IGU Study on Urban Air Quality: Enhancing and Saving Human Lives

Switch to Natural Gas Helps Mega-Cities Dramatically Improve Air Quality and Reduce Emissions of GHG and Air Pollutants
IGU represents more than 97% of the gas industry

91 Charter, 10 Premium Associate, 47 Associate members
Context: COP 21 and a spotlight on emissions
Natural Gas. An agent of change in the fight against urban air pollution

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

Emissions for EU-27, 2005

<table>
<thead>
<tr>
<th></th>
<th>NO₂</th>
<th>SO₂</th>
<th>PM₁₀</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>0.5</td>
<td>0.8</td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Coal</td>
<td>1.2</td>
<td>1.5</td>
<td>1.8</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Sources: EPA, AF42 Compilation of Air Pollutant Emission Factors, CentAUR Area Combustion Emissions Inventory Enhancement Project - Final report 2011

Four global mega cities are taking action
Case Study 1: Istanbul

By the early 1990s Istanbul had become unliveable, due largely to burning of lignite. Policy response was massive investment in gas distribution systems. As a result of the switch, particulate matter declined from over 100 micrograms per cubic meter in the early 1990s to just above 50 by 1997. SO₂ concentrations also began an immediate decline in the early 1990s. By the end of the 1990’s SO₂ had fallen nearly 90%.
Case Study 2: Ontario / Toronto

- Landmark decision made to entirely phase out coal-fired power in 2004
- Largest population in North America to do so
- Before the switch to gas, air pollution in the city contributed to 1,700 premature deaths and 6,000 hospitalizations per year
- Switch to gas and removal of coal led to reduction in deaths and hospitalizations by 23% and 40% respectively
- Inherent flexibility of gas means that it works very well with wider mix: nuclear / renewables

Figure 6: Emissions from Electricity Generation as a Percent of Total Ontario Emissions

Figure 5: Fuel Mix in Ontario's Electricity Sector 2003-2014

SOURCE: Canada National Pollutant Report Inventory, Author's Analysis
(PM10 emissions exclude open sources such as road dust, agriculture, and construction)

SOURCE: Ontario Independent Electricity System Operator; KSD
Case Study 3: New York

In 2007, the levels of Ozone and PM2.5 exceeded US EPA standards. New policy enacted.

30% of heavy fuel-burning buildings in New York City converted to cleaner fuels. Approximately 75% of those that made the switch converted to natural gas or ultra-low sulfur No. 2 oil.

SO\textsubscript{x} concentrations decreased by 69% in four years; PM2.5 levels met EPA standards for the first time in 2014.

780 fewer deaths in the city and over 2,000 fewer emergency room visits each year.

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Table 2: Average Pounds of Pollutant-Forming Emissions per MWh for U.S. Coal and Natural Gas Power Plants, 2005

<table>
<thead>
<tr>
<th></th>
<th>Coal</th>
<th>Natural Gas</th>
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<tr>
<td>SO\textsubscript{2}</td>
<td>12</td>
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<tr>
<td>PM\textsubscript{2.5}</td>
<td>.59</td>
<td>.11</td>
</tr>
<tr>
<td>PM\textsubscript{10}</td>
<td>.72</td>
<td>.12</td>
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Figure 2: Comparison of Estimated Nickel Concentrations in PM2.5

SOURCE: New York City Department of Health and Mental Hygiene
Case Study 4: Beijing

- The average PM2.5 levels in China's urban areas are often 6 times higher than WHO standards. In Beijing they are 10 times higher.

- Approximately 50% of this air pollution burden is attributable to coal.

- Regional co-ordination vital to protect Beijing.

- China has adopted a variety of policies and goals to promote increased generation from renewables, increased supply and infrastructure to distribute natural gas, and increased nuclear generation.
Conclusion: Gas as the positive change agent

Enhanced use of natural gas in energy generation, heating and industry will drastically reduce emissions, mercury and particulate matter, thereby providing enhanced quality of life for virtually everyone in urban society.

We support policies that reduce GHG emissions and emissions of health damaging air pollutants such as:

- Improvement of end-use energy efficiency
- Increases in combustion efficiency
- Encouragement of fuel switching
- Increased use of non–combustion renewable energies

Figure 1: Comparison of Emissions from Different Fuels

Thank you