Natural Gas and Renewables

Luis Bertran, Secretary General, IGU

8 June 2017

IGU
INTERNATIONAL GAS UNION
UNION INTERNATIONALE DU GAZ

The Energy Chamber of Trinidad & Tobago
www.energy.tt

European Union

International Gas Union

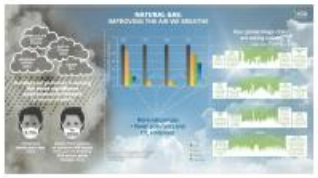
Leading the future of the Industry

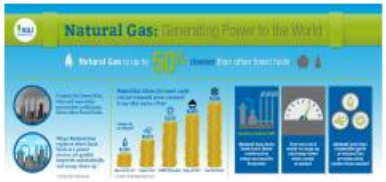
As the global voice of gas,
IGU seeks to improve the quality of life by advancing gas as a key contributor to a sustainable energy future

- 90 Charter Members
- 62 Associate Members
- Founded in 1931

- IGU Secretariat
- Barcelona, Spain

- Presidency 2015-2018
- Washington, DC USA
- South Korea 2018-2021





27th WORLD GAS CONFERENCE WASHINGTON DC JUNE 25-29 2018 IGU

New Head Quarter in Barcelona

IGU SECRETARIAT
SPAIN 2016-2022

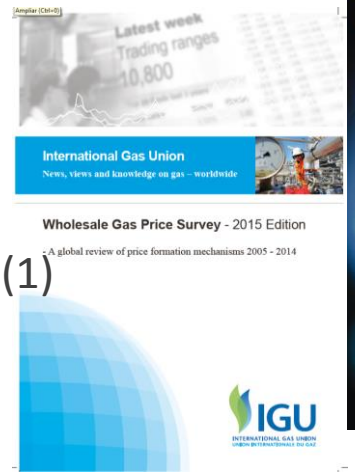
IGU Secretary General
Mr. Luis Bertran

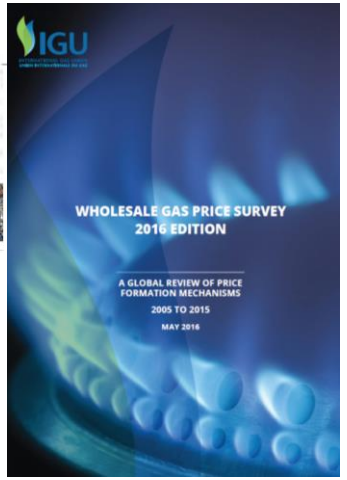
2. International Market and Price

A Global Challenge and Opportunity

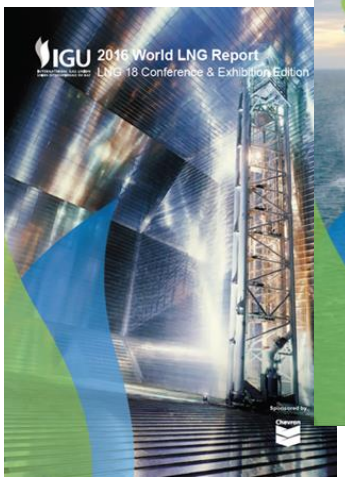
IGU Reports:

WHOLESALE GAS PRICE SURVEY (1)





WORLD LNG REPORT



(1) Started in 2009 at WGC 2009 in Buenos Aires

2. International Market and Price

Think global act local

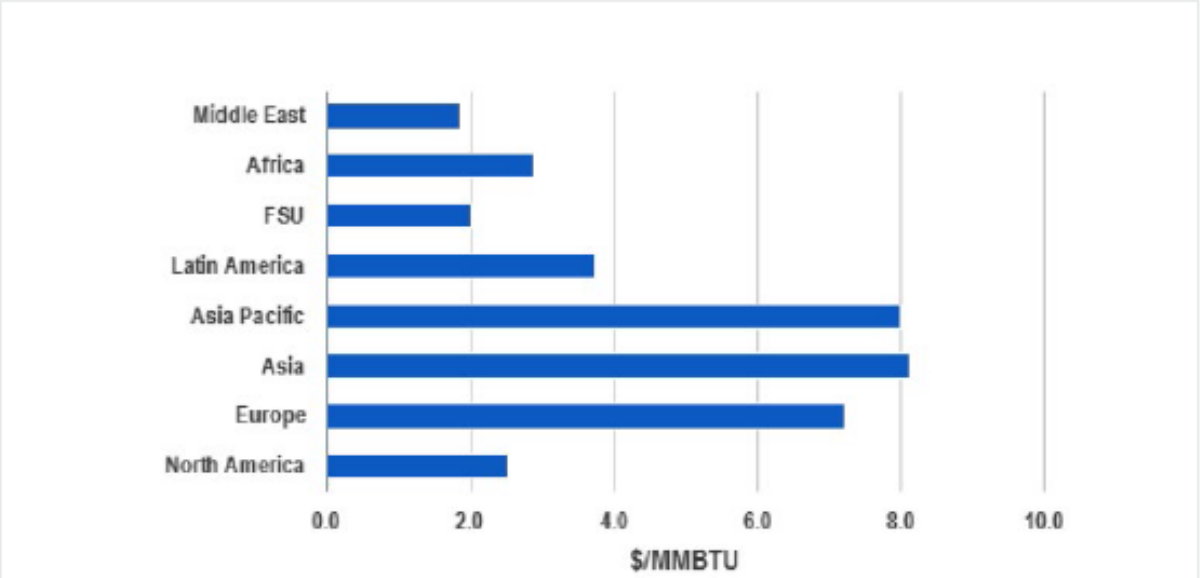
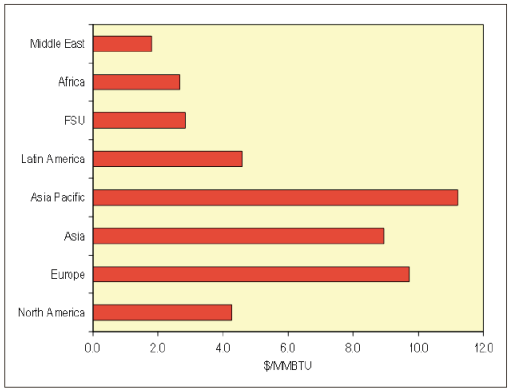


Figure 4.2: Wholesale Prices in 2015 by Region

*Figure 3.15. **Wholesale Prices in 2014 by Region***



Wholesale Gas Price Survey 2016 and 2015

2. International Market and Price

World Price Formation

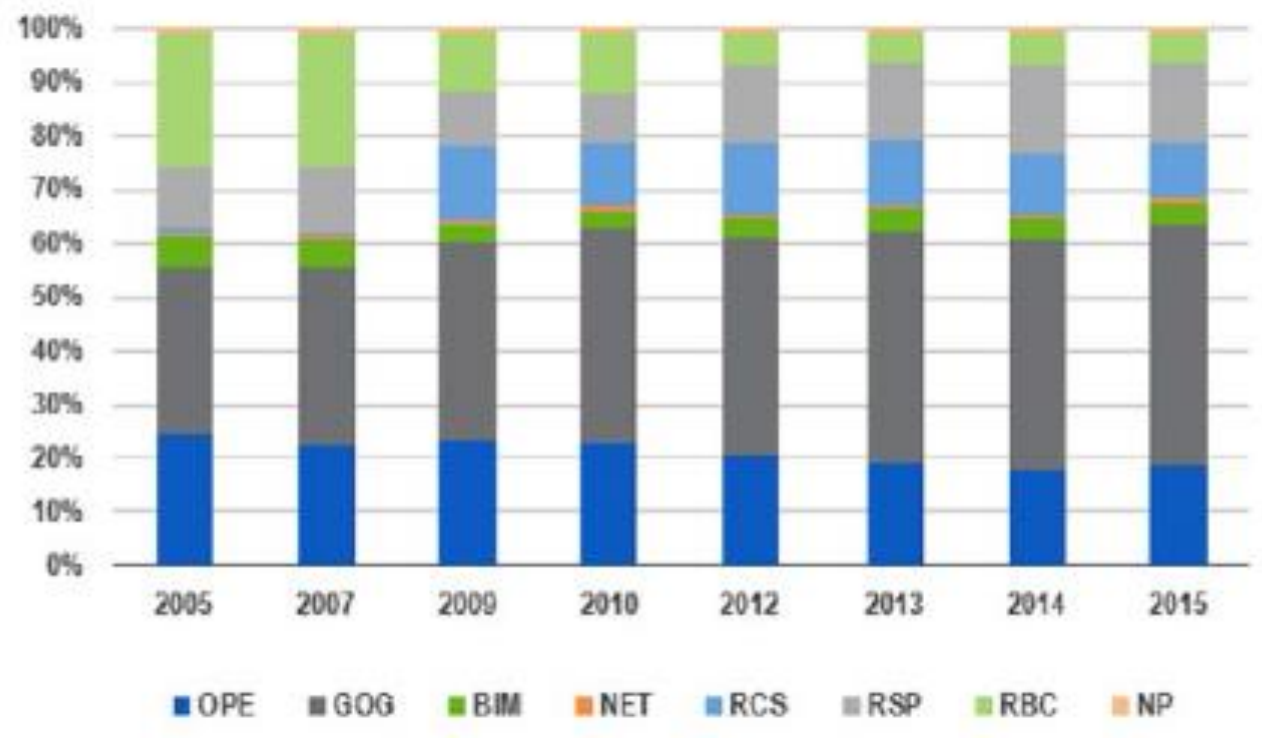


Figure 3.14: World Price Formation 2005 to 2015 – Total Consumption

2. International Market and Price

Gas Price Development

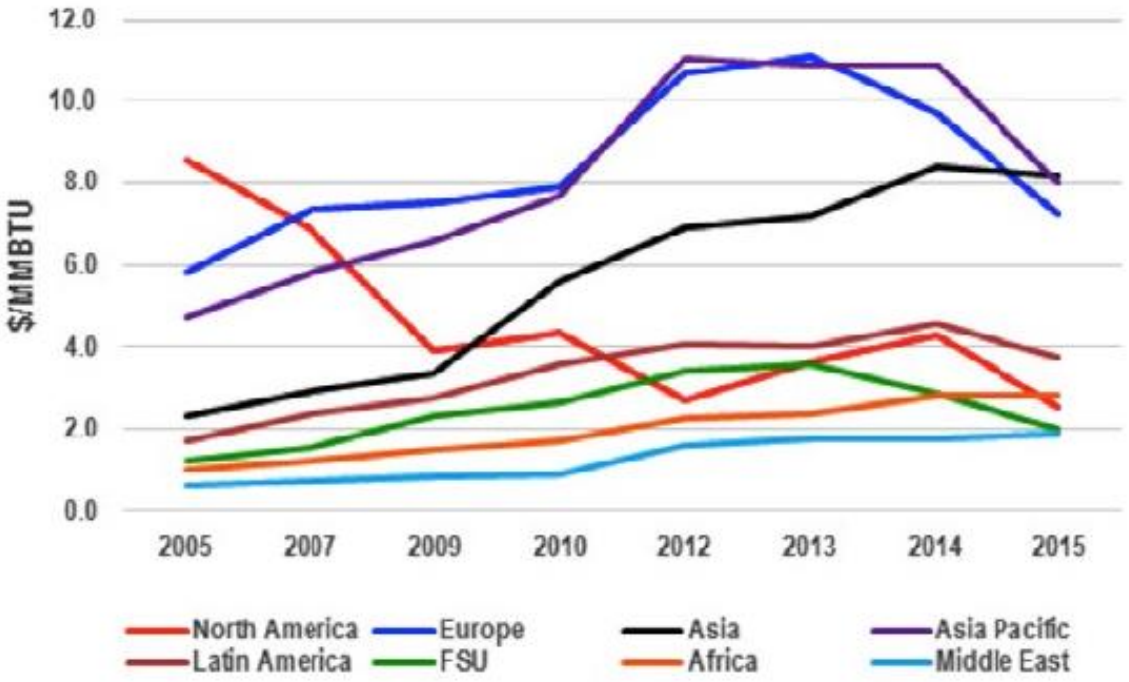
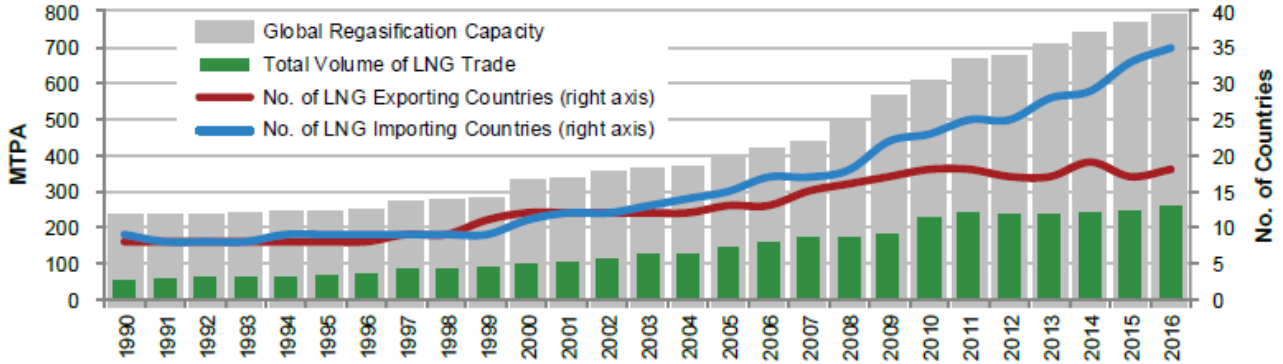


Figure 1.3: Wholesale Price Levels 2005 to 2015 by Region

2. International Market and Price

Opportunities for LNG exporters

Figure 3.1 LNG Trade Volumes, 1990-2016



Source: IHS Markit, IEA, IGU

More importing countries and so on

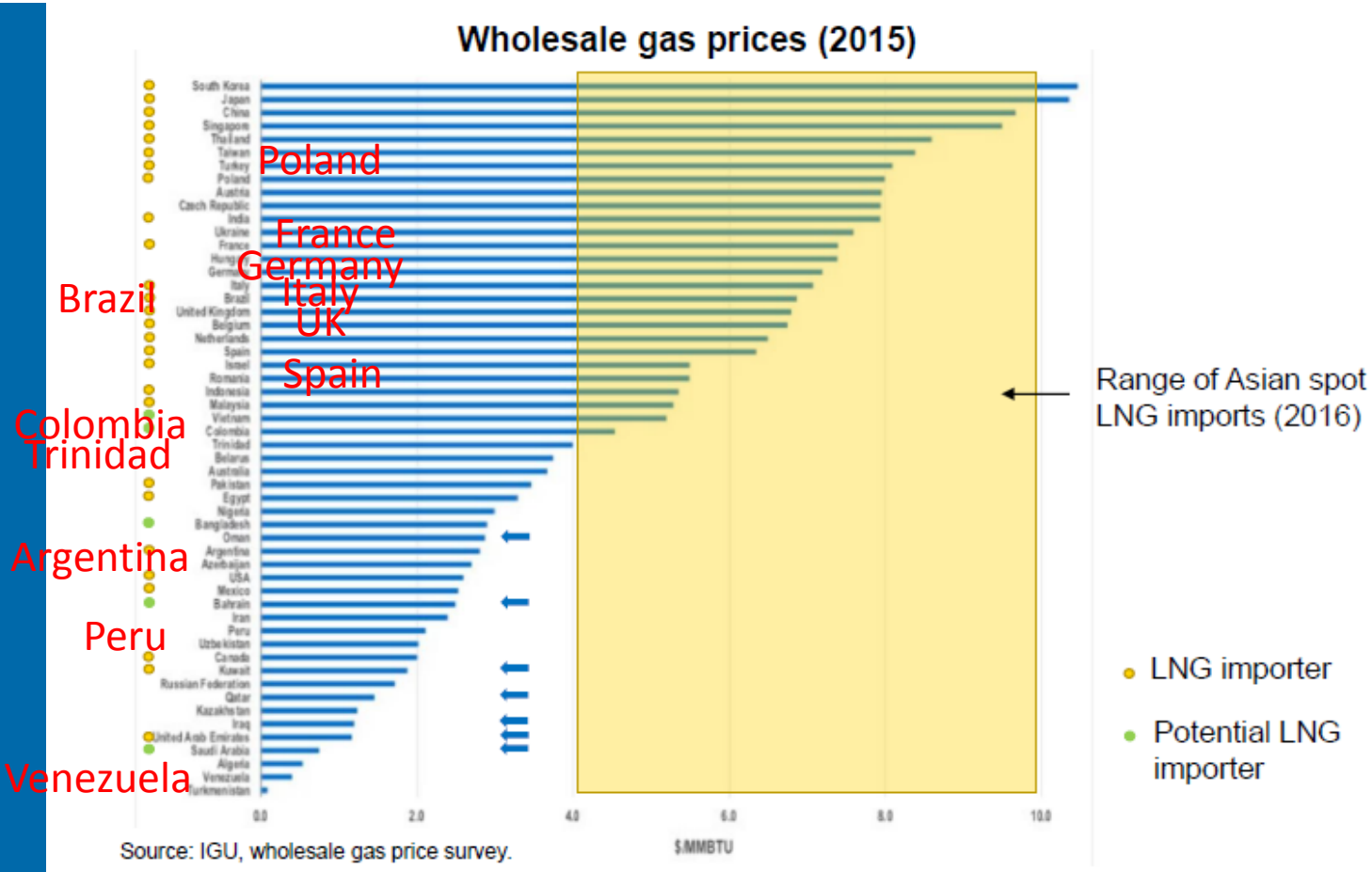
Price formation led by USA

International price level in some regions are higher than Europe price level

2. International Market and Price

Opportunities for LNG exporters

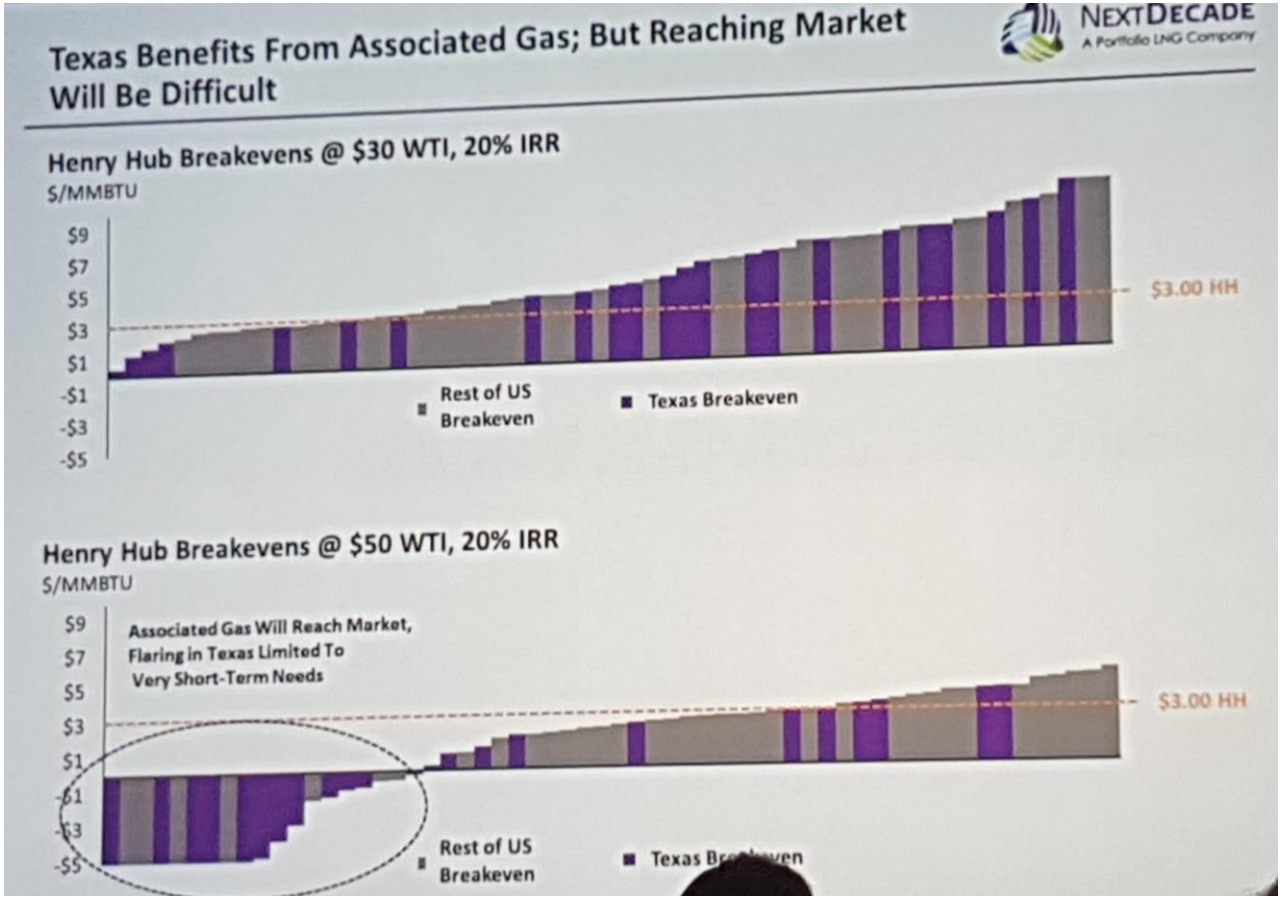
Think Global and act local



Range for Asian spot market

2. International Market and Price

Opportunities reducing cost production

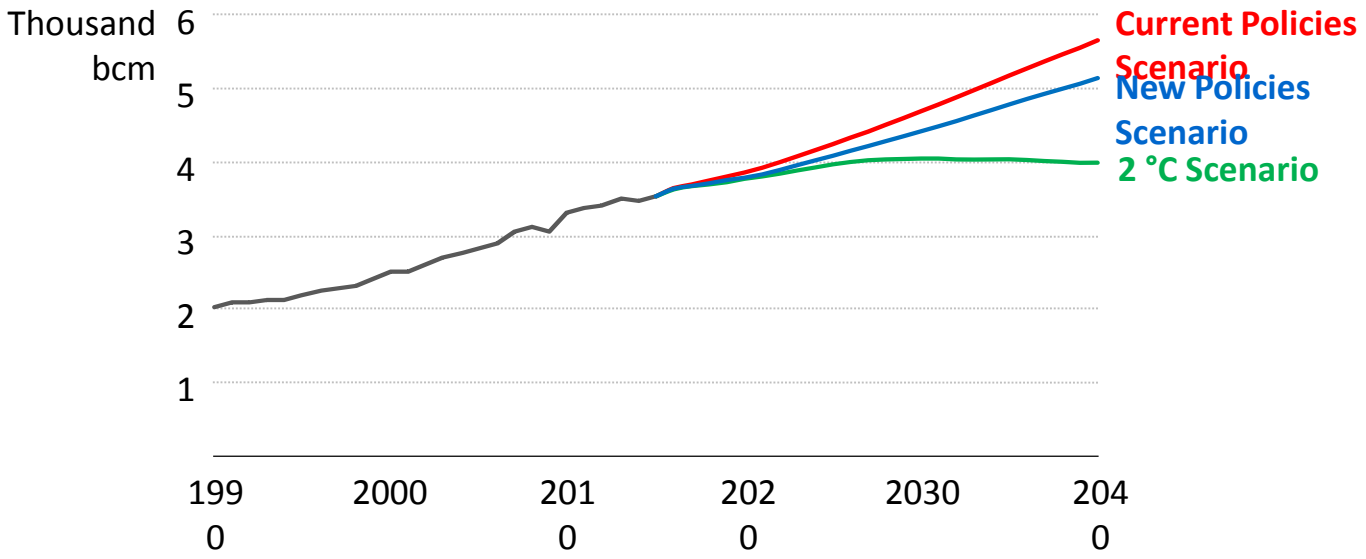


Blast the production using fracking technologies

3. A Growth Story for Natural Gas

3. Golden Age of Gas

World Natural Gas Demand by Scenario

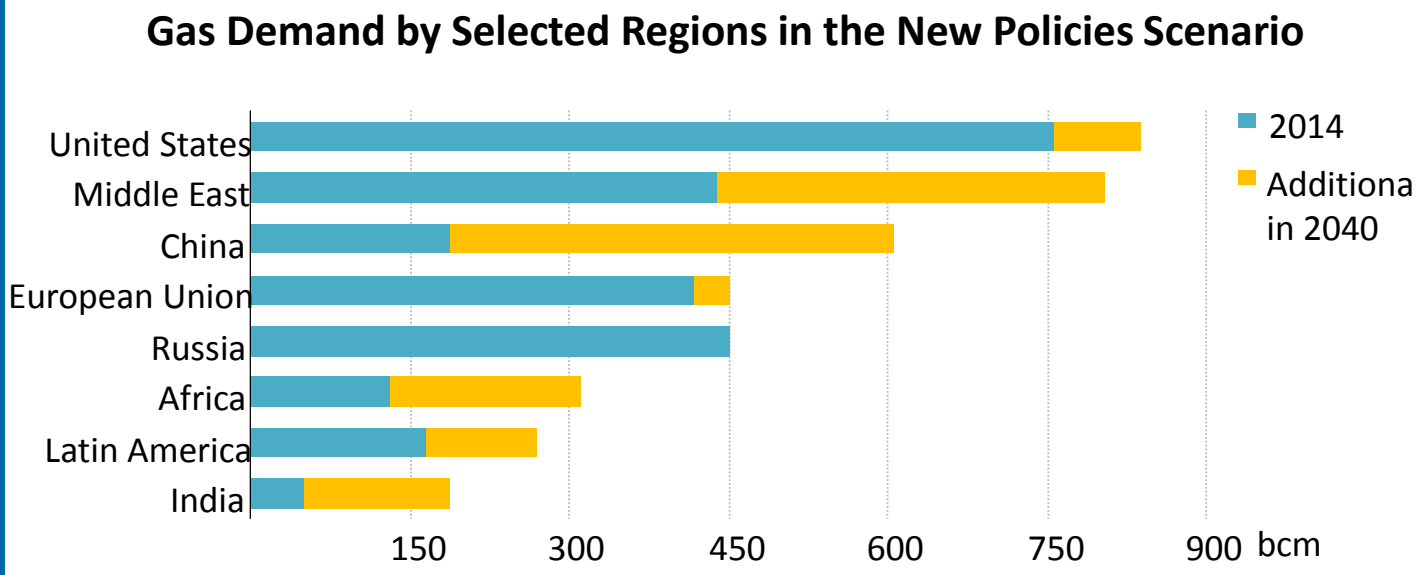


Global gas demand is projected to plateau from the late-2020s in the 2 °C Scenario

Source: World Energy Outlook 2016; OECD/IEA

3. Gas Demand Growth: A Question of Geography

3. Golden Age of Gas

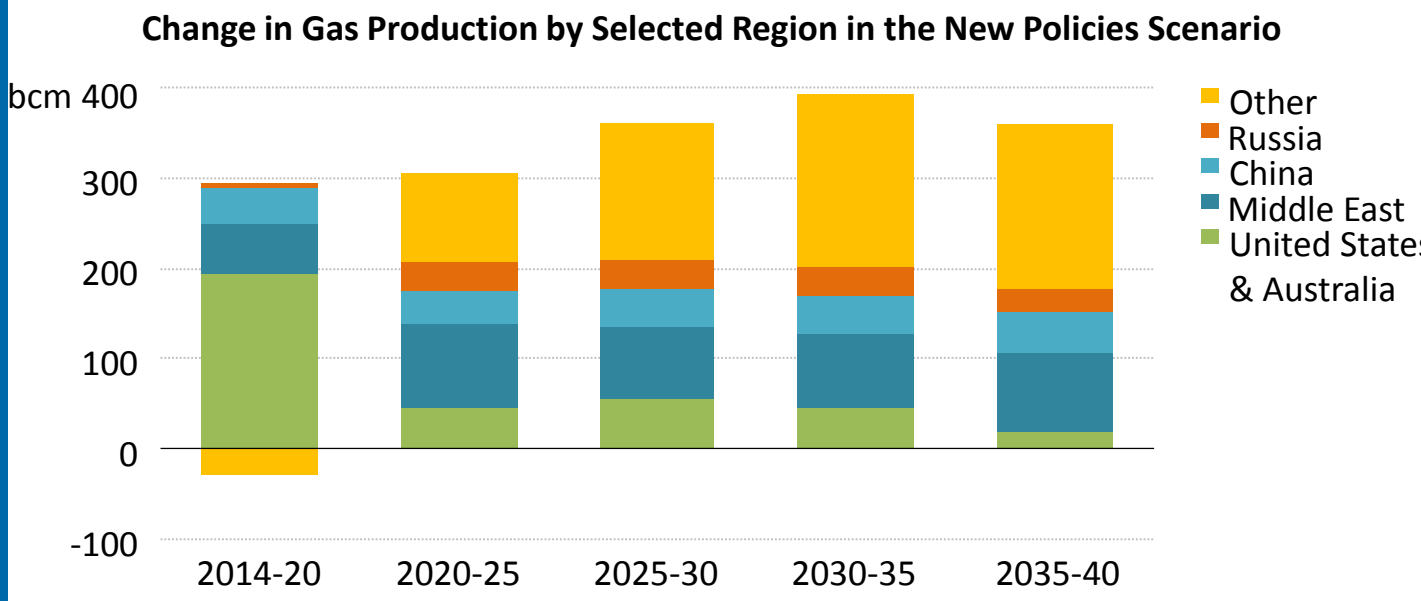


Developing countries lead the growth in global gas demand

Source: World Energy Outlook 2016; OECD/IEA

3. Not Quite the Usual Suspects

3. Golden Age of Gas



By the 2020s, a rising share of gas output growth needs to come from a new cast of producers, such as East Africa & Argentina

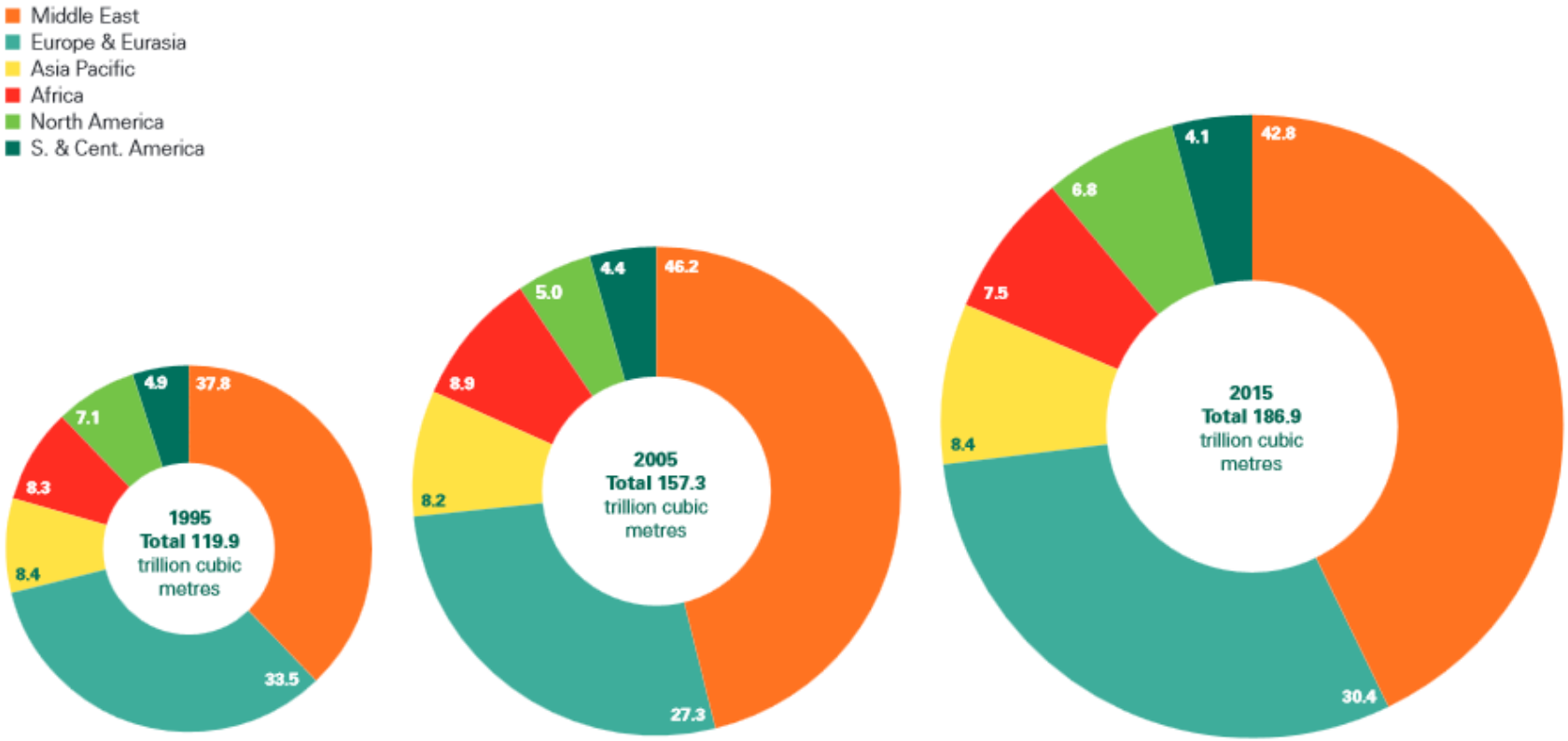
Source: World Energy Outlook 2016; OECD/IEA

3. Evolution of Proven Gas Reserves

Gas is available and widely distributed

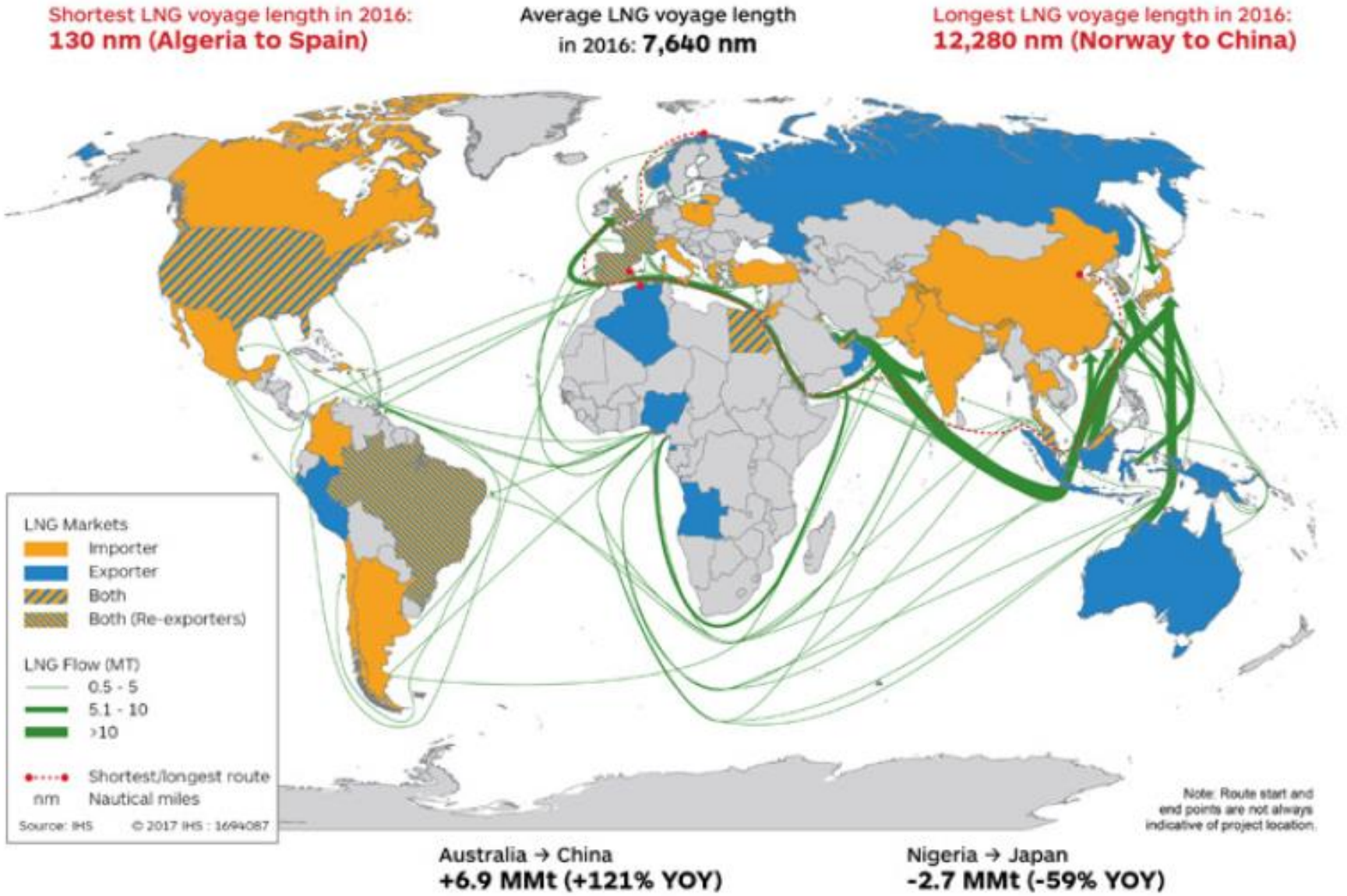
Distribution of proved reserves in 1995, 2005 and 2015

Percentage



BP Statistical Review of World Energy, 2016

3. Global natural gas trade



3. Golden age of Gas

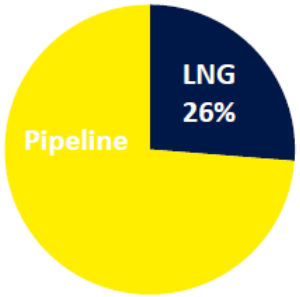
Contractual terms and pricing arrangements are all being tested as new LNG from Australia, the US & others collides into an already well-supplied market

A wave of LNG spurs: A second natural gas revolution

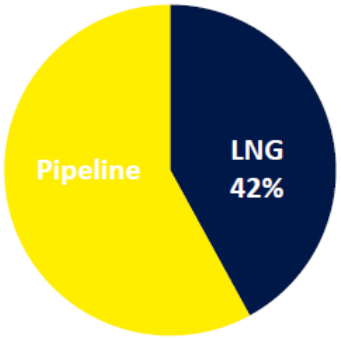
258.0 MT

Global LNG trade reached a historic high in 2016

2000
525 bcm



2014
685 bcm



2040
1 150 bcm

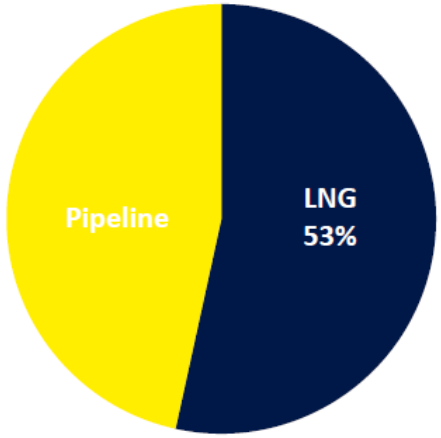
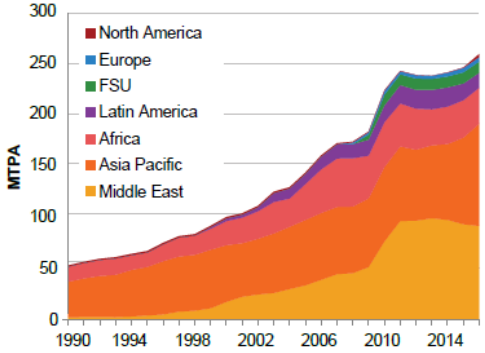
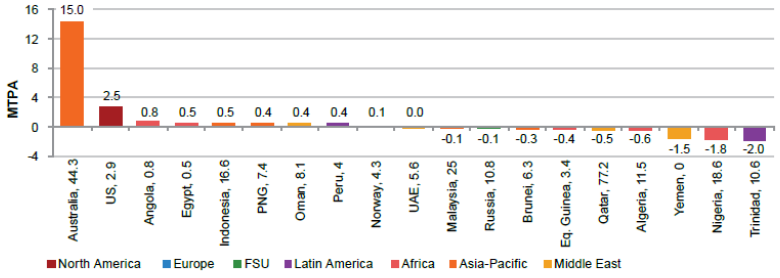


Figure 3.6: LNG Exports by Region, 1990-2016



Note: FSU = Former Soviet Union. Sources: IHS Markit, IGU

Figure 3.3. 2016 Incremental LNG Exports by Country Relative to 2015 (in MTPA)



Source: IHS Markit, IGU

4. Reactions to the COP21 agreement

4. Paris Agreement

4. Natural Gas Enables the Energy Transition

4. Paris COP 21

A call to action

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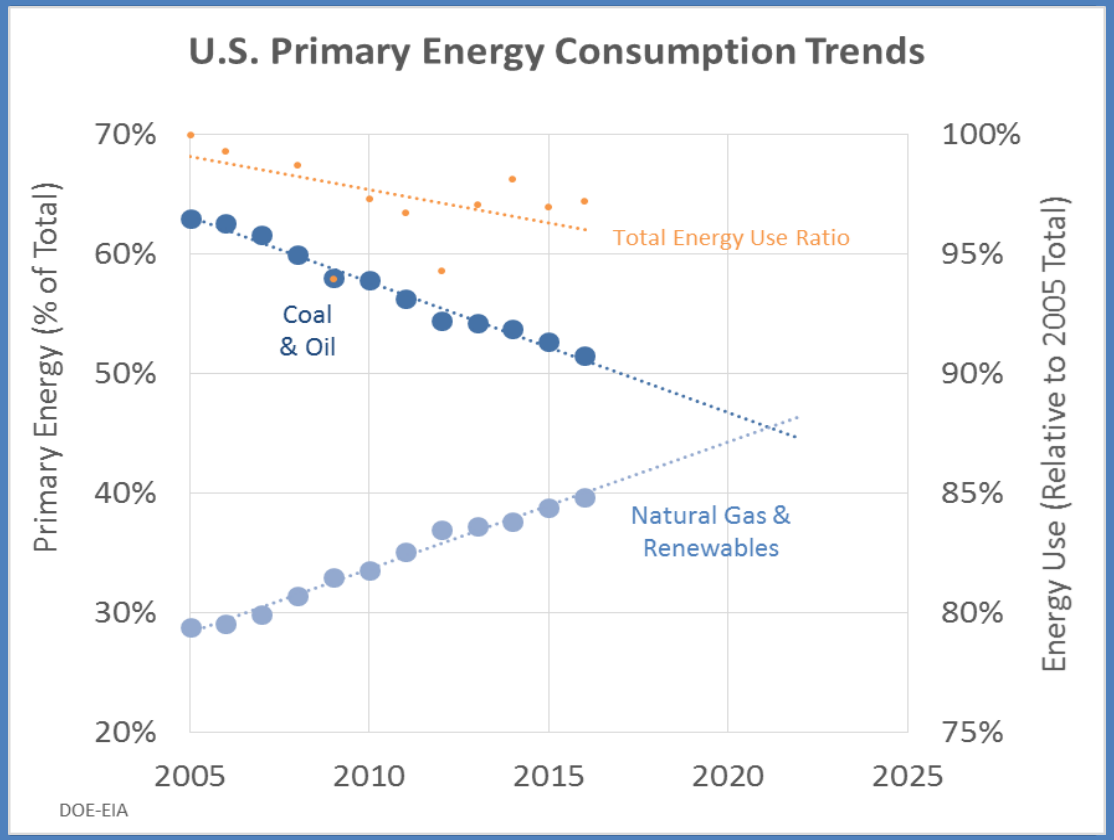
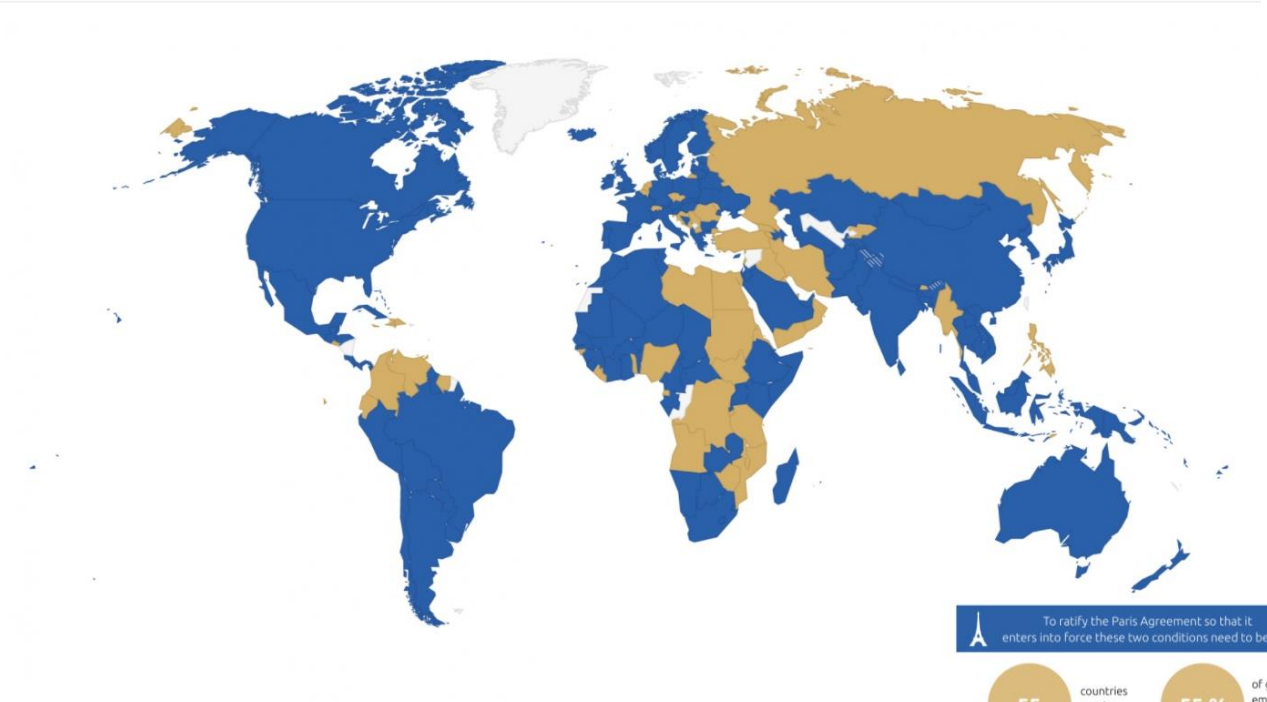
4. Paris COP 21

A call to action

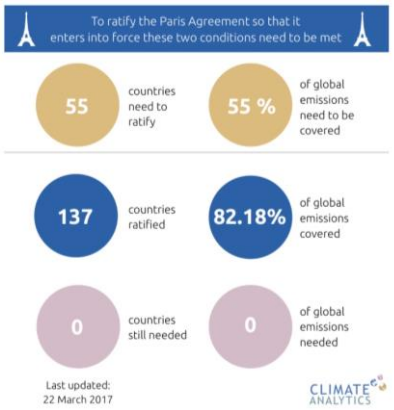


4. Paris Agreement. Plans involved

141 Parties have ratified the Paris Agreement



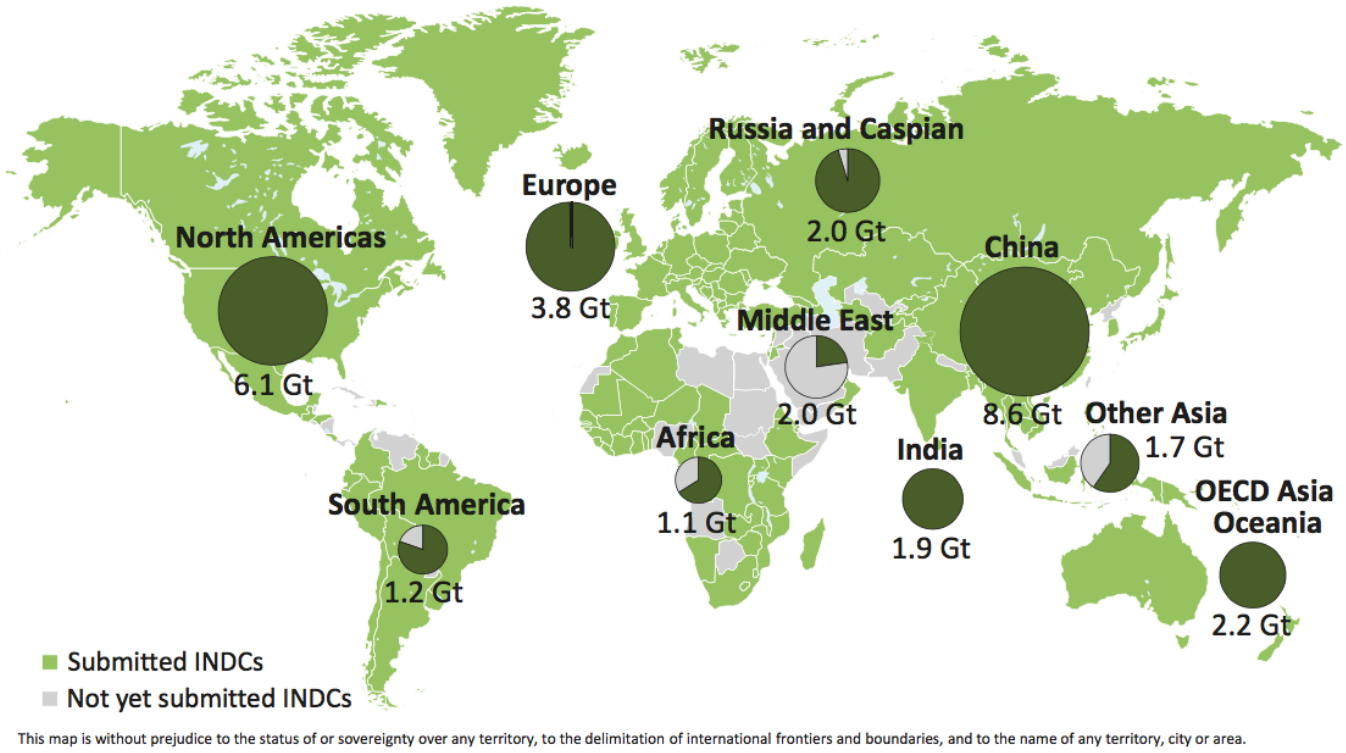
As of 22 March 2017: **194 Parties signed the Agreement, 137 Parties ratified.**



4. Paris Agreement. Plans involved

IEA projected gas as a winner with increasing *share in energy mix*, unlike coal or oil

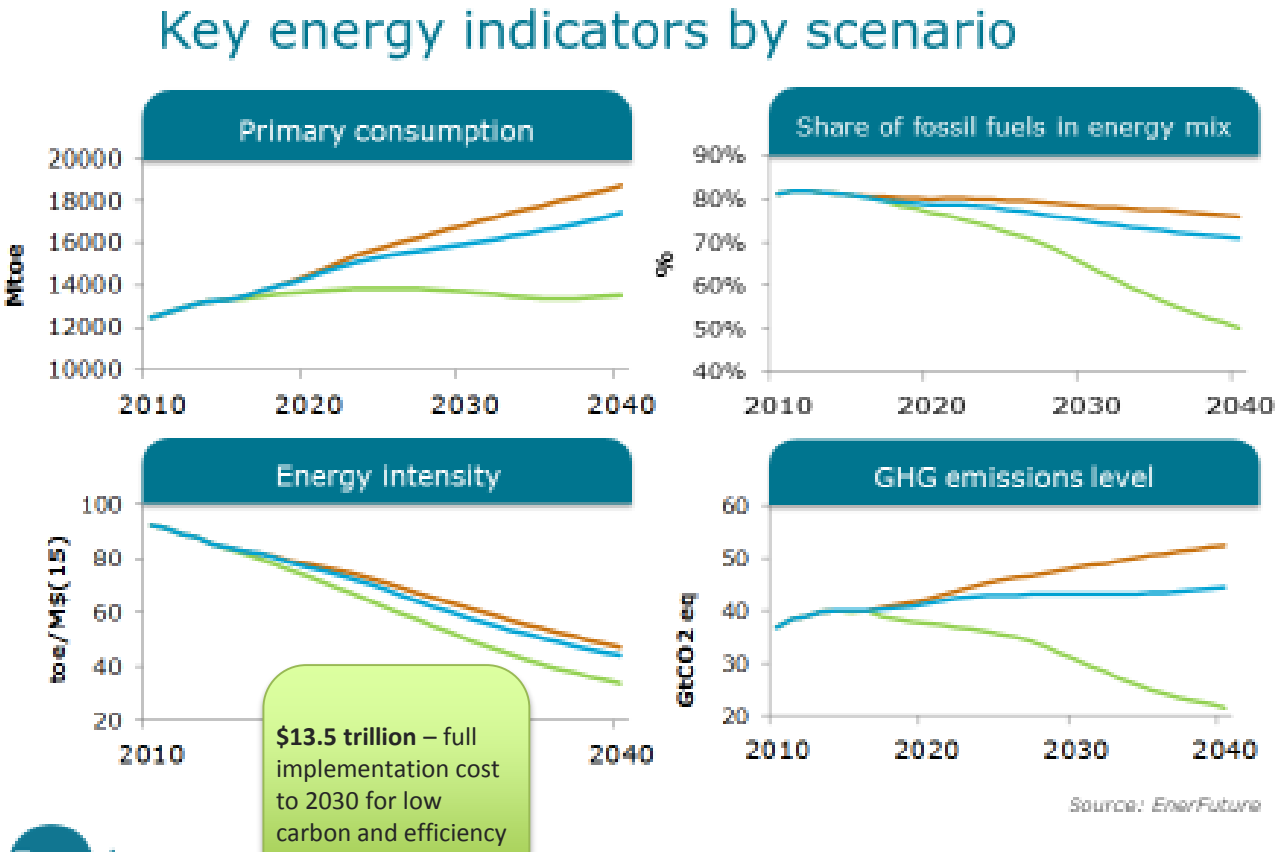
However, this should not be taken by industry as default, because of significant uncertainties



(as submitted to COP21 in 2013 Source: IEA)

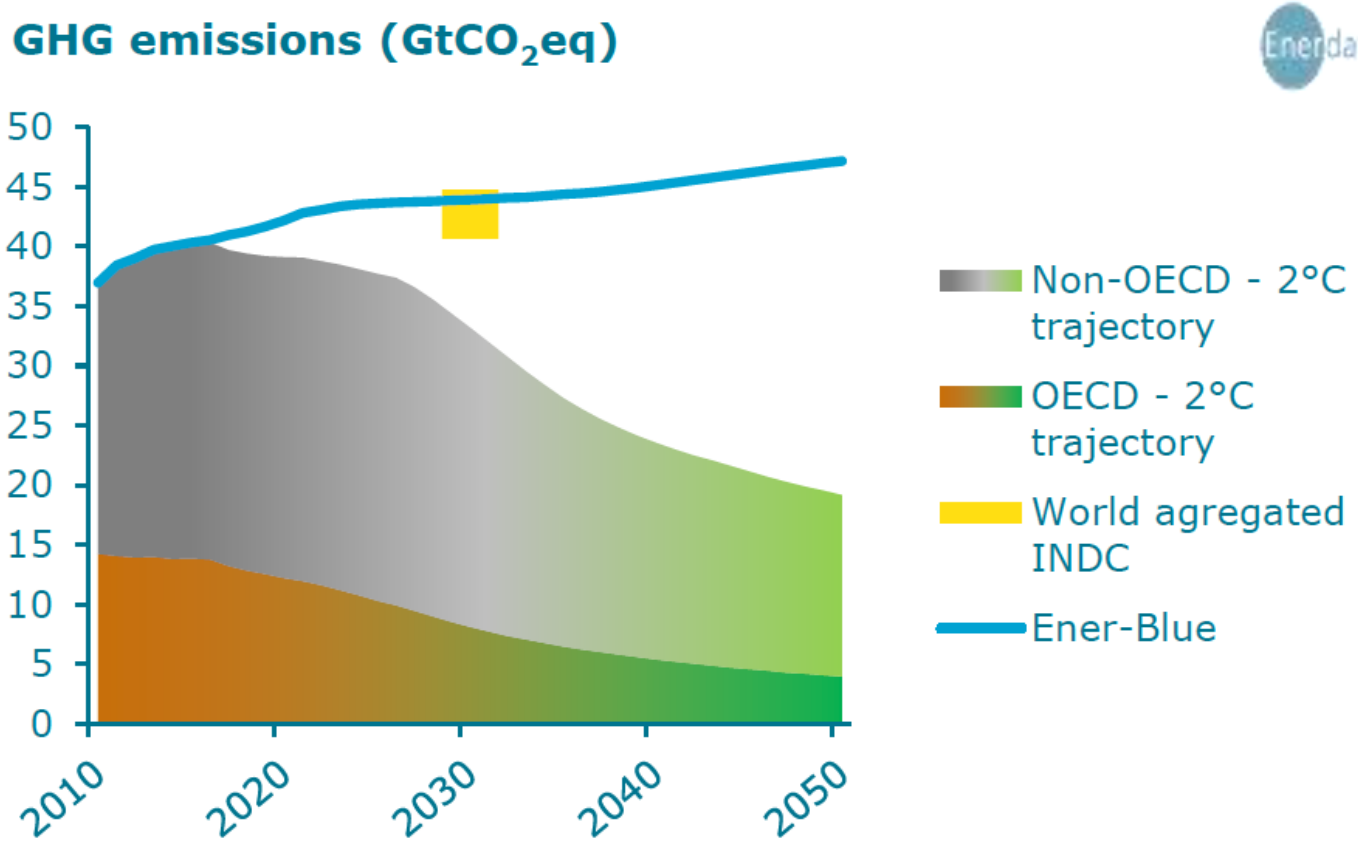
4. Paris Agreement. Plans involved

INDC's submitted cover over 90% of global fossil fuel demand and almost 80% of production



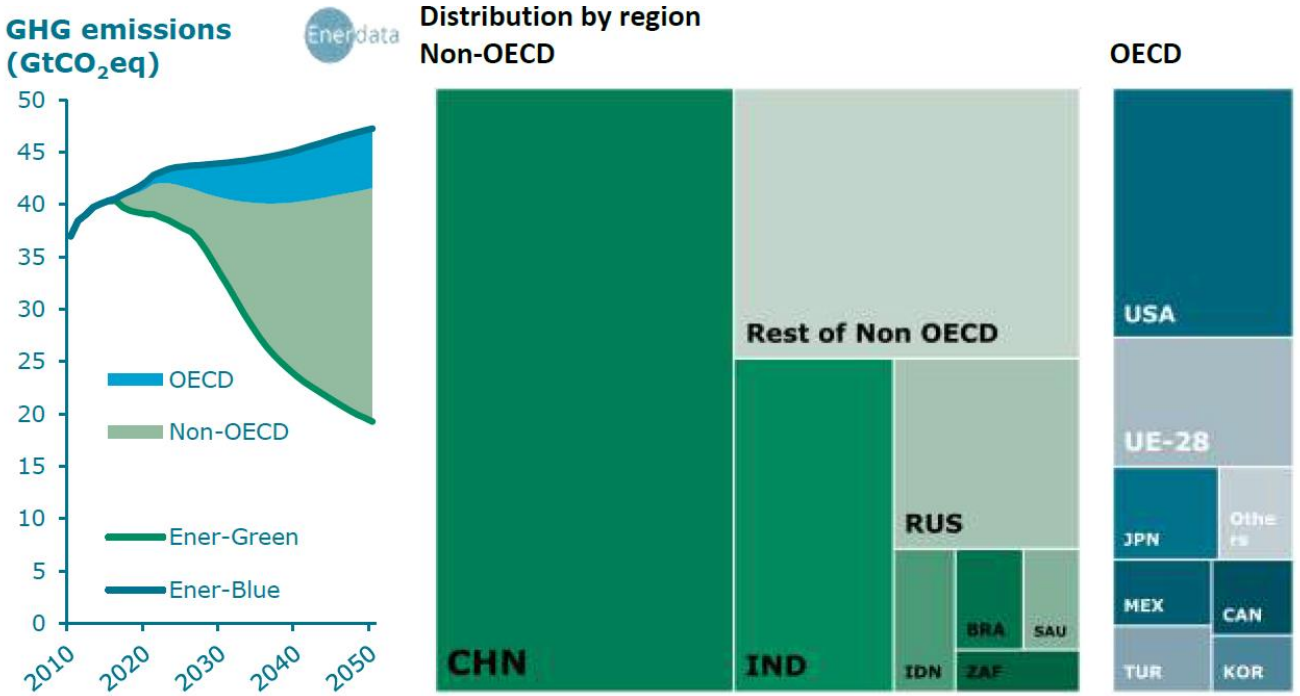
4. Paris Agreement. Plans involved

INDC's versus 2 ºC trajectory. Global GHG emissions forecast for scenario



4. Paris Agreement. Plans involved

500 GtCO2 eq is the additional cumulative effort, from NDC's commitments to 2 ºC scenario (Ener-green)



Additional cumulative GHG emission reduction (2015 – 2050) by major regions between INDC and 2°C scenarios

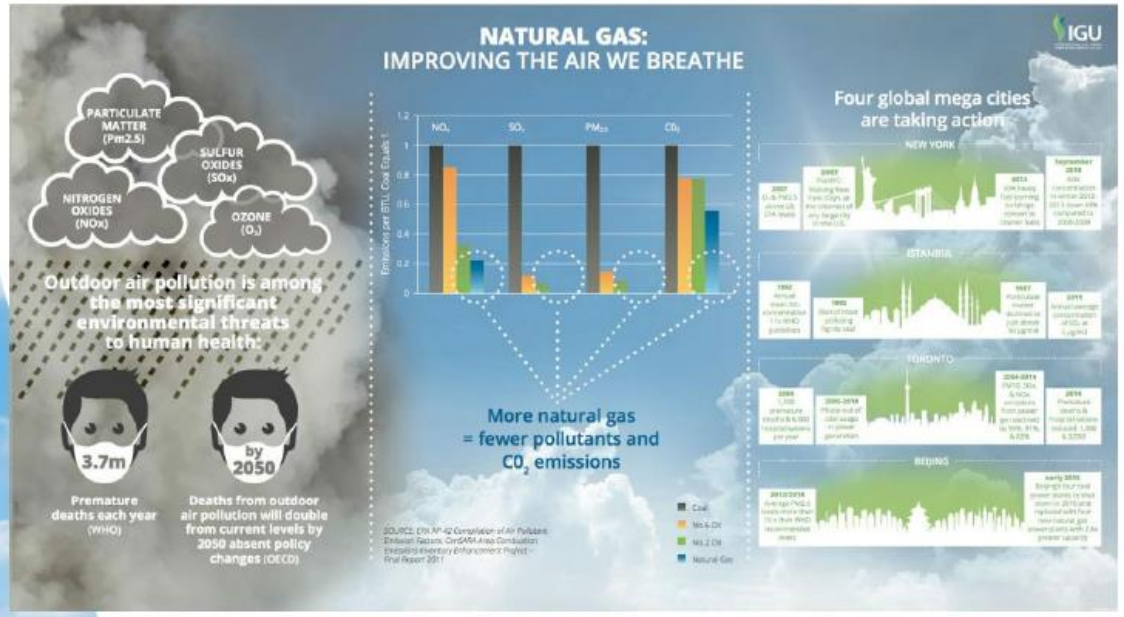
Polluted and Dirty air is an urgent crisis

HONG KONG - Over 70% of those surveyed said they would be willing to pay for air that meets the tightest World Health Organization (WHO) standards, termed "Air Quality Guidelines (AQGs)".

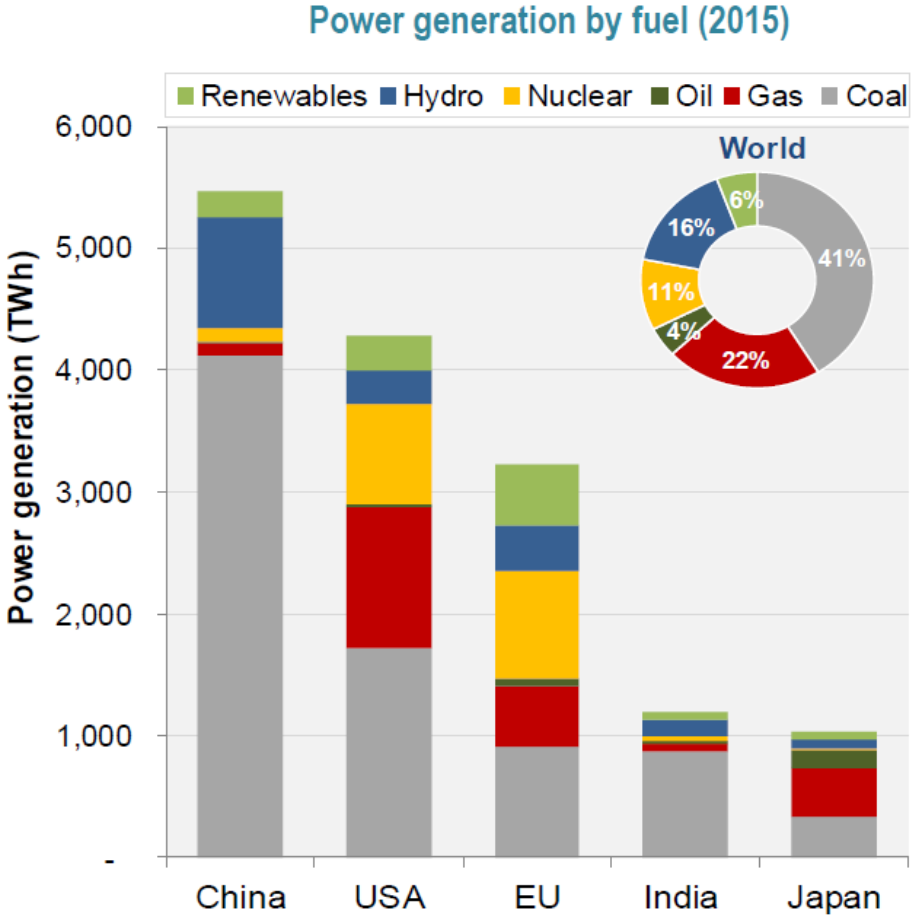
CHINA - "Exposure to Smog Is Severe Hazard" reported that the lung cancer rate in Beijing had increased by 60 percent in the last decade even though the smoking rate did not change.

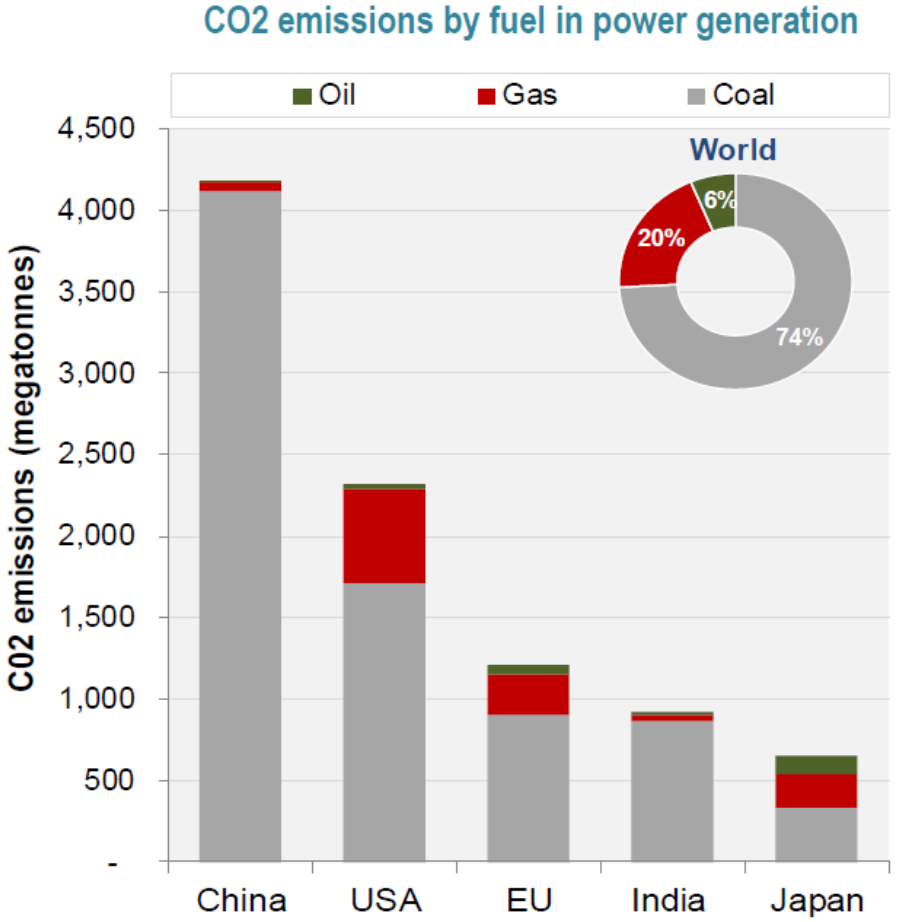
SPAIN - 94% of the Spanish population breathes air of poor quality, which translates into 19,940 premature deaths a year, that is, ten times more than deaths from road traffic accidents, according to the study, the quality of air in Spain in 2012, presented by Ecologists in Action."

Case studies in improving urban air quality



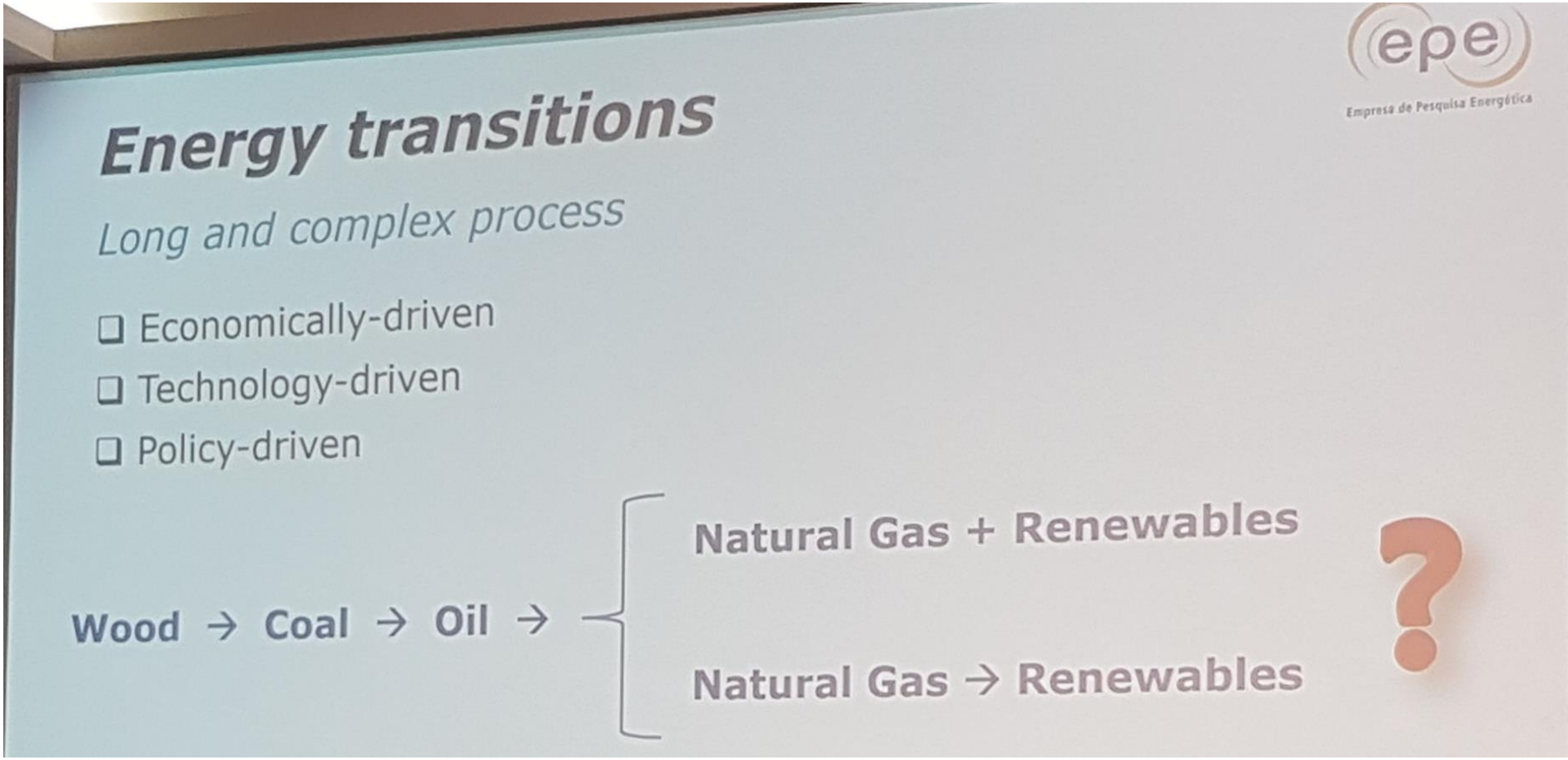
Coal to Gas switch: fastest way to reduce CO2 and smog in cities





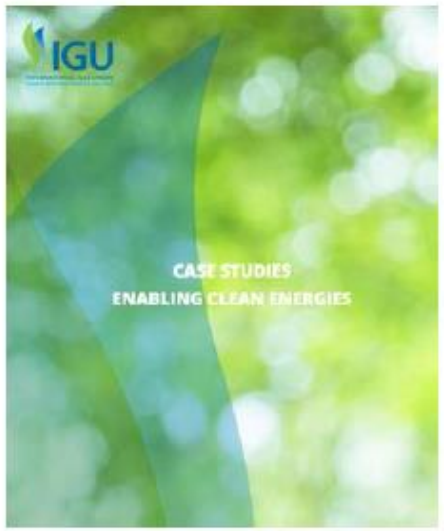
Source: Lambert Energy Advisroy Group (based on BP and IEA Stats)

5. Gas working with renewable Energy transitions: Long term process



5. Gas working with renewable Energy transitions: Long term process

Case Studies
in Improving Urban Air Quality
2015 & 2016 Editions



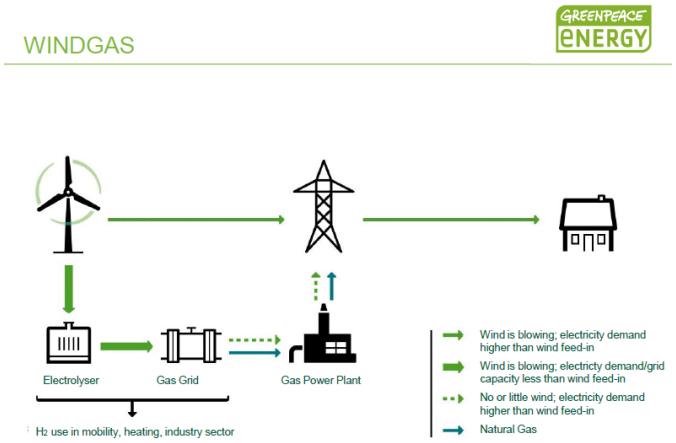
Case Studies
Enabling Clean Energies

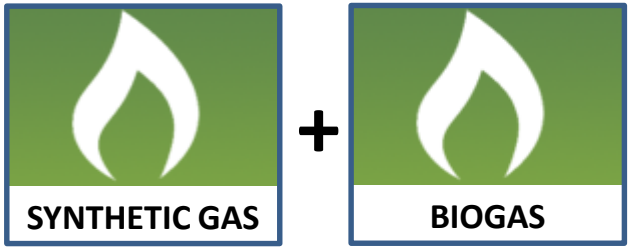
1. Support variable renewable production
2. Integrating systems CHP
3. Biogas
4. Power to Gas

Natural Gas Business: Challenges and Opportunities. Gas in a sustainable energy mix

Natural gas in the transition

Development and wide deployment of new zero/low-carbon technologies associated to the gas industry (e.g. biogas/biomethane, Power-to-gas and synthetic gases)



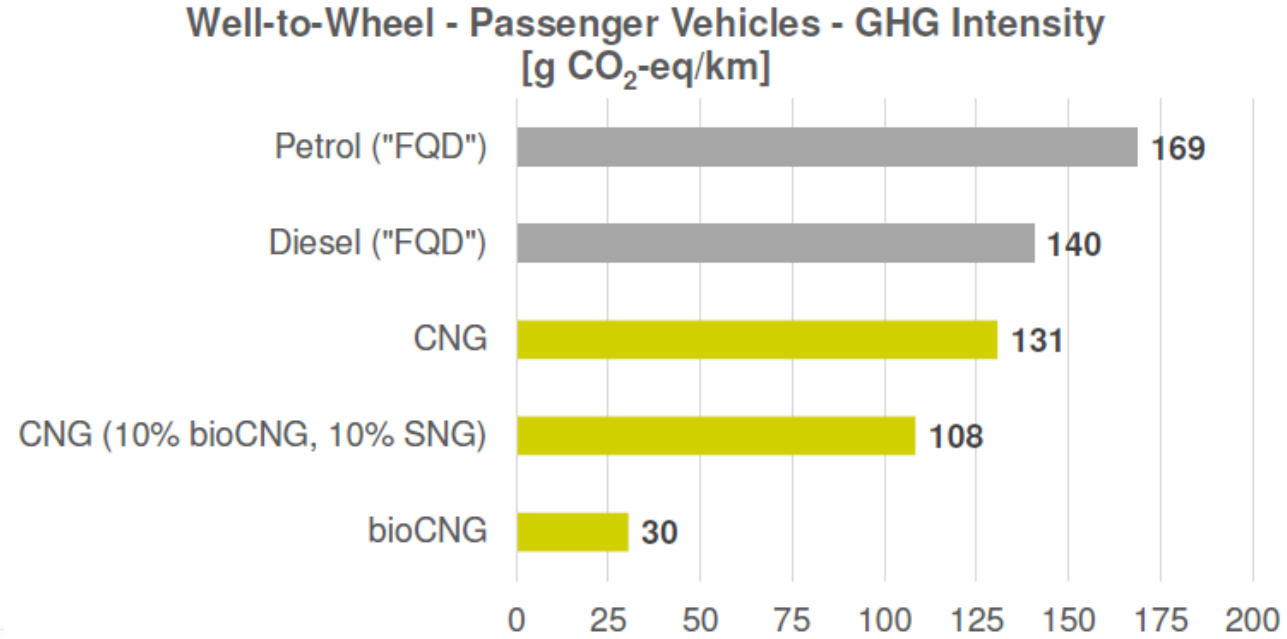


Source: GreenPeace Energy

5. Natural Gas Vehicles Business: Challenges and Opportunities

Natural gas in transpor-tation

-
-



5. Natural gas as transportation fuel
Fuel Consumption of Different vehicles. Equivalences

Natural gas in transport-tation

Consumption of CNG/LNG MW.h/year

395.000

5.900

3.000

290

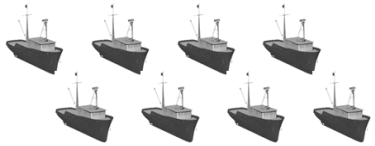
40

1 Ferry

uses as much fuel as

65 small boats

or



130 fishing boats

or

1.300 buses

or

10.800 taxis

or

80.000 private cars

5. Natural gas as transportation fuel
Fuel Consumption of Different vehicles. Bunkering

First LNG Bunkering Vessel

ENGIE/NYK/MC "ENGIE ZEEBRUGGE" - Courtesy of ENGIE, Mitsubishi Corporation and NYK

5. Closing thoughts on energy transition

Natural gas in the transition

- Urgency needed to tackle climate change and air quality
- Gas can play important role; need enlightened policies
- Governments provide direction, markets respond
- More investment in technology
- Tireless focus by industry on social license

Three things to remember

- We need more energy globally
- We contribute at Paris agreement
- Natural Gas is part of the long term sustainable energy solution

Next appointment in Washington

27th WORLD GAS CONFERENCE
WASHINGTON DC
JUNE 25-29 2018
IGU

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12,000 ATTENDEES

40,000m² EXHIBITION

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AGA American Gas Association

PROUDLY SUPPORTED BY
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Chevron ExxonMobil

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The Energy Chamber of Trinidad & Tobago

European Union

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Thank you for your attention!