Projects and objectives

1. Health

Project 1.1	**Exposure to traffic related air pollution in early life, lung function and airway disease in 8-yearold children** **Project leader**: Tom Bellander Forsberg, IMM, Karolinska Institutet.
Project 1.2	**Short-term health effects in susceptible subgroups, using newly developed source specific local time series of air pollution** **Project leader**: Tom Bellander, IMM, Karolinska Institutet.
Project 1.3	**Health effects of short-term and cumulative seasonal exposure to road dust and wood smoke particles at real-world exposure conditions** Panel studies of particles from road dust and wood smoke with focus on inflammatory and respiratory effects. **Project leader**: Bertil Forsberg, Yrkes- och miljömedicin, Umeå universitet.
Project 1.4	**Long-term exposure to traffic exhaust and incidence of obstructive airway disease in a prospective cohort – co-funding** Studies of incident asthma and chronic bronchitis in a cohort of adults from three Swedish cities in relation to traffic pollution exposure at home. **Project leader**: Bertil Forsberg, Yrkes- och miljömedicin, Umeå universitet.
Project 1.5	**Is exposure to particulate air pollution associated with exhaled nitric oxide and blood markers of imflammation?** To assess the acute impact of particulate air pollution, on exhaled nitric oxide, which is a marker for airway inflammation, and inflammatory markers in blood. The exposure will be modeled from stationary measurement of NO_x, ozone, $PM_{2,5}$ and PM_{10}, permanent address and time spent in heavy traffic within 48 hours. The overall aim is to examine 10 000 subjects with exhaled nitric oxide, lungfunction, inflammatory markers in blood and genotyping. **Project leader**: Anna-Carin Olin, Arbets- och Miljömedicin (AMM), Sahlgrenska Akademin.
Project 1.6	**Is long term exposure to particulate air pollution associated with an increased risk for ischemic heart disease** To assess the effect of long term exposure to particulate air pollution on incidence of cardiovascular events in north-eastern Gothenburg 2001-2003. **Project leader**: Anna-Carin Olin, Arbets- coh Miljömedicin (AMM), Sahlgrenska Akademin.
Project 1.7	**Cohort study on total public health burden related to long term-exposure to air pollution** **Project leader**: Göran Pershagen, IMM, Karolinska Institutet.

Project 1.8	**Long term exposure to traffic related air pollution and genetic susceptibility in relation to myocardial infarction** **Project leader**: Göran Pershagen, IMM, Karolinska Institutet.
Project 1.9	**DISOZPOLL; Diesel and ozone effects on the cardiovascular system** To increase the understanding of how ozone and diesel exhaust interacts with the lungs, leading to events in the cardiovascular system that are linked to the increased health effects related to these pollutants. **Project leader**: Thomas Sandström, Lung och allergikliniken, Norrlands universitetssjukhus.
Project 1.10	**PMMECH – Mechanisms behind particulate matter air pollution induced toxicological effects** To increase the understanding of how source, size and chemical characteristics of particulate matter pollution contributes to adverse cellular and biomedical events, linked to adverse health effects. **Project leader**: Thomas Sandström, Lung och allergikliniken, Norrlands universitetssjukhus.
Project 1.11	**Woodpart-2. A human experimental study using wood smoke for studies of acute effects of particulate air pollution on inflammation, coagulation and oxidative stress** The specific aims are to find out whether effects of wood smoke on airway inflammation and blood coagulation found in a recently performed study (Barregard et al 2006) can be repeated at lower levels of particles and if the effects differ in relation to the fraction of ultrafines (UFP < 100 nm) in the smoke. **Project leader**: Gerd Sällsten, Occupational and Environmental Medicine, Sahlgrenska Academy.
Project 1.12	**Health effects of long range transported particles: a population study using air mass trajectories** The aim of the project is to test whether air masses of certain origins are associated with markers of pulmonary and/or systemic inflammation. **Project leader**: Gerd Sällsten, Occupational and Environmental Medicine, Sahlgrenska Academy.

2. Particulate matter

Project 2.1	**Chemical Modelling of Aerosol Formation** Develop and validate a robust module for describing the chemical PM fraction and its relation to sources. **Project leader**: David Simpson, Norwegian Meteorologial Institute (MET.NO).
Project 2.2	**Developing dynamic particle description including formation, growth and deposition** To develop and evaluate a computationally fast aerosol dynamics module, capable of simulating the aerosol size distribution and composition in the framework of 3-D Eulerian CTM (Chemical Transport Modelling) on local to regional scale. **Project leader**: Valentin Foltescu, SMHI.

Project 2.3	**Construct emission databases for dynamic particle models and validate urban models concerning particle size distribution and chemistry** Development of source specific particle-size resolved emission factors for both number and mass suitable for both urban and regional particle dynamic models that describe how the particle-size distribution develop and disperse over an urban area. **Project leader**: Christer Johansson, ITM, Stockholm University.
Project 2.4	**Aerosol OA sampling and ^{14}C analysis** Aerosol sampling and ^{14}C analysis for producing data to be used to develop and validate the OA module to be implemented in the 3D chemical aerosol model. **Project leader**: Kristina Stenström, Lund University, Department of Physics, Division of Nuclear Physics.

3. Ecosystem effects

Project 3	**Ecosystem effects** The objective is to improve our understanding of short and long term effects of nitrogen deposition with respect to recovery from acidification, biodiversity and eutrophication and to provide scientific support for measures to reduce negative impacts on the environment. **Project leader**: Cecilia Akselsson, IVL, Swedish Environmental Research Institute.
Project 3.1	**Nitrogen cycling in forest ecosystems** To further clarify the fate and impacts of nitrogen in forest ecosystems. This includes the role of nitrogen in acidification and recovery from acidification of forest soils and surface waters, and to correlate soil nitrogen processes to vegetation responses. Also to study ecosystem biodiversity, focusing on the interactions between plants and their natural enemies that contribute to the governing of ecosystem species composition. This particularly in response to low doses of nitrogen input as well as vegetation recovery following decreased nitrogen input. **Project leader**: Cecilia Akselsson, IVL, Swedish Environmental Research Institute.
Project 3.2	**Dynamic nitrogen model development and evaluation** To evaluate and further develop dynamic models for nitrogen in forest ecosystems including vegetation interactions, and to develop policy relevant tools such as critical loads to be used in national and international assessment and abatement activities on air pollution. **Project leader:** Salim Belyazid, IVL, Swedish Environmental Research Institute.

4. Integrated Assessment Models

Project 4	**Integrated Assessment Modelling, IAM** The overall objective of this sub program is to provide a basis for optimisation and assessment of future air pollution policies in Sweden and Europe. **Project leader**: John Munthe, IVL, Swedish Environmental Research Institute.
Project 4.1	**Costs of non-technical measures in IAM models - theoretical considerations** The objectives of this sub-project are to evaluate different concepts on how costs could be included in integrated assessment models and to develop a practical theory to be able to use in integrated assessment modelling. Such an approach should take into account the parallel inclusion of both technical and non technical measures in model formulation and assumptions. The abatement cost functions should not only be theoretically correct including major costs of interest and the synergies amongst them, but these costs should also be possible to estimate and be practical to include in an IAM. **Project leader**: Mohammed Belhaj, IVL, Swedish Environmental Research Institute.
Project 4.2	**Inclusion of non-technical measures in the GAINS model** The objective is to harmonise the cost theory developed in project 4.1 with the operative features of the cost calculations in GAINS. This requires both the cost theory developed in project 4.1 to be adjusted to the operational requirements in GAINS as well as it requires the GAINS methodology to be expanded so that new abatement measures can be taken fully into account. **Project leader**: Stefan Åström, IVL, Swedish Environmental Research Institute.
Project 4.3	**Development of a GAINS Sweden** The purpose of this project is to contribute to the construction of a national IAM resource through adjusting the GAINS model developed at IIASA for testing new theories and implementing regional and local simulations on a Swedish, and eventually Nordic level. The result will be a GAINS Sweden, with possible Nordic extension, yet directly based on the European GAINS model and developed in close collaboration with IIASA. The aims are to: • Adjust GAINS into a functional version on a Swedish (Nordic) level/resolution; • Implementing the cost module as developed in project 4.2 into the current GAINS Europe model or into the GAINS Sweden version; • Possible structure adjustments of the GAINS model to enable the introduction of alternative scenarios and baseline costs as discussed in subproject 4.1 and 4.2. **Project leader**: Salim Belyazid, IVL, Swedish Environmental Research Institute.
Project 4.4	**Integrated assessment modelling at a national scale** To carry out a case study in GAINS Sweden based on national cost estimates, latest dose response relationships as well as alternative scenarios. The focus of the case study will most probably be the Domestic sector (or the transport sector). **Project leader**: Jenny Arnell, IVL, Swedish Environmental Research Institute.