**INTEGRATED ASSESSMENT OF AIR POLLUTION AND CLIMATE ACTIONS**

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**ABSTRACT**

The main objective of the EC-funded project ICARUS was to minimize environmental and health impacts in urban areas through the development of integrated tools and strategies in support of air quality and climate change governance in EU cities. An integrated approach for air pollution assessment has been coined and implemented, combining ground-based measurements, atmospheric transport, chemical transformation modelling and air pollution indicators derived from satellite, airborne and personal remote sensing. Technological and non-technological measures have been proposed, taking into account societal dynamics and motivating citizens towards adoption of environment-friendly alternatives with a positive impact on their health. The ICARUS methodology has been applied in eight EU cities, including Athens and Thessaloniki. Spatially distributed (1×1 km) business-as-usual (BAU) emission inventories for the major air pollutants were developed for years 2015, 2020 and 2030. Emissions values (E) were disaggregated by sector groups/subgroups/activities and by type of fuel based on the expected changes in activities (A) and emission factors (EF) for each sector (E = A × EF). The derived emission inventories fed the WRF-Chem model to estimate air pollution concentration levels. According to Athens and Thessaloniki city stakeholders, key policies/measures with different time horizons (2020-2030) aiming at reducing air pollutants and GHGs emissions in different sectors were selected in the sectors of transportation, buildings, energy supply and waste management. The new emission inventories for each policy have been used as input to the WRF-Chem model to estimate changes in the air concentration levels with respect to the BAU scenarios, accounting for the future climate projections. Health impact assessment was based on the population attributable risk fraction concept making use of the HRAPIE concentration-response (C-R) functions approved by the WHO. Among the investigated scenarios, in the Greater Athens Area, the scenario with the highest emission reductions for all pollutants is the promotion of sustainable mobility through eco-driving, cycling and walking, as well as an enhanced usage of public transportation in Athens metropolitan area, while in Thessaloniki, highest reductions of air pollutants has been obtained for transport related measures such as promotion of green vehicles and promotion of public transport and the use of metro by building an integrated urban mobility system.

**KEYWORDS:** GHG emissions, air pollution, win-win solution, health impact assessment