

## Atmospheric emissions inventory in the Belluno Valley

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An atmospheric emissions inventory is an essential tool in order to recognize the pressures acting on a territory and at the same time it is an instrument to use in numerical dispersion models in order to study future scenarios. ARPAV Belluno Department performed a local-based inventory (bottom-up approach), in order to outline a picture as realistic as possible of the emissions on the area. If necessary the emissions evaluations have been done through the emissions factors of the European Environmental Agency, Politecnico of Milan and CTN-ACE APAT data base. Special attention has been paid on industrial processes, road traffic and domestic heating, even if the data base includes off-road means (farming and railways), dumps, composting plants, quarries, greenhouses, farms and so on.

Factories are punctual sources, and their emissions have been estimated from the authorisation certificates stored in the emission archive of the Belluno Province. About 150 factories have significant emissions, and so they are submitted to periodical chemical analysis. The emissions of one thousand factory chimneys have then been acquired from those analysis. At first we noticed that the 20 most important activities performed about 90% of total annual dust emissions of the industrial sector. For the remaining small activities (“ex ridotto inquinamento” and “poco significativa”) information on the production unit and raw material consumption have been collected.

In order to estimate the traffic contribution, about 60 roads in the Valley have been considered: 22 urban roads in Belluno, 15 in Feltre and 24 rural roads. The weekdays, Saturdays and Sundays mean traffic flows and the corresponding hourly flows have been calculated for every road length. Besides traffic flows, the provincial fleet of vehicles has been considered, in order to calculate emissions according to European Union COPERT III methodology. On the basis of these analysis, the most relevant situations appeared in Belluno, Feltre and Ponte nelle Alpi.

The domestic heating has an important contribution in the emissions' total amount. Thanks to information from ISTAT, BIM Metano, Belluno Province, ARPAV and the investigating project on the wood burning, that was carried out by ARPAV in the schools (in collaboration with the Belluno School Office), the number of plants for each kind of combustible has been found out in the 32 investigated municipalities. The performed investigation has further pointed out the different wood combustors used in the area. From the collected data atmospheric emissions estimates has been done through emission factors from the Politecnico of Milan.

Respect to PM10 pollution in the Valley domestic heating plays a very important role and wood combustion stands out among combustibles. Looking in detail at wood combustion, it is possible to notice that traditional stoves are the main responsible for pollution, due to the great number of plants in the area and their higher emissions and lower efficiency compared to new technology stoves. This suggests the definition of new studies directed to atmospheric prevention and reclamation policy.

Domestic heating, even if in the past it has often been underestimated, it is a clear problem in the whole Alpine area. This is due to the large amount of sources in the territory, specially in the valley bottom, with few meters high emissions acting in the most critical period (wintertime), when aerological conditions and thermal inversion worsen the situation.

In sum, the main PM10 emissions source is wood burning for domestic heating, followed by road traffic and industrial activities. For NOx the main contribution is due to road traffic, followed by industry and domestic heating; in this last case wood combustion presents a reduced contribution respect to other combustibles. For SOx the major role is played by industry and domestic heating, while the other pollution sources are less relevant. At least CO emissions are due to traffic and domestic heating.

This emission inventory is therefore a very useful instrument to support management activities and territory planning, in order to preserve and improve air quality in the Valley; through constant inventory updating and through numerical dispersion models able to compute ground concentration from emissions sources data, ARPAV is capable to offer Local Bodies a technical support in order to actions and policies assessment.