



WGC 2021
28th WORLD GAS CONFERENCE
DAEGU, KOREA 21-25 JUNE



Executive Committee Workshop

Santiago de Chile, 25 April 2019

Agenda of the Day

08:30-09:50 Panel discussion 1 “Current Status and Updates of Natural Gas Industry”

09:50-10:20 Coffee Break

10:20-10:30 Welcome address

- **Mr. Joe Kang, IGU President**
- **Mr. Antonio Bacigalupo, President, Asociación de Empresas de Gas Natural (AGN)**

10:30-10:50 Keynote welcome remarks from Chile and Argentina

- **Ms. Susana Jiménez, Minister of Energy, Chile**
- **Mr. Gustavo Lopetegui, Secretary of State of Energy, Argentina**

10:50-12:15 Panel discussion 2 “Gas industry insights in South America: Regional View”



Panel discussion 1

“Current Status and Updates of Natural Gas Industry”

Asia West and South

Hazli Sham Kassim

President, Malaysian Gas Association



Regional Characteristic & Trends: Major Developments



INDIA

- LNG & Regas expansion plan;
 - 9 MMTPA additional LNG capacity commissioned in next 12 months
 - Regas capacity from 27 to 78MTPA by 2022
- Pipelines to grow from 16,000 km to 30,000 km



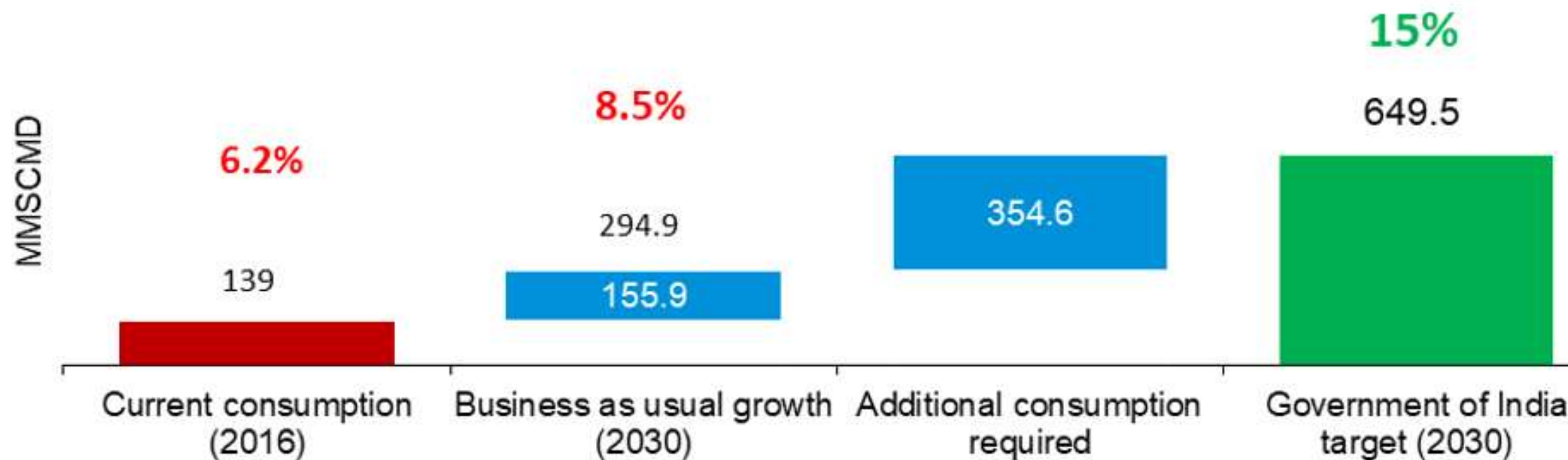
- **Energy Trilemma:** Challenge to provide affordable energy access, whilst trying to comply to carbon emissions commitment
- More gas exporting countries are now importing LNG
- Slow price reforms not encouraging upstream investments

Regional Characteristics & Trends: SUPPLY AND DEMAND



INDIA

ASIA

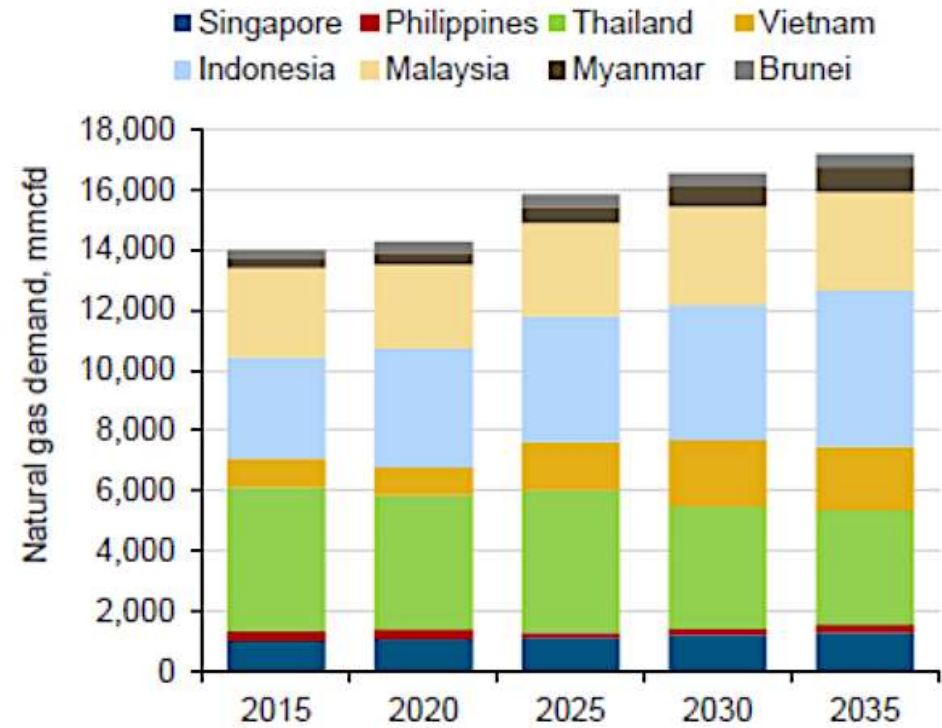


Source: Indian Gas Society

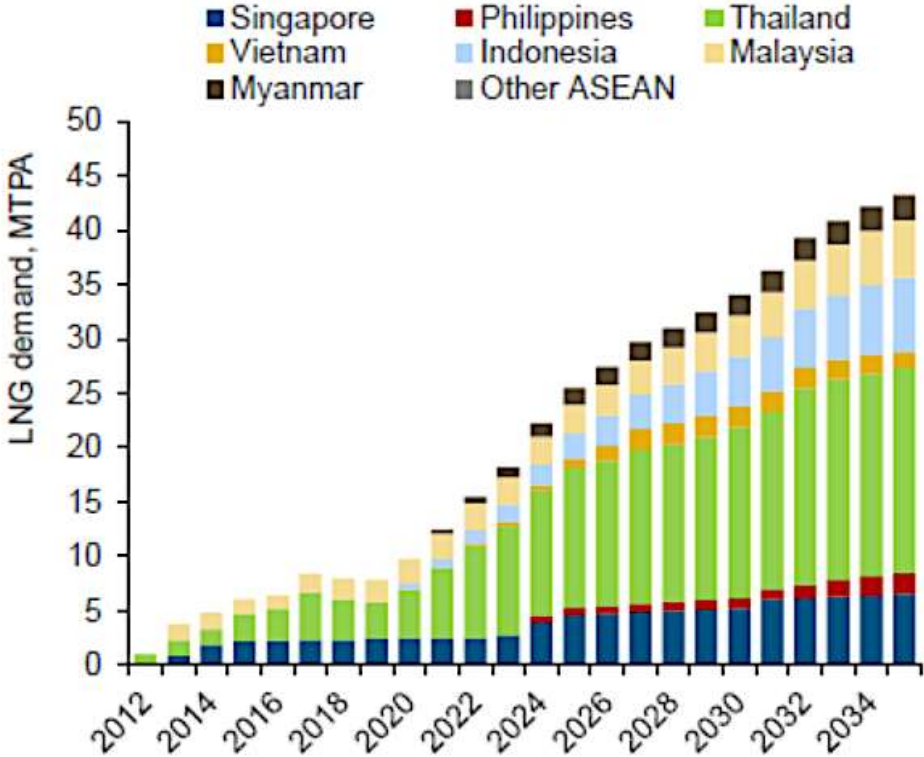
Regional Characteristics & Trends: SUPPLY AND DEMAND



Natural gas demand in ASEAN
(reference case)



LNG import requirement
(Reference case)



Source: ASCOPE

Key Opportunities & Threats for Gas

Opportunity

Threat



INDIA

- Govt ambition to grow gas in primary energy mix from 6% to 15% by 2030
- Pipelines to grow from 16,000 km to 30,000 km
- LNG import capacity from 27 to 78MTPA by 2022.

- Power from gas still too expensive, causing stranded assets.



- 65 million people still without electricity
- Trans ASEAN Gas Pipeline
- Increasing access to gas through virtual pipelines, including micro LNG
- RE Ambition

- Subsidy mindset
- Priority to make electricity affordable favours cheaper coal
- Financial viability of infrastructure Investment

Role for IGU

Member Needs & Priorities:

- Positioning of gas vis a vis RE & coal
- Addressing Energy Trilemma

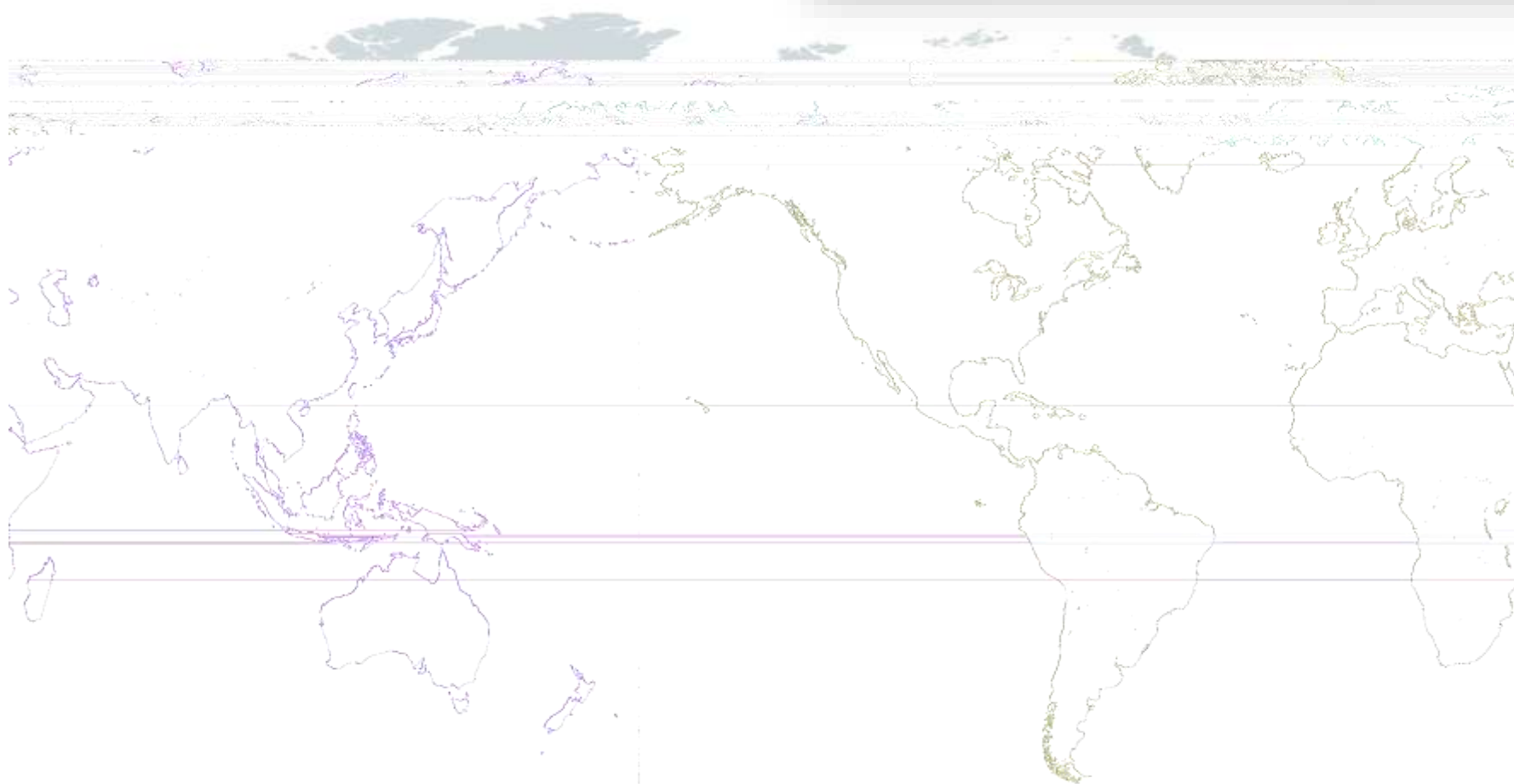
Key Outreach Opportunities for the Next 6 Months:

Date	Event	Attendance
June 24-25	Asia Oil & Gas Conference (AOGC)	Dr. Joe M Kang speaking on Day 1
June 26	Malaysia Gas Symposium (MyGaS)	
September	India Gas Forum	
October 10	IGU Council Meeting	

North-East Asia and Australasia



Graeme Bethune
Chairman, Australian Gas Industry Trust



Regional Characteristic & Trends: Major Developments

- **China:** switch from coal to gas to improve air quality, imposition of tariffs on imports of US LNG, Russian gas pipeline to commence end 2019.
- **South Korea:** encouraging gas and renewables, to lower taxes on LNG up to 74%, raising taxes on thermal coal by 27%, from April 2019.
- **Japan:** restart of 5 nuclear reactors in 2018.
- North Asian LNG spot prices fall to 3-year low below US\$5/MMBtu.
- **Australia:** progress on Pluto LNG expansion and Darwin and NWS LNG backfilling. Risk of limits on Queensland LNG exports.
- **PNG:** close to decision on LNG expansion.

Regional Characteristics & Trends: SUPPLY AND DEMAND

- **China:** consumed a record 280 BCM (207 Mt) of natural gas in 2018, up 18.1% year on year. Gas consumption growth in 2018 outpaced growth of 15.3% in 2017 and 6.6% in 2016. LNG imports up 40.7% to 54 Mt and total imports up 32.4% to 90 Mt. China passed Japan to be world's largest gas importer. Focus on improving air quality.
- **Japan:** LNG imports flat in 2018 at 83 Mt.
- **South Korea:** LNG imports up 17.5% to a record 44 Mt in 2018.
- **Australia:** LNG exports up 23.0% in 2018 to a record 69.5 Mt. Ramp-up of Ichthys and start-up of Prelude to increase to exports to ~80 Mt in 2019. Biggest supplier to China and Japan, second to Korea.
- Growing interest in renewables and hydrogen in all countries.

Key Opportunities & Threats for Gas

Opportunity

- Gas is part of a diversified energy supply for importing countries: North Asia is a major energy importer. Energy security is important and a diversified energy portfolio is important for energy security. LNG played a critical role in energy security after the Japanese earthquake in 2011.
- Gas has a major role in improving air quality in Asia, particularly in China.

Threat

- Alternative cheaper or cleaner fuels: coal, nuclear and renewables.
- Renewables are still minor in North Asia, but are likely to grow.
- High gas prices in North Asia put gas at a disadvantage against increasingly cheap and clean renewables.
- High domestic prices linked to international prices in LNG exporting countries (e.g. Australian east coast) leading to energy switching and gas demand destruction.
- Anti-fossil fuel movement in Australia and New Zealand targeting exploration and development, companies and current and future workforce, restricting supply and increasing domestic prices.

Role for IGU

Member Needs & Priorities:

- Gas advocacy generally, in the face of strong and growing opposition in Australia to both onshore gas exploration and development and offshore exploration (anti-oil but with potential risks also for gas).
- Advocacy of environmental benefits of LNG to importing countries in context of LNG contribution to growing Australian emissions and risks to future development.
- Advocacy of economic benefits of LNG to exporting countries (Australia and PNG).

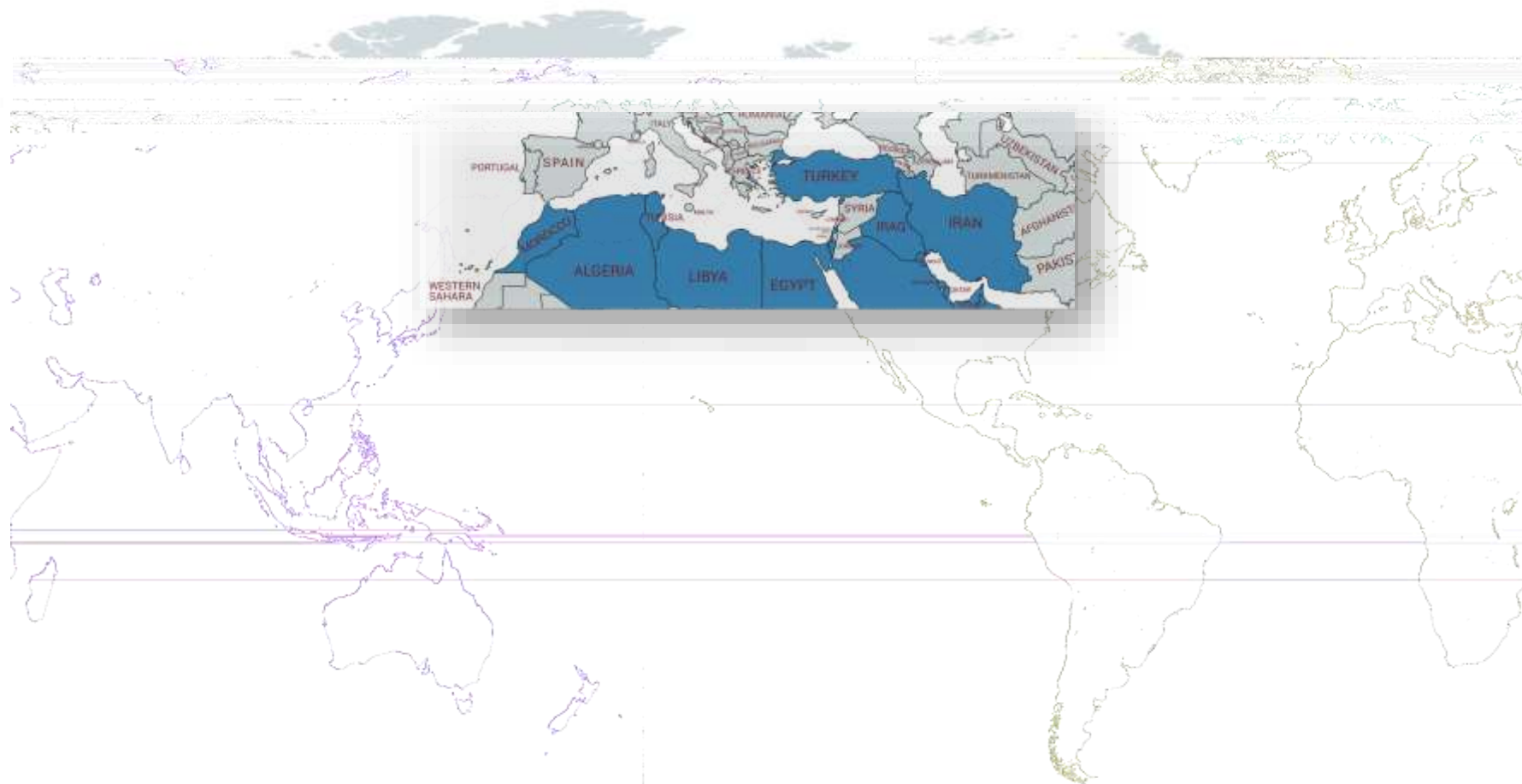
Key Outreach Opportunities for the Next 6 Months:

Date	Event	Attendance
18-19 April	G20 ETWG Meeting Tokyo	G20 Energy Sherpa's and government officials +key global organisations
12 June	G20 Natural Gas Day Tokyo	TBC

Middle East & Africa



Khaled AbuBakr
Chairman, Egyptian Gas Association



Regional Characteristic & Trends: Major Developments

- East Mediterranean new gas finds in Cyprus, Egypt & Israel are changing the natural gas trade map of the whole Middle East & Africa regions and affecting the natural gas trade worldwide.
- With its 2 LNG facilities on the Mediterranean sea, Egypt is on the way to be a regional energy hub.
- New gas discoveries in East Africa (Mainly in Mozambique and Tanzania) are paving the way for more natural gas driven opportunities.
- Mozambique – South Africa natural gas pipeline with a capacity of 5bcm is expected to come online in 2020.*

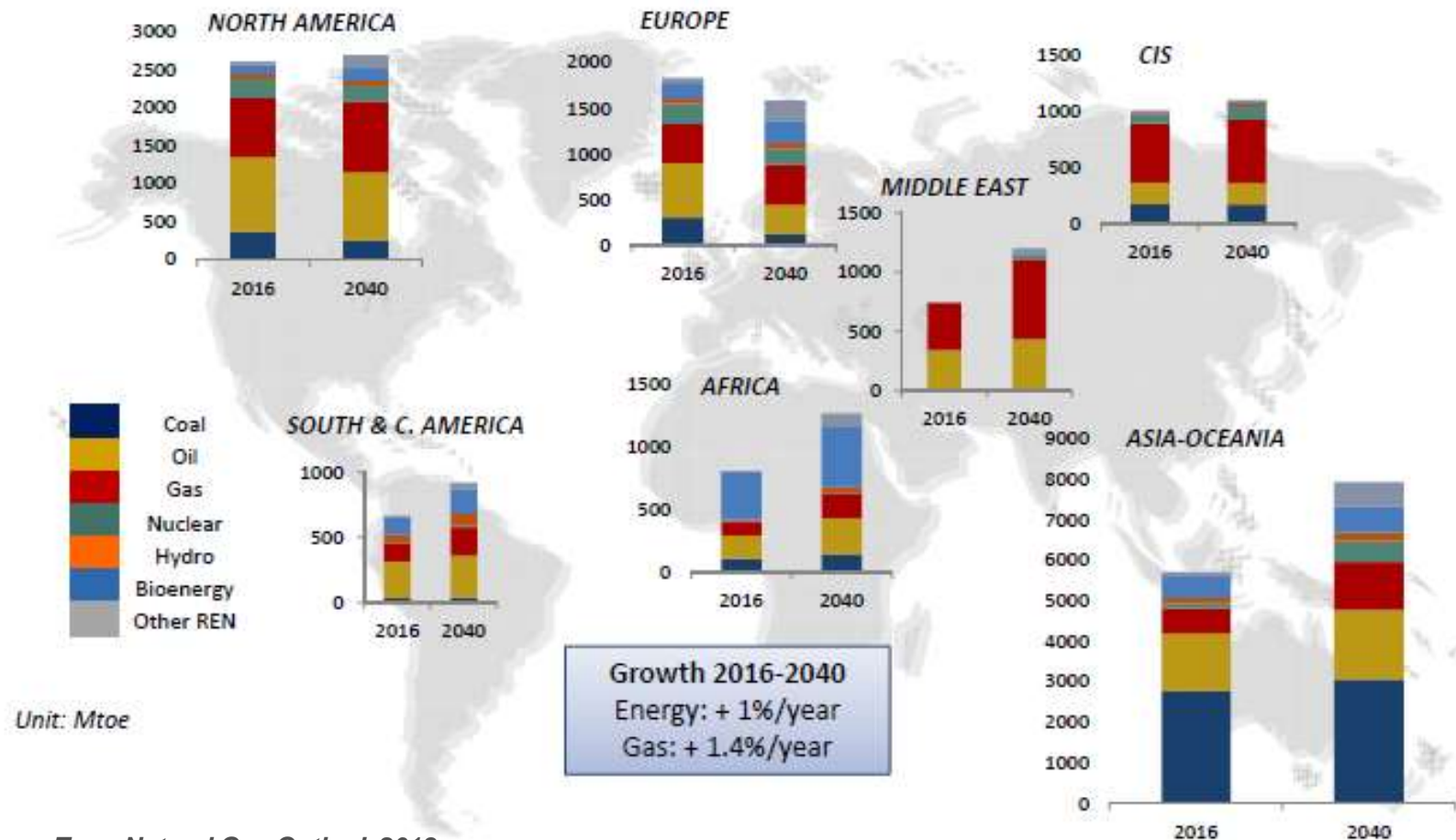
Region	Consumption	Gas price	Production	Trade – Region average		Infrastructure
				Imports	Exports	
Africa	↑ 6.7%	-	↑ 8.6%	↓ -5.0%	↑ 8.9%	↑ LNG liquefaction (Mozambique FID)
Middle East	↑ 4.8%	-	↑ 4.1%	↓ -3.7%	⊖ -0.1%	⊖ No key developments

Source: Energy insight analysis

Source: IEA, Cedigaz, Bloomberg, press reports, BCG analysis

Regional Characteristics & Trends: SUPPLY AND DEMAND

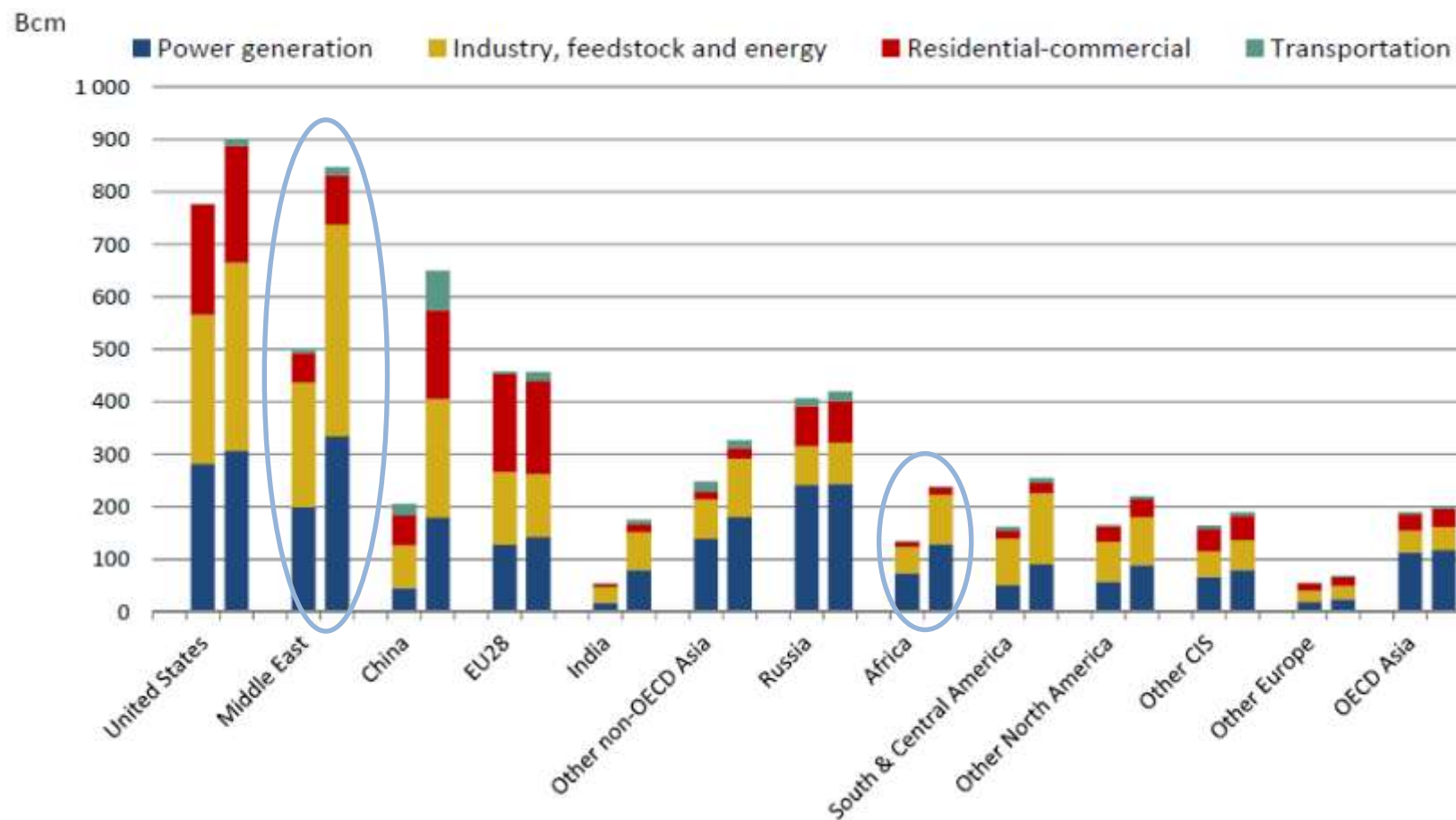
Differences in the evolution of the fuel mix across regions strongly impact the global energy transition



Source: CEDIGAZ, Medium and Long Term Natural Gas Outlook 2018

Regional Characteristics & Trends: SUPPLY AND DEMAND cont'd

Natural gas demand in 2016 and 2040 by sector



Source: CEDIGAZ, Medium and Long Term Natural Gas Outlook 2018

Key Opportunities & Threats for Gas

Opportunity

- Major gas discoveries in East Mediterranean (Zohr, Aphrodite, Leviathan) gas fields.
- With its great geographical location, 2 LNG facilities on the Med. Egypt is set to become a regional energy hub.
- The Middle East is a key region for natural gas trade worldwide with Qatar considered one of the biggest natural gas producers in the world
- East Africa potential specially with recent gas discoveries in Mozambique and Tanzania .
- Un-tapped opportunities and natural gas utilization to residential & industrial customers mainly in sub-Saharan African is a key to great success of natural gas to enhance people quality of living.
- According to researches, Developing and emerging economies, including Africa(2.5%),and the Middle East (2.2%),will lead gas demand growth by 2040 .

Threat

- Unclear support to natural gas in the transition to low carbon economies.
- Natural gas suffers from the erroneous perception that there is a lack of supply security (natural gas improves security of supply because of its abundance, affordability and diversification of supply sources with growing LNG).
- New gas pricing approaches expose gas project developers to large market fluctuations.
- Geopolitical tensions in key supply regions.
- Financial institutions are moving away from funding oil and gas projects (e.g. the World Bank).

Role for IGU

Member Needs & Priorities:

- Easier subscription logistics and cheaper fees for African Countries
- Incentives for new members
- Developing reports with a special focus on Africa and the future natural gas holds for this continent
- More IGU events in Africa

Key Outreach Opportunities for the Next 6 Months:

Date	Event	Attendance
May 2019	12th Annual Sub-Saharan Africa Oil/Gas Conference 2019	tbc
Jul 2019	Africa 2019 Oil & Gas International Trade Exhibition	tbc
Sep 2019	World Energy Congress (Abu Dhabi)	Joe Kang speaks Release Gas Technology and Innovation Report

Europe + Russia, Black Sea and Caspian



Andrea Stegher

Sr. Vice President, SNAM Italy



Marcel Kramer

President, Energy Delta Institute, Netherlands



Regional Characteristics & Trends: SUPPLY AND DEMAND



- 2018 record year for exports to Europe (incl. Turkey) at 202 BCM, up 4 percent from 2017
- About 20% of total went to countries in Central and Eastern Europe
- Production declines in Western Europe were the key driver of growing European need for imports
- Gas in Western Europe gaining share from coal
- Gazprom estimates 2018 European market share at close to 37%, says "no specific target is being aimed at".

Major Infrastructure Developments



- Turk Stream pipelines into operation in 2019 across Black Sea to Turkey/EU border in 2019
- Power of Siberia pipeline to China into operation in 2019
- Bovanenkovskoye field (Yamal) reached design production capacity of 115 BCM. Expected to produce until well into next century
- Nord Stream 2 pipeline construction in Baltic Sea continues, over one third laid so far. Permits received from Finland, Sweden , Germany and Russia. Denmark requested investigation of a new (more Southern) route . As yet unclear impact on schedule. Existing Nord Stream system was used fully at 59 BCM in 2018.
- No clarity as yet on outcome discussions with Ukraine on transit of Russian gas beyond 2019

Regional Characteristic & Trends: Supply & Demand

- Europe natural gas demand remaining close to 500 bcm (slight reduction on 2017 due to weather) but targeting additional volumes in 2019 due to progressive **coal to gas switch**, both related to coal phase-out policies and relative pricing (including CO₂).
- Russia hitting a new record in 2018 as the largest supplier to European markets (***around 43%***, according to Eurostat).
- Domestic production reduction, with most relevant phenomenon linked to Groningen



"Gas production at the Groningen field is falling faster than expected; output at the field will fall to 15.9 bcm in the year ending Oct 2020 (-1.5 bcm than originally planned)"

- **Southern Corridor project development:**
 - TANAP scheduled for starting operations by 1H 2019 (16 bcm, of which 6 for the Turkish market)
 - TAP under construction with expected start of operation by 2020 (10 bcm, of which 8 to Italy)

Regional Characteristic & Trends: Supply & Demand

- LNG increasing substantially in 2018 (+7%), but strongest growth expected in 2019 (also due to progressive **reduction in price differentials**) also given abundant regasification capacity in place and liquid market (**28% load factor** in 2018 excluding re-loading).



LNG Imports	2018 (bcm)	% of total imports	2018 vs. 2017
Spain	14.7	26%	-12%
France	11.5	20%	11%
Italy	8.5	15%	2%
UK	6.7	12%	5%
Portugal	4.0	7%	6%
Poland	2.7	5%	58%
Belgium	3.1	6%	140%
Netherlands	2.5	4%	199%
Greece	1.0	2%	-35%
Lithuania	0.8	1%	-33%
Malta	0.6	1%	75%
Sweden	0.3	1%	17%
Finland	0.1	0%	52%
Norway	0.0	0%	-96%
Total	56.7		7.2%



Regional Characteristic & Trends: Major Developments



- Natural gas industry release of new study of the «Gas for Climate 2050 Initiative» with **270 bcm of biomethane and hydrogen** forecasted in the system by 2050 with **savings of 217 b€ per year** with respect to full electrification.
- **Road transportation CO₂ emission standards** adopted by EU Parliament for 2021-2030 limit NG utilisation: incentives foreseen for vehicles with tailpipe emission < 50 gCO₂/km
- European Parliament election in May and termination of present mandate of European Commission need to **strengthen European Gas Industry positioning** pursuing solutions towards the “**net-zero CO₂**” target fixed, with new technology solutions envisaging also CCS and CCUS.

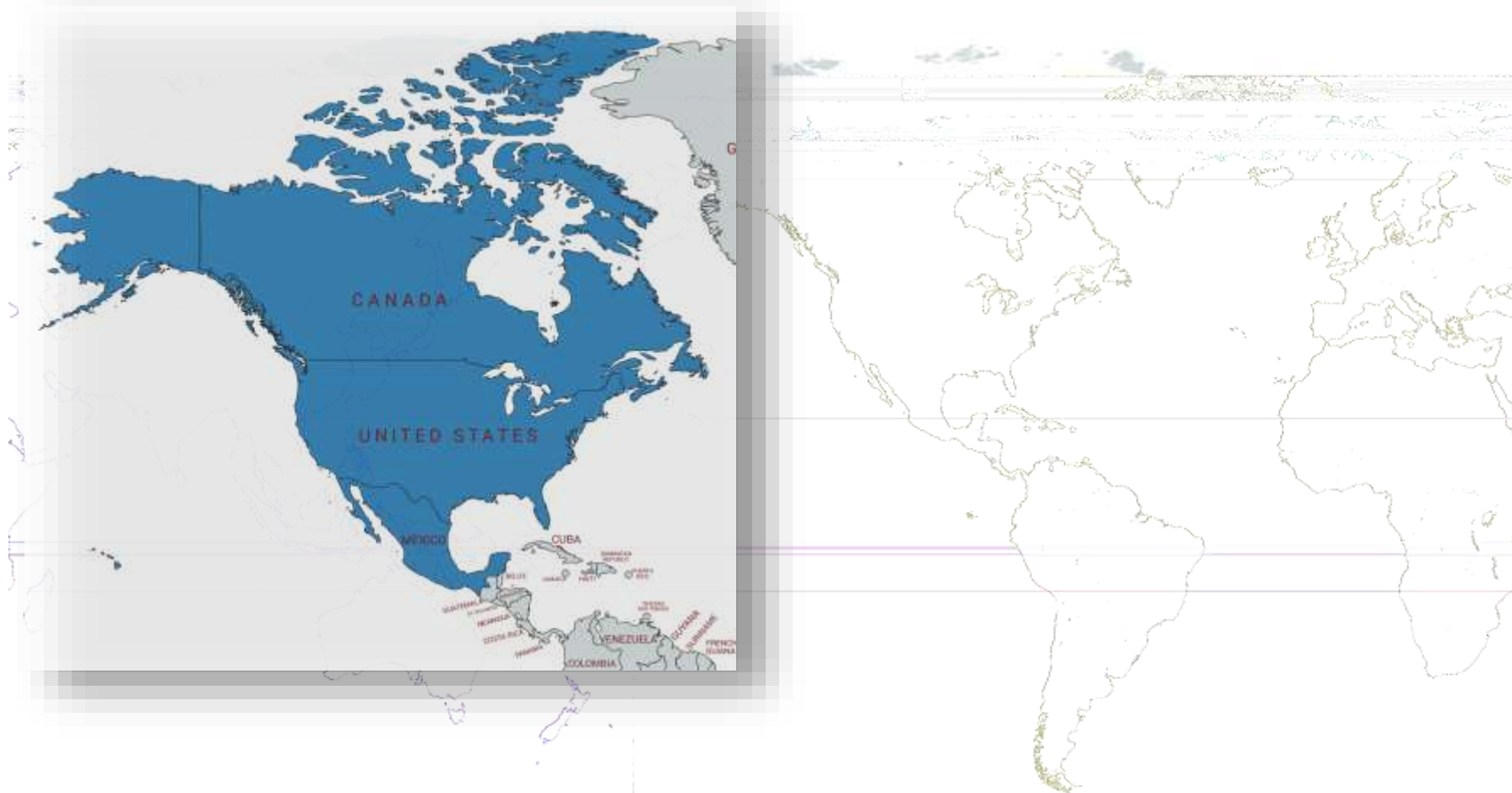
Role for IGU: Member Needs, Priorities & Key Outreach

- IGU needs to have a **more structured presence** in European gas themes/discussions
- IGU presence needs **to be in line and consistent with existing associations/programs**: suggested re-joining of Gas Naturally (GN), as the umbrella association of gas players in Europe
 - IGU to cooperate and support/co-organise potential events to give worldwide views and focus on supply/technology...
 - IGU to work with GN members (GIE, Marcogaz, ...) on specific matters of interest to best coordinate efforts (e.g. methane leakage)
- Need to clearly understand and work together within European logics given potential **spill-over effects** (e.g. multilateral financing institutions funding focus on RES and not on NG)



North America

Timothy Egan
President & CEO, Canadian Gas Association



Regional Characteristic & Trends: Major Developments

- Gas storage leaks and pipeline incidents have created real challenges for infrastructure companies (Canada – a wake-up call on reliability; US – local moratoria from incidents or lack of infrastructure; Mexico – tragic accidents (albeit on RPP pipes, not gas).
- At a high level, gas continues to play strongly in the politics of energy (Canada – affordability and emissions story; US – reliability, resilience and emissions story; Mexico – economic impacts, energy nationalism).
- The broader outlook for gas remains strong in all 3 countries, albeit to varying degrees (Canada – market growth but serious access challenges because of regulatory environment; US – production and consumption numbers continue to climb, underpinning broader growth; Mexico – foundational economic development on the infrastructure being built but political interference threatens future development).
- The growing trend of opposition to push at the local level is alarming – municipalities declaring climate emergencies, city councils banning gas use, states declaring moratoria on expansions, etc.
- The environmental community opposition is well-funded, well-organized and determined to eliminate fossil fuels from the North American energy economy.

Regional Characteristics & Trends: SUPPLY AND DEMAND

- The supply picture continues to grow, keeping prices very low, helping gas competitiveness for power generation and growing transportation conversation.
- The gas price spread advantage vs. electricity continues to be a significant issue in some jurisdictions and there is a growing discussion around use of gas in distributed applications.
- Alternatives like RNG and hydrogen are increasingly presented as part of the supply picture discussion in various jurisdictions (California, several other states, several Canadian provinces) with policies and programs continuing to evolve (a growing “if you want renewables, we are the cheapest” discussion).
- This renewable gas discussion, however, does not satisfy environmental “keep it in the ground” advocates as a legitimate alternative supply option.
- There are some clouds with respect to deliverability (and implications for supply and demand) because of opposition to infrastructure in select markets.

Key Opportunities & Threats for Gas

Opportunity

- Consumer prices given NA/global abundance
- Global environmental benefits of gas
- Technology innovation at end-use
- Public is angry about rising energy prices, driven by green policy, and gas looks good
- The public is hyper-sensitive to any incident and transparency and quick responses are key (note BC example).

Threat

- Impacts of environmental (climate) policies
- Perception of gas as another hydrocarbon
- Electrification agenda
- Shift in opposition to hydrocarbons moving to local level, e.g. coalition of mayors with bans, state moratoria
- Opposition gets a boost whenever there is an incident, e.g. storage and pipeline leaks

Role for IGU

Member Needs & Priorities:

- Articulating the global environmental and social benefits of gas exported from North America
- Profiling the innovation benefits that gas delivers
- Recognizing and responding to the coordinated global efforts of our opponents

Key Outreach Opportunities for the Next 6 Months:

Date	Event	Attendance
05/27-29/	Clean Energy Ministerial in Vancouver	20+ Global Energy Ministers
10/28-29/	NA Tri-lateral Natural Gas Summit, Vancouver	Associations, leading companies from across NA

Latin America and the Caribbean

Orlando Cabrales

President, Columbia Natural Gas Association



Regional Trends: Central & South America

WEO 2018

- Demand growth by 2040 is estimated at 1.9% per year (2.3% in Brazil);
- Production growth by 2040 is estimated at 2.1% per year (4.3% in Argentina and 4.9% in Brazil)

Regional Characteristic & Trends: Major Developments

Chile:

- Challenges in the integration of non-hydro renewables in an electricity system that is planning to phase out coal-fired power generation. It is not clear yet that natural gas would replace coal;
- Low penetration of NG in all segments of demand (power generation, industrial, households, and transportation);
- High levels of particulate matter MP in the main cities due to biomass consumption for cooking and heating;
- There is an opportunity to reduce the carbon footprint in copper mining by using NG;
- On transportation, there are tax policies that favour the use of diesel affecting the competitiveness of NG; Policies are needed to encourage the use of NG in transportation (mainly in trucks and buses);
- A back up mechanism needs to be developed in case of interruptions in the supply of NG from Argentina.

Regional Characteristic & Trends: Major Developments

Argentina:

- Exports to Chile restarted in October of last year with an average daily volume of 5Mm³, with a peak supply in February of 9.1Mm³;
- Exports of electricity in the spot market to Brazil coming from gas-fired power plants have increased 290% this year over 2018;
- The Argentine government did not extend the contract of the FSRU unit in Bahia Blanca and instead, YPF contracted a SSLNG unit (Tango LNG) in the same area to start exporting 2.5Mm³/d in the 4Q of 2019;
- Only the FSRU in Escobar remains in the country;
- The government is conducting an analysis to build a new gas pipeline from Vaca Muerta to Buenos Aires (+ 1000 km).

Panama:

- It started receiving LNG mainly for power generation.

Regional Characteristic & Trends: Major Developments

Brazil:

- Great opportunities in pre-salt;
- Cost challenges; pre-salt gas expected to be competitive in the mid-term (5 years);
- NG is fundamental to back up the electric system which is heavily dependant on hydro generation;
- New contract with Bolivia in 2019.

Ecuador:

- A succesfill bid round in March due to better fiscal and contractual conditions to attract foreign investment;
- 7 blocks were awarded out of 8 offered.

Colombia:

- 5 E&P contracts were awarded in the Caribbean offshore;
- A commission of experts engaged by the government endorsed pilots for fracking;
- A new bid round was launched offering 20 blocks.

Key Opportunities & Threats for Gas

Opportunity

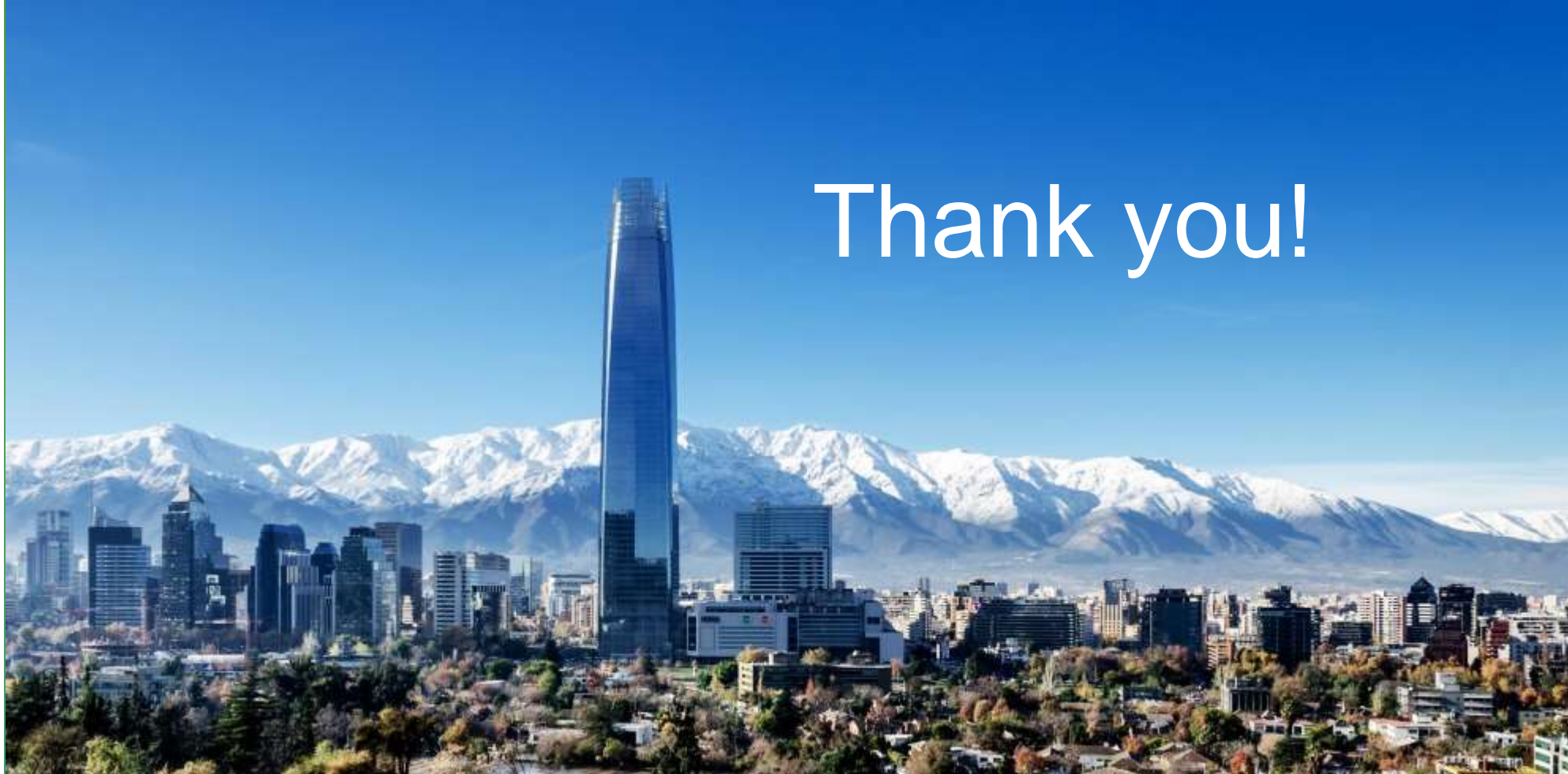
- Full development of Vaca Muerta in Argentina and the pre-salt in Brazil;
- Natural gas demand has significant room to grow;
- There are gaps in infrastructure across the region;
- Guyana could become a game changer;
- If the political situation in Venezuela is fixed, the country could attract significant investment to rebuild the economy and the gas& oil industry

Threat

- Lack of policies and regulation to promote the use of natural gas;
- Political instability may affect economic reforms that incentivise investment in the energy sector;
- Incorporation of non-hydro renewables without a back up fired by natural gas, not with coal.



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Thank you!

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Santiago de Chile, 25 April 2019