Convention on Long-range Trans-boundary Air Pollution

Task Force on Integrated Assessment Modelling

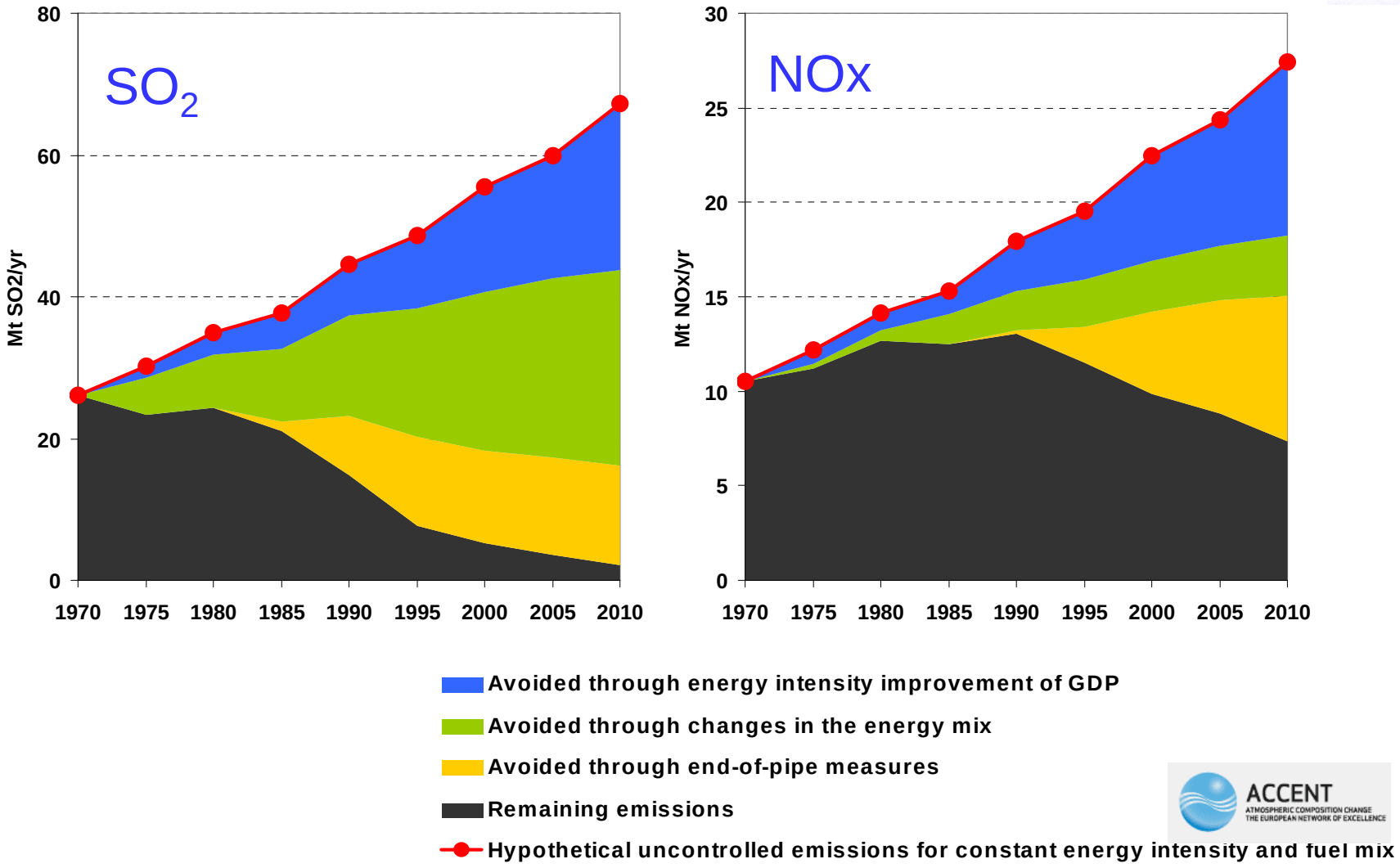
39th meeting

23-25 February – Stockholm

72 participants, including ~ 10 from EECCA

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

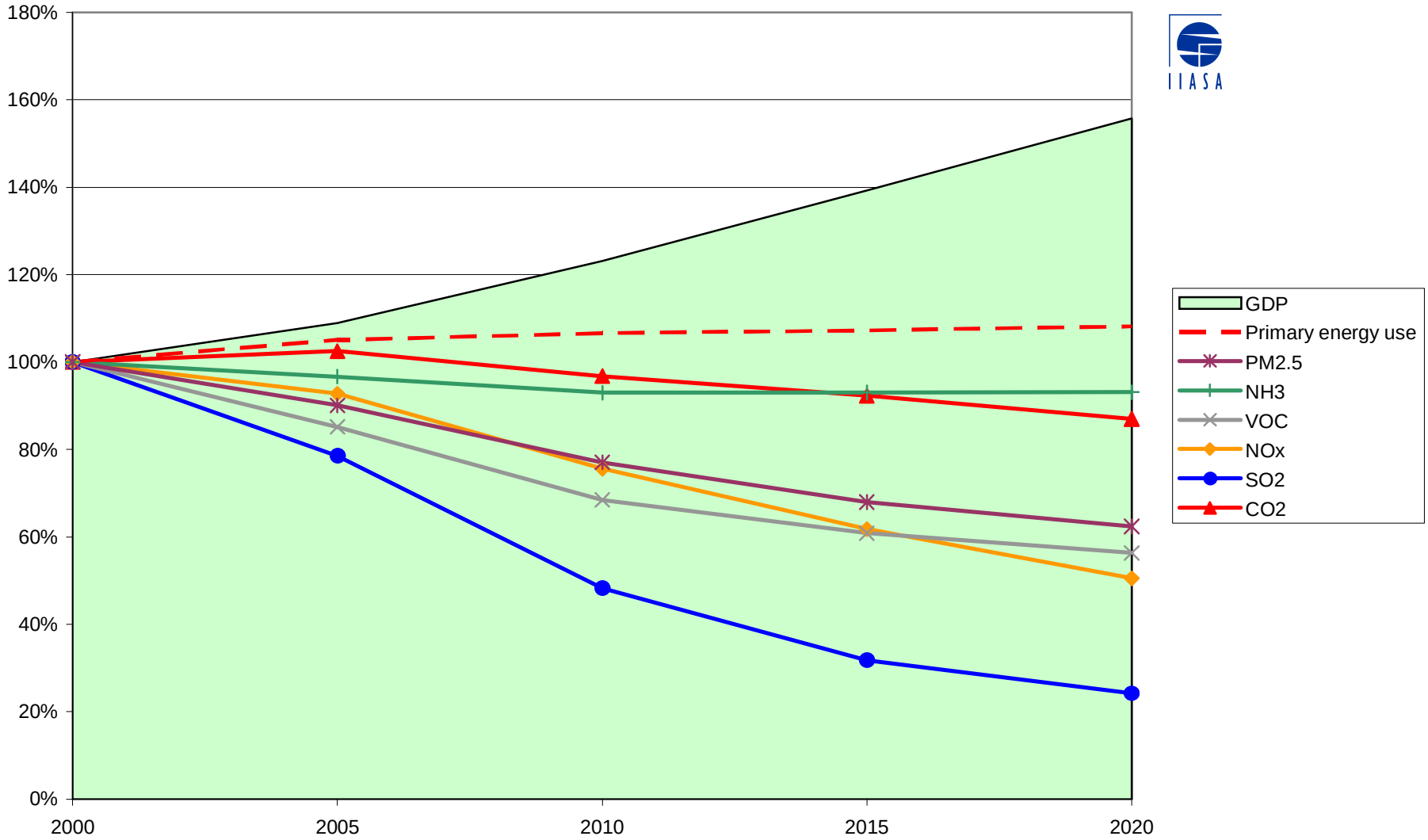
Factors determining European SO_2 and NO_x emissions 1970-2010



IIASA

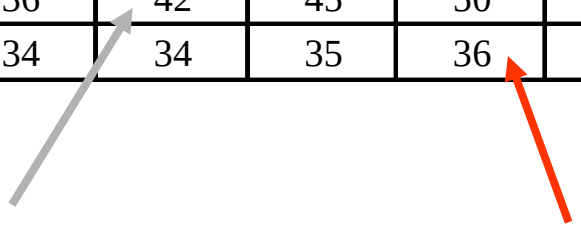
ACCENT
ATMOSPHERIC COMPOSITION CHANGE
THE EUROPEAN NETWORK OF EXCELLENCE

Emissions of all pollutants decline, but ammonia hardly



Ambition levels for Europe: trade-off between costs and impacts

		2020 BL	LOW	Low*	MID	High*	HIGH	MTFR
Aadditonal cost above BL 2020								
Costs	million €/yr	0	610	905	2.262	5.380	10.752	69.155
	% of GDP	0	0,00	0,01	0,01	0,03	0,07	0,45
Resulting changes from 2000								
Reduced impacts %	Loss in life expectancy	43	51	51	57	63	63	69
	Acidification	69	74	76	80	85	84	89
	Eutrophication	29	36	42	45	50	50	57
	Premature deaths ozone	32	34	34	35	36	39	41



LOW-MID-HIGH-MTFR

Each step =

- ~ 10.000 live years gained
- ~ € 2 billion savèd due to less absence
- ~ 20.000 km^2 protected from acidification
- ~150.000 km^2 protected from eutrophication
- But at increasing costs

What choice to make?

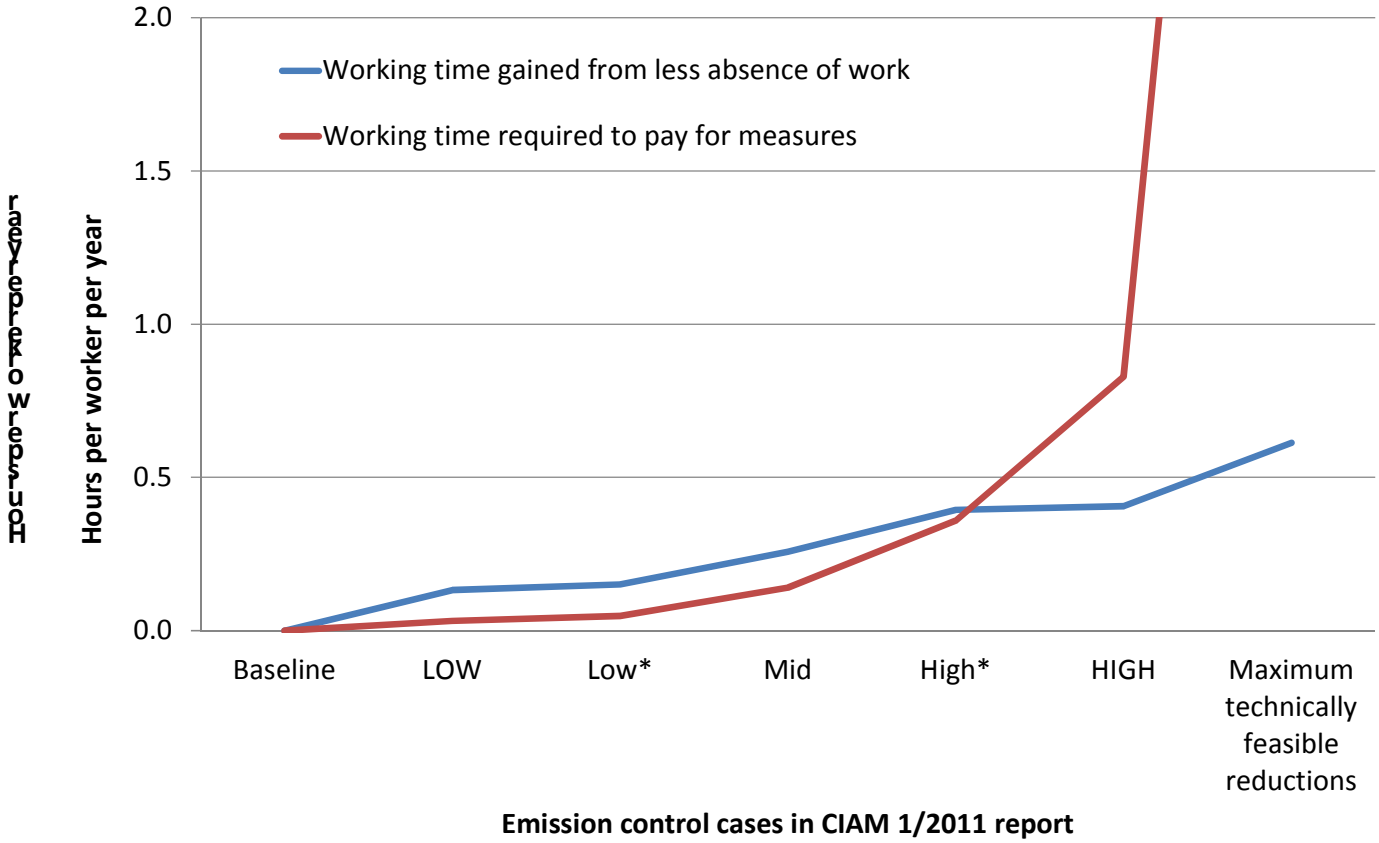
TSAP: willingness to pay = € 1.5 bn

		2020 BL	LOW	Low*	MID	High*	HIGH	MTFR
Aadditonal cost above BL 2020								
Costs	million €/year	0	245	319	864	2.288	3.807	49.117
	% of GDP	0	0,00	0,00	0,01	0,02	0,05	0,65
Resulting changes from 2000								
Reduced impacts %	Loss in life expectancy	52	56	56	59	63	63	69
	Acidification	70	74	76	80	84	84	88
	Eutrophication	21	28	34	37	42	42	50
	Premature deaths ozone	34	37	37	38	39	41	43
Emission reduction %	SO2	74	75	74	76	80	79	83
	NOx	55	57	58	59	60	62	64
	PM2.5	39	46	45	48	52	52	67
	NH3	9	18	27	30	35	32	41
	VOC	46	49	49	50	51	55	63

Risks:

- ***No reduction in non-EU countries***
- ***Energy policy in 2020BL less successful: then higher costs, and additional NH3 reduction would become more cost-effective***

There is potential for further cost-effective action with large benefits

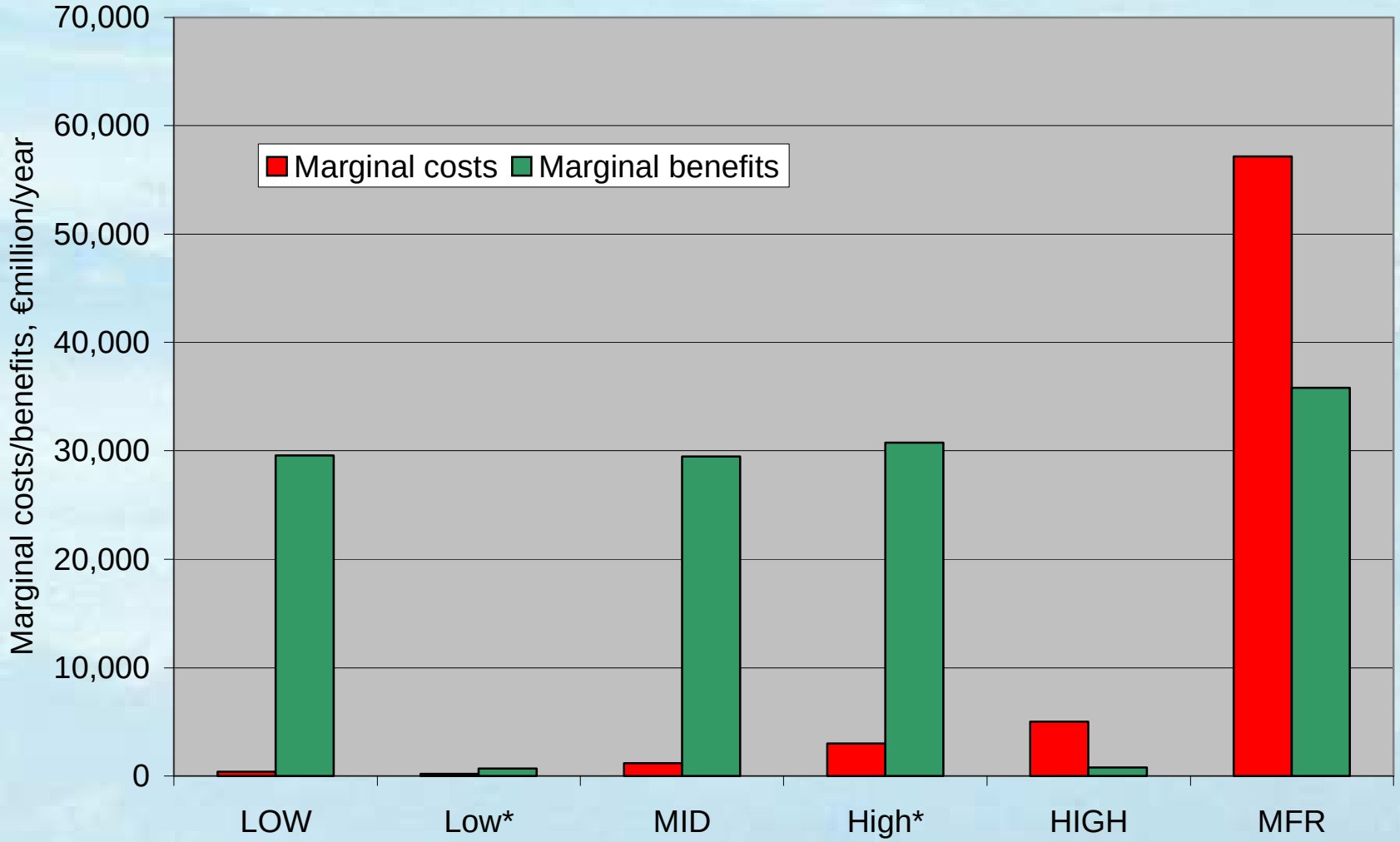


EU-27, based on Holland et al., 2011

Cost-Benefit Analysis TFIAM-scenarios

(Mike Holland, preliminary results)

(mortality effects only)



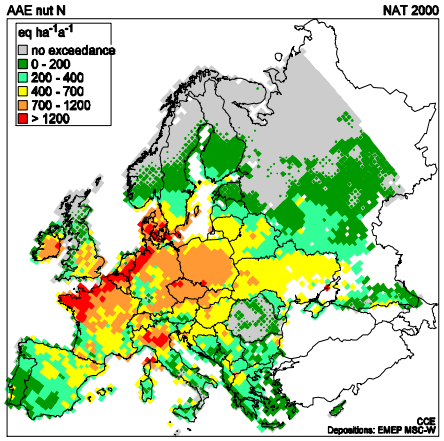
Ex post impact analysis

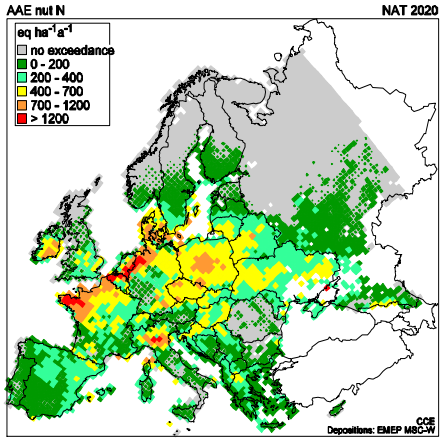
- In co-operation with the Working Group on Effects
- Joint background report to the revised Gothenburg Protocol
- Including indicators as mentioned in Annex 1 and Cost-benefit analysis

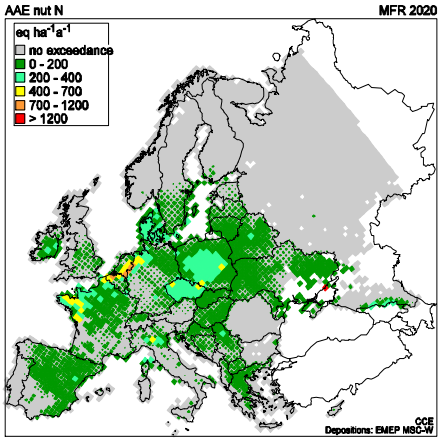
ICP M&M:
Indicators for risk and species occurrence tell the same story

Indicator of risk:

AAE - Nitrogen

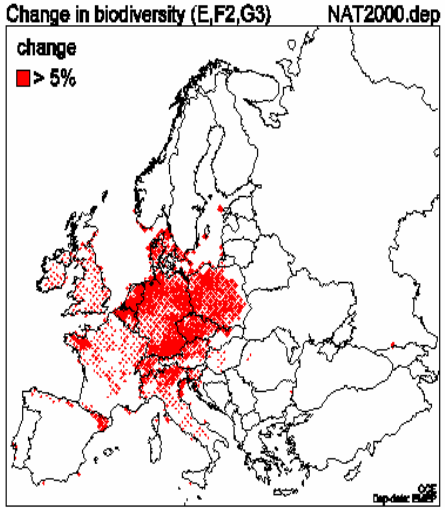


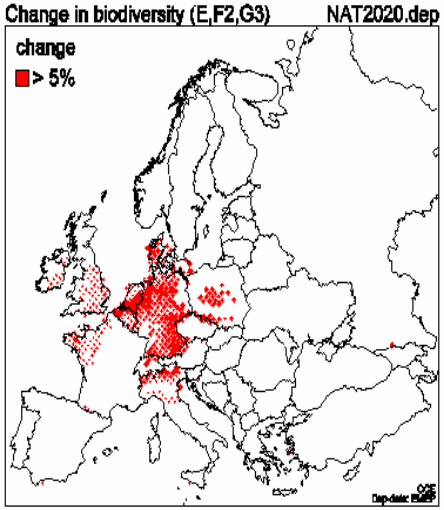


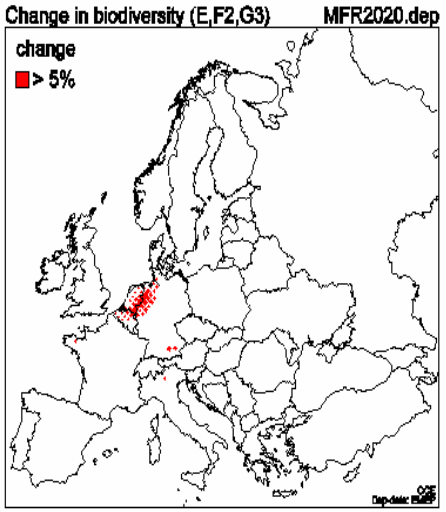


Indicator of :

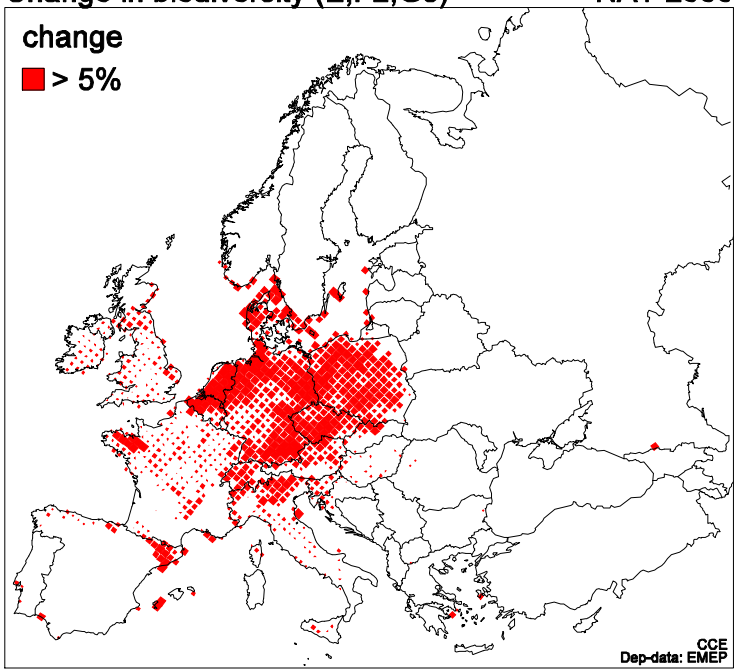
loss of biodiversity



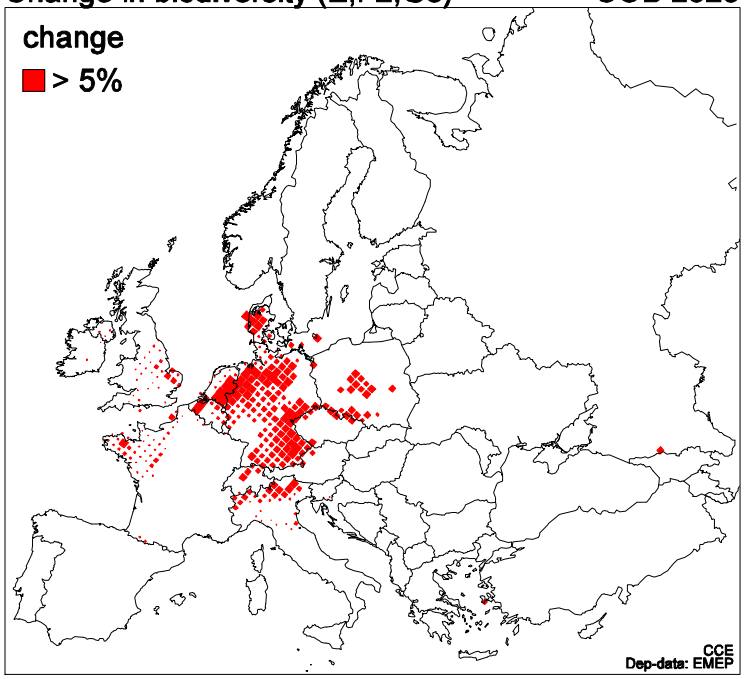




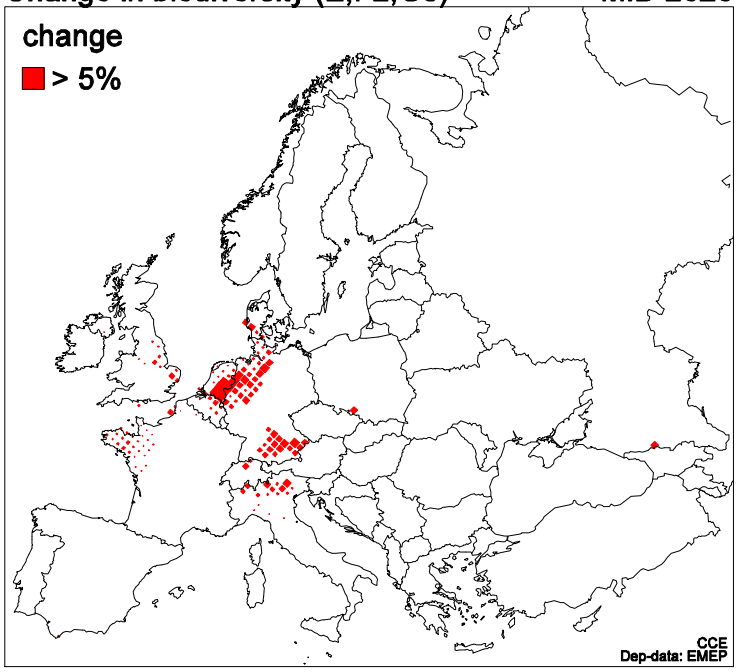
Change in biodiversity (E,F2,G3) NAT 2000



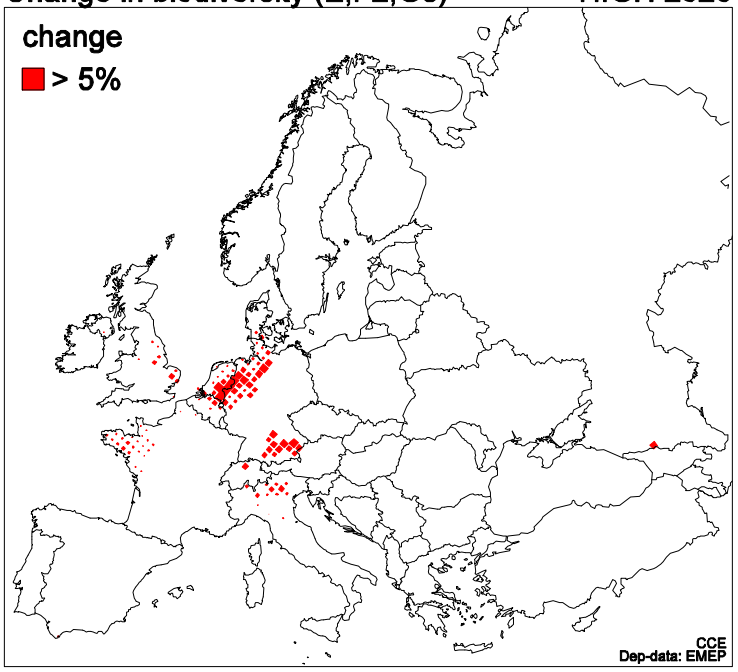
Change in biodiversity (E,F2,G3) COB 2020



Change in biodiversity (E,F2,G3) MID 2020



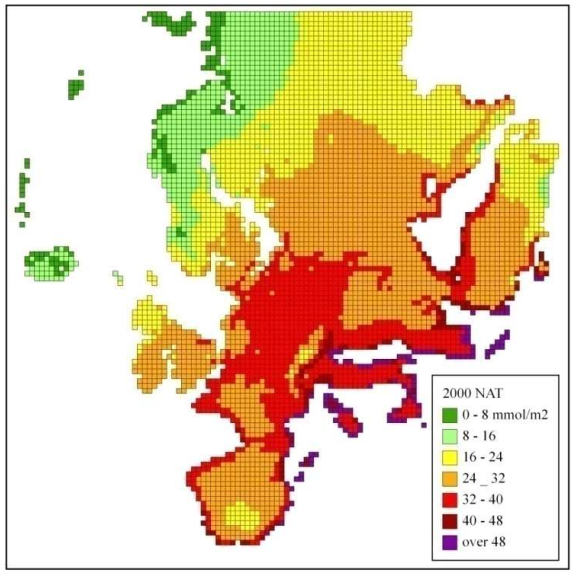
Change in biodiversity (E,F2,G3) HIGH 2020



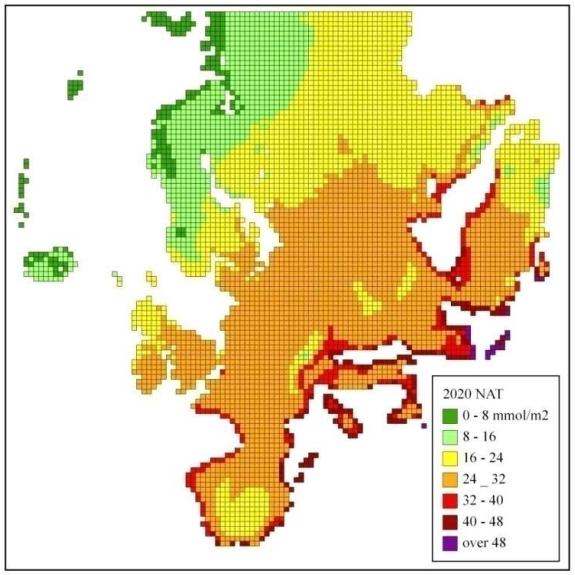
Ex-post Impact Analysis WGE/CCE

ICP Vegetation:
Ozone impacts (POD_6) decrease in time and with MFR

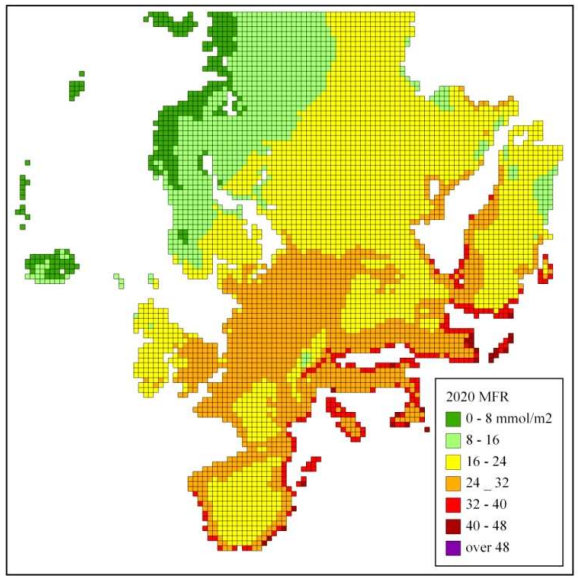
NAT2000



NAT2020



MFR2020



The magnitude of the impact is expected to decrease

The areas (intensely) impacted are reduced

The risk to food production continues to be of concern in the future, including northern Europe

Global wheat production: -15% (2000) .. -25% (2030)
~10% reduction of carbon sequestration

ICP Materials:
Effects on materials will decrease but not disappear by 2020

NAT2000 NAT2020 MFR2020

More severe effects are expected in urban areas

Key measures for the mid case

SO_2:

- FGD for power plants in non-EU
- Low S coal in domestic sector in new EU Member States

NO_x:

- SCR for power plants in non-EU
- NO_x controls in some industrial sectors (e.g., cement) (EU and non-EU)

PM2.5:

- Dust control for iron & steel industry in non-EU
- Agricultural waste burning (EU and non-EU)

BC → wood burning + diesel particle traps

NH_3:

- Measures for cattle, pig and poultry farms

Cattle = 50% NH_3 emissions!

- Substitution of urea fertilizer
- Agricultural waste burning (EU and non-EU)

VOC:

- Additional measures for sectors falling under the Solvents Directive
- Agricultural waste burning (EU and non-EU)

Will ELVs be sufficient?

- Current EU-regulation covers ~ 50% of the emissions of NH3, VOC, PM2.5 and BC; 75% of the NOx-emissions and ~90% of the SO2-emissions.
- Challenges: agricultural waste burning, domestic wood burning, off-road vehicles (>50% reduction potential of PM2.5, BC, VOC).
- ELVs and national emission ceilings are not automatically linked: no or less strict ELVs would imply larger national responsibilities in meeting the ceilings

Loose ends

- Check feasibility based on national data
- (European) Russia or “PEMA”
- Fuel sold / fuel used
- Real life vehicle emissions included; will Euro-6 deliver?
- Some sources not included: e.g. NOx from agricultural soil, VOC from crops → flexibility needed!
- PM2.5/BC emission sources probably lacking and emission factors uncertain
- Further sensitivity analysis?
- Long term objectives
- ….

40th meeting TFIAM

18-21 May Oslo

(Including ½ day NEBEI)

Focus on:

1. Feasibility emission ceilings based on national data
2. Preparation TFIAM/WGE report

Time schedule

TFIAM

2010

Feb: Baseline proposal

May: Analyses of targets options

Nov: Sensitivity analysis

2011

Jan/Feb: Scenario runs

May: Final runs

Oct: Report

WGSR

2010

Apr: Baseline accepted

Sept: Guidance on targets

Dec(EB): Guidance on targets

2011

April: Ambition level

Sept: Final Protocol

Dec(EB): Protocol adopted