Pollutants in the Urban Environment (PUrE)

A Consortium project led by the University of Manchester and funded by the EPSRC under the "Sustainable Urban Environment" (SUE) Programme

PROJECT AIM

The aim of the PUrE project is to develop an integrated decision-support framework comprising a suite of appropriate models and tools for a more sustainable management of urban pollution.

SPECIFIC OBJECTIVES

The specific research objectives and themes of the project are:

1. to develop further understanding of and to establish links between **sources, pollutants and human activities** in the urban environment;
2. to develop an integrated approach to the selection and application of appropriate tools for **modelling the fate and transport** of a range of pollutants in the urban environment which considers important processes and key dynamic aspects;
3. to develop an assessment methodology and integrate a suite of appropriate models and tools to help urban stakeholders understand the potential **human health and ecological impacts** of pollution in the urban environment;
4. to understand the relationships between **socio-economic factors, human behaviour** and urban pollution and to ensure that a robust understanding of these issues underpins the methodological development of the PUrE programme;
5. to develop a methodology that enables consideration of **spatial and temporal dimensions** of urban pollution;
6. to develop a methodology for integrated **sustainability assessments** of alternative options (human activities, technologies, policies etc.) **and** scenarios, showing explicit **trade-offs** between environmental, social and economic criteria and enabling balanced decision making;
7. to develop a better understanding of complex relationships between pollution, **policy and liability**; and
8. to understand the main **risks and uncertainties** in different elements of the PUrE methodology and decision-support framework, including uncertainties in the decision-making process.

DELIVERABLES

The main deliverables are a decision-support methodology, modelling platform (software) incorporating a suite of models and tools, and the end-user guidance documents.

METHODOLOGY

The PUrE conceptual approach and main research themes are shown in Figure 1. The decision-support framework, as shown in Figure 2, consists of three parts: *Problem structuring*, *Problem analysis* and *Problem resolution*. The first, *Problem structuring,* stage enables the end-user to define the decision problem by posing a series of relevant questions. This stage is followed by *Problem analysis*, which can be carried out by taking either the problem- or decision-oriented approach. The former takes the end-user through a modelling route to obtain the information necessary for decision making and the latter through a multi-criteria decision analysis route if the necessary information is already available. Following the problem-oriented route, the end-user can choose either simple or complex tools and models to analyse sources of pollutants as well as their fate and impacts on receptors. Examples of the tools that will be included in the framework include life cycle assessment, substance flow analysis, air and water pollution dispersion, health impacts models, whole life costing and sustainability indicators. The end-user will also be able to choose a suitable multi-criteria

decision analysis technique to make a decision, appropriate recommendations or gain new knowledge in the *Problem resolution* stage of the decision-making process. If necessary, the process can be repeated and refined until the desired outcome is reached. The end-user guidance manual will be developed to guide the end-user through different stages of decision making, including identification of the main drivers and questions, choice of appropriate decision-paths and multi-criteria decision techniques as well as different tools and models.

Therefore, the framework would enable the end-users to structure their specific problem for analysis, to select appropriate models and tools for their specific assessment, to perform comparative evaluations of sustainability criteria and to assess alternative options and future scenarios.

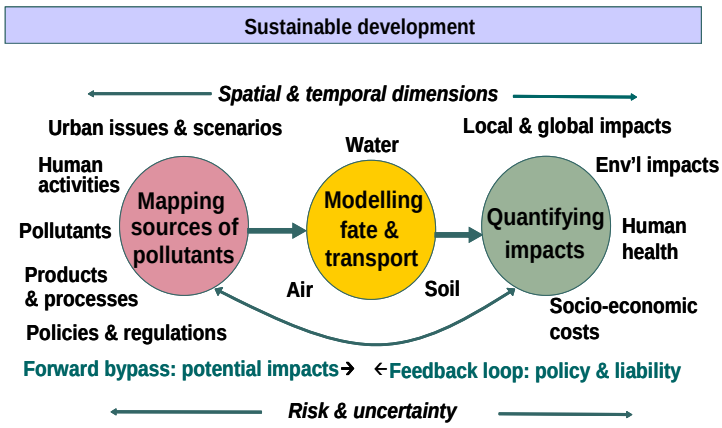

Figure 1

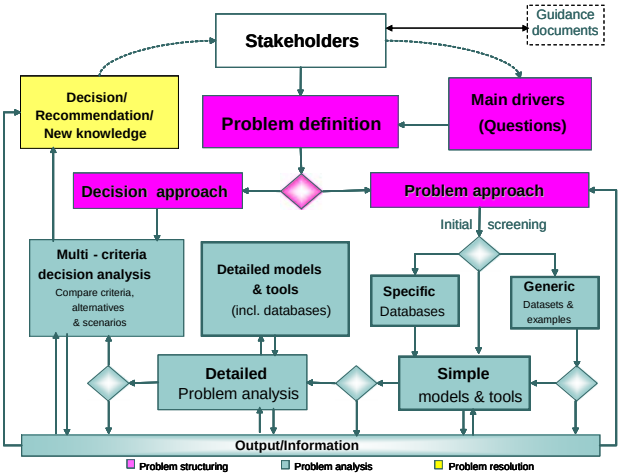

Figure 2

PROJECT MANAGEMENT

Principal Investigator and Research Director: Prof. Adisa Azapagic

Project Co-ordinator: Carol Pettit

The University of Manchester

CONSORTIUM PARTNERS

Academic

- **The University of Manchester**
- **Cardiff University**
- **Forest Research**
- **London School of Hygiene and Tropical Medicine**
- **University of Exeter**
- **University of Sheffield**
- **University of Surrey**

Non-academic

- **ARPA Sicily**
- **ARUP**
- **BCSD-UK**
- **BRE**
- **Codel**
- **EA**
- **Forestry Commission**
- **Golders**
- **HPA**
- **NSCA**
- **QUB**
- **SEPA**
- **SEEDA**
- **SNIFFER**
- **TRL**
- **UKWIR**
- **WRc**

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