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EXPERIENCES ON THE USE OF AIR QUALITY MODELS AS A POLICY INSTRUMENT IN THE NETHERLANDS

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INTRODUCTION

In the Netherlands, air quality models have been used extensively by all levels of governmental bodies for many years now. Ever since the nineties, local concentrations of, in particular, nitrogen dioxide and particulate matter around traffic ways and stationary plants are calculated by the CAR-model and NNM-model. The 21st century showed a development towards more diversity in air quality models and in their users. The models are used more intensively as well. This is due to jurisprudence of cases in which legislation about particulate matter played an important role.

REASONS AND EXPERIENCES ON THE USE OF AIR QUALITY MODELS

Legal obligations and jurisprudence

Since the nineties the Ministry of Housing, Spatial Planning and Environment (VROM) has provided several models firstly for (local) authorities, and secondly for citizens and companies. The annual report on air quality required by the EU, with information about the concentrations in relation to European limit values, was at that point in time the main purpose for using these models.

By introducing the Air Quality Order in 2001 (Blk2001) it became necessary for authorities to supply exhaustive information on air quality in carrying out their legal obligations, e.g. spatial planning and environmental permits.

For every task performed by administrative bodies that could affect air quality concentrations, the Blk2001 expected a report which could show that the European limit values for particulate matter (PM_{10}) or nitrogen dioxide (NO_2) would not be exceeded in future years. These tasks, linked to e.g. spatial planning, could effect every single location in the Netherlands. Therefore, information on air quality would have been available for the entire Dutch territory. This could not be achieved by a monitoring network only, due to practical and financial reasons. This meant that from 2001, in addition to the regular annual report, air quality calculations were executed with e.g. zoning plan procedures, the granting of permits for stationary plants and traffic regulations. This resulted in an increased development of air quality models and the intensity with which these models were used.
The Dutch monitoring network (LML) has been used for calculations and validations, e.g. concerning the national background concentrations. In addition, results of measuring at local situations make comparison with calculation model results possible. These comparisons show that model results laid well within the requirements set by the EU.

Up until 2003 the general perception on exceeding of the PM_{10} limit values, was that the State Government was the authority responsible for improving PM_{10} concentrations. For this reason, local and regional authorities didn't always map PM_{10} concentrations. Jurisdiction by Administrative Jurisdiction Department of the Council of State in 2003 however, stated that both state and local/regional governments had a responsibility for improving PM_{10} concentrations.

Experiences

Although the Ministry of Housing, Spatial Planning and Environment offered several standard models for their administrative bodies, users of those models interpreted input and output differently. Moreover, there were other models in use than just the standard ones, which led to differences in results**.**
The obligations of the Blk2001 led to an increase in legislation and policy. It gave the impression that new development in spatial planning and building activity was not possible in the Netherlands because of air quality regulations.

DEVELOPMENT IN LEGISLATION: TO A CONVERGENCE IN THE USE OF MODELS

Adjustment to legislation: Air Quality Order 2005

In 2005, the Air Quality Order 2005 (Blk2005) was adjusted. The Blk2005 had the important effect of a flexible link between developments (spatial planning, permits, etc) and concentrations in open air. In preparation to the programmed approach of the National Air Quality Cooperation Programme (NSL), this adjustment to legislation should have led to more room for developments and less regulations. However, the necessity to examine the effects of developments on air quality – and consequently to execute model calculations – remained to a large extent.

Adjustment to legislation: Measurement and calculation regulation air quality (Mrv2006)

The Blk2005 also laid the foundation for the Mrv2006. The main purpose of the Mrv2006 was the advancement of the uniformity in (the use of) air quality models.
The most important ways to promote this are:

1. the requirement of three standard methods of calculation, each with its own application range;
2. the obligatory use of generic input data;
3. the definition of the locations where air quality is to be calculated and locations where assessment is excluded.

1. Standard methods of calculation (SRM)
    - SRM1: for line sources (roads) in urban areas; calculation rules of the CARII-model;
    - SRM2: for line sources (roads) in open areas; calculation rules of the VLW-model;
    - SRM3: for point and area sources (industrial and agricultural sources); calculation rules of the NNM-model.

The Ministry of Housing, Spatial Planning and Environment offers a free implementation for each SRM. Other methods and models are only allowed when approved by the Minister. An important condition to obtaining approval is that results can deviate at the most 10% from the standard reference values.

2. Generic data

Every year a set of generic data as input to air quality models is approved and provided by the Minister of Housing, Spatial Planning and Environment. All model developers are obliged to use these input in their models. The generic data contains:

- background concentration;
- meteorological data;
- roughness data;
- emission factors (motor vehicles and intensive livestock farming).

3. Assessment locations

In the Mrv2006 (and other following regulations) characteristics of locations of assessment for air quality have been determined:

- a maximum of 10 meters distance up to the edge of the roadway;
- outside stationary plants;
- representative of a certain amount (no micro analysis).

PROGRAMMATIC APPROACH: NATIONAL AIR QUALITY COOPERATION PROGRAMME (NSL)

As of November 15th 2007 changes have been made in the Environmental Management Act (Wet Milieubeheer), which from then on describes air quality regulation. The changes in the Environmental Management Act also lay down the foundation for the National Air Quality Cooperation Programme (NSL), which aims at ensuring that the Netherlands remains within the EU-limits. The NSL-programme includes both (spatial) developments and projects as well as measures for the coming years. Within the NSL-programme, local, regional and state authorities work together in ensuring the implementation of the measures set up by each administrational level.

The changes made in the Environmental Management Act and the start of the NSL-programme also have consequences for the use of air quality models. Assessment-criteria are no longer described in the MRv2006 but in the Regulation assessment air quality 2007 (Rbl2007). Furthermore, many spatial development plans no longer have to be assessed separately, but are assessed within the (monitoring of the) NSL-programme. This reduces the need for individual model calculations, and puts the focus on a more central and uniform way of assessing the air quality.

Uniformity: Saneringstool

The starting point of the programmatic approach has been to determine the scale of the air quality problem in the Netherlands, upon which an appropriate set of measures was to be developed in order to meet EU-standards. One of the aims of the NSL-programme is to determine the air quality problem in a uniform way.

For this purpose the Saneringstool has been developed. The Saneringstool calculates where air quality bottlenecks in the Netherlands are likely to occur. It does so by processing SRM1 and SRM2 model calculations alongside roads in relevant locations. These calculations take into account background concentrations and in some specific locations also the contributions of air traffic and intensive livestock farming (calculated by SRM3-models). In short: the Saneringstool performs an overall air quality calculation for the most relevant locations in the Netherlands (the NSL-regions).

The authorities responsible for the different sources of air pollution (e.g. local authorities, provinces, environmental protection agencies, highway authority) are responsible for recording the necessary local information into the database of the Saneringstool. This data contains, e.g., traffic intensities and traffic types, congestion levels and source heights and is used for the model calculations.
An important element in the NSL-programme is that it provides platforms where NSL-partners can exchange information between each other and with VROM. These discussion platforms also result in more uniformity in providing (local) data in the Saneringstool by the NSL-partners.

Measures in the Saneringstool:

The Saneringstool uses the generic data provided by VROM such as the background concentration and emission factors. Within this generic data the effects of national and international policies, instruments, plans and objectives are taken into account, e.g. emission standards, NEC-ceilings and stimulating the use of cleaner cars. This means that the effects of national and international measures make their way into the model calculations of the Saneringstool.

By integrating these effects in the calculations, the Saneringstool has given an important and detailed insight in the scale and location of the remaining air quality bottlenecks in the Netherlands in 2008, 2011, 2015 and 2020. Local and regional authorities responsible for the different sources of air pollution have used this information to develop, allocate and agree

upon a set of local/regional measures. This set of measures, and their estimated effects, have been included in the Saneringstool.

With both (inter)national and regional/local measures now incorporated in the Saneringstool, the Netherlands can demonstrate that it is capable of meeting the EU-standards in 2011 en 2013/2015 (for PM10 and NO2 respectively).
This information was used for a request to the European Commission to grant the Netherlands extension for meeting the EU-standards. In 2009 this request was granted.

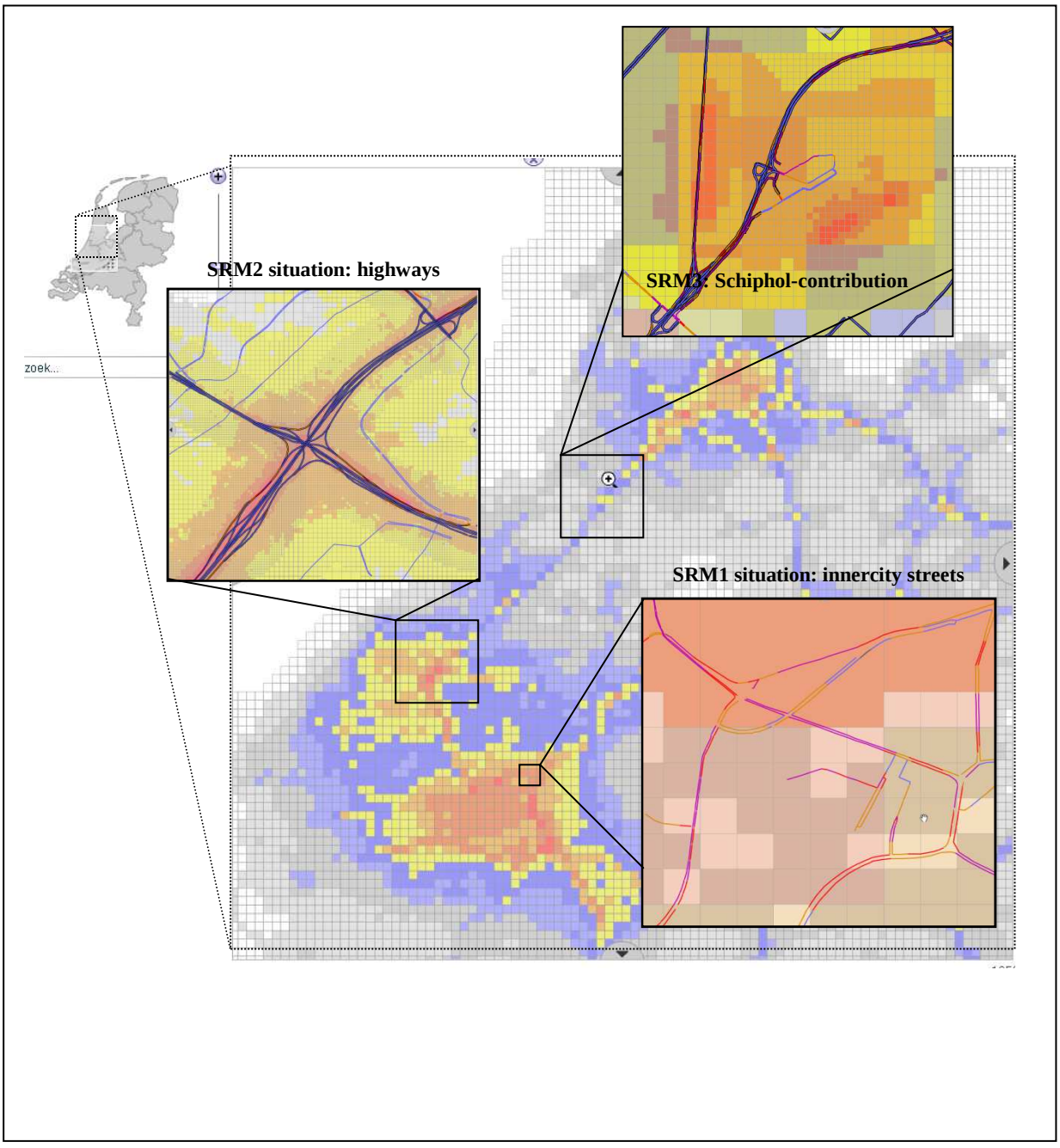

Figure 1: Indication of poster presentation