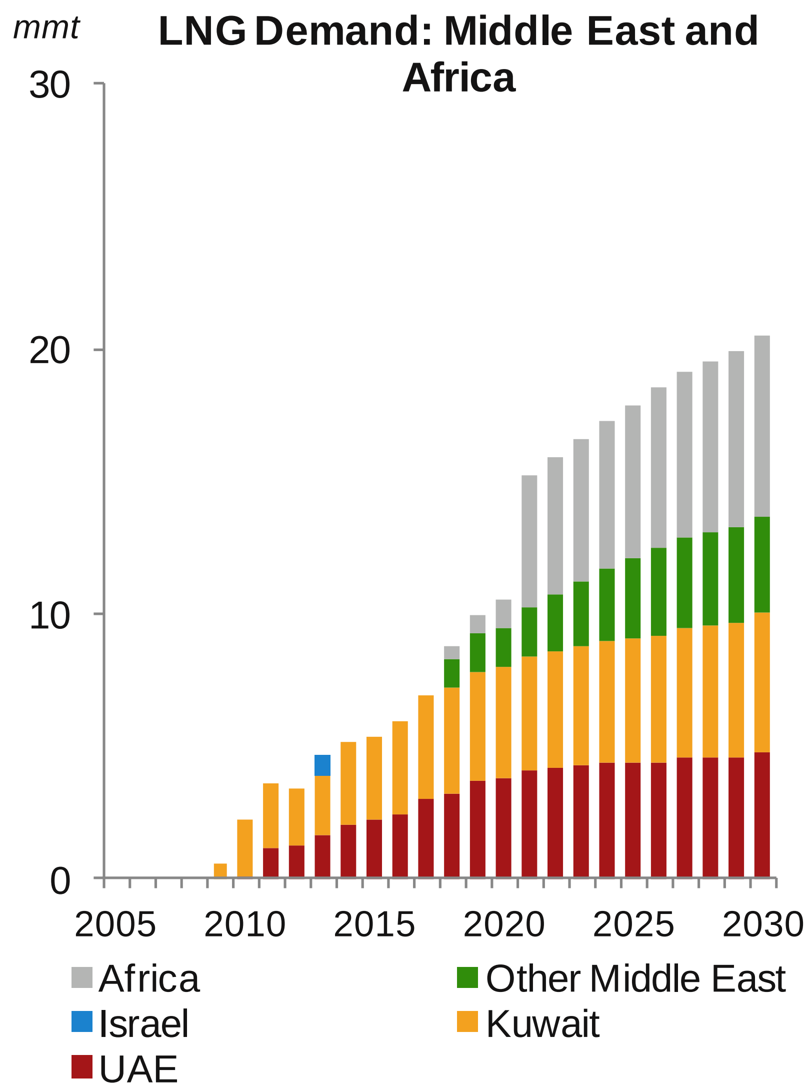
# LNG Demand Outlook: Middle East & Africa

- Fastest growth region: 10.8% p.a. from 2012-2030, but smallest market
- Power Biggest Driver for Existing Markets: UAE, Kuwait
  - Fuel switching away from oil
  - Need to meet rising power demand during peak months (summer)
  - Both have proposed expansions to import capacity
- New Importer: South Africa
- Proposed New Importers:
  - Benin, Ghana, Kenya



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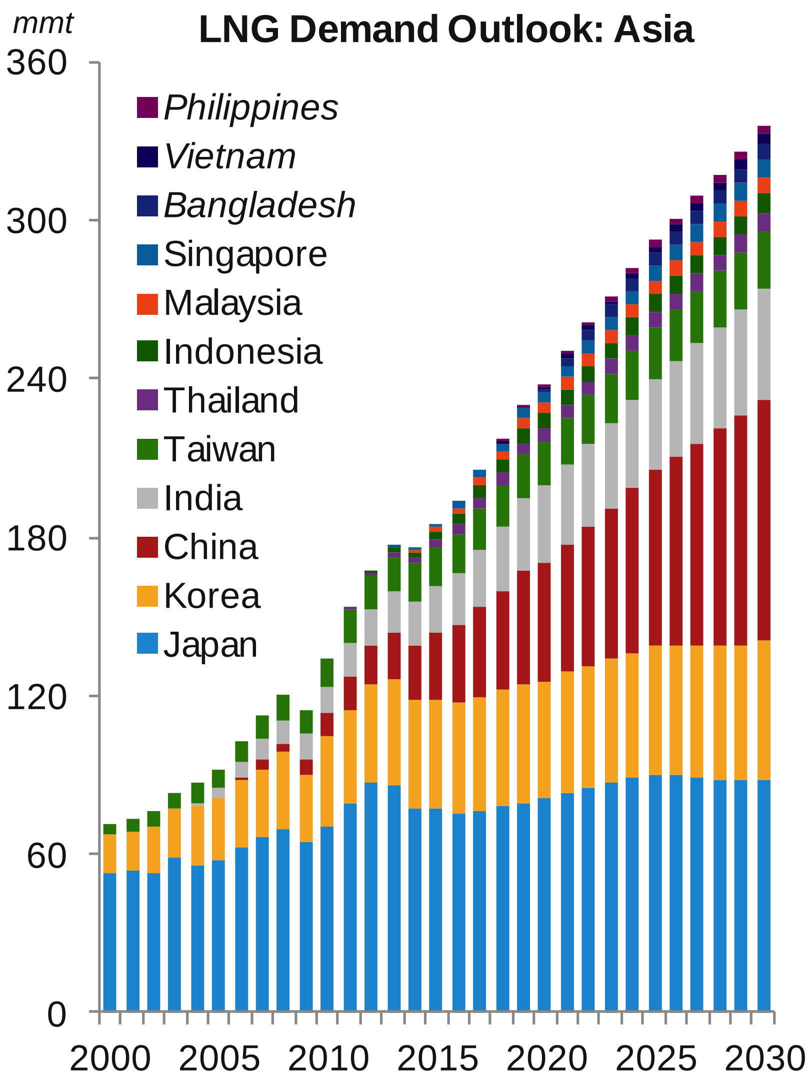
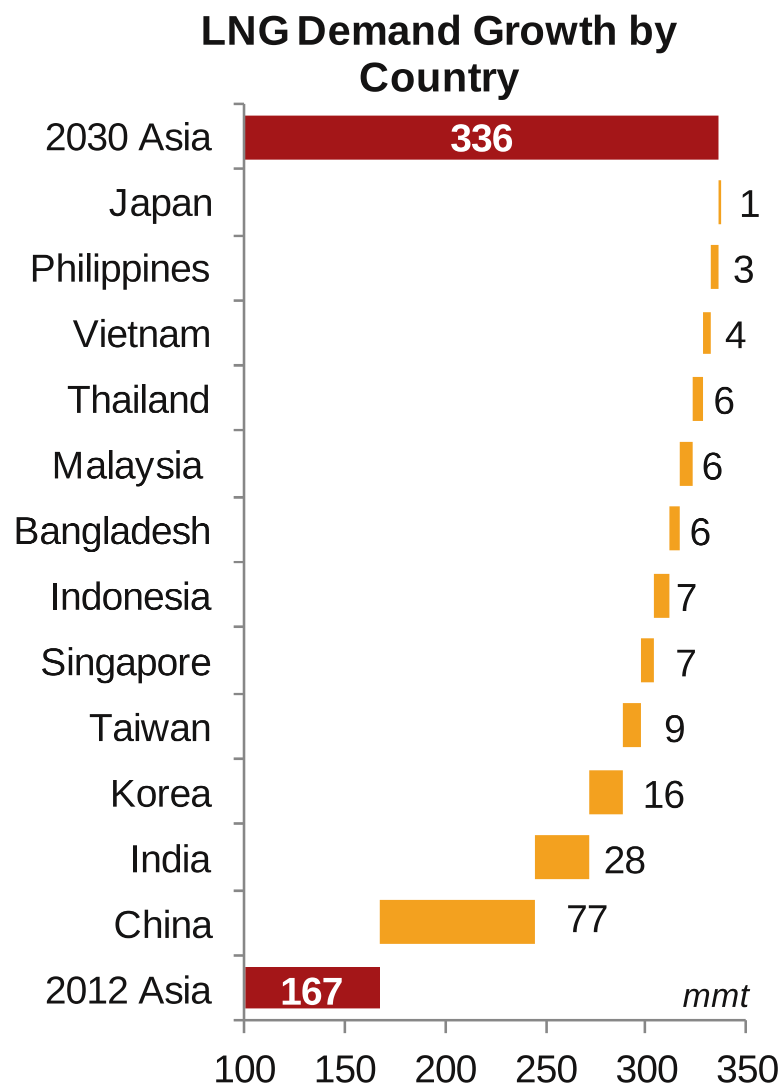
# LNG Outlook: Asia



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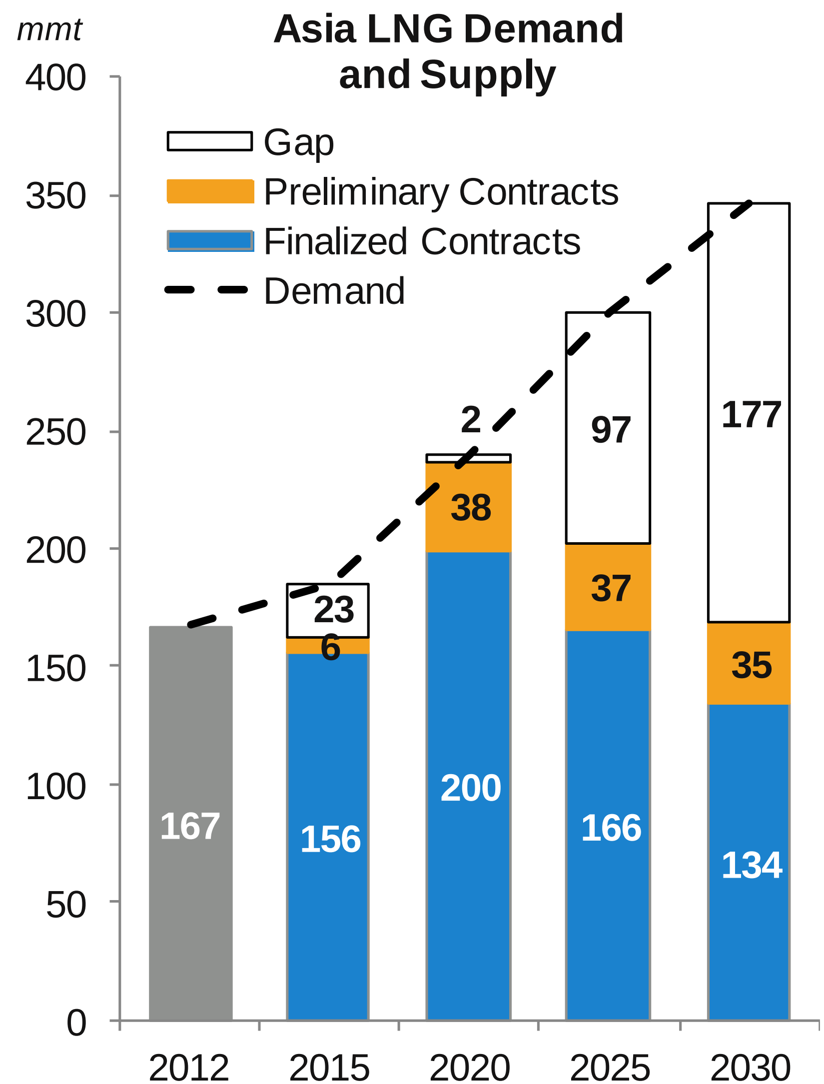
# Growing Supply-Demand Imbalance in Asia

- How To Assess Markets for LNG Projects: Supply-Demand Gap
- Finalized Contracts (15-20 years)
  - SPA: Sales and Purchase Agreement
  - Equity Offtake (small portion of total)
- Preliminary Contracts
  - MOU: Memorandum of Understanding
  - HOA: Heads of Agreement
- Markets have different preferences for the share of demand not tied to long-term supply contracts
  - Short-term contracts
  - Spot volumes



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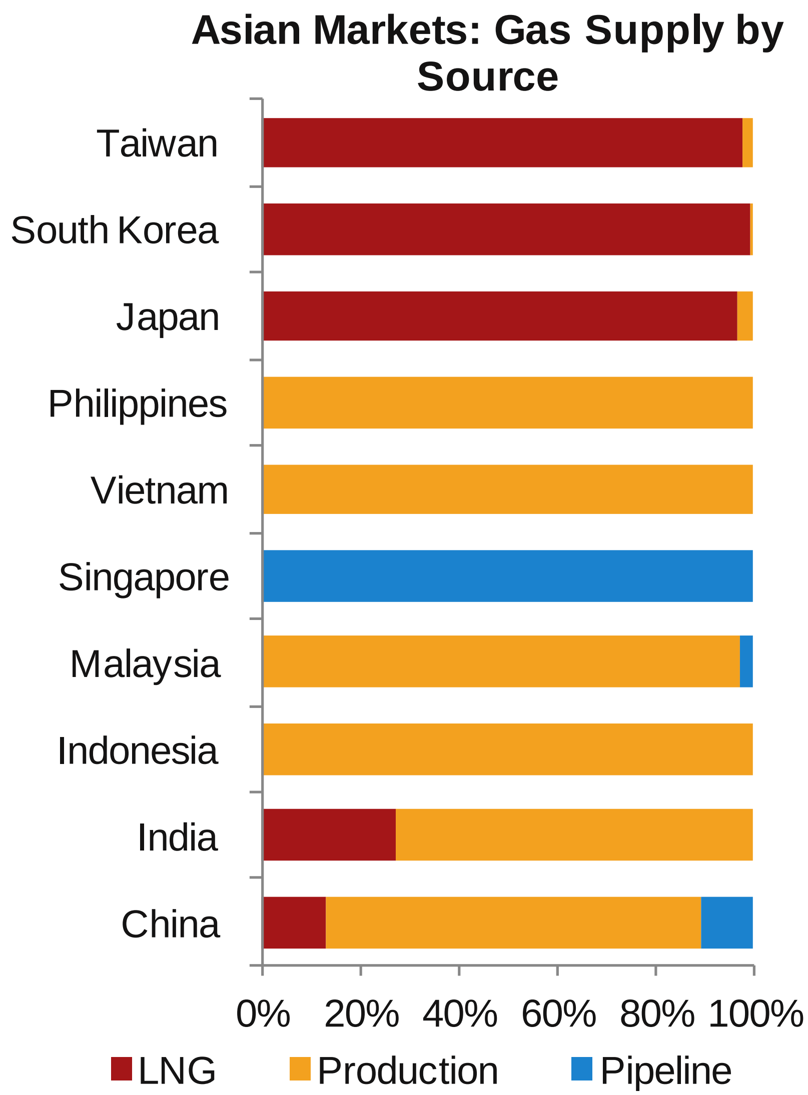
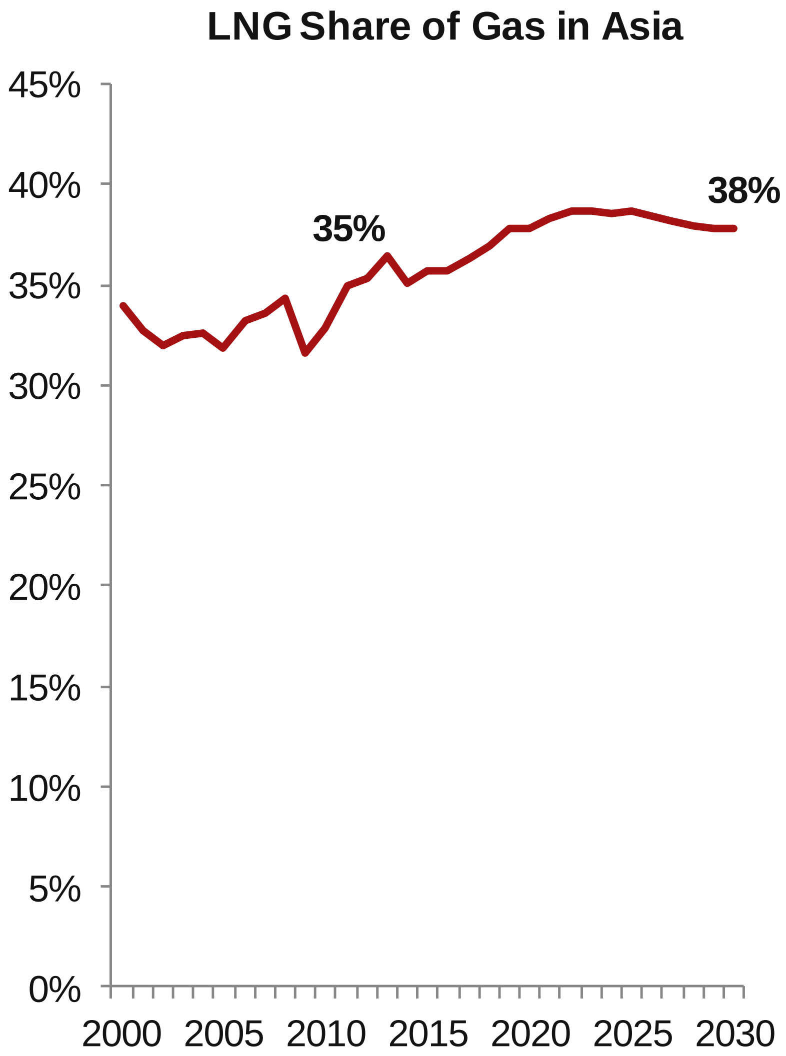
# LNG Important Supply Source for Asia



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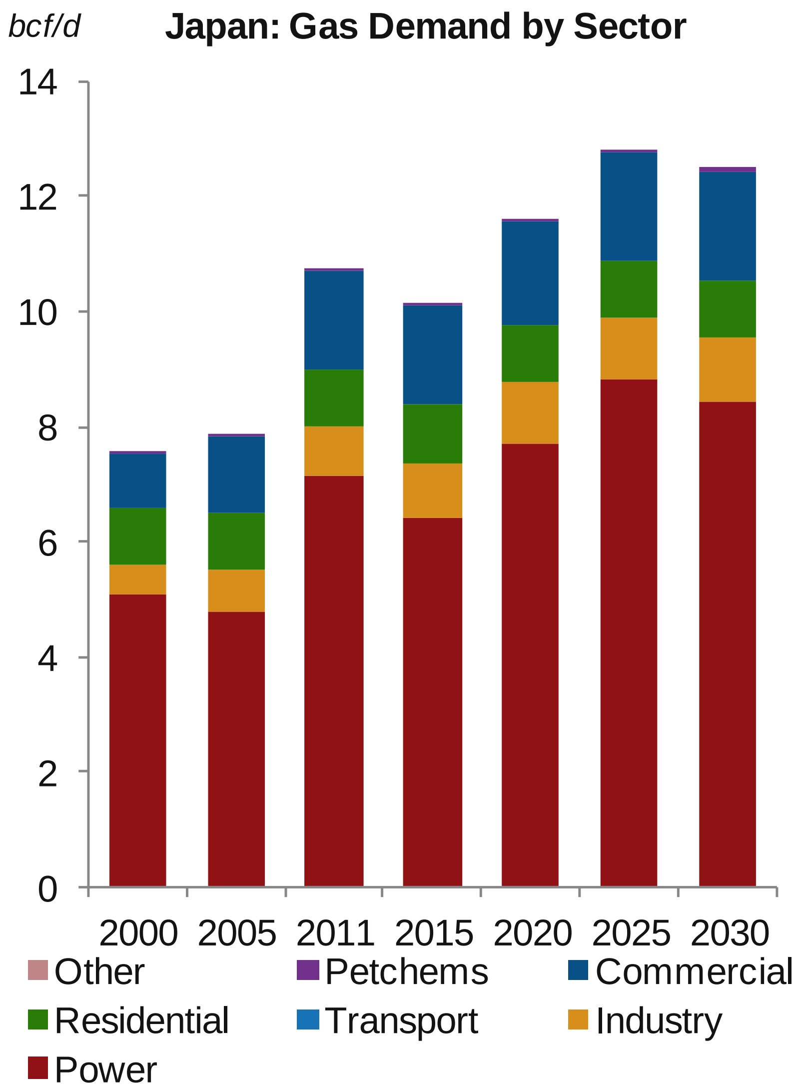
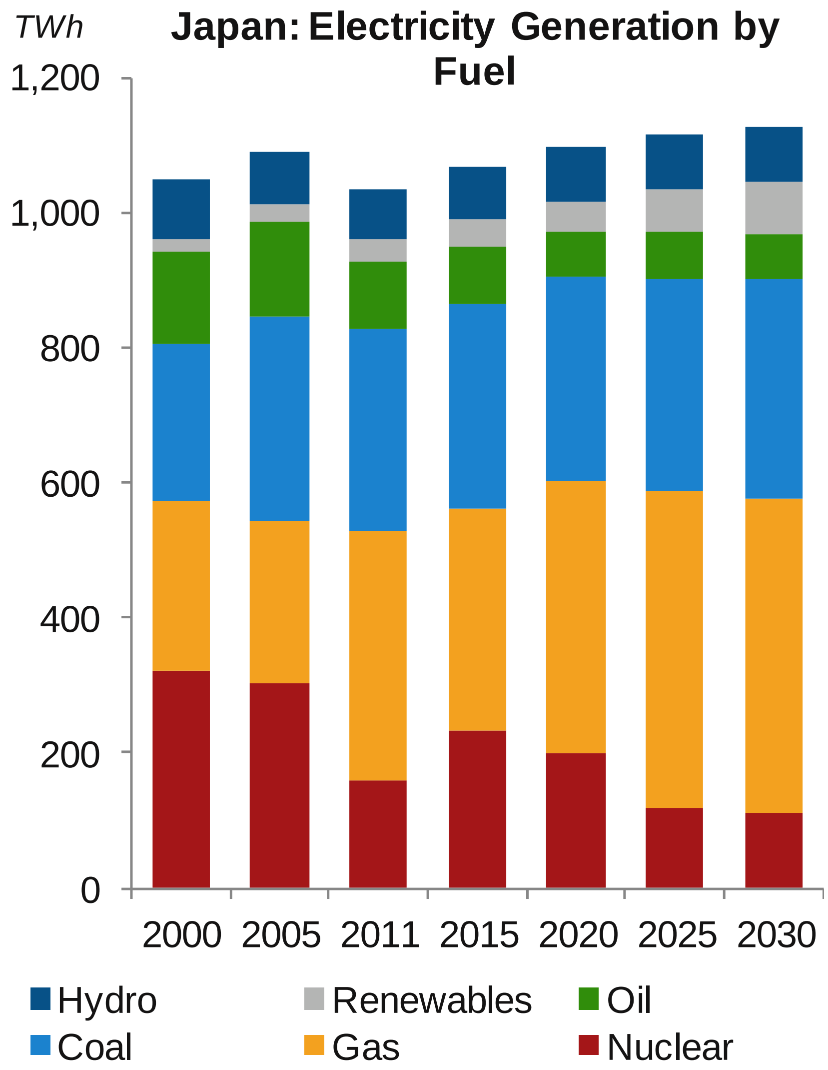
# Japan: Gas Demand Drivers



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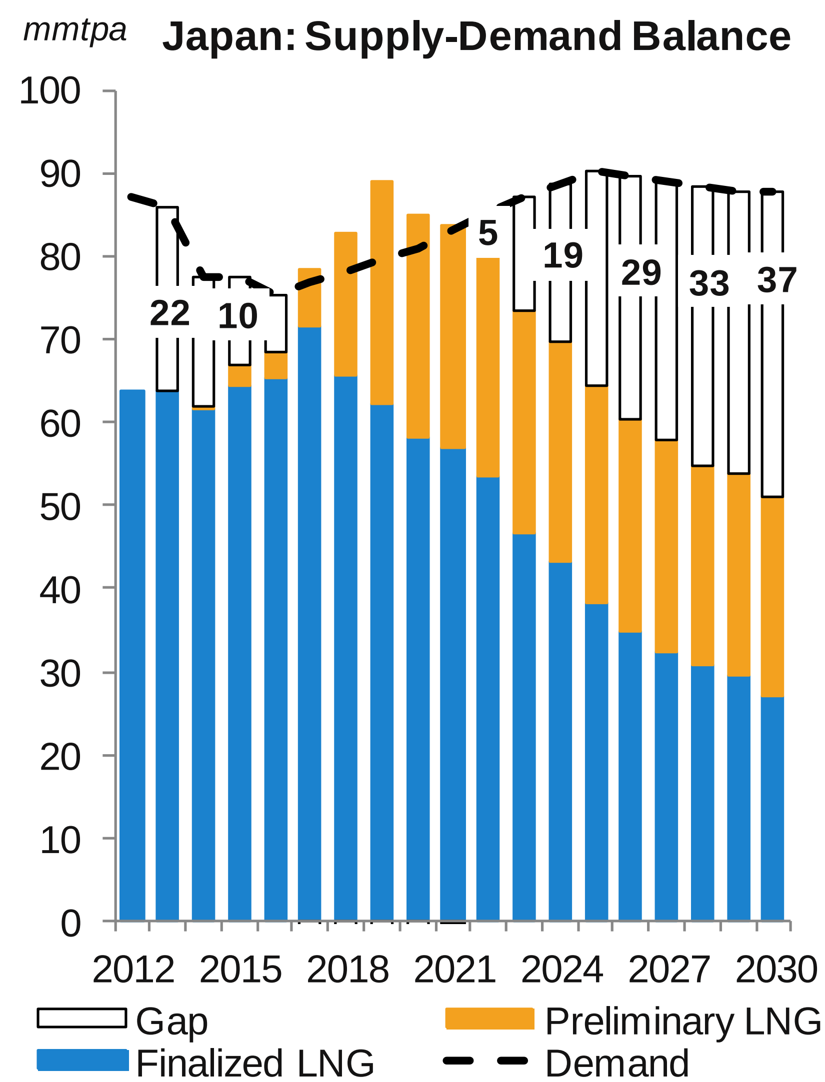
# Japan: LNG SD Outlook

- Japan is the largest destination for LNG (88 mmtons in 2012)
- LNG Buyers:
  - Gas Utilities (e.g Tokyo Gas, Osaka Gas)
  - Electric Utilities (e.g. Tokyo Electric)
  - Other marketers/traders (Mitsubishi, Mitsui)
- Uncertainties in Outlook:
  - Choice of fuel in power generation:
    - Nuclear
    - Coal
    - Renewables



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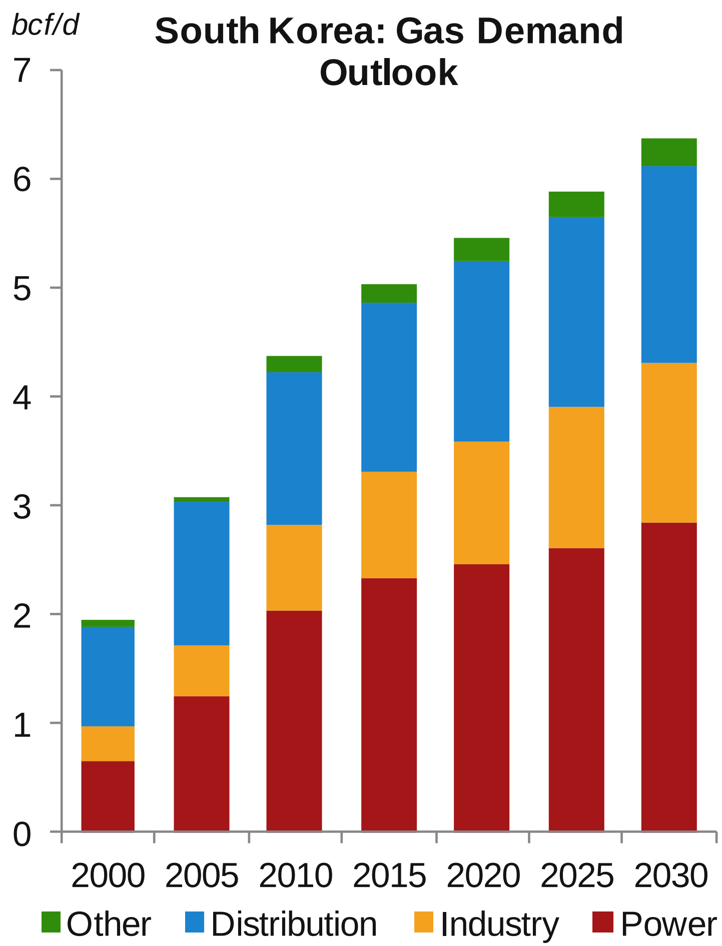
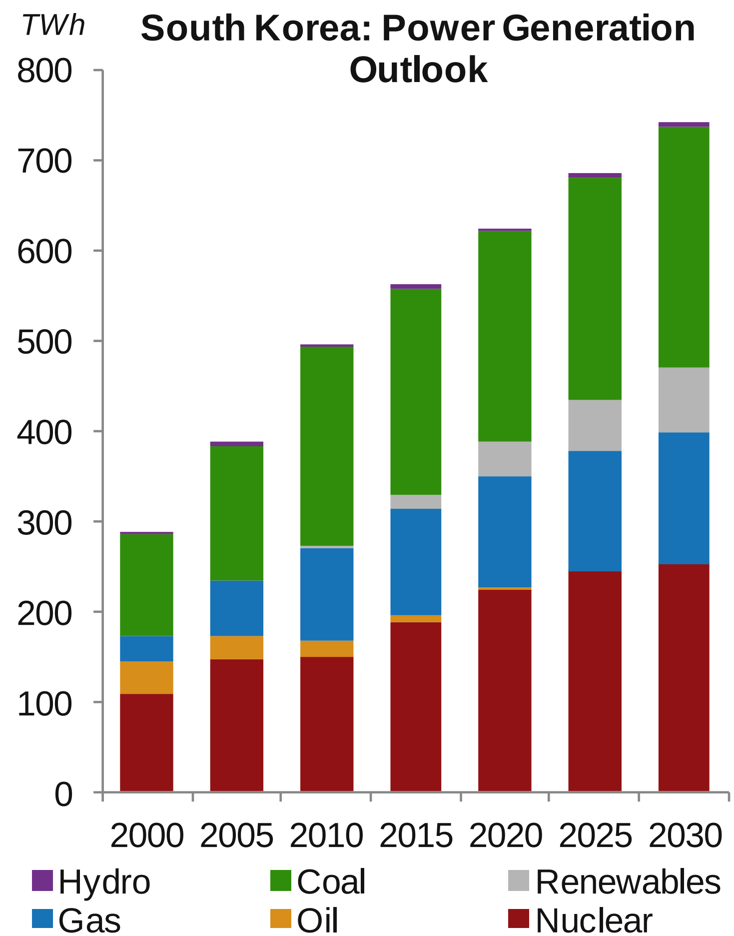
# South Korea: Gas Demand Drivers




**Power and industry largest drivers**

**Steady role in fuel mix for gas**



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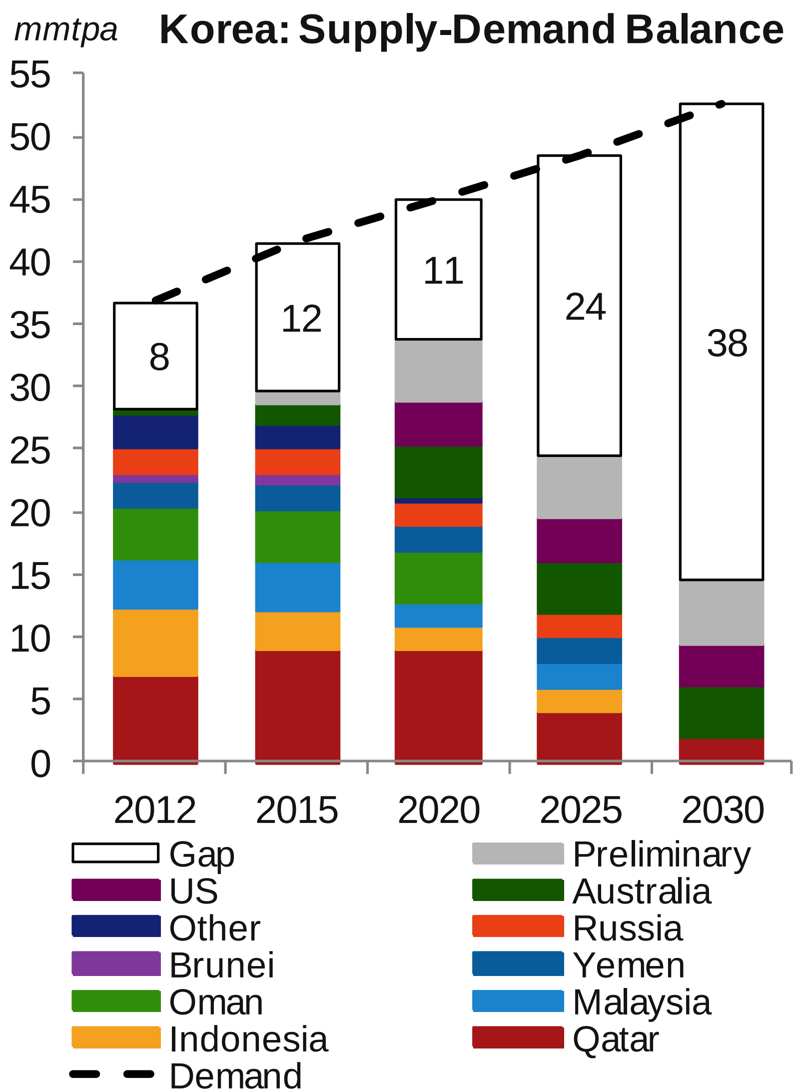
# South Korea: LNG SD Outlook

- Larger relative S-D gap than Japan
  - Korea heavily reliant on the spot market to meet demand
- Seasonal demand swings and storage
- LNG Buyers:
  - Korea Gas Corp (KOGAS)
  - Companies importing LNG for own-use:
    - Posco (Steel producer)
    - K-Power
    - KEPCO-owned Korea Midland Power Company (KOMIPO)
    - GS (proposed)
- Uncertainties in outlook:
  - Liberalization of gas market
  - Commitment to nuclear power targets



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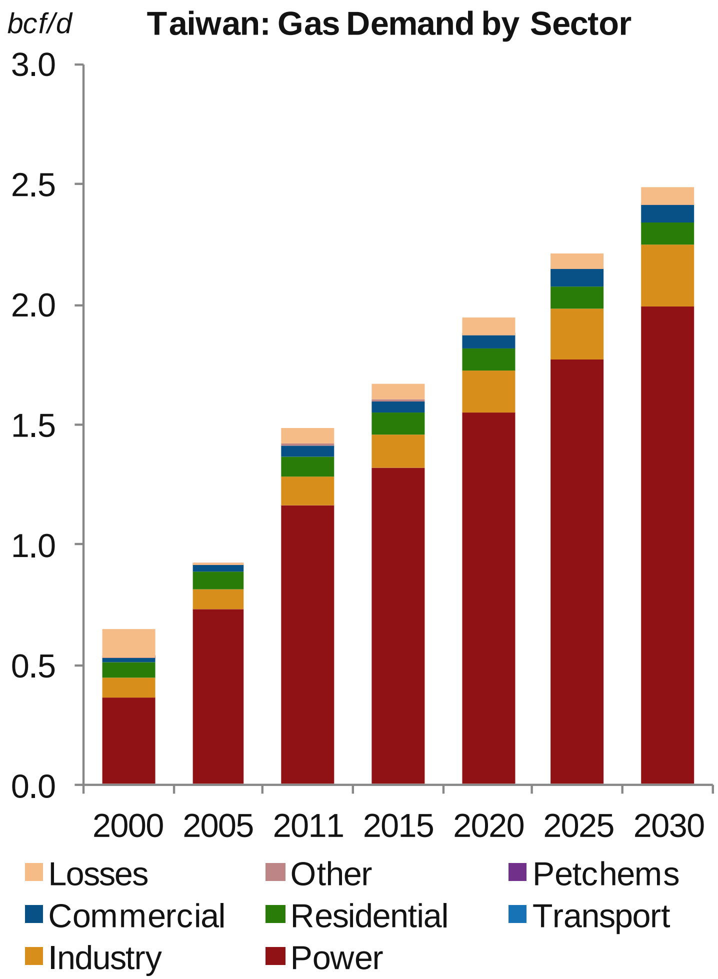
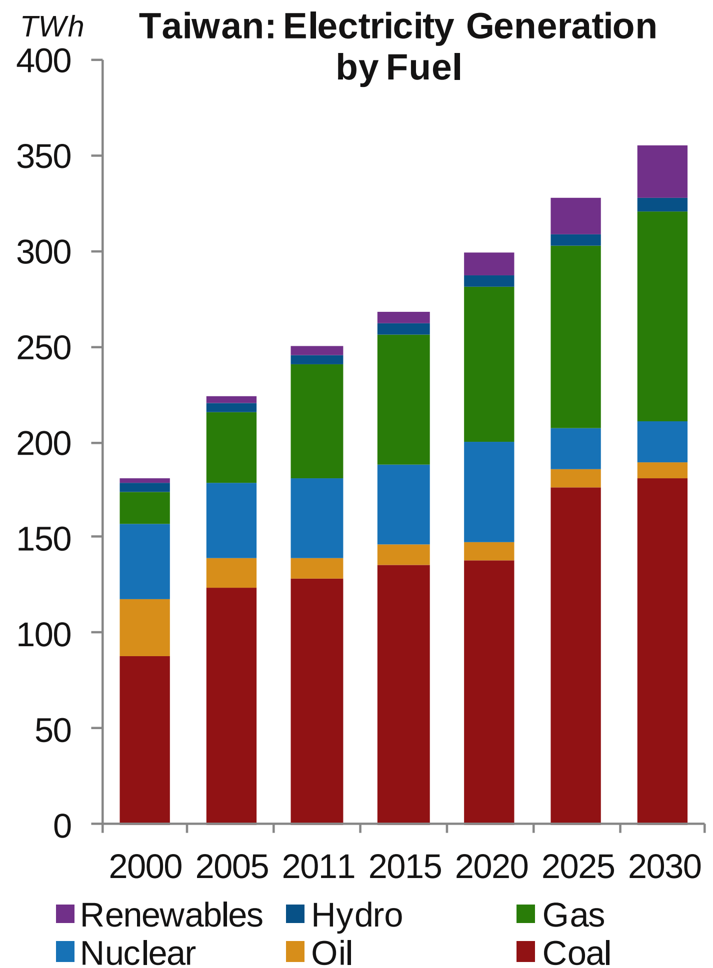
# Taiwan: Gas Demand Drivers




Gas prioritized for power generation

Growing role for gas in power



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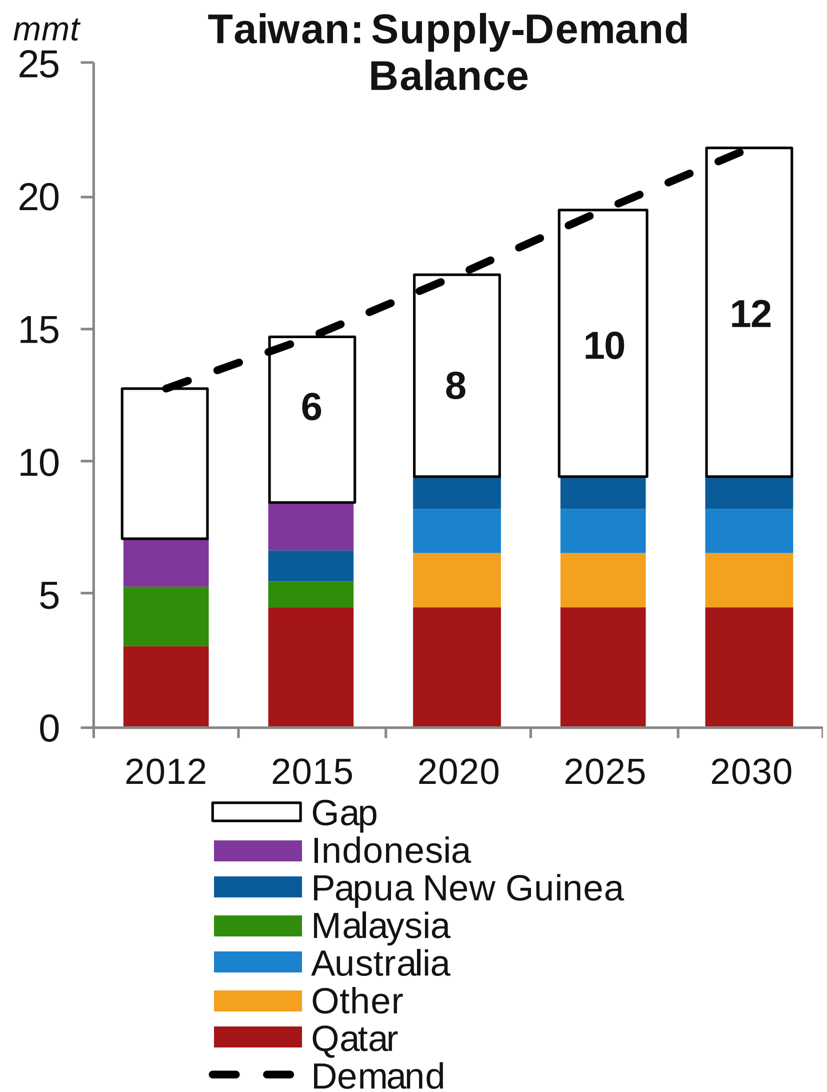
# Taiwan: LNG SD Outlook

- Relatively large SD gap
- LNG Importers:
  - CPC
- Uncertainties in Outlook:
  - Power generation from gas
  - Development of new LNG import capacity



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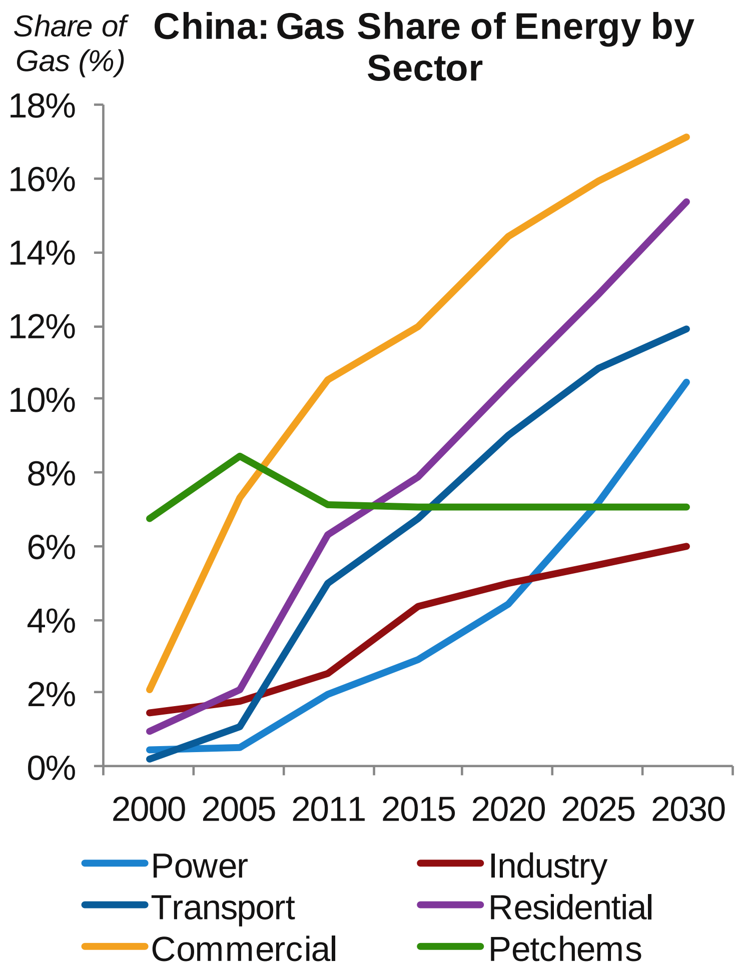
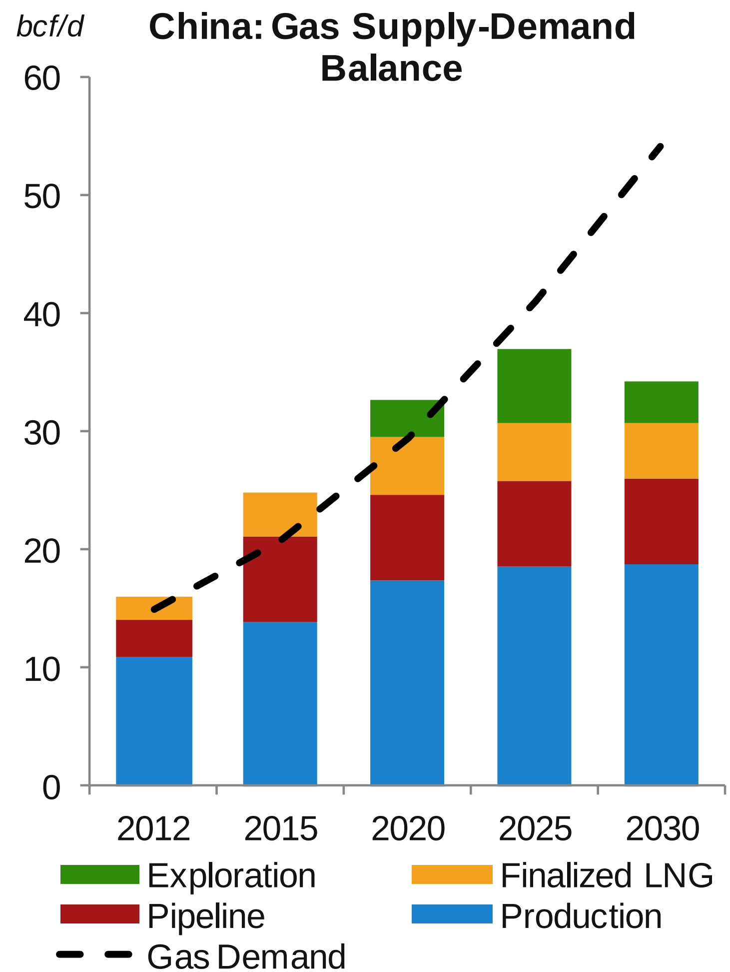
# China: Gas Demand Drivers




**High demand upside from gas penetration potential**




**LNG competes with pipeline gas & production**



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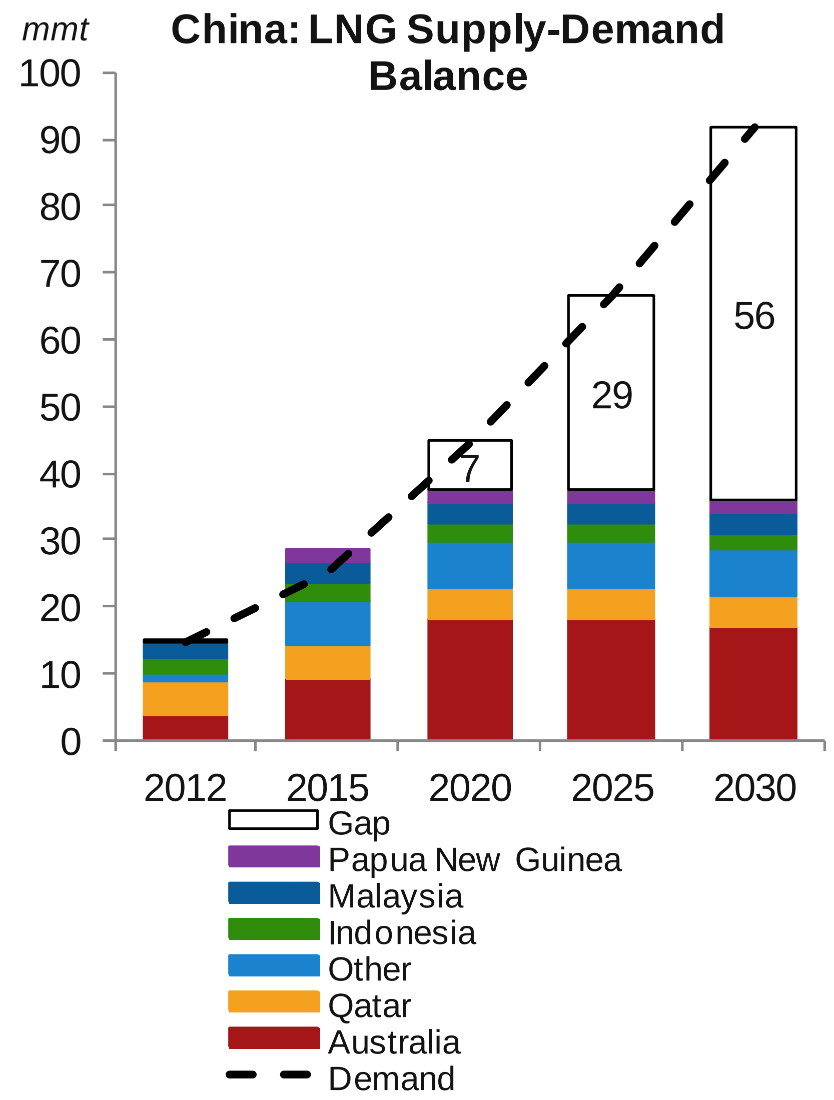
# China: LNG SD Outlook

- Well-supplied through 2020
- Chinese NOCs moving up the LNG value chain
- LNG Importers:
  - CNOOC
  - PetroChina
  - Sinopec
  - Others
- Uncertainties in Outlook:
  - Availability of other supply sources
  - Gas pricing



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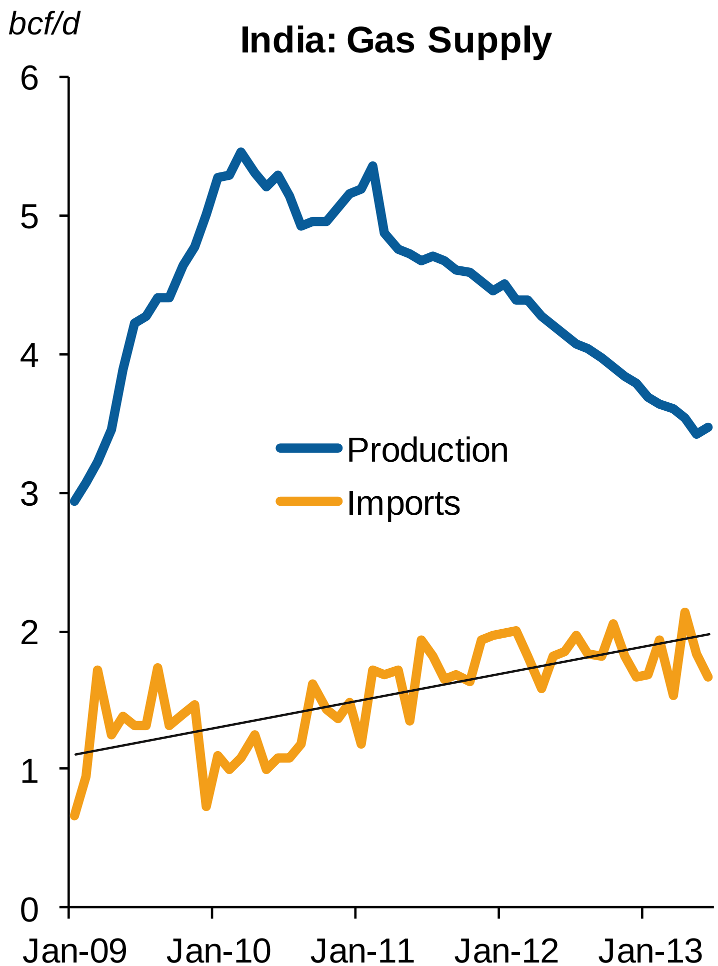
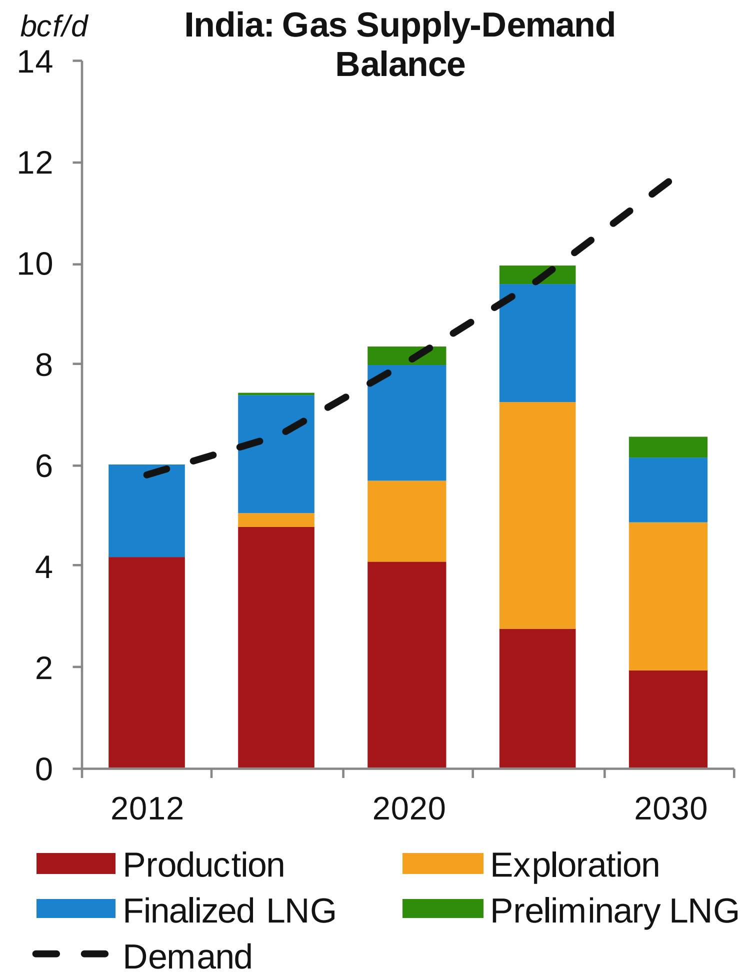
# India: LNG Demand Drivers




**LNG offsetting declines in production**

**Can India deliver on its exploration potential?**



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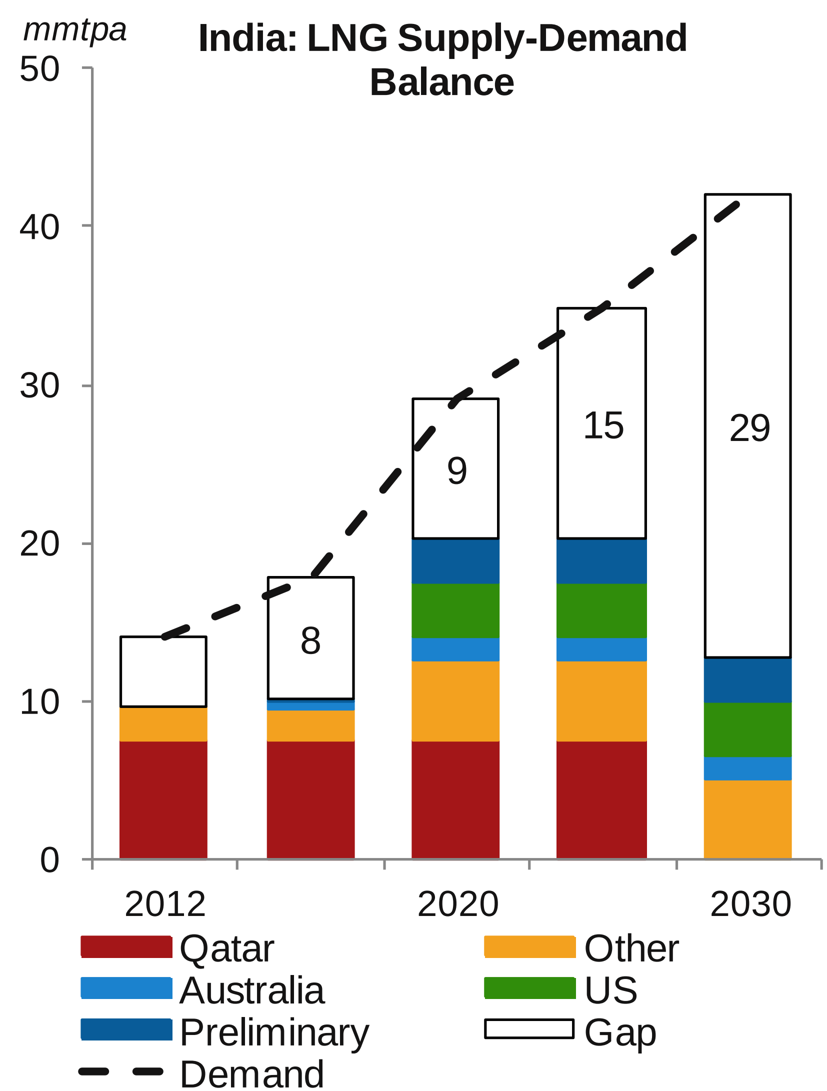
# India: LNG SD Outlook

- LNG Importers:
  - GAIL
  - Petronet LNG
  - Reliance
  - Gujarat State Petroleum Corporation (GSPC)
- Uncertainties in Outlook:
  - Availability of other sources of supply
  - Gas pricing



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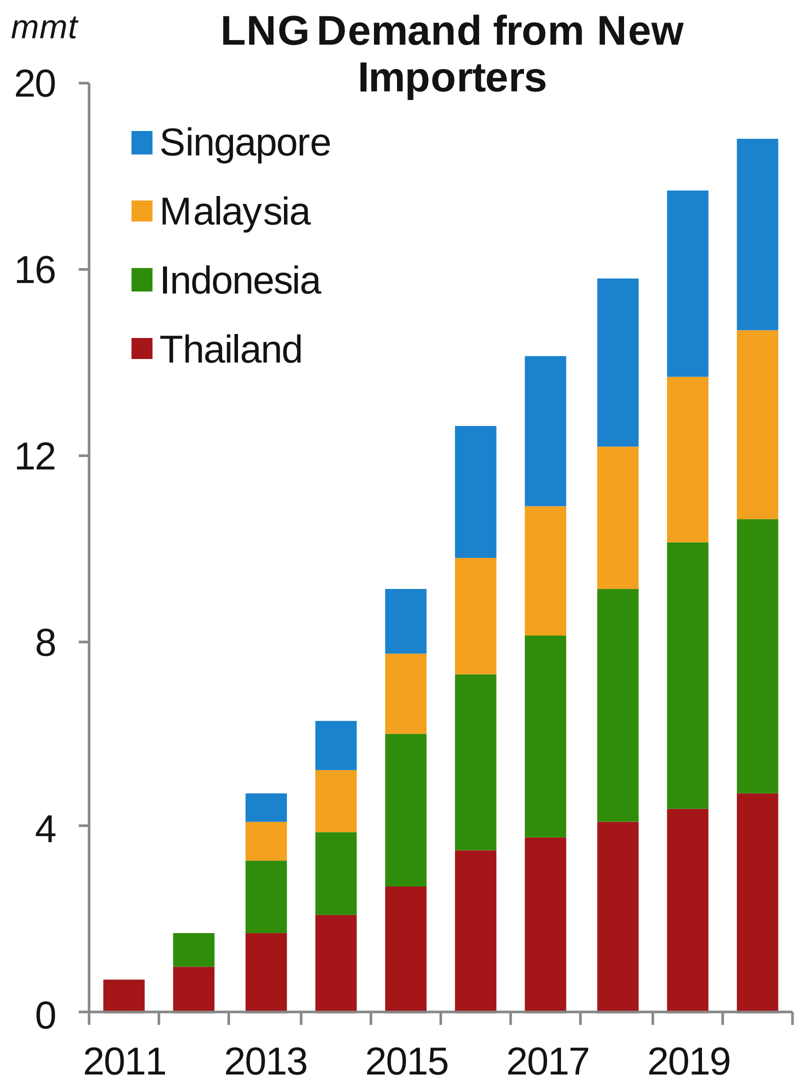
# Demand From New LNG Importers in Asia




*Source: PFC Energy Global LNG Service*

| Country | LNG Demand Drivers |
|---|---|
| Singapore | Pipeline gas supply<br>Fuel substitution<br>Government Incentives |
| Indonesia | Coal use in power<br>Government promotion of domestic LNG<br>Infrastructure development |
| Malaysia | Power sector<br>Gas pricing reform<br>Industrial development |
| Thailand | Ability to pay<br>Domestic gas production<br>Pipeline gas imports (Myanmar) |



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# LNG Potential of Proposed Importers in Asia

| Country | LNG Demand Drivers | Constraints |
|---|---|---|
| Philippines | Power/gas shortages | Gas pricing |
| Vietnam | Delays in domestic production<br>Gas and power pricing<br>Coal | Gas pricing<br>Regulated Electricity Market<br>Government Capacity |
| Pakistan | Gas Supply Shortages<br>Power | Government Capacity<br>Gas pricing<br>LNG Financing |
| Bangladesh | Gas Supply Shortages<br>Power, Transport, Industrial, Distribution | Government Capacity<br>LNG Financing |
| Sri Lanka | Power | Market Size |

# Concluding Remarks

- Markets opportunities exist globally
- LNG becoming increasingly popular for existing and new markets
- Many uncertainties will shape outlook:
  - Nuclear
  - Coal
  - Oil Price
  - Domestic production
  - Gas Pricing