Council Workshop
Yogyakarta, 10 October 2019
Programme (10:30-13:00)

❖ Welcome address

❖ Panel discussion 1

  “Current Status and updates on the Natural Gas Industry”

❖ Panel discussion 2

  “The Role of Gas in Fueling Sustainable Growth in Asia”
Panel discussion 1

Current Status and updates on the Natural Gas Industry
IGU’s Regional Coordinators

Timothy Egan
President & CEO, Canadian Gas Association

Andrea Stegher
Sr. Vice President, SNAM Italy

Marcel Kramer
President, Energy Delta Institute, Netherlands

Graeme Bethune
Chairman, Australian Gas Industry Trust

Orlando Cabrales
President, Columbia Natural Gas Association

Khaled AbuBakr
Chairman, Egyptian Gas Association

A Sustainable Future – Powered by Gas
Asia North-East & Austalasia

Graeme Bethune
Chairman, Australian Gas Industry Trust

Australia now produces nearly a quarter of global LNG and has achieved a major milestone last year in becoming the largest exporter.

In the meantime, there are concerns over possible supply shortages and price escalation in the domestic market and is this influencing the state of Australian projects

What is your take on this complex situation? What are the lessons here for other jurisdictions?
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Australian Domestic Supply vs. Imports: Infrastructure Challenges & Opportunities

Combined nameplate capacity of Australia’s 10 LNG projects: 88 Mtpa

Australia exported 75 Mt of LNG in FY 2019 making it the 2nd largest exporter in the World.

Domestic demand: 1,010 PJ
Export demand: 4,070 PJ

Approximate Distances
Australia: Equal to:
East - West: 4,000 km San Francisco to Washington DC
North - South: 3,700 km Ottawa to Mexico City

Map produced by REARTMAPPING.COM.AU © Copyright EnergyQuest 2019
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Africa & Middle East

Khaled AbuBakr
Chairman, Egyptian Gas Association

What is the latest outlook for the East Med gas developments,

and,

what are the perspectives of creating a gas trading hub for the Mediterranean?
East-Med Developments & Prospects of a Trade Hub
The supply picture continues to improve in North America, keeping prices very low.

How is this affecting the producer side of the industry?
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Projected N. American Production & Price Trends

- **A Appalachia**
  Production grows at 6% p.a. as the basin is debottlenecked in 2018-19

- **B Western Canadian**
  Sedimentary Basin (WCSB)
  Steady growth in Montney production with possible upside with Western Canadian LNG

- **C Haynesville**
  Renewed interest due to close proximity to LNG export terminals and attractive well economics

- **D Associated gas/Permian**
  Permian production will increase by ~7.2 bcf/d from 2018 to 2030

**Total projected natural gas production**

- **Source:** McKinsey Energy Insights North American Gas Outlook to 2030

**Natural Gas Prices: $US/Mcf**

- Source: US Energy Information Administration

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A sustainable future – powered by gas.
There are high expectations on the development of the huge shale gas resources in the Vaca Muerta formation in Argentina.

What are the main challenges to fully develop this potential?
Latin America & the Caribbean: Prospects in Argentina

ARGENTINA WIDENING SEARCH FOR OIL, NATURAL GAS

- Tarija Basin
  - Los Monos (shale gas)

- Northwest Basin
  - Yacoraite (shale/tight oil and gas)

- Chaco-Paranaense Basin
  - Devonico-Permico (shale oil)

- Cuyo Basin
  - Cacheuta (shale oil)

- Neuquen Basin
  - Vaca Muerta (shale and oil gas)
  - Los Molles (shale gas)
  - Agrió (shale oil)

- San Jorge Gulf Basin
  - D-129 (shale oil, tight oil)
  - Neocomiano (shale oil)

- Austral Basin
  - Inoceramus

Source: Technological Institute of Buenos Aires

A Sustainable Future – Powered by Gas
East Europe, Russia, Black Sea and Caspian: *New Pipelines*

Marcel Kramer
President, Energy Delta Institute, Netherlands

With the pending completion of the Turkish Stream pipeline, Turkey’s role as a market and transit country for natural gas from Russia and the Caspian seems to become even more important.

Could you give us a quick update on the status of the project and its implications?
East Europe, Russia, Black Sea and Caspian: *TrukStream Pipeline*

Russia-Turkey gas pipeline plans
Moscow and Ankara seek to develop Turkey as a transit route for Russian gas to Europe, avoiding Ukraine

Russia-backed gas pipelines
- TurkStream
- Blue Stream

Rival EU-backed pipeline
- Southern Gas Corridor

Existing —— Planned

Sources: BP, EntsoG, GIE

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East Europe, Russia, Black Sea and Caspian: Russian LNG

Marcel Kramer
President, Energy Delta Institute, Netherlands

We read a lot about Russian pipeline projects, but how about the outlook for LNG exports from Russia?
East Europe, Russia, Black Sea and Caspian: *Yamal LNG*
The Commission and 22 member states support a Net Zero CO₂ target by 2050.

Obviously there are some hold out to this, but can you please comment on how gas can fit in this scenario?
More Than 60 Countries Say They’ll Zero Out Carbon Emissions. The Catch? They’re Not the Big Emitters.

By Somini Sengupta and Nadja Popovich  Sept. 25, 2019

36 billion metric tons of CO₂ per year

- More than 60 countries are aiming to reduce carbon emissions to net-zero by 2050, according to the United Nations.

Europe’s Ten Biggest Polluters
Megatonnes of CO₂ equivalent produced in 2018*

1. Belchatów, Poland - Coal power plant - 38.2
2. Neurath, Germany - Coal power plant - 32.2
3. Niederaussem, Germany - Coal power plant - 25.9
4. Jänschwalde, Germany - Coal power plant - 22.8
5. Weisweiler, Germany - Coal power plant - 16.8
6. Schwarze Pumpe, Germany - Coal power plant - 12.4
7. Lippendorf, Germany - Coal power plant - 11.7
8. Maria Iztok, Bulgaria - Coal power plant - 10.5
9. Boxberg Werk IV, Germany - Coal power plant - 10.2
10. Ryanair, Ireland - Airline - 9.9

* The annual rankings are not a list of companies. They focus on power stations, manufacturing plants and airlines. The EU focuses on those activities as they can be measured and checked with a high level of accuracy.

Source: European Commission
Europe’s Progress toward meeting GHG Emissions Commitments

Fig. 1: Greenhouse gas emission trends, projections and targets in the EU

- Historic GHG emissions
- GHG emissions (proxy)
- Projections with existing measures
- Projections with additional measures
- 2030 Target: -78.6 Mt CO2eq per year
- 2050 target: -157 Mt CO2 eq/year (-80%)
- 2050 target: -157 Mt CO2 eq/year (-95%)

European Environment Agency (EEA)

North American municipalities are starting to pass resolutions banning natural gas hook-ups because of concerns about climate change.

How is industry responding
Municipality Gas Bans Trend

**Plans to phase out natural gas buildings gain traction**

The next target in the climate-change debate: your gas stove

**‘It is possible’: Victoria mayor says fossil-free future not optional**

By Jennifer Crosby
Anchor Global News

**San Jose Becomes the Largest City in the US to Ban New Natural Gas Lines**

**Natural gas soon to be outlawed in almost all new Menlo Park buildings**

By Jan. 1, 2020, heating systems in all new homes and buildings in the city must run on electricity

**Santa Rosa homebuilders urge city officials to rethink potential natural gas ban on new homes**

At the heart of one of a growing movement to mitigate climate change, Santa Rosa is facing a potential ban on natural gas in new homes, becoming the latest city to join the growing trend of phasing out fossil fuels in favor of renewable energy sources.

A jogger runs past the Scattergood power plant, Feb. 12, 2019, in Los Angeles. Los Angeles will abandon a plan to spend billions rebuilding three natural gas power plants as the city moves toward renewable energy, Mayor Eric Garcetti said Monday.
Bogota has the most dense Bus Rapid Transit (BRT) system in the world. Recently, more than 50% of the new fleet has been renewed with articulated and bi-articulated buses powered by natural gas.

What are the main drivers that made this possible?
Latin America: Transmilenio – World’s most intense BRT powered by natural gas

- 114km of exclusive lanes for TM
- 12.9 million km travelled per month
- 2.5 million passengers per day
- 26.6 km/hour on average in the system

- 741 articulated and bi-articulated buses powered by natural gas
  - 1.4 km per m³ bi-articulated
  - 1.5 km per m³ articulated
- 300km average autonomy
- Near 0 PM2.5 emissions
This is a region which promises to be critical for the natural gas industry, from both supply and demand sides, and it is also one where some of the largest economic opportunities lie and can bring people out of energy poverty.

How can the industry seize this opportunity?