

NILU: F 7/2005
REFERENCE: Q-303
DATE: FEBRUAR 2005

An Air Quality Monitoring and Management System for Hanoi

Bjarne Sivertsen

**Presented at the World Bank
meeting in Hanoi,
26 February 2005**

An Air Quality Monitoring and Management System for Hanoi

*Presented at the World Bank meeting in Hanoi,
26 February 2005*

Bjarne Sivertsen



Norwegian Institute for Air Research
POBox 100, No-2027 Kjeller, Norway
www.nilu.no

An Air Quality Monitoring and Management System for Hanoi

1 Introduction

NILU has been asked by the World Bank to participate in a meeting on air quality monitoring and management in Hanoi. VEPA in Hanoi has expressed interest for a development of an air quality monitoring and management system in Hanoi similar to the existing network of monitoring stations already operated in Ho Chi Minh City. A proposal has been presented to VEPA, which included the main objectives and the actions and services needed to obtain a modern air quality monitoring and management system for Hanoi.

In the meeting in Hanoi NILU presented a typical AQMS platform and presented briefly the AirQUIS system and its possibilities.

2 Objectives

The main objective for the air quality monitoring and management system for Hanoi is to

- Establish a system of real-time air quality monitoring and management for Hanoi
- Develop a common standard methodology for a common tool/software platform to be used at urban and national level in Vietnam
- To collect and process the data from different sources of air pollution (mobile and fixed) to compute their impact on the ambient air quality.
- To establish a system and knowledge adequate for short and long-term planning
- Data dissemination and common distribution of information within national a network

Future prediction of pollution levels in different parts of Vietnam should be possible using the database and planning system delivered as an Air Quality Management System.

3 NILU may offer adequate input

To meet the objectives NILU will offer to develop a GIS based Air Quality Management System based on the AirQUIS platform which already is being operated by HEPA in HoChiMinh City.

The following elements will be included:

- Evaluation and improvement of existing measurements
- Improving the quality assurance and quality control (QA/QC) procedures
- Start collecting data for a Emission Inventory for point, line and area sources
- Perform Dispersion Modelling
- Improve reporting procedures
- Establish Air Quality information dissemination solution using internet

A major part of the development will include capacity building and training including:

- Understanding the air quality management concept
- How to operate an air quality monitoring network
- Data quality assurance, QA/QC procedures
- Statistics and reports
- Collection of data for the Emission Inventory

- Basic training in the use of dispersion and exposure models
- How to publish air quality information using Internet

4 The AirQUIS platform

AirQUIS is a GIS based air quality assessment and planning system, which has been used for integrated Air Quality Assessment and Management in small and large cities, in industrial areas and in areas and countries around the world. The immediate needs for Hanoi will be to establish the Measurement Module, which has been developed for handling on-line and off-line measurement data of air quality and meteorology. This module includes data quality controls, data statistics and graphical presentation tool for reporting and data assessment

AirQUIS also includes additional modules for modelling and air quality planning, which can easily be added to the measurement module. These modules include:

- Emission inventory procedures and emission models
- Wind field, dispersion and exposure models
- Data presentation tools and dissemination interfaces to web pages etc.

All data are stored on a modern database platform and presented through a Graphical User Friendly Interface (GUI) on an advanced Geographical Information System (GIS).

We believe that this platform will meet many of the objectives stated by VEPA in Hanoi. To build an AirQUIS project (database) includes importing data into the different modules in the system. Descriptions of the input data will be provided.

The AirQUIS models include an air emission calculation model, a meteorological model, an air dispersion model and different ways of calculating population exposure. The models provide the possibility of identifying the results of alternative planning scenarios as well as describing the present situation. The contribution to the pollution from different source categories, such as industry, traffic and domestic heating can be calculated based on emission or fuel consumption data. In this way the system can be used as a tool for evaluating and comparing different measures to reduce air pollution as a basis for cost-effectiveness ranking.

Basic training in air pollution modelling as well as descriptions and background for the models available in AirQUIS will also be provided to VEPA. Any additional work such as additional support in performing emission inventories or undertaking air pollution modelling will have to be discussed between the parties. Also additional instruments and monitoring stations are not included in this estimate.

5 References

- Bøhler, T. and Sivertsen, B. (1998) A modern Air Quality Management system used in Norway. Kjeller, Norwegian Institute for Air Research (NILU F 4/98).
- Larssen, S., Sluyter, R. and Helmis, C. (1999). Criteria for EUROAIRNET - The EEA Air Quality Monitoring and Information Network. (Technical Report no. 12). URL: <http://reports.eea.eu.TEC12/en/tech12.pdf>.

Sivertsen, B (1999) On-line Air Quality Monitoring Systems used in Optimal Abatement Strategy Planning. Presented at the International Conference on Environmental Management, Health and Sustainable Development, Alexandria, Egypt, 22-25 March 1999. Kjeller (NILU F 7/99).

Sivertsen, B (2000) Understanding air quality measurements. Kjeller (NILU TR 4/2000).

Sivertsen B. and Bøhler T. (2000) On-line Air Quality Management System for Urban Areas in Norway. Presented at “The air of our cities – it’s everybody’s business”. Paris 16-18 February 2000. Kjeller (NILU F 4/2000)

Slørdal L.H. ,S.E. Walker and S.Solberg. (2003) The urban air dispersion model EPISODE. Technical description. Kjeller (NILU TR/2003).

About AirQUIS: <http://www.nilu.no> <http://www.airquis.no>



Norwegian Institute for Air Research

- Founded in 1969
- Independent foundation from 1986
- Annual turnover
- 20 mill US\$

- 140 employees
 - 80 scientists
 - 45 PhD scientists
 - Accredited laboratories

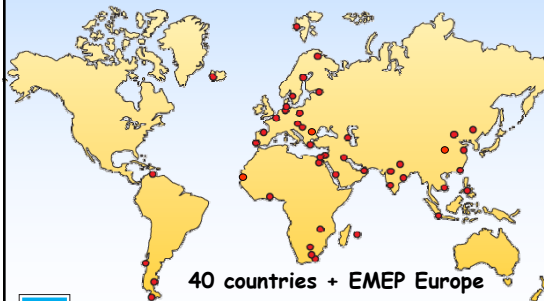
Some major NILU clients:

- UN Economic Commission for Europe
- European Environmental Agency/Topic Centre for Air Quality
- European Commission
- World Bank
- World Meteorological Organisation
- World Health Organization (WHO)
- UNEP
- The European Bank for Reconstruction and Development
- ERWDA, UAE
- Nordic Development Bank

Selected development projects:

- Guangzhou S & T Commission (China)
- Egypt Environmental Affairs Agency
- Department of Mines, Botswana
- HCMC HEPA/DONRE (AQMS)

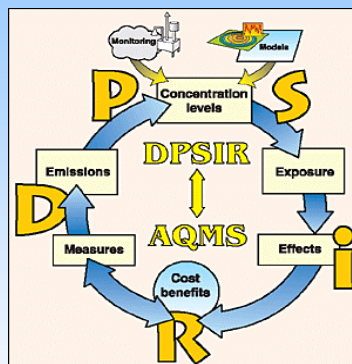
International Assignments



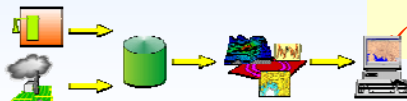
www.NILU.NO
NILU/BS-AirQ-2005

AirQUIS

NILU support to Hanoi



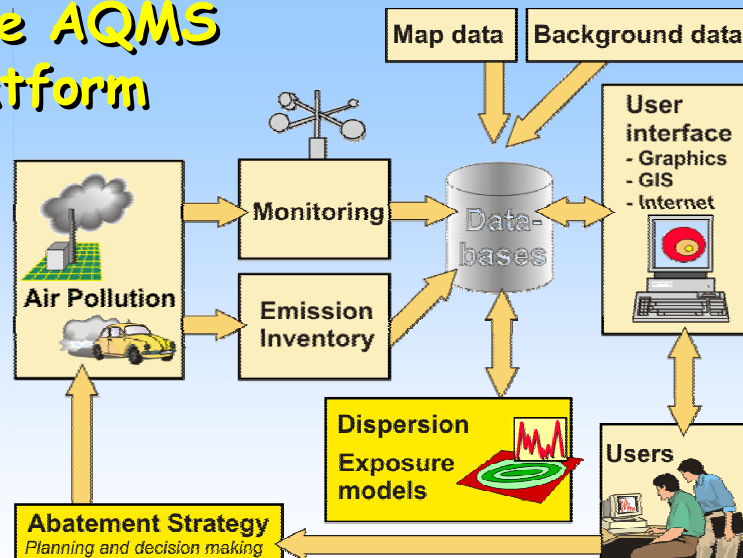
- ✓ Review current organisational set-up
- ✓ Assess and evaluate present Air Quality monitoring system
- ✓ Review sites, instruments and retrieval system
- ✓ Design and modify the Air Quality monitoring and management programme
- ✓ Develop data retrieval and QA/QC
- ✓ Establish databases and assessment system
- ✓ Install AQ management platform (AirQUIS)
- ✓ Collect input data for modelling
- ✓ Perform assessment and management
- ✓ Data and information dissemination through Internet application (AirOnline)
- ✓ Institutional building and training



www.NILU.NO
NILU/BS-AirQ-2005

AirQUIS

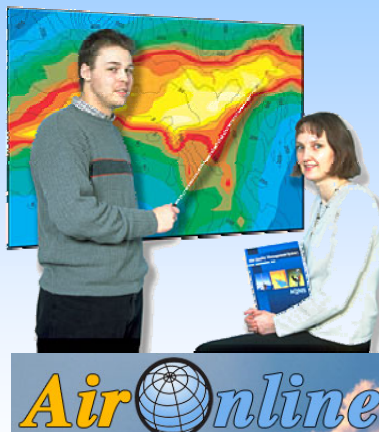
The AQMS platform



www.NILU.NO
NILU/BS-AirQ-2005

AirQUIS

AirQUIS Applications

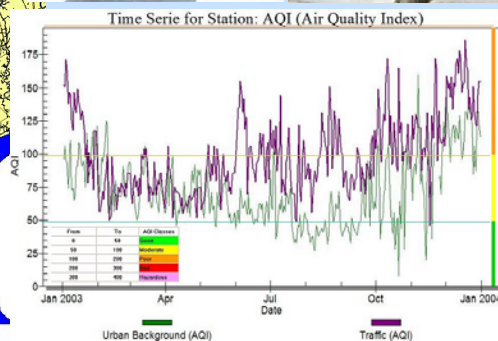


- Environment impact assessment
- A.Q. forecasting and early warning
- Optimal abatement strategies
- A.Q. information systems, including;
 - Online data
 - Internet applications



www.NILU.NO
NILU/BS-AirQ-2005

AirQUIS



www.NILU.NO
NILU\BS-AirQ-2005


AirQUIS


AirQuality - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www2.nlu.no/airquality/hcmc/


AirOnline





Những bản kết
Environmental Agencies of
the world
WHO air quality guidelines

Powered by:



www.nlu.no

Chất lượng không khí địa phương: HCMC

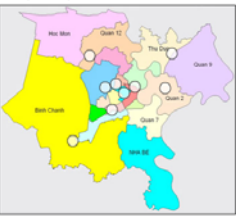
Chỉ số báo về môi trường được tính theo quy định số 111/2004/QĐ-UB của Ủy ban nhân dân Thành phố Hồ Chí Minh ngày 23 tháng 4 năm 2004. Chỉ số được tính theo 5 Tài nguyên và Môi trường Thành phố Hồ Chí Minh.

Chỉ số:

18 January 2005

Traffic	Urban Background	92	50	100	Good	Moderate	Poor	Unhealthy	Hazardous
75	201	300	301	500					

Bản đồ phân bố trạm



Mạng quan trắc không khí tự động

Hệ thống quan trắc chất lượng không khí được thiết lập tổng hợp:

- Tháng 6-2000, được sự tài trợ bởi UNDP & DANIDA, một hệ thống các trạm quan trắc tự động (do 24/24 giờ, các trạm số: PM10, SO2, NH3, CO, O3) được thành lập bao gồm 02 trạm thuộc khu vực trung tâm (thị trấn Thủ Đức, Trung tâm Quận 1 và Thủ Đức (phòng QLĐT), 02 trạm thuộc khu vực đường tại quận 3 (Sở Khoa học và Công nghệ) và quận 5 (trường Hồng Bàng).
- Tháng 11-2002, được sự tài trợ của UNCRAD, hệ thống quan trắc chất lượng không khí tự động được bố trí tại trung tâm 5 trạm: Tháp Cầm Vĩnh Phước 1, CVPH Quang Trung Quận 12, VPH UBND Quận 2, Bờ Thủ Đức Quận Tân Bình và Phòng Giáo dục-Huyện Bình Chánh (nay là Bình Tân).

Ngôn ngữ: Vietnamese

Chọn trạm:

Những bản kết, HCMC

News

Vietnam News

**On-line
Air Quality
data
on HEPA
Internet
pages**

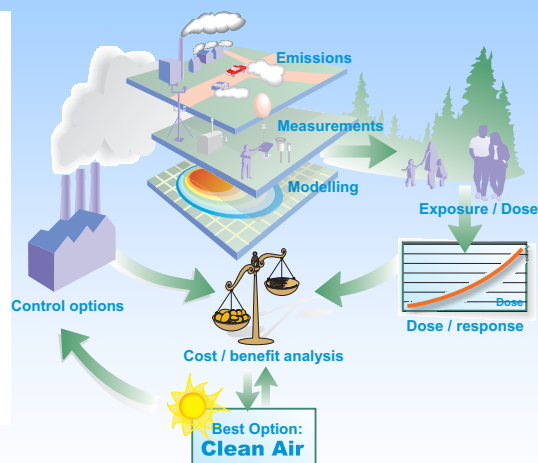
AQI
Updated daily



AirQUIS

A complete Air Quality Management System for Hanoi

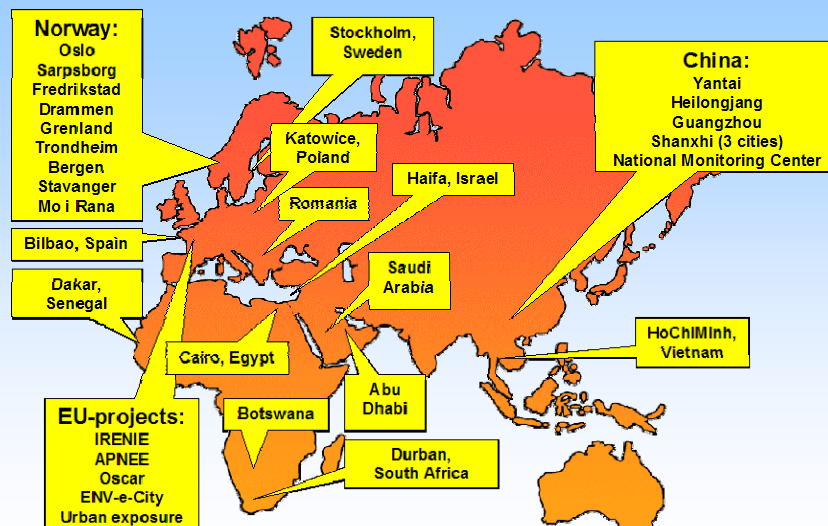
- ✓ For Assessment and planning
- ✓ Check impact of regulations
- ✓ Optimal abatement
- ✓ Identify Cost-effective future measures



www.NILU.NO
NILU/BS-AirQ-2005

AirQUIS

AirQUIS Installations



www.NILU.NO
NILU/BS-AirQ-2005

AirQUIS

Norwegian Institute for Air Research

www.nilu.no

NILU
POBox 100
NO-2027 Kjeller
Norway
Fax: +4763 89 80 50
E-mail: nilu@nilu.no



www.NILU.NO
NILU/BS-AirQ-2005

AirQUIS