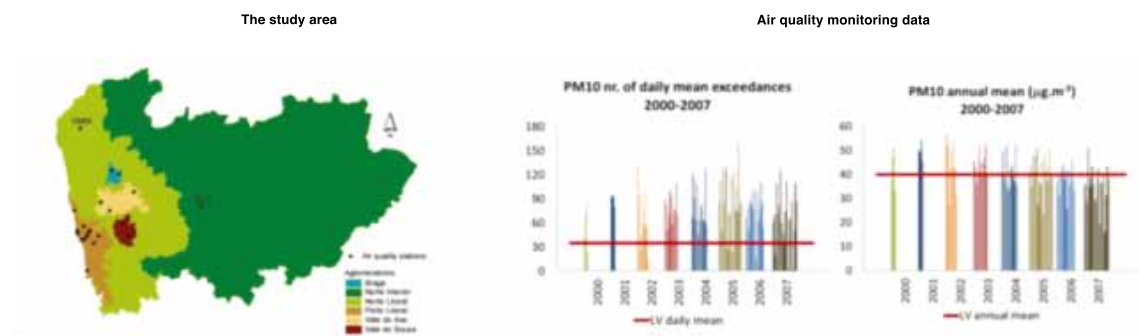


TECHNOLOGY, HUMAN BEHAVIOUR AND ECONOMIC CHALLENGES AS DRIVING FORCES TO IMPROVE URBAN AIR QUALITY

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Air pollution problems are major threats to human well-being compromising environmental, social and economic assets. The Northern Region of Portugal have been often affected by high levels of air pollutants, particularly during the 2000-2007 study period, when a high number of exceedances to human health protection legislated limit values (EU Directive 20008/50/EC) have been measured. These exceedances occurred in traffic, industrial, urban and suburban background stations with an estimated exposed population of around 500,000 inhabitants. Air quality plans/measures to reduce those levels are necessary to design, test and finally implement, related mainly to the traffic sector, but also to the industrial and residential combustion sectors.

Based on an emission inventory, traffic, industrial activity, residential combustion and construction sites were identified as the main anthropogenic sources of PM10. Strategic mitigation measures to reduce PM10 levels were defined according to their environmental performance and economic costs, and they have been discussed with the entities involved in their local/regional implementation. The final list of selected measures was designed and started to be implemented in January 2010.

A numerical modelling tool was used to assess the efficiency of the selected and applied measures and a maximum reduction of about $4.8 \mu\text{g.m}^{-3}$ of PM10 annual mean for 2015 was predicted. Meanwhile, the observed values registered at the air quality network clearly show that the PM10 daily and annual average values are already decreasing since 2008. These outcomes point out two main drivers for the air pollution reduction: the economic crisis (occurring since 2008) and the implementation of the mitigation measures (in practice since 2010). The eco-

nomics crisis forced a substantial change in consumption patterns and in daily lifestyle contributing to a considerable reduction in the pollutant emissions namely from industry and traffic, and thus leading to a better air quality in the northern region and showing that personal patterns of production and consumption have an essential role in preserving and protecting our environment.

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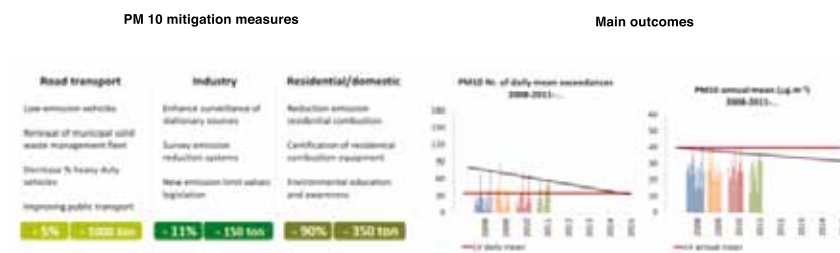


FIGURE 1
LEFT: The study area and the air quality monitoring stations.
RIGHT: The PM10 daily exceedances and annual mean values registered during 2000-2007

FIGURE 2
LEFT: PM10 mitigation measures.
RIGHT: Evolution of the PM10 values monitored during and after the mitigation measures