



Global Gas Markets Supporting Growth and Sustainability

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Back-to-back with PETROTECH 2016



5TH IEF-IGU MINISTERIAL GAS FORUM

New Delhi, India

Gas for Growth: Improving economic
prosperity and living standards



सत्यमेव जयते

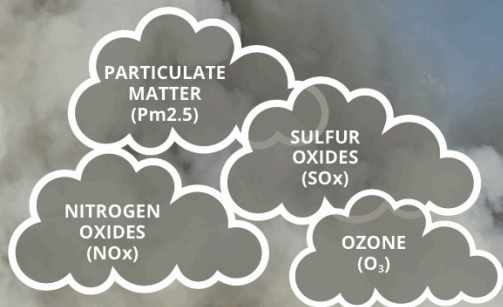
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IGU Recent Global Publications



Case Studies in Improving Urban Air Quality 2015

New York, Istanbul, Toronto, Beijing



Outdoor air pollution is among the most significant environmental threats to human health:

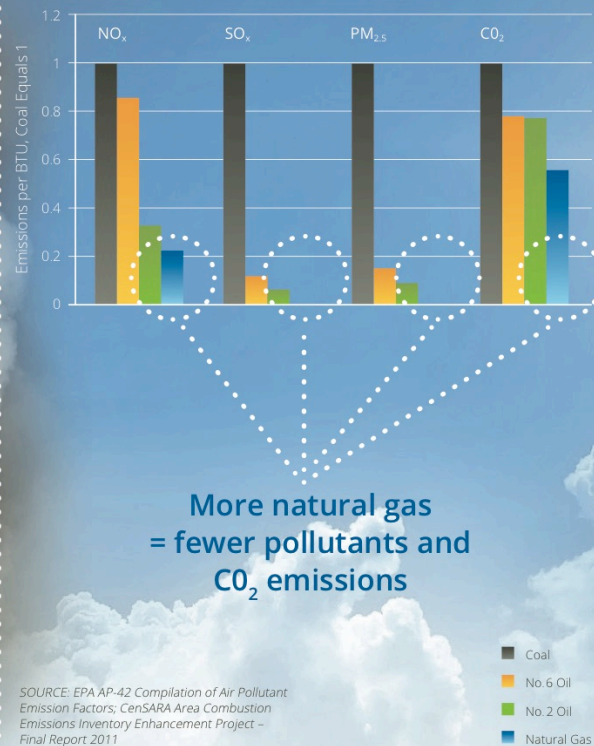


Premature deaths each year (WHO)



Deaths from outdoor air pollution will double from current levels by 2050 absent policy changes (OECD)

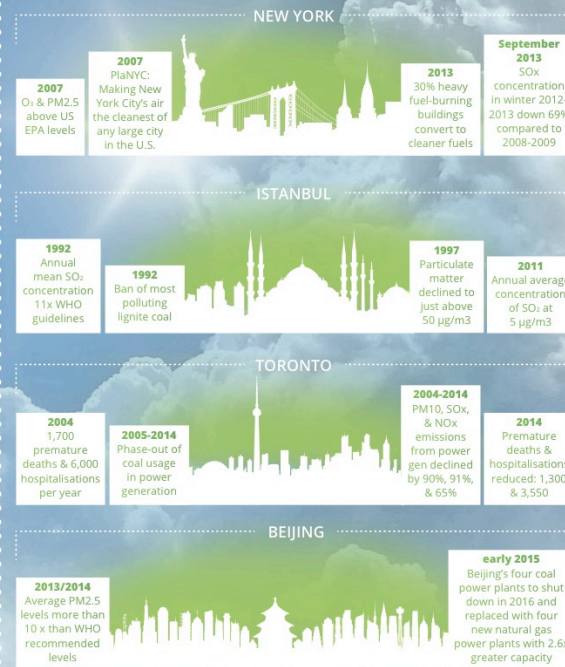
NATURAL GAS: IMPROVING THE AIR WE BREATHE



More natural gas
= fewer pollutants and
CO₂ emissions

SOURCE: EPA AP-42 Compilation of Air Pollutant Emission Factors; CenSARA Area Combustion Emissions Inventory Enhancement Project - Final Report 2011

Four global mega cities are taking action



Energy. Climate summit

Natural gas industry's mission to clear the air

Large groups cite fuel's green benefits as they argue for more favourable treatment

ED CROOKS — NEW YORK

The natural gas industry is seeking to separate itself off from other fossil fuels, promoting the dramatic improvements in air quality achieved by cities including New York, Toronto and Istanbul through shifting away from coal and oil.

At the international climate talks in Paris, gas producers are arguing that they should receive more favourable treatment from governments because of the environmental benefits of gas.

Large oil and gas groups including Royal Dutch Shell, BP, Total and Reliance have signed a statement backing efforts to curb carbon dioxide emissions, and see an opportunity in shifting power generation from coal to gas.

Coal-fired power stations release roughly twice as much carbon dioxide as gas-fired plants for an equivalent output of electricity.

The International Gas Union, whose members are industry associations and leading gas companies including Gazprom of Russia, Saudi Aramco and Qatargas, is also highlighting the benefits in terms of reduced local pollution from switching from coal and oil to gas.

An estimated 3.7m people worldwide die each year as a result of ambient air pollution, and many of those deaths are believed to be caused by energy use.

In emerging economies including India and China, many cities suffer from choking smog that is in part caused by burning coal, fuel oil and petrol.

Cities that have used more gas and less coal and oil have achieved large cuts in pollutants that cause respiratory illnesses, including the particulates — small airborne particles of solids and liquids — that are responsible for lung cancer, heart attacks, strokes and asthma attacks.

Mel Ydreos, of the IGU, which launched a report in Paris yesterday setting out the industry's case, said: "We believe that gas stands apart, and should not be dumped into the same bucket as other fossil fuels."

The IGU argued that cities such as New York showed how urban air pollu-



The skyline of New York, partly shrouded in smog, 1973
Photo: Getty Images

tion could be tackled. In New York City, the utility Consolidated Edison has, since 2011, switched almost 5,000 large buildings over from using heavy oil for heating to gas, encouraged by an initiative launched by the mayor and backed by the environmental defence fund.

Its gas sales across the company's territory have risen from 1.09tn British thermal units on its peak day in 2005 to 1.68tn on its peak day this year.

Janice Nolen, of the American Lung Association, a group that campaigns to cut respiratory illnesses, said that, along with other changes including tighter curbs on pollution from coal-fired power stations, the reduced use of heating oil in New York had contributed to a significant improvement in air quality.

The weight of particulate matter in New York's air has dropped from an annual average of 17 microgrammes per cubic metre in 2003-05 to 10.6 microgrammes per cubic metre in 2012-14.

Other cities including Toronto and Istanbul have reported similar improvements. Beijing, which suffers from notorious air quality problems, has been working to cut pollution through a series of measures including relocation of heavy industry, increased use of public transport and the conversion of all power plants downtown to gas.

By 2020, Beijing expects to derive 32 per cent of its energy from gas, and just 6 per cent from coal, said Yalan Li, general manager of Beijing Gas Group.

Fatih Birol, executive director of the International Energy Agency, the watchdog backed by rich countries' governments, said in New York this week that the agency's vision from 2011 of a possible "golden age of gas" had not come to pass.

As a fuel for power generation in Asia, he said, gas was being squeezed between renewables such as solar power that were backed by government mandates,

and cheap coal. In both China and India, domestic gas production has been disappointing, and concerns about energy security and the cost of liquefied natural gas are a brake on demand.

There are also environmental problems associated with gas. Methane, the chief component of natural gas, is also a greenhouse gas, so leaks from pipelines and other equipment contribute to global warming. Gas facilities can also emit volatile organic compounds that contribute to the formation of ozone.

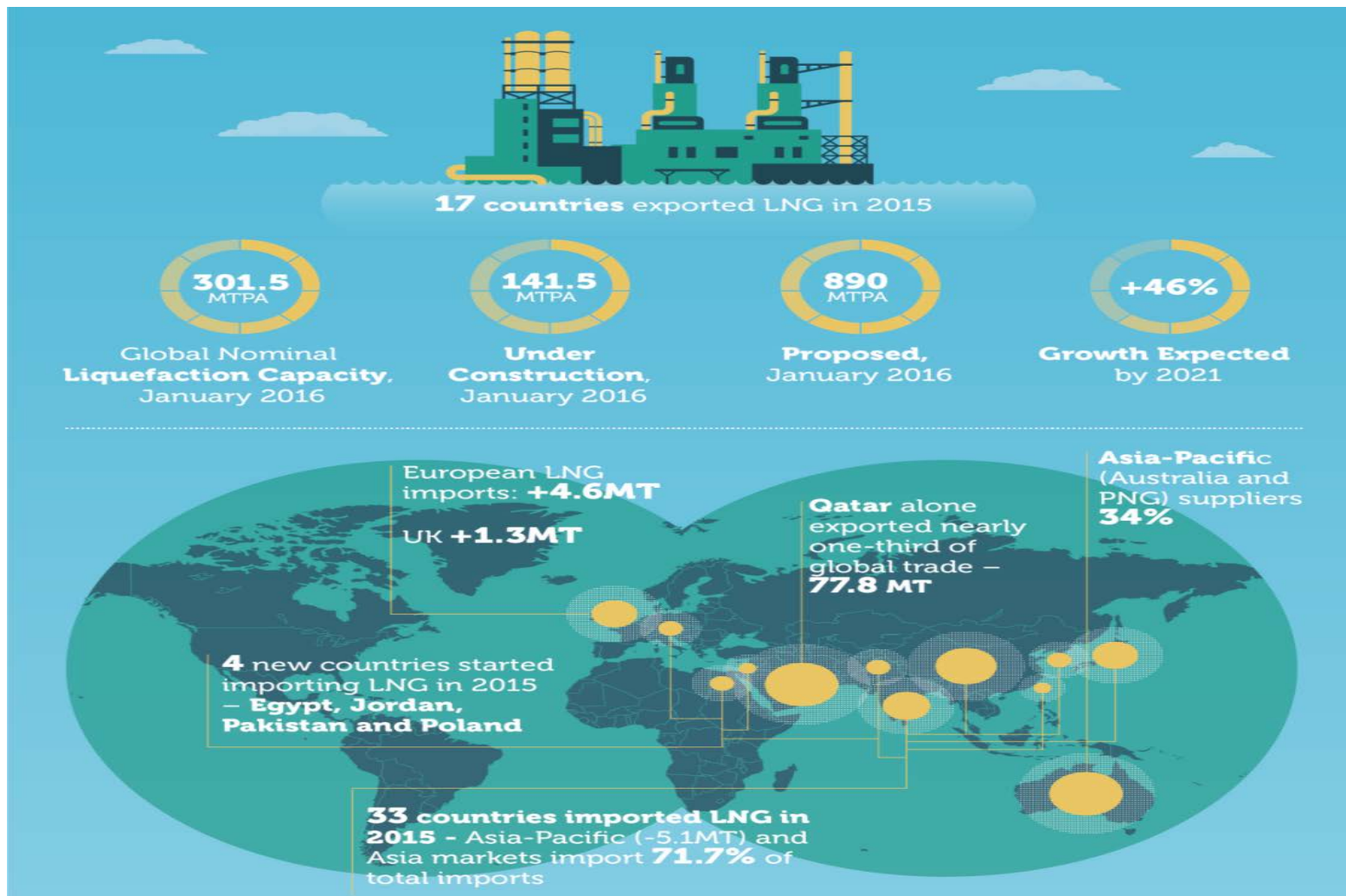
Scott Foster, director of the sustainable energy division at the UN Economic Commission for Europe, a policy promotion body, agreed there was a vital role for gas. "There is no plausible scenario that doesn't include a significant proportion of the energy mix being fossil fuels for the near to medium term."

"Governments need to put in place policies that recognise the benefits that natural gas can bring."

32%
The proportion of energy Beijing expects to derive from gas by 2020

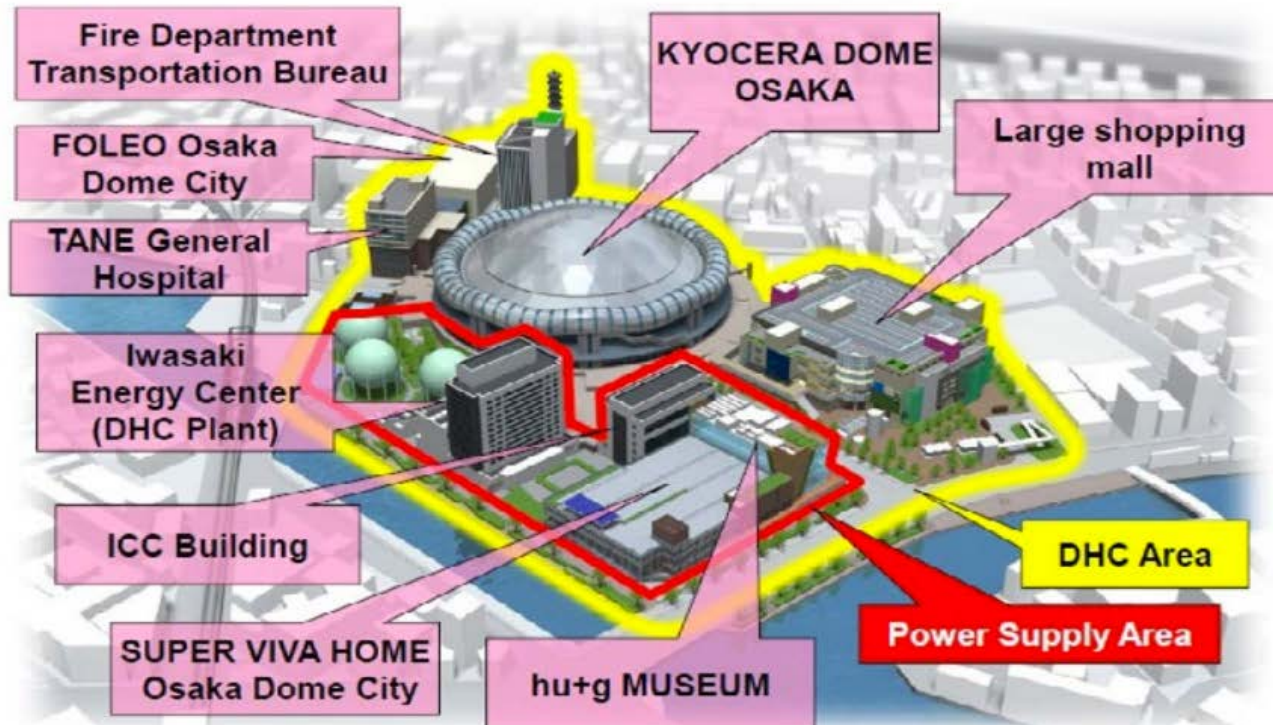
6%
The proportion of energy the Chinese capital anticipates will come from coal in the same timeframe

2016 World LNG Report



Case Studies in Enabling Clean Energies

District Energy System Integrates Solar and Gas



Wholesale Price Survey, 2016 Edition

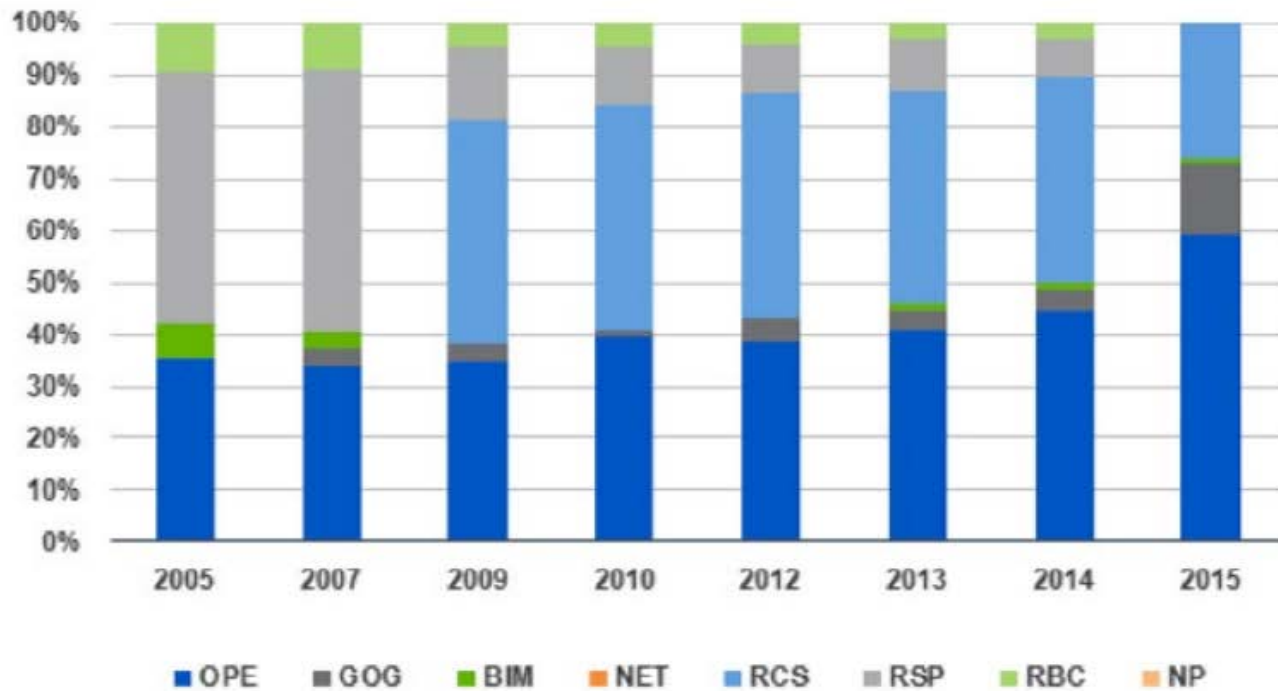
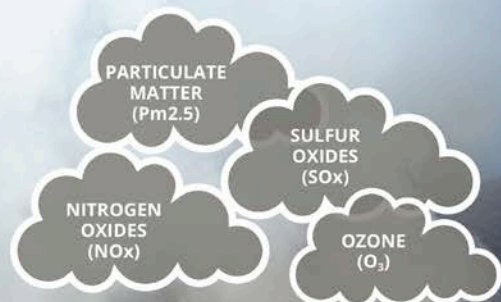


Figure 5.11: Asia Price Formation 2005 to 2015

Case Studies in Improving Urban Air Quality 2016

Berlin, Dublin, Krakow, Rotterdam

NATURAL GAS: IMPROVING THE AIR WE BREATHE



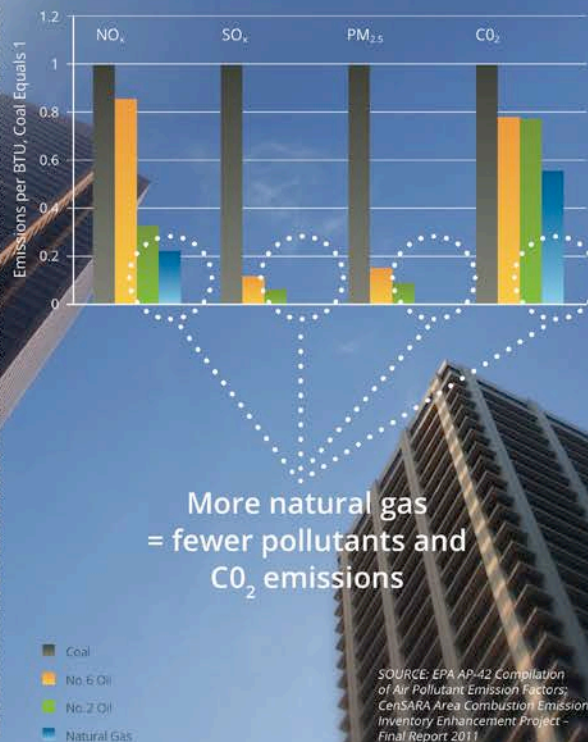
Outdoor air pollution is among the most significant environmental threats to human health:



Premature Deaths in the EU (EEA)



Total Health-related Costs associated with air pollution (EEA)



More natural gas
= fewer pollutants and
CO₂ emissions

SOURCE: EPA AP-42 Compilation of Air Pollutant Emission Factors; CenSARA Area Combustion Emissions Inventory Enhancement Project - Final Report 2011

Four European Cities Take Action



Required Policy Support

- Strong and predictable carbon price
- Continued market reform; clear and transparent market price signals and increased liquidity
- Continued support for free trade of LNG
- Stable and predictable regulatory frameworks