

# **Mexico National Emissions Inventory: A New Tool for Decision Making**

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## **ABSTRACT**

Championed by Mexico's National Institute of Ecology (INE) and sponsored by the United States EPA, the Western Governors' Association (WGA) and the North American Commission for Environmental Cooperation (NACEC), this project started out in 1995 with the initial purpose of developing a methodology and an Execution Plan to complete Mexico's National Emissions Inventory. Its products so far have been several manuals for the development of emissions inventories in Mexico and training material, as well as the Mexicali Emissions Inventory. The project is currently in Phase II of three, which comprises the compilation of existing databases owned by Mexico's Federal and State Environmental Authorities, as well as specific private entities. The inventory for the six bordering states is expected to be completed by mid 2003, whereas the full product should be concluded by 2004.

In itself, the project represents a novel effort to put together disperse and limited emissions information, available in very diverse formats of variable quality. It has brought together energy, environmental and transport authorities, as well as private organizations and NGOs.

Once completed, the Inventory will serve as the primary tool to reformulate or otherwise confirm current air quality improvement policies and to develop better regulations, detect specific information needs, evaluate current emissions databases and serve as a baseline for air quality prognosis. Overall, it represents a unique opportunity to congregate all stakeholders with an impact on air quality to become involved in this assessment, which will serve as foundation for a more science-based approach to decision making in Mexico, will support a better understanding of air quality issues in the Mexico-US border region and will provide critical information for a North American emissions inventory.

## **INTRODUCTION**

The first official efforts to protect air quality in the Mexico-US border region were first launched with the subscription of Annex IV and V of the La Paz Agreement, in 1989. These sections of the agreement refer to Transboundary Air Pollution, International Transport of Urban Air Pollution and the creation of the Air Quality Workgroup, as part of the Border XXI Program. This group developed several projects, with primary focus in 3 regions: Tijuana-San Diego, Mexicali-Valle Imperial, and Cd. Juárez-El Paso-Sunland Park. The projects included the installation of an Air Quality Monitoring Network for Tijuana and Mexicali, an intensive Air Quality Monitoring Study for both Nogales, a study of air quality for PM<sub>10</sub> and toxics content in the Douglas-Agua Prieta region, training for EPA and SEMARNAP personnel on urban air models, the setup of a bilingual website and other short-term studies for both Nogales and Agua Prieta-Douglas. Later on, the Joint Advisory Committee (JAC) would also be formed to address specific issues from the El Paso del Norte Air Basin.

As part of these efforts, Mexico's National Emissions Inventory project started out in 1995, bringing together Mexico's National Institute of Ecology (INE) and the United States EPA with the support of the Western Governors Association (WGA), with the initial purpose of developing a methodology and an Execution Plan to complete Mexico's National Emissions Inventory. The North American Commission for Environmental Cooperation (NACEC) and the Under Secretariat for Environmental Management and Protection from the Secretariat of Environment and Natural Resources (SEMARNAT) have also become involved in this project as key stakeholders.

Being a multi-stakeholder project, the inventory will serve various purposes. It responds to a Federal mandate established in Article 111 of Mexico's General Environmental Law (Ley General del Equilibrio Ecológico y Protección al Ambiente, LGEEPA). This article requires to integrate and update a national emissions inventory, with a strong coordination with local authorities for this purpose<sup>1</sup>. The NACEC has also drawn its attention to compiling a North American emissions inventory to air, as part of its Cooperation on North American Air Quality Issues Project. Finally, US regional planning agencies also participate in the project, as part of their efforts to comply with regional haze regulations.

The inventory comprises point, area, biogenic and mobile sources of 7 pollutants of interest: nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>), volatile organic compounds (VOC), carbon monoxide (CO), particulates (PM<sub>10</sub>, PM<sub>2.5</sub>) and ammonia (NH<sub>3</sub>). Emissions data are being collected for 1999, on a state and municipal level, where possible, to allow for future projections up to 2018. It will be completed in two phases, the first of which will include only the 6 Mexican states located on the Mexico-US border (Baja California, Sonora, Chihuahua, Coahuila, Nuevo León and Tamaulipas), expanding in the second phase to the whole country. The project is due to conclude by mid 2004.

## **BODY**

Up to 2000, the project was focused in promoting capacity building activities, and developing and testing the methodology for the inventory. As a result, the project team published several manuals and advanced workbooks and developed various technical studies (such as the Mobile 5 – Mexico adaptation) and the inventories for Tijuana and Mexicali. Currently, most of the team's work is centered on information gathering and data processing to build up the inventory itself, although other technical studies are also being worked on, such as the NONROAD-Mexico Model and the Mobile 6–Mexico model, as well as 4 remaining manuals to complete the set.

This paper is intended to discuss diverse process-related issues pertinent to the development of the inventory. These are related to the prevailing institutional framework in Mexico, the diverse stakeholders of the project and the ownership and maintenance of the inventory, once it is completed. It is also intended to address the desired outcomes of this project, from the perspective of Mexico's authorities and researchers. Other issues, such as methods, tools and technical issues, including the status of the project are included in another paper to be presented at this same Conference.

## **Institutional framework**

Since the inventory comprises emissions from various sources, the institutional framework prevalent in Mexico is a key issue in trying to compile emissions information, particularly for point sources. Point sources belonging to the following industry sectors are under federal jurisdiction and should file an annual emissions report to the Environmental Management Under Secretariat of SEMARNAT: chemical, petroleum, petrochemical, paints and dyes, automotive, paper and cellulose, glass, metalworks, electricity generation, asbestos, cement and lime, and hazardous waste treatment<sup>2</sup>. This annual report can be submitted either to the local SEMARNAT office (Delegación) or directly to the central office in Mexico City. Reports are frequently submitted as hard copies, which means the Delegaciones and central offices have to transfer them to an electronic format, a job both dreary and time-consuming. Hence, this transfer is often postponed or abandoned to attend other duties. Point sources not belonging to the sectors previously mentioned are under state or even municipal jurisdiction, and reporting requirements and format vary between locations, or there may be no requirements at all.

Communication within SEMARNAT, including INE, the Environmental Management Under-Secretariat and the Delegaciones, as well as with local environmental authorities became crucial. Representatives from these agencies, particularly those located on the border states, are part of the

Technical Advisory Committee (TAC) and have attended the project meetings. All 32 state representatives have been issued official letters from INE, describing the project and the information needs, and have been encouraged to contact the team with any concerns or questions on the project. These authorities will eventually be incorporated to the TAC, as the project approaches the second phase. INE has also asked the Delegaciones to contact their local authority counterparts to coordinate the submittal of information. The Environmental Management Under Secretariat is also a member of the Binational Advisory Committee (BAC), where key decisions related to the project are discussed. At this point, there has already been a strong response from the Delegaciones and local authorities, eager to receive training and establish a solid inventory in their own jurisdiction.

### **Other government stakeholders**

A similar situation was encountered when trying to compile the information needed for area sources emissions. Data on fuel production, distribution and use is all within PEMEX – the single government-owned refiner in Mexico. However, this represented a challenge in itself, since PEMEX is formed up by 4 individual companies, each with different levels of information. Contact with other Secretariats was also needed to obtain data on transport, agricultural activities and power generation. These agencies have no mandate to report or compile emissions information. Hence, the level of aggregation and the format were also very variable between agencies.

The Energy Secretariat (SENER) was involved from the first stages of the project. Since PEMEX and the power generation sector (CFE) report to SENER on a regular basis, SENER has been a key contact for the project. Nonetheless, INE had several meetings and established an active information exchange with key representatives from PEMEX, the Transport and Communications Secretariat (SCT), the Agriculture, Livestock and Fisheries Secretariat (SAGARPA) and INEGI (the National Institute of Statistics, Geography and Information Technology), in charge of producing municipal and state level statistics. For most of these Secretariats, a first-time contact was established to find out the scope and limitations of their data and their requirements to render it for use in the project. All this process is being documented to leave a valuable precedent for future updates.

### **Non-government stakeholders**

The emissions estimations for area sources also requires data on production, distribution and use of products (mainly solvents) manufactured and utilized in several sectors. This data is not usually concentrated in government agencies, but within private organizations. To obtain reliable and detailed information from these organizations is always a challenge. Additionally, the recent publication of a requirement to report detailed emissions information for the Mexican Pollutant Release and Transfer Registry (RETC) after several years of struggle, was reason enough for the private sector to be reluctant to render any information.

The team identified several leading trade associations that were expected to have publications, reports and statistics that could be of use. With INE as leading contact, the team approached these organizations and invited them to participate in the project, supplying them with enough background information about the objectives and scope of the inventory, making a clear distinction between the newly established RETC and the Mexico National Emissions Inventory. After an initial meeting, each association was contacted personally, their available data assessed and detailed information requests were issued. Due to limited response, a follow-up meeting was held in which a detailed report on progress was submitted by the team and a description of future estimates was displayed, to show the participants how the process would be carried out in the absence of detailed information and to encourage their much needed input in the project. With this, the team intends to build up stakeholders' confidence in the process, as well as increase their awareness of the importance of being part of this project.

## **Ownership and management of the inventory**

As with other emissions inventories, Mexico's NEI will serve as primary input to develop a nation-wide air quality management strategy. Local and regional efforts, such as the existing PROAIRES (Air Quality Management Programs) developed for Mexico City, Toluca, Guadalajara, Monterrey, Tijuana-Rosarito, Mexicali and Ciudad Juarez were based on their respective inventories. It is then expected that similar programs stem out of the NEI. The inventory is also expected to be used by universities and research institutions in their work on air quality issues. It will, in time, be useful for modeling purposes, to assess health and environmental impacts of emissions.

As a first-ever effort, this project was championed by INE, accompanied by the Environmental Management Under-Secretariat from SEMARNAT. Due to internal re-structuring within SEMARNAT, INE is now dedicated to research activities and all management and regulatory duties have been transferred to other areas in SEMARNAT. In the future, the Under-Secretariat for Environmental Management will hold updating and management responsibility for the Inventory.

## **CONCLUSIONS**

The assembly of Mexico's first-ever National Emissions Inventory will provide a primary tool for the policymakers, useful in the development of new standards, regulations and programs pertaining to air quality management. It will also be useful in assessing the quality of existing emissions databases and in setting priorities for improvement in this area. Research and scientific communities will also benefit from this tool, as it will provide a solid baseline upon which to predict future trends in air quality and assess different control scenarios.

The use of this new tool will also prove very powerful in designing new sector-specific policies. The current debate on energy issues is just one example of the beneficiaries from this project.

The experience gained in this project has been useful in appreciating the importance of a better integration within SEMARNAT and with local environmental agencies, as well as with other government entities involved in managing the data used to integrate and update emissions inventories. This will translate into a better understanding of the inventory and a first step to improve data management in Delegaciones and local governments. It will also provide a clear and transparent framework on which to build future data collection efforts with the private sector. Country-wide training in these issues is an expected spin-off of this project in the near future.

However useful, the inventory will not reach its full potential unless it is managed, maintained and updated regularly. The role of SEMARNAT in the next stages of the project is primary to achieve this. It is also important to integrate other existing inventories in this dynamic process, to achieve nation-wide goals.

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## **KEYWORDS**

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