iSCAPE

IMPROVING THE SMART CONTROL OF AIR POLLUTION IN EUROPE

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At a glance

Title: iSCAPE - Improving the Smart Control of Air Pollution in Europe
Instrument: Research and Innovation Action (RIA)
Call: H2020-SC5-04-2015 "Improving the air quality and reducing the carbon footprint of European cities"
Total EU contribution: € 5,850,829
Duration: 3 years
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Consortium:

> *University College Dublin*
> *Trinity College Dublin*
> *Università di Bologna*
> *University of Surrey*
> *Ilmatieteen Laitos (Finnish Meteorological Institute)*
> *Universiteit Hasselt*
> *Technische Universität Dortmund*
> *JRC - Joint Research Centre - European Commission - Institute for Environment & Sustainability*
> *Institut D'Arquitectura Avancada De Catalunya - FabLab Barcelona*
> *T6 Ecosystems srl*
> *Nanoair Solutions S.r.l.*
> *Future Cities Catapult Ltd.*
> *Dublin City Council*
> *Agenzia Regionale Prevenzione e Ambiente dell´Emilia-Romagna*
> *European Network of Living Labs*

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Project Web Site: www.iscapeproject.eu
Key Words: air quality, climate change, living labs, smart cities

The challenge

Air Pollution continues to be a global concern among the scientific community for its impacts on the human health, the environment and climate change. Improved control and regulation of air pollution over the past fifty years has achieved significant improvements in the quality of air, particularly in cities. This has been brought about through the introduction of mandatory air pollution control policies, the statutory regulation of air quality and the development of remediation technologies to conform to enforceable standards. While these policies have improved air quality overall, air pollution still remain the main environmental health hazard, resulting in high costs for health care systems, unhealthy workers and an estimated 400,000 premature deaths in Europe in 2011. In addition, air pollution patterns are changing in several urbanized areas of the world due to climate change, with a significant effect on respiratory health. While existing air pollution control policies and technology include measures to reduce the concentrations ($g/m3$), emission rates (g/s) and total emissions (g) of contaminants, the direct control of air pollution concentrations in the urban atmosphere and the exposure of the population have received relatively limited attention and it is especially so considering expected/forecasted climate change.

Project Objectives

The overall aim of iSCAPE is to develop and evaluate an integrated strategy for air pollution control in European cities grounded on evidence-based analysis. The project will develop the tools required to obtain an air pollution free/low carbon society by addressing air quality and climate change concerns together through the application of new smart and sustainable technologies for integration into urban design and guidelines. This will include the development and assessment ex-ante of a framework aimed at changing mobility behaviour and will harness emerging smart city capabilities and protocols to implement novel urban air pollution control strategies using improved policy-oriented information and technology. These abatement options will be assessed in selected EU cities used as Living Labs and will be designed to achieve measures of reductions in air pollution exposure and climate change impacts.

The specific OBJECTIVES of the project are:

1. Develop new sustainable and passive air pollution control strategies.

2. Assess existing and proposed air pollution control technology and policy interventions for major air pollution sources in European cities.

3. Rapidly deploy innovative technological solutions.

4. Customise an advanced integrated air quality modelling tool for the assessment of air pollution and associated control strategies.

5. Assess the interlinkages between air pollution and climate change.

6. Propose a conceptual framework for sustainable urban mobility.

7. Empower EU citizens with smart awareness raising activities and build capacity for decision makers through policy recommendations.

Methodology

The iSCAPE approach aims to intervene in a physical way on the urban landscape by inserting physical objects (Passive Control Systems) to alter the ventilation rate in the city and affect air pollution and climate change. These developed sustainable and passive remediation strategies will be integrated with behavioural change interventions at individual and administrative level. The different abatement options will be assessed using seven pilot sites in different cities across the EU (Dublin, Bottrop, Guilford, Lazzaretto, Vantaa, Hasselt and Bologna), which will be used as Living Labs. iSCAPE will deploy an additional (to existing ones) network of air quality sensors in each of these cities. As such, the combined measurements from the existing and deployed sensors will permit the assessment of the benefits from the iSCAPE's interventions on a neighbourhood and city-wide scales. The iSCAPE framework includes two groups of interventions aimed at reducing both air pollution levels and climate change precursors:

I. **Passive Control Systems (PCSs)**: these include low boundary walls, trees and hedge-rows, green walls and roofs, photocatalytic coatings, green urban spaces and road geometry interventions.

II. **Behavioural Change:** this set of interventions will include (1) actions to promote changes in transport mode choice for EU Cities inhabitants (Sustainable Urban Mobility framework) ; (2) action to promote changes in activity patterns.

Expected Results

iSCAPE will have the following expected outcomes:

- The proposed interventions will produce a reduction of the negative effects on health and climate together with the costs associated with air pollution in the EU.

- Lower concentrations of air pollutants in cities will be achieved using technologies adapted to local needs, such as: low boundary walls, green walls and roofs, photocatalytic coatings, changes in activity patterns to reduce congestions, etc.

- iSCAPE will assess ex-ante a range of behavioural change interventions such as (1) actions to promote changes in transport mode choice for EU Cities inhabitants; (2) action to promote changes in activity patterns.

- iSCAPE will test and deploy solutions that can be produced at a relative low cost and that can be exploiting using different complementary business models.

- iSCAPE will assess the effectives and thus design guidelines of smart interventions in practice to integrate them into urban design and planning policy following a "win-win" approach for climate change and air pollution abatement.

- iSCAPE will foster a societal transformation to a green and low carbon economy by engaging citizens in citizens-science activities as part of the Living Labs.