

TFIAM progress of work 2020-2021

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Progress of work in 2021

- April: TFIAM 50
- Contributions to the Gothenburg Protocol Review report
- Participation in other TF meetings and workshops + HELCOM nitrogen disc.
- Finalisation of Ammonia Assessment report and PM/BC guidance document

- Cost of Inaction report – to be finalised in coming months
- 3rd meeting of EPCAC – planned for November 2021
- NIAM session on Health Impact Assessment (with WHO) – to be planned
- NIAM tutorial on IAM for national experts: if interested please contact stefan.astrom@ivl.se

And one additional request by the WGSR

- The Working Group requested the Gothenburg Protocol review group, with the assistance of the Centre for Integrated Assessment Modelling, to prepare an **informal document on synergies with other policy areas, in particular air-climate synergies,** for consideration by the Working Group at its sixtieth session (December 2021) and requested that the scope of pollutants included methane, black carbon and nitrogen and its compounds - see question 6.3 (d)
- Chair of the GPG requested help from TFIAM





TFIAM 50

- Identified draft answers to the questions asked by the Gothenburg protocol review group
- Supported to include a guidance document on non-technical and structural measures in 2022/2023 workplan
- Recognised the need to further study and discuss the effectiveness of ammonia control for reducing PM2.5 exposure
- Proposed to extend the European GAINS model version to enable multi-scale analysis
- Recognised that costs of inaction still are larger than costs of action, albeit with regional variation. Also remembered the importance of considering transboundary effects of national policies
- Revived the Network of National Integrated Assessment Modellers

Suggested 2022-2023 TFIAM work plan elements

- Prepare and organise TFIAM and EPCAC meetings
- Focus work on Gothenburg Protocol Review, including communication with other task forces
- Start preparing a guidance document on non-technical and structural measures to be delivered in 2023
- Support NIAM activities, including follow-up (national) IAM analyses with updated WHO air quality guidelines
- Continue cooperation with HELCOM on marine nitrogen loads

Questions from the Gothenburg Protocol Review Group

N°	Question	Who	Timing	Status?
1. Review of obligations in relation to emission reductions				
1.4				
	a. Emission trends	TFEIP, TFIAM	Fall 2021 - Spring 2022	
	b. What are the main causes of emission reductions (incl. drivers)?	TFEIP, TFIAM	Fall 2021 - Spring 2022	
	c. Remaining sources?	TFEIP, TFIAM	Fall 2021 - Spring 2022	
	d. Key sectors with reduction potentials?	TFEIP, TFIAM	Fall 2021 - Spring 2022	
1.5				
	a. Implementation rate of technical annexes?	TFTEI, TFEIP CIAM, TFRN, Parties	Spring 2022	n.a.
	b. Implemented newer source-oriented measures?	TFTEI, TFEIP CIAM, TFRN, Parties	Spring 2022	n.a.
	c. Implemented non-technical or structural measures?	TFTEI, TFEIP CIAM, TFRN, Parties	Spring 2022	n.a.
	d. Identified barriers?	TFTEI, TFEIP CIAM, TFRN, Parties	Spring 2022	n.a.
	e. What barriers?	TFTEI, TFEIP CIAM, TFRN, Parties	Spring 2022	n.a.

 = Sufficient information available

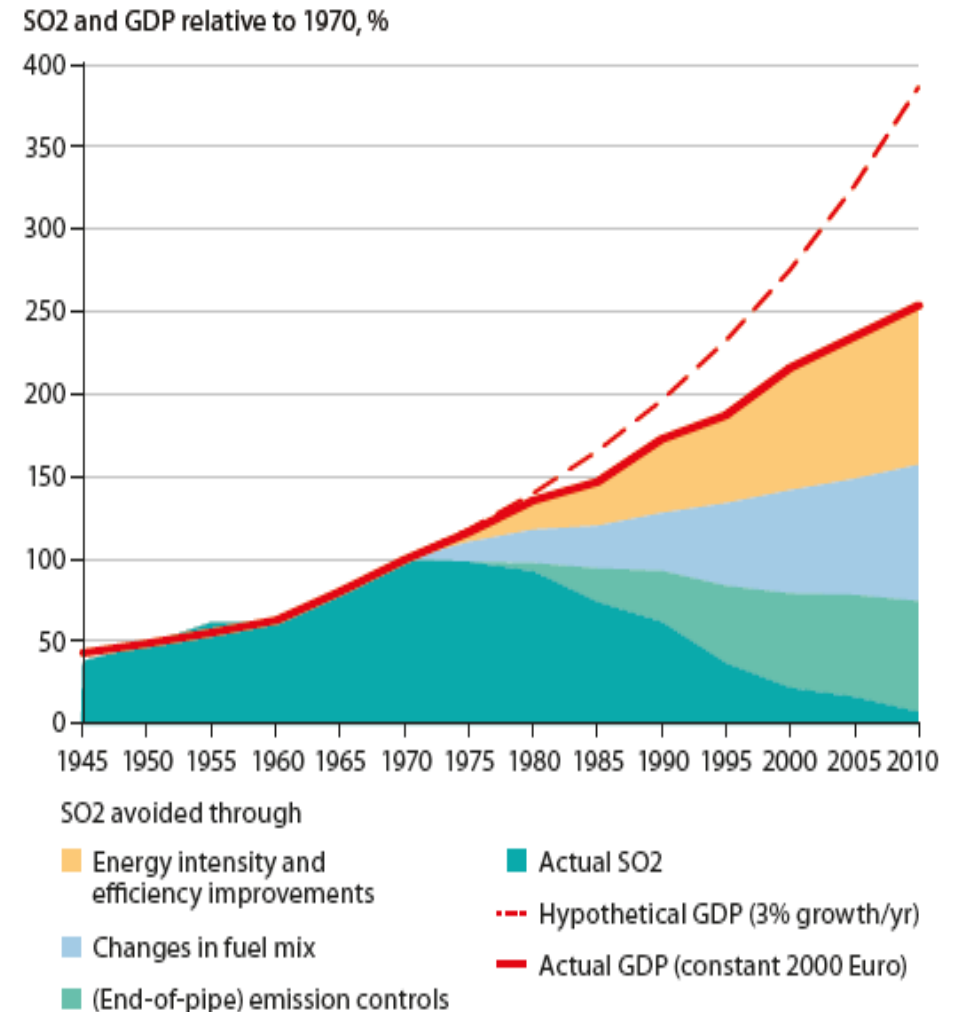
 = Ongoing and on time

 = Difficult or delayed

1.4b What are the main causes of emission reduction?

(Spring 2022)

- See Rafaj et al 2014a,b:
 - Combination of abatement measures (FGD, SCR) and structural changes
 - Energy efficiency improvements
 - Fuel mix changes (coal-gas-renewables)
 - For NH3: introduction of EU- milkquota (1984)



1.4d Where are large additional reduction potentials?

(Spring 2022)

- Depends on scenario estimates for CLE and MFR, especially for EECCA/SEE
 - In EU: ammonia, residential solid fuel burning, agricultural waste burning
 - In EECCA/SEE: coal power plants and residential solid fuel burning, transport emissions?

Questions from the Gothenburg Protocol Review Group

N°	Question	Who	Timing	Status?
2. Review of progress made towards achieving the environmental and health objectives of the Protocol				
2.1				
	a. What are the observed and projected air quality?	MSC-W, TFMM	Spring 2021	
	b. Trend association with region or transcontinental emission trends?	TFHTAP, TFIAM (EPCAC)	Spring 2021 → Spring 2022	●
	c. What are the observed and projected trends in urban air quality? Source attribution?	TFHTAP, TFIAM (EPCAC)	Spring 2021 → Spring 2022	●
2.4				
	a. What is the observed and projected trend in life years lost due to exposure to ozone, particulate matter and nitrogen dioxide?	TFH, CIAM	Fall 2021 → 2022	?
	b. What are observed and projected trends for other health metrics, e.g. morbidity?	TFH, CIAM	Fall 2021 → 2022	?

● = Sufficient information available

● = Ongoing and on time

● = Difficult or delayed

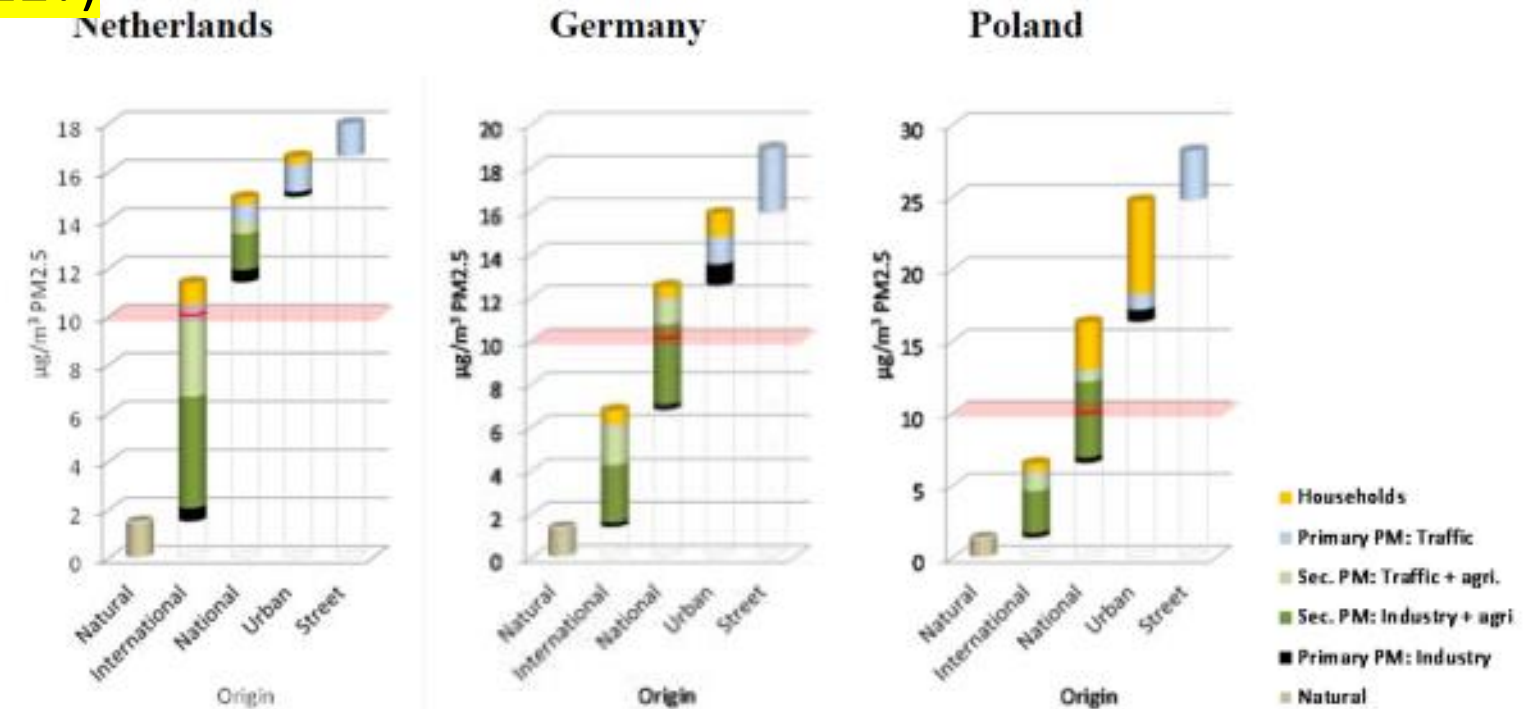
2.1c What is the contribution of long-range transport to exceedance of WHO-guideline concentrations in cities?

International cooperation is needed to reduce secondary particulate matter

(Spring 2021, moved to Spring 2022?)

See: ao. Kieseewetter et al, 2013

Could a local air quality approach be a driver for additional air quality policy in countries that did not sign the protocol?






Local measures alone will often be insufficient to meet WHO guideline levels

2.4a,b What is projected trend in life years lost and morbidity due to ozone, PM2.5 and NO2?

(Fall 2022) Answer to be coordinated with TF Health

- Latest RR-factors and counterfactual values
- Advice on how to avoid double counting of impacts?
- Advice on how to estimate morbidity impacts (and associated economic costs) - see also Mike Holland, 2020

Questions from the Gothenburg Protocol Review Group

N°	Question	Who	Timing	Status?
4. Evaluation of mitigation measures for black carbon emissions				
4.2				
	a. To what extent have the measures implemented to meet the emissions reduction obligations for PM contributed to reduce BC and PAH emissions (see art 2(2) of the amended GP on prioritization).	TFTEI, TFIAM, CIAM	Spring 2021 → Spring 2022	●
	b. What are projected trends in BC and PAH-emissions?	TFTEI, TFIAM, CIAM	Spring 2021 → Spring 2022	●
	c. What is the contribution of residential solid fuel burning to BC and PAH-emissions?	TFTEI, TFIAM, CIAM	Spring 2021 → Spring 2022	●
	d. Which additional PM-measures (technical and non-technical) are also effective for reducing BC and PAH-emissions?	TFTEI, TFIAM, CIAM	Spring 2021 → Spring 2022	●
	e. What are best available techniques to reduce BC emissions?	TFTEI, TFIAM, CIAM	Spring 2021 → Spring 2022	●
	f. What would be appropriate definitions and calculation methods (emission factors) for BC and the condensable part of PM?	TFTEI, TFIAM, CIAM	Spring 2021 → Spring 2022	●
4.4				
	What will be the impact of the inclusion of condensables	CEIP, CIAM, TFTEI	Spring 2021 → Spring 2022	●
 = Sufficient information available  = Ongoing and on time  = Difficult or delayed				

4.2 Impact of PM-emissions reductions to black carbon and polycyclic aromatic hydrocarbons emissions

(Spring 2022)

- See: [ECE/EB.AIR/WG.5/2021/8 \(unece.org\)](https://www.unece.org/ece/eb/air/wg5/2021/8)
- For modelling: BC = EC and PAH = OC

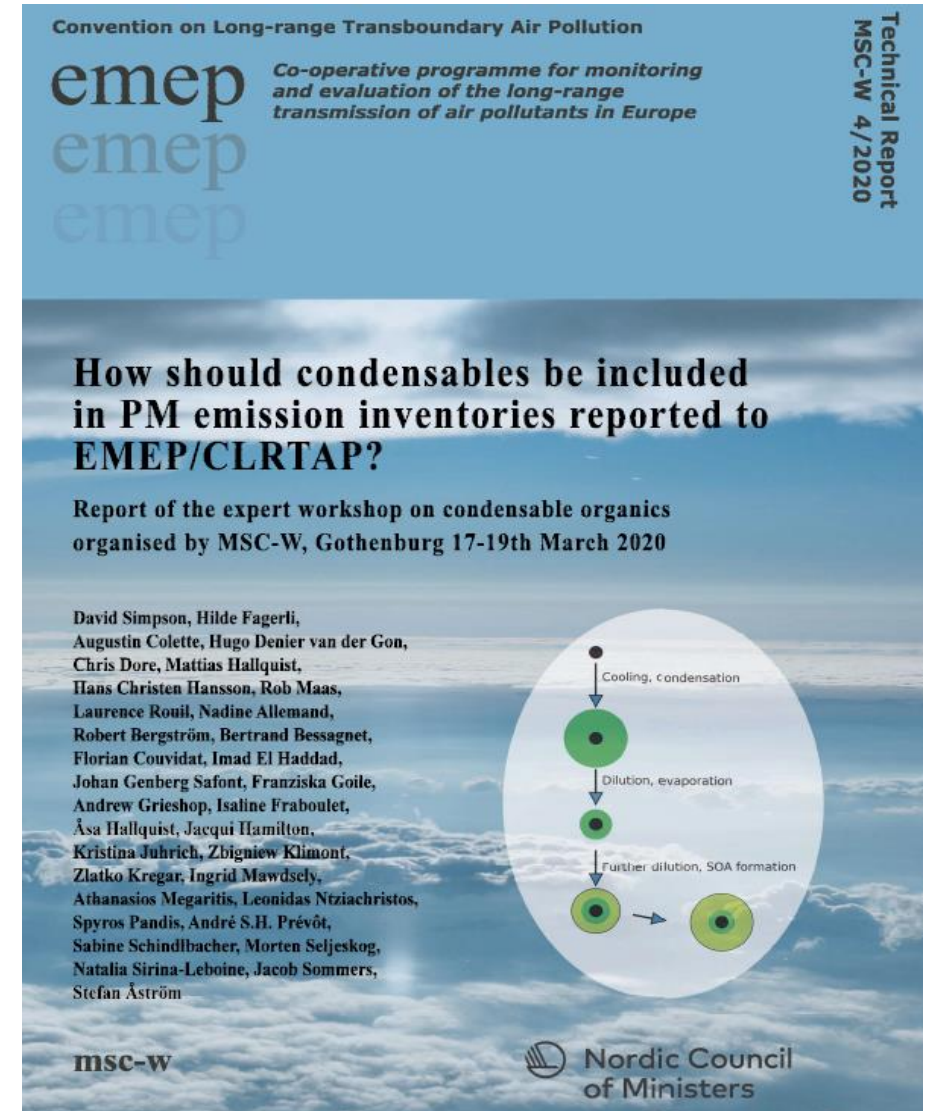
Priorities:

- Reduce solid fuel burning in residential sector
- Accelerate retirement of old fleet of diesel vehicles
- Improve effectiveness of bans of open burning of waste, including agricultural residues
- Synergies with climate policy (eg. zero-emission vehicles)

4.4 What will be the impact of including condensables in reporting of particulate matter?

(Spring 2022) lead: EMEP/MSC-W

- More complete source apportionment of population exposure
- Shift in optimal policy strategy to tackling residential solid fuel burning
- Adjustment of historical PM-emission data
- Need for better national data on residential wood burning
- Revision of national PPM-reduction obligations and ELVs ?



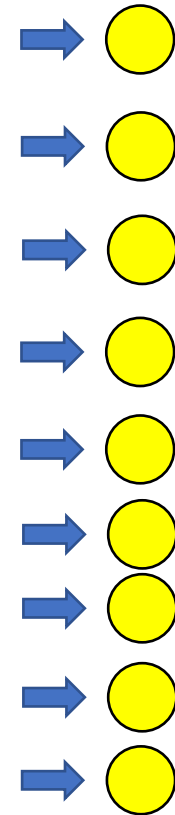
Thank you

- Further information: rob.maas@rivm.nl , stefan.astrom@ivl.se

Complementary slides

Status of other GPG questions

- 3.1a – will obligations be met?
- 3.1b – are planned reductions adequate?
- 3.1c – projected reductions for non-parties?
- 3.1d,e – BAT effects?
- 3.1f – air & climate interactions, postpone to spring 2022
- 3.1g – GAINS improvements
- 3.5a – When is cost of action lower than of inaction?
- 3.5c Non-Technical Measures (etc)
- 3.6 – Are local measures sufficient?
- 6.3a,b,c Methane emissions, postpone to spring 2022



3.1a Will the Protocol obligations be met based on latest emission projections?

(Fall 2021)

TFIAM49:

- Model calculations for EU-countries show that full implementation of emission limit value regulations would enable parties to meet national emission reduction obligations for SO₂, NO_x, NMVOC and PPM_{2.5}, assuming an average lifetime of existing installations and vehicles
- Many parties have difficulties to meet the ammonia reduction obligation, even with implementation of emission limit values for new large stables
- See: <https://ec.europa.eu/environment/air/pdf/CAO2-MAIN-final-21Dec20.pdf>.

3.1a3 What would be the optimized emission reduction obligations, given the updated emission inventories and projections and the same gap-closure ambitions as used in the preparation of the amended Gothenburg Protocol?

(Spring 2022)

- Including sensitivity analysis for condensables and deposition reduction targets for marine ecosystems (to be formulated by Gudrun Schütze et al. WGE)

3.1b Are emission reduction obligations adequate for meeting long term environmental and health protection targets?

(Fall 2021) Based on updated RRs from TFH and updated CL from CCE/ICP Veg

Scenario's:

- 1) full implementation of the 2020 emission reduction obligations
- 2) emission projections for 2030 based on national air pollution control programmes
- 3) tentative emission projections for 2050 assuming implementation of climate policies

Current difficulties and slow progress in reduction of ammonia emission suggest that exceedance of nitrogen critical loads will remain; impact of secondary aerosols on population exposure to PM_{2.5} as well as ozone damage to be analysed

3.1c What are the estimated reductions based on the best available emission projections for non-Parties to the revised protocol (EECCA/SEE)?

(Fall 2021)

Several alternative sources will be used and implemented in GAINS; these include the EU-project on West Balkan and EECCA and IEA/FAO projections. CEIP and TFTEI will be involved to get a most up-to-date picture of current legislation and actual current implementation of abatement technologies

Bilateral communication with the Parties involved will depend on available co-funding and time (and will probably be postponed to the revision phase of the protocol)

Uncertainties about the actual implementation of measures will probably remain significant

3.1d,e Will implementation of best available techniques and emission limit values be adequate for meeting long term environmental and health protection targets of the protocol beyond 2020?

(Fall 2021)

- CIAM/IIASA: MTRF scenario considering BAT and ambitious ELVs as defined in the technical annexes (with support of TFTEI)
- CIAM update of (best available) emission projections for several EECCA- and west-Balkan countries, including Turkey, for both current legislation and with maximum feasible technical measures
- IIASA and MSC-W concentration and deposition calculations and evaluating health and environmental impacts

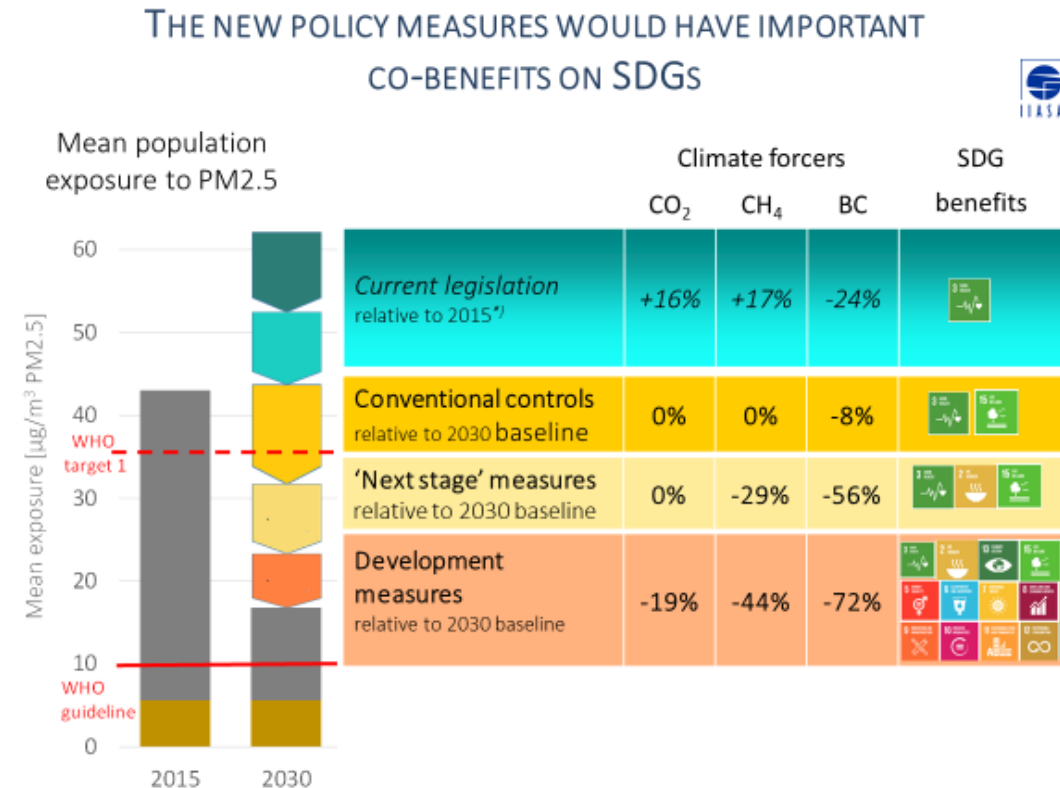
3.1f What would be the impact of emission reductions on climate and vice versa

(spring 2021, move to spring 2022)

- See: Amann et al. 2020:
 - [Reducing global air pollution: the scope for further policy interventions | Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences \(royalsocietypublishing.org\)](#)
 - [2nd Clean Air Outlook study for the EU](#)

TFIAM 48: Remaining nitrogen problems would require additional action.

An integrated design of climate and air quality policy is needed to deal with policy trade-offs: fuel switch for climate reasons should not worsen (local or regional) air quality, and air pollution strategies should aim to be at least climate-neutral



3.1g What are the latest improvements of the GAINS model with respect to scenario development and cost updates? What is the state of play for countries in Eastern, South-Eastern Europe and Turkey, the Caucasus and Central Asia?

(Fall 2021)

- Including condensables; installation structure in residential sector
- Waste management sector
- High emitter vehicles
- Downscaling 10x10 km – improved source attribution in cities
- New projections data for selected EECCA, West Balkan, Turkey

3.5a What will be the costs of additional measures in the ECE region that would not exceed the external costs of inaction

(Fall 2022)

- A TFIAM/TFTEI-report on the Costs of Inaction will be available in the coming months. See informal document: [Cost of inaction TFIAM two pager.pdf \(unece.org\)](#)
- For ammonia: see Ammonia Assessment report [ECE EB.AIR WG.5 2021 7-2102624E.pdf \(unece.org\)](#)

- Updates from TFRN, see:

Options for Ammonia Mitigation: Guidance from the UNECE Task Force on Reactive Nitrogen http://www.clrtap-tfrn.org/sites/clrtap-tfrn.org/files/documents/AGD_final_file.pdf and: Framework (advisory) code of good agricultural practice for reducing ammonia emissions <https://www.unece.org/fileadmin/DAM/env/lrtap/Publications/>

3.5c What are available non-technical measures and what policy instruments to trigger them?

(Fall 2021)

- Multiple benefits for environment and individual health from shifting car mobility to active mobility (walking, cycling and public transport use) and changing diets (less meat, more vegetables)
- Effective in several cities: pricing, regulation and infrastructural measures (remove parking places and car lanes, improve facilities for cycling and fast public transport)

See: [Note on non-technical and structural measures -201120.pdf \(unece.org\)](#)

WGSR will probably request a guidance document on non-technical measures (and/or economic instruments)

3.6 Are additional local air quality measures sufficient and cost-effective to reduce health risks or strive towards WHO air quality guideline values?

(Fall 2022)

Local traffic measures are effective to reduce the health burden for people living along busy roads that are exposed to high pollution levels. Cities can stimulate early replacement of old installations, wood stoves and non-road mobile machinery in favour of newer ones, that comply with stricter emission limit values

Even in large cities like Berlin and London, there is a large regional and transboundary contribution to the concentration of particulate matter at traffic stations

Meeting WHO guideline values requires that also long range pollution source are addressed (need for a multiscale governance approach)

6.3a,b,c What is the projected future trend in methane emissions and related health and ecosystems impacts?

(Spring 2021, move to spring 2022)

Answer to be coordinated with TF HTAP and WGE

- CLE and MFR projections to be based on ECLIPSE-scenarios
- CLE focus on emission from waste and gas exploration, gas recovery from landfills and reduced use of fossil fuels
- Additional measures focus on emissions from cattle (changes in cattle feed, and reduced livestock)
+reduced meat consumption

Höglund-Isaksson et al. (2020). Technical potentials and costs for reducing global anthropogenic methane emissions in the 2050 timeframe –results from the GAINS model. Environ. Res. Commun. (2020) 025004 <https://doi.org/10.1088/2515-7620/ab7457>

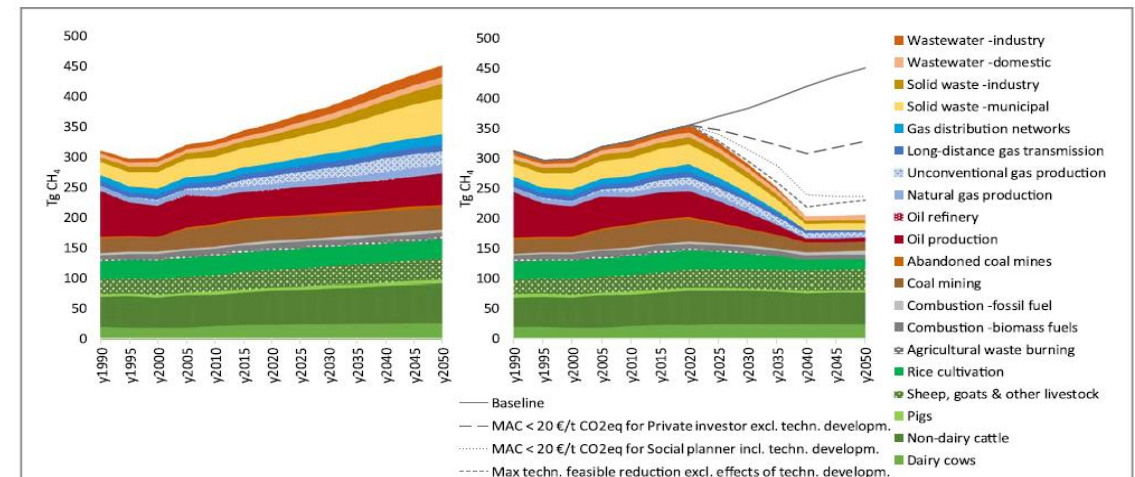


Figure 8. Global anthropogenic CH₄ emissions 1990–2050 in the Baseline scenario (left panel) and with Maximum technically feasible reduction (MFR) including effects of technological development (right panel).