



French analyses for the NEC revision

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Outline

- **Scenario development in GAINS-France and first analyses**
 - preparatory work: national projections, scenario analyses & development
 - modification of NEC BL by 2012 bilateral consultation hypotheses
 - modification of NEC BL by a French energy scenario
 - comparison of GAINS scenarios, also with French projections
- **Cost-effectiveness of “urea substitution” in the Commission Proposal scenario**
- **Health benefits in France from the implementation of the Commission Proposal in France and abroad**
 - CHIMERE – ARP-FR analyses based on GAINS-EU data
- **Conclusions**
 - results from analyses
 - work with GAINS-FR

Stepwise modification of the IIASA NEC BL scenario by French hypotheses

- **Preparatory work: national projections, scenario analyses & development**
- **Introduction of data modifications suggested by France during the 2012 bilateral consultations into GAINS-FR**
 - data modifications requested by France but not all translated into the NEC BL scenario
 - activities for historic years, activities other than energy/transport/agriculture
 - adaptation of emission factors and control strategy
 - data modifications not accepted in 2012 for consistency reasons (transport assumptions)
- **Replacement of PRIMES 2013 in GAINS-FR by French energy scenario**
 - French “with existing measures” energy projection
- **Comparisons of GAINS scenarios, also with national projections**
- **Data (activity, EFs, CS) provided by CITEPA, GAINS modifications made by INERIS, joint analyses**

Preparatory work: national projections, scenario analyses & development (1/3)

- **Emission projections available in France (French Ministry of Ecology)**
 - Tool developed by CITEPA
 - Detailed on SNAP level 3 and coherent with the latest historical inventory available
 - Updated every two/three years with a new energy scenario
- **For the bilateral consultations of 2012, an in depth analysis of the GAINS BL scenario carried out**
- **Focus on NO_x emissions, PM emissions and to a lesser extent on SO₂ and NH₃**
 - Changes suggested in some historical data and activities other than energy, transport & agriculture
 - Additions of activities suggested (waste incineration)
 - Changes suggested for control strategies in various sectors (PP, IN_BO, road transport, glass production, cement production, refineries...)

Preparatory work: national projections, scenario analyses & development (2/3)

- In combustion plants for PP sector and industry, control strategy defined to better take into account the size of plants and the different ELVs applied (IED, French regulation for plants between 2 to 50 MW)
- Control strategy in IN_BO detailed according to several sub-sectors (CHEM, PAP, OTHER, OTHER_L... IN_BO_CON)

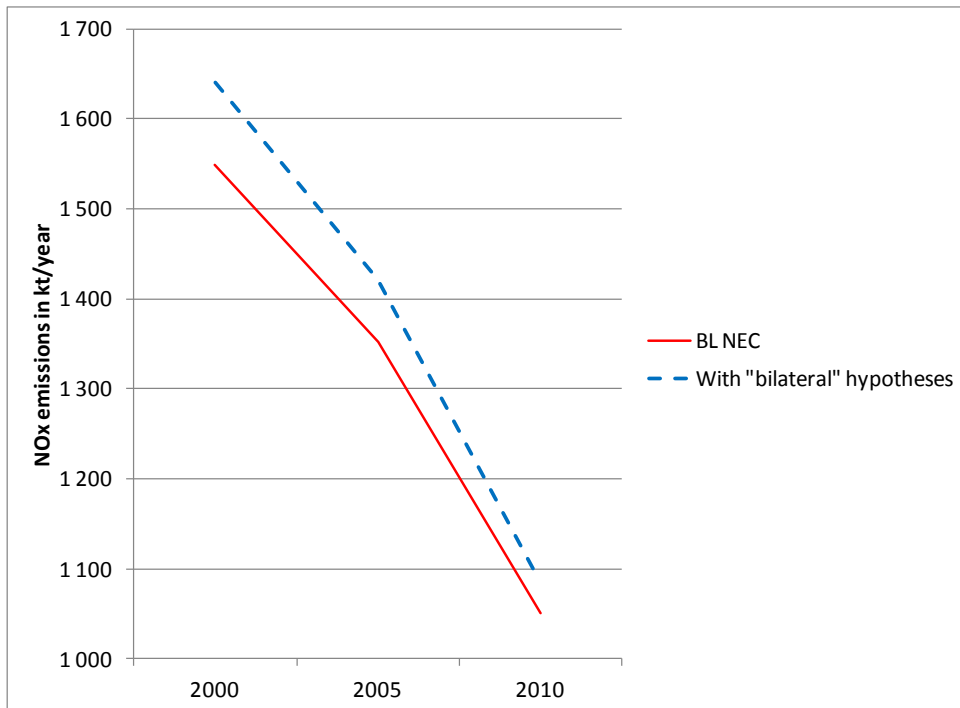
(Usefulness of the French tool detailed by range of size on plants to define an aggregated control strategy in GAINS (only one GAINS sector to represent all the sizes of combustion plants except for coal for which plants lower and higher than 50 MW are taken into account))

Preparatory work: national projections, scenario analyses & development (3/3)

- **Some changes suggested by France in 2012 not included in the new GAINS baseline of 2013**
 - e.g. road transport control strategy, IN_BO control strategy, waste incineration...
- **Good opportunity to test the impact of those changes in GAINS France**

Introduction of the 2012 bilateral hypotheses into the IIASA NEC BL (1/4)

- **Bilateral hypotheses increase NO_x emissions compared to NEC BL**
 - NO_x: +92 kt in 2000, +70 in 2005, + 35 kt in 2010



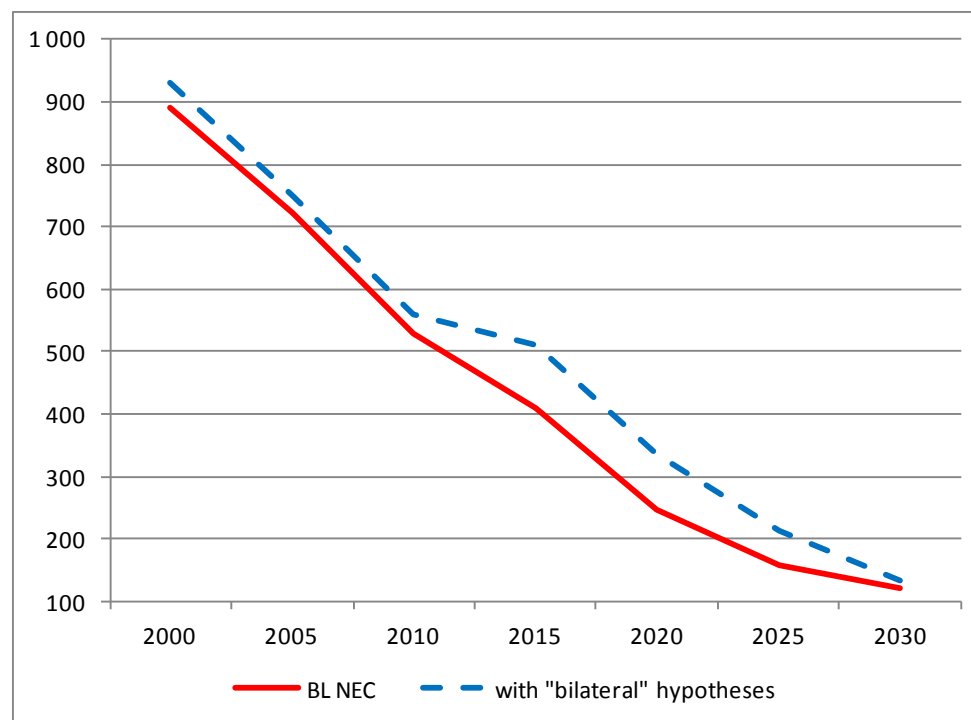
Major factors behind higher emissions

- Slow down of turnover of road transport fleet and introduction of Euro norms at dates specified in the Directives
- Accounting for municipal waste incinerators with energy recovery in PP sector
- Modification of control strategy for some activities

=> Optimisation for Commission Proposal based on underestimated 2005 emissions compared to bilateral scenarios

Introduction of the 2012 bilateral hypotheses into the IIASA NEC BL (2/4)

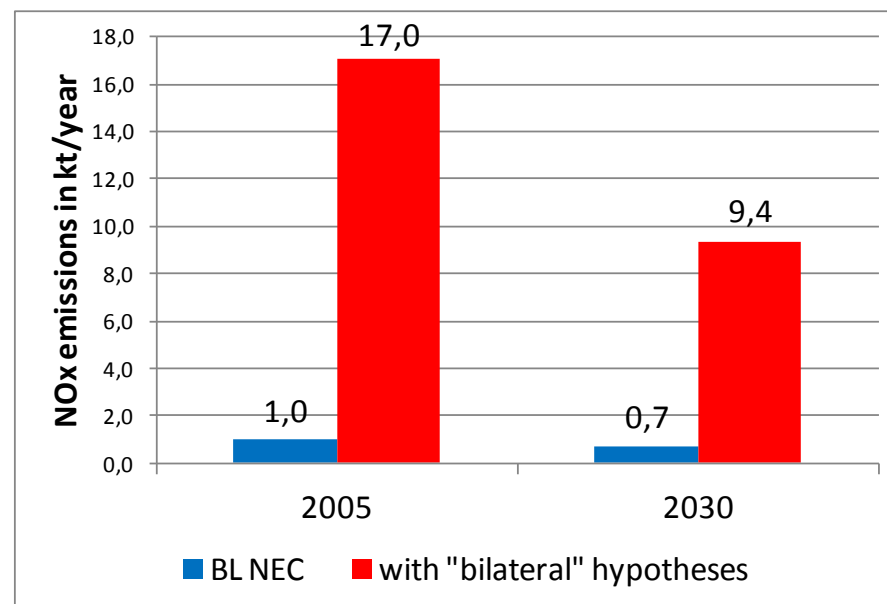
- **Contribution to higher emission levels of modification of turnover of road transport fleet and introduction of Euro norms at dates specified in the Directives**
 - significant impact on NOx emissions: +27 kt in 2005, +88 kt in 2020, +10 kt in 2030



- **No impact on optimisation but on emission levels in Commission Proposal scenario**

Introduction of the 2012 bilateral hypotheses into the IIASA NEC BL (3/4)

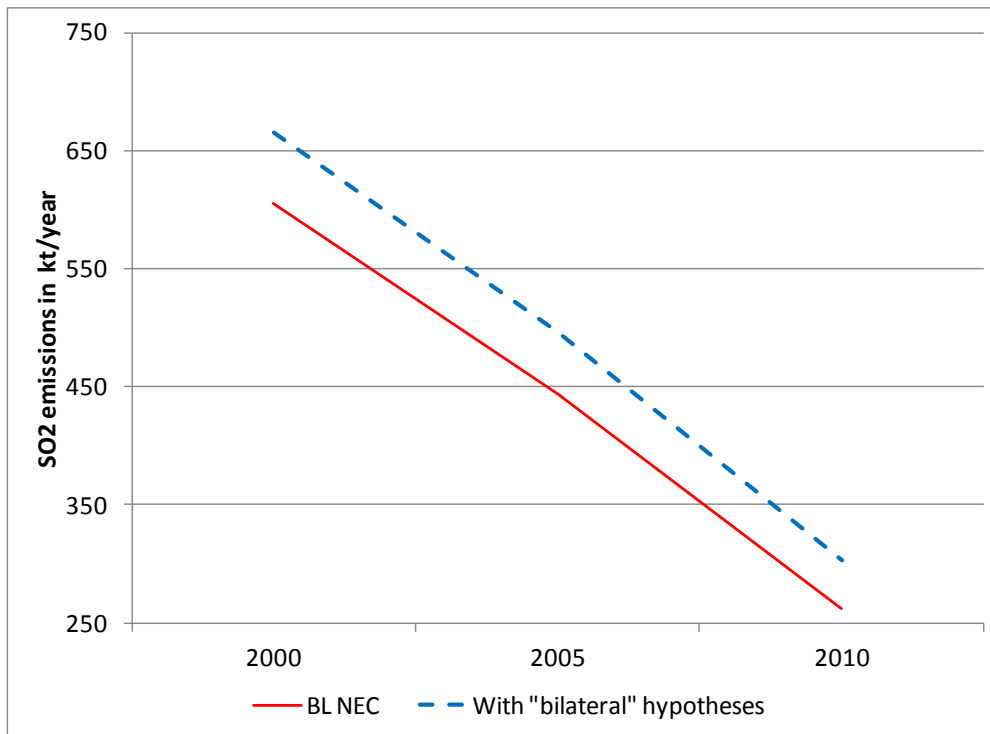
- Contribution to higher NO_x emission levels of introduction of activity from municipal waste incinerators with energy recovery (PP_EX_OTH, OS2)



- Activity not accounted for in NEC BL and Commission Proposal

Introduction of the 2012 bilateral hypotheses into the IIASA NEC BL (4/4)

- **Bilateral hypotheses increase SO₂ emissions compared to NEC BL**
 - SO₂: +61 in 2000, + 52 in 2005, +41 in 2010



Major factors behind higher emissions

- Accounting for municipal waste incinerators with energy recovery in PP sector
- Increase in activity of coal power plants > 50 MWth
- Change in control strategy for maritime transport medium vessels (< 1000 GRT) using diesel oil (more NOC, less stage 2)
- Increase in activity of glass production

Replacement of PRIMES 2013 by a French energy scenario and comparisons with French projections (1/2)

- **Impact on SO₂ emission reductions in 2030 relative to 2005**
 - **BL: -74%**
 - **Commission proposal : -78%**
 - **MTFR : 79%**

 - **BL with French energy scenario (GAINS France) : -64%**
 - **French projections (CITEPA tool): -69%**
- **Significantly lower percentages of emission reductions when the French energy scenario is used**
- **Remaining differences with the French Projections currently investigated**

Replacement of PRIMES 2013 by a French energy scenario and comparisons with French projections (2/2)

- **Impact on NOx emission reductions in 2030 relative to 2005**
 - **BL: -67%**
 - **Commission proposal : -70%**
 - **MTFR : 75,5%**

 - **BL with French energy scenario (GAINS France) : -66%**
 - **French projections (CITEPA tool): -69%**
- **Lower percentage of emission reductions when the French energy scenario is used**
- **Remaining differences with the French Projections currently investigated**

Urea substitution in the Commission Proposal scenario

- **Commission Proposal scenario implies NH₃ emission reduction of 162 kt relative to NEC BL emission level in 2030**
- **22% of this reduction come from the measure “urea substitution”**
 - substitution by ammonium nitrate fertilizer
- **What are the cost assumptions in GAINS for this measure?**
 - simply the price differential between the two fertilizer types as stated in the “Draft guidance document” (1)?
 - this might significantly underestimate costs in France
 - French regulation transposing the Seveso Directive was tightened after the AZF accident (2001)
 - ammonium nitrate classified as substance requiring specific storage conditions
- **Likely impact on cost-effectiveness of the measure “urea substitution” in the Commission Proposal**

(1) “Draft guidance document for preventing and abating ammonia emissions from agricultural sources”, WGSR, September 2012

Health benefits and costs to France from the implementation of the Commission Proposal in France and abroad

- **Analysis with the INERIS modelling chain**

- emission data from GAINS-Europe (as of 20 January 2014)
- air quality modelling with CHIMERE
- health impact analysis (HIA) with ARP-FR
- cost-benefit analysis (CBA) comparing GAINS-EU costs to ARP-FR benefits

- **Scenarios**

- A: BL emission levels EU28, 2005
- B: BL emission levels EU28, 2030
- C: BL emission levels EU (except France), NEC Proposal emission levels France, 2030
- D: NEC Proposal emission levels EU28, 2030

- **Results for France**

- health impacts
- benefit-cost analysis

ARP = Alpha-RiskPoll

Health impacts and benefits in France

- Without surprise, health impacts decrease with each successive scenario

- impacts A > impacts B > impacts C > impacts D
- impact reduction (= benefit) most important when moving from A to B
- significant benefits also from Commission proposal implementation (move from B to C & D)

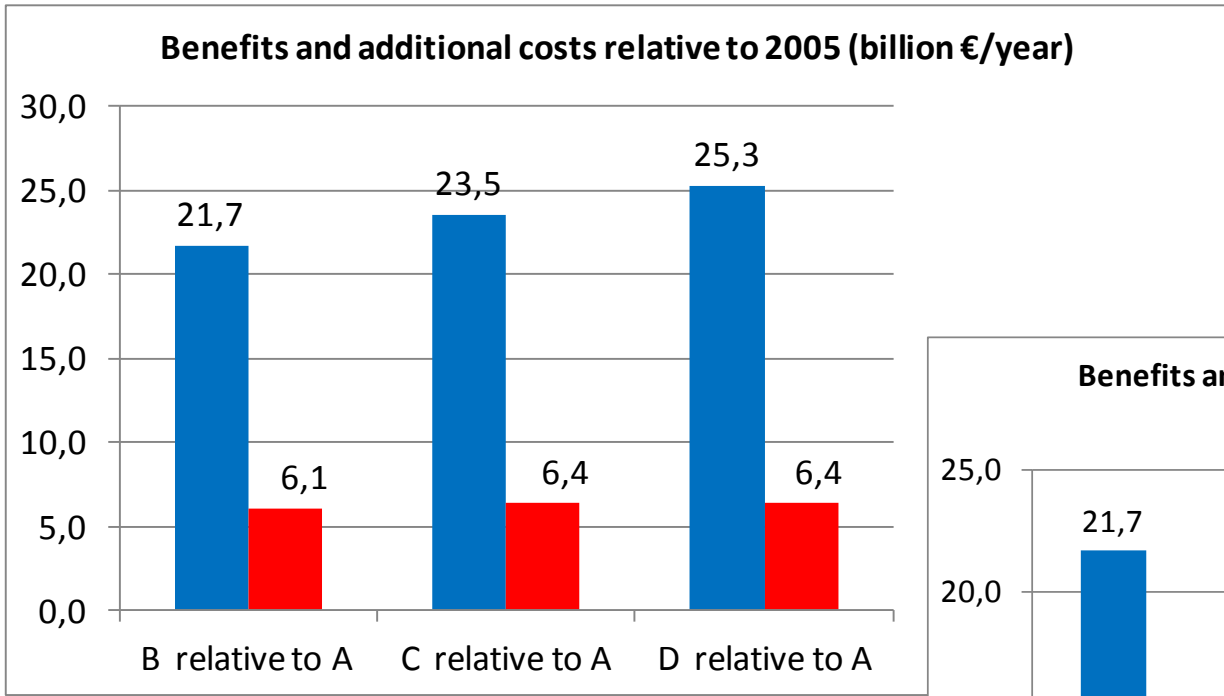
A	BL 2005, FR & EU
B	BL 2030, FR & EU
C	BL 2030 EU, NECProp FR
D	NECProp FR & EU

- “Driving factors” behind increase in health benefits when moving from BL to NEC Proposal in 2030

- reduction of ozone related impacts in 2030 dominated by emission reductions outside France (impact reduction C-D > impact reduction B-C)
- reduction of PM_{2.5} related impacts in 2030 dominated by emission reductions in France (impact reduction C-D < impact reduction B-C)

Work in progress – preliminary results

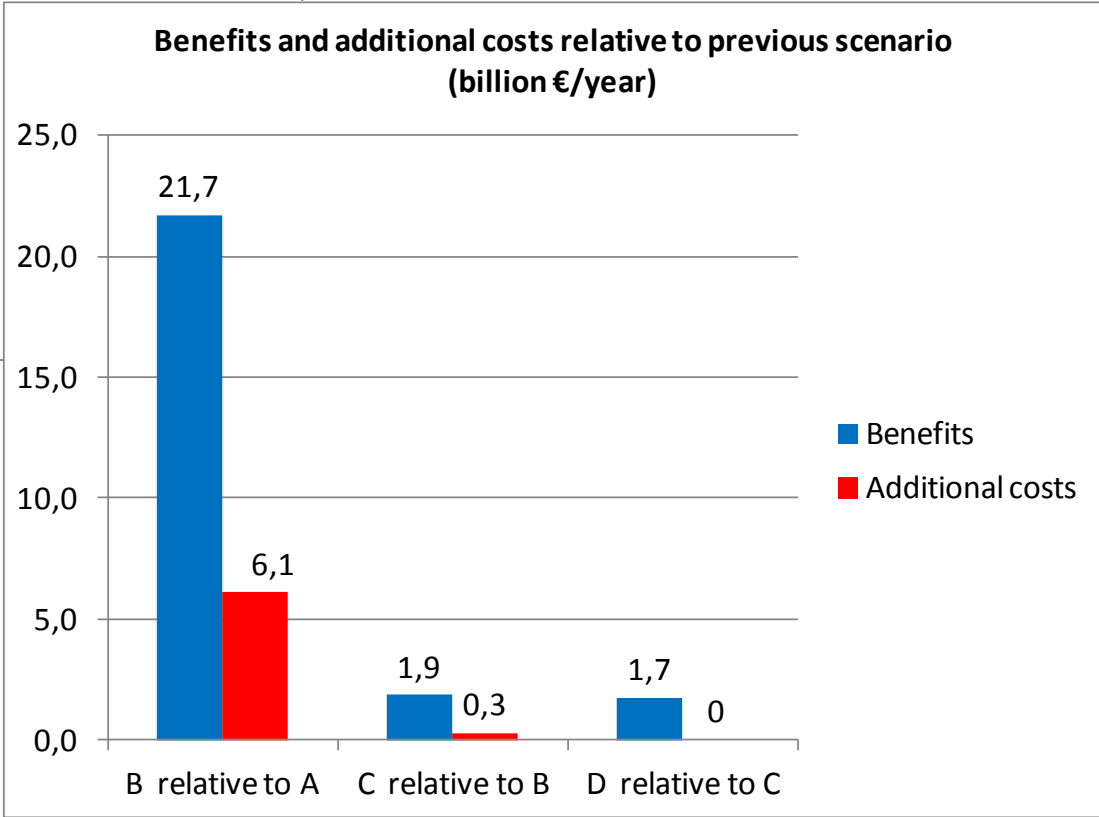
Health benefits & additional costs in France



- Conservative benefit estimate
- Health benefits exceed additional costs to France
- Benefits from international policy agreements

A	BL 2005, FR & EU
B	BL 2030, FR & EU
C	BL 2030 EU, NECProp FR
D	NECProp FR & EU

Work in progress – preliminary results



Conclusions – results from analyses

- **Optimisation for NEC Proposal based on underestimated historic emission levels for France compared to national inventories**
 - NO_x, SO₂ and VOCs
- **Some activities not yet accounted for in the NEC scenarios**
 - e.g. waste incineration
- **Simplified representation of size of combustion plants in GAINS leads to uncertainties in emissions estimated**
- **Potential methodological issue for the measure “urea substitution”**
 - real world cost-effectiveness?
- **Benefits from international cooperation in air pollution policy making confirmed by HIA/CBA analysis**

Conclusions – work with GAINS-FR

- **National scenario developments in GAINS-FR useful for**
 - BL & and NEC proposal analysis
 - sensitivity analysis
- **Stepwise and iterative approach to data modification in GAINS-FR**
 - reflects data updates, improvements in inventories ...
 - increases robustness of GAINS-FR scenarios over time
 - improves our understanding of how results change in GAINS with data modification
 - adjustments of EFs & CS in GAINS require in-depth knowledge of the activities and full comprehension of effects on GAINS-results
- **Work in progress**
 - no complete national projection translated into GAINS-FR yet
 - so far focus on sub-set of pollutants & on energy projection

Thank you for your attention!