



Gothenburg Protocol Revision

Preliminary results of CIAM scenario
modelling for EECCA countries

Simone Schucht for TFIAM/CIAM

Revision of the Gothenburg Protocol decided by EB-43

- Decision 2023/5 (December 2023)
 - Launching a process to revise the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, as amended in 2012 and to address other conclusions of its review
- The revision process will consider, inter alia
 - (f) New flexibilities, and other approaches to better facilitate ratification and subsequent implementation by current non-Parties to the present Gothenburg Protocol
- The Centre of Integrated Assessment Modelling (CIAM) assesses the feasibility of targets and approaches, e.g.
 - Reduction targets for health, ecosystems...
 - Flexibility approaches

TFIAM to provide Policy brief on potential targets to reduce risks for health and ecosystems

- An informal document reflecting CIAM modelling work
- To be updated throughout the GP revision process (~2026)
- Next version for the meeting in Leuven in October 2024 with replies to comments from Parties
- To be submitted to EB-44 (with Russian translation)

The version 2 (April 2024) of the Policy Brief is available here: <https://unece.org/environment/documents/2024/05/informal-documents/agenda-item-2-draft-policy-brief-potential-targets>

A compilation of the comments received is available on the TFIAM website:
<https://previous.iiasa.ac.at/web/home/research/researchPrograms/air/policy/TFIAM.html>

Contents of the Policy Brief

- Overview of policy scenarios
 - Baseline climate, energy, and air pollution scenario
 - Maximum Technically Feasible (MTFR) air pollution control scenario
 - Combined advanced climate/energy/dietary scenario + MTFR = LOW
- Scenario impacts for health and ecosystems
- Feasibility of reductions of health and ecosystems effects – least cost scenarios
- First analyses for flexibilities (staged approaches)
- Conclusions

CIAM scenarios supporting GP revision

Progress in modelling

Z. Klimont, G. Kieseewetter, F. Wagner, M. Posch, C. Heyes

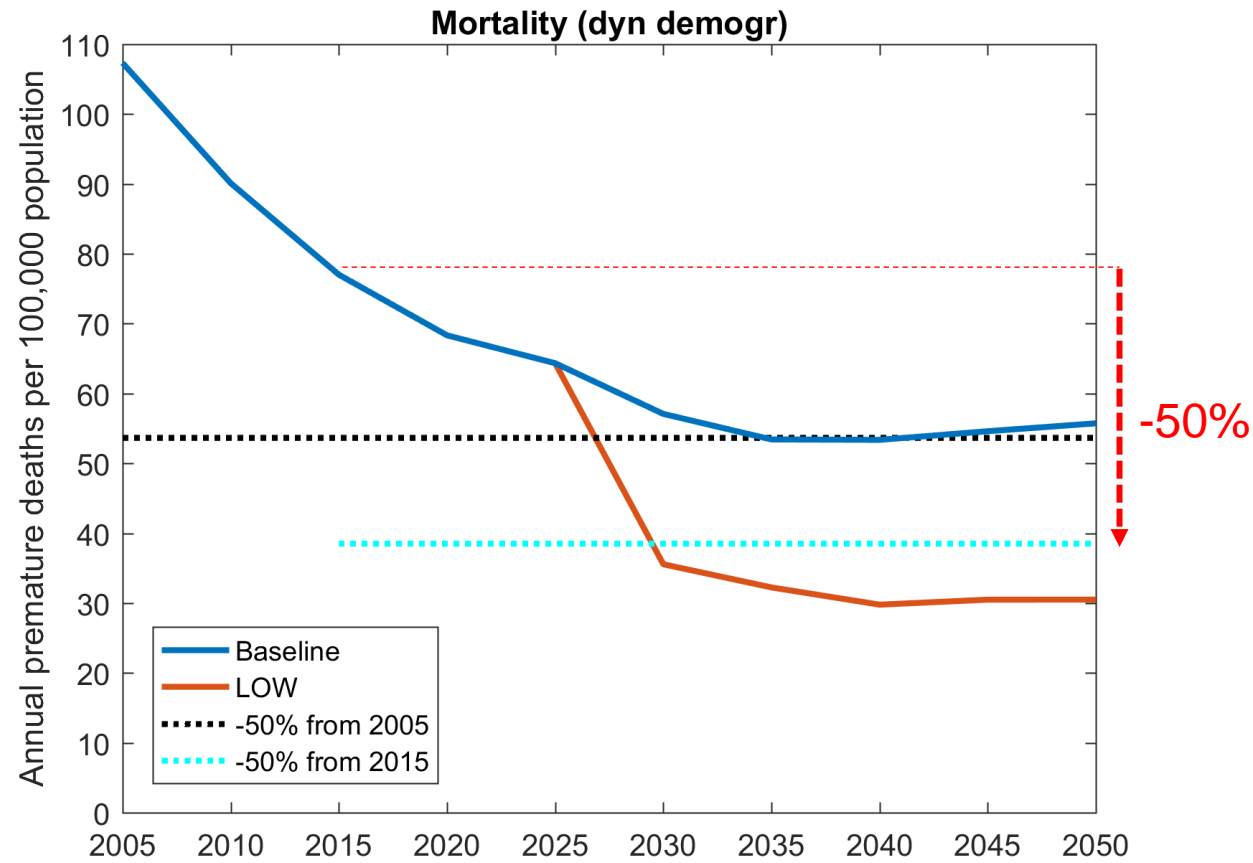
Baseline scenario for GP revision

All scenarios for air pollutants and methane up to 2050

- ***Baseline*** (update compared to the scenario used for the GP review)
 - Based on consultation with most countries
 - For EECCA consultations took place only with Moldova
 - Selected EECCA (Moldova, Ukraine, Georgia) using the same modelling tools as for EU
 - Remaining countries – analysis of national submissions, reports, international statistics, projections updated based on recent IEA & FAO Outlooks
- ***Need for involving representatives from more EECCA countries***

Scope for further mitigation in the UNECE region

Exploring attainability of reducing PM_{2.5} related health risks by 50%



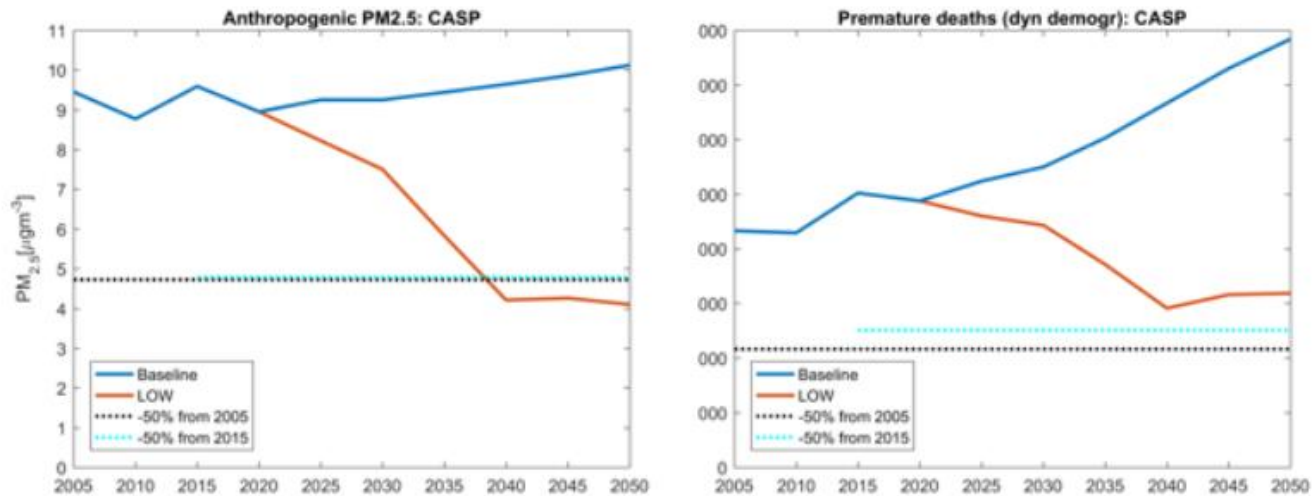
Initial conclusions – Health targets by 2040

- **Feasibility:** Achieving 50% reduction of mortality risk between 2015 by 2040 is feasible at the UNECE level
- **Importance of CLE enforcement:** achieves part of the necessary reduction
- **Further mitigation efforts needed** to achieve the 50% health mortality target with dynamic population

Scope for further mitigation in the UNECE region

Exploring attainability of reducing PM_{2.5} related health risks by 50%

EECCA (excl Belarus, Russia, Ukraine)



Source: GAINS model (CIAM/IIASA)

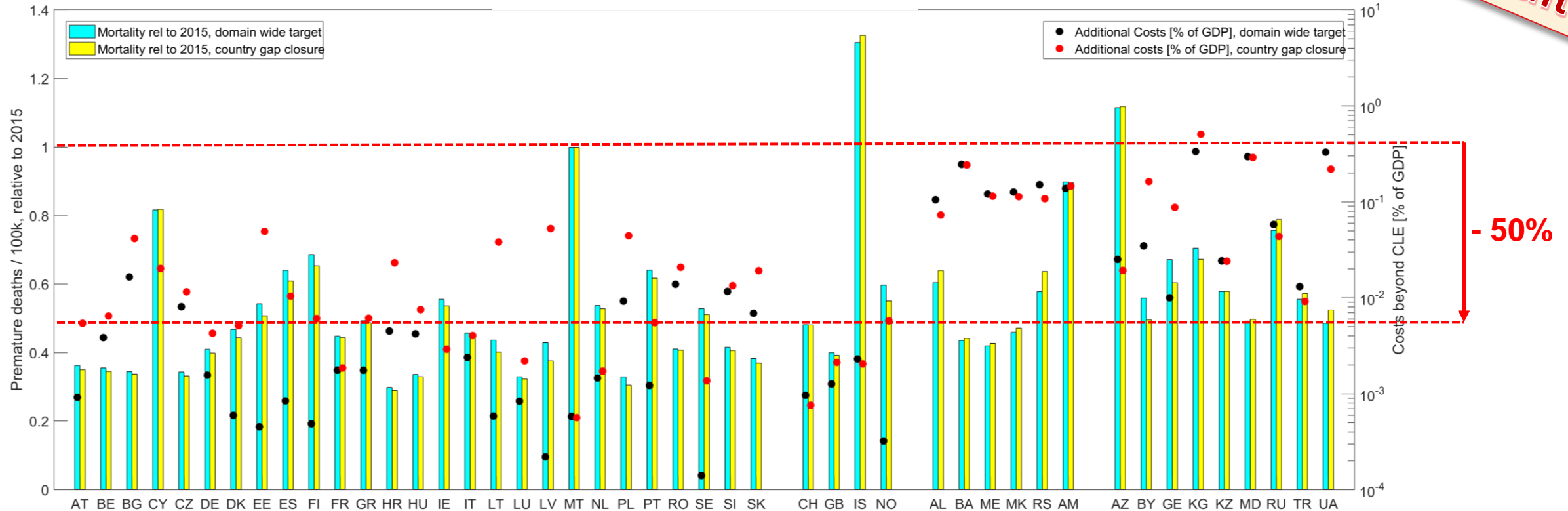
Initial conclusions – Health targets by 2040

- For EECCA exposure to PM_{2.5} is projected to increase
- High mitigation efforts needed to achieve a 50% reduction
- 50% health impact reduction not feasible in all EECCA countries

Least-cost reduction of PM health impacts in UNECE (excl. North America)

Draft results

Results for the **2040** mortality reduction target (considering demographic changes)



- 50% health risk reduction is not feasible in all EECCA countries and would require high costs (as GDP%)
- We will explore scenarios with a cap on maximum costs per GDP

Initial conclusions – Health targets by 2040

Feasibility: Achieving 50% reduction air pollution related mortality risks between 2015 and 2040 is feasible at the UNECE level, but not in every country

Importance of CLE enforcement: Full enforcement of Baseline policies (CLE) achieves by 2040 about 30% reduction in mortality risks, compared to 2015, but mortality risks in EECCA countries could increase due to aging and population growth

Mitigation efforts needs: additional measures needed to achieve the 50% risk reduction target

Costs: additional costs vary significantly between the countries (from less than 0.1% of GDP to nearly 1% of GDP)

Egalitarian approaches, such as setting a cap on maximal costs as % of GDP, will imply lower health benefits in EECCA countries and bring the feasibility of a 50% reduction target further away

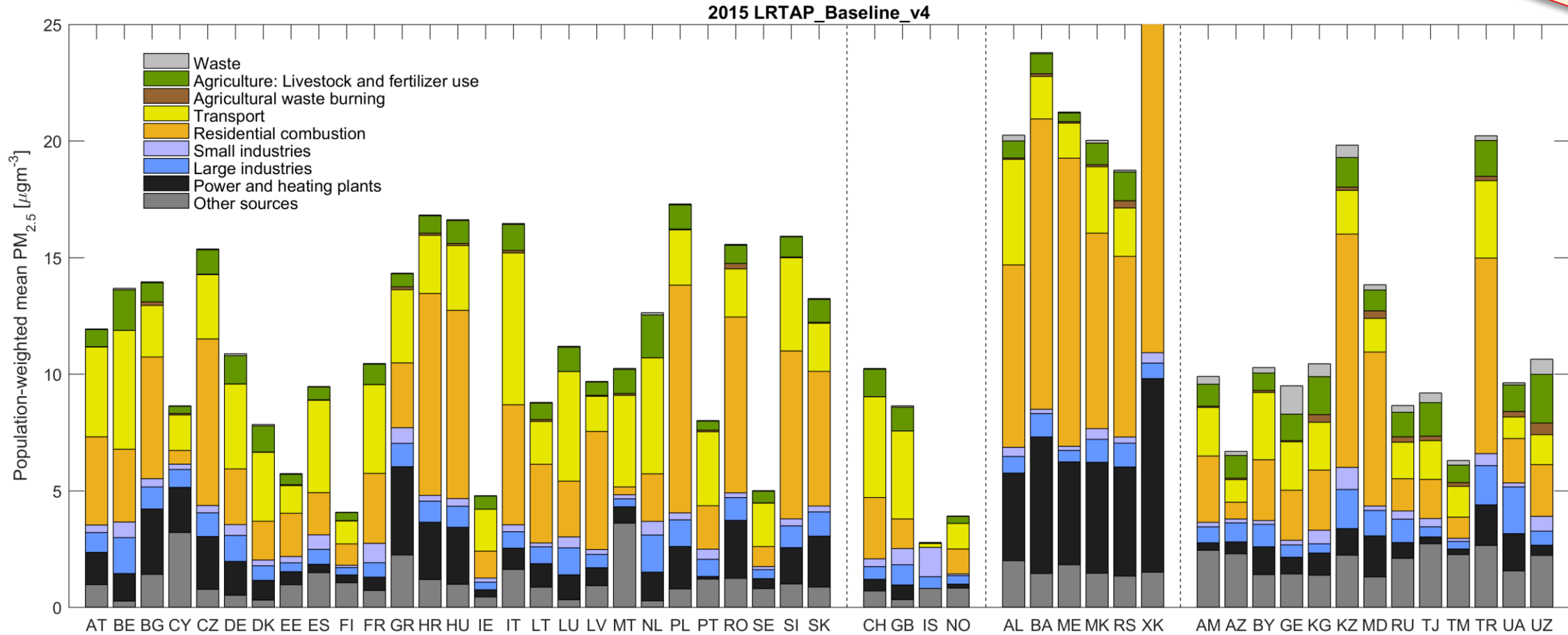
Target setting and flexibility: staged approach

- Staged approach, e.g. with prescribed mitigation measures in specific sectors could form a ‘preferred’ technical scenario for a given region
- In such a ‘preferred’ scenario expensive measures could be excluded, what will lead to less reduction of mortality risks. Other regions would have to do more to meet the UNECE-wide target of 50% risk reduction.
- The defined technical variant(s) will be compared with the cost-optimal solution for the whole UNECE-domain

Sector source contributions to PM_{2.5} in UNECE (excl. North America)

Results for **2015**: Population weighted country mean anthropogenic PM_{2.5} concentrations

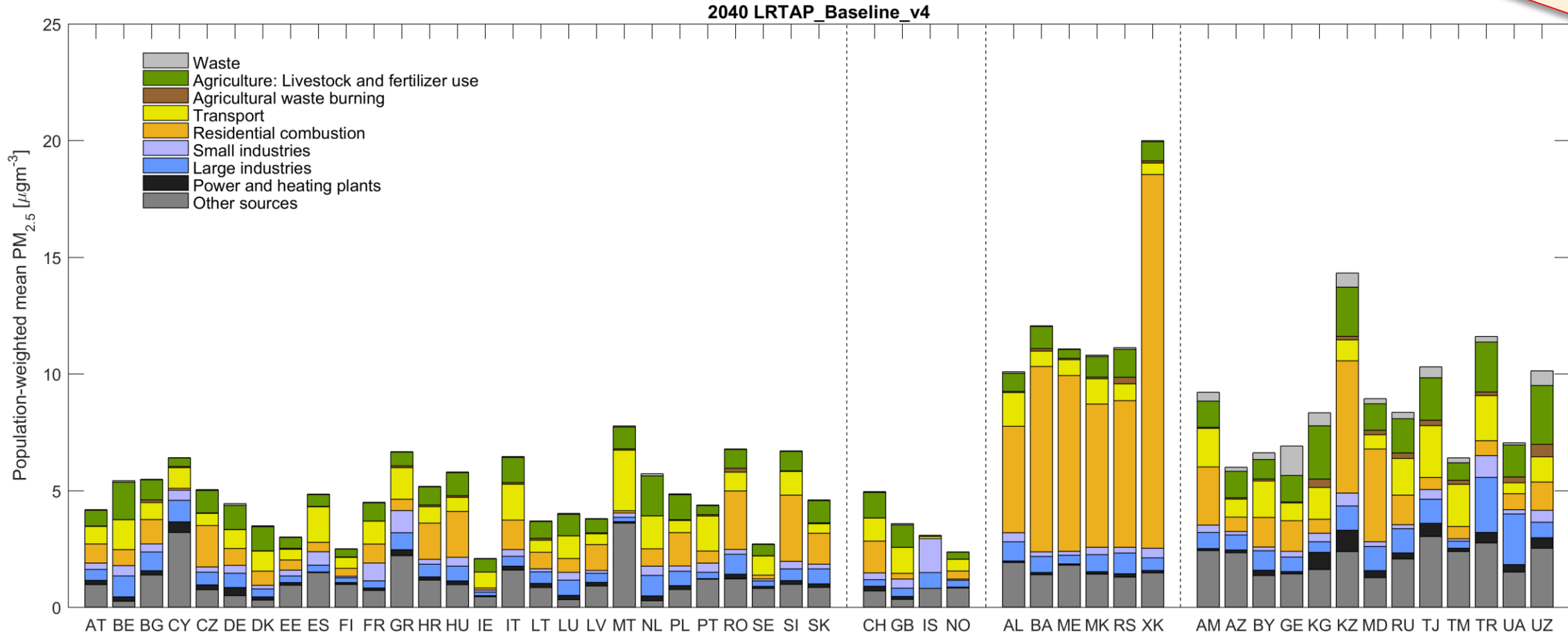
Draft results



Sector source contributions to PM_{2.5} in UNECE (excl. North America)

Results for **2040 Baseline**: Population weighted country mean anthropogenic PM_{2.5} concentrations

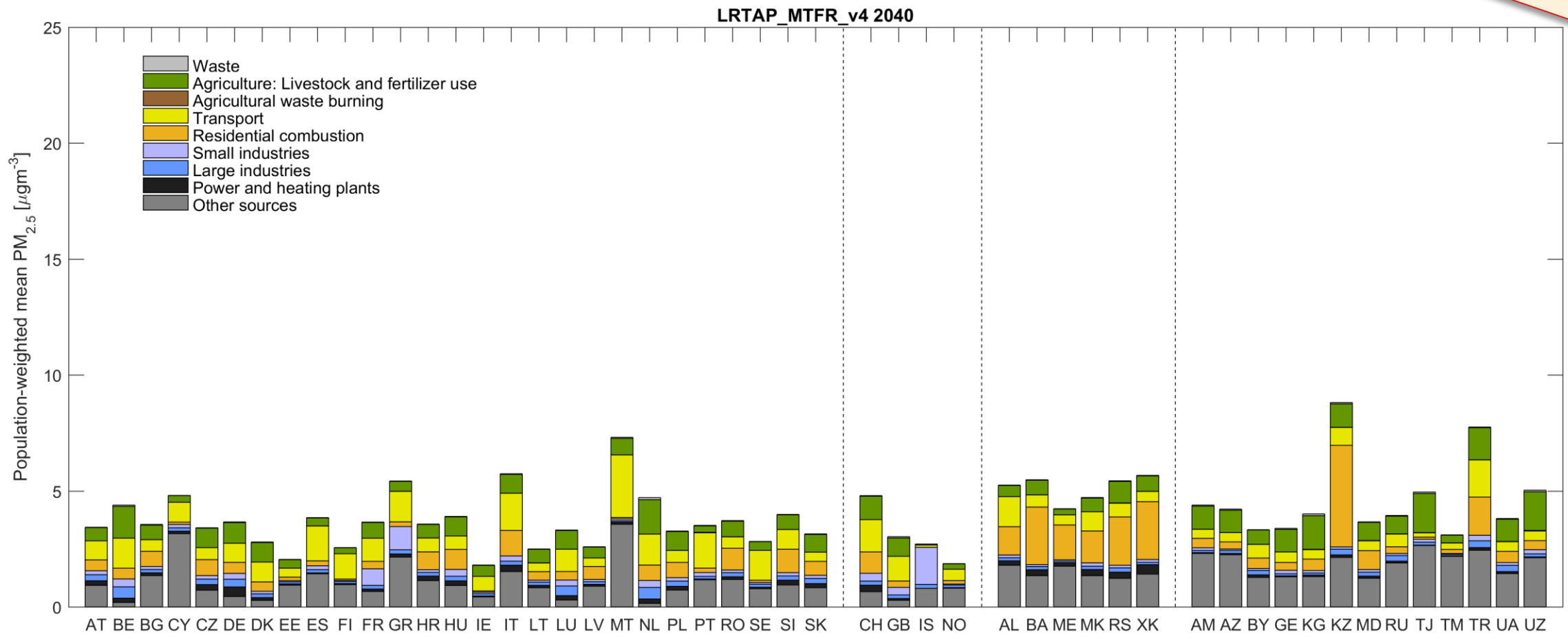
Draft results



Sector source contributions to PM_{2.5} in UNECE (excl. North America)

Results for **2040 MTR** : Population weighted country mean anthropogenic PM_{2.5} concentrations

Draft results



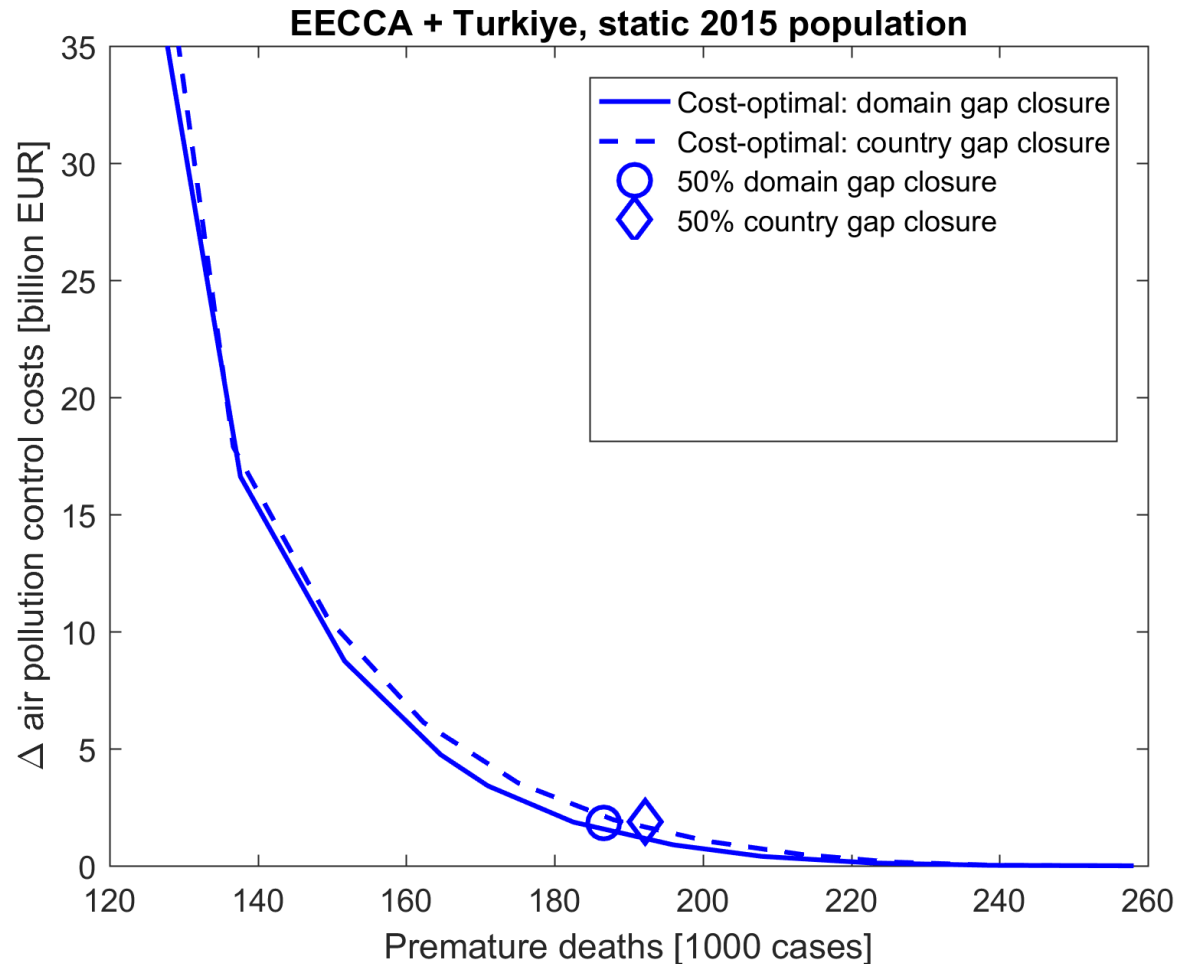
Designing preliminary staged/phased cases

Sector intervention scenarios

- 4 sector specific intervention scenarios were defined as variants of the Baseline
- These assume EU standards for emission controls implemented in the GAINS model from 2030 to comply with the EU policies and are applied for specific sectors in all non-EU/EFTA countries
 - PP: Power & Heating Plants
 - IND: Industrial combustion and processes
 - TRA: Road and off-road transport
 - DOM: Residential combustion
- All other sectors remain as in the Baseline

Domain wide optimization vs staged approach

EECCA + Türkiye



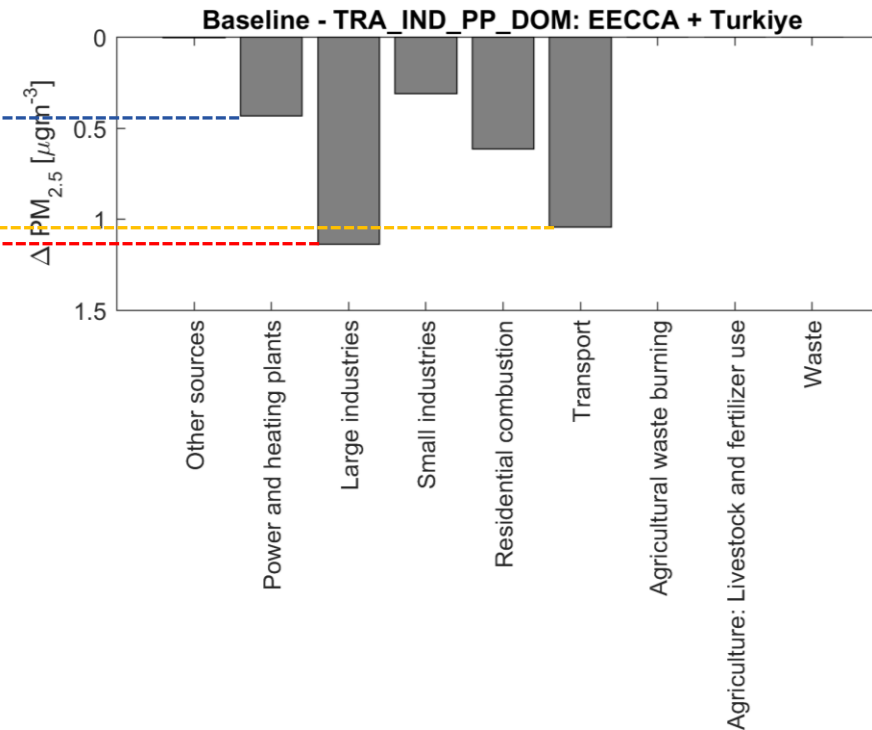
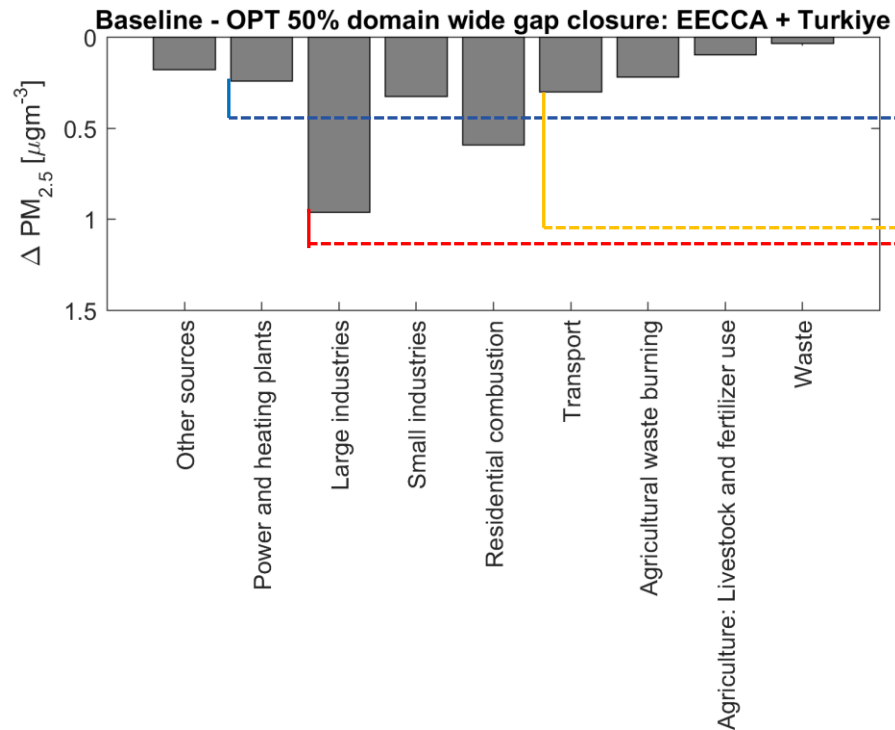
- 50% gap closure solutions are similar, here UNECE-Europe wide gap closure forces stronger reductions
- While a sizable health improvement is estimated for the staged approach, the costs are much larger for achieved benefits in the preliminary staged approach case (all four sectors included)
- Some of the mitigation potential mobilized in the staged case is beyond the cost-effective portfolio of solutions to reach domain wide goals [see next slide]

Domain wide optimization vs staged approach

EECCA + Türkiye

Least-cost approach

Draft staged approach case:
enforcing EU legislation for power, industry,
residential combustion, and transport



- Staged approach mobilizes additional mitigation potential for most addressed sectors, compared to the cost-effective solution

Preliminary conclusions on flexibility and further work

- Staged approach can provide important improvements, but not in all regions and possibly at relatively high cost, compared to the cost-effective solutions
- Coordinated early action on agriculture could offer another case, e.g., implementation of EU IED for Agriculture
- Residential heating is also amongst the sectors that require further emission reductions and should ideally be part of an effective staged approach
- The staged approach implementation is the first draft and will be further fine-tuned to better represent country-specific aspects
- With flexibility approaches also health benefits will be lower and the feasibility of 50% reduction target will be further away than in the least cost solution for the whole domain

Outlook

- Further exchange needed with EECCA/WP/Türkiye
 - Feedback on flexibility approaches
 - Feedback on options to be analysed by modelling
- More time for exchange at the Informal delegates Meeting in Leuven (21-24 October 2024)
 - Special session on flexibilities
- Special workshop planned in March 2025 in cooperation with EC
 - Back-to-back with TFIAM

Thank you!

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Presentations and conclusions from TFIAM and EPCAC meetings found at:

<https://previous.iiasa.ac.at/web/home/research/researchPrograms/air/policy/TFIAM.html>