Across policy and pollution scales

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Second Clean Air Outlook

• Assesses prospects for achieving the objectives of the NECD for 2030 and beyond.
• Update of the First Clean Air Outlook (CAO1), including National Air Pollution Control Programmes (NAPCP) and an increased level of ambition for fighting climate change.

For reference: NECD negotiations and CAO1 baseline
• PRIMES 2016 Reference scenario (-30% GHGs in 2030)

CAO2 baseline:
• (PRIMES) Baseline of the Commission’s June 2019 assessment of the draft NECPs (National Energy and Climate Plans) of the MS (-40% GHGs targets for 2030)

Additional climate policy variants:
• ‘1.5 TECH’ and ‘1.5 LIFE’ scenarios of the EU 2050 climate strategy vision:
  Net zero GHG emissions in 2050

The 2030 Climate Ambition of the European Green Deal
• (-55% GHGs in 2030) – The Mix55 Scenario of the Commission’s Impact Assessment

Published in January 2021: https://ec.europa.eu/environment/air/clean_air/outlook.htm
Updates of emission inventories for 2005/10/15: from 2017 to 2019

- After CAO1, many MS reported significant changes in historic inventories due to new inventory guidebook and improved statistics
- But only little change of total EU-27 emissions (~2-6%, depending on pollutant)
- Further changes to be expected from full implementation of new inventory reporting guidelines
Emission projections for selected air pollutants under various scenarios for EU-27

Source: GAINS model (IIASA)
Key results: Emissions - Differences between emission reduction commitments (ERCs) and emission projections for 2030 (% of 2005 emissions)

SO₂, NOₓ, PM2.5, NH₃, VOC

Excess emissions
Safety margin

CAO2 baseline
with NAPCPs

Do not meet 2020 GP obligations
Distribution of population exposure to PM2.5 for key scenarios, EU-27

Source: GAINS model (IIASA)
Much of the AQ improvements in MSs emerge from EU coordinated policy

Source: GAINS model (IIASA)
Summary – Second Clean Air Outlook

- Emission inventories continue to be updated/improved, however, implications on modelling results for compliance are limited.

- NH$_3$ remains the most challenging pollutant for the achievement of the NEC reduction commitments. However, several MS have reported new measures in the NAPCPs that, if fully implemented, can contribute to reaching them.

- The analysis reconfirms the relevance of the international component of air pollution and reveals the importance of (past and future) EU-wide coordinated policies.

- The increased ambition of European climate policies leads to important reductions of energy-related air pollutants and thereby reduces the pressure on other sectors for reaching compliance with the NECD reduction commitments – but not for NH$_3$. 
Local vs. regional/national policy; PM2.5 concentrations and source apportionment for Ha Noi, Vietnam

2015

Current legislation

Advanced controls in Ha Noi

Advanced controls in Greater Ha Noi/Red River Delta

Legend ([µg/m³])

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Source: GAINS – Vietnam, collaboration with Vietnamese Academy of Science and Technology (VAST)
World Bank Flagship Study: Ambient Air Quality and Public Health in South Asia

Impact of recent AQ policies on exposure in 2030

Mean PM2.5 exposure (µg/m³)

India IGP  India non-IGP  Other countries

Contributions from natural sources  Effect of 2018 legislation in 2030 (depending on implementation)

2018

Delhi NCT  Bihar  Haryana  Jharkandh  Punjab  Uttar Pradesh  West Bengal
Andhra Pradesh  Assam  Chhattisgarh  East Himalaya  Goa  Gujarat  Him. Pradesh  Karnataka  Kerala  Madhya Pradesh  Maharashtra  Rajasthan  Orissa  Tamil Nadu  Uttar Pradesh  Uttarakhand  West Himalayas
Dhaka  PK Karachi  PK NW  PK Punjab  PK Sindh  Sri Lanka
World Bank Flagship Study: Ambient Air Quality and Public Health in South Asia

Scope for additional exposure reductions in 2030

2018 legislation in 2030 (depending on implementation)

- Contributions from natural sources
- Effect of 2018 legislation in 2030
- Scope for reduction from additional local measures in 2030
- Scope from additional measures in other regions in 2030

PRELIMINARY RESULTS
Support to review of the Gothenburg Protocol [1]

• Extending GAINS-Europe model domain to include consistently all EECCA countries- jointly with MSC-W [Dec 2021]

• Review of data, assumptions and development of new scenarios for some of the EECCA (Georgia, Moldova, Ukraine) and Western Balkan (Albania, Bosnia-Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia) countries - EU funded EUCLIMIT-9EAST project [Dec 2021]

• Dedicated version for Kazakhstan operational

• GAINS model developments/updates
  – New representation of waste management sector
  – Revised implementation of high-emitting vehicles
  – Finer (10km) spatial resolution for primary PM dispersion – jointly with MSC-W
  – Participate in the Nordic Council funded project on update of estimates and development of methods to implement condensables (led by MSC-W and TNO)

• Further development of multiscale modelling (joint work with MSC-W); building on experience in recent Asian projects (urban/rural interactions) similar analysis could be done for EECCA and Balkan countries
Key messages

European policy

• \( \text{NH}_3 \) remains the most challenging pollutant for the achievement of the EU NEC reduction commitments. However, new measures in the NAPCPs, if fully implemented, can contribute to reaching them.

• The increased ambition of European climate policies leads to important reductions of energy-related air pollutants and thereby reduces the pressure on other sectors for reaching compliance with the NECD reduction commitments – but not for \( \text{NH}_3 \).

Local/regional air quality management (AQM)

• A large variety of emission sources contribute to PM2.5 pollution in ambient air - thus, effective AQM needs to balance measures across these sources.

• There is limited scope for cities to achieve major reductions of PM2.5 on their own.

• There is scope for further measures beyond current policies that could approach the WHO Targets.

Gothenburg Protocol review support

• GAINS extended domain to include EECCA

• Further model development will, among others, support improved multiscale modelling.
Additional slides
Updates of emission inventories for 2005/10/15: from 2017 to 2019

• After CAO1, many MS reported significant changes in historic inventories due to new inventory guidebook and improved statistics.

• But only little change of total EU-27 emissions (<~2% for NO$_x$, PM2.5, NH$_3$; <6% for SO$_2$ and VOC).

• Further changes to be expected from full implementation of new inventory reporting guidelines.
Cases of premature deaths attributable to the exposure to PM2.5 and area of terrestrial ecosystems where N deposition exceed the critical loads for eutrophication, EU-27

Source: GAINS model (IIASA)
Emission projections for key air pollutants under various scenarios for EU-27