



## CONSULTATION ON EC4MACS MODELLING METHODOLOGY

Please fill in one questionnaire for each model, and provide your comments in the respective boxes.

Please return the questionnaire to the EC4MACS coordinator Hans Benzinger ([benzing@iiasa.ac.at](mailto:benzing@iiasa.ac.at)) before June 15, 2009.

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Model	<b>GAINS</b>
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### **1 Assessment of model design**

**To what extent does the structure of each model provide a scientifically credible representation of the reality?**

*The model has been continuously expanded, pushing back the boundaries to take account of more factors, and now linking greenhouse gases and air quality pollutants in the GAINS model. This has improved the model capabilities considerably. The IIASA team have made valiant efforts to check the data used for each country, and their assumptions about abatement measures and costs.*

**What are the limitations of the model structure and the implied system boundaries and to what extent may these restrict the validity of the conclusions and policy**

*A very difficult aspect of modelling is treating behavioural change; although GAINS can be run in scenario mode to examine "what if" situations. The same applies to other extraneous factors. There are also some inevitable simplifications, for example related to questions of scale and sub-national considerations.*



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## **2 Representation of reality in the modules**

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To what extent does the structure of each model provide a scientifically credible representation of reality?

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*Please fill in text here ...*

*Most of the modules, for example the atmospheric modelling, are subject to review and inter-comparison with other models; the critical load approach has been developed with international participation of experts, and now extended to dynamic modelling for acidification. However, although IIASA have allowed for important improvements such as ecosystem dependent deposition, unfortunately these have been rejected in modelling for the EC because of the difficulties implied in reaching the inflexible targets set in the TSAP.*

*In addition there are problems of scale, and national assessment with more detailed spatial resolution can give very different estimates of ecosystem exceedance. Ammonia in particular, with a large component of local deposition, when treated as a transboundary pollutant results in lack of emphasis on local measures to improve ecosystem protection.*

*Similarly IIASA has made adaptations of the model for enhancement of atmospheric concentrations in urban areas, but these are very simplified compared with modelling undertaken with respect to urban air quality at city or national level*

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### **3 Treatment of uncertainties**

Have the most policy-relevant uncertainties (related to variability of the system inexactness of input data and lack of knowledge) been adequately addressed?

*Please fill in text here ...*

*The IIASA team have undertaken substantial scenario analysis to investigate the effect of various assumptions and uncertainties. Unfortunately it is still difficult to assess uncertainties in some of the underlying data from other models such as energy projections from PRIMES, and agricultural projections from CAPRI, though this is really a task for other modelling teams in EC4MACS rather than IIASA. Alternative national data are difficult to assemble on a consistent basis.*

*Whereas a lot of work has been done to check estimation of air quality pollutant emissions, some effort is also desirable in checking emissions of greenhouse gas emissions, and consistency with national estimates.*

Is there an alternative formulation conceivable that could provide better policy-relevant insights into uncertainties?

*Please fill in text here ...*

*Also it would be helpful to have more information broken down at a national level on recent work by IIASA on cost curves for greenhouse gas reductions for Annex 1 countries, and on how measures to improve efficiency or switch fuels are represented; again how is this consistent with PRIMES etc.*

*There are other considerations in deciding abatement policies as well as environmental benefit and cost which become important at a national level- for example equitable distribution of effort across e.g. the farming community, and interaction with other policies/problems. Some ancillary tools such as MCDA can be helpful in this respect.*

Do available model results represent uncertainties accurately? Are there other ways conceivable for attaining more robust conclusions?



*Please fill in text here ...*

*Although there has been extensive scenario analysis, there is still potential for more e.g. to look at more than a central energy scenario from PRIMES; and for different agricultural projections.*

*An area where there are very large uncertainties still is in emission inventories for PM; where there are still big differences in even the sources addressed in national inventories as compared with GAINS.*

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Is there a risk that the model gives policy advice that systematically underestimates or overestimates the need for policy measures to protect the environment? What are the major reasons for a bias, if any?

*Please fill in text here ...*

*There are always additional options that are not included in GAINS, e.g. behavioural change; in general additional possibilities could enable emission reductions at lower cost.*

*There are also "wild card" situations that can radically alter expectations, e.g credit crisis*

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## **4 Communication with stakeholders, policy-makers and public**

How do the modelling teams verify the quality of input data that are used in model? Is the quality of the input data obtained from national sources and from other models sufficiently guaranteed? In what way do teams give feedback to providers of input to maximise the robustness of model results?

*Please fill in text here ...*

*IIASA should be congratulated on their work here. Making the model and associated data available on the web site enables the checking of data by national experts; and IIASA allocate time to bilateral consultations and are prepared to revise data accordingly. One difficulty is that national assessments are continually being revised themselves, and are not a fixed entity.*

In what way are users and stakeholders involved in the modelling process, and is this sufficient to ensure transparency and acceptability of the results for policy advice?

*Please fill in text here ...*

*As above the GAINS website is a very good source of information. The opportunity provided by the UN ECE, in particular TFIAM, to discuss and question the work produced by IIASA with GAINS, is very important. IIASA's help and interaction with the network of national integrated assessment modelling activities, NIAM, is also very welcome.*

Are the presentations of the results clear? If not, can the communication and dissemination of the results be improved?

*Please fill in text here ...*

*Generally good, following an established format.*

*The greatest lack of transparency is about the data fed in from other models such as PRIMES.*

Is the model structure transparent? (e.g., are the assumptions clearly exposed and motivated, and is their influence on the model-results explained?)

*Please fill in text here ...*

*Generally yes.*

*One slight niggle is that the some of the reports e.g. on abatement measures are quite old, and it can be difficult to trace updates. If such updates could be documented in some way with a search by key words on the GAINS web site this would be helpful.*





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## **5 Other comments**

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*Please fill in text here ...*

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Thank you for providing this feedback to the EC4MACS team!

Please return this questionnaire to the EC4MACS coordinator Hans Benzinger ([benzing@iiasa.ac.at](mailto:benzing@iiasa.ac.at)) before June 15, 2009.

You will receive information on the EC4MACS review workshop that is planned for October 2009.