



# Effects joint Report

## In the framework of the Gothenburg Protocol Review

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# Objective

- ICPs/TFs prepared detailed information about the impacts in the framework of the GP review. Information included in different documents with different levels of detail
- Main general messages included in policy documents, but not details and the work behind

## Main objectives of the document

- Gather in a document the impacts of the implementation of the GP as amended in 2012
- Updated and complementary information to 2015 document
- Understandable document for information dissemination
- Analysis of the observed impacts and projections of the emission reductions: conclusions, recommendations and future challenges

# Background

## 2019

- GP entered into force. EB decided to start the review (Decision 2019/4). GP review Group (led by K. Scavo prepared questions to the subsidiary bodies

## 2021

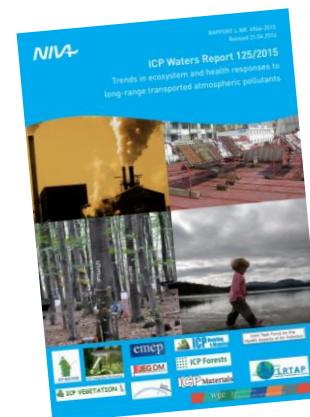
- WGE (ICPs/TFs) prepared information for the review.
- Joint Report to the 7th joint sesión
- Informal Document with extended information

## 2022

- Report on the review (Impacts in Section IV). Annex I with additional information
- Decision 2022/4 Conclusion of the review of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, as amended in 2012, and the path forward

## 2015

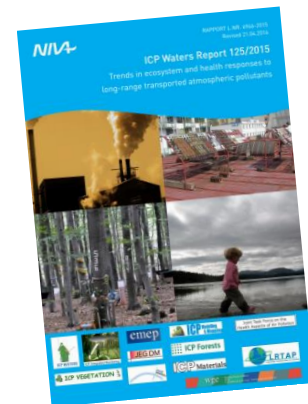
- Trends in ecosystem and health responses to long-range transported atmospheric pollutants (Rapport LNR 6946-2015)



# Background documentation

**2015:** Trends in ecosystem and health responses to long-range transported atmospheric pollutants (Rapport LNR 6946-2015)

- Structured by air pollutants and its effects: Sulphur and Nitrogen (Acidification), N as nutrient, Ozone, PM, HMs and POPs
- Trend analysis: 1990-2012
- Projections: some references to the *Guidance document on health and environmental improvements using new knowledge, methods and data* (2014) (data for 2005 and 2020)



**2021:** Informal Document with extended information from ICPs and TFs in response to questions raised in the frame of the amended GP review (updated December 2021)

- Structured by *receptors* (ICP/TF) and effects of air pollutants (S, N, O<sub>3</sub>, and PM)
- Trend analysis: 1990 - (2020)
- Projections: case studies (no official scenarios at the moment)
- New elements: biodiversity, dynamic modelling, challenges, gaps....

## Trends in ecosystem and health responses to long-range transported atmospheric pollutants emission reductions

- Structured by air pollutants and its effects: Sulphur and Nitrogen (Acidification), N as nutrient, Ozone and PM
- Trend analysis: (1990) - (2020)
- New elements: biodiversity, dynamic modelling
- Special mention to consolidated monitoring networks, modelling activities and environmental indicators for impact/risk assessment
- Conclusions and Recommendations. Future challenges

### What else?

- Impact Projections: According to “official” scenarios? -> In collaboration with EMEP
- .....

# Acidification

## ICP Waters

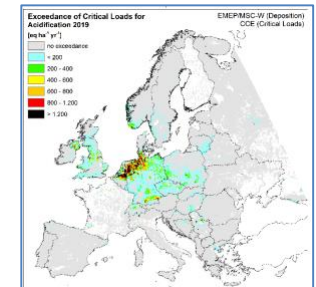
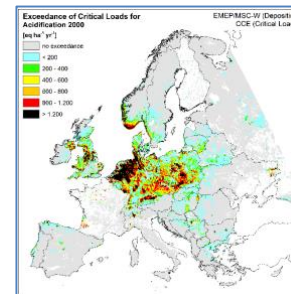
- Chemical recovery (1990-2016). Biological recovery (data from 2022 report)
- Impact of land use and land cover change related to CC in re-acidification

## ICP Integrated Monitoring

- Site specific CL for acidification and eutrophication
- Recovery from soil acidification
- Dynamic modelling needed for time scale impacts for future emission scenarios (damage and recovery)
- Need to expand network to other ecosystem types and collaboration with other networks. Include vegetation monitoring

## ICP Modelling & Mapping

- Update of the methodology
- Trends of impacts: exceedances (area and AAE)



# Nitrogen as Nutrient

## ICP Waters

- Studies on the effects of N in water chemistry and biology. (Update with Report 149/2022? Nitrogen in surface waters: time trends and geographical patterns explained by deposition levels and catchment characteristics)

## ICP Integrated Monitoring

- Site specific CL for eutrophication
- Trends of chemical parameters (N). Emission reduction of N need to be higher for recovery
- Dynamic modelling needed for time scale impacts for future emission scenarios (damage and recovery)

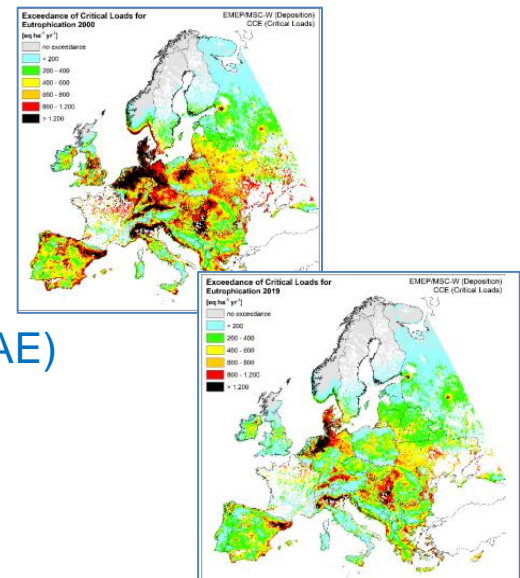
# Nitrogen as Nutrient

## ICP Forests

- Monitoring deposition (1997-2020)
- Trends of tree growth, N saturation, N depletion, ectomycorrhizal community structure, composition of ground vegetation

## ICP Modelling & Mapping

- Update: Background database, receptors map
- Trends of impacts: exceedances of eutrophication (area and AAE)
- CL exceedances and protection status of ecosystems
- Influence of the deposition of different species on the CL exceedances





## ICP Forests

- Visibly injury
- POD & AOT40 and visibly injury

## ICP Vegetation

- Trend analysis: AOT40 and POD
- 1995 – 2014
- Projections: 2010 - 2030. Case studies
- Impacts on vegetation and ecosystems at 2030 and beyond
- Observations (Visible leaf-injury): 1990-2006, 2007-2015 and OTC
- New challenges: interactions with N and Climate Change (changes in phenology, vegetative period and therefore in O<sub>3</sub> fluxes)

# Impacts on materials

## Observed trends

Corrosion in urban, industrial and rural sites

- Trend analysis: 1987-2018. 1, 4 and 8 years of exposure

Soiling

- Trend analysis: 2005-2018, 2 years of exposure
- No decrease in the trend of soiling after 1997

Projections

- Case study: 2030

## 2015 document

- Corrosion and soiling until 2012
- No trend analysis

## Guidance document (2014)

- Expected improvements in Corrosion and Soiling

## 2015 document

- O<sub>3</sub>: Population exposure and health response. SOMO35 2000-2002, 2010-2012
- PM: Population exposure

## Guidance document (2014)

- % Mortality for O<sub>3</sub>, % Mortality for PM, % Morbidity for O<sub>3</sub> and PM

## Report 2025

- Extended information on impacts on human health. Trend analysis ?

# Other elements.....

## Biodiversity

- ICP Waters, ICP-IM, ICP-Forests
- Biological recovery from acidification (ICP Waters)
- Trends of tree growth, N saturation, N depletion, ectomycorrhizal community structure, composition of ground vegetation (ICP-Forests)
- Need more data
- Need to support and keep long-term monitoring

## Monitoring

- Consolidated monitoring networks. Historical data.
- Support and extend monitoring networks: new sites, new ecosystem types
- Extend monitoring parameters in selected sites and vegetation
- Challenge: funding to maintain monitoring
- Collaboration with other monitoring networks

# Challenges

- N impacts...
- .... and interaction with other stressors (O<sub>3</sub>, CC...)
- Need to expand network to other ecosystem types and collaboration with other networks.
- Extend monitoring parameters in selected sites, including biology
- Include CC projections, biological indicators for recovery, target loads for policy advise

# Report 2024-2025

## Additional value to 2015 Report

- Broader time frame (8-10 more years)
- Updates
- New findings and challenges
- Biodiversity, Dynamic modelling, ozone metrics

## What is still missing

- Projections (future scenarios) and impacts
- More detail about health impacts
- Atmospheric/emission/deposition data (past and future)
- .....

## Agenda

**2024: Draft document** (Trends according to what is done + updated information from ICPs)

**WGE EMEP 11<sup>th</sup> meeting**

**2025: Draft and final document** with trends and projections, in collaboration with EMEP

**WGE/EMEP bureau** (work progress)

**WGE EMEP 12<sup>th</sup> meeting** (Final document)

## Question.....

Is it worth making another document? What type?

## If yes.....

- Agenda
- New inputs: scope, ICPs involved and time schedule
- Gaps
- Type of document



**Time for a fruitful discussion...**





# Thank you for your attention

WGE/EMEP Bureaux  
February, 2024