

2. Context and Programme Objectives

2.1 The EPSRC Sustainable Urban Environment Programme

DISTILLATE is one of 14 research programmes funded under the UK Engineering and Physical Sciences Research Council's overarching research programme on the development of a Sustainable Urban Environment (SUE). The SUE Programme was designed by EPSRC in the context of three key drivers – the need to improving the quality of life of the UK's citizens, to supporting the sustainable development of the UK economy and society; and to meet the needs of the users of EPSRC funded research in industry, commerce, Government and the service sector. Through this Programme, EPSRC sought to support research that:

- targets key quality of life indicators in water and air quality, waste and resources, transport. Climate change, land use, construction and housing;
- is conducted in the context of the 1987 Bruntland Report definition that sustainable development "... meets the needs of the present without compromising the ability of future generations to meet their own needs.";
- meets the needs of users of the research through supporting developments in sustainable products and services; energy, water and utility services; integrated transport and distribution services; sustainable environmental services and holistic waste management; and efficient and inclusive health and public services.

As the work within DISTILLATE progresses, we will ensure that we interact with, and benefit from, the work of the other research programmes within SUE. Of the 14 programmes, four are in a cluster focusing on transport issues, with whom we will collaborate more closely.

2.2 The research challenge

Transport is one of the most significant sources of unsustainability in urban areas. Across Europe, urban traffic congestion costs in excess of €100B each year, and these costs are predicted to double in the next decade. Local and trans-boundary pollution and the resultant health impacts impose costs of a similar magnitude, and there are around 20,000 fatalities on urban roads each year. Those without cars are increasingly disadvantaged as land use patterns change to accommodate the dominant role of the car. On a wider scale urban transport alone contributes around 14% of all the CO₂ generated in Europe, and is a major contributor of NO₂, and thus reduces the continent's ability to meet its global (EC, 2001) and regional (DETR, 2000a) commitments.

Many countries are now advocating integrated approaches to these problems, in which the full range of transport policy interventions (infrastructure, management, regulation, information and pricing) are combined with land use, environmental and wider social policy instruments (ECMT, 1995, DETR, 1998, 2001, Whitelegg & Haq, 2003). Most of the constituent elements of these strategies are already available, although there will always be the potential for new technologies (Perrett and Stevens,

1996; Perrett et al, 1998; Dodgson et al, 2000); and new influences on behaviour (Stradling et al, 2000, Jones and Sloman, 2003). However, there is a serious lack of detailed understanding of the impacts of many of these policy instruments and of their transferability to different contexts (TRANSPLUS, 2003a). A recent review for DfT concluded that, of some 60 possible policy instruments, reliable predictions of impact on demand and supply could only be made for around 15 to 20 instruments (Simmonds et al, 2001). There is therefore a significant need for better empirical evidence, and our KonSULT knowledgebase (May et al, 2002, May, 2003a), developed with EPSRC and DfT support, provides a basis for recording and disseminating these results. Even more serious is the lack of understanding of how to design integrated strategies which most effectively combine infrastructure, management, regulation and pricing. The limited results to date indicate the benefits of synergy between these types of instrument (Dasgupta et al, 1994; May et al, 2000; Proost and van Dender, 2000; Martens et al, 2002, Emberger et al, 2003), but do not yet provide the basis for cities to design strategies which will meet their future needs most effectively.

Even where appropriately sustainable strategies are identified, there are serious barriers to their implementation. The recent European Conference of Ministers of Transport (ECMT) report (ECMT, 2002) highlights poor policy integration and coordination, counterproductive institutional roles, unsupportive regulatory frameworks, weaknesses in pricing and poor data quality and quantity as reasons for the failure of most cities to pursue the policies advocated in its earlier report (ECMT, 1995). Above all, it notes the challenge of “bringing together the diverse and divergent interests of [the] great many actors in the urban transport system”, and that “coordination and cooperation between these stakeholders – while essential to long term implementation of sustainable strategies – is often complex and resource intensive.” These observations are reflected in more recent work in the UK (W S Atkins 2001, 2003, Steer Davies Gleave, 2002). Recent work within the consortium has indicated the problems that local authorities face in trying to implement cross-sector initiatives, where they have to overcome barriers resulting from different priorities, cultures and funding regimes (Jones *et al*, 2003). Research into governance issues has demonstrated that institutional boundaries and responsibilities create barriers to the integration of policy measures and instruments (Stewart et al, 1999; Hull, 2003a, 2003b; Beattie et al, 2001). The value of participatory GIS as a way of more accurately representing different stakeholders’ knowledge has been highlighted in recent work at York (www.york.ac.uk/inst/sei/pp/pubpartic.html). Here GIS-P has been used to document knowledge which local advocacy groups and other citizens possess, and to draw non-specialist understandings of problems into policy responses in a more direct way than previously attempted (Yearley *et al* 2003). While some of the solutions to the problems are clearly in the social science domain, they can benefit greatly from engineering and applied science research. Particular elements include the development of novel and enhanced models of the transport and land use system (Webster et al, 1988; Simmonds et al, 2001; Wegener and Grieving, 2001); development of indicator frameworks for cross-sector evaluation (Jones et al, 2003); improved data collection procedures relevant to the wider range of sustainability indicators, design tools which aid the development and implementation of integrated strategies (TRANSPLUS, 2001); and interactive means of involving the full range of stakeholders in making effective decisions using, for example, GIS technologies (Carver et al, 2001; Cinderby, 1999; TRANSPLUS, 2003b). These developments and

their application are best pursued through a coordinated programme of science, social science and engineering research, and this is the focus of this consortium.

2.2 Vision, Objectives and Scope

Our vision is of a step change in the way in which sustainable urban transport and land use strategies are developed and delivered. We aim to achieve this through a focused programme of research in the UK context, in such a way that the more generally applicable tools and approaches can be disseminated widely both in the UK and internationally. Given this vision, the principal objective of DISTILLATE is to develop, through a focused, inter-disciplinary research programme, ways of overcoming the barriers to the effective development and delivery of sustainable urban transport and land use strategies and, through them, enhanced quality of life. We have defined the scope to include all passenger transport policy interventions, both large and small, which have a significant impact on sustainability, as well as those land use interventions which have a significant impact on transport. While focusing on urban areas, we will also be considering the regional context of those areas. Given the balance of local authority interests, we have decided not to address freight transport specifically.

The principal scientific contributions will be in two broad areas: the improvement of analytical support tools for strategy development and scheme design and operation; and the enhancement of decision-making processes and techniques including the development of indicators. These will result in advances in both applied and social science research which should be of benefit to those conducting research in cognate areas. We will be targeting key quality of life indicators in transport and land use; seeking ways of meeting the needs of the present without compromising the ability of future generations to meet their needs; and meeting the needs of research users by supporting developments in integrated transport and land use. Collaboration within the consortium will strengthen the capability of the UK research base in urban sustainability and provide an identifiable source of multi-disciplinary academic excellence able to respond to the needs of end users, within the context of a strategic research agenda.

In this context, this research programme has the following seven sub-objectives, each of which relates to a research project which had been identified as a priority research need by our local authority partners:

1. to document and review the barriers to the delivery of sustainable strategies;
2. to develop new methods for generating appropriate strategy and scheme options and for designing integrated strategies;
3. to establish an effective set of core indicators and targets as an input to strategy formulation, forecasting and appraisal;
4. to support the more effective collaboration between the agencies responsible for transport strategy development, both within and between local authorities;
5. to develop approaches for overcoming the financial and other barriers to effective implementation;
6. to enhance existing predictive models to reflect the impact of the wider range of policy instruments, and to facilitate interactive strategy development;
7. to improve the methods used for appraisal to reflect more effectively the requirements of sustainability.

2.4 Programme structure

The preparatory work for this proposal was conducted as part of a scoping study funded by EPSRC, work on which has been reported in a series of support documents available from the Programme Manager. In addition to developing our research ideas in consultation with end users, we carried out reviews of 25 key underlying issues.

We developed our programme structure, during the scoping study, through a series of discussions with local authorities, the Department for Transport and other stakeholders. In collaboration with our local authority partners, we identified the following five key stages in the development and implementation of a transport and land use strategy:

- problem identification;
- strategy development;
- scheme design;
- implementation; and
- operation.

Our proposal for a project to study the operation stage was not successful, and we have therefore had to omit consideration of this stage from this research programme.

For each of the remaining key stages we identified the barriers to effective strategy development and implementation, developed research proposals to tackle those barriers, and assigned priorities to them. From this longer list of potential research tasks, we identified nine which are priority needs for our local authority partners, and offer a significant research challenge. These have been grouped into our two broad research areas.

Within the key stages we identified, with our local authority partners, some 35 case studies which could usefully illustrate and inform our research. Three of our local authorities have offered case studies which cover all of these stages, and involve projects and processes which will be current throughout the four years of our research programme. Those local authority partners offering these case studies are referred to as “super sites”. They are Bristol City Council, Surrey County Council and Merseytravel.

With the encouragement of the local authorities, we have grouped the case studies into four clusters, which will be managed by the local authorities themselves, and will provide an opportunity for the members of a cluster to learn from one another, as well as from our research. The clusters will also be a research resource for the project team to learn from practical experience. Two of the clusters map directly onto our two broad areas of research; the other two apply that research to two main areas of policy in which the local authorities have particular interest: development projects and sustainable transport modes. Some of the case studies in each cluster will be “laboratory” case studies which we will use intensively in our research; others will be “comparator” case studies for use by the clusters as part of the learning and dissemination process. Further details of the case studies are given in Annex 1. It should be noted that the case study list may be modified during the course of the research programme.

Figure 1 illustrates the overall project structure. It shows:

- the stages of strategy development which local authorities need to pursue (in the centre);
- Project A, which provides an integrative role for this whole programme;
- the two broad areas of research and, within them, the other six technical projects (B to G) and the two projects which are yet to be funded (to left and right);
- the four clusters (1 to 4);
- the horizontal task of coordination and dissemination.

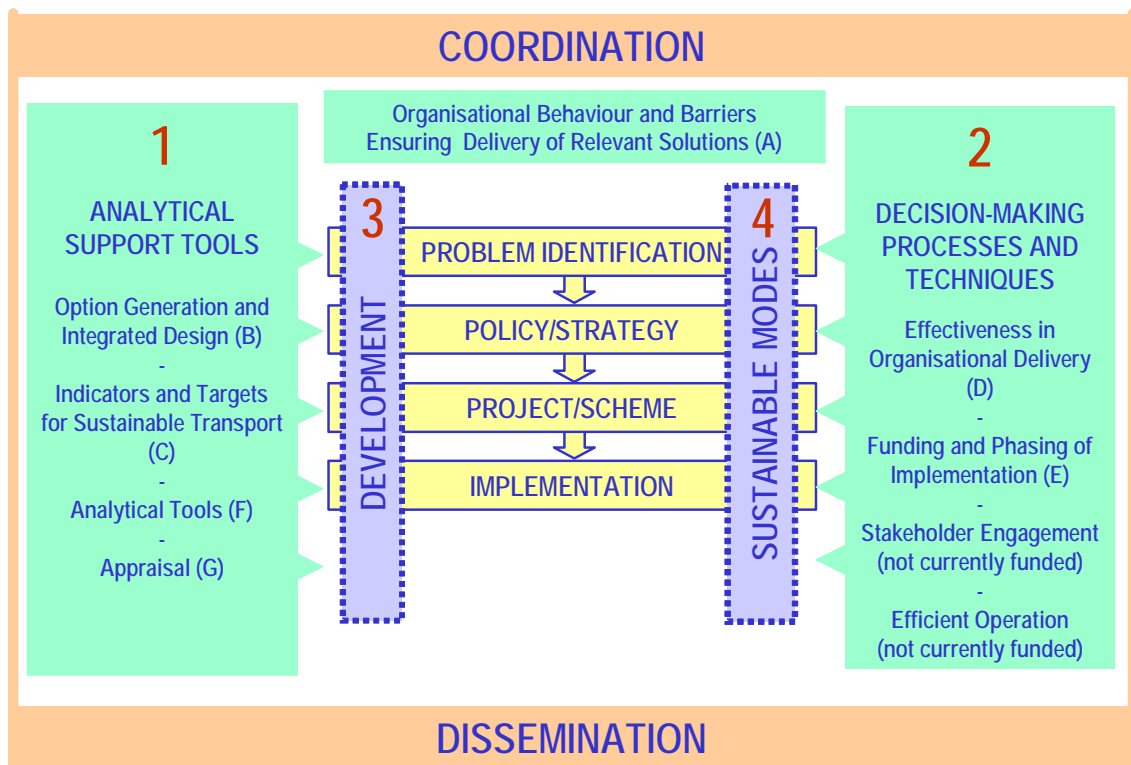


Figure 1: DISTILLATE Scope and Content

Key:

1, 2, 3, 4: Clusters

A, B, C, D, E, F, G: Projects

Figure 2 illustrates the interaction, within the programme between Project A, the other six technical projects (B to G), and the horizontal task of coordination and dissemination.

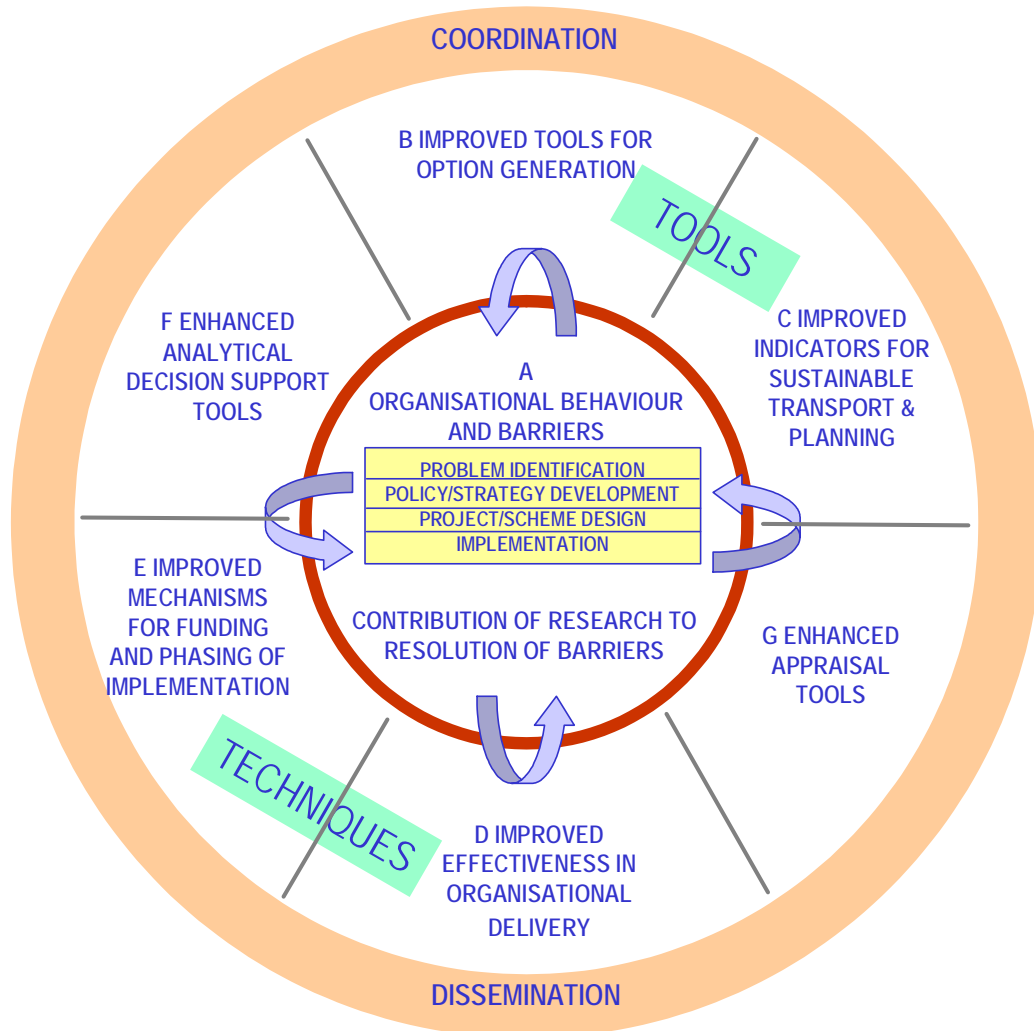


Figure 2: DISTILLATE Projects

2.5 Research tasks and projects

This section outlines the objectives of each of the seven technical projects, relating them to the programme sub-objectives listed above. Each is described more fully in Section 3.

Project A (Organisational Behaviour and Barriers) produces a conceptual map of the problems and issues affecting the delivery of integrated and sustainable transport and land use solutions (sub-objective 1), and provides the central integrative core of the whole research project.

Project B (Improved Tools for Option Generation) develops option generation tools, which will improve the quality of transport/land use strategies and schemes by enhancing the range, innovation and quality of the options input to the forecasting and appraisal procedures (sub-objective 2).

Project C (Improved Indicators for Sustainable Transport & Planning) establishes an effective set of core indicators that is able to encapsulate the concerns of various stakeholder groups, to be transparent and measurable, and to take due account of links with forecasting and appraisal (sub-objective 3).

Project D (Improved Effectiveness in Organisational Delivery) develops ways of overcoming institutional barriers to the effective development and delivery of strategies (sub-objective 4).

Project E (Improved Mechanisms for Funding and Phasing of Implementation) seeks to develop improved methods for dealing with different funding regimes that could affect successful implementation and to suggest how phasing of implementation should be handled at the planning stage (sub-objective 5).

Project F (Enhanced Analytical Decision Support Tools) enhances existing predictive transport and land use models so that they can be used more effectively and intensively by local authorities and other stakeholders (sub-objective 6).

Project G (Enhanced Appraisal Tools) explores improvements in appraisal methods to reflect more effectively the requirements of sustainability (sub-objective 7).