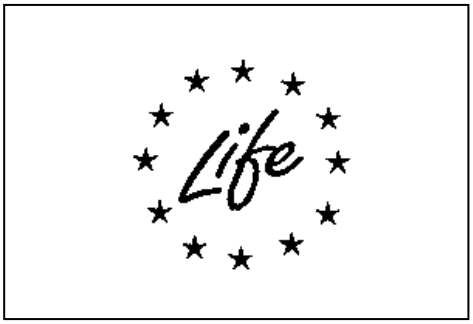

LIFE 08 ENV/F/000487

Deliverable V: Action P2
Basis for authorities to adopt a more integrated approach to urban management by informing stakeholders to use the techniques and methods successfully tested in the project

Context:
Air pollution related to the traffic is one of the most pressing problems in most European urban areas. Traffic-generated pollutants include nitrogen oxides, volatile organic compounds and particulate matter (PM). The transformation of these compounds within the atmosphere, involving sunlight, leads to the formation of a series of harmful intermediates or end products (such as ozone and PAN-type compounds). As a result, several regulations have been implemented within Europe to reduce the pollutants emissions. In the very recent years, photo-catalytic self-cleaning and “de-polluting” materials have been suggested as remediation process (for NOx and aromatic VOCs) in the polluted urban environment. The commercial products are based on the photo-catalytic properties of a thin layer of TiO_2 deposited at the surface of the material (such as glass, pavement, …) or embedded in paints or concrete. The use of TiO_2 photocatalyst as a friendly air pollution emerging control technology has been reported in many European areas (i.e. Dives church in Misericordia in Rome and in France, the new Air France building at CDG airport, the Cité de la Musique et des beaux arts in Chambéry and the Hotel de Police in Bordeaux, ….). However, both the effectiveness and the real impact on air quality of these relatively new technologies have been tested in a limited manner before going into market.

The work conducted so far has shown that the photocatalytic technology could reduce the concentrations of NOx and BTEX (Benzene, Toluene, Ethylbenzene and Xylenes) in air. However, our work has shown that all the carbon containing species were not fully oxidized into carbonate and that all the nitrogen containing species were not trapped as nitrate : recycling process to the atmosphere exist. Indeed, our work has proven the formation of other species such as HONO (known as a OH sources, known as mutagenic and carcinogenic and facilitating ozone pollution) and other oxygenated hydrocarbons (aldehydes, PAN-type compounds, …) as a result of

the interaction between NOx/VOCs/particles and surfaces containing TiO_2. The production of these later species may represent an important source of new pollutants in the urban environment and may have a strong impact on the radicals concentrations and consequently on the building up ozone pollution. Further more, it has shown that the substrate was playing a role and that different results could be obtain with different formulation.

The tests conducted within P2 of the ongoing EU-Life+ project (PhotoPAQ, “PHOTOcatalytic remediation Processes on Air Quality”) have enabled us draw some conclusions which could be used by the authorities to adopt a more integrated approach to urban management by informing stakeholders to use good techniques and methods.

Our recommendation to authorities when choosing/evaluating the material to be used is to not only rely on pollutants capture efficiencies but to pay a careful attention to possible release of volatile species which may in turn affect the air quality.

This information must be provided for each material

Information for the authorities:

- ***Tests under laboratory conditions have shown effectiveness of the loss of NOx*** when exposed to TiO_2-containing materials and irradiated using both sun light and lamps.