

INTEGRATED ASSESSMENT MODELLING: CLRTAP EXPERIENCE

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Co-operative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe



Working Group on Effects of the Convention on Long-range Transboundary Air Pollution



CONTEXT

- IAM is one of the activities borne by the EMEP programme which provides scientific background to the CLRTAP and its protocoles
- CLRTAP: Adopted in 1979, CLRTAP is a UNECE convention (Europe, USA, Canada) ratified by 51 Parties
- 8 protocols among which the 1999 Gothenburg Protocol to abate Acidification, Eutrophication and ground level ozone that entered into force in 2005 and has been amended in 2012 with new objectives (2020) and to include PM issues
- IAM drove the objective set by the "multi-pollutants / multi-effects" Gothenburg protocol











IAM ADDED -VALUE :

- Defining emission control strategies by accounting for their costs, feasibility, and their impacts and benefits
- Maximizing benefits, optimizing costs and burden sharing
- The GAINS model (former RAINS) developed by IIASA provides "a framework for assessing strategies that reduce emissions of multiple air pollutants and greenhouse gases at least costs, and minimize their negative effects on human health, ecosystems and climate change".
- It allows to test various emission reduction scenarios regarding as objective a number of metrics (end points) that are representative of health and environment impacts
- The Convention approach (and EU legislation) is based on national emission ceilings





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GAINS APPROACH : INTEGRATED APPROACH FOR THE POLLUTANTS AND THE EFFECTS

	PM (BC, OC)	SO ₂	NO _x	voc	NH ₃	со	CO ₂	CH ₄	N ₂ O	HFCs PFCs SF ₆
Health impacts: PM (Loss in life expectancy)	\checkmark	\checkmark	1	\checkmark	\checkmark					
O ₃ (Premature mortality)			\checkmark	\checkmark		V		\checkmark		
Vegetation damage: O ₃ (AOT40/fluxes)			\checkmark	\checkmark		\checkmark		\checkmark		
Acidification (Excess of critical loads)		\checkmark	\checkmark		\checkmark					
Eutrophication (Excess of critical loads)			\checkmark		\checkmark					
Climate impacts: Long-term (GWP100)	(^)	(√)	(1)	(1)	(v)	(v)	\checkmark	\checkmark	\checkmark	V
Near-term forcing (in Europe and global mean forcing)	V	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	(\1)	\checkmark	(√)	(1)
Black carbon deposition to the arctic	V	- 1								

Source : IIASA – GAINS website

IAM CONCEPT Input data IAM modules **Results Cost database including Economical** Ρ and energy data on sources, Scenarios runs: emissions, mitigation scenarios - linkages between 0 More effects strategies emission LI (efficiency, feasibility..), reduction C Emission strategies and inventories Y impacts; - cost evaluation **Transfer/deposition** module Cost D Législations - S/R matrices benefits É + - effects calculation analysis C (including climate) **Optimization :** IS looking for the best compromise Macro-+ **Optimization module** 0 economics - minimizing the costs with N **Policy** respect with health and objectives environmental objectives





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ROJECTIONS, SCENARIOS

k (Protocols, EU Directives) allows to gather emission and

-economic Issues (TFTEI) helps for projections

hanges in data reported year by year



