EU4GREEN

Development of emission reduction commitments (ERCS)

Meeting of the Regional Working Group on the Green Agenda for the Western Balkans| Date: 14 May 2024

Quelle: Umweltbundesamt, M. Deweis

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Context – EU4Green

- the Project EU4Green aims to support the Western Balkan economies in implementing the Green Agenda
- the project will address five contextual pillars:
- decarbonisation and resilience: climate action, clean energy, smart mobility
- circular economy: sustainable production and consumption, waste
- **depollution: air,** water and soil monitoring and prevention
- sustainable agriculture and food production, rural areas
- biodiversity: protection and restoration of ecosystems
- the main beneficiaries are Albania, Bosnia and Herzegovina, Kosovo*, Montenegro, North Macedonia, and Serbia

* *This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.*

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Context – Action Plan for the Implementation of the Sofia Declaration on the Green Agenda for the Western Balkans 2021-2030

- the population of the Western Balkans is exposed to some of the highest concentrations of air pollution in Europe
- pollution is up to five times higher than the prescribed and EU guideline levels[1]
- main reasons:
  - low-quality solid fuels
  - industry facilities that need technical improvement
  - old vehicles
  - coal-fired thermal power plants
  - residential heating

1 Air pollution and human health: The case of Western Balkans, UNEP, 2019, Air-Quality-and-Human-Health-Report_Case-of-Western-Balkans_preliminary_results.pdf (developmentaid.org)

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Context – Action Plan for the Implementation of the Sofia Declaration on the Green Agenda for the Western Balkans 2021-2030

- Action 36: Finalize the process of ratification of the Convention on Long-range Transboundary Air Pollution and its protocols.
    - Action: WB economies adopted emission reduction plans
    - Emission reduction commitments to be established
    - Action 36a: Support modelling to establish national emission reduction commitments for the five main pollutants covered by the NEC Directive and the Gothenburg Protocol under the Convention on Long-range Transboundary Air Pollution
    - outcome of this work package of the EU4Green project can be used as a scientifically underpinned starting point for the establishment of Emission Reduction Commitments
- Action 37: Develop and implement Air Quality Strategies
    - outcome of this work package of the EU4Green project can also support the development of Air Quality Strategies

1 For more information see: https://unece.org/environmental-policy-1/air

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Context – Air emission reporting

- the Air Convention has 51 Parties
- Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia are Parties to the Air Convention
- Albania, Montenegro, North Macedonia and Serbia report air emission inventories under the UNECE Air Convention[1]
- reporting under the Air Convention foresees that countries report annually on more than 100 different source categories for several pollutants
- the source categories covering the anthropogenic emission sources and can be grouped into the following main sectors
    - Energy
    - Transport
    - Industry
    - Agriculture
    - Waste
- for more information on reporting under the Air Convention, see: www.ceip.at

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Context – Air emission reporting

Ratification status of the Air Convention and related protocols												
	1979 LRTAP Con-vention	1984 EMEP Protocol	1985 Sulphur Protocol	1988 NO_x Protocol	1991 VOC Protocol	1994 Sulphur Protocol	1998 Heavy Metals Protocol		1998 POP Protocol			1999 Gothenburg Protocol
	Geneva Convention	Geneva Protocol	Helsinki Protocol	Sofia Protocol	Geneva Protocol	Oslo Protocol	Aarhus Protocol	2012 Amend-ment	Aarhus Protocol	2009 Amend-ment I	2009 Amend-ment II	2012 Amend-ment
AL	2005 (AC)	2011 (AC)	2009 (AC)	2009 (AC)								
BA	1993 (S)	1993 (S)										
ME	2006 (S)	2006 (S)					2011 (AC)		2012 (AC)			
MK	1997 (S)	2010 (AC)	2010 (AC)	2010 (AC)	2010 (AC)	2014 (AC)	2010 (AC)		2010 (AC)			2014 (AC)
RS	2001 (S)	2001 (S)					2012 (AC)		2012 (AC)			
(AC) = Accession (S) = Succession												

Source: http://www.unece.org/env/lrtap/status/lrtap_s.html

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Context – The GAINS model

IIASA: International Institute for Applied Systems Analysis develops and operates the **GAINS model (Greenhouse Gas - Air Pollution Interactions and Synergies)**

- air pollutants and greenhouse gases often have common sources
- they interact in the atmosphere and cause a variety of harmful effects on the environment and human health
- the GAINS model explores cost-effective emission control strategies
- GAINS is available as an open-access online tool[1]

https://gains.iiasa.ac.at/models/gains_models4.html

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Context – GAINS model

	PM (BC, OC)	SO_2	NO_x	VOC	NH_3	CO	CO_2	CH_4	N_2O	HFCs PFCs SF_6
Health impacts: PM (Loss in life expectancy)	√	√	√	√	√					
O_3 (Premature mortality)			√	√		√		√		
Vegetation damage: O_3 (AOT40/fluxes)			√	√		√		√		
Acidification (Excess of critical loads)		√	√		√					
Eutrophication (Excess of critical loads)			√		√					
Climate impacts: Long-term (GWP100)	(√)	(√)	(√)	(√)	(√)	(√)	√	√	√	√
Near-term forcing (in Europe and global mean forcing)	√	√	√	√	√	√	(√)	√	(√)	(√)
Black carbon deposition to the arctic	√									

Source: https://iiasa.ac.at/sites/default/files/2021-09/gains-matrix.png

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Aim of the project

- **develop emission reduction commitments (ERCs)** for SO_2, NO_x, NH_3, NMVOC and $PM_{2.5}$ for 2020-2029 and for 2030 and beyond for Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia
- the ERCs are based on a premature mortality related target as for the national commitments set in the NEC Directive
  - specifically, by 2030, a 50% reduction of premature deaths attributable to air pollution for the whole region, compared to 2005.
- Cost-effective means of achieving the suggested emission reduction commitments have been calculated using the GAINS model
- **resulting in ERCs for each of the WB economies by pollutant.**

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Comparison of reported data and GAINS databases

- IIASA conducted an in-depth analysis of the available WB economies **air pollutant emission inventories** (submitted under the Air Convention) and the corresponding estimates used in the GAINS model
- as not all WB economies submitted data/complete date, additional information from international databases (e.g., International Energy Agency, UN Food and Agriculture Organization, International Fertilizer Association, OECD, etc.) was used
- GAINS also used data collected and developed during the EUCLIMIT-9EAST project[1]
- the results of this comparison/analysis were used to prepare for the **consultation meetings with the inventory experts from the WB economies**
- based on the exchanges and discussions during the consultation meetings, IIASA **updated the GAINS databases accordingly**

1 Service Contract ENER/A3/SER/2019-563/SI2.840866 - ENER/2020/OP/0005; Extension of the EU Energy and Climate Modelling Capacity to include the Energy Community and its Nine Contracting Parties

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Consultation meetings with the inventory experts from the WB economies

- one online consultation meeting was held with representatives of each of the six WB economies
- **the representatives of the WB economies** were usually experts from the institutes that compile the air emission inventories (e.g. environment agencies) and representatives from the responsible ministries
- presentation and discussion of comparison of:
  - estimates of historical emissions (2005-2020) – GAINS vs national inventory (if provided)
  - draft GAINS baseline scenario (including projections) – comparison to national baseline if available
- example questions that were discussed:
  - Is there any policy in place to mitigate NH_3 emissions from agriculture?
  - Assumptions on how quickly the new vehicle emission regulations will penetrate the vehicle fleet?
  - Emission factors for wood burning (default Tier I or distinguishing between types of installations)
- after the meeting data was exchanged

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Validation of GAINS atmospheric calculation

- IIASA used the GAINS model to calculate the annual mean ambient concentrations of $PM_{2.5}$ for the period 2005 to 2020.
- to the extent possible, IIASA took into account best available information about the spatial distribution of emissions
- IIASA obtained the most recent monitoring data from international databases (e.g., AIRBase) and national networks
- IIASA performed and visualized the validation of GAINS model calculations against existing monitoring data.

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Output of the project

- **Preliminary proposal for emission reduction commitments (ERCs)** for SO_2, NO_x, NH_3, NMVOC and $PM_{2.5}$ for 2020-2029 and for 2030 and beyond for Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia
- Illustration of cost-effective means of achieving the reduction commitments
- Validation/comparison maps of GAINS model calculations of ambient $PM_{2.5}$ against existing monitoring data
- technical project report

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Examples for cost-effective measures

- cleaner residential boilers
- flue gas cleaning in industry (boilers)
- power plants – further tightening control of particulate matter; more efficient filtration
- steel industry – primary measures
- cement industry – primary measures
- efficient application of mineral fertilizers

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Status of the project

- **Preliminary emission reduction commitments (ERCs)** for SO_2, NO_x, NH_3, NMVOC and $PM_{2.5}$ for 2020-2029 and for 2030 and beyond for Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia were presented to air emission experts in an online meeting
- cost-effective means of achieving the reduction commitments for all WB6 economies were presented at the same meeting
- additional bilateral consultation meetings will be held with some of the WB6 economies with the purpose to clarify and discuss the results of the analysis for ERCs
- additional data can be considered to fine tune the model results

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Beyond the project

- Outcome of this work package of the EU4Green project can be used as a **scientifically underpinned starting point for the establishment of Emission Reduction Commitments**
- **GAWB Action Plan**
    - Action 36: Finalize the process of ratification of the Convention on Long-range Transboundary Air Pollution and its protocols.
    - Action 36a: Support modelling to establish national emission reduction commitments for the five main pollutants covered by the NEC Directive and the Gothenburg Protocol under the Convention on Long-range Transboundary Air Pollution
- RWG GAWB members can take note of the outcome of the modelling exercise and use these results for a discussion at a political level

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The two scenarios which served development of the preliminary ERCs

The CLE scenario = Current Legislation scenario

- assumes effective implementation of all committed air quality policies

The MTFR scenario (Maximum Technically Feasible Reduction)

- refers to the case where all emission reduction measures included in GAINS are used to calculate emissions
- this is the LOWEST attainable level of emissions for this scenario with given energy, industry, agriculture development
- measures are not applied to 100% by 2030

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