Urban Air Quality
An Urgent Issue
Diplomatic Gas Forum 2016 - Oslo
12 December 2016
Paris climate agreement

PARIS 2015
UN CLIMATE CHANGE CONFERENCE
COP21 • CMP11

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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:

3.7m
Premature deaths each year (WHO)

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

More natural gas = fewer pollutants and CO₂ emissions

NATURAL GAS:
IMPROVING THE AIR WE BREATHE

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Financial Times coverage during COP 21

Natural gas industry's mission to clear the air

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

**By EMERLYN - NEW YORK**

The natural gas industry is seeking to separate itself 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 are on an opportunity in shifting power generation from coal and gas.

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

The International Gas Union, whose members are industry associations and leading gas companies including Gasprom 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 5.7 million 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 in part caused by burning coal, fuel oil and petrol.

Cities that have used more gas and less coal and oil have fewer incidents in pollutions that cause respiratory illnesses, such as particulates – small airborne particles of solids and liquids – that are responsible for lung cancer, heart attacks, strokes and asthma attacks.

Mel Zivro, of the American Lung Association, a group that campaigns to cut respiratory illnesses, said that, along with other changes including tighter controls 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 12 micrograms per cubic meter in 2005-06 to 6.4 micrograms per cubic meter in 2012-14.

Other cities including Toronto and Bucharest have reported similar improvements. Bucharest, 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 in gas.

By 2030, Beijing expects to derive 3% per cent of its energy from gas, and just 6 per cent of coal, said Yidan Li, general manager of Beijing Gas Group.

Faith Binsh, 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 2012 of a possible "golden age of gas" had not come to pass.

As a bed 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 concern about energy security and the cost of liquidified 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 smog.

Scott Frei, director of the Sustainability program at the UN Environment Programme, agreed there was a vital role for gas. "There is no plausible scenario that doesn't include a significant proportion of the energy not being fossil fuels for the next to medium term. Governments need to put in place policies that recognize the benefits that natural gas can bring."
Case Studies in Improving Urban Air Quality 2016
Berlin, Dublin, Krakow, Rotterdam

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

400,000
Premature Deaths in the EU (EEA)

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

More natural gas = fewer pollutants and CO₂ emissions

NATURAL GAS:
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Emissions per TCU, EU-wide, 2010

- NO₂
- SO₂
- PM₁₀
- CO₂

Four European Cities Take Action

BERLIN

1990
SO₂ emissions at 170,000 t/a
Phasing out coal burning

1990 – 2012
Share of natural gas in the city’s primary energy balance increased from 7% to 42%

2015
50% emissions decreased
59% NOx emissions decreased
PM10 emissions decreased by 42% compared to 1990

DUBLIN

1980
Urban air pollution from numerous coal blocks

1990
Smoke control by 80-90% of total

1999 – 2014
PM10 emissions declined by 67% in the residential sector

KRAKOW

2014
PM10 concentrations exceed EU safety limits in 168 of 365 days

2016
Citywide coal ban implemented by 2016
Measures to expand gas distribution network, modernize district heating system and promote renewable energy sources for domestic heating

ROTTERDAM

2010
Industrial sector around port causes 85% of Rotterdam’s GHG emissions
NOx emissions exceed EU standards

2016
Start of LNG bunkering operations in Rotterdam
LNG can reduce NOx emissions by up to 90% and SOx and PM emissions by up to 100%

SOURCE: EPACAP-1: Comparison of Air Pollutant Emission Factors; CenSAM Arctic Emissions Inventory Enhancement Project - Final Report 2011

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Gas Takes Center Stage in Cleaning Up the Air and Reducing Carbon Emissions

Historical and Projected Primary Energy Balance of Berlin in The Reference Case and Two “Climate-Neutral” Scenarios

Source: Berlin Senate – Department for Urban Development and the Environment
Gas Makes Inroads at Coal’s Expense

Decline in Ireland’s Coal Use
Gas Replaces Coal to Clean Up One of Europe’s Most Polluted Cities

Loss in life expectancy due to fine particulate emissions in Europe
A Hub for LNG-Fueled Transportation

Comparison of Emissions from Different Fuels


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European PM$_{2.5}$ and PM$_{10.0}$ Levels - 25 October 2016

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