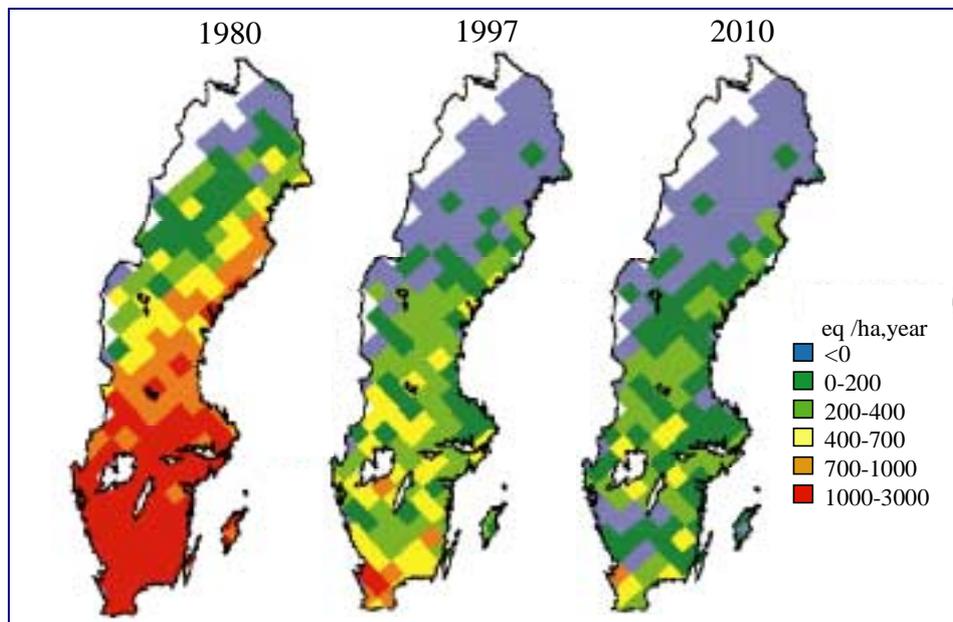




**International and National Abatement Strategies for
Transboundary Air Pollution**

*International and National
Abatement Strategies for Transboundary
Air Pollution
Phase II: 2003-2006*

Programme plan for 2005



Exceedance of critical loads for acidification in Sweden 1980- 2010.

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1 Introduction

The ASTA programme started in 1999 with the aim to support the revisions of the international agreements under the Convention on Long- Range Transboundary Air Pollution (CLRTAP) and the European Union. The European Commission will present a thematic strategy on air pollution in mid 2005 and the negotiations on revisions of the Gothenburg Protocol are expected to start in 2006.

ASTA and ASTA scientists are taking an active part in the process through scientific research and through facilitating communication between science and policy. This role includes basic research in order to develop new knowledge within important areas, e.g. particulates and biodiversity. It also includes more directed research and model development to support synthesis and integrated assessments, forming the basis for the international agreements and the EU legislation. New concepts for critical loads for acidification and critical levels for ozone effects on vegetation have been developed. ASTA is also making use of its direct channels into the process, by the organisation of international workshops on subjects crucial for the abatement strategies.

The programme is now in its second phase, which runs between 2003 and 2006. ASTA is today a key actor as a supplier of scientific knowledge for the development of the European air pollution strategies, in particular in areas of origin and composition of atmospheric aerosols, acidification of soils and water and its recovery, nitrogen effects on ecosystems and biodiversity, ozone effects to forests and crops.

ASTA's role does not only include research directly under ASTA but also a role of ensuring that other relevant scientific findings are linked into the policy development process. This means that ASTA has been particularly active in organising workshops and expert meetings, educating and transferring results and tools to CLRTAP and EC bodies (in particular CAFE, Clean Air For Europe) and relevant organisations in the different countries under the Convention. This role will continue and may even be intensified during the coming two years.

In addition, ASTA will support national Swedish actors on issues related to transboundary air pollution. This is done within a linked project, primarily financed by the Swedish National Board of Forestry and The Swedish Energy Agency.

2 Overall objectives and benefits to stakeholders

The overall goals for Phase II of the ASTA programme are:

1. To support the LRTAP Convention, especially the revision of the Gothenburg protocol, with scientific results and analysis tools, evaluations and assessments.
2. To support the CAFE programme of the European Commission, in particular the revision of the National Emissions Ceilings directive (NEC) and the air quality directives/strategies with scientific results, analysis tools, evaluations and assessments.
3. To support national Swedish negotiators and policy makers, active in the CLRTAP and CAFE processes, with appropriate scientific information, tools and assessments for the national strategy.
4. To provide relevant information for the revision of the national Swedish environmental quality objectives, of which is the first is expected to take place in 2003/2004 and possibly a second in approximately 2007.
5. To provide scientific information concerning transboundary air pollution, CLRTAP and CAFE to Swedish societal sectors and organisations (forestry, energy etc), which support the ASTA programme, as well as to make it available to the Swedish community and its citizens in general.

6. To include the interactions between long-range transport of air pollutants and forestry (whole-tree harvesting, wood-ash recycling, compensation fertilisation) in the scientific basis used in national assessments of land-use and forestry alternatives.
7. To improve the general scientific understanding of transboundary air pollution and its effects, and to communicate this to stakeholders and others interested.

2.1 Potential benefits to stakeholders

As already mentioned, the most important activities for ASTA are to support the LRTAP Convention and the CAFE programme of the EU. ASTA will closely follow all the work under these bodies and contribute where appropriate. ASTA will continue to take initiatives to workshops, assessments, improvements of manuals etc. The ASTA board will continuously take decisions on such activities.

The ASTA programme has today activities and competence making it possible to follow and interact with most of the bodies under CLRTAP and EU CAFE. The relations with CLRTAP's different bodies are illustrated in Figure 1. In Table 1, the expected time schedule of CLRTAP and CAFE is put into perspective of the suggested activities of the ASTA programme.

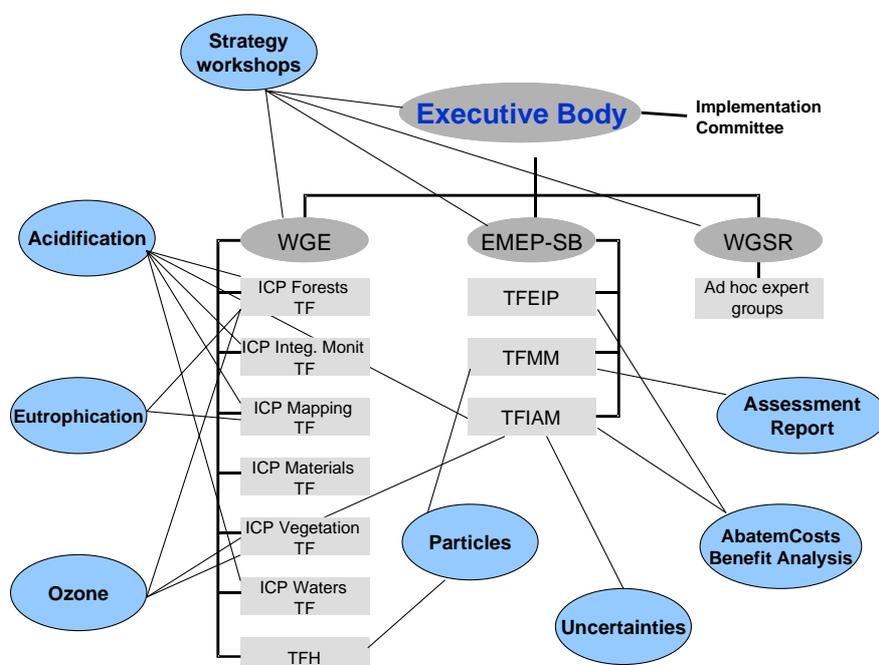


Figure 1 The relations with CLRTAP's different bodies and ASTA research. ASTA activities are marked in blue.

Table 1 Activities within LRTAP and CAFE, and the related activities within the ASTA programme during the period 2004-2007.

Year	Major ASTA activities	LRTAP	EU/CAFE
2004	<p>Validation of maps</p> <p>Assessment report. Together with EMEP.</p> <p>ASTA conference (workshop) on the concepts and support of CAFE and CLRTAP strategies (Göteborg Oct 04)</p> <p>Joint Expert Group on dynamical modelling, Sitges November 2004.</p> <p>Cost for environmental effects.</p> <p>Preparation of Special Issue for Ambio</p>	<p>Updated maps</p> <p>Report on long term changes in atmospheric composition and deposition (collaboration with ASTA)</p> <p>Collaboration with CLRTAP bodies in particular with TFIAM and WGSR.</p> <p>Review of results of call for dynamical modelling results (Target Loads)</p> <p>Improve scientific background</p>	<p>Collaboration with CAFE. Broad communication and discussion on possible strategies.</p> <p>Contribution to CBA analyses under CAFE</p> <p>Improve scientific background</p>
2005	<p>ASTA conference: "Legitimacy- scientific and social – in air pollution abatement in Europe"</p> <p>ASTA workshop on effects of nitrogen on vegetation in ecosystems</p> <p>ASTA workshop on nitrogen dynamics and acidifying impacts of nitrogen deposition</p> <p>Workshop on non technical measures</p> <p>Further development on uncertainties</p>	<p>Improvement of acidification assessment</p> <p>Information on costs and benefits</p> <p>TFIAM workshop on RAINS methodology</p>	<p>Thematic strategy of CAFE</p> <p>Improved maps on CL for eutrophication and acidification</p> <p>Info on costs and benefits</p>
2006	<p>Book on effect quantification, critical loads and levels</p> <p>Final reports of the ASTA programme</p>	<p>Negotiations</p> <p>Revision of Gothenburg protocol</p>	<p>Processing through the Council and the Parliament</p>
2007			<p>Final decision by Council and Parliament</p>

3 Significant overall developments during 2004

Short progress reports of the ASTA activities during 2004 are given in connection with the description of each activity later in the Programme Plan. Here we only want to mention a few results, of particular importance for the international air pollution strategies:

- The organisation of the workshop on Review and Assessment of European Air Pollution Policies in collaboration with the two key policy actors; The European Commission through CAFE and the Convention on Long-range Transboundary Air Pollution.

- The development of a dynamic model on biodiversity changes due to impact of nitrogen deposition and climate factors.
- The publication of the EMEP 25 year Assessment report, in which ASTA took an editorial responsibility.
- The preparation of approx. 10 papers for a Special Issue of Ambio to be published in 2005.
- CBA analyses of ozone effects on crops and forests.
- The release of a Special Issue of Atmospheric Environment, based on the workshop on ozone effects and the preparation of new concepts for critical levels for ozone.
- The organisation of a national workshop on effects of nitrogen deposition on ecosystems.
- The co-organisation of an expert meeting on dynamic modelling in Sitges, Spain, October 2004.
- Participation in the review of the CAFE integrated assessment model.
- During 2004 has ASTA produced two PhDs: Liisa Martinson LTH and Peter Tunved ITM. (Another PhD during 2005 in relation to ASTA is Johan Uddling, GU)

4 Directions for 2005

The interaction between science and policy will increase during the remaining part of ASTA and ASTA will act as an important communication partner throughout the preparation and negotiation process. The coming year will therefore have a few activities of particular importance for the scientific support to policy. These activities include:

- The organisation of a workshop on science-policy relations.
- Investigations of linkages between regional air pollution effects and climate change.
- Investigation of the cost-efficiency of including non-technical measures in air pollution control.
- Evaluation of a dynamic model on biodiversity effects due to S and N deposition.
- Taking active part in the Acid Rain Conference in Prague in June 2005.
- Plan and prepare background material for a workshop on ecosystem effects of (low dose) nitrogen deposition.
- Develop scientific and science-policy issues of importance for the air pollution policies after 2006.
- Lead the development of critical limits for ozone impacts on forest trees.
- Participation in assessment of results of dynamic model results in Europe.
- Assessment of current knowledge on the role of nitrogen in acidification of soils and surface waters and possibilities for improvement of dynamic models.
- Participation in the further development of the EMEP model.

4.1 Organisation of the work

ASTA Phase II is organised in four interdisciplinary, principal Themes:

- Theme 1: Source-effect relationships, indicators and target setting
- Theme 2: Realisation, costs and benefits
- Theme 3: Uncertainties, transparency and communication
- Theme 4: Support to national strategies

A schematic sketch of the ASTA Phase II organisation is presented in Figure 2.

The research in Theme 4, support to national strategies, is financed by the Swedish National Board of Forestry and The Swedish Energy Agency. The ASTA board is the head responsible for this research but a national stakeholder steering group has the board role in the continued work. The project plans and work within Theme 4 is carried out in co-operation with the national stakeholder steering group and the detailed plans for 2005 for the national programme is not included in this document. In summary, the research is focussed on national assessments of the impacts of acidification and eutrophication for different scenarios of forestry, deposition, and related issues. A basic tool in this work is the national database of soil properties and land-use developed within the ASTA programme. The database is used for upscaling of e.g. leaching and nitrogen, base cations and carbon. The national programme also includes activities on assessment of ozone impacts on forest growth and particle emissions from bioenergy production.

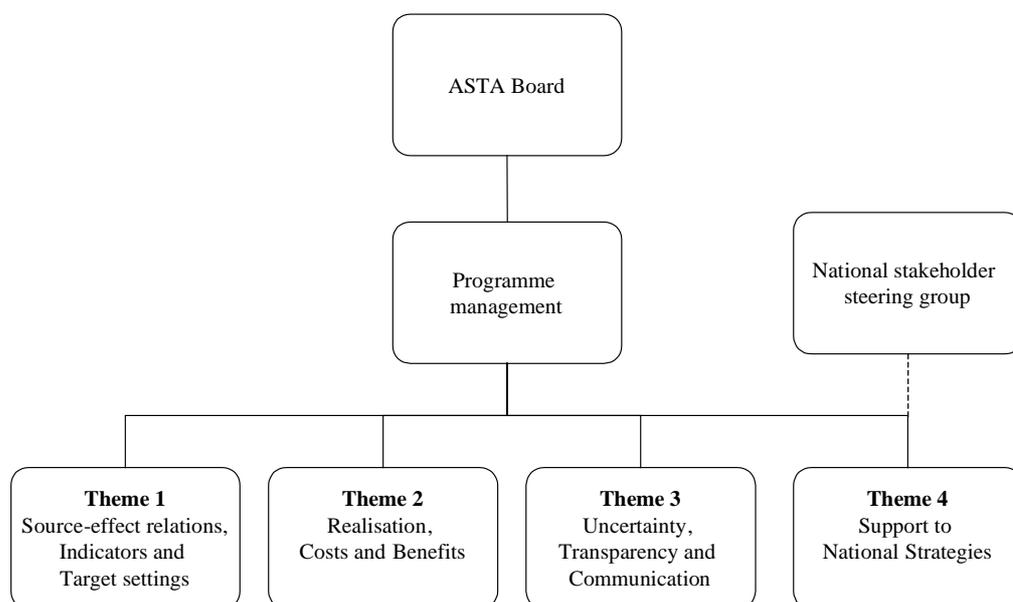


Figure 2 The organisation of ASTA Phase II

4.2 Organisation

ASTA has benefited from a very active and highly qualified board, which to a large part has remained intact over the first phase. This board will largely remain during Phase II. The members of the board are presented in Table 2.

Table 2 ASTA board members.

Function	Name
Chairman of the Board	Lars Lindau
Board Member	Gunnar Hovsenius
Board Member	Anton Eliassen
Board Member	Anna Lundborg (associated)
Board Member	Olof Olsson (associated)

Table 3 Management and secretariat.

Function	Name
Programme Director	Peringe Grennfelt
Deputy Programme Director	John Munthe
Co-ordinator Theme 1	Håkan Pleijel
Co-ordinator Theme 2	John Munthe
Co-ordinator Theme 3	Peringe Grennfelt
Co-ordinator Theme 4	Olle Westling
Steering Group Member	Göran Sundqvist
Steering Group Member	Harald Sverdrup
Steering Group Member	Hans Christen Hansson
Steering Group Member	Annika Nordin/Lars Ericson
Programme secretary	Jenny Arnell

5 National and international collaboration

5.1 Scientific collaboration

The scientific groups within ASTA are already well established in different European scientific networks, some of them with EU funding. ASTA will continue to make use of these networks, in particular for scientific discussions and for the formation of consensus on crucial environmental issues.

ASTA will intensify its international scientific collaboration with CLRTAP Centres and ongoing international projects. This collaboration includes in particular a close collaboration with the Centre for Integrated Assessment Modelling at IIASA, the Co-ordinating Centres for Effects on implementation of the new concepts on critical loads and levels and MSC-W on particulates. ASTA scientists also participate in several international projects directly aimed at supporting the policy development. One such project is the NEPAP network with the aim to support the CAFE programme with scientific expertise.

On the national, Swedish scale, the strong links between ASTA and other research activities will be continued. Collaboration with scientists active in some of the other MISTRA programmes, some completed, such as MARE, SUFOR, SWECLIM, LUSTRA and RESE, is developed and will be further developed e.g. through an initiative to co-ordinate MISTRA-funded research activities on nitrogen. The well established collaboration with scientist active within the SUFOR programme will continue and result in model tools that in a more appropriate way may be able to support decisions on forest production and environmental policy.

The collaboration with the Swedish research programs, BHM and SNAP, will further increase the value of the research activities on particles.

6 Sub-programmes

The four proposed sub-programmes were outlined in the overall programme plan for Phase II (found on <http://asta.ivl.se>).

7 Budget

7.1 Budget for 2005

The budget for 2005, including reserve, and costs for co-ordination and administration is estimated to 6 760 kSEK financed by MISTRA.

Table 4 Proposed budget for 2005 (Co-ordination, administration and reserve are not included)

	Total	SLU/UU	LU Ke	IVL	GU S	GU M	ITM	LU Kä
Sum per institute	5860	510	500	2930	530	470	470	450
Theme 1								
<i>1.1 Biodiversity</i>								
1.1.1 Experimental studies and evaluation of vegetation recovery after nitrogen load reduction	140	140						
1.1.2 Testing and application of model for indicator species in Boreal forests	70	70						
<i>1.2 Acidification and recovery</i>								
1.2.1 Support to JEG	100		50	50				
<i>1.3 Ozone Level II</i>								
1.3.1 Contribution to assessment of ozone impact and critical levels for forests on European scale	200			100		100		
<i>1.4 Particles</i>								
1.4.1 Cloud - particle interactions	870						420	450
<i>1.5 Development of dynamical model for the assessment of combined ecosystem effects</i>								
1.5.1 Dynamic N-modelling, validation and scenarios	400		400					
Theme 2								
<i>2.2 Valuation</i>								
2.2.3 CBA Ozone and Acidification	900			800		100		
<i>2.3 Scenarios and control measures</i>								
2.3.2 Assessment of scenarios used for non-technical measures	550			550				
Theme 3								
<i>3.1 Social science</i>								
3.1.1 Scientific uncertainty and political negotiations	200				150	50		
<i>3.2 Uncertainties</i>								
3.2.1. Uncertainties in nitrogen effects on biodiversity	100	100						
3.2.2 Uncertainties in ozone effects in relation to climate change	50					50		
3.2.3 Uncertainties -in the fate of and dynamics of nitrogen	190			190				
<i>3.3 Communication</i>								
3.3.1 Dynamic modelling outputs - European assessment	350			350				
3.3.2 Workshop on nitrogen effects on biodiversity	200	150	50					
3.3.3 Workshop "Democratised science-based abatement strategies" + workshop report	430			100	330			
3.3.4 Annual reports (AMBIO) and ASTA website	400			400				
3.3.5 ASTA Book	370	50		50	50	170	50	
3.3.6 Preparation for nitrogen dynamics workshop (2006)	40			40				
<i>3.4 Global strategies and future issues</i>	300			300				

8 Compilation of Themes and projects under ASTA – Activities during 2005

Theme 1. Source- effect relationships, indicators and target setting

Co-ordinator: Håkan Pleijel

Project 1.1: Models for assessing biodiversity changes in terrestrial ecosystems
Project leader: Annika Nordin and Lars Ericson
General Objective: To continue to develop and apply quantitative models describing the impacts of nitrogen deposition on vegetation changes in forest ecosystems.
Status: Currently used European models are not relevant to conditions in Sweden and the Nordic countries. Basic work on the development of new empirical concepts to describe and predict vegetation changes as a function of nitrogen deposition needs to be continued.
Stakeholder: WGE and CAFE
Acceptance: A large effort needs to be made on gaining acceptance of any new concepts for biodiversity predictions in Europe. Scientific evaluation and workshop.
Organisation: Team of Annika Nordin and Lars Ericson
Co-operation: Co-operation with project 1.5
Budget 2005: 210 kSEK
Activities 2005: 1.1 Experimental studies and evaluation of vegetation recovery after nitrogen load reduction 1.2 Testing and application of model for indicator species in Boreal forests Collect additional data from the earlier field experiments and present results from the research that shows the changes in the Boreal ecosystems. The results will be published in international scientific papers and will be communicated with CAFÉ and CLRTAP by participation at the ICP Vegetation meeting in Spain in February 2005 and the European workshop in the autumn.

Project 1.2: Dynamic models for recovery from acidification
Project leader: Filip Moldan
General Objective: To develop, apply and keep dynamical models up to date for acidification/recovery of forest soils and surface waters on the European scale
Status: During 2005, results of dynamic models from LRTAP countries will be reported to CCE.
Stakeholder: CLRTAP-WGE, CAFE and National authorities.
Acceptance: Dynamical models for acidification/recovery are well established in the CLRTAP community.
Organisation: Team of Mattias Alveteg, Filip Moldan, Veronika Kronnäs, Harald Sverdrup, John Munthe
Co-operation: JEG, ICP Forest, ICP Freshwaters, National Agencies, NIVA, CEH, IIASA, Univ. Virginia
Main deliverable: Model tools and concepts and their application for assessment of recovery times of soils and surface waters in selected parts of Europe. Assessment of results of call for dynamic modeling data.
Budget 2005: 100 kSEK (50 LTH and 50 IVL)
Activities 2005: 1.1.1 Support to JEG (Joint Expert Group) The development is essentially completed and only support and participation in the Joint Expert Group on Dynamic modelling remains. This group will likely meet in November 2005 to evaluate the results of the call for dynamic modelling data and links to RAINS modelling. The JEG will assess the outcome both in terms of applicability in the continued policy process (e.g. RAINS modelling) and basic model performance (uncertainties, necessary improvements in model and/or data availability).

Project 1.3 Ozone
Project leader: Håkan Pleijel and Per Erik Karlsson
General Objective: To finalise the development of flux-response relationships for crops and forest trees and the derivation of critical levels from these. To actively support the implementation of the new critical levels for ozone in the negotiations on a European level.
Status: The work on crops is essentially completed and the work in 2005 will focus on forests. ASTA will take leading role in the further development of flux-based methods for ozone damage on trees.
Stakeholder: WGE CCE, ICP Vegetation, ICP Forests
Acceptance: The flux-based approach is accepted for some crops but will need further refinement for trees.
Organisation: IVL and GU
Co-operation: Botan, Asa, Karlstad, Finland, and certain other research groups in several European countries, which contribute data to the European scale analyses performed within ASTA for crops and forest trees
Budget 2005: 200 kSEK (100 GU, 100 IVL)
Activities 2005: 1.3.1 Contribution to assessment of ozone impact and critical levels for forests on European scale The work will consist of preparatory workshops in York and in Sweden and participation in the main official workshop in November in Obergurgl. The aim is to change the flux-response relation of ozone effects on forests from temporary to permanent. For crops the dose-response in relation to quality will be completed and published.

Project 1.4 Source-receptor relationships for long range transported particles
Project leader: Hans-Christen Hansson
General Objective: To establish the primary reference on physical and chemical particle characteristics, its dependence of origin and atmospheric processes in background air over N Europe to support model development and health risk assessment.
Status: Regional monitoring of particles is today limited to some integrated parameters (e.g. PM10). Present model do not compare well with measured PM10. Scientific understanding and model development needs a more detailed description as particle size and chemical composition and its variation in time and space. ASTA has facilitated and supported such measurements performed within a Nordic network of background sites. Collaboration between the modelling and monitoring communities has resulted in a validated description of the natural contribution of particles and organic compounds from the boreal forest and its interaction with anthropogenic particles in the atmosphere. Basically understanding and model description has been obtained for natural emissions giving the natural aerosol over the Nordic region. This is used to compare with the measured polluted aerosol giving a possibility to calculate the effect on the atmosphere, the climate and human health. The model is found to also well describe the ageing of the anthropogenic aerosol.
Stakeholder: EU CAFE working group on particles. EMEP: TFMM, MSC-W, CCC and Swedish EPA.
Acceptance: Health effects caused by particles are a main topic for the EU CAFE programme. There is as well a need for a better description of the atmospheric processes governing the transport and deposition of acidifying and eutrophying compounds. There is a large political interest for a co-ordinated European policy.
Organisation: ITM and Lund University
Co-operation: Norwegian Meteorological Institute (MSC-W), Norwegian Institute for Air Research (NILU), University of Helsinki, Gothenburg University and Finnish Meteorological Institute.
Budget 2005: 870 kkr (ITM 420, LuKF 450)
<p>Activities 2005:</p> <p>1.4.1 Cloud – Particle interaction Complete the research on the influence from the clouds on the particle transformation and deposition. This is important for the dynamic model within EMEP. This work will be in co-operation especially with FMI and University of Helsinki with support of NMR and the BACCI Nordic Center of Excellence, (BACCI: Research Unit on Biosphere - Aerosol - Cloud - Climate Interactions).</p> <p>1.4.2 Implementation of new parameterisation in the EMEP dynamic model Within the framework of NORPAC, a NMR project, the updating of the dynamic EMEP particle model will start during 2005. This work will be done in close cooperation with MSC-W and University of Helsinki.</p> <p>1.4.3 Setting up a measurement network for measuring EC Within NORPAC a common network for measuring EC is set up both for urban and regional sites to determine the emission factors of EC as well as to establish an quantitative description of how different atmospheric processes affect the EC concentrations. The measurements will started early 2005.</p> <p>A PhD will be completed during 2005. Publication of earlier research will continue.</p>

Project 1.5 Development of a dynamic model for the assessment of combined ecosystem effects
Project leader: Harald Sverdrup
General Objective: To develop a customised model for the assessment of the combined ecosystem effects of regional air pollution (acidification, N deposition, particles, and ozone), climate and land use practices.
Status: Parameterisation methods and data exists for some experimental plant groups. Full integration of for example parameters as nitrogen, soil water, temperature and classification of species has also been taken into account in the model.
Stakeholder: European National Focal Centres for mapping critical loads for sulphur and nitrogen under the CLRTAP UN/, WGE, CAFE, Swedish forest management research; HEUREKA, SUFOR, Swedish Agricultural University colleagues
Acceptance: Within the effects assessment groups within ECE and IIASA, effects modules are very much demanded. A large effort needs to be made on gaining acceptance of any new concepts for vegetation predictions in Europe among people in basic research.
Organisation: Lunds Universitet Key persons; Harald Sverdrup, Annika Nordin, Han van Dobben, Wim de Vries
Co-operation: Project 1.1, Alterra Green World Institute The Netherlands
Budget 2005: 400 kkr
Activities 2005: 1.5.1 Dynamic Nitrogen modelling, validation and scenarios Dynamic Nitrogen simulations. Continued work with the FORSAFE and FORSAFE-VEG models. Validation of the model with Integrated Monitoring places and calculate vegetation response for scenarios of deposition of S and N, climate scenarios and forests handling

Theme 2. Realisation, costs and benefits

Co-ordinator: John Munthe

Project 2.2: Valuation of effects
Project leader: Mohammed Belhaj
General Objective: To evaluate economic and other benefits for ecosystems etc. of additional control measures for air pollutants in relation to the control costs.
Status: Cost Benefit Analysis has become a more widely used tool for assessment within the environmental field, both international as well as national. Knowledge on how to value biologic diversity and how to incorporate the dynamic processes are still underdeveloped. CBA for air pollutants is currently on-going within CAFE.
Stakeholder: WGE, WGS, CAFE and Swedish Environmental Protection Agency.
Acceptance: CBA is a required component of development of new directives in the EU.
Organisation: IVL, GU,
Co-operation: IIASA, Swedish Environmental Protection Agency
Budget 2005: 900 kkr (800 kkr IVL, 100 kkr GU M)
Activities 2005: 2.2.3 Assessment of costs and benefits of reduced emissions Finalisation of Cost Benefit Analyse of Ozone effects on crops and forests in Sweden and Europe. Based on data from EMEP and or SMHI. Up scaling to Europe is dependent on availability of data from other EU-countries. CBA studies in relation to acidification will be made on for example: environmental damage, forestry, health and corrosion.

Project 2.3: Scenarios and non-technical measures
Project leader: Catarina Sternhufvud
General Objective: To support the validation process of the baseline scenarios used in CAFE and CLRTAP, using non-technical measures as a starting point.
Status: The choice of baseline scenario is likely to become critical for future environmental strategies including air pollution, and all countries in the Convention are requested to give feedback and input to the scenarios created at IIASA. The use of non-technical measures in the baseline scenarios and in the cost curves has become more important due to their importance for the climate change as well as for other air pollutants. Full assessment of the role of NTMs is somewhat limited by lack of adequate methods and data.
Stakeholder: WGS, CAFE, TFIAM, Swedish EPA
Acceptance: Validation of the baseline scenarios are essential for the credibility of their use. The use of non-technical measures in the scenarios or in the cost curves are slowly becoming accepted also for reduction of transboundary air pollution.
Time constrains: Input to the scenarios created at IIASA has to be provided during 2003-2004 and the validation of their proposed scenarios need to be carried out during 2004.
Organisation: IVL, Swedish EPA
Co-operation: IIASA
Budget 2005: 550 kkr
Activities 2005: 2.3.2 Assessment of scenarios used for non-technical measures Baseline scenarios and non technical measures Estimation of the cost from non technical measures in the transport sector, will be completed on the budget from 2004. It is important to discuss and include the non-technical measures in the air pollution issue within EU and CLRTAP. It is difficult to simplify the non-technical measures so some specific measures will be studied. The cost and effect of using the non-technical measures in the international air pollution policies and strategies will be estimated.

Theme 3. Uncertainties, transparency and communication

Co-ordinator: Peringe Grennfelt

Project 3.1: Scientific credibility in a complex society
Project leader: Göran Sundqvist
General Objective: To evaluate the influence of uncertainties and scientific credibility on the process of international agreements on emission control
Status: Focus on the science-policy relations within the future revision of the Gothenburg protocol and EU directives for transboundary air pollution.
Stakeholder: The scientific community involved in the LRTAP work
Acceptance: Knowledge on how science interacts with policy is still underdeveloped. With the introduction of new concepts and models in the international regulation it is of great importance to gain knowledge on how science and policy interact, communicate and influence each other. Stakeholders have demanded an assessment of uncertainties in the revision of the Gothenburg protocol and the NEC directive. EU is requiring more transparency in the work of expertise in order to increase the credibility of expert knowledge. A close collaboration between the social science and the natural science expertises in ASTA may facilitate further interactions between science and policy in CLRTAP and CAFE communities.
Organisation: Göteborg University (Göran Sundqvist, Rolf Lidskog, Martin Letell), IVL Peringe Grennfelt
Cooperation: Lancaster University (Centre for the Study of Environmental Change), Örebro University (Centre for Urban Research/Centre for Man-Technology-Environment),
Budget 2005: 200 kkr (150 GU S, 50 GU M)
Activities 2005: 3.1.1 Scientific uncertainty and political negotiations Completed PhD and continued study focused on the particle issue. Further see under 3.3.3 Workshop “ Democratised science-based abatement strategies”

Project 3.2 Uncertainties in source effects relationships
Project leader: Peringe Grennfelt (Mattias Alveteg, Filip Moldan, Veronika Kronnäs, Joakim Langner, HC Hansson, Erik Swietlicki, Olle Westling)
General Objective: To continuously evaluate the uncertainties in key models of importance in different international agreements on emission control.
Status: The need for assessing uncertainties in source-effect data is large and always of great importance. Any form of assessment of uncertainty needs to be based on scientific data. Uncertainty assessments will be needed in connection with the development of abatement scenarios.
Stakeholder: TFIAM, WGSR, WGE, EMEP, Industry, NGOs
Acceptance: Policymakers and stakeholders have requested that uncertainties should be assessed in connection with the revisions of the Göteborg Protocol and the NEC directive.
Time constrains: Data need to be available in 2004-2005 (CAFE) or 2005-2006 (CLRTAP)
Organisation: The work will be carried out by IVL, SMHI, LU Chemical Technology, SLU MA.
Co-operation: IIASA, CCE and MSC-W
Budget 2005: 340 kkr (100 kkr UU, 190 kkr IVL, 50 kkr GU M)
<p>Activities 2005:</p> <p>3.2.1 Uncertainties in nitrogen effects on biodiversity.</p> <p>3.2.2 Uncertainties in ozone effects in relation to climate change. This work will focus on assessing how flux models can be used to assess how ozone damage will be influenced by climate change. started in 2004, completion in 2005.</p> <p>3.2.3 Uncertainties in the fate and dynamics of nitrogen. Uncertainties in the fate of nitrogen deposited on forest soils are one of the biggest sources of overall uncertainty in predicting future surface water quality. This work will focus on evaluation and assessing available scientific research in this field. See also plans for an international workshop (3.3.2/3.3.6)</p>

Project 3.3 Communication
Project leader: Peringe Grennfelt
General Objective: Ensure a customer-oriented and timely communication between ASTA and policy-relevant bodies and communities under CLRTAP, EU and other international organisations.
Status: The success of ASTA in terms of policy support depends strongly on the ability to customise and deliver the scientific material on time. Continued need for material even after IAM and strategy development purposes. ASTA has a strong interaction with the various bodies under CLRTAP and will be able to support several on-going activities within CLRTAP and CAFE.
Stakeholder: All bodies under CLRTAP, EU organisations, industrial organisations, NGOs, Politicians
Acceptance: Many stakeholders, policy makers and the general public do not consider transboundary air pollution as a remaining environmental problem.
Time constrains: The schedule and deadlines for deliveries are very tight and definite and material not available on time may be without consideration in the further process.
Organisation: IVL and to some extent all the participants in the programme
Co-operation: The MISTRA secretariat, Swedish Environmental Protection Agency, UNECE secretariat, Nordic Council of Ministers, EU CAFE etc.
Budget 2005: 1790 kkr (UU 200; LuKT 50; IVL 940; GU S 380; GU M 170, ITM 50)
Activities 2005: There will be a strong focus on communication of results and discussions with stakeholders and responsible organisations during 2005. 3.3.1 Dynamic modelling outputs- European Assessment: It has been recognised by the UN ECE CLRTAP Joint Expert Group (JEG) on dynamic modelling, that outputs from the dynamic models could be explored in more ways than producing TLFs. The JEG has urged the CCE to include preliminary scenario analysis from the two deposition scenarios defined by the coming call for data in their planned report on the response to the 2004 call. ASTA also proposed a novel end-user friendly way of communicating outputs from the dynamic models at the JEG meeting using half time of recovery. This work will be carried out in cooperation with CCE and interested NFCs. 3.3.2 Workshop on nitrogen effects on biodiversity. This workshop will be aimed at introducing vegetation responses to low-level nitrogen deposition in the critical loads framework. 3.3.3 Workshop on “Democratised science-based abatement strategies”. An international workshop will be held in Gothenburg may 2005. The workshop theme: Towards Robust European Air Pollution Policies: Constrains and prospects for a wider dialogue between scientists, experts, decision-makers and citizens. 3.3.4 ASTA Annual reports and the ASTA website. Production of the annual presentation of the research results within ASTA in the annual report. Continued presentation of up to date information is presented at the ASTA website, the website is also used as a platform for spreading information both within the ASTA research group and for example material to workshops etc. 3.3.5 ASTA book, a book with the research out come of ASTA will be produced. 3.3.6 Preparation for nitrogen workshop (2005 or 2006). This workshop will focus on nitrogen dynamics in forest soils and surface waters and on the effects of low nitrogen deposition. This is based on a suggestion from the JEG and discussions are currently on-going with other international institutions (e.g. RIVM, CEH, NIVA) on workshop arrangements.

Project 3.4 Overall development and evaluation of regional air pollution strategies
Project leader: Peringe Grennfelt
Objective: Support the overall scientific work on strategies for regional air pollution.
Status: The upcoming strategies will contain several improvements in all compartment models and databases. There is a need to closely follow and evaluate the new concepts and models in terms of their scientific basis as well as in their ability to give results that are in accordance with the overall expectations. This activity aims to take a global view on all aspects of importance for the IAM strategies.
Stakeholder: CLRTAP, EU CAFE, National experts, Industry, Scientific community TFIAM
Acceptance: The acceptance of the chosen concepts and model approaches will very much depend on evaluations and assessments (E&A) of IAM compartments as well as the overall IAM. This project aim to support the E&A process.
Time constrains: Main activity in 2004 and 2005
Organisation: IVL
Co-operation: IIASA, NEPAP network
Budget 2005: 300 kkr
<p>Activities 2005:</p> <p>3.4.1 Future issues</p> <p>Future issues such as globalisation is of great importance. The outcome of the Göteborg workshops pointed to some areas of particular concern for the future. These include the expansion of the regional air pollution issues to a hemispheric scale and a more holistic approach to nitrogen. Some European initiatives are under development (EU research proposals; COST activities) and this activity aims to make sure that ASTA scientists and research will be part of these activities.</p> <p>An activity that engages ASTA is the Acid Rain 2005 Conference in Prague. ASTA participates in the organisation committee.</p> <p>The work under TFIAM will also be followed, in particular the further development of the RAINS model in relation to the review undertaken in 2004.</p>

9 Abbreviations

ASTA	International and National <u>A</u> batement <u>S</u> trategies for <u>T</u> ransboundary <u>A</u> ir Pollution
BACCI	Nordic Centre of Excellence, Biosphere - Aerosol - Cloud - Climate Interactions
CAFE	Clean Air For Europe (EU)
CCE	Coordination Centre For Effects (CLRTAP)
CCC	Chemical Coordination Centre (CLRTAP)
CLRTAP	Convention on Long-Range Transboundary Air Pollution
EMEP	Cooperative programme for monitoring and evaluation of the long range transmission of air pollutants in Europe (CLRTAP)
HEUREKA	MISTRA Programme
IAM	Integrated Assessment Modelling
ICP	Integrated Cooperative Program. Vegetation, Crops, Forests etc (CLRTAP)
IIASA	International Institute for Systems Analysis
JEG	Joint Expert Group
LUSTRA	Land Use Strategies for Reducing Greenhouse Gas Emissions (Mistra)
MSC-W	Meteorological Synthesising Centre West (CLRTAP)
NGOs	Non-Governmental Organisations
NORPAC	Validated models describing Nordic urban and regional concentration of particles and organic/elemental carbon
RESE	Remote Sensing for the Environment (Mistra)
SUFOR	Sustainable Forestry In Southern Sweden (Mistra)
TFIAM	Task Force on Integrated Assessment Modelling (CLRTAP)
TFMM	Task Force on Measurements and Modelling (CLRTAP)
UN ECE	United Nations Economic Commission for Europe
WGE	Working Group on Effects (CLRTAP)
WGS	Working Group on Strategies