The European Commission’s science and knowledge service

Joint Research Centre
Air quality co-benefits of the Paris Agreement:

Two birds, one stone?

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WHO First Global Conference on Air quality and Health
30-10-2018
Climate change and air pollution: *sharing sources*
GHG mitigation pathways under the Paris Agreement

![Graph showing GHG emissions and temperature change over time under different scenarios.](image-url)

- **Reference**
- **NDC**
- **2°C**

- **75th percentile**
- **Median**
- **25th percentile**

**GHG emissions (Gt CO₂e)**
- **Temperature change (°C)**
GHG emission mitigation, by sector

Reference

B2°C

Source: JRC, GECO2017
Does climate policy improve air quality? (I)

**Sulphur dioxide - SO₂**

**Nitrogen oxides - NOₓ**

**Black carbon - BC**

<table>
<thead>
<tr>
<th>NDC</th>
<th>2°C</th>
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<tbody>
<tr>
<td>World</td>
<td></td>
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<tr>
<td>Brazil</td>
<td></td>
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<tr>
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<tr>
<td>USA</td>
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CO₂ emission reduction (%)
Does climate policy improve air quality? (II)

NDC 2030

2°C 2050
Human health: avoided premature mortality

Global

Avoided premature mortality (1000)

Year

2020 2030 2040 2050

NDC 2°C

FLE SLE BAT

Global

Brazil

Avoided premature mortality (1000)

Year

2020 '20 '30 '40 '50

Russia

Avoided premature mortality (1000)

Year

2020 '20 '30 '40 '50

USA

Avoided premature mortality (1000)

Year

2020 '20 '30 '40 '50

India

Avoided premature mortality (1000)

Year

2020 '20 '30 '40 '50

China

Avoided premature mortality (1000)

Year

2020 '20 '30 '40 '50

EU28

Avoided premature mortality (1000)

Year

2020 '20 '30 '40 '50
Role of CH$_4$ mitigation: GHG and Ozone precursor

Past and projected global CH$_4$ emissions

Change in global mortalities from exposure to O$_3$ from global CH$_4$ emissions relative to exposure of the same population to year 2010 O$_3$ levels

<table>
<thead>
<tr>
<th>Year</th>
<th>High Emission Scenarios</th>
<th>Low Emission Scenarios</th>
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</thead>
<tbody>
<tr>
<td>2030</td>
<td>30500</td>
<td>28400</td>
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<tr>
<td>2040</td>
<td>18400</td>
<td>15400</td>
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<tr>
<td>2050</td>
<td>90800</td>
<td>69100</td>
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</tbody>
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Note: The graphs illustrate the projected changes in global CH$_4$ emissions and the associated change in mortalities from exposure to O$_3$ due to these emissions.
Cost of mitigation vs value of air quality co-benefits
Conclusion and caveats

Broad-based global climate action brings substantial air quality co-benefits

An integrated policy perspective can maximise gains for planet, health and economy

This study looks at mitigation cost and air quality co-benefits, and ignores direct benefits of avoided climate impacts and costs of air quality regulation

Future work could provide better insight to policymakers on the sectors and mitigation actions with the largest 'double dividend' in the context of a long-term climate strategy
Thank you
Any questions?
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Energy system transformation

Total primary energy consumption in 2050 (Mtoe)

Reference

NDC

2°C

- Solids
- Oil
- Natural gas
- Nuclear
- Biomass
- Hydro
- Other renewables