

**ENVIRONMENT & SUSTAINABLE DEVELOPMENT  
KEY ACTION 4**

# ***The City of Tomorrow and Cultural Heritage***



**FP5  
PROJECTS**

<http://www.cordis.lu/eesd/ka4/home.html>

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# **How does this document work?**

The projects are listed alphabetically by the priority area of the Key Action in which they fall. You will find each priority area listed in the Section II. Section III lists all the projects. Section IV lists all the clusters, which have been established around different projects and which are centred on strategic thematic areas. Section V includes full tables outlining each project, including project titles, work descriptions, contact details, and a list of participants. Web-site addresses can be found at the start of each sub-section.



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# I. Introduction

The *City of Tomorrow and Cultural Heritage* Key Action aims to improve urban sustainability through delivering real, noticeable benefits to citizens throughout the EU by 2010. It will achieve this:

- by concentrating these resources on four specific areas:
  - city planning and management,
  - cultural heritage,
  - built environment,
  - urban transport,

where action is urgently required, and where there is untapped technological potential and strong demand for new solutions from cities themselves;

- by focusing primarily on the integration and co-ordination of outputs from other EU and national research programmes, thus avoiding duplication of effort;
- by selecting only projects likely to have significant impacts, regionally and at European level, managing and clustering them with a view to practical implementation and the transferability of their results;
- by ensuring appropriate end-user involvement, and creating transnational networks with the capacity, opportunity and motivation to continue to exploit and disseminate results after the research phase is completed.

The Key Action has thus been specifically designed to ensure rapid, EU-wide take-up of practical new approaches to urban governance, planning and management. It is expected to produce, within a decade, measurable advances in economic development, environmental performance and quality of life, which will directly benefit the 80% of EU citizens, who now live in cities and large towns.

This document includes the main projects that relate to the Key Action within the Fifth Framework Programme. Following changes within the Research DG, a number of INCO projects (International Cooperation in Research) are managed alongside within the City of Tomorrow & Cultural Heritage Key Action. These projects involve research into cultural heritage preservation and integration in the Med-countries. They are listed under Section 4.2 of this guide.





## **II. List of priority areas**

### **4.1 Sustainable city planning and rational resource management**

- 4.1.1 Improving urban governance and decision making
- 4.1.2 Improving the quality of urban life
- 4.1.3 Improving economic development, competitiveness and job creation in city centres and neighbourhoods

### **4.2 Protection, conservation and enhancement of European cultural heritage**

- 4.2.1 Improved damage assessment on cultural heritage
- 4.2.2 Development of innovative conservation strategies
- 4.2.3 Foster integration of cultural heritage in the urban setting

### **INCO projects (International Co-operation in research)**

### **4.3 Development and demonstration of technologies for safe, economic, clean, effective and sustainable preservation, recovery, renovation, construction, dismantling and demolition of the built environment, in particular for large groups of buildings**

- 4.3.1 Sustainable construction and reconstruction of large groups of buildings and urban infrastructure
- 4.3.2 Optimum use of urban land and rehabilitation of brownfield sites

### **4.4. Comparative assessment and cost effective implementation of strategies for sustainable transport systems in an urban environment**

- 4.4.1 Strategic approaches and methodologies in urban planning towards sustainable urban transport
- 4.4.2 Comparative assessment and demonstration of novel transport forms and related infrastructure



### III. List of projects in each priority area

#### 4.1 Sustainable city planning and rational resource management

##### 4.1.1 Improving urban governance and decision making

ACRONYM	TITLE	
<b>COMMUNAL LABELS</b>	Development of instruments for labelling, benchmarking and TQM for (energy-) efficient communities	31
<b>DEMOS</b>	Democratic Participation in Urban Governance	33
<b>DISCUS</b>	Developing Institutional and Social Capacity for Urban Sustainability	34
<b>ECOPADEV</b>	Developing new decision-making tools to promote the sustainable development in European cities based on eco-industrial park strategy	37
<b>GREENSCOM</b>	Communicating Urban Growth and Green: assessment of planning concepts and policy instruments for sustainable development of the urban landscape	39
<b>IANUS</b>	Indicator system to assess new urban services. Improving decision making through evaluation	43
<b>INTEGAIRE</b>	Integrated urban governance and air quality management in Europe	45
<b>INTERACT</b>	Integrated Urban governance for the City of Tomorrow	47
<b>LASALA</b>	Eco-efficient urban management and new models of urban governance: the evaluation of LA21 in European local authorities through "concerted self assessment"	48
<b>LASALA-ONLINE</b>	Local agenda 21 self-assessment for local authorities on-line	51
<b>PASTILLE</b>	Promoting action for sustainability through indicators at the local level in Europe	53
<b>PEGASUS</b>	Planning, Environment, Governance and Sustainability	55
<b>PLUS</b>	Participation, leadership and urban sustainability	57
<b>RECOURSE</b>	Research and Education Centre for Urban Socio-Economic Development	59
<b>SUDLAB</b>	Sustainable urban development laboratory	61
<b>SUT-GOVERNANCE</b>	Sustainable urban tourism: involving local agents and partnerships for new forms of governance	63
<b>UGIS</b>	Urban development programme, urban governance, social inclusion and urban sustainability	65
<b>URBEST</b>	Urban best practices	67
<b>URBS PANDENS</b>	Urban Sprawl: European Patterns, Environmental Degradation and Sustainable Development	69

## 4.1.2 Improving the quality of urban life

ACRONYM	TITLE	
<b>AWAST</b>	Aid in the management and European Comparison of a municipal solid waste treatment for a global & sustainable approach	71
<b>AGORA</b>	Cities for People	73
<b>BUGS</b>	Benefits of urban green space	75
<b>CAST</b>	Process and software tools for analysis and simulation of development of cities into the future	77
<b>CLEANAIR</b>	Increased quality of life for 76 million EU citizens by enhancing air quality in urban areas through development of a residential cleaning technology for burning solid fuel for domestic use	79
<b>ENTRUST</b>	Empowering Neighbourhood Through Recourse of Urban Synergies with Trades	81
<b>EUROCULT21</b>	Urban cultural profiles exchange project	85
<b>EUWMC</b>	European urban waste management cluster	89
<b>FUMAPEX</b>	Integrated Systems for Forecasting Urban Meteorology, Air Pollution and Population Exposure	91
<b>GREENCLUSTER</b>	Clustering of five ongoing research projects on green space in urban areas	93
<b>GREENSPACE</b>	The contribution of urban green-space to quality of life	95
<b>HOMESERVICES</b>	Benchmarking sustainable services for the housing sector in the city of tomorrow	97
<b>INDICATORS FOR SOCIAL URBAN SUSTAINABILITY</b>	Formal Indicators of Social Urban sustainability	99
<b>INERWASTE</b>	Development of a new wastes inerting technique for landfilling or valorisation	101
<b>LCA-IWM</b>	The Use of Life Cycle Assessment Tools for the Development of Integrated Waste Management Strategies for Cities and Regions with Rapid Growing Economies	103
<b>LUDA</b>	Improving the quality of life in large urban distressed areas	107
<b>MICRODRAINAGE</b>	Development of a cost-effective solution for the safe and definitive remediation of the European landfills which present the danger for the leachate to pollute the waterbed	109
<b>NEHOM</b>	Evaluating housing and neighbourhood initiatives to improve quality of life of deprived urban neighbourhoods and assessing their transferability across Europe	111
<b>NOZONE</b>	An intelligent responsive pollution and odour abatement technology for cooking emission extraction systems	113
<b>ORMA</b>	Optimisation of resource use and waste management in an Eco Industrial Park	115
<b>ACRONYM</b>	<b>TITLE</b>	

<b>OSCAR</b>	Optimised Expert System for Conducting Environmental Assessment of Urban Road Traffic	117
<b>PAYT</b>	Variable rate pricing based on pay-as-you-throw as a tool of urban waste management	118
<b>PETUS</b>	Practical Evaluation Tools for Urban Sustainability	121
<b>PUB+</b>	Accessibility to the public utility buildings for urban citizens with mobility impairments. The socio-economic comparative studies.	123
<b>RELIEF</b>	Environmental relief potential of urban action on avoidance and detoxification of waste streams through green public procurement	125
<b>RESTATE</b>	Restructuring Large-scale Housing Estates in European Cities: Good Practices and New Visions for Sustainable Neighbourhoods and Cities	129
<b>RE URBAN MOBIL</b>	Mobilizing RE-urbanisation on condition of demographic change	130
<b>RUROS</b>	Rediscovering the urban realm and green spaces	133
<b>SAPPHIRE</b>	Source Apportionment of Airborne Particulate Matter and Polycyclic Aromatic Hydrocarbons in Urban Regions of Europe	136
<b>SELMA</b>	Spatial deconcentration of economic land use and quality of life in European metropolitan areas	138
<b>SPECTRA-PERSEUS</b>	Permanent research in spatial development in the context of EU enlargement and information society advancement	140
<b>SURE</b>	A Time-Oriented model for Sustainable Urban Regeneration	142
<b>S.W.A TOOL</b>	Development of a methodological tool to enhance the precision and comparability of solid waste analysis data	144
<b>TOOLSUST</b>	The involvement of stakeholders to develop and implement tools for sustainable households in the city of tomorrow	147
<b>URBAN AEROSOL</b>	Characterisation of urban air quality indoor/outdoor particulate matter chemical characteristics and source-to-inhaled dose relationships	149
<b>URBAN EXPOSURE</b>	Integrated Exposure Management Tool Characterizing Air pollution-relevant Human Exposure in Urban Environment	151
<b>URBEM</b>	Urban River Basin Enhancement Methods	153
<b>URBSOIL</b>	Urban soils as a source and sink for pollution	155
<b>URGE</b>	Development of urban green spaces to improve the quality of life in cities and urban regions	156
<b>WATERTIME</b>	Improving the quality of urban life through sustainable decision-making on city water system reform	160

#### **4.1.3 Improving economic development, competitiveness and job creation in city centres and neighbourhoods**

<b>ACRONYM</b>	<b>TITLE</b>	
<b>COMET</b>	Competitive Metropolises - Economic Transformation, Labour Market and Competition in European Agglomerations	162
<b>MASURIN</b>	Management of Sustainable Revitalising Urban Industrial Sites	163
<b>OPTIAS</b>	Development of a Management Concept for Optimising the Location Strategy (Optias) in Urban and Suburban Commercial Properties	166
<b>SUPER</b>	Sustainable urban planning and economic (re)development	168
<b>URBAN CATALYSTS</b>	Strategies for temporary uses- potential for development of urban residual areas in European metropolises	170

## 4.2 Protection, conservation and enhancement of European cultural heritage

### 4.2.1 Improved damage assessment on cultural heritage

ACRONYM	TITLE	
<b>BIOBRUSH</b>	Novel approaches to conserve our European heritage: Bioremediation for Building Restoration of the Urban Stone Heritage in European States	178
<b>CARAMEL</b>	Carbon content and origin of damage layers in European monuments	180
<b>DEMOTEC A</b>	Development Of A Monitoring System For Cultural Heritage Through European co-operation	182
<b>ESDCON</b>	European Salt Damage Conservation Network	184
<b>FIRE-TECH</b>	Fire Risk Evaluation to European Cultural heritage-Quantification of priorities and optimisation of fire protection strategies	188
<b>FRIENDLY HEATING</b>	Friendly heating: comfortable to people and compatible with conservation of art works preserved in churches	190
<b>IDAP</b>	Improved Damage Assessments of parchments	192
<b>IMPACT</b>	Innovative modelling of museum pollution and conservation thresholds	194
<b>ITER</b>	Isotopic Technologies applied to the analysis of ancient mortars	196
<b>LIDO</b>	A light dosimeter for monitoring cultural heritage: development, testing and transfer to market	198
<b>MIMIC</b>	Motorclimate indoor monitoring in cultural heritage preservation	200
<b>MODHT</b>	Monitoring of Damage in Historic Tapestries	202
<b>MULTI-ASSESS</b>	Model for multi-pollutant impact and assessment of threshold levels for cultural heritage	204
<b>ONSITEFOR-MASONRY</b>	On-site investigation techniques for the structural evaluation of historic masonry buildings	206
<b>VIDRIO</b>	Determination of conditions to prevent weathering due to condensation, particle deposition and micro-organism growth on ancient stained glass windows with protective glazing	210

### 4.2.2 Development of innovative conservation strategies

<b>ACRONYM</b>	<b>TITLE</b>	
<b>ASSET</b>	Assessment of suitable products for the conservation treatments of seas-salt decay	212
<b>BACPOLES</b>	Preserving cultural heritage by preventing bacterial decay of wood in foundation poles and shipwrecks	214
<b>BIODAM</b>	Inhibitors of biofilm damage on mineral materials	216
<b>BIOREINFOR-CE</b>	Biomediated calcite precipitation for monumental stones reinforcement	218
<b>CATS</b>	Cyanobacteria attack rocks:control and preventative strategies to avoid damage caused by cyanobacteria and associated microorganisms in roman hypogean monuments	220
<b>COALITION</b>	Concerted action on molecular microbiology as an innovative conservation strategy for indoor and outdoor cultural assets	222
<b>COLLAPSE</b>	Corrosion of Lead and lead-Tin Alloys of Organ Pipes in Europe	224
<b>COMPASS</b>	Compatibility of Plasters and Renders with Salt loaded Substrates in Historic Buildings	226
<b>CONTROLLED PAPER CLEANING</b>	Controlled paper cleaning using laser technology	228
<b>DIAS</b>	Integrated tool for in situ characterization of effectiveness and durability of conservation techniques in historical structures	230
<b>HISTO-CLEAN</b>	Intelligent Measurment Technology For Laser Cleaning Of Historic Buildings And Monuments	232
<b>INKCOR</b>	Stabilisation of Iron Gall Ink Containing paper	234
<b>LASERACT</b>	Laser multitask non destructive technology in conservation diagnostic procedures	235
<b>MASTER</b>	Preventive Conservation Strategies for Protection of Organic Objects in Museums, Historic Buildings and Archives	237
<b>MIP</b>	Transitional Metals in Paper	239
<b>PAPYLUM</b>	Chemiluminescence: a novel tool in paper conservation studies	243
<b>ROCEM</b>	Roman cement to restore built heritage effectively	245

#### **4.2.3 Foster integration of cultural heritage in the urban setting**



<b>ACRONYM</b>	<b>TITLE</b>	
<b>APPEAR</b>	Accessibility Projects sustainable Preservation and Enhancement of urban subsoil Archaeological Remains	247
<b>SUIT</b>	Sustainable development of urban historical areas through active integration within towns	249

## **INCO projects on cultural heritage**

<b>ACRONYM</b>	<b>TITLE</b>	
<b>ACHIMED</b>	Archaeological composites in Mediterranean architecture : baked glass ceramics alteration and re-creation	251
<b>CAHRISMA</b>	Conservation of the acoustical heritage by the revival and identification of the Sinan's Mosque's acoustics	253
<b>CHIME</b>	Conservation of historical Mediterranean sites by innovative seismic-protection techniques	257
<b>FORTIMED</b>	Restoration and use of the early medieval fortifications in the east Mediterranean countries	258
<b>HERCOMANES</b>	Heritage conservation and management in Egypt and Syria	261
<b>JEWELMED</b>	Comparative Analysis Of Manufacturing Technologies In Goldsmithing And Silversmithing From The seventh to the first Century B.C In The Mediterranean Area	262
<b>TEXMED</b>	New materials and eco-sustainable technologies for the conservation and restoration of textiles	264

## **4.3 Development and demonstration of technologies for safe, economic, clean, effective and sustainable preservation, recovery, renovation, construction, dismantling and demolition of the built environment, in particular for large groups of buildings**

### **4.3.1 Sustainable construction and reconstruction of large groups of buildings and urban infrastructure**

<b>ACRONYM</b>	<b>TITLE</b>	
<b>CRISP</b>	Construction and city related sustainability	270
<b>CURE</b>	Centre for Urban Construction and Rehabilitation: Technology Transfer, Research and Education	274
<b>HQE<sup>2</sup>R</b>	Sustainable renovation of buildings for sustainable neighbourhoods	276
<b>IRMA</b>	Integrated decontamination and rehabilitation of buildings, structures and materials in urban renewal	279
<b>PRESCO</b>	European thematic network on practical recommendations for sustainable construction	281
<b>RISK-UE</b>	An advanced approach to earthquake risk scenarios with applications to different European towns	285
<b>RUFUS</b>	Re-use of Foundations for Urban Sites	287
<b>SAFEFLOOR</b>	Low risk and totally recyclable structural buildings	289
<b>SHE</b>	Sustainable housing in Europe	291
<b>SUREURO</b>	Sustainable refurbishment Europe	293
<b>WAMBUCO</b>	European Waste Manual for Building Construction	297

### **4.3.2 Optimum use of urban land and rehabilitation of brownfield sites**

<b>ACRONYM</b>	<b>TITLE</b>	
<b>CABERNET</b>	Concerted action on brownfield and economic regeneration network	301
<b>HYGEIA</b>	Hybrid geophysical technology for the evaluation of insidious contaminated areas	304
<b>NORISC</b>	Network orientated risk assessment by in-situ screening of contaminated sites	306
<b>RESCUE</b>	Regeneration of European sites in cities and urban environment	308

## **4.4. Comparative assessment and cost effective implementation of strategies for sustainable transport systems in an urban environment**

### **4.4.1 Strategic approaches and methodologies in urban planning towards sustainable transport**

<b>ACRONYM</b>	<b>TITLE</b>	
<b>ARTISTS</b>	Arterial Streets towards sustainability	314
<b>ASI</b>	Assess implementations in the frame of the Cities-of-Tomorrow programme	316
<b>ASTRAL</b>	The diffusion, exploitation, transfer and take-up of research results from a cluster of research projects undertaken under Task 4.4.1 of the City of Tomorrow and Cultural Heritage Key Action	318
<b>CITY FREIGHT</b>	Inter- and intra-city freight distribution network	320
<b>ECOCITY</b>	Urban development towards appropriate structures for sustainable transport	322
<b>ISHTAR</b>	Integrated software for health, transport, efficiency and artistic heritage recovery	324
<b>PLUME</b>	Planning and Urban Mobility in Europe	326
<b>PROMPT</b>	New means to promote pedestrian traffic in cities	328
<b>PROPOLIS</b>	Planning and research of policies for land use and transport for increasing urban sustainability	330
<b>PROSPECTS</b>	Procedures for recommending optimal sustainable planning of European city transport systems	332
<b>SCATTER</b>	Sprawling cities and transport: from evaluation to recommendations	334
<b>SUTRA</b>	Sustainable urban transportation	336
<b>TRANSPLUS</b>	Transport planning, land use and sustainability	338
<b>VELOINFO</b>	The European Network for Cycling Expertise	342

### **4.4.2 Comparative assessment and demonstration of novel transport forms and related infrastructure**

<b>ACRONYM</b>	<b>TITLE</b>	
<b>CYBERMOVE</b>	Cybernetic transportation systems for the cities of tomorrow	344
<b>ECTOS</b>	Ecological city transport system: demonstration, evaluation and research project of Hydrogen fuel cell bus transportation system of the future	346
<b>EDICT</b>	Evaluation and demonstration of innovative city transport	348
<b>MOSES</b>	Mobility Services for Urban Sustainability (car sharing)	350
<b>NETMOBIL</b>	New Transport system concepts for enhanced and sustainable personal Mobility	351
<b>STARDUST</b>	Towards sustainable town development: a research on deployment of urban sustainable transport (driver assistance systems)	354

## IV. List of clusters of projects

No	Name of the cluster	Project acronym
<b>AREA 4.1 Sustainable city planning and rational resource management</b>		
1.	Air pollution	CLEANAIR, FUMAPEX, INTEGAIRE, NOZONE, OSCAR, SAPPHIRE, URBAN AEROSOL URBAN EXPOSURE,
2.	Greencluster	BUGS, GREENSCOM, GREENSPACE, RUROS, URGE
3.	Governance for urban sustainability	BUGS, COMMUNAL LABELS, DEMOS, DISCUS, EUROCULT21, GREENSCOM, GREENSPACE, IANUS, INTERACT, LASALA, NEHOM, PASTILLE, PEGASUS, PLUS, RUROS, SUT-GOVERNANCE, TOOL SUST, UGIS, URBAN CATALYSTS, URBS PANDENS, URGE
4.	Urban planning & economic development	COMET, ENTRUST, ECOPADEV, MASURIN, OPTIAS,
5.	Urban regeneration	ENTRUST, LUDA, NEHOM, RESTATE, RE URBAN MOBIL, SURE, URBAN CATALYSTS
6.	Urban waste management	AWAST, LCA-IWM, ORMA, PAYT, SWA-TOOL, RELIEF,
<b>AREA 4.2 Protection, conservation and enhancement of European cultural heritage</b>		
7.	Air pollution threshold levels for cultural heritage	CARMEL, MULTIASSESS
8.	Damage to historic buildings	ASSET, COMPASS, DIAS, ESDCON, ROCER,
9.	Environment inside museums	INK-COR, FRIENDLY HEATING, IDAP, IMPACT, LIDO, MASTER, MIMIC, MIP, MODHT, PAPYLUM, VIDRIO,
10.	Foster integration of cultural heritage into the urban setting	APPEAR, SUIT
11.	Novel microbiological tools for conservation	BIOREINFORCE, CATS, COALITION, BACPOLES, BIODAM, BIOBRUSH
<b>AREA 4.3 Development and demonstration of technologies for safe, economic, clean, effective and sustainable preservation, recovery, renovation, construction, dismantling and demolition of the built environment, in particular for large groups of buildings</b>		
12.	Brownfield regeneration	CABERNET, HYGEIA, NORISC, RESCUE
13.	Sustainable buildings and neighbourhoods	CRISP, HQE2R, PRESCO, SUREURO
<b>AREA 4.4. Comparative assessment and cost effective implementation of strategies for sustainable transport systems in an urban environment</b>		
<b>AREA 4.4.1 Strategic approaches and methodologies in urban planning towards sustainable transport</b>		
14.	Land use and transport (LUTR)	ASTRAL, ARTISTS, CITY FREIGHT, ECOCITY, ISHTAR, PLUME, PROPOLIS, PROMPT, PROSPECTS, SCATTER, SUTRA, TRANSPUS
<b>AREA 4.4.2 Comparative assessment and demonstration of novel transport forms and related infrastructure</b>		
15.	New transport system concepts for enhanced and sustainable personal urban mobility (NETMOBIL)	CYBERMOVE, CYBERCARS (IST), EDICT, STARDUST,



## V. Abstracts of projects

The projects detailed hereafter are classified per priority area

### 4.1 Sustainable city planning and rational resource management

#### 4.1.1 Improving urban governance and decision making

##### Summary Table

ACRONYM	NUMBER	TITLE PROJECT WEBSITE
COMMUNAL LABELS	EVK4-1999-0007	Development of instruments for labelling, benchmarking and TQM for (energy-) efficient communities <a href="http://www.communal-labels.de">http://www.communal-labels.de</a>
DEMOS	EVK4-2001-00105	Democratic Participation in Urban Governance <a href="http://www.demosproject.org">www.demosproject.org</a>
DISCUS	EVK4-2001-00103	Developing Institutional and Social Capacity for Urban Sustainability <a href="http://www.iclei.org/europe/discus">www.iclei.org/europe/discus</a>
ECOPADEV	EVK4-2001-00089	Developing new decision-making tools to promote the sustainable development in European cities based on eco-industrial park strategy <a href="http://www.ecopadev.net">www.ecopadev.net</a>
GREENSCOM	EVK4-1999-00006	Communicating Urban Growth and Green: assessment of planning concepts and policy instruments for sustainable development of the urban landscape <a href="http://www.greenscom.com">www.greenscom.com</a>
IANUS	EVK4-1999-00010	Indicator system to assess new urban services. Improving decision making through evaluation <a href="http://www.project-ianus.org/">http://www.project-ianus.org/</a>
INTEGAIRE	EVK4-2001-00080	Integrated urban governance and air quality management in Europe <a href="http://www.integaire.org">http://www.integaire.org</a>
INTERACT	EVK4-2001-00064	Integrated urban governance for the City of Tomorrow <a href="http://www.interact-network.org">www.interact-network.org</a>
ACRONYM	NUMBER	TITLE PROJECT WEBSITE

<b>LASALA</b>	EVK4-1999-00011	Eco-efficient urban management and new models of urban governance: the evaluation of LA21 in European local authorities through "concerted self assessment" <a href="http://www.iclei.org/europe/lasala/index.html">http://www.iclei.org/europe/lasala/index.html</a>
<b>LASALA-ONLINE</b>	EVK4-2002-00549	Local agenda 21 self-assessment for local authorities on-line <a href="http://www.iclei.org/europe/lasala">http://www.iclei.org/europe/lasala</a>
<b>NEHOM</b>	EVK4-2000-00027	Evaluating housing and neighbourhood initiatives to improve quality of life of deprived urban neighbourhoods and assessing their transferability across Europe <a href="http://www.nhh.no/geo/nehom">www.nhh.no/geo/nehom</a>
<b>PASTILLE</b>	EVK4-1999-00004	Promoting action for sustainability through indicators at the local level in Europe <a href="http://www.lse.ac.uk/Depts/geography/Pastille">http://www.lse.ac.uk/Depts/geography/Pastille</a>
<b>PEGASUS</b>	EVK4-CT-2002-80003	Planning, Environment, Governance and Sustainability
<b>PLUS</b>	EVK4-2001-00100	Participation, leadership and urban sustainability <a href="http://www.plus-eura.org">www.plus-eura.org</a>
<b>RECOURSE</b>	EVK4-CT-2002-80007	Research and Education Centre for Urban Socio-Economic Development <a href="http://recourse.univ.gda.pl">http://recourse.univ.gda.pl</a>
<b>SUDLAB</b>	EVK4-2002-00579	Sustainable urban development laboratory
<b>SUT- GOVERNANCE</b>	EVK4-1999-00001	Sustainable urban tourism: involving local agents and partnerships for new forms of governance <a href="http://sut.itas.fzk.de/">http://sut.itas.fzk.de/</a>
<b>UGIS</b>	EVK4-1999-00012	Urban development programme, urban governance, social inclusion and urban sustainability <a href="http://www.ufsia.ac.be/ugis">http://www.ufsia.ac.be/ugis</a>
<b>URBEST</b>	EVK4-2001-00068	Urban best practices
<b>URBS PANDENS</b>	EVK4-2001-00052	Urban Sprawl: European Patterns, Environmental Degradation and Sustainable Development <a href="http://www.pik-potsdam.de/gerhard/projekt">www.pik-potsdam.de/gerhard/projekt</a>



## 4.1.2 Improving the quality of urban life

ACRONYM	NUMBER	TITLE PROJECT WEBSITE
AGORA	EVK4-2000-00568	Cities for People
AWAST	EVK4-CT-2000-00015	Aid in the management and European Comparison of a municipal solid waste treatment for a global & sustainable approach <a href="http://awast.brgm.fr">http://awast.brgm.fr</a>
BUGS	EVK4-2000-00526	Benefits of urban green space
CAST	EVK4-CT-2002-00079	Process and software tools for analysis and simulation of development of cities into the future <a href="http://www.intesys.co.uk/castpublic/index.htm">http://www.intesys.co.uk/castpublic/index.htm</a>
CLEANAIR	CRAF-1999-71007	Increased quality of life for 76 million EU citizens by enhancing air quality in urban areas through development of a residential cleaning technology for burning solid fuel for domestic use
ENTRUST	EVK4-CT2001-20007	Empowering Neighbourhood Through Recourse of Urban Synergies with Trades <a href="http://www.entrust.soc.new.net/">http://www.entrust.soc.new.net/</a>
EUROCULT21	EVK4-CT-2002-20012	Urban cultural profiles exchange project
EUWMC	EKV4-2002-00575	European urban waste management cluster
FUMAPEX	EVK4-2001-00281	Integrated Systems for Forecasting Urban Meteorology, Air Pollution and Population Exposure
GREENCLUSTER	EVK-2002-00538	Clustering of five ongoing research projects on green space in urban areas
GREENSPACE	EVK4-2000-00039	The contribution of urban green-space to quality of life <a href="http://www.green-space.org">www.green-space.org</a>
HOMESERVICES	EVG3-2001-00025	Benchmarking Sustainable Services for the Housing Sector in the City of Tomorrow
INDICATORS FOR SOCIAL URBAN SUSTAINABILITY	EVK4-2000-35001	Formal Indicators of Social Urban sustainability
INERWASTE	CRAF-1999-72226	Development of a new wastes inerting technique for landfilling or valorisation
LCA-IWM	EVK4-2001-00185	The Use of Life Cycle Assessment Tools for the Development of Integrated Waste Management Strategies for Cities and Regions with Rapid Growing Economies
ACRONYM	NUMBER	TITLE PROJECT WEBSITE
LUDA	EVK4-2001-00152	Improving the Quality of Life in Large Urban Distressed Areas

<b>MICRODRAINAGE</b>	CRAF-1999-71827	Development of a cost-effective solution for the safe and definitive remediation of the European landfills which present the danger for the leachate to pollute the waterbed
<b>NOZONE</b>	CRAF-1999-71300	An intelligent responsive pollution and odour abatement technology for cooking emission extraction systems
<b>ORMA</b>	CRAF-1999-70125	Optimisation of resource use and waste management in an Eco Industrial Park
<b>OSCAR</b>	EVK4-2001-00159	Optimised Expert System for Conducting Environmental Assessment of Urban Road Traffic <a href="http://www.eu-oscar.org">www.eu-oscar.org</a>
<b>PAYT</b>	EVK4-CT-2000-00021	Variable rate pricing based on pay-as-you-throw as a tool of urban waste management <a href="http://payt.net">http://payt.net</a>
<b>PETUS</b>	EVK4-2001-00205	Practical Evaluation Tools for Urban Sustainability
<b>PUB+</b>	EVK4-CT-2002-80009	Accessibility to the public utility buildings for urban citizens with mobility impairments. The socio-economic comparative studies.
<b>RELIEF</b>	EVK4-CT-2000-00035	Environmental relief potential of urban action on avoidance and detoxification of waste streams through green public procurement <a href="http://www.iclei.org/ecoprocura/relief/">http://www.iclei.org/ecoprocura/relief/</a>
<b>RESTATE</b>	EVK4-CT-2002-00085	Restructuring Large-scale Housing Estates in European Cities: Good Practices and New Visions for Sustainable Neighbourhoods and Cities <a href="http://www.restate.geog.uu.nl">http://www.restate.geog.uu.nl</a>
<b>RE URBAN MOBIL</b>	EVK4-CT2002-00086	Mobilising RE-urbanisation on condition of demographic change <a href="http://www.re-urban.com">www.re-urban.com</a>
<b>RUROS</b>	EVK4-CT2000-00032	Rediscovering the urban realm and green spaces
<b>SAPPHIRE</b>	EVK4-2001-00192	Source Apportionment of Airborne Particulate Matter and Polycyclic Aromatic Hydrocarbons in Urban Regions of Europe
<b>SELMA</b>	EVK4-2001-00163	Spatial Deconcentration of Economic Land Use and Quality of Life in European Metropolitan Areas
<b>SPECTRA-PERSEUS</b>	EVK4-2002-00508	Permanent Research in spatial development in the context of EU enlargement and information society advancement
<b>ACRONYM</b>	<b>NUMBER</b>	<b>TITLE</b> <b>PROJECT WEBSITE</b>
<b>SURE</b>	EVK4-CT2002-00094	A Time-Oriented model for Sustainable Urban Regeneration
<b>S.W.A TOOL</b>	EVK4-CT-2000-00030	Development of a methodological tool to enhance the precision and comparability of solid waste analysis data <a href="http://swa-tool.net">http://swa-tool.net</a>

<b>TOOLSUST</b>	EVK4-2000-22026	The involvement of stakeholders to develop and implement tools for sustainable households in the city of tomorrow <a href="http://www.toolsust.org">http://www.toolsust.org</a>
<b>URBAN AEROSOL</b>	EVK4-2000-00018	Characterisation of urban air quality indoor/outdoor particulate matter chemical characteristics and source-to-inhaled dose relationships <a href="http://www.nilu.no/projects/urban-aerosol/">http://www.nilu.no/projects/urban-aerosol/</a>
<b>URBAN EXPOSURE</b>	EVK4-200100234	Integrated Exposure Management Tool Characterizing Air pollution-relevant Human Exposure in Urban Environment <a href="http://www.nilu.no/pip/">http://www.nilu.no/pip/</a>
<b>URBEM</b>	EVK-2001-00154	Urban River Basin Enhancement Methods <a href="http://www.urbem.net/">http://www.urbem.net/</a>
<b>URBSOIL</b>	EVK4-2001-00055	Urban soils as a source and sink for pollution <a href="http://urbsoil.paisley.ac.uk/">http://urbsoil.paisley.ac.uk/</a>
<b>URGE</b>	EVK4-2000-00554	Development of urban green spaces to improve the quality of life in cities and urban regions
<b>WATERTIME</b>	EVK4-2002-00271	improving the quality of urban life through sustainable decision-making on city water system reform

#### 4.1.3 Improving economic development, competitiveness and job creation in city centres and neighbourhoods

<b>ACRONYM</b>	<b>NUMBER</b>	<b>TITLE PROJECT WEBSITE</b>
<b>COMET</b>	EVK4-2001-00035	Competitive Metropolises - Economic Transformation, Labour Market and Competition in European Agglomerations

		Agglomerations <a href="http://www.oeaw.ac.at/isr/comet">www.oeaw.ac.at/isr/comet</a>
<b>MASURIN</b>	EVK4-2001-00058	Management of Sustainable Revitalising Urban Industrial Sites <a href="http://www.masurin.net">www.masurin.net</a>
<b>OPTIAS</b>	CRAF-1999-70880	Development of a Management Concept for Optimising the Location Strategy (Optias) in Urban and Suburban Commercial Properties <a href="http://www.optias.info/">http://www.optias.info/</a>
<b>SUPER</b>	EVK4-2002-00565	Sustainable urban planning and economic (re)development <a href="http://www.mep.tno.nl/SUPER">www.mep.tno.nl/SUPER</a>
<b>URBAN CATALYSTS</b>	EVK4- 2000-00544	Strategies for temporary uses- potential for development of urban residual areas in European metropolises

## **4.1 Sustainable city planning and rational resource management**



## 4.1.1 Improving urban governance and rational resource management

### COMMUNAL LABELS (Development of instruments for Labelling, Benchmarking and TQM for (Energy-) efficient communities)

**Project Reference:** EVK4-1999-00007  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-01-2000  
**End Date:** 31-12- 2001  
**Duration:** 24 months

#### Problems to be solved

The liberalisation of energy markets, the introduction of eco-taxes in various EU Member States and the urgency for comprehensive administrative reform presents communities with enormous challenges and opportunities to develop innovative and sustainable long-term energy policies. Thinking globally but acting locally by improving the energy efficiency of communities is a decisive criteria for reducing environmental pressure, whilst at the same time improving local economic performance. However, although many communities have already endeavoured to achieve higher energy efficiency, they often lack the suitable instruments and indicators for the comparable assessment of measures and the establishment of continuously improved energy policy. Small communities under 10,000 inhabitants, on the basis of their special situation (lack of know-how and lack of financial and personnel resources), need a special set of instruments. This project seeks to overcome these problems through assessing the barriers and instrument deficits to introducing innovative energy instruments in communities.

#### Scientific objectives and approach

Several regions within Germany, Austria and Switzerland have already come up with different approaches for improving energy efficiency in communities and in developing energy concepts. This project's aim is the introduction of new energy-related structures in public administration as well as new participatory models in energy policy, communal processes and administrative behaviour integrated in a quality management system for energy-related tasks and processes in communities. This will lead to the development of a differentiated certification system that allows communities the opportunity for self-assessment and benchmarking. A pilot test phase of the certification system in twelve communities in four countries will show the potential of improvement and advance the implementation of energy-efficient measures. Polish communities will provide a test-bed for the methodology in Central and Eastern Europe. For smaller communities, special instruments will be established for their specific needs. The gathered experiences will lead to the instrument "tool-kit" for the implementation of energy efficiency measures on a communal level, exemplary participatory processes for the inclusion of citizen and interest groups tested, and special measures for small communities with under 10,000 inhabitants delivered. Finally, the current status of research and practice EU-wide will be evaluated and advanced. Experiences will be exchanged and a transfer of know-how will take place during a series of workshops. The most manifest sign of sustainable local energy policies is the development of an EU-wide labelling and certification system documenting exemplary energy efficiency in communities. The label will in turn contribute to the economy and employment in these energy efficient communities.

#### Expected impacts

The project will lead to the creation of instruments that potentially can be used across the EU, as well as to countries of Central and Eastern Europe, to judge the energy efficiency of towns and communities and establish a quality management system for continuous energy work. These instruments build on the experience already existing within the countries examined in terms of local or communal energy concepts and develop an optimisation and evaluation system operating against the backdrop of changing energy policy conditions.

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## **DEMOS (Democratic Participation in Urban Governance)**

**Project Reference:** EVK4-CT-2001-00066  
**Contract Type:** Research

**Start Date:** 01-02-2002  
**End Date:** 30-06-2005  
**Duration:** 29 months

### **Problems to be solved**

Demos is responding to concerns about citizen apathy and mistrust of government, but also to many positive opportunities which exist to revitalise local democracy. Many cities across Europe recognise the need for innovative mechanisms for devolved, participatory local governance to achieve more effective local democracy, higher turn-out rates at elections and, more generally, social inclusion and sustainable development. Past experience of devolved approaches to local governance (area management) and enhancement of citizen participation in local decision-making, however, shows there are no ready, easily-applied models which can engender productive local participation in governance in municipalities. Rather the record in many cities has been one of initial enthusiasm for devolved governance followed by failure to achieve practical, sustainable outcomes. These recurring failures of participation have resulted in disinterest and even cynicism about governance on the part of citizens, and a discrediting of the concept of devolved participation amongst politicians and officers in local governments.

The proposed project is not only in synergy with key EU policies but actively contributes to them because of local authorities' role as the principal vehicle for delivery of national and European social policies to citizens:

- initiatives relating to urban issues, governance, sustainability and social inclusion, such as Sustainable Urban Development in the EU, European Governance – a White Paper, Social Policy Agenda, the Social Action Programme 1998-2000,
- actions related to facilitating wide-spread access to the new knowledge based economy, the European Employment Strategies and the very recent National Social Action Plans, Anti-Discrimination package 2000 and proposed 6<sup>th</sup> Environmental Action Programme.

### **Scientific objectives and approach**

The overall objective of Demos is to foster understanding of effective options for enhanced citizen participation in urban governance by comparison, across European political cultures, of a range of practical initiatives. With few exceptions, the contribution of research has not yet assisted local municipalities in breaking the cycle of failed initiatives described above. In part this is because research has tended to be carried out on a disinterested or neutral observer model, critically commenting on failed initiatives at a time when it is too late to constructively influence those initiatives, and in a situation in which local political culture and past experience of participation has a substantive influence on outcomes. Demos will take an action research approach to provide not only continual assessment of pilot actions tested in the partner cities but also constructive feedback and training through a learning network of stakeholders. The pilot actions will be preceded by an audit of existing good practice and the development of a research framework, and followed by evaluation and benchmarking. Dissemination of the replicable learning resulting from the project will be designed to contribute to the development of European policy and practice.

### **Expected impacts**

The concrete deliverables of Demos will include a database and published Report of Good Practice in Citizen Participation in Local Government on the project website. Reports detailing the conceptual framework, an assessment framework of indicators of achievement in citizen participation in municipal governance, and guidelines for pursuing innovations in local governance.

### **Coordinator**

#### 4.1.1 Improving urban governance and decision making

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## DISCUS (Developing Institutional and Social Capacity for Urban Sustainability)

**Project Reference:** EVK4-2001-00103  
**Contract Type:** Research

**Start Date:** 01-12-2001  
**End Date:** 30-11-2004  
**Duration:** 36 months

## Problems to be solved

The project is set up to research the following three key research questions:

1. What are the factors and conditions within urban local government that enable the development of organisational capacity for addressing the requirements of sustainable development, and through what mechanisms/policy processes are these employed?
2. How are participatory measures for involving stakeholders in decision-making processes influencing the development of social capital within all sectors of civil society?
3. What processes are occurring between local government and civil society to enable greater understanding of the roles that each has to play in achieving sustainable urban development, and what are the conditions which permit improved communication networks and a framework for capacity building?

Improving institutional capacity and social capital at the local level should provide more effective and participatory conditions for urban decision-making for sustainable development. Effective approaches to sustainable city planning are expected to contribute to an improvement in the quality of life of urban communities across Europe, and thus also increasing competitiveness of municipalities of varying sizes, and a range of political, cultural and socio-economic backgrounds.

By focusing on and investigating the factors and conditions that are conducive to the development of innovative and sustainable forms of urban systems and by providing valuable information in relation to the prerequisites for the successful implementation of urban sustainable development initiatives, the project clearly contributes to those EU policies outlined in a range of policy documents (e.g. Towards an urban agenda in the European Union and Sustainable Urban Development in the European Union: A framework for Action) and concerned with promoting urban sustainable development.

## Scientific objectives and approach

The objectives of the project are to examine the factors and conditions that permit good governance for urban sustainable development in European towns and cities, with an emphasis on identifying and understanding the relationship between institutional development/capacity-building in local government, and social capital formation/capacity-building in civil society.

A consortium composed of six research institutes, training agencies, local government organisations and NGO from across Europe, expert in academic research, policy and practice in urban governance and local sustainability, will conduct an extensive evaluation of the processes of institutional learning in local government, and of the relationship between civil society and local government in the sphere of urban sustainable development.

This will be achieved through a 36-month programme to include a review of capacity building and a detailed methodological framework, providing the structure for an in-depth evaluation of 40 case study local authorities. Fieldwork taking place in the selected local authorities will encompass document analysis, in-depth interviews with key actors (local government and other stakeholders), and questionnaires of a broad cross-selection of local government officers.

This project will advance the state-of-the-art by looking at the ways in which local government and civil society interact and by analysing the implications of these interactions for sustainable urban development. In addition, it can be argued that while individual aspects of what may constitute good practice of local sustainability have been already analysed in a number of research projects, it still remains to be identified what enables such good practice to emerge. Consequently, the formulation of comprehensive policy recommendations on this issue is a challenge that will be confronted within the frame of this project.

## Expected impacts

The project will provide a unique resource that will permit individual and comparative evaluation of conceptual knowledge and the development of policy guidelines for effective urban governance for sustainable development. The results will be made available for exploitation – in particular by the local authorities participating in the European Sustainable Cities and Towns Campaign, the European

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Commission, national governments and local authorities – through the publication of a Project Evaluation Report, Guidelines for European Sustainability Awards, and Policy Guidance for Effective Governance for Sustainability. The publication of these via the Project Website will permit wide dissemination to local authorities, agencies, and citizens across Europe and worldwide.

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## **ECOPADEV (Developing new decision-making tools to promote the sustainable development in European cities based on eco-industrial park strategy)**

**Project Reference:** EVK4-CT-2001-00064  
**Contract Type:** Combined RTD/DEMO

**Start Date:** 01-01-2002  
**End Date:** 31-06-2004  
**Duration:** 30 months

### **Problems to be solved**

ECOPADEV will research and develop decision-making tools for local authorities to improve town planning and local living conditions.. The strategy of Eco-industrial park development require the participation of industry, citizens and local authorities showing the real needs of the industry and citizens, and perspectives of local authorities for town planning

### **Scientific objectives and approach**

The main objective of the ECOPADEV project is the development of decision-making tools and methodologies for local authorities for promoting the sustainable city management in basis of Eco-industrial Parks development. In order to achieve this objective the following scientific objectives will be performed: Definition of harmonised guidelines to gather key data, Procedures to solve "conflict if interest", Indicators, Creation of extra-net communication systems, Definitions of management structure and Validation of designed decision-making tools in three European cities.

The project presents a problem solving approach, based on Eco-industrial park development. The strategy of Eco-industrial park development will permit to achieve global objectives, which would be more difficult by individual companies. Local authorities will join the city common interest with industrial park development in order to promote sustainable development. The industrial areas, which have high influence in social, economical and environmental aspects in the cities, will be one of the starting points for future social, economical and environmental challenges within the Framework of Local Authorities.

### **Expected impacts**

The positive interactions between administration and industry will promote several positive outputs to be used in town planning and sustainable development promotion by local authorities, other public organisations, industrial parks managers, industries and policy makers. Some expected benefits are also related to the Ecopark strategy applied: industrial symbiosis.

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## **GREENSCOM (Communicating Urban Growth and Green: Assessment of Planning Concepts and Policy Instruments for Sustainable Development of the Urban Landscape)**

**Project Reference:** EVK4-1999-00006  
**Contract Type:** Cost-sharing contracts

**Start Date:** 04-01-2000  
**End Date:** 30-06-2003  
**Duration:** 39 months

### **Problems to be solved**

Urban planners and decision-makers in many cities in Europe are facing the challenge of finding a good balance between urban open spaces and built up areas. Since this is a complex challenge that requires the involvement of various stakeholders and interests, the governance- and decision-making aspects are of major importance. Problems of urban open spaces are related to urban growth. If growth takes the form of expansion in the urban fringe, there is increased pressure of sub-urbanisation, urban sprawl and traffic on surrounding greenbelts. If there is growth in the existing city, there is the pressure of intensive use, building activities, fragmentation by roads, pollution and noise imposed on green areas and other open spaces in existing cities. In some of these open spaces, the so-called 'brownfields', pollution inherited from past industrial uses may pose difficulties to conversion for either housing or green functions. As a result there is increased pressure on the 'greenfields' in the urban fringe. In many cases, green areas become small and scattered, polluted and disturbed. Traditionally, urban growth and green are seen as competitive or even mutually exclusive. Yet cities have sometimes found ways to turn 'green fingers' or 'greenways' into the backbones of urban development. Policies and projects have been launched aiming at both sustainable economic and ecological development. The GREENSCOM project focuses on learning from success and failure of local government experiences in this context.

### **Scientific objectives and approach**

Abundant technical knowledge is available on greenstructures and urban open spaces, but the 'process-knowledge' of communication strategies, planning concepts and policy instruments often remains underexplored. Learning about these strategies and instruments is the central research objective of GREENSCOM. The project consists of a series of working packages that each have a clearly circumscribed output. The outcome of the project as a whole is a toolkit. The toolkit consists of communication strategies and policy instruments recommended under specified conditions. The tools are neither 'blueprints'-nor recipes, but methods and approaches that can stimulate a deliberate process of learning by doing at the local level. The tools will be useful to those involved in governing urban growth and green at both the strategic and operational levels.

The research approach lead to a project in three phases. First, relevant questions and hypotheses regarding communication and policy instruments were formulated in interaction with the cities involved. Then, a framework was developed that allowed for comparative study of the cases. In the second phase, this framework was used for case studies in five European countries. The third phase is an assessment of the cases and leads to the toolkit. In all phases researchers closely work together with urban practitioners. The assessment of the fourteen case studies in Gothenburg, Helsinki, Tampere, Aarhus, Houten, Utrecht and Cergy Pontoise started in the summer of 2002. The toolkit development processes will be achieved in the summer of 2003.

### **First results and questions tackled**

Greenscom research shows how modern governance and a communicative approach can enhance the performance of municipal organisations, contribute to the improvement of green space (ecological quality, user quality, identity) and reduce conflicts over land use. The Uggedal case in Gothenburg, for example, shows how the involvement of current inhabitants helped to save recreational green areas for the future generations and prevented time-consuming appeal procedures.

Recent political developments in NW Europe and frustrated voters force us to critically review the relationship between decision-makers and citizens. Which changes are feasible and desirable to enhance representation of the interests of the various social groups in planning processes for the integration of green space in urban development ?

Urban pressure on green space also necessitates the identification of approaches that reinforce the role of public green in urban development planning.

##### New instruments, new capacities

It is especially the 'tools in transition' that deserve attention. At the same time, however, the roles, capacities and attitudes of the planners are also of prime importance in attempts to combine expert knowledge with the knowledge of citizens and users and to establish contacts between citizens and users and the decision-makers. The self-management case study in Utrecht shows that the management of public green by residents enhances the quality of the green space and contributes to well-being and social cohesion.

A new procedure has been developed by the Helsinki local authorities. It is based on an inventory of the green amenities in a district, and both densification and the development of the green areas are planned simultaneously.

##### When top-down? When bottom-up?

When to aim for top-down approaches and when for bottom-up? Communication is a time-consuming and therefore costly process. At the same time, data on the economic benefits of improved social relations and integrated plan quality are scarce. The objective should not be as much communication as possible, but adequate and effective communication. At the strategic level in particular, instruments that give citizens more access to the decision-making process are rare. Do citizens have a say in the strategic decisions that cities make in the context of the international competition between cities? The Cergy Pontoise cases demonstrate the importance of both centralised (timely provision of public transport for new districts) and local initiatives and show the French alternative to a district-oriented approach.

The Aarhus case in Denmark shows how a planner mobilised public support for reopening the river, by making a hole in the street through which: Hole in the street, Aarhus>

##### What can municipal authorities do to improve their communication?

How can municipal organisations adapt more adequately to a strengthened role of citizens and users in balancing urban growth with green space? To guarantee public interest and stimulate citizens to take initiatives and assume responsibility in a new social context, some legal conditions are essential and adequate plans and financial procedures are indispensable.

How can municipal organisations assess the quality of their communication with the public? Among the criteria that should be applied to evaluate the communication with citizens are shared learning and mutual trust. Communication maps can also help to inventory communicative relations and identify missing stakeholders.

The Greenscom project has studied fourteen cases in a context of densification, development at the urban fringe and maintenance and management of existing green space. In the course of 2003, articles will be published, a conference organised and the toolkit for urban practitioners, based on the findings of the Greenscom project, will be launched.

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## **IANUS (Indicators system to Assess New Urban Services. Improving decision making through evaluation)**

**Project Reference:** EVK4-1999-00010  
**Contract Type:** Cost-sharing contracts

**Start Date:** 02-01-2000  
**End Date:** 30-09-2002  
**Duration:** 33 months

### **Problems to be solved**

Indicators System to Assess New Urban Services (IANUS): A major activity of public administrations is devoted to create facilities and supply services in order to provide a response to growing social demand for quality of life and to improve the competitiveness of cities. Despite the vast number of experiences performed there is a lack of objective knowledge about the results of building facilities and implementing new services, throughout the countries of the EU, and affecting particularly local administrations. As a result of that, there is an uncertainty on the achievement of objectives both in facilities in operation and when planning new facilities. In order to cover that shortcoming, the IANUS project provides urban managers with a tool to assess the overall satisfaction of public facilities in economic, functional, social and environmental terms. That tool helps to plan correction actions on current facilities, and to get a more accurate definition of new ones.

The project provides the following value added to European Union policies: It helps to improve urban quality of life, as it includes the criteria of citizen and user satisfaction as a key indicator to evaluate public facilities. It improves competitiveness of the cities, helping them to provide citizens with more attractive facilities and services. It promotes a model of public investment that takes into account sustainability. It contributes to harmonise evaluation criteria among different administrations. It allows the establishment of systems for comparing the facilities of different countries using unified indicators. It allows, through comparison, the prediction of new demands manifested in other parts of Europe.

### **Scientific objectives and approach**

The usual process of investment in public constructions takes into account only two steps: drawing up the project and carrying out the construction. The project proposes a new approach in which investment is considered as a global investment cycle, whose different stages include previous experiences in order to improve on them. That global investment cycle involves a promotion phase, a programming phase, drawing up the project, carrying out the works, an operational phase and the deconstruction. Interrelations between different stages and feedback from them allow to gather experience, and so to improve management. Within this approach, the project provides a tool for evaluating experiences at the operational stage of facilities, that allows covering shortcomings through next items: It provides a global method for the evaluation of facilities in functional, economical, user satisfaction and environmental terms. It provides objective data facilitating the decision-taking process on new public investments, and so helping to improve urban government. It provides a multidisciplinary point of view based on criteria supplied by public managers, technicians, citizens and service users. It provides a base of comparable items, which can serve as a point of reference for evaluation. It provides a tool for the global analysis of facilities already in operation, allowing planning correction actions.

### **Expected impacts**

Prospects of the project include huge dissemination and exploitation plans to spread its use by public investors throughout the EU. Consequences expected from this are: a better quality of life of citizens, by building new equipment more accurately designed to fulfil their needs; better environmental criteria when building public constructions, getting a lower environmental impact, and more efficient and saving energy buildings; integration of social collectives with special needs by implementing criteria of design for all (elderly, children, disabled persons) through a friendly architecture; contribution to policies to fight the degradation of urban centres, regeneration of less favoured-areas and combating social exclusion by a better assessment of the actions required. This means that IANUS project will help to promote sustainable development, to make cities more competitive and to offer better services to its citizens.

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## **INTEGAIRE (Integrated urban governance and air quality management in Europe)**

**Project Reference:** EVK4-2001-00080  
**Contract Type:** Thematic Network

**Start Date:** 1.03.2002  
**End Date:** 28.02.2005  
**Duration:** 3 years

### **Problems to be solved**

INTEGAIRE aims to explore solutions to key challenges for urban governance and air quality management throughout Europe. The principal objectives are:

The first focuses on urban governance and concerns the development of the existing weak and poorly specified interface between, on the one hand, air quality assessment, management and monitoring tools developed in relation to the urban environment, and on the other hand, tools for sustainable urban governance at the urban level. The aim is to encourage the development of a strongly integrated model and appropriate tools linking air quality science and technology to the needs of end users at the urban level, and thereby optimise local decision-making;

The second horizontal objective concerns the development of a coherent and comprehensive framework of network activities that facilitates the identification of RTD gaps and future RTD priorities in the field of urban air quality management and urban governance. These initiatives will assist the development, and provide a sound basis for, the new research agenda, that will be pursued via the 6th Framework Programme and the European Research Area.

### **Scientific objectives and approach**

INTEGAIRE aims to contribute to:

- Improving the implementation at urban level of current Air Quality legislation through the development of recommendations and exchange of experience on air quality management, air quality assessment, integration of national and local practice and public information.
- Information exchange on approaches and successes on the development and/or implementation of local action. This activity focuses on the results of European & national research and its usefulness in the local context and on sharing this information with ongoing work on European policy developments, feeding into the European "Clean Air For Europe" (CAFE) initiative.
- Integration between local and European levels in development of EU Air Quality policy (CAFE)
- Interactions with existing RTD activities on Air Quality (SATURN, relevant FP5 projects including ISHTAR, URBAN-AEROSOL and BUGS, and relevant national/ local projects/programmes) to promote the use of research results and new tools in Air Quality management and to identify gaps in available information, highlighting research priorities

### **Expected impacts**

1. Provision of an international forum for urban air quality officials and other urban air quality specialists;
  2. Identification of effective urban strategies;
  3. Identification of institutional barriers and solutions to integrate urban Air Quality management into other fields of competence including transport, spatial planning and regional competencies;
  4. Identification of implementation problems in current legislation and solutions;
  5. Stimulation of urban Air Quality management by encouraging interaction amongst responsible local officials;
  6. Increased effectiveness of urban Air Quality management: insights into the "pros and cons" of different approaches;
  7. Better implementation at the urban level of current Air Quality legislation;
  8. Inputs from the urban level to planned revisions of Air Quality legislation;
  9. More effective communication with citizens
- 
10. Stimulation of a coherence between public information/involvement approaches across Europe
  11. Provision of a toolbox of strategies/approaches/measures for Air Quality officers

#### 4.1.1 Improving urban governance and decision making

12. Provision of a forum of local expertise to assist developers of European level strategies and measures
13. Better insights into the feasibility of local measures to improve urban Air Quality
14. Inputs to the development of urban Air Quality improvement scenarios in CAFE
15. Broad forum for providing feedback to ideas developed in CAFE

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## **INTERACT (Integrated Urban Governance for the City Of Tomorrow)**

**Project Reference:** EVK4-CT-2001-20005  
**Contract Type:** Thematic Network

**Start Date:** 01-01-2002  
**End Date:** 31-04-2004  
**Duration:** 36 months

### **Problems to be solved**

INTERACT aims to respond to the implementation of urban comprehensive strategic plans, which seek to include such varied and complex objectives as economic growth, social integration, quality of life, health, safety and respect for the environment. It aims to improve the implementation of multisectoral and partnership policies such local Agenda 21, the European social policy (through new structural funds), the European employment policy, etc. At its level it also contributes to help cities from the accession countries to have access to the know-how generated by the partner cities and the project as a whole in these fields.

### **Scientific objectives and approach**

The success of the implementation of multisectoral policies strongly depends on the improvement of urban integrated governance, i. e. on the development of mechanisms for understanding, mechanisms for acting and mechanisms for co-ordinating. INTERACT is going on the assumption that most of major urban governance problems are not directly linked to one particular policy but rather to the overall governance system. That is why, through a networking synergy around sustainable development strategies, INTERACT aims to produce a new urban integrated management methodology (Guide to Integrated urban governance and training service), really adapted to city constraints and to the need of co-operation with other partners.

The INTERACT work plan is organised around local pools (cities officers, NGO's, Local universities teams) and a European network (13 Cities co-ordinators, cities officers, Eurocities, scientific committee, training team), that are connected in the methodology through a range of meetings on a rotation principle, a dissemination process and seminars. Meeting agendas will be structured by cities' case studies, best practices and debates on new mechanisms to improve urban integrated governance, which could be transferred to every European cities.

### **Expected impacts**

INTERACT will allow a share of knowledge and best practices in the field of the implementation of comprehensive strategic plans, through a wide dissemination of newsletters in all Eurocities network, and through the web site [www.interact-network.org](http://www.interact-network.org) where all INTERACT results will be available. Furthermore, INTERACT results will lead to the concrete improvement of urban integrated governance. During the 3 years period the network will produce two guides to urban integrated governance (a first guide and a final up-dated one) presenting the mechanisms for understanding, for acting and for co-ordinating, which have come up while analysing cities case studies. These case studies will be gathered in two cities case studies reports (WP1/WP2). Two seminars (WP1/WP2) will present the first urban integrated governance methodology and then the up-dated and final one, to all wishing European cities in Eurocities network. The second seminar will also introduce the training course (WP3), putting officers teams in situation of co-operation/competition, to help multisectoral projects to be successfully implemented in a complex environment. This training course will be first given in INTERACT 13 member cities. These cities will have already been involved in an officers exchange programme in other INTERACT cities (8 weeks per city) that will produce a synthesis reports on the lessons learnt from the officers exchange. After the 3 years period, INTERACT training course will be made available for the training departments of every wishing European that needs a modernisation of its integrated management.

### **Coordinator**

#### 4.1.1 Improving urban governance and decision making

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**LASALA (Eco-efficient urban management and new models of urban governance: the evaluation of LA21 in European local authorities through "concerted self assessment")**

**Project Reference:** EVK4-1999-00011

**Start Date:** 26-02-2000



**Contract Type:** Cost-sharing contracts

**End Date:** 25-08-2001

**Duration:** 18 months

## Problems to be solved

There has been a tendency to assume that Local Agenda 21 (LA21) is an end in itself, rather than a process, which assists local communities in moving towards a more sustainable world. Virtually all the research up until now has been concerned with understanding how LA21 works, and how it relates to pre-existing policy structures and to local political systems. In contrast, the LASALA project accepts these findings and now seeks to take knowledge further by identifying and researching new models of urban governance and effective management instruments, processes and practices applied to work towards urban environmental sustainability, and in particular the thrifty use of natural resources. Thus this project contributes fully to the implementation and evolution of the third and fourth aims of the Commission Communication on 'Sustainable Urban Development in the European Union: A Framework for Action', COM 98 (605) final, namely protecting and improving the urban environment towards local and global sustainability, and contributing to good urban governance and local empowerment. The project also contributes to the wider policy of facilitating the LA21 process throughout Europe and is fully in accordance with the wider strategic policy objectives embodied in European environmental policy.

## Scientific objectives and approach

This project aims at generating broadly-based empirical material through recruiting 150-250 European local authorities in 32 countries who have signed the Aalborg Charter in 1994 and are engaged in LA21, (i.e. committed to sustainable development planning) and by undertaking in-depth case research on new governance schemes implemented by local governments and management systems/instruments/tools applied for managing the city in an eco-efficient way. The first objective is to conduct a 'tele-guided, concerted Local Agenda 21 self-assessment' by the recruited European local authorities. The second objective is to evaluate LA21 in the participating local authorities with a view to developing new models of urban governance and eco-efficient urban management; this will lead to a European LA21 report. The third objective is to identify and disseminate best practices in urban governance and eco-efficient urban management with a target number of 20 case studies from at least 15 European countries. The fourth objective is to assess the functioning of the method of 'concerted self-assessment' and provide guidelines for its application resulting in a 'Local Agenda 21 Self-Assessment Manual'. The fifth objective is finally to facilitate the exploitation of the project results by information provision and dissemination.

## Expected impacts

All conceptions of sustainable development integral to LA21 imply a reduction in the use of non-renewable energy sources, the adoption of less polluting lifestyles and transportation and the introduction of patterns of living which are within the carrying capacity of the global environment. If secured, these approaches will inevitably reduce urban pollution and environmental degradation, with consequent implications for improvements in urban health and global environmental conditions. The concept of 'eco-efficient urban management' is central to this project and will make a significant contribution to the policy processes aimed at preserving and enhancing the environment and minimising the use of natural resources.

## Coordinator

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## **LASALA-ONLINE (Local agenda 21 self-assessment for local authorities on-line)**

**Project Reference:** EVK4-2002-00549  
**Contract Type:** Accompanying Measure

**Start Date:**  
**End Date:**  
**Duration:** 15 months

### **Problems to be solved**

This proposal for an Accompanying Measure aims to maximise the benefits and add value to the successful results obtained from the research project "Local Authorities Self-Assessment of Local Agenda 21 (LASALA)"(EVK4-CT-1999-00011) that was financed by the European Commission under the 5th Framework Programme, Key Action 4: " City of Tomorrow and Cultural Heritage" under heading "4.1.1 Improving urban governance and decision making". The target is to improve urban governance and decision-making by setting up a fully automated self-evaluation tool for European local authorities engaged in LA21 processes, and to ensure its wide use amongst participants of the European Sustainable Cities and Towns Campaign. This will be achieved by enhancing the self-assessment module and by developing computer software to move from manual to automatic encoding of data and elaboration of benchmarking reports. The resulting online facility will allow local authorities to self-assess their LA21 activities and to benchmark their individual responses against the LASALA database. The database will be automatically updated with each new reply and this will allow identification of general trends and changing dynamics of the European wide local sustainability scenario.)

### **Scientific objectives and approach**

The overall target of this proposal for an Accompanying Measure is to improve urban governance and decision-making by setting up a common, fully automated self-evaluation tool for European local authorities engaged in Local Agenda 21 processes, and to ensure its wide exploitation amongst the members (local authorities) of major European Local Government networks as well as amongst the participants of the European Sustainable Cities and Towns Campaign.

With this Accompanying Measure it is proposed to upgrade the LASALA self-assessment methodology in two ways: 1) through the enhancement and translation of the content of the self-assessment questionnaires; 2) through the development of the necessary software to allow the transition from the manual encoding of data and elaboration of a benchmarking report for the participants, to the automatic encoding of the data and production of benchmarking reports.

A consortium composed of six European partners, including research institutes, training agencies and Local Government Networks will enhance the content of the self-assessment module previously developed in the LASALA research project. The Consortium will meet to agree on changes to the content of the LASALA self-assessment module in light of the proposed automatisisation facility. The content of the two Exercises of the module will be adapted to allow replies in a 'check box' style and ensure their automatic handling, evaluation and benchmarking. Representatives of the Steering Committee of the European Sustainable Cities and Towns Campaign will be invited to join the consortium's work as an Advisory Panel to ensure the inclusion of end-user opinions.

After reviewing and enhancing the LASALA self-assessment module content, a translation will be undertaken in 11 European Union official languages plus Catalan and 8 Accession country languages. The online self-assessment facility will be adapted to allow automated processing of replies. A computer software will be developed to allow the automatic processing of each new entry; feeding of information into the LASALA database; benchmarking of individual responses; making the database available on line and linked to the LASALA self-assessment facility.

The endorsement of the enhanced LASALA self-assessment module by members of the Steering Committee of the European Sustainable Cities and Town Campaign will be pursued. Amongst others, this will be done by organising a Thematic Working session on Evaluation of the ESCT Campaign. A wide promotion of the enhanced LASALA self-assessment facility amongst members of major European local government networks will be undertaken via specific membership channels available including internet web pages, member-net, newsletter, announcement letter, press release, leaflet. A similar promotion will be undertaken amongst ESCT Campaign's participants as part of promotional activities of the Campaign office.

## Expected impacts

The proposed Accompanying Measure will contribute to the objectives of "Key Action 4: City of Tomorrow and Cultural Heritage" and, in particular, to the heading '4.1.1 Improving urban governance and decision making' in that :

- it will provide an enhanced evaluation framework for European local authorities engaged in LA21 processes to assess progress made in their local sustainability processes
- the widespread exploitation of this enhanced evaluation framework will provide valuable information in relation to the prerequisites for the successful implementation and promotion of sustainable urban development policies at the European level.
- the enhanced evaluation framework will contribute to a better understanding of decision-making processes to support sustainable development. In particular, it will enable European local authorities to self-assess their own achievements, to benchmark them against other European local experiences and thus to identify weak and strong points in their sustainability process.

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## **PASTILLE (Promoting action for sustainability through indicators at the local level in Europe)**

**Project Reference:** EVK4-1999-00004  
**Contract Type:** Research

**Start Date:** 01-03-2000  
**End Date:** 31-08-2002  
**Duration:** 32 months

### **Problems to be solved**

Sustainability indicators have been widely adopted as a key policy tool for moving towards sustainable development but their widespread adoption is not without problems. The key emerging problem is: How can sustainability indicators be used to 'make a difference' to decision-making? The project addresses this key problem by focusing on the use of local sustainability indicators at the urban level to assist decision making to achieve sustainable city planning and resource management. This is one of the fastest growing areas of indicator use and it is also one which raises most directly the problem of relating indicator development and design to changing decision making and behaviour. The involvement of local communities - broadly defined to include business and citizen groups - is often an integral element of devising sustainability indicators. How this relates to the efficacy of indicators as a policy tool is a key issue of urban governance, as well environmental governance. The integration of local sustainability indicators as decision making tools into the hierarchy of national and supranational indicators and strategies will also be addressed, relating as it does to the application of the subsidiarity principle.

### **Scientific objectives and approach**

The overall objective of the project is to analyse the implementation of local sustainability indicators programmes, in a variety of contexts, and to develop models, methods and techniques to ensure that these indicators impact on decision making at the municipality level. In addition, the project has four more detailed objectives. First, it will define the range of roles that local sustainability indicators can play and the variation in processes of indicator development. Second, it will examine the processes of indicator development and use in the partner cities and relate this to the contextual factors operating in each case. Third, it will identify the role of local sustainability indicators in examples of public policy decision making and development within each partner city, and assess their impact and effectiveness. Fourth, it will disseminate research results in order to facilitate more effective urban governance and more relevant strategic European policies in the context of subsidiarity. The research will be undertaken by a consortium drawn from four countries: UK, France, Austria and Switzerland

In each country there will be a local research partnership comprising a municipality and a research competence (sometimes a joint competence). The localities involved are: London (specifically, the London Borough of Southwark), Le Grand Lyon, Vienna and Winterthur. These partnerships will adopt a common methodological basis to investigate the local sustainability indicators programmes in each municipality; each municipality has been chosen on the basis of an existing active involvement with sustainability indicators.

The local partnerships will analyse the factors influencing the impact of such indicators on decision making in the context of a specific local case study within each municipality, again according to a common analytic framework.

This approach will allow for: local diversity in the sustainability indicators programmes; the variety of functions that local sustainability indicators play; and the specificity of the local socio-economic, environmental and political/administrative context. The recommendations regarding best practice that will arise from the research should, therefore, have a broad applicability across different local contexts.

### **Expected impacts**

PASTILLE should lead to improved methods of urban governance by enhancing the effective of local sustainability indicator programmes. It is anticipated that the models, methods and. techniques devised from the analysis of the research findings will enable both a practitioners' guide and citizens' briefing to be

written and disseminated; these should have the potential to affect practice in diverse local municipalities across Europe in the medium term.

## Coordinator

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## **PEGASUS (Planning, Environment, Governance and Sustainability)**

**Project Reference:** EVK4-CT-2002-80003  
**Contract Type:** Accompanying measure

**Start Date:** 01-06-2002  
**End Date:** 31-05-2004  
**Duration:** 24 months

### **Problems to be solved**

Through *PEGASUS*, the project partners wish to address the following challenges facing us in Europe at the urban level:

1. In order to ensure the sustainable development of our cities at the urban level, we must promote the use of integrated and holistic approaches to policymaking and implementation. The challenge is to develop an approach that will deliver the key pillars of sustainability; economic development, social inclusion and environmental protection, and that will create instruments and management systems through which the integrated objective of sustainability can be achieved in practice.
2. To be achieved, sustainable development requires a paradigm shift in the way that governance is carried out and in the way that decisions are taken and made. In short, we need to take a strategic and longer-term view of the way we plan and develop our urban areas so as to identify problems in advance and use our scarce resources more effectively

### **Scientific objectives and approach**

The main objective of the *PEGASUS* project is to assess the potential applicability of the Dutch “Spatial Development and Environment” (ROM) approach to other urban areas across Europe. ROM has been developed and tested in several pilot projects across The Netherlands in the last few years. As *PEGASUS* is a consortium of partners concerned with urban policies and decision-making, the partners will make use of the experiences gained in a Dutch national pilot project.

In this way, the project will also promote a new and innovative approach to urban and regional planning, governance and decision-making. Rather than following the traditional path of identifying a problem, environmental or other, and developing the means to address this particular problem, the partners in *PEGASUS* will take a different route. In *PEGASUS*, the partners will aim to assess the potential in their urban area to take a completely new and different, area-based approach. This will begin with the development of an overall strategy, followed by the establishment of a series of objectives and targets, a set of indicators and, finally, measures, or projects, which contribute to these objectives and targets.

Furthermore, the partners will assess the best ways of ensuring the involvement of all relevant actors (from the local to the national level) throughout the process.

In pursuing the above objectives the local and scientific partners in the project will enter into a series of debates on:

- The challenge of linking economic, social and environmental policy objectives and the need to ensure a proper balance between all of these policy areas.
- The challenges of ensuring efficient and successful cooperation between different actors within the government chain from local to national and between government and third parties including the voluntary and business sectors and other local and regional actors. This debate will certainly contribute to the ongoing European discussion on better governance and a network Europe.
- The relation between the administrative city and the surrounding metropolitan area, sometimes also referred to as the “Functional Urban Region” or Wider Territorial Unit (Urban Audit – European Commission DG REGIO). The debate will address and begin to bring forward solutions to the existing discrepancies between policy challenges and the level at which they are best addressed and government competencies and the limitations which they face.
- The existing discrepancy between “solution oriented research” and the need for more strategic, longer-term research aimed at identifying trends and connected challenges before they emerge and at developing strategies and approaches to avoid challenges becoming problems.
- In more practical terms, the project will:
- Bring the experiences of the Dutch “ROM” approach to a greater European audience of urban planning specialists. With Urban Planning Specialists we mean both researchers and scientists active on issues related to urban and regional planning and decision-makers at local regional and

#### 4.1.1 Improving urban governance and decision making

national levels in Europe. The focus will lie on the expertise and experiences gained in a particular urban ROM project which has been running successfully for almost 8 years. The essentials in brief are the involvement of all relevant actors within the geographic area to determine, together, the long-term trends, objectives and targets for that area. Following from this, indicators and eventually, individual projects or initiatives are developed.

- Assess, through a two-day training workshop, an analysis and a series of local workshops bringing experts in science and practice together, whether or not this innovative approach can be used at the urban level in different circumstances in different European urban areas.

### Expected impacts

- The project will bring researchers and local, as well as national decision makers together in a coordinated effort working towards a common and very specific objective, the assessment of the applicability of the ROM approach in a number of European cities.
- PEGASUS goes beyond raising awareness and reaches a real cooperation to assess the potential to use the ROM approach elsewhere in Europe and identify the challenges that would need to be addressed
- Sustainability as an objective
- PEGASUS will result in concrete policy and research recommendation directed not only at the European Commission but also at local authorities across Europe and at national governments.
- PEGASUS will facilitate the stronger cooperation between different European projects in the field of governance financed in the framework of the 5th FP on Research such as PLUS, DEMOS and INTERACT thereby creating greater added value for all.

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## **PLUS (Participation, leadership and urban sustainability)**

**Project Reference:** EVK4-2001-00100  
**Contract Type:** Research

**Start Date:** 01-02-2002  
**End Date:** 30-09-2004  
**Duration:** 30 months

### **Problems to be solved**

The quality of life in towns and cities of Europe depends to a considerable extent on the quality of urban governance. Policy makers at all levels of government recognise that enhancing the quality of life requires a more substantial approach to urban development. For example, the European Commission published a Framework for Action in 1998 titled: Sustainable Urban Development in the European Union. This indicates that the economic, social and environmental changes facing European urban areas are intertwined and that effective approaches to meeting these challenges require improvements in governance and local citizen empowerment. This project aims to promote effective urban governance by identifying approaches to city leadership and community involvement, which work well. Strong leadership and effective public involvement are complementary and both need to be developed if the quality of urban living in Europe is to be enhanced.

### **Scientific objectives and approach**

The objective of this proposal is to accumulate and disseminate practical knowledge about the complementarity of political leadership and citizen involvement in cities, which are active in promoting sustainable development. By researching alternative approaches to urban leadership and community involvement in local decision-making in nine countries the project will identify aspects of good practice, and disseminate findings to cities, national governments, and the EU.

Comparative analysis of 18 carefully chosen cities – two from each of the nine countries – is being undertaken using a common evaluative framework. The research will focus on two policy fields, which are crucial to the quality of life in towns and cities; economic regeneration and social inclusion.

### **Expected impacts**

The project will lead to better understanding of the way sustainable urban development can be enhanced by developing improved approaches to local decision-making. A new conceptual framework will be developed which will aid thinking in relation to effective urban governance. The project will also produce and disseminate nine country case studies as well as a practical guide on how to assess the performance of urban governance in a given town or city. By creating an internet database, developing a distance learning pack and running interactive, cross-national dissemination events the project aims to provide practical assistance to politicians, officials and citizens who want to promote the sustainable development of towns and cities in the future.

### **Coordinator**

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## **RECOURSE (Research and Education Centre for Urban Socio-Economic Development )**

**Project Reference:** EVK4-CT-2002-80007  
**Contract Type:** Accompanying measure

**Start Date:** 01-12- 2002  
**End Date:** 30-11- 2005  
**Duration:** 36 months

### **Problems to be solved**

The RECOURSE activities are focused on the studies of urban problems which are not deeply investigated or not widely understood by the social environment of Newly Associated States (NAS) as crucial for sustainable development. In the centre of interest are study on the improving urban governance and the developing comprehensive instruments for sustainable city management. After almost half of the century break, the democratic system and self-governance are introduced in the post-communist countries. Because of the lack of tradition and experience the local agencies are keen to learn from the experience of EU and other NAS fellow countries.

One of the measures of urban sustainable development is the quality of life. The imbalance economic, social and environmental policy of the communist period resulted in destruction of many areas. Especially the social and environmental consequences of the intensive industrialisation of the urban areas were deeply neglected in the research studies. Rising the quality of housing and regenerating the declining neighbourhoods are of the crucial meaning for residential attractiveness of cities and in the further consequences for its economic prosperity.

### **Scientific objectives and approach**

Developing the conceptual and methodological frameworks to support the comparative urban sustainable development studies is one of the major scientific aims to achieve. These methods take on increasing significance as Europe becomes more integrated economically and socially. The comparative and joint researches of NAS and Western European centres are of the value for both partners as they give a new perspective of investigation and interpretation of the results growing from different experience and tradition.

### **Expected impacts**

The participation of leading scientists in the project will create a unique opportunity to raise the level of scientific activity of the Centre. It will also help to bridge the communication gap between Western and Eastern European urban research centres. The project creates the friendly environment for fruitful dialog of East and West, of different disciplines, of researchers and practitioners that will last beyond the project time span.

Realisation of the project will create the unique opportunities for young researchers scientific development and research training through their active participation in international links in form of seminars, workshops, research visits. Establishing the Centre enable the quicker progress in their professional careers, which is currently impeded by the shortage of resources. By the same token, the chances to attract talented young people in the competition with private firms or state institutions are growing. Offering interesting perspectives for relevant, European level scientific development will help in their decisions.

The particular activities of the project will help to meet the EU teaching standards through exchange of teaching techniques and experience as well as mutual students' visits in the frame of twinning program. The experience of RECOURSE should also stimulate the undergraduate students' activity in other international programs for students.

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## **SUDLAB (Sustainable urban development laboratory)**

**Project Reference:** EVK4-2002-80014  
**Contract Type:** Accompanying Measure

**Start Date:** Jan 2003  
**End Date:** Dec 2004  
**Duration:** 24 months

### **Problems to be solved**

The accompanying measure SUDLAB is directed to supporting projects funded through Key Action 4 (KA4), by helping to relate their activities, results and solutions to the situations found in European cities. This will improve the focus and targeting of the projects, and help to 'commercialise' the solutions by identifying the number and types of city that would benefit from the solutions. SUDLAB is underpinned by the wish of the Lead Contractor, GHK and its partner EUROCITIES to improve access to information on the need for Sustainable Urban Development (SUD) policies and to encourage the take up of workable solutions including those stemming from KA4.

### **Scientific objectives and approach**

SUDLAB will provide urban managers with information about the relative performance of their city and local authority on: a range of measures of SUD; factors influencing future SUD including the policy drivers at EU and national level; and, the scope of solutions generated by projects within the KA4. In so doing, SUDLAB will provide users with high quality up to date data to help inform policy and investment choices. SUDLAB will also identify the markets of the products of KA4 projects and promote their application.

SUDLAB will be built around a website supported by a powerful database and content manager. The database will be structured around selected domains, relating to urban development, for example, travel patterns, waste management and cultural assets. The analytical capability of the database will enable users to generate reports pertinent to the choices they face in a more complete and robust way than hitherto and at considerably reduced costs. Prospective users and KA4 projects will be involved during the development period. SUDLAB will be developed in stages relating to the roll out of KA4 projects and EU level policy priorities.

### **Expected impacts**

Following the funding period SUDLAB will be extended to include policy and technical solutions from sources other than KA4 and it is envisaged that SUDLAB will become self-financing on a commercial basis. Users will have easier access to better qualitative and quantitative information at lower cost than otherwise would be possible.

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## **SUT-GOVERNANCE (Sustainable Urban Tourism: Involving Local Agents and Partnerships for New Forms of Governance)**

**Project Reference:** EVK4-1999-00001  
**Contract Type:** Cost-sharing contracts

**Start Date:** 15-02-2000  
**End Date:** 14-02-2003  
**Duration:** 36 months

### **Problems to be solved**

Sustainable urban tourism requires attention to varied elements, including

- maintaining physical heritage in the context of living, developing cities;
- allowing maximum access to available infrastructure, tourist sites, parks, and other green spaces;
- strengthening the cultural and social viability of local community;
- balancing interests of residents and visitors;
- economic viability
- minimizing adverse ecological impacts on sites from transportation, and
- unsustainable consumption patterns.

Achieving this involves advancing knowledge and practice about the types of partnerships that can be formed to promote urban sustainable tourism; the roles of government and other stakeholders in this partnerships; how local governments can apply them to local tourism development; and the critical issues and challenges to local authorities seeking to create such partnerships. This project presents an effort to work with public-private partnerships and urban governments in Europe to develop, validate, and deploy a general framework for urban sustainable tourism partnerships that is applicable to a variety of urban municipal and development contexts.

### **Scientific objectives and approach**

The overall goal of the project is to elaborate and promote innovative forms and instruments of local governance to improve urban tourism development involving the principles of sustainability and participatory decision-making. The project's methodological approach involves the analysis of framework conditions, policies, best practices, and results, drawing on detailed field work in four European countries (Germany, Austria, Greece and Bulgaria), supported by a broader information and case scan. After validating insights and best practices through concept mapping, a benchmarking process is undertaken to assess practices and performance in sustainable tourism in European cities and to provide customised feedback to participating localities. Broader forms of dissemination through written and electronic means and a workshop supplement these efforts. The project develops an integrated framework to assist in understanding and catalysing partnerships for sustainable management of tourism, and potentially other urban challenges.

### **Expected impacts**

This project is designed to advance knowledge, tools, and practice to assist decision-makers, governments, and other stakeholders in urban tourism development, including the private sector and non-governmental groups, to implement sustainable tourist practice. Research and policy application of the study findings include:

- Elaboration of the general principles concerning sustainability and tourism development applicable at the local level of urban development
- Promotion of alternative practice of urban governance in order to allow flexible adaptation to the different types of problems of urban areas
- Enhancement of direct contacts among various levels of governance and especially among same level local actors without passing necessarily through higher level authorities
- Facilitation of the communication among partnership members through the homogenisation of basic terminology and standardisation of main practice
- Improvement in the efficiency of resources devoted to the formulation and implementation of sustainable urban tourism
- Development of basic sustainability indexes of urban tourism development

#### 4.1.1 Improving urban governance and decision making

- Enhancement and spread of information and experience related to best practice of European urban development.

### Coordinator

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## **UGIS (Urban Development programme, urban governance, social inclusion and urban sustainability)**

**Project Reference:** EVK4-1999-00012  
**Contract Type:** Cost-sharing contracts

**Start Date:** 04-01-2000  
**End Date:** 31-03-2003  
**Duration:** 39 months

### **Problems to be solved**

During the last decade all over Europe urban development programmes have been established with a view to combat urban problems and/or to stimulate urban dynamics. These programmes have been set up in a new policy-making context, that of urban governance, the development of which they have often stimulated. Three problems will be addressed in this project. What are the effects of urban development programmes on social inclusion and urban sustainability? How did certain forms of urban governance shape these programmes, their definition, their implementation and their successes and failures? How has the presence of these programmes changed urban governance or even stimulated forms of urban governance (the feedback loop).

### **Scientific objectives and approach**

To answer these problems, the project undertakes a multilevel research in 32 neighbourhoods in 9 countries. The cases are selected on two criteria. Firstly, neighbourhoods must be part of an urban development programme. They are, however, selected in such a way that a sufficient range of differentiation is obtained on a number of crucial variables. Second, to minimise new and expensive research, data should be available for at least two time periods.

The research integrates multiple levels and will proceed from a comparative perspective, but will focus on the European dimension.

The effects of urban programmes on social inclusion in deprived urban areas, on sustainability in the selected cities and on urban governance are assessed through the analysis of a multilevel database and through cross-evaluation by the international project team. To perform that task, smaller teams of four experts are selected from the project members and perform their evaluation in cities in a 'foreign' country, assisted by the local partner.

### **Expected impacts**

A network of stakeholders is developed and activated through this collaboration and through the production of a handbook. The evaluation focuses on 'benchmarking' for evaluating the processes and outcomes of the programmes (in terms of strengths and weaknesses of types of programmes and of related forms of urban governance). The conceptual and theoretical framework forms a strong basis for a common database that will contain both quantitative and qualitative data at different levels. This framework and the methodology offer opportunities to develop a genuine European approach. A number of concrete deliverables will be developed that can be used by end-users; such as the network, reports that puts local initiatives in a European comparative context, the handbook with models of good practice.

### **Coordinator**

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#### *4.1.1 Improving urban governance and decision making*

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## **URBEST (Urban best practices)**

**Project reference:** EVK4-2001-00068  
**Contract Type:**

**Start Date:**  
**End Date:**  
**Duration:**

### **Problems to be solved**

URBEST is a communication project on urban best practices aiming at involving relevant stakeholders in a wide debate on socio-economic and technological innovation in urban areas. It brings together content providers (experts in urban issues, development agencies, networks of cities) and communication experts (TV producers and TV Channels). URBEST will organise a cycle of 6 months TV programmes to be broadcast on a network of European TV Channels. The TV programmes will have a common structure. They will show examples of European best practices, compare them with the local situation and host a debate with local stakeholders. Exchange of information among TV Channels will run through an Internet based information platform. TV programmes across Europe are expected to produce different debates reflecting local approaches. URBEST will have characters of openness (other media will be able to join during the project) and repeatability.

### **Scientific objectives and approach**

URBEST objectives are: to broadcast 36 TV debates focusing on urban best practices on 6 European TV Channels; to involve relevant stakeholder in the debate; to enhance circulation on information on innovative experiences in urban context among local governments, experts in urban issues, media and citizens; to constitute an open communication platform on urban issues for regional TV channels; to create a user friendly database on urban best practice that can be accessed by administrations and media.

On a longer run URBEST aims at developing a communication model based on comparison of different urban experiences as reference scenarios for vision making and on the active involvement of citizens. URBEST intends to be the basis for further developments of communication actions based on a participative dynamic extended to a wide range of social actors. URBEST will combine scientific content provided by experts in urban issues and the organisation of communication provided by TV producers and a network of European TV channels.

The initial phase of the project will be devoted at the selection of relevant best practice examples and research projects to be shown on TV programmes. The International Institute for the Urban Environment will be in charge for the methodology to be used in the selection. The choice of cases will then serve as basis to set up the TV programme schedule. The TV programme schedule will be the element on which partner in charge for communication management will issue the detailed production plan and the detailed broadcasting plan.

At the same time, the above partner will be in charge for the installation of technical facilities and training of personnel of the TV Channels. Production and broadcasting will run on nine months. Production will start three months earlier than broadcasting in order to set up and populate the audio-visual database from which TV Channels will be able to select the best practice examples to be used in the programmes. The database will be accessible via Internet to all TV Channels involved and will guarantee delivery of audio-visual content according to broadcasting standards.

Management and dissemination will run during the 24 months duration of the project. Dissemination will be diversified on the basis of the different categories targeted (citizens, local administrations, experts in urban issues, media) and will aim at favouring the adoption of URBEST communication model to other actions aimed at the exchange of experiences across Europe and based on the involvement of relevant stakeholders.

### **Expected impacts**

#### *4.1.1 Improving urban governance and decision making*

Expected results will be the production and broadcasting on 6 European TV channels of 36 TV programmes showing examples of best practices and promoting a debate involving relevant stakeholders on the potential adoption of those best practices to the local context. Creation of an audio-visual database on urban best practices that will be available after the project to other TV Channels and administrations. Future possibilities to further develop the project and repeat the experience on a larger scale.

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#### **Participants**

## **URBS PANDENS (Urban Sprawl: European Patterns, Environmental Degradation and Sustainable Development)**

**Project Reference:** EVK4-2001-00052  
**Contract Type:** Research

**Start Date:** 01-01-2002  
**End Date:** 31-12-2004  
**Duration:** 36 months

### **Problems to be solved**

Urban sprawl is one of the most important types of land-use changes in Europe. It increasingly diminishes the quality of life in Europe and brings forth major impacts on the environment (e.g. via surface sealing, emissions by transport, or ecosystem fragmentation), the social structure of an area (e.g. via segregation, life style changes, or neglecting urban centres) and the economy (e.g. via distributed production, land prices, or issues of scale). These threats, their interaction and the conflicting interests in resolving them, represent a common challenge across Europe. Against this background URBS PANDENS strives for an integrated impact assessment of regulations, incentives, economic instruments and infrastructure measures on urban sprawl. Within the project policies as imposed by European, national and regional agencies will be investigated and options for improvement are developed.

### **Scientific objectives and approach**

Despite their different economic structure, culture, social composition and urban density cities exhibit similarities in major determinants of urban development, such as civilisation, urban form, natural and man-made environment. Starting from a hypothesis on functional similarity of sprawl, the project will perform an integrated assessment of the environmental, economic, social and political aspects of urban sprawl in selected EU and accession countries. On basis of seven case studies (Liverpool, Stockholm, Leipzig/Halle, Vienna, Warsaw, Ljubljana and Athens) modern qualitative modelling techniques utilizing so-called qualitative differential equations (QDE) will be used. The model(s) generalise(s) the processes of sprawl by statements as general as: the more segregation in a region the more migration from the urban centre. General statements of this type form a network which can be formalised as a qualitative model. Formally, this type of a qualitative model represents an entire family of conventional models of urban sprawl as they might have been derived by individual modelling attempts in the region.

Once one or two qualitative models are established as a functional-pattern of sprawl, the model results can be used as possible scenarios (a single qualitative model gives various future scenarios) of future developments in the regions. These scenarios are evaluated within stakeholder workshops with respect to sustainable development. This ranking of futures will then be used for policy design on basis of the models, good cases databases, local experience and politics, and further stakeholder dialogues.

### **Expected impacts**

A policy guide represents the central product of the project. The pattern approach taken allows to produce a guide which is broadly applicable, i.e. to other than the specific case study regions also. The guide basically reflects the three stages of the project, i.e. pattern identification, scenario evaluation and policy design, on basis of the concrete project results. This guide should in principle be usable by urban planners in different regions, as long as the simple identification scheme indicates their region as to be of one or the other of the types identified in the project. Besides this central integrated result, broadly applicable, the detailed studies of the seven case regions can be expected to have some impact on urban planning and administration in these regions.

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## 4.1.2 Improving the quality of urban life

### **AWAST (Aid in the management and European comparison of a municipal solid waste treatment for a global and sustainable approach)**

**Project Reference:** EVK4-CT-2000-00015

**Contract Type:** Research

**Start Date:** 01-01-2001

**End Date:** 31-12-2003

**Duration:** 36 months

#### **Problems to be solved**

Municipal Solid Waste management is a major problem for all the local communities of the EU. The different involved players (political, industrial, municipalities) are faced to a lack of methodologies and software to define, evaluate, optimise or adapt their waste treatment decisions and to meet the progress targets set at the EC level. The AWAST project will answer this need by providing end-users with a flexible simulation software that, in a comprehensive approach, takes into account technical, energetic and economic aspects, and also the social and environmental aspects. It will be validated on 3 European cities displaying a wide variety of practices, performance achievement and local contexts. National environmental agencies, local communities and non-governmental associations, joined together in a Steering Committee, will guarantee that the needs of the end-users will be met and that the research results will be properly disseminated.

#### **Scientific objectives and approach**

The AWAST project objective is to provide end-users with flexible simulation software that, in a comprehensive approach, takes into account technical, energetic and economic aspects, and also the social and environmental aspects. It will be based on process analysis and simulation, including energetic and economic aspects, of the whole waste management system: collection, sorting, transport, biological treatment, thermal treatment, landfill.

The project objectives will be addressed through a work plan organised in three major technical parts: R&D tasks for tool development, application tasks and valorisation and dissemination of results.

The first phase of the project has focussed on R&D tasks to adapt and develop existing academic models in order to build models of global parameters and of specific channels fitting with the industrial context of the applied approach. The models are integrated in a global simulator of waste management systems

The second phase concerns application tasks for tool validation: A study of the local waste management in three European local communities (Orléans in France, Lisbon in Portugal and Stuttgart in Germany) will make it possible to validate the approach.

#### **Expected impacts**

As a global impact, the project will contribute to the objectives of the Waste reduction and its life cycle management —i.e. “reduce the volume, variety and hazardousness of solid waste requiring disposal through a better understanding of the life cycle of waste streams and developing strategies for their reduction, re-use and treatment with minimum environmental and social impact”— The project intends to provide end-users and stakeholders with an instrument that will allow them to adapt best practices and build strategies for sustainable waste management, disposal and reuse in cities.

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## AGORA (Cities for People)

**Project Reference:** EVK4-2000-00568  
**Contract Type:** Research

**Start Date:** end 2002  
**End Date:** end 2005  
**Duration:** 36 months

### Problems to be solved

Cities for People will develop and test a pan-European audit methodology to analyse human activity in European spaces and to identify best practice model for urban planning and design in the 4 European cities studies in the project (Barcelona, London, Malmö and Utrecht). The AGORA partners will also study the transferability and applicability of this best practice model among the 4 studies European cities and then to other European cities. AGORA will also develop design proposals that will illustrate how the research methodology can be responsive to the specific needs of individual cities across Europe and can contribute to improving the quality of urban life in Europe. AGORA -CITIES FOR PEOPLE -seeks to address issues of the contemporary city-state, to reconfigure and promote a new genius loci. To propose an urban model of development that is not one of dysfunction, rupture and cataclysmic change, but subtle (soft), incremental, positive and dignified transformation, where the power of place can still prevail; and within which the citizens are empowered, informed, and sustained in their dynamic and increasingly virtual orientated environment.

### Scientific Objectives and Approach

METHODOLOGY, to develop: a research methodology for analysing the relationship between urban form and urban functioning. By urban form we mean the spatial and physical make-up or urban centres, as affected by planning, design and policy decisions. By urban functioning we mean the social and economic life or urban centres as represented by quality of life indicators including patterns of human activity, economic transaction, land-use, land value, anti-social behaviour and safety.

AGORA will define and establish a common audit methodology through collaborative working, by defining and identifying the following components:

- Capital Route -the geographical area for study in each European City representing a micro-cosmos of the city, which will enable the gathering of comparable local data.
- A common Technology Platform that will build on existing 'space syntax' methods to analyse spatial activity using graph-representational and Geographic Information System (GIS) technologies to provide a common framework to store, represent and analyse physical and functional data.
- Urban design components -identification, investigation and cataloguing of the urban components in relation to human activity and perception through quantitative and qualitative analysis.
- A communication platform and tool, Urban Design Interface, to exhibit, share and publicise all the research findings and to capture and reflect feedback from the end-users.
- The four main objectives of the AGORA Cities for People project are, via a EUROPE AUDIT

AGORA will implement the audit methodology by establishing an Urban Design Observatory (UDO) in each European city for study (i.e. Barcelona, London, Malmö and Utrecht); the vehicle for the gathering, analysing and discussion of research data; (and the disseminator of information for user participation through the Urban Design Interface) .

AGORA will study the designated Capital Routes in each city, how these routes function and how they are currently being used by gathering socio-economic data on them. This will include ethnographic analysis and the participation of end-users.

Gathering local data at the established UDOS, investigating how space and movement interact with other characteristics of the urban environment, building computer models and analysis (by using the Technology Platform -space syntax);

AGORA also aims to develop a better understanding of the end-user perspective, through the participation of stakeholders' including urban designers, local government agents and, ultimately, members of the public.

A best practice model. AGORA is proposing collaborative working to develop and test a pan-European methodology to analyse the use of space in European urban spaces and to identify a best practice model for urban planning and design in the 4 European cities studied in the project (Barcelona, London Malmö and Utrecht). The AGORA partners will also study the transferability and applicability of this best practice model among the 4 studied European cities to other European cities. By embracing the notion of the city and its relationships to human activity, and placing the citizen at the centre of this process, it will seek to

#### 4.1.2 Improving the quality of urban life

harness the dynamic forces impacting on city centres and develop proactive models which can contribute to long term sustainability.

- Citizen intervention. AGORA will also recognise the role of the citizen to contribute, expand and evolve a symbiotic relationship towards the sustenance of the city -to enrich its culture and participate in its governance, and as stakeholders, to maintain the city's vitality for future generations.
- Urban Planning Quality of urban life. AGORA will research the effects of urban planning and design decisions on every day life in urban centres.
- Space syntax technology. AGORA will use space syntax methodologies to provide a scientific legitimacy to underpin its approach to planning urban spaces, by the use of this an objective measurement analysis methodology. AGORA will also further develop space syntax methodologies and integrate live data with GIS to model the changes in use of space by citizens in city districts and urban corridors. Further it will allow modifications within space, such as the introduction of new lighting schemes, to be tested, piloted and modelled within computer environments. The project will investigate how space and movement interact with other characteristics of the urban environment.
- Soft design. AGORA will advance the innovative use of 'soft' design modification strategies to improve cityscape and socio-economic utilisation of space.

Another of the main results of the project will be the development of prototypical design proposals that will illustrate how the research methodology can be responsive to the specific needs of individual cities across Europe, and how these can contribute to improving the quality of European urban life.

We also expect AGORA to create a common dialogue and debate among planners, designers and policy makers, as well as citizens. (The latter is also very important to create an understanding of each other's needs.) If the project methodology is adopted and implemented, we also expect there to be an improvement of the quality of social and economic life in city centres.

### Expected Impacts

Pan-European audit methodology. AGORA will aim to develop and test a unique pan-European audit methodology that will contribute to develop a better understanding of the ways in which planning, design.

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## **BUGS (Benefits of urban green space)**

**Project Reference:** EVK4-2000-00526  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-03-2001  
**End Date:** 01-03-2004  
**Duration:** 36 months

### **Problems to be solved**

Cities experience increasing signs of environmental stress, notably in the form of poor air quality, excessive noise, and traffic congestion. At the same time, the pace at which land is being consumed by urban development in Europe is a major concern. The enhancement of green areas has the potential to mitigate the adverse effects of urbanisation in a sustainable way, particularly because there is a broad societal support for more green in and around cities.

### **Scientific objectives and approach**

The objective of BUGS is to develop a methodology to assess the impact of green space and settlement patterns on urban environmental quality (traffic congestion, air quality, noise) and social well-being, and to formulate recommendations regarding the use of green space as a design tool in urban planning strategies. Particular care will be taken to obtaining feedback from the potential end users and to the efficient dissemination of the results. Furthermore, a strategy will be developed to ensure the exploitation of the consortium's expertise after the termination of the project.

During the first phase, the project pursues a mixture of environmental and socio-economic research regarding the impact of green areas on urban environmental quality and social well being, allowing the development and testing of specific tools. At the urban/regional scale, the impact of green areas on traffic congestion and emissions is modelled, with special attention for cycling walking networks and for economy efficiency. Satellite-based maps are used to evaluate accessibility and connectivity of green areas. The potential of green space to help shaping compact and polycentric cities is studied, and the effect of land use on urban/regional air is simulated. At the smallest scales (street, canyon, parks) measurements and model simulations are performed to estimate the effect of vegetation on microclimate, air quality, and noise propagation. Furthermore, case studies are performed to assess the impact of urban green areas on social well being. A harmonisation workshop is planned to ensure efficient interdisciplinary collaboration, and is scheduled to focus the work and ensure the relevance of the results to the end-user community.

During the second phase, tools and methods developed during the first phase by the different partners on different urban areas are applied to a common test case (cluster of cities in the Ruhrgebiet, Germany) including the entire consortium. The goal of this exercise is to couple the different models and methodologies, and to bring the integrated assessment methodology to perfection. Working in a close collaboration with the local authorities of the test area and employing participatory planning techniques involving local authorities, design guidelines will be formulated regarding the use of green space as an urban design tool. Based on the findings of the test case, a scenario will be produced for the efficient technical implementation of the integrated assessment methodology, safeguarding its general nature so that it can be applied to any city within Europe. Simultaneously, a marketing strategy will be elaborated, the goal of which is to define and initiate an organisational structure permitting the exploitation of the consortium's expertise after the termination of the project, offering the methodology as a service to urban and regional authorities.

### **Expected impacts**

It is expected that BUGS will increase current knowledge regarding the effect of green space on urban environmental and socio-economic quality. The final result will consist of a methodology to assess the benefits of urban green space, and a scenario for its effective implementation on European cities after the termination of the project. Ultimately, this should contribute to a better quality of life for millions of European citizens.

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## **CAST (Process and software tools for analysis and simulation of development of cities into the future)**

**Project Reference:** EVK4-CT-2002-00079  
**Contract Type:** Research

**Start Date:** 01-10-2002  
**End Date:** 30-09-2005  
**Duration:** 36 months

### **Problems to be solved**

Cities of the future are in fact cities of today, but 50 or more years later. Inherent problems of individual cities of today are likely to create even bigger problems in the future. However, careful planning of various aspects of the development of a city is likely to produce a more sustainable development and a more efficient city of the future. To help improve the quality of urban life in the future, a City Analysis Simulation Tool (CAST) will be developed.

### **Scientific objectives and approach**

CAST will be developed on the basis of principles of complexity and in the domain of virtual reality. The complex model of the city will emerge without explicit programming from the interaction of city components governed by simple rules applied on a component level, without explicit programming of the city model as a whole and without top-down control.

The benefits of such tool would be wide ranging. A virtual reality model of the city would enable a better assessment of the impact of planning applications and the impact of transport, whilst the analysis of the configuration of streets, buildings, and street lighting could help with deciding on the measures for safety and crime prevention. The same model would be used for analysis of the citywide energy consumption, and analysis of all energy and material inputs and outputs. The model will be based on principles of complexity, and would enable investigation of highly non-linear future consequences resulting from simple changes on individual parts of the city today. As this will be achieved by self-organisation of the model, CAST will be unlike any other city simulation tool known today, from which the users will be able to learn something new about future development of their cities.

### **Expected impacts**

Once the basic virtual reality model of a city has been developed, CAST will enable the model to simulate a scenario of changes over a number of years, showing what the city would be like in the future. The simulation of 50 years of the real time would be compressed in the computer model to the timescale of minutes. CAST will enable the user to investigate complex interactions between future developments and the existing urban environment. The user will be able to go back, make changes in the development scenarios, and re-run the simulation. This will enable the users to make right decisions which stimulate sustainable development and improved quality of urban life in the future, thus avoiding expensive mistakes.

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**CLEANAIR (Increased quality of life for 76 million EU citizens by enhancing air quality in urban areas through development of a residential cleaning technology for burning solid fuel for domestic use)**

**Project Reference:** CRAF-1999-71007  
**Contract Type:** Craft

**Start Date:** 01-05-2002  
**End Date:** 01-05-2004  
**Duration:** 24 months

**Problems to be solved**

The European Environment Agency found that 70 to 80 % of 105 European cities surveyed exceeded WHO air quality standards. Particulate matter is singled out as the most important pollutant with regards to health effects, and in many cities in the EU up to 40 % or more of the emission of particulate matter is from domestic use of solid fuels. Mortality rate due to outdoor air pollution is estimated to 0,6 % (low estimate)<sup>4</sup> of total annual deaths, making inadequate ambient air quality responsible for 24 240 deaths annually in the EU. Extrapolated, the total cost for EU caused by respiratory disease due to inadequate ambient air quality is 1,2 billion Euro annually.

Our project also directly contributes to the Directive on assessment and management of ambient air quality (96/62/EEC) which aims to establish the basic principle of a common strategy to define and set objectives for ambient air quality, and to the Council Directive relating to limit values for sulphur dioxide, nitrogen oxides and particulate matter in ambient air (1999/30/EC).

**Scientific objectives and approach**

The aim of the project is to develop a novel "end of pipe" electrostatic precipitation and oxidation device for household solid burning fires and stoves, that exploits a non-thermal plasma produced by electron discharge within the reaction chamber. There does not exist a product in today's market that offers cleaning of household combustion. This will be achieved through:

Scientific characterisation of the internal and external physical and chemical environment.

To achieve a scientific understanding of the requirements of different fuels and combustion phases in relation to the cleaning effect, the maintenance of chimney draft, the corrosive and property degradation effects of the smoke gases and the effects of ambient air environment on materials and appliances in the device.

Development of plasma-effect reaction chambers by a novel electrode and chamber design that uses conducting polymer chamber walls as one of the electrodes and a sharp metallic spear as the other, and an ion fan effect created to compensate for the effective drag that the device creates when installed into the chimney flue to achieve 95% cleaning efficiency of Particulate Matter (PM) and maintain the chimney draft to within 2% of the original, unmodified chimney performance. Development of a high voltage Switch Mode Power Supply (SMPS) by a novel approach to high voltage switching technology that enables the high voltage unit to create the necessary high voltage for the plasma effect to take place in order to achieve 95 % cleaning efficiency of particulate matter with energy consumption of approx. 100 W. Encapsulation and insulation of power supply for protection against degradation from smoke gases and ambient air environment.

The principle innovations of the project will be:

An uniquely cost effective, air pollution control system for reduction of PM from household combustion with a unique miniaturised design for spear and conductive cylinder electrodes and mixing of fresh air and combustion gases, and a miniaturised electronic, high voltage Switch Mode Power Supply, SMPS unit.

The process will be validated on a prototype/pilot basis through two case studies; one representing household combustion "end of pipe" air pollution system and one further characterising the wider application of the technology, especially the high voltage SMPS unit as component in other products.

**Expected impacts**

Use of electricity for domestic heating will often require new infrastructure in many areas, is expensive and is often based on limited energy resources that often are neither renewable nor sustainable. Use of smokeless fuels represents low energy efficiency compared to using coal or biomass directly. Clean burning ovens are an expensive solution, i.e. cost of buying and installation, and often limited to new building and refurbishment. Development of an "end of pipe" technology for residential clean burning of coal and biomass would be of great benefit to the EU.

By solving the problem the consortium aim to capture market in Europe and Worldwide for household combustion "end of pipe" system of € 442 mill. creating more than 1300 jobs. This will save heating costs for European households with up to 80% and secure continued use of biomass such as wood for domestic heating and reduce future demand and dependency on fossil fuels of up to 100 000 ton on a yearly basis. It will also reduce incidents of respiratory diseases in urban areas in Europe with 1.2 billion Euro on a yearly basis. With a marked penetration of 2 % this cost will be reduced with 9,6 million Euro annually .

The project will also contribute to the reduction of the number of European citizens being exposed to inadequate ambient air quality and to the reduction of the 24 240 deaths annually in EU due to inadequate ambient air quality. With a marked penetration of 2 %, the number of deaths will be reduced with 200 annually. It will also contribute to the reduction of the 1 540 000 cases of respiratory disease among European adults and the reduction of 460 000 cases among European children due to inadequate ambient air quality. With a marked penetration of 2 % this number will be reduced with 12 320 annually. Use of biomass such as wood will contribute to replace other not renewable and sustainable forms of energy<sup>8</sup>, thus substituting the use of 1 ton of fossil fuel (gas or oil) reducing the emission of 2,7 million ton of CO<sub>2</sub> from a "typical" household annually.

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## **ENTRUST (Empowering Neighbourhood through Recourse of Urban Synergies with Trades)**

**Project Reference:** EVK4-CT2001-20007  
**Contract Type:** Thematic Network

**Start Date:** 01-02-2002  
**End Date:** 31-03-2004  
**Duration:** 26 months

### **Problems to be solved**

Many cities face the common challenge of deprived urban neighbourhoods in recession, especially sharply in mixed function neighbourhoods where the social problems of disadvantaged groups of residents intertwine with the economic difficulties of declining businesses. Experience shows, that the general growth trend does not help to solve the problem those benefiting from the growth forsake deprived neighbourhoods, increasing the segregation further, as their place is taken by even more socially excluded and less environmentally conscious. Spending significant amounts of public monies on infrastructure in such neighbourhoods, in the absence of a long-term strategy for putting in place inclusive structures that can capitalise on these improvements results in a failure to impact on the existence of both residents and businesses. When spending ceases the neighbourhoods and the quality of life therein quickly decline again and their competitiveness among European cities is critically reduced.

### **Scientific objectives and approach**

The objectives of ENTRUST are:

- (1) to increase the stakeholders' awareness of sustainable neighbourhood revitalisation, assessed in economic, architectural, environmental, social and cultural terms, all of which contribute to the overall quality of life, and
- (2) to empower the stakeholders to jointly engage in neighbourhoods now solely within the remit of city management to influence the decision making process.

ENTRUST approach is:

- (i) to establish a network of research institutions and end users: municipalities, urban regeneration enterprises and neighbourhood managers for exchange of emerging experience;
  - (ii) to identify (a) indicators for necessity and feasibility of forming and running public private partnerships for resolving problems of deprived mixed neighbourhoods, and (b) preconditions necessary to successfully initiate the process of partnership formation both respecting national and local specificity and defining common European denominators;
  - (iii) to assemble the innovative experience of end users emerging in existing participation projects in order to identify and integrate best practices in pursuit of positive effect of public-private partnerships to sustainable neighbourhood development, and
  - (iv) to develop an optimised methodology for creating conditions conducive to forming and running public-private partnerships which will engage all principal stakeholders from public governance bodies to groups of residents and enterprises around the common aim of regeneration.
- (iii) to assemble the innovative experience of end users emerging in existing participation projects in order to identify and integrate best practices in pursuit of positive effect of public-private partnerships to sustainable neighbourhood development, and
  - (iv) to develop an optimised methodology for creating conditions conducive to forming and running public-private partnerships which will engage all principal stakeholders from public

governance bodies to groups of residents and enterprises around the common aim of regeneration.

## Expected impacts

Various stakeholders will be enabled to form and drive mixed public-private partnerships for working together on aims as above by providing them with methodology of partnership creation. Such methodology and partnerships created following it will be instrumental in regenerating deprived mixed function neighbourhoods, reversing decline and moving towards sustainability through decentralised empowerment, increasing competitiveness, improving quality of life and enhancing cultural identity. Such partnerships will influence the development of deprived mixed function neighbourhoods, taking over parts of the responsibility from public authorities, focussing on improvements to quality of life in a holistic and wide ranging manner, emphasising sustainability, both for businesses and the communities of which they are part, enacting market forces to sizeably contribute to sustainable development of the deprived regressing neighbourhoods.

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#### *4.1.2 Improving the quality of urban life*

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## **EUROCULT21 (Urban Cultural Profiles Exchange Project)**

**Project Reference:** EVK4-CT-2002-20012  
**Contract Type:** Thematic Network

**Start Date:** 1-02-2003  
**End Date:** 31-03-2005  
**Duration:** 26 months

### **Problems to be solved**

The Urban Cultural Profiles Exchange project is a thematic network aiming at developing new optimised cultural management tools as well as at creating a long-lasting forum where cities can develop and exchange best practices, ideas on future plans, policies and scenarios.

Four main objectives were set for the implementation of the project EUROCULT 21, which will each, be dealt with in different stages of our methodology:

- To promote discussion, identify challenges, exchange best practices and diffuse knowledge concerning the current role of culture in urban governance, from city objectives (policy making and programmes) to the methodologies (strategic planning or public-private partnerships).
- To identify new research and funding needs on urban cultural policy in the years to come.
- To formulate innovative cultural strategies in collaboration with other European cities and University centres.
- To prepare a clear set of recommendations on cultural policy to the European institutions and Members States.

After the thematic network period, cities and academics will maintain this reflection and progress dynamics: urban societies are continuously on the move so that urban cultural policies need to be monitored and up-dated. The project participants will pass from the status of suppliers to the status of users of the project results.

### **Scientific objectives and approach**

Four main objectives were set for the implementation of the project EUROCULT21 which will each be dealt with in different stages of our methodology:

- To promote discussion, identify challenges, exchange best practices and diffuse knowledge concerning the current role of culture in urban governance, from city objectives (policy making and programmes) to the methodologies (strategic planning or public-private partnerships).
- To identify new research and funding needs on urban cultural policy in the years to come.
- To formulate innovative cultural strategies in collaboration with other European cities and university centres.
- To prepare a clear set of recommendations on cultural policy to the European institutions and Members States.

After the thematic network period, cities and academics will maintain this reflection and progress dynamics: urban societies are continuously on the move so that urban cultural policies need to be monitored and up-dated. The project participants will pass from the status of suppliers to the status of users of the project results. They will test the new common indicators and they will invite every European city, research centre and stakeholders wishing to participate actively in this collective based approach, to continue to enhance the debate and make new researches on urban cultural policy. EUROCULT21 will focus on three main strands of work:

- I. A two-day training workshop. This two-days training workshop aims to
  - Deepen the knowledge among the partners on the role of culture in urban governance by understanding the current implementation and management of the cultural policy at local level (history, future challenges, successes and failures).
  - Provide European cities and other reachable territorial communities with comparative urban statistics and indicators allowing for the standard evaluation in the years to come of urban cultural policy in European cities.
- II. National analysis of potential and organisation of ten assessment workshops:

Following the start workshop, the public authority partners will organise 10 national workshops (one for each countries represented in the project). Each workshop will bring together all the partners cities involved in the project in the same country as well as a selected list of academics, cultural managers, and cultural actors and NGO's.

The aims of these national workshops are:

- To identify the future challenges on the role of culture in the urban governance in the 21st century.
- To compare at national level the available information on urban cultural policy (i.e. institutional and financial structures, strategies for development, kinds of social and economic consequences, functions they have in the urban environment, etc.).
- To assess the potential barriers and possibilities for adopting the existing cultural indicators and methodologies in each participant city or urban area.
- To make recommendation on future policy and researches to the European Institutions and Member States.

### III. Final European Event

The project will culminate with a major European event that will bring together all the project partners together with several European experts and representatives from the European institutions and major European associations. The aim of this final event is to debate the result of the project and to produce a general set of recommendation and funding requirements.

## Expected impacts

The following milestones are being foreseen:

- A two day training Workshop
- 10 local workshops
- A final event
- 4 editions of a newsletter
- a web page
- a final report including a set of research recommendations.

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## **EUWMC (European urban waste management cluster)**

**Project Reference:** EKV4-2002-00575  
**Contract Type:** Accompanying measure

**Start Date:** end 2002  
**End Date:** end 2005  
**Duration:** 36 months

### **Problems to be solved**

Waste prevention is a crucial point of sustainability in the city of tomorrow. The Council Directive 75/442/EEC on waste, 1996, says, that the prevention of generation of waste shall remain the first priority, followed by the recovery of waste and finally by safe disposal of waste (hierarchy of principles for waste management). Unless joint waste prevention measures are taken on a higher level a growing impairment of the environment has to be reckoned with. Negative impacts on the environment are use of valuable land for waste disposal purposes, release of harmful substances from landfills and waste transports into air, soil and water. These effects will have a long-lasting, direct and indirect influence upon the quality of life.

EUWMC is formed by six inter-related research projects within the 5<sup>th</sup> research framework programme, which focus on:

- Waste prevention measures through the enhancement of sustainable consumption and awareness raising and implementation of the polluter pays principle.
- Optimisation of waste recovery and treatment systems.
- Measuring the technical effectiveness and economic efficiency of such measures through the development of waste data description and prediction models.

### **Scientific objectives and approach**

The principal objective of EUWMC is to assist cities, in obtaining maximum benefit from the research undertaken by the six cluster partners related to the main topics maximisation of the potential synergy and intensification of the dissemination:

- Maximisation of the potential synergy
  1. Critical comparison and consolidation of the preliminary results, in order to better direct future research plans and activities towards waste prevention
  2. Identification of other external projects in operation in related areas of waste prevention
  3. Identification of measures for waste prevention which are being considered or already successfully used in cities and eco-industrial parks
- Intensification of the dissemination
  4. Dissemination to a wider audience of these preliminary results and activities
  5. Development and maintenance of an interactive web-site, as a "Thematic Portal" dedicated to waste prevention;
  6. Identification of common recommendation for the future EC waste management policy

### **Expected results**

The cluster project will generate an exchange of information among socio-economic research and technological/scientific research in the field of waste prevention. Providing consolidated recommendations produced by 6 research projects concerning waste management planning which are disseminated by various means:

- Workshops and Conferences
- Evaluation of the results by means of case studies within cluster partner projects
- Flyers and brochures
- Interactive Web-site

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## **FUMAPEX (Integrated Systems for Forecasting Urban Meteorology, Air Pollution and Population Exposure )**

**Project reference:** EVK4-2001-00281  
**Contract Type:** Shared-cost RTD

**Start Date:** 01-11-2002  
**End Date:** 31-10-2005  
**Duration:** 36 months

### **Problems to be solved**

Most of major European conurbations experience severe short-term pollution episodes that are harmful to the environment and to human health, especially for children and the elderly. The European Environment Agency evaluated that more than 40 million people, living in 115 major urban areas in Europe, are exposed to pollutant levels that exceed the reference levels stated by the World Health Organisation. EU Air Quality Directives and national regulatory legislation were introduced to abate these adverse effects. In order to diminish or prevent critical concentration levels, abatement action (such as traffic reduction) should be planned at least one-two days in advance. Often no effective action can be imposed because no or only inadequate forecasting models exist. In some European cities, early warning systems like Urban Air Quality Information and Forecasting Systems (UAQIFS) are already employed. They need to be improved, verified, supplemented by meteorological prediction and population exposure models, and then implemented more widely in Europe for providing better protection of human and environmental health in cities and urbanised regions with ever-increasing population.

### **Scientific objectives and approach**

The quality of the urban air pollution forecast and the UAQIFS critically depend on the mapping of emissions, the urban air pollution (UAP) models, and the meteorological data.

The quality of the meteorological data should be largely enhanced by using downscaled data from advanced numerical weather prediction (NWP) models. These different topics, as well as the application of population exposure models, have traditionally been treated in distinct scientific and administrative communities whose expertise needs to be combined to enhance the possibilities of forecasting air pollution episodes in European cities. The main objectives of the project are thus the improvement of meteorological forecasts for urban areas, the connection of NWP models to UAP and exposure models, the building of improved UAQIFS, and their application in cities in various European climates.

The necessary steps will evolve in ten separate but inter-linked Work Packages realised by 16 participants and 6 subcontractors. They represent leading NWP centres, research organisations, and organisations responsible for urban air quality, population exposure forecast and control, and local/city authorities from ten European countries.

### **Expected impacts**

The main impact of FUMAPEX will be improved, validated, inter-compared, and accessible UAQIFS implemented in an increasing number of European cities. Forecast and prevention of the worst air pollution episodes in large cities according to air quality directives will lead to an improved quality of human life and of the environment.

Additional impacts are the potential use of improved weather and pollution forecasts for emergency management (fires, accidental emissions) and for long-term air quality management (scenario studies, emission abatement strategies, sustainable city life). Linking scientists and administrators of different specialisation will also lead to speeding-up and innovation in related urban research and application addressed by FP5 (e.g. urban climate, sustainable transport, environment, and health).

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## **GREENCLUSTER (Clustering of five ongoing research projects on green space in urban areas)**

**Project Reference:** EVK4-2002-00538  
**Contract Type:** Accompanying Measure

**Start Date:**  
**End Date:**  
**Duration:** 24 months

### **Problems to be solved**

Green open spaces in urban areas are essential for the citizens' quality of life and urban sustainability. As these areas tend to be used as a freely accessible public good, their full value is often under-appreciated, which leads to lack of investments and maintenance. Five ongoing EU-funded research projects are addressing, from different perspectives, the various functional values of green urban space: the economic, social and ecological values. They develop options and criteria for the development and maintenance of urban green. Rather than presenting the results of these individual projects to relevant stakeholders in a fragmented way, a co-ordinated presentation of the consolidated findings of the five projects should enhance their impact.

### **Scientific objectives and approach**

As the projects range in their approaches from fundamental to applied and from highly technical to primarily participatory and communicative, there is an academic challenge in demonstrating how the projects can supplement each other and together be more than the sum of the constituent parts. The projects are to be put into a common framework. The accompanying measure will deal with possible mutual overlaps, or contradictions. Workshops will bring the partners of the different projects together for peer reviews of the methods, the empirical evidence and of the tools and decision support systems developed by each project. Mutual exposure to the preliminary findings and to the ways of presenting the results is likely to impact on the final phase of each of these 5 projects and to improve the consistency and relevance of their outcomes to the outside world.

The three conferences and two review reports envisaged for this project should also bring to light some agreement on future courses of action, both in the applied and in the scientific fields. Hard facts and explanations based on sufficient empirical evidence can be distinguished from plausible statements and hypotheses needing further research work.

The first conference will analyse and compare the different approaches taken in the 5 projects and inventorize their main findings. This will be published in a first Comparative Review Report. About 6 months later a second conference will take the review a bit further by discussing the scientific achievements in these combined projects on the one hand and the practical toolkits to be derived from them on the other. Practitioners from the research sites – the cities - will be invited to take part in this conference. This conference will result in a second Comparative Review Report. Towards the end of the 2-year period we will organise a third conference, which will be open to outside researchers, practitioners and policy makers. This is where we undertake a consolidated presentation of our findings.

### **Expected impacts**

More than individual research reports, the activities envisaged in this joint project are expected to reach large numbers of people who are responsible for the development and upkeep of public green spaces in urban areas all over Europe. Two of the three conferences and the two review reports will mainly have an impact in academic circles and relatively few practitioners. The third conference, which will be preceded by the formal launching of a mobile exhibition and video, is expected to have a much wider impact. And last but not least, the project will establish a website for communicating and debating the results of the five partner projects and of their joint activities. This website is expected to outlive the duration of the accompanying measure for many years. It shall have links to other relevant websites, e.g. the COST 11 website and those of professional organisations on urban growth and green space.

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## **GREENSPACE (The contribution of urban green-space to quality of life)**

**Project Reference:** EVK4-2000-00039  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-12-2000  
**End Date:** 30-11-2003  
**Duration:** 36 months

### **Problems to be solved**

Urban greenspace (parks, country parks, nature reserves, greenways and all landscaped public open space) makes an essential contribution to the quality of life. It provides a recreational resource, a peaceful retreat from the city, an attractive backdrop to built development, safe and exciting play areas for children and a reserve for urban wildlife. Nobody would deny these benefits. However, as a public good, greenspace is often taken for granted, both by the municipal authorities that must maintain it, and by the public it is intended to benefit. The municipal authorities do not receive any significant income from greenspace, but must budget for its maintenance along with other municipal responsibilities such as education or roads. Use, for the most part, is not excludable, and so there is a diminished incentive for individual members of the public to campaign for the maintenance of greenspace. Consequently, many greenspace areas are either neglected or are sustained with low maintenance expenditure in a form that risks becoming less relevant to modern lifestyles.

### **Scientific objectives and approach**

This research will assess how strategic planning can maximise the contribution that different areas of urban greenspace make to the quality of life and the urban environment while minimising user conflicts and degradation.

The scope of the research is interdisciplinary. All members of the research team, but especially the urban designers and ecologists, will describe and categorise the existing provision of greenspace in sample cities together with the use that is made of it. Environmental economists and sociologists will establish the relative importance of greenspace attributes and the combination of greenspace types that maximise public welfare. Spatial scientists and visualisation experts will develop three-dimensional models of options for the further development of greenspace. They will work closely with the social scientists to determine which designs would maximise public utility without compromising (indeed enhancing) the function of the city as a place of business and investment.

The economists will draw on ecological information and qualitative sociological data to produce choice experiments. This methodology calls upon respondents to select between, or trade off, sets of greenspace types and other attributes that contribute to quality of life. The experiment will be given extra reality through the use of visualisation. The results and the visualisation will be tested and refined through a process of public participation intended to involve urban citizens in the planning of greenspace provision in their home cities.

### **Expected impacts**

The research team is concerned that urban greenspace is at risk of being undervalued in terms of both its current and potential contribution to quality of life. Many greenspace areas have suffered from inadequate management that, at best, has focused on essential maintenance rather than enhancement, with the result that these areas are under-utilised, especially by certain segments of society. Related problems are obvious neglect or vandalism. On the other hand, there are many other greenspace areas, which have a good level of maintenance and are well used by all social groups and classes.

An objective is to find out, firstly why there are these differences, and secondly, how the benefits of greenspace can be maximised. Improvements could come about through direct enhancement of design, strategic planning for different types of greenspace or the establishment of network or corridors between different areas. A further objective is to maximise the quality of existing greenspace and to reduce tendencies to unsustainable low-density urban sprawl.

The research will engage the public fully through a process of public participation. Active working relationships will be established with municipal authorities, both for case studies, and for the exchange of ideas that will ensure the relevance and applicability of the research. Networking will be extended to municipal authorities, institutions and interested groups throughout Europe. This will include northern and southern European states as well as new member states. The applicability of the research will be underpinned by a decision support tool or computer model, which can be applied to all cities and adapted for local circumstances.

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## **HOMESERVICES (Benchmarking sustainable services for the housing sector in the city of tomorrow)**

**Project Reference:** EVK4-CT-2002-00100  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-10-2002  
**End Date:** 30-09-2004  
**Duration:** 24 months

### **Problems to be solved**

The proposed project focuses on studying how to save environmental resources by replacing products with services that fulfil the same needs of the consumer. Previous studies show that consumers must be able to use such services (e.g. car sharing) as conveniently as products owned by themselves. Therefore the project concentrates on the conditions necessary for providing these services directly at the home of the client or nearby. Studies in this field show that co-operative marketing strategies of the housing sector and service providers must be applied in order to develop convenient and cost-efficient eco-services to the consumer.

Therefore, the principal actors in this field are the:

1. Housing sector;
2. Service providers and;
3. The users themselves, mostly tenants.

### **Scientific objectives and approach**

The main objective of this project is to stimulate the introduction of sustainable services, which are provided directly at the house of the client. These services are called homeservices in this project.

The HOMESERVICES project is focused on

1. describing the present situation of technical, social, knowledge or mobility-oriented services in their broadest sense, (i.e. services relating to mobility (carsharing), energy (heating, hot water), washing, repair, maintenance and renting services as well as technical, information and social services, mainly for mothers, sick, disabled and elderly persons), which are or may be provided directly at home by the housing sector or any other institution,
2. analysing the environmental, economic and social effects of these services and their potential for sustainability,
3. analysing the tenants attitudes towards these services and how they influence demand, acceptance or refusal of forms of joint use and of advanced services,
4. evaluating representative housing pilot projects in the participating cities in order to analyse which factors facilitate or hinder the development of innovative buildings with a broad set of services, with a focus on interviews with architects and housing companies,
5. analysing the potential ecoservices, like existing and proposed forms of joint use, eco- and personal services, their obstacles and promoting factors,
6. benchmarking the housing sector and other suppliers as providers of services, based on the balanced scorecard approach,
7. comparing 12 European cities, which are partially implementing Local Agenda 21 projects,
8. developing an ideal scenario, elaborating proposals for the creation of adequate legal and other positive framework conditions, focusing on better living conditions, especially for elderly people and families, as well as on reducing the environmental impact of human activities,
9. creating a service catalogue in print and on the web and carrying out workshops with possible providers and other actors (consumers, authorities, architects, etc.) in order to guarantee the dissemination of results and the start up of a network.

### **Expected impacts**

We assume that a market for services directed towards households and individuals exists, but that it has to be accessed through innovative concepts. Due to the proximity to the tenants, the housing sector may play a key role in promoting sustainable patterns of technical, knowledge- or mobility-oriented and personal services by

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- initiating these services,
- offering these services in co-operation with small and medium-size service providers and
- creating the structural framework for offering these services.

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## **INDICATORS FOR SOCIAL URBAN SUSTAINABILITY (Formal indicators of social urban sustainability)**

**Project Reference:** EVK4-2000-35001  
**Contract Type:** Exploratory awards

**Start Date:** 15-05-2000  
**End Date:** 14-05-2001  
**Duration:** 12 months

### **Problems to be solved**

The relationships between the form of urban public space and the kind and quality of human social activities within that space have been investigated and deepened during the last forty years. The outcome of these studies is a set of spatial/formal components, supposed to affect and foster the strength of local social networks. Scope of the research is a systematic comparison between "samples" of real urban fabrics and cities, selected for their different historical origins and cultural contexts, through a measurement based on the use of formal indicators.

### **Scientific objectives and approach**

- to provide a larger empirical basis for a wider awareness of the linkage between the form of cities and the social behaviours;
- to provide a set of technological tools fit for the practical gathering and processing of data on the form of urban public space.

### **Expected impacts**

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## **INERWASTE (Development of a new wastes inerting technique for landfilling or valorisation)**

**Project Reference:** CRAF-1999-72226  
**Contract Type:** Craft

**Start Date:** end 2002  
**End Date:** end 2004  
**Duration:** 24 months

### **Problems to be solved**

### **Scientific objectives and approach**

Objectives: The elimination of dangerous industrial and municipal wastes is one of the main environmental problems to overcome in the next decades. Current waste stabilisation technologies consist in the incorporation of wastes into a cement matrix, but some important problems are still remaining in current technologies. These project aims at overcoming the limits of current stabilisation technologies through the improvement of a mineral binder based on a new combination of a hydrated calcium trisulfoaluminate phase and hydrated ferritic phase. This new stabilisation technology will be designed especially to the treatment of several heavy metals rich wastes (polluted oils, thermal processes wastes) that are very relevant for the industrial activity of involved SMEs.

Work description: Through the improvement of binder formulation, INERWASTE objective, are more particularly:

- To increase the incorporation ratio of wastes in the cement matrix (quantified objective to increase this ratio from 20% to 40%.)
- To improve the safety of stabilised wastes by the suppression of setting problems, a better retention of pollutants, and a better durability (to optimise the physico-chemical interactions between the mineral binder and wastes.)
- To improve mechanical properties of stabilised wastes (to explore some valorisation possibilities for stabilised wastes)

In this purpose, the technical work will be divided into 6 workpackages:

WP1: Industrial specifications

WP2: Development of the new binde

WP3: Laboratory scale validation

WP4: Industrial validation on contaminated soil

WP5: Industrial validation on thermal processes residues

WP6: Management of the project

### **Expected results**

The direct impact for industrial partners is that this new stabilisation technology is expected to reduce the toxicity of wastes that could therefore be stored in non-toxic landfills. This is expected to reduce storage costs by a factor 2. Another direct result is a new stabilisation technology for the remediation of contaminated soil, what represents a very big market opportunity for SMEs from Eastern European countries, where soil contamination by industrial waste is dramatic.

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## **LCA-IWM (The Use of Life Cycle Assessment Tools for the Development of Integrated Waste Management Strategies for Cities and Regions with Rapid Growing Economies)**

**Project Reference:** EVK4-2001-00185  
**Contract Type:** Research

**Start Date:** 01-09-2002  
**End Date:** 31-08-2005  
**Duration:** 36 months

### **Problems to be solved**

The review of the results of the EU 5th Action Programme show that despite much progress in the waste management waste quantities throughout the European Union are increasing (EEA, 2000). The problem of waste strikes strongest the large cities, especially their highly populated zones where the opportunities for waste minimisation through e.g. home composting of bio-fraction are limited and the lack of free space significantly restricts the waste management infrastructure. Poorly planned waste management system can cause a serious nuisance for a city dwellers.

A large discrepancy among the EU Member States and regions as for the implementation of waste policy can be observed. For instance, in the northern countries on average 20% of waste is collected separately, while in the southern only 5%. Some EU Member States (e.g. Germany) have achieved higher recovery and recycling rates for packaging wastes than target values, while other countries such as Portugal, Greece, France, Spain, appear not to be making as much progress. Yet, even more difficult situation in waste management exists in the EU Accession States. These countries undergo currently in the process of harmonisation of their national environmental laws in the EU policy. In the nearest years they need to fulfil a number of requirements to adjust to the European standard. One of the primary tasks is to develop waste management plans at the local, regional as well as the national level, which in countries like Poland is planned for the period 2002-2010 (MOS 2000). The other, more difficult task is their implementation (in Poland 50% municipalities by the year 2010, (MOS 2000)). Large cities are confronted here with the most difficult problem, due to their infrastructure, demographic, social complexity.

Addressing the above outlined needs the main objective of the proposed research project is to develop tools to support (i) planning of new and (ii) optimisation of existing waste management systems in the European cities. The primary application areas are the regions with fast growing economies, which are (i) EU Accession Countries and (ii) countries like Greece, Spain and Portugal, etc. These countries undergo currently a rapid economic development, resulting in significant increase of waste quantities, while their waste management systems still require much effort to be adjusted their to the European state-of-the-art. However, the proposed decision supporting tools can be as well used in any other European region, for the purpose of waste management optimisation and/or benchmarking.

### **Scientific objectives and approach**

#### **1) Waste Prognostic model**

*Current problem:* Common mistake occurring in the process waste management planning is inaccurate estimation of future waste generation trends. As a result waste processing facilities (such as incineration or composting plants) with overestimated size and capacity have been constructed across the EU. Unforeseen in a planning phase reduction of quantities of municipal waste and changes in their composition resulted in many facilities utilising only partly their constructed capacity and thus operating at very high economic costs. Especially in the targeted regions data about waste generation characteristics is lacking. Full waste analysis is expensive and takes a long time.

*Proposed solution:* Developing a practical software tool for waste management planners to model and predict changes in waste generation (quantity and composition) along with other developments taking place in cities and regions with rapidly growing economies (e.g. demographic change, socio-economic developments, technological developments). Benefit of such a model will be more precise planning of waste management systems, and individual waste treatment/disposal facilities, and thus their better performance in both ecological and economic terms.

#### **2) Criteria and quantitative indicators enabling assessment of the environmental, economic and social performance of integrated waste management strategies.**

*Current problem:* Implementation of the EU Waste policy can be achieved in many ways. The national experiences show that some of the solutions can be more efficient and sustainable than the others (Coopers & Lybrand 1996). Modern Waste Management presents a high level of complexity, thus selection of a better waste management scenario requires many aspects (environmental, economic and

social) to be considered. There is a need to develop a comprehensive assessment method, which enables to identify the optimum waste management option for a specific situation.

*Proposed solution:* To develop a set of qualitative sustainability criteria along with quantitative impact indicators for waste management assessment. Three kinds of aspects of sustainability will be addressed: environmental, economic and social. The criteria will provide a conceptual assessment framework, the indicators will allow for the quantitative assessment and benchmarking of alternative Waste Management options. The developed criteria and indicators will adhere to the principles of Integrated Waste Management (IWM) and thus optimise the way of EU waste policy implementation. The goal of IWM is to effectively manage waste through resource conservation, optimising the use of treatment technology and limiting disposal. The developed assessment method will be based on a life cycle assessment (LCA) approach i.e. the borders of assessment will be extended to account for all relevant aspect resulting from a waste management system. LCA assesses the use of resources and the release of emissions to air, water and land, and the generation of useful products from waste and from the moment when waste is generated until its final disposal take place. The developed methodology will provide a monitoring tool for an existing system and benchmarking against other. Moreover if accompanied by the LCI modelling software tool, with the extensive data on the environmental aspects (emissions, resources use etc) it will provide a practical tool for waste management planning and optimisation.

The sustainability criteria and indicators will reflect the objective of the evaluation, will be science-based and will be applicable. It is believed that the application of LCA methodology can improve credibility of a standard waste management impact assessment. LCA results can be communicated to the public and through providing scientific evidence improve understanding and acceptance for waste management facilities. A software application will be developed to compute the sustainability indicators. It will contain additionally an optimisation module. This decision supporting tool, will be based on a multi-variable optimisation approach considering and will be capable of determining the optimal waste management scenario based on the environmental, economical and social input information.

### **3) Optimal waste management scenarios for the selected cities from fast growing European regions (from Spain, Poland, Lithuania, Slovakia, Greece<sup>1</sup>)**

The developed methodology and tools will be applied for waste management planning in the selected cities from the rapid growing regions. Optimal waste management scenarios for these cities will be identified. The selected cities come from various European regions and climate zones, and thus also the waste composition and quantities vary. The size of cities ranges from less the 100 thousand to over 4 million inhabitants, however all of them are important municipalities in the respective countries. The scale of waste management problems in selected cities is varied. In Polish, Slovak and Lithuanian cities waste management plans do not exist yet. Waste is only landfilled there. In the selected Greek city, there is a need to develop a new waste management plan. Whilst in the Spanish cities, revision and optimisation is needed due to problems with implementation and too ambitious objectives of the current waste management plan. All the selected municipalities have shown strong interest in participation in the project and project deliverables (confirmed by letters of intent).

## **Expected impacts**

The objective of the proposed project is to develop support tools for waste management planning and monitoring. It is believed that the waste generation prognostic model will be a useful tool to plan waste management systems with appropriate capacity and thus functioning efficiently in both environmental and economic terms. Another project deliverable, sustainability criteria and indicators with optimisation tool will allow for optimisation of the waste management system at the planning phase and thus minimise its negative impacts. This systematic approach to waste management planning will ensure better environmental and life quality for the future for the targeted regions and in consequence for the whole Europe.

The targeted End-Users of this project are various actors involved in waste management planning and monitoring: (i) primarily, in the cities and regions with fast growing economies (for planning, assessment and optimisation) (ii) secondly, in any other European regions (for monitoring, benchmarking and optimisation).

Adequate waste management plans are prerequisite of an efficiently functioning waste management systems. (Council Resolution 97/C 76/01). Therefore, one of the primary objectives of the 5th EAP was to develop waste management plans at the national and local level. The review of the results of the EU 5th Action Programme shows that despite much progress in the waste management the objectives were not

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<sup>1</sup> Names of the cities are not provided for anonymity reasons



achieved. A need for developing sound waste management practise across Europe, which promotes waste recovery and recycling has been reaffirmed, along with the further demand for waste management plans at the national and local levels (EEA 2000, 6th EAP).

This research project addresses the above stated needs for improvement o waste management practice across Europe.

Namely, the targeted End-Users are:

- Municipalities and local/regional authorities responsible for spatial and waste management planning and development in cities,
- Institutes and Consultancies developing or/and evaluating local waste management plans,
- Officials and decision-makers that verify the proposed developed strategies for waste management in cities and regions.

For all these end-users the developed tolls will provide an objective, practical and science-based decision support.

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## **LUDA (Improving the quality of life in large urban distressed areas)**

**Project Reference:** EVK4-2001-00152  
**Contract Type:** Cost-sharing contracts

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

Most European cities have large urban areas suffering environmental, economical and social distress that results in a high level of political pressure to make rapid improvements to the quality of life. Especially in the take-off phase of urban rehabilitation, this often leads to an uneconomic use of resources and it narrows options for development. It contrasts with the need for far-sighted strategic planning and development addressing three main challenges of these areas: their large dimension, the complexity of problems and the uncertainty of their future development. LUDA seeks to tackle this challenge by providing tools and methods for a more strategic approach towards urban rehabilitation, and by supporting cities in initiating and managing such an approach in its early stages.

### **Scientific objectives and approach**

The overall goal of the project is to contribute to the improvement of the quality of life in large urban distressed areas by providing a systematic strategic planning and development approach with special consideration of the take-off phase of rehabilitation processes. The leading question is, how an integrated strategic process of sustainable rehabilitation and development for large urban distressed areas with a complex set of problems, rather vague development perspectives and high public pressure for rapid improvements can be initiated and better managed during its initial stages.

The project consists of nine work packages which follow a logical progression and which consider both: the demands of interdisciplinary research and the practical requirements of municipalities. A comprehensive literature review and the collection of documented experiences with rehabilitation approaches, a Europe-wide analysis of tools for initiating and managing rehabilitation programmes as well as the consideration of the experience of reference cities provide a sound scientific information base for practical action. Major issues are systematically described in a respective compendium. From a practical viewpoint, case areas in six cities are defined, and their key problems are described. Based on this, the take-off phases of urban rehabilitation in the case areas are scientifically supported and analysed. Rehabilitation strategies are developed. Respective tools and methods are further developed. Conclusions provide an input for a checklist on initiating sustainable urban rehabilitation in large urban distressed areas and policy papers dealing with key issues as well as for networking and dissemination.

The project brings together six cities as well as ten research institutions and non-governmental organisations from eight different European countries (including an accession state) in an interdisciplinary way. Furthermore it provides a platform for a broader discussion with other cities, research institutions and civic organisations. Teamwork and permanent information exchange are ensured by establishing interactive, interdisciplinary workshops, videoconferences and a net of cities. Mutual exchange and networking between cities and research partners are oriented towards establishing learning processes.

### **Expected impacts**

From a scientific perspective LUDA serves to enhance the knowledge about the phenomenon of large urban distressed areas. Of particular importance are analytical tools for setting boundaries and defining priority action areas, co-operation and participation in distressed areas, and the applicability of methods to cope the challenges of such areas.

From a practical perspective LUDA will provide decision-making aids and consultation about available tools, methods and success factors, facilitate a learning process, organise city-networking, formulate policy recommendations and support the implementation of key projects that will lead to an improved quality of life in large urban distressed areas.

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## **MICRODRAINAGE (Development of a cost-effective solution for the safe and definitive remediation of the European landfills which present the danger for the leachate to pollute the waterbed)**

**Project Reference:** CRAF-1999-71827  
**Contract Type:** CRAFT

**Start Date:** end 2002  
**End Date:** end 2004  
**Duration:** 24 months

### **Problems to be solved**

A study of the European Environment Agency revealed that 120 millions tonnes of waste are yearly disposed in landfills, corresponding to 63% of the overall amount of the European solid wastes. Although most of European landfills are modern lined sites, equipped with water-proof membranes and leachate collection systems, a survey made for the European Commission by the European Topic Centre on Waste, based on data available for Germany, Italy, France, Spain, Portugal and Greece indicated that at least 13500 European landfills present the danger for the leachate to contaminate the subsoil and the waterbed. Leachate pools are randomly positioned within the landfill mineralised content, temporarily trapped by low porous clays, concentrating a large variety of hazardous chemicals and dangerous contaminants, such as vinyl chloride, nitrates, sulphates and heavy metals (Lead, Chromium, Mercury). Several toxicological studies exist on the effect of leachate pollution on human being, animals and plants, demonstrating that these substances can cause cancer (carcinogens), birth defects (teratogens) and mutations (mutagens). Data available demonstrates that the main European countries have followed-up the EC directive; during 2000, considering only France, Germany and Spain, about 1 billion Euro have been allocated for the remediation of dangerous sites. Furthermore they are not safe for the operators who may come in contact with highly dangerous materials and substances dispersed in the polluted ground and in the waste content as well as may face sudden explosions caused by the bio-gas developed inside the landfill body which accumulates just below the surface.

### **Scientific Objectives and approach**

In order to develop a definitive methodology for landfill remediation the SME partners have fixed the following objectives for the outcome of the project: availability of a robotic unit able to be remotely-operated in 1.6 meters internal diameter micro-tunnels, while autonomously performing the feeding and drilling operations, setting-up 800 millimetre long SIDRA elements with a diameter of 88.9 millimetres (three inch and a half, standard perforation pipes), disposed in raise crowns, with radial direction, and angle planned on the radar landfill maps. Each draining line, drilled in the landfill body, have a length up to thirty meters, drilled and fitted down in forty-five to ninety minutes, depending on the encountered ground. Availability of an autonomous and tele-operable supplying system, to transfer the needed amount of SIDRA elements from the main vertical well to the drilling unit, able to interface with the drilling unit and carrying a number of pipe elements covering the request of at least a draining line and half, corresponding to 45 meters, and two hollow bits. Capability to identify leachate pools located at up to 40 meters from the landfill bottom, through a 1 meter diameter GPR antenna operated in the micro-tunnels, with a resolution better than 1 meter and a single-pass detection rate of at least 85-90%, working with a maximum frequency of 200 MHz. Provision of a service for an overall maximum cost ranging between 22 and 27 Euro/m3 according to the size and features of the landfill, including the clean cover to avoid rain water infiltration and therefore any further leaching from out of service or abandoned landfills.

### **Expected impacts**

To launch a new service for landfill remediation estimated in 15 millions Euro per year within two years from project completion, leading in the medium term to world wide sales of 275 millions Euro, through licenses, with huge impact on sectors dominated by SMEs; to reduce the cost for the remediation of a medium sized landfill up to 50% with respect to traditional methods; create secondary market opportunities for the automatic drilling unit worth 25 millions Euro/year; create secondary market opportunities for the Ground Penetrating Radar worth 8 millions Euro/year;

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## **NEHOM (Evaluating housing and neighbourhood initiatives to improve the quality of life of deprived urban neighbourhoods and assessing their transferability across Europe)**

**Project Reference:** EVK4-2000-00027  
**Contract Type:** Cost-sharing contracts

**Start Date:** 28-11-2000  
**End Date:** 27-11-2003  
**Duration:** 36 months

### **Problems to be solved**

TSER projects of the 4th Framework programme documented trends of urban deprivation related to stigmatised housing neighbourhoods, which are threatening social cohesion, economic viability and thus the quality of urban life. Different national/local models of housing policies, planning and management of neighbourhood housing have proved to be effective in combating these trends. Comparative analyses of innovative models and evaluation of their transferability are, however, lacking. Based on analyses of innovative neighbourhood solutions we will provide a handbook/CD-ROM database of national and local effective solutions containing guidelines on transferability. The work will be undertaken in close contact with participating housing companies, city administrations and resident organisations.

### **Scientific objectives and approach**

- To build a database of innovative and effective housing initiatives and neighbourhood practices which: Have been developed by local communities, governments and the private sector; Are effective in improving the quality of life in deprived urban neighbourhoods, and; Build the capacity and social entrepreneurial skills of local residents and actors.
- To develop guidelines for transferring effective housing initiatives and neighbourhood practices between countries and localities; and additionally report on experimental transfer and adaptation of concrete initiatives in the NAS partner localities.
- To identify a toolkit of principles, quantitative and qualitative measures for assessing the relationships between housing initiatives and the quality of life in urban neighbourhoods.
- To provide information for feasible strategies of EU and NAS urban housing policies.

### **Expected impacts**

Through the evaluation of 29 neighbourhood case studies and 8 national reports undertaken by the consortium so far, the aims are at creating tools for better management of neighbourhoods and housing initiatives in order to improve the quality of life in deprived urban settings, e.g. reduce poverty, provide shelter, protect the environment and support economic development. To achieve this the consortium of 9 academic partners extended with two practitioner NAS partners have established co-operative links with national/local networks of public and private housing agencies.

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## **NOZONE (An intelligent responsive pollution and odour abatement technology for cooking emission extraction systems)**

**Project Reference:** CRAF-1999-71300  
**Contract Type:** CRAFT

**Start Date:**  
**End Date:**  
**Duration:**

### **Problems to be solved**

The problems of removal of odours, particulate and other by-products of the cooking process are currently achieved by several technologies including filtration, incineration, carbon absorption, photolysis and oxidation. These methods are usually expensive but some have been proven to remove 99% of particulate matter (PM), but with less degree of success with the gaseous emissions (Volatile Organic Compounds or VOCs) and especially odours.

Similarly these methods, either use chemical based mediums with short lifespan and the attending maintenance cost, or they are based on the use of filters, which tends to clog up with fats and grease, thereby becoming a fire hazard. Alternatively they use air-washers, which transfers the problem to waste water, which then has to be removed or treated. Apart from air pollution, the emissions from these outlets consist of local irritants such as depositions of fat on roofs, cars and the production of odour within the urban environment.

It is now estimated that complaint against odour and emission from industrial catering units stands at 3300 per annum [4] in the urban local authorities. In addition a significant level of fat and grease is built up in the ductwork creating fire hazards. Therefore there is a need for a safe, dynamic response (to emission input load), multivariable controlled, integrated pollution and odour abatement system that is capable of removing 99.5% of PM as well as neutralising more than 90% of VOCs and odours while preventing the build up of fat and grease that are potential fire hazard. Say some words on the importance of the phenomenon in urban areas. You should justify the positioning of the work into the City KA.

### **Scientific objectives and approach**

The barrier to effective deployment of ozone against odour and pollution abatement is the inability to control the ozone generation mechanism for rapid response to variable and dynamic loads of pollution typical of commercial catering environment.

Therefore a scientific quantification of the interaction of process variables for the ozone production process and the factors influencing the mechanism of VOC neutralisation will be undertaken. These scientific understanding through close control and monitoring of UV/Ozone characteristics will be encapsulated in a multivariable control algorithm that will be used for monitoring the pollution and odour abatement system.

Add that care will be taken to stimulate the use of the new technology in urban areas where the problems are more acute. You could refer to the creation of an urban stakeholders group. Care will be taken to create awareness for the technology, especially in the urban environment stimulating the uptake of the technology as best practice through the appropriate local authorities

### **Expected Impacts**

The proposed technology will lead to a state of the art commercial and domestic cooking fume extraction system without fat deposits (hence danger of fire) with reduced odour and harmless VOC emissions. This will lead to 3% reduction in incidents, injuries and deaths resulting from catering industry fires, while generating sales revenue of €424million and 843jobs.

The outcome of this project will be demonstrated in a commercial kitchen as a demonstrator for project dissemination and the partners plan to apply for patents on the thermal accessory design and the material recovery system. Who will be the main beneficiaries? When will the new system be marketed? What could be its cost compared to competitive technologies? Development of a working industrial unit can be expected within approximately 9-12 months of the end of the project. Where the consortium forms the

supply for the entire system supplied and installed through members of the consortium who are currently serving the catering industry and by licensing through sponsor companies such as Enodis Europe who supplies large chains of catering establishment.

### **Coordinator**

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### **Participants**

## **ORMA (Optimisation of resource use and waste management in an Eco Industrial Park)**

**Project Reference:** CRAF-1999-70125  
**Contract Type:** Craft

**Start Date:** 01-05-2001  
**End Date:** 30-04-2003  
**Duration:** 24 months

### **Problems to be solved**

This project aims to design an integrated industrial system for the optimisation of waste treatment and energy resource use in an Eco Industrial Park (EIP) with specific reference to a potential EIP in the Langhe area (Northern Italy). It is proposed that the EIP will be managed and controlled by an integrated information system developed during the project.

### **Scientific objectives and approach**

In order to create a new and complex industrial system which maximises the use of resources through "closed loops" of materials use, the project objective is to demonstrate the technical feasibility and environmental sustainability of an EIP, through the work of 4 SMEs, supported by two academic institutions and a research centre, interacting via an integrated network of supporting activities. It will be possible to achieve this goal in two different stages in the development of the EIP:

1. Initially branch offices of existing organisations located outside the Park will be built in the EIP; this will be an initial phase to test out the structure and to optimise the resources use. The integrated energy and waste management plant will be designed during the development of the project, the EIP will be initially an industrial system for services.
2. In the final improvement phase of the project, after the validation procedures have been completed, additional parts of the organisations, plus any new organisations will move into the EIP. This will include manufacturing elements of the existing organisations. This will enable the results of the Life Cycle Assessment methodology to be established that will optimise the use of resources in the Park and minimise the impact.

This will permit to establish 'a priori' whether the proposed industrial park will truly meet the industrial ecology concept by incorporating an environmental friendly choice of materials processes and technologies. The work plan for this project includes a preliminary study of existing Eco Industrial Parks, an assessment of alternative building materials for the proposed EIP, the use of Life Cycle Assessment methodologies to establish the environmental impacts of resource and energy flows related to the proposed EIP, the design of alternative technologies for the treatment and integrated management of the Park, and an integrated information system allowing communication, control and exchange of information within the Park. The European added value and the contribution to the implementation and evolution of EU policies will be expressed by validating the transferability of methodologies and technologies developed in this project in six existing European EIPs located in Italy, France, England, Denmark and Germany.

### **Expected impacts**

#### **Coordinator**

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## **OSCAR (Optimised Expert System for Conducting Environmental Assessment of Urban Road Traffic)**

**Project Reference:** EVK4-2001-00156  
**Contract Type:**

**Start Date:**  
**End Date:**  
**Duration:**

### **Problems to be solved**

This proposal addresses the major problem of road traffic congestion and the resulting air pollution in urban areas. The quality of life of the Citizen is expected to diminish in several ways as a result of the growth in urban traffic including increased journey times, deterioration in air quality and health of vulnerable groups and increased inefficiencies and economic costs affecting industry and business. In terms of air quality it is recognised that limit values for NO<sub>2</sub> and PM<sub>10</sub> will be difficult to meet in European urban areas. Current environmental assessment models, however, cannot adequately address complex traffic flows and micro-scale dispersion patterns observed in urban streets. This severely limits the ability of End Users to identify cost-effective and environmentally sustainable options for impact reduction in order to meet EU Air Quality Directives and the associated Daughter Directives. The overall aim of OSCAR will be to develop and deliver an optimised Expert System to assess the environmental impact of road traffic in terms of traffic flows, emissions and air pollution integrated with the capability of identifying suitable impact reduction options.

### **Scientific objectives and approach**

In order to meet the overall aim of OSCAR, gaps in NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations and emissions datasets will be identified. Methods for improving modelling approaches for the Expert System will be examined. In addition to measuring vehicle emissions, ambient concentration datasets will be collected at roadside and background sites at Athens, Helsinki, London and Madrid. The consortium will work closely with end users to identify their requirements in relation to the Expert System and its applications. The new datasets will be integrated into next generation models developed specifically for urban road traffic conditions. An optimised user-orientated Expert System will be developed in a modularised architecture. Once evaluated, the system will be demonstrated to end users such as city authorities. A particular feature of the OSCAR system will be its ability to identify impact reduction options for the user. Through the modular architecture other environmental models, such as for noise and vibration, resulting from EU funded projects will be integrated into the system. The consortium will work with end users to widely disseminate the outcomes of the project on a European wide basis.

### **Expected impacts**

A key deliverable will be the OSCAR Expert System for end users. Through the work programme the Consortium will also deliver new datasets of ambient concentrations of NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>, exhaust emission factors, traffic characteristics and meteorological parameters measured at roadside and background sites in four European cities. Development of next generation models for predicting hourly levels of street level concentrations will help to advance the state of the art. Through OSCAR, best practices and harmonised methodologies for measuring air pollutants, emission factors and traffic characteristics in free flowing and congested urban situations will also result.

### **Coordinator**

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### **Participants**

## **PAYT (Variable rate pricing based on pay-as-you-throw as a tool of urban waste management)**

**Project Reference:** EVK4-2000-00021  
**Contract Type:** Research

**Start date:** 01-01-2001  
**End date:** 30-06-2003  
**Duration:** 30 months

### **Problems to be solved**

The project addresses the environmental concerns of waste caused pollution and secondary materials utilisation, by increasing our knowledge about the effectiveness and suitable design of variable rate pricing as a policy option for reducing household discards, particularly those destined for final disposal. Pay-as-you-throw (PAYT) substitutes for flat rates and is meant to incentivise households to divert an increased portion of its discards away from traditional disposal to recycling. Both, waste reduction and recycling are priorities of community environmental policy. Implementation has been so far by parts of towns and small communities. The focuses of this proposal are large metropolitan areas where different framework conditions impact on the feasibility and require other solutions to be applied.

The project shall allow to create new working relationships between urban centres that have experimented with PAYT to interact with cities who indicate that they are considering this scheme, and between the research sector and users to insure the issues addressed correspond to user needs. In combination with the tools that will be provided to decision makers the project is expected to become a catalyst to achieve a breakthrough in sustainable organised waste management schemes based on the polluters responsibility to pay for the environmentally benign disposal of their generated waste and environmental burden caused. Changes of community behaviour towards avoidance of waste and more conscious segregation of different waste materials, fairly charged and cost-covering waste fees and user friendly MSW services are following in the causal chain.

### **Scientific objectives and approach**

The project is aimed at providing a comprehensive analysis of potentials and pitfalls of PAYT including the impacts on citizen and their environment, based on which guidance will be given to policy makers and implementing bodies to introduce such system under the specific constraints set by differing environments in order to achieve waste reduction. Another objective is to initiate steps towards resolving identified gaps and shortfalls in both knowledge and technology for implementing PAYT and thus facilitate orientation to providers of services and equipment for designing and developing suitable technical solutions. The project also target at organising new pathways providing increased dissemination reach and stakeholder collaboration.

Several types of project participation including city/research organisation pairings and a set of liaison participants representing the various stakeholders are the key for this and allow the analysis of the PAYT approach to be executed involving various perspectives. Workpackages have been designed to achieve a synthesis of scientifically obtained knowledge and statistical and empirical data related to the implementation of PAYT in different settings and in contrast to analysed user needs and experience. At the outset of the project a comprehensive picture of the drivers, barriers and workable ways related to a successful introduction of PAYT in the city environment will be available. Providing these information in an appropriate fashion will be a means to guide urban decision makers to create the necessary framework and shape the policy in way that general community concerns in the waste management sector can be met. The project itself sets a firm basis for the type of co-ordination and collaboration between the involved stakeholders needed to achieve this.

A broader range of methodologies is necessary to obtain the desired information and ensure they reflect the concerns and behaviour on the side of the stakeholders. For this purpose practices of scientific analysis (literature review, modelling etc.) are performed in combination with empirical research, assessment and survey techniques applied on different aspects and stakeholder levels. The importance of public participation in environmental decision making will direct the focus of the latter to the participating households. Investigations on socio-political factors and econometric considerations, and the use of their results in an analytical exercise integrating all relevant aspects (i.e. economic, social, political,

technical, organisational and spatial) determine the strategy to be followed in order to reach the new quality of knowledge needed to enhance the effectiveness and acceptance of urban waste management measures.

### Expected impacts

Deliverables include the analysis of user concerns and needs compiled in a document called "What decision makers want to know about PAYT" and the consolidation of corresponding findings of the research translated into a guidebook for urban decision-makers and concerned stakeholders. Further, several case studies looking at the application in differing cultural and socio-economic settings, a proposal of demonstrations and an outlook at the possibilities for innovation and technology transfer for providers of services and equipment.

Impacts expected from this project may therefore take a wide spectrum. With the review of available knowledge and experience a comprehensive overview on the state-of-the-art, encountered problems and main factors with regard to the implementation of PAYT in European cities will be provided in an early stage of the project already. It is setting the basis for a more thorough discussion and consideration of the approach in policies, city governance and development, and in future research.

Moreover, work efforts under this project will induce the transfer of in-depth information from "innovators" and lay ground for potential "adopters" of this approach and increase the probability of targeted innovation and technology transfer. With the research results we can contrast using a flat rate to pay for waste management with variable rate pricing. Moving in this way the state of knowledge forward impact in many ways. A new quality of measures leading to the modification of household behaviour, more acceptance and efficiency in dealing with MSW may be the consequence. Besides direct social and economic benefits that can be derived (e.g. fairness in paying for the service received, recovery of actual costs), various advantages for the environment (e.g. saving of landfill space) and life quality of the community will be achieved.

### Coordinator

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## **PETUS (Practical Evaluation Tools for Urban Sustainability )**

**Project Reference:** EVK4-2001-00205  
**Contract Type:** Research

**Start Date:** end 2002  
**End Date:** end 2005  
**Duration:** 36 months

### **Problems to be solved**

There is a large amount of research and practical projects being undertaken on sustainability and urban infrastructure, however there is a lack of evaluation and dissemination on what are often very good and useful projects that could be transferable to other parts of Europe and wider. There is a growing debate over conceptual models associated with sustainable development and indicators of sustainability. However, making operational such conceptual models through the use of standardised evaluation tools is not widely carried out. The project team has worked together for about four years on a COST ACTION (C8 Urban Infrastructure and Sustainability), assessing a range of case studies carried out by local authorities and other government organisations. This has revealed a lack of proper evaluation, which leads to uncertainty over the success of projects and difficulty in assessing their transferability for application elsewhere.

### **Scientific objectives and approach**

The aim of this study is to provide a framework of practical evaluation tools that can be used to analyse sustainability and urban infrastructure projects in order to assess them against a set of standard criteria and provide information to assess the potential for transferring them to other areas of Europe and the World. PETUS will provide examples of projects that can be used to demonstrate how best public and private funds can be spent on sustainable projects to achieve 'Best Value'. The main benefit of creating the evaluation tools within the PETUS project will be to enable projects to be compared to each other to assess applicability in various situations in response to different problems. The tools will be applied to a range of projects across all aspects of urban infrastructure. They will take into account social, economic and environmental factors so that the most suitable project can be selected by end users. The tools will be refined and guidance given on their use. The benefit of the study will be to provide public and private sector organisations tools and guidance to achieve best value and to help to obtain public satisfaction with their environment. The PETUS web-site will provide a central location for all sustainable projects that have been evaluated using the tool established during the study.

It is an important issue as large resources are being spent on projects which could provide very interesting and useful guidance for other public and private sector organisations who may want to carry out similar urban infrastructure/sustainable works. If the project is not carried out millions of Euro will continue to be spent on a range of urban infrastructure/sustainability projects that will remain potentially unknown by other potential end users. Also, the need to minimise and manage environmental risks, use resources efficiently, improve the built environment and introduce innovative transport strategies will require a consistent and comparable approach to urban project evaluation. The benefits gained and lessons learnt from one project can be relayed to other similar projects throughout Europe and the World.

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## **PUB + (Accessibility to public utility buildings for urban citizens with mobility impairments. socio-economic comparative studies)**

**Project Reference:** EVK4-CT-2002-80009  
**Contract Type:** AM

**Start Date:** 01-02-03  
**End Date:** 31-05-04  
**Duration:** 14 months

### **Problems to be solved**

The disabled community is gaining lately intense attention in the EU. This appears to be a trend noted by its social fairness and stamped by the drive for an equal opportunity society. The problem PUB+ seeks to primarily address is “a better understanding and a more radical institutionalisation of concrete policy and other measures for the removal of the barriers of the disabled people in the residential environment” However, besides being highly welcome in this sense, PUB+ also welcomes an opportunity to sense the supporting services and products that will necessarily materialise as long as this above trend gets into more concrete shape.

### **Scientific objectives and approach**

PUB + addresses the broad topic of the accessibility of public utility buildings to disabled people. The project

- Will depart from a thorough understanding of the current situation and its limitations, which will be thoroughly compiled by means of, literature reviews and desk research, as well as intense physical interviewing,
- Will primarily seek to identify the EU and the global best practice and to propose viable strategies for its adaptation to the local conditions.

### **Expected impacts**

PUB+ will produce and widely disseminate a practical guide, with clear and technically sound suggestions and directions, targeting a gradual enhancement of the living standards of disabled people, with regard to their accessibility to their building environment.

PUB+ will put a great emphasis on awareness-creating actions, looking forward to act as an enabler to policy initiatives that may help integrate a well-defined best practice into a more tightly defined institutional framework. PUB + will attempt to identify the business implications of buildings that demonstrate a friendliness to disabled people, and will seek to interface these opportunities with other related activities and products of the consortium.

### **Coordinator**

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## **RELIEF (Environmental relief potential of urban action on avoidance and detoxification of waste streams through green public procurement)**

**Project Reference:** EVK4-CT-2000-00035  
**Contract Type:** Cost-sharing contracts

**Start Date:** 20-12-2000  
**End Date:** 19-09-2003  
**Duration:** 33 months

### **Problem to be solved**

Public Procurement in Europe adds up to some 12% of total GNP. It therefore offers a big potential for promoting sustainable production, closing material cycles and avoiding waste. For this reason, authorities have been developing "green" procurement practices for more than 20 years. However, despite the strategic potential the innovations triggered in the economy still appear to be marginal. A European strategy is missing and until now there are no figures for the calculated environmental relief potential of green purchasing.

Without a data basis it is not possible for purchasers to focus on priorities. Therefore they have to make decisions on their own on which products are to be purchased green – and which are not. This ends up in mere symbolic action much too often. Other hindering factors, such as uncertainty about how to introduce green purchasing, and which criteria can be legally applied – a direct result of missing information, reinforce this trend. Moreover the political support is often not strong enough for brave decisions, as politicians do not know how big the potential of green purchasing really is. And last but not least the legal framework for public procurement, which emphasises the free market principals of non-discrimination and transparency, is often perceived as limiting the opportunities for green purchasing, although recent clarification from the European Commission should remove this concern.

### **Scientific objectives and approach**

The project addresses five objectives. The final objective is to develop a strategy for green purchasing in Europe, which will be approached as a campaign of cities (5). This is to be complemented by the development of a set of policy recommendations addressed to the European level and tools, including purchasing guidelines for local authorities for specific product groups, a green purchasing manual for local authorities, and a code for the relation of green purchasing to trade rules and internal market principles (4). To provide an empirical basis for this the next objectives is to calculate, on a European level, environmental relief potentials for different scenarios and to explore procurement tools, which trigger product innovation (3). This entails environmental, socio-economic and market analyses, for which the appropriate methods have to be developed, based on existing approaches (2). In order to ensure relevant calculations, the first objective is to identify product groups with high environmental relief potential and with which public authorities can achieve extensive market influence. This is complemented by an assessment of current practices and potentials (1).

The project can roughly be divided into a scientific phase and a more implementation oriented phase. The first phase will develop the methods and carry out assessments and calculations, while the latter phase will develop, discuss and implement policy recommendations.

The scientific phase will start with an international survey on national approaches, which is followed by in-depth surveys on the city partners. The information gathered here – including an analysis of city-inherent hurdles - will serve as a reference source, focussing particularly on the most relevant product groups.

The method development will be started by building consensus on a comprehensive set of environmental and economic indicators. On this common basis, three tiers of methods will be adopted with respect to green purchasing environmental assessment; socio-economic evaluation and; market conditions methods. Once the methods and their fundamentals are clear, the scope for the European calculation will be prepared in the form of scenarios. In parallel to the calculations, instruments will be explored for promoting product innovation through procurement, such as performance contracting or other recent schemes.

The implementation phase will start with the development of draft policy recommendations and tools. Recommendations for urban environment policies, product policies and trade and internal market policies will be addressed to the European level. Draft European purchasing guidelines for specific product groups

will be addressed to the purchasing communities (mainly cities). A specific tool will be developed in form of a "code of orientation" addressing the legal dilemma of internal market rules which are blind to environmental criteria.

The draft documents will be discussed in multi-stakeholder roundtables and finally a strategy for a "cities for green purchasing" campaign will be set up, alongside the development of a manual for green purchasing. This will result in the implementation of the project results through the cumulative action of cities across Europe.

### Expected Impacts

The project will improve the current situation on the scientific side by delivering methods, calculations and of course urgently needed data. Additionally, Status Reports and Priority Assessments will be published for the six partner cities from different parts of Europe. This will be the basis for a wide range of activities to follow, some inside but mostly outside the project.

Within the project, recommendations for European and local policies will be derived. There will be three background papers for the European Union, a legal code of orientation and guidelines on 6 product groups. All these will be discussed in multi-stakeholder roundtables for consultation and consensus building – representing the most concentrated European discussion context known on green purchasing.

Strategically, joining purchasing power will achieve not only marginal changes but also shifts on the supply-side of the market toward sustainability. The project will assist this by developing a "Cities for Green Purchasing Campaign". For this a manual on green purchasing will be written together with an ambitious agenda to set the results into action.

Outside the project, the results on methods and calculations will enable scientists all over Europe to make their own surveys on potentials for certain authorities and certain product groups. Local authorities will be able to benefit from the experiences of the six participating cities and their status reports. Public authorities who are looking for guidance, and in addition private business, will profit from the guidelines, which will provide them for the first time with a document applying to the whole European internal market.

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#### *4.1.2 Improving the quality of urban life*

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## **RESTATE (Restructuring Large-scale Housing Estates in European Cities: Good Practices and New Visions for Sustainable Neighbourhoods and Cities)**

**Project Reference:** EVK4-CT-2002-00085  
**Contract Type:** Research

**Start Date:** 01-11-2002  
**End Date:** 31-10-2005  
**Duration:** 36 months

### **Problems to be solved**

Cities are the dynamos of the European economy, enabling the EU (and potential member states) to maintain a strong position in the global economy. When these cities contain large areas that are not faring well or, even worse, hinder the economy, it is important to find out how best to change these areas in order to remove the dysfunctional characteristics. Large-scale post-war housing estates can be seen as problematic areas in many cities all over Europe. Economic decline goes hand in hand with physical and social decline in these areas. The focus of this project is on the circumstances in these large post-war estates, on policies to counteract negative trends and on activities which stimulate positive developments. If the problems of these areas will not be solved they will increasingly hinder cities to function well in an economic sense.

### **Scientific objectives**

The project has the following objectives:

1. to identify and to clarify the social and economic changes which have occurred in large post-war estates and particularly to identify general and specific factors influencing emerging problems and patterns of decline in these areas;
2. to develop a checklist of items that have proved to be important in successful and less successful policy responses with respect to these estates;
3. to draw conclusions about the potential for cross-national transfer of knowledge and experience and for co-operation in strategic planning for these areas and in area and estate management;
4. to produce a comprehensive handbook in which forward looking scenarios and new visions for large post-war estates in Europe will be coupled with examples of evidence based best practice to achieve sustainable future development of these areas;
5. to build an easy to use database for practitioners and researchers containing details of the nature, successes and failures of present policies aimed at improving the position of large post-war estates and their inhabitants;
6. to consider whether and how European level policy could contribute to more effective responses to problems associated with these estates. Methods used in the research are literature research, statistical overviews, interviews, a survey and discussion with urban representatives.

### **Expected impacts**

The study takes a multi-disciplinary and international comparative approach and involves strong collaboration between researchers, stakeholders and end-users (policy-makers and politicians). Finding out the specific problems of these areas and the causes of problems in each national and urban context is the first element in the research project. To find out which policies have been used to counteract these problems, how successful they have been and what are the reasons behind this success (or failure), is an important aim of the project. Finding “best practices” can eventually lead to more effective policy responses for these areas. Since the ten states chosen for comparison exhibit a vast range of demographic, socio-economic, cultural and political conditions, the results of the study will contribute to responding to the problems at a truly European level (East and West).

One of the objectives of RESTATE is to produce a comprehensive, evidence based handbook which draws on the experience in different European cities and sets out alternative, forward looking scenarios and new visions for large-scale post-WWII housing estates in Europe (East and West). This handbook will also set out best practices for future sustainable developments of these areas and for effective policy implementation. The results can be used by policy makers to find out in which context which measures

have been and can expected to be successful with respect to improving large-scale housing estates in cities.

This research project involves the active participation of national, regional and local representatives, responsible for and/or working with policies that affect the estates. They will together form the Council of Urban Representatives (CUR). This CUR will be consulted and informed in all-important stages in the project. This will be done by meetings, but also by way of an online environment, using targeted communication software. In this way optimal feedback and optimal exchange of the results will be guaranteed.

A specified interdisciplinary working model will be jointly created by the partners of the consortium, both from the part of the municipalities involved as well as from the research institutes. The main indicators of re-urbanisation potentials and obstacles in different European contexts will be defined and comparably investigated by means of case studies combining quantitative and qualitative methods. Interdisciplinary as well as disciplinary analyses (sociology/demography, architecture/planning, economics, and urban ecology) will be undertaken.

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### RE URBAN MOBIL (Mobilising Re-urbanisation on Condition of Demographic Change)

**Project Reference:** EVK4-CT2002-00086  
**Contract Type:** RS

**Start Date:** 01-11-2002  
**End Date:** 30-11-2005  
**Duration:** 36months

## Problems to be solved

In the consequence of de-industrialisation, sub-urbanisation and demographic change, problems of social, physical and environmental destabilisation have become typical for many inner-city residential areas, especially in old industrial centres in the EU and the CEES. Therefore, their traditional functions – as built cultural heritage on the one hand and crucial material and symbolic link between city centre and periphery – are threatened. This destabilisation will further increase social and spatial polarisation processes contradicting a sustainable urban development, which is a major EU policy aim.

## Scientific objectives and approach

Re-urbanisation is meant to be a comprehensive, socially integrative strategy aimed at development of the housing and living conditions in the entire core city, in particular its historical residential areas adjacent the city centres. While the traditional approach towards urban regeneration and renewal was still focussed on urban growth, at present the ongoing demographic changes (low fertility rates, smaller households, ageing) have to be considered as a new and decisive determinant. Therefore, re-urbanisation has to be redefined as a qualitative concept.

The complexity and interdependencies of urban development require both an interdisciplinary approach and linkages between research and practice.

## Expected impacts

Main outcomes of the project in scientific and practical terms will be a modified theoretical model and methodical approach of re-urbanisation, an 'Environmental Atlas' and future scenarios for inner-city neighbourhoods, legal and economic instruments as well as tested communication and promotion strategies for re-urbanisation, a toolbox applicable in different European contexts, an information and monitoring system comprising small-scale data on different issues concerning inner-city areas and an international expert team on questions of re-urbanisation.

The project will contribute to improving the quality of life in inner-city neighbourhoods with respect to different age groups, social strata and life styles. It intends to involve local stakeholders, to improve the relationships between citizens and local authorities, share know-how on integrated urban development strategies, disseminate methods, strategies and result by way of European urban and science networks.

Moreover, long-term impacts are to be expected: With increasing polarisation between growing and declining cities in Europe, many regions will be confronted with problems of demographic and overall urban change in future. A further need of transferable knowledge and best practice experiences on how to deal with inner city decline under the conditions of demographic change will arise.

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#### *4.1.2 Improving the quality of urban life*

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## **RUROS (Rediscovering the urban realm and open spaces)**

**Project Reference:** EVK4-CT2000-00032  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-01-2001  
**End Date:** 31-12-2003  
**Duration:** 36 months

### **Problems to be solved**

The central aim of this proposal is to produce an urban design tool that provides urban designers, planners and other decision makers, with the appropriate means for effectively assessing the development of cities, targeting outdoor spaces in the urban context across Europe. By improving urban spaces it is possible to revitalise urban spaces and improve quality of life. This will be achieved having problem solvers (research institutes and municipalities' technical representatives) working closely together with problem owners (users of open space and city representatives, i.e. municipalities).

### **Scientific objectives and approach**

WP1 – Background work: Collect all the background work that will form the basis for the development of the proposed urban design tool. Establish close-contact with municipalities, which will be maintained throughout the project, in order to have a clear understanding of the needs of different areas.

WP2 – Field survey: This will present the spine of the proposed research, examining environmental, comfort and socio-economic characteristics of the different case study cities. This will begin having: identified methodology for monitoring techniques, constructed monitoring equipment, designed questionnaires: a) for comfort studies, b) to identify social character of the area.

WP3 – Technical and socio-economic analysis: The analysis of the field studies will run almost in parallel with the field studies, commencing after a set of surveys has been completed. Analysis will be on different fronts: microclimate, human comfort (thermal, visual, audible), morphological as well as use of space and social character of the different areas.

WP4 – Development of urban design tool: This includes development of the comfort models for different climate contexts, methodology for drawing comfort maps, and design guidelines for the development of outdoor spaces, including interventions to the urban context. A list of indicators for the socio-economic implications of the development of outdoor spaces, for the area will also be produced. All these will be examined in the framework of current national and EU guidelines for the development of outdoor spaces, particularly as far as their potential for application is concerned.

WP5 – Pilot application: Application of urban design tools to the study areas for assessing possible actions in the areas, in order to demonstrate the use of models and guidelines for the design of outdoor spaces. Further implementation of the design guidelines to the municipalities of Ailmos? Thermi and Fribourg.

WP6 – Evaluation: Evaluation of the pilot study to examine the use of the tool as an effective mean for the design of outdoor spaces.

WP7 – Dissemination & exploitation: Disseminate the work widely, throughout its duration to: potential users of the tool, municipalities and other decision makers, the research community and citizens in general.

WP8 – Project management: Provide overall coordination of the project for all WPs, with effective communication between individual contractors

### **Expected impacts**

The project aims to produce an urban design tool that provides urban designers, planners and other decision makers, with the appropriate means for effectively assessing the development of cities, targeting outdoor spaces in the urban context, across Europe. By improving urban spaces it is possible to revitalise

urban spaces and improve quality of life. This will be achieved having problem solvers (research institutes and municipalities' technical representatives) working closely together with problem owners (users of open space and city representatives, i.e. municipalities).

1. To establish a series of mathematical models for evaluating thermal, visual and audible comfort conditions in urban spaces. Rather than a single model applicable throughout Europe, this model will take into account the most influential microclimatic parameters for each area, leading to slight variations of the same model for different climatic contexts. The relative importance of the thermal, visual and acoustic environment will also be identified.
2. To identify appropriate morphological parameters determining the microclimate of the area and the resulting comfort conditions.
3. To develop a methodology for mapping comfort conditions in the urban context
4. To develop design guidelines to target the development of open spaces in new areas as well as the improvement of existing situations of interventions to the existing urban fabric. The design guidelines will have the form of 'best practice guides' for municipalities and urban designers adding value to current EU policies.
5. To apply the model and proposed design guidelines at different open spaces to eight cities across Europe, at sixteen different study areas.
6. To implement the model and the respective design guidelines to the three different municipalities involved in the project, planning to develop their area.
7. To identify a series of indicators for evaluating socio-economic implications of development of outdoor spaces for the area, applicable across Europe

### Coordinator

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## **SAPPHIRE (Source Apportionment of Airborne Particulate Matter and Polycyclic Aromatic Hydrocarbons in Urban Regions of Europe )**

**Project Reference:**  
**Contract Type:**

**Start Date:**  
**End Date:**  
**Duration:**

### **Problems to be solved**

Air pollution by both particulate matter (PM) and polycyclic aromatic hydrocarbons (PAH) presents a significant problem to EU citizens. This is due to their proven adverse impacts on human health, in terms of their role in the aetiology of inter alia lung cancer, along with respiratory and cardiovascular disease. There are also significant adverse impacts for the economy of the EU as a consequence of air pollution-related disease, owing to:

- the additional burden placed on health services; and
- the number of working days lost.

Consequently, the EU and its member states are actively legislating for improvements in air quality and monitoring to verify progress in this regard, as failure to tackle this issue will negatively impact on the social well-being and economic competitiveness of the EU. An integral part of improving air quality is the identification (or apportionment) of the principal sources of pollutants, as so doing permits the most effective targeting of source control strategies. Currently, the methodology used for source apportionment of PM and PAH is somewhat disparate in nature, and is rarely accessible in a format that is both readily implementable and relevant to the local city authorities with responsibility for air quality management. As a result, there is a need to develop a harmonised approach to source apportionment of PM and PAH to meet the needs of local city authorities.

### **Scientific Objectives**

The overall objective of SAPPHIRE is to develop and validate a readily transferable common pan-European methodological approach to source apportionment of atmospheric PM and PAH that will be utilised by city authorities. To do so, a series of campaigns monitoring air pollution at 2 locations in each of the following partner cities: Athens, Birmingham, Copenhagen, Helsinki, and Oporto. Data from these campaigns will be used to develop and validate the source apportionment methodology. A technical report describing clearly the source apportionment protocol will be written, and a user friendly customised software package to assist in the data analysis required for source apportionment will be produced. To maximise exploitation of SAPPHIRE outputs, the local authorities of partner cities will critically appraise and review drafts of both the technical report and software package.

### **Expected Impacts**

The principal output of SAPPHIRE will be a harmonised approach to source apportionment of atmospheric PM and PAH. City authorities will have access to a technical report and accompanying user friendly customised software package (with users manual) for data acquisition and interpretation. Use of the approach will allow the sources of atmospheric PM and PAH to be estimated. In turn this will permit development of appropriate control strategies aimed at reducing concentrations of PM and PAH, and allow the probable impact of the various options for control to be assessed. For example, the effect of reducing permitted vehicle or stack emissions, or of local traffic management schemes, or modifying industrial processes, could be predicted more reliably. Together with knowledge of the social and economic costs of air pollution, proposed control measures could be subjected to cost/benefit assessments.

### **Coordinator**

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## **Participants**

## **SELMA (Spatial Deconcentration of economic land use and quality of life in European metropolitan areas)**

**Project Reference:** EVK4-CT-2002-00102  
**Contract Type:** Cost-sharing contracts

**Start Date:** 2002-12-01  
**End Date:** 2005-11-30  
**Duration:** 36 months

### **Problems to be solved**

The dynamics of urban growth present constant challenges to urban quality of life. In recent years urban land use change and the constant residential pressure on land consumption at the urban fringe, has been increasingly recognised as a major force challenging quality of life in metropolitan areas. EU communications and expert opinion place the issue of urban sprawl squarely in the realm of those areas where 'the social and economic mechanisms leading to more land consumption have to be better understood'. SELMA widens this interest to include the deconcentration of economic land use (commercial, industrial and service-based) – a no less potential challenge to the rational management of European cities. In addition, the proposed project integrates this focus with a second area of EU policy interest relating to urban quality of life. While this has hitherto focussed on collecting suitable indicators and developing methodologies for reliably capturing this concept, SELMA attempts to translate the effects of economic land use deconcentration into quality of life outcomes

### **Scientific objectives and approach**

The primary goal of SELMA is to design urban planning and management strategies to ensure the maintenance of quality of life in European metropolitan areas. The evaluation of these spatial configurations will be based on quality of life, socio-economic and environmental dimensions. Two of the main deliverables will be a policy analysis and decision makers handbook of best practices and a taxonomy of forms of economic land use deconcentration that can be used for ranking and bench-marking in urban planning and management. In order to design and evaluate planning strategies we will develop a land use simulation model, which is another major deliverable of SELMA. Rather than build a new land use model ex nihilo, the SELMA model will be developed on the basis of an existing modelling platform (UrbanSim). This platform has the advantage of a free access to source code, which can be used to adapt and apply the model to different urban environments and policy contexts.

The approach to reach the objectives is as follows:

- By analysing the relationships between driving forces and the deconcentration of economic land use within seven metropolitan areas and seven smaller cities across European countries.
- By analysing the impacts of these deconcentration processes on three quality of life dimensions (socio-economic, environmental, and resource).
- By assessing the effectiveness of planning policy responses to the challenges of deconcentration of economic land use.
- By adapting the UrbanSim model to the needs of planners to evaluate urban growth planning strategies.
- By close cooperation between academics (9 contractors) and a mixture of 10 end-users (local authorities, national planning agencies and private companies).

### **Expected impacts**

The expected results are:

- A common integrative theoretical and methodological framework for the design of planning strategies to manage urban growth.
- A taxonomy of forms of economic land use deconcentration that can be used for ranking and benchmarking in urban planning and management.
- A planning-evaluation simulation tool for urban growth management attuned to the needs of end-users.
- A best practice guide based on collective experience in dealing with deconcentration of economic land use.
- A policy analysis and decisionmakers handbook evaluating different regulatory frameworks and presenting results of the simulation of different policy scenarios.

These results will lead to the realisation of the stated objectives.

## Coordinator

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## **SPECTRA-PERSEUS (Permanent research in spatial development in the context of EU enlargement and information society advancement)**

**Project Reference:** EVK4-2002-00508  
**Contract Type:** NAS 2 - Accompanying measure

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

EU-integration and enlargement processes affect spatial development in the accession countries as well as in the member states and the problems of environmental, social, cultural and economic aspects of development of European continent and harmonisation of its integration is closely linked to optimisation of spatial development.

These new conditions require new formal and informal instruments with which to guide spatial development and research in order to ensure a continual transfer of know-how and international cooperation and integration of research capacities.

### **Scientific objectives and approach**

The SPECTRA-PERSEUS project provides a framework to enhance the existing activities of the SPECTRA centre in the field of incorporation of sustainable spatial development into planning decisions by focusing on permanent research into spatial aspects of the development of information society within the enlarging Europe. The project aims at: strengthening of integration of the Centre in the European research area through intensifying the links with outstanding centres in the EU and NAS and NIS and operating in the network of research with all stakeholders in spatial development.

To achieve the objectives of the project and strong European added value the project includes:

- Support to networking through intensification of the contacts of the Centre with existing EU and CEE partner institutions, coordination of the research, organisation of the conferences, colloquia, workshops, summer schools and virtual workshops, study exchanges for young researchers and PhD students from EU, NAS and NIS countries, know-how transfer and improvement of the skills of public administrators and business people.
- Increase the scope of the Centre through opening new fields in spatial development research, focused on instruments, management and use of IT.
- Preparation of multilateral R&D projects in twinning with the partner institutions,
- Intensification of know-how transfer into the planning and governing practice and business, via expertise, doctoral and life-long education, with the aim to support social and economic needs of the NAS,
- Improvement of spreading know-how via creation of network of the regional cooperation centres, with the aim to support accession process and involvement in the EU programmes, like ISPA, SAPARD

### **Expected impacts**

Higher quality and efficacy of research and sustainable spatial development and increased involvement of the NAS and NIS – research centres in European research space, Implementation of Quality Assurance System, Public relation development, Establishment of regional cooperation units, Workshops, Conferences, Institutional regional network and its linkage to EU networks, Submission of the projects for EU grant support, Summer school for young researchers and PhD students, Opening of the projects in newly established areas of research.

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## **Participants**

## **SURE (A Time-Oriented model for Sustainable Urban Regeneration)**

**Project Reference:** EVK4-CT2002-00094  
**Contract Type:** RS

**Start Date:** 01-11-2002  
**End Date:** 31-10-2005  
**Duration:** 36 months

### **Problems to be solved**

SURE has been designed in order to respond to different needs felt by European cities and their citizens, especially in urban crisis areas, where the economic and social transformations led to the emergence of new social, environmental and specifically urban problems (loss of jobs and rise of unemployment, loss of public services, unsafe neighbourhoods, vacant land and abandoned industrial sites, high pollution levels, degeneration of public spaces).

Since those areas are currently facing crucial development choices in redefining their character, SURE aims at defining technical and organisational tools to help local governments and local stakeholders in designing their development choices.

### **Scientific objectives and approach**

From a scientific point of view, SURE will try for the first time to analyse urban regeneration problems in a time-space perspective, which means not only using the traditional economic and spatial indicators, but trying to enrich the analysis with time related aspects.

A time related perspective has characterised a number of experimental local policies (namely about public services, urban safety and mobility) in Italy over the past decade, but its application to urban regeneration problems at a European scale is a disciplinary innovation.

From a technical point of view, SURE will develop a time-oriented model for urban regeneration, a chronographic instrument for the analysis and interpretation of local contexts.

### **Expected impacts**

The main deliverable of SURE research project will be the chronographic TOOL, which is a definition of an international standard for Chronographic Information Systems. The important point is that such Chronographic Information System will be designed in partnership at the European level and will be extensively tested in five different European local contexts.

In the process of design and implementation of the TOOL, a number of distinct deliverables will be produced, which could be interesting to the scientific community as well as to Local authorities: a collection of best practices regarding use of chronographic instruments for Urban renewal policies, an Atlas of contextualised chronographic maps, and finally some Guidelines for the realisation of Chronographic GIS instruments.

Moreover, SURE will provide an innovative approach, a methodology which will become a concrete deliverable, starting from the analysis of urban areas in need of regeneration, using stakeholder involvement tools at the local level, and helping local decision makers to design viable and innovative policies to redevelop their areas and enhance economic as well as social welfare.

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## **S.W.A.-TOOL (Development of a methodological tool to enhance the precision & comparability of solid waste analysis data)**

**Project Reference:** EVK4-2000-00030

**Contract Type:** Combined (research + demonstration)

**Start Date:** 01-04-2001

**End Date:** 01-04-2004

**Duration:** 36 months

### **Problems to be solved**

Waste analyses are a widely used tool for acquiring relevant information for use in waste management planning, and increasing the efficiency and effectiveness of planned measures. Despite efforts in this direction, waste analyses have only been partly standardised to date. Analyses are designed on a case-by-case basis. This leads to unsatisfactory results, and makes it difficult to compare the effect of different waste management measures.

### **Scientific objectives and approach**

In the RESEARCH PART, a standardised methodological tool is to be developed to assist in implementation of waste analyses, so as to enhance data accuracy and comparability, and go beyond the stage of "do-it-yourself" analysis designs.

The scientific objective of the research part focused on the aim of achieving improved data quality to support the planning of measures for an environment-friendly waste management and to provide reliable indicators which permit a comparative judgement of the effectiveness and efficiency of different waste management measures, which shall further lead to a benchmarking of waste management services in various settlement areas.

The technological objectives are the development of a methodological tool for selection of the analysis design.

This includes establishing minimum standards, which a waste analysis should always meet, e.g. in respect of comparability with other analysis results. Over and above these minimum standards, selection criteria should also be established to enable the user to select the most appropriate analysis design in relation to the specific objectives and circumstances.

In the DEMONSTRATION PART, the methodological tool is to be applied in three European towns/cities. The insights obtained will permit revision of the tool. In addition, the analyses performed will serve as reference projects for use in dissemination activities.

The scientific objective of the demonstration part is the verification and modification of the methodological tool developed in the research part.

### **Expected impacts**

The use of this tool for the planning and practical implementation of waste analyses is intended to demonstrate:

The user-friendliness of a waste analysis planned with the methodological tool, whether data acquired by means of the analysis meets the objectives of the analysis; and whether the methodological tool is a suitable instrument for planning waste analyses under a variety of conditions.

These criteria are the "filter" for evaluation of the methodological tool. Any shortcomings revealed by practical implementation of the analyses are to be examined, particularly as to whether they are attributable to any methodological weaknesses. This information will serve as the basis for revision of the methodological tool and its adaptation to the practical requirements of the waste management business.

In addition to the above objectives, which are primarily methodological in nature, the waste analyses have the following additional goals. The data acquired by the analyses is to be used directly for their primary purpose, namely as planning information for waste management projects and, the analyses are to serve as reference projects. They will enable dissemination and exploitation to be backed by real-life examples demonstrating the suitability and practical relevance of the methodological tool.



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## **TOOLSUST (The involvement of stakeholders to develop and implement tools for sustainable households in the city of tomorrow)**

**Project Reference:** EVK4-2000-22026  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-12-2000  
**End Date:** 30-11-2003  
**Duration:** 36 months

### **Problems to be solved**

During the last years both environmental organisations, politicians and the research community have concentrated on the development of sustainable cities. This is reflected in the European Sustainable Cities and Towns Campaign. The relevance of consumption and the activity of households are also recognised in this process, and several EU-project were funded in the Fourth Framework Programme. But the development of consumption pattern and consumption level in Europe still represents a great challenge to the environmental goals both on national, European and global level.

This project will build upon the empirical results and the theoretical innovations made in the sustainable cities network process. We will expand the analysis beyond individual attitudes and the behaviour of households by including stakeholders such as: consumer organisations, environmental organisations, retailers, the local political authorities and local governments. The main innovative aspects of our project is the development of tools for a sustainable development of consumption, and the involvement of stakeholders in this process: identifying goals, develop and test various tools for sustainable consumption and the implementation of these tool sin everyday life.

### **Scientific objectives and approach**

In a multidisciplinary approach – including both natural and social sciences – the point of departure is the description of the state of art and the situation for households in selected European cities. The potential for changes will be analysed in both a short-term and a long-term perspective. The three main objectives are divided into five steps and workpackages:

1. Research step: The place of households and consumption in the environmental goals in the cities
2. Research step: Household metabolism in the five actual cities
3. Analyse the possibilities and tools for significant short-term changes:
  - The use of consumer information, the green household budget
  - The consequences for evaluation of quality of life
  - Importance of stakeholder participation in the decision making process
4. Research step: Potential for long term changes in a back-casting approach, within the factor four perspective
5. Research step: Involvement of stakeholders in the implementation and dissemination phase

We will combine quantitative data and using both focus groups and qualitative interviews. The main focus within this project is the potential for environmental changes in household behaviour.

### **Expected impacts**

We expect to give a significant contribution to the integrated product policy (IPP) of Europe. Europe's future economic development is characterised by a tension between global economic competition and the need for green innovation. The concept of 'Integrated Product Policy' is an attempt to answer this challenge. The innovation of new environmental friendly products is a vital part of the product oriented environmental policy. Significant innovative progress has been made in the car industry (catalytic converter), in the detergent industry (micro powder) and in the increasing life-span of durables in households. By the way consumers organise their everyday life, and how they use the improved products are still extremely important. If households and consumers use the new eco-friendly products in an unsustainable way, the scientific and industrialised improvement will be absorbed by the increasing consumption level and the never changing consumption pattern of million of households. This is the best argument for an integrated product policy, for the integration of activity by industry, retail, consumption and political authorities.

We will also emphasize the economic consequences for the stakeholders involved especially consumers and retailers. Changes in environmental behaviour among consumers will represent crucial challenges to businesses. A special attention will be put on the role of the retail system, and to the dissemination of results. In this process one has to take into consideration that stakeholders have different needs and wants. The development of information and other tools must be able to meet the need of various groups of stakeholders. The relevance for accessing countries will also be a part of this dissemination process.

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## **URBAN-AEROSOL (Characterisation of urban air quality indoor/outdoor particulate matter chemical characteristics and source-to-inhaled dose relationships)**

**Project Reference:** EVK4-2000-00018  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-02-2001  
**End Date:** 01-02-2004  
**Duration:** 36 months

### **Problems to be solved**

The objective of the proposed cooperative research is the understanding of the particulate matter (PM) chemical composition/size distribution indoor/outdoor characteristics in several European urban areas and their consequences on exposure and internally deposited regional dose in the human respiratory tract. This will be accomplished by incorporating state-of-the-art continuous parallel indoor/outdoor measurements, detailed chemical characterisation of the PM constituents combined with state-of-the-art tools for micro-environmental modelling and dosimetry in order to diagnose the complex relationships between PM pollution sources and inhaled deposited dose on humans. The research study will examine residential non-smoking accommodation places across Europe.

### **Scientific objectives and approach**

### **Expected impacts**

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## **URBAN EXPOSURE (Integrated Exposure Management Tool Characterizing Air pollution-relevant Human Exposure in Urban Environment)**

**Project reference:** EVK4-CT-2002-0090  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-10-2002  
**End Date:** 01-10-2005  
**Duration:** 36 months

### **Problem to be solved**

One of the most important environmental concerns of today is the negative impact of pollution on human health. This is reflected in priorities for DG Environment "Clean Air for Europe", and in the Programme of Community action in the field of public health (COM(2000) 285 final) that specifies urban particulate matter as an important factor. Directive 1999/30/EC sets human health-based standards for particulate matter in ambient air. While the air quality guidelines of WHO and EC standards are relevant to outdoor pollution levels, the underlying epidemiological studies need to rely on correct exposure estimation. In order to implement the environmental legislation at local level, relevant information on good practice and appropriate tools have to be available. For effective management there needs to be correct characterisation of the chemical composition of air and characterisation of actual human exposure, taking into account all important routes of exposure (air, water, others).

### **Scientific objectives and approach**

Based on knowledge generated from a number of previous and ongoing projects, a comprehensive state-of-the-science model for quantifying human exposure in urban areas will be developed. The model will cover combined exposure from air pollutants (specifically particulate matter) and from house water use (specifically chloroform) not addressed previously. The model will be scientifically validated and developed in a form of management tool interface. It will be implemented within an existing management tool, and used for two case studies. An exposure database for Europe will be compiled from existing sources, and this database will be used to demonstrate the management tool for stakeholders and end-users in Europe.

### **Expected impacts**

The project will provide better understanding of exposure, translated into an advanced science-based tool for management of urban air quality, and the tool will be operationally implemented. In this way, the assessment of human exposure from indoor and outdoor air to particulate matter, and the assessment of human exposure from house water and ambient air to drinking water disinfection by-products, will become available as a support mechanism for urban management decisions.

Main deliverables from the project include a scientific basis for exposure assessment tool, a validated exposure model, implementation of this model for use in air quality management systems and a database of European exposures. The tool will be implemented with an existing air quality management tool, installed in two urban areas and made ready for use by the local authorities. Further dissemination to the stakeholders will use demonstrations in other urban areas without the implemented tool. Scientific dissemination is also part of the project.

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## URBEM (Urban River Basin Enhancement Methods )

**Project Reference:** EVK4-2001-00154  
**Contract Type:** Research

**Start Date:** 01-11-2002  
**End date:** 30-10-2005  
**Duration:** 36 months

### Problems to be solved

In the past urban watercourses have been confined to narrow river corridors with the channels canalised and concrete and other man-made materials forming the bed and banks of the river. Many urban streams have been converted into closed conduit sewers, and now receive both storm drainage and raw or dilute sewage from the surrounding area. The pollutant loading also frequently leads to poor water quality, indeed this adverse impact of urbanisation often extends to the watercourses downstream of the urban area. In some cases the bacteriological or chemical quality of urban streams may present a severe threat to public health. The result is that many urban watercourses have virtually no aesthetic or amenity value, support a limited range of ecosystems, and do not meet the water quality objectives prescribed by the EC Water Framework Directive (WFD).

### Scientific objectives and approach

The URBEM project will provide new tools, techniques and procedures to enhance watercourses located in urban areas. These tools should provide enough scope to cover the differing, multi-functional uses of urban watercourses and their adjacent communities across Europe. URBEM will provide for those who are involved in urban river rehabilitation, the best and most innovative practice with which to develop a comprehensive rehabilitation scheme that will achieve the "maximum ecological potential" requirements of the WFD. As river rehabilitation involves many aspects, the project is targeted at different institutions involved in the enhancement of watercourses at all levels.

### Expected impacts

The benefit provided by URBEM include the provision of a comprehensive framework to facilitate urban watercourse rehabilitation that takes into account the regional variations in modification and use of watercourses across Europe. Specific benefits of the URBEM research project will be: new tools to assess the potential for enhancement and rehabilitation of urban watercourses; innovative urban watercourse rehabilitation techniques for use in future schemes and decision making support procedures, including social, economic, environmental and safety aspects, to help planners and city authorities effectively prioritise and plan urban river rehabilitation projects that help to achieve "maximum ecological potential". In addition the URBEM project will provide guidance, in the form of training and briefing modules, to public, professional and environmental authorities about how to plan, implement and maintain an urban rehabilitation scheme.

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## **URBSOIL (Urban soils as a source and sink for pollution)**

**Project Reference:** EVK4-CT-2001-00053  
**Contract Type:** Research

**Start Date:** 01-01-2002  
**End Date:** 31-12-2004  
**Duration:** 36 months

### **Problems to be solved**

In urban areas soils acquire new functions and play a distinct environmental role. There is an increasing awareness that soils are fundamental in the preservation of local, regional and worldwide environmental quality. They have esthetical and recreational functions in parks and gardens and contribute to the preservation of biodiversity. They also directly influence the citizens' health. There is a need for a better understanding of the urban soils and more information that is needed for their sustainable management. Otherwise political decision making and legislative regulations on a European scale are precluded.

### **Scientific objectives and approach**

Most urban soils are contaminated but there is a lack of a common approach or methodology that allows a comparative assessment of the soil qualities and their relationships to other environmental or health properties to set up target levels or limits of soil quality parameters. Current methods for studying and classifying soils need to be adapted to urban settings. A common methodology to study and evaluate soil in different urban settings is urgently required.

The overall aim of this project is to identify and document soil quality parameters and their use in urban areas to provide local, national and European authorities with decision support tools for the correct planning and sustainable management of the soil resource in the cities and towns of Europe.

This will be achieved through the creation of a database of urban environment data for various cities in Europe, the introduction, adaptation and calibration of the criteria and methods for the determination of soil quality indicators in urban settings, the use of sophisticated analytical techniques as well as simple and easy-to-handle rapid tests for the measurement of soil quality parameters for urban soils, the use of these data sets as input parameters for state-of-the art modelling of changes of soil quality and build-up of decision support system for various European settings, the involvement of end-users such as local governments in the research, development and implementation process.

### **Expected impacts**

This project will produce Decision Support Tool (DST) on soil quality to be used at all levels (European, national, local) in Europe for better appraisal of the soil resource and its valuable functions within a wide range of urban environments. The DST is expected to constitute the basis for a better environmental regulatory policy for sustainable development in urban areas. Output will be data sets, definitions and new management approaches with appropriate tools. In addition there are clear benefits to citizen participation. For example it will enhance community involvement to support neighbourhood development and community sustainability, drawing economic benefit.

Longer-term scientific and technological prospects include the potential for standardisation of management and impact assessment approaches. The tools produced can be modified to consider other urban resource management issues and updated as this develops. The results will be disseminated in the form of assessment and control manuals, reports, scientific publications, as well as contributions to international conferences and meetings, training courses/workshops for the end-users, maps and validated analytical procedures. The intermediate and final results will also be available through the URBSOIL website, accessible by all citizens.

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## **URGE (Development of Urban Green Spaces to Improve the Quality of Life in Cities and Urban Regions)**

**Project Reference:** EVK4-CT-2000-00022  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-03-2001  
**End Date:** 28-02-2004  
**Duration:** 36 months

### **Problems to be solved**

The aim of the URGE project is to improve the provision of cities with green spaces, both qualitatively and quantitatively, thus enhancing the quality of life of the urban population and contributing to the sustainable development of European cities. One major objective is to increase the available knowledge of the complex interactions between nature, economy and social systems in urban environments, considering this as a premise to the development of modern strategies for the design and management of urban landscapes.

The present structure and functionality of urban green spaces are regarded as sub-optimal in many cases while their contribution to the quality of urban life in principle is recognised and accepted. The URGE project identifies the following problems that exist in the development and management of urban green spaces. These are:

- The knowledge deficit about the complex functions of urban green spaces, dependent on their location and structure;
- The deficit of integrated/interdisciplinary methods for an optimal development of urban green spaces;
- The lack of consideration and integration of concerned citizens and users of urban green spaces;
- The lack of exploitation of financial possibilities for the development and management of urban green spaces by the tertiary or the private sector

### **Scientific objectives and approach**

The strategy of the URGE project is to initiate co-operative work between researchers from different academic disciplines and cultures, and the relevant practitioners, in order to deliver universally applicable, user-friendly results. The design of the project is both creative and progressive as it is:

- Interdisciplinary - through the co-operative work of researchers from different disciplines;
- User-integrated - through the co-operation of researchers and users (cities) within the consortium;
- Transparent - through the presentation of interim results on the homepage and in public symposia;
- Tolerant - regarding mistakes through the built-in feedback mechanism;
- Flexible - through the incorporation of recommendations made during the research process;
- Practical - by providing diverse tools (city profiles, interdisciplinary catalogue of criteria, manual) for users and partners in the research process;
- Intercommunicative - by creating a European network with project partners, reference cities, experts and other interested parties;
- Cost-effective - through reliance upon remote expertise and the local application of simple techniques.

The analytical optimisation occurs through the use of the different fields of research in conjunction with consideration of user demands. The catalogues of criteria will be compiled in the various specialist institutions, using "state-of-the-art" theory of the respective disciplines. Investigations will be carried out using the eight case study green spaces. Analysed data from the case study level will be integrated into the level of the whole city and vice versa. An additional flow of information will emanate from the reference cities. Input from interested researchers, planners and municipal representatives is also possible through a discussion platform.

**The following cities participate in URGE:  
as partners:**

- Leipzig / Central Europe
- Birmingham / Western Europe

- Genoa (Region Liguria) / Southern Europe
- Budapest / Eastern Europe

**as reference cities:**

- Alphen aan den Rijn / The Netherlands
- Antwerp / Belgium
- Dublin / Ireland
- Helsinki / Finland
- Istanbul / Turkey
- Krakow / Poland
- Lisbon / Portugal
- Ljubljana / Slovenia
- Malaga / Spain
- Montpellier / France
- Sofia / Bulgaria
- Zurich / Switzerland

The researcher group is characterised by its interdisciplinarity. It comprises several research institutions representing four different disciplines: ecology, sociology, economics and planning, located in different European countries. The Interdisciplinary Department of Urban Landscapes at the UFZ is in charge of the co-ordination, including the scientific co-ordination between the partner cities and research institutions, as well as the interdisciplinary co-ordination. During the workshops, the interim results will be reviewed and discussed by the consortium.

The main outcomes of the project will be:

**City profile:** The catalogue of requirements for the city profiles will be published as an aid for inventories and further investigations about urban green situations. It contains a list of which kinds of information, e. g. conditions and structure of urban areas, distribution of green spaces, types of green spaces, districts with a deficit of green, are needed to provide a basis survey.

**Catalogue of interdisciplinary criteria (ICC):** The catalogue of interdisciplinary criteria provides a tool for civil planning authorities and private planning organisations, for their use in the process of green space development. By its consideration of different situations and structures in different European regions, the catalogue will be applicable for planning authorities and institutions all over Europe. This catalogue also provides information about the combination and integration of criteria for interdisciplinary work in different fields of research and planning activities. The field-testing of the catalogue guarantees its high quality, its scientific methodology and its usefulness in local planning.

The resultant manual will be utilisable as a handbook by planning authorities and other planning institutions. This handbook will provide general and adaptable methods and measures for the sustainable development and management of urban green spaces. It will be based on the "catalogue of interdisciplinary criteria" and the "city profiles," and so it will include procedures for the analysis and evaluation of existing urban green structures and individual green sites. It will also contain information regarding good practice, effective planning instruments and preconditions for the use of different tools. It will take into account both the planning practices and the financial and cultural situations in the different European countries, as well as giving examples of best practice, definitions and explanations.

Right from the beginning of the project, a network for communication and the exchange of information has been established and will be continuously managed. This network consists of several communication levels for different kinds of users, supported by various media. By this means, scientists, planning authorities, NGOs, planners and citizens will have the possibility to be informed about project outcomes and are able to contribute suggestions and criticisms to the consortium. This communication is supported by an Internet platform and by workshops.

## **Expected impacts**

The project contributes to the improvement of the future management of green spaces in cities and urban regions by providing methods and guidelines for the planning authorities how to include ecological, social and economic demands in the process of planning and maintenance. Thus, the multi-disciplinary strategies contribute to the concept of sustainable development and the integration of actors/users in the project corresponds to the idea of the Local Agenda 21.

#### 4.1.2 Improving the quality of urban life

The improvement of the green space situation in cities and urban regions of Europe, which is made possible through URGE, influences the quality of locations both on a small and a large scale. Providing attractive and accessible green spaces of high ecological value benefits to the competitiveness of the urban location on various levels.

The deliverables of the project contribute to several approaches both in research and in practice. First, the toolbox ICC means a scientific benefit providing answers to complex problems. Second, both the toolbox and the manual contribute to the evaluation of existing and future green projects and simultaneously propose ways of improvement. Thus, these publications facilitate the planning and monitoring of urban green projects. Third, the manual provides assistance to decision makers with regard to the improvement of instruments in politics and planning issues. This assistance includes specific proposals on how to apply the existing instruments more efficiently. The developed tools are flexible for the application in different European regions and situations.

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## **WATERTIME (Improving the quality of urban life through sustainable decision-making on city water system reform)**

**Project Reference:** EVK4-2001-00271  
**Contract Type:** Cost-sharing contracts

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

The project addresses the issue of how to improve the quality of urban life by reaching economically, socially and environmentally sustainable decisions on water systems in cities. The team of partners is drawn from different parts of Europe - Spain, Italy, UK, Germany, Finland, Hungary - and with a range of expertise, including economics, political science, environmental science and law, water institutions. The project will study current decision-making on water systems in 29 European cities, and long-term historical experience. Two final reports will be produced: one on best practices, and the other developing a model for participative decision-making. The work will be disseminated to stakeholders and public authorities, who will also be involved during the course of the research.

### **Scientific objectives and approach**

The general objectives of the proposal are to:

- Analyse decision making processes on the design and organisation of water systems in selected European cities;
- Elaborate set of recommended best practice for decision makers;
- Elaborate a decision-making model that will enable a comparative evaluation of various options and thus result in more sustainable water systems and an improved quality of urban life;
- Disseminate findings and developed instruments among decision-makers and other stakeholders

The project addresses the question of how to reach sustainable decisions on the question of water systems. This is an issue of great importance to the quality of urban life in the EU and Accession Countries; the cost of necessary investments in water and sanitation are very high; and various forms of public, private and public-private partnership are possible.

The work will consist of a series of research packages.

1. Establish an initial common analytical framework and to research the common European and international factors affecting decision-making on water in cities.
2. Conduct detailed case studies of decision-making on water systems in 29 European cities, in 13 countries covering the north and south of the EU, and accession countries, selected because significant decisions affecting their water systems have been made in recent years: The participants and key factors in these decisions will be analysed, together with indicators of the sustainability of these decisions - economically, socially and environmentally.
3. In parallel an analysis will be carried out of the long-term historical consequences of decisions made on water systems in these Europe over time.
4. The data from these reports will be integrated and used to construct a framework for decision-making and evaluation methodology.
5. Two final reports will be produced: one identifying best practice in decision-making on water systems and the other developing a model for a participative decision-making process.
6. The results will be publicly disseminated through a special website, and also via specially convened meetings of stakeholders and public authorities

### **Expected impacts**

The project will deliver a model for decision-making on water systems, and provide a set of recommendations on best practice, for use in cities where decisions are made in future. The project will also deliver a series of reports on analytical frameworks, historical conditions, and specific case studies that will assist researchers and policy-makers in developing greater understanding of these processes.

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### 4.1.3 Improving economic development, competitiveness and job creation in city centres and neighbourhoods

#### COMET (Competitive Metropolises - Economic Transformation, Labour Market and Competition in European Agglomerations)

**Project Reference:** EVK4-2001-00035  
**Contract Type:** Research

**Start Date:** 01-12-2001  
**End Date:** 30-11-2004  
**Duration:** 36 months

#### Problems to be solved

The change of service structures in European metropolitan areas is a trend favouring service concentration in suburban communities removing economic functions from inner cities and provoking location competition within metropolitan areas. The growth of the service sector produces new location and interaction patterns as a consequence of increasing floor-space requirements as well as increasing urban transport. Linkages between new sub-centres in the urban periphery and in suburban areas arise which question the traditional centre-periphery flows and attribute significant importance to the cooperation between core cities and suburban communities.

How can these trends be evaluated, taking into account concepts of sustainability as well as local and European competitiveness? What are the demands of the key branches which, cause them to move to peripheral locations? Could these requirements be satisfied in the core cities? Which political and planning structures refer to these developments? Which strategies seem suitable for preserving the functional diversity of inner cities as well as maintaining the competitiveness of the agglomeration as whole? What types of planning measures might stimulate the location of competitive (= international tradable) services?

#### Scientific objectives and approach

To achieve the aim of elaboration of decision-making instruments for urban planning and sustainable development on the tertiary sector in Inner Cities and Suburban areas, the project first will analyse the degree of structural service diversification in Inner Cities and Suburban areas in Amsterdam, Barcelona, Berlin, Brussels, Copenhagen, Strasbourg and Vienna during the last three decades. The project works on a basis of an updated morphological delimitation of agglomeration areas and with a harmonised database. Main topics of the scientific approach are:

- Analysis of employment statistics with reference to NACE categories; analysis of commuter flows within the metropolitan areas, building statistics and land use plans,
- Questionnaire on location preferences and motives for choice of location conducted with enterprises in selected service branches and
- Analysis of planning instruments and strategies applied so far, together with an attempt to evaluate their effects on land use and location.

#### Expected impacts

- Empirical-based and comparative knowledge about the sub-urbanisation process of tertiary functions in European agglomerations,
- Information about the demands on location and infrastructure of the service key branches and the driving forces for their mobility towards the suburban belt,
- Evaluation of urban and regional planning programmes and norms to keep cities competitive, their effects for Inner Cities as well as for suburban areas and elaboration of new planning strategies to guarantee a balanced urban centre-periphery development (simulation model, Guidelines for practitioners, teaching tool)

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## MASURIN (Management of Sustainable Revitalising Urban Industrial Sites)

**Project Reference:** EVK4-2001-00058  
**Contract Type:** Research

**Start Date:** 01-01-2002  
**End Date:** 31-12-2004  
**Duration:** 36 months

### Problems to be solved

Within the boundaries of European cities, there are many smaller industrial sites surrounded by residential areas. These sites, especially those that are older, are associated with a multitude of problems: out-dated infrastructure, production processes and non-compliance with current environmental regulations. The consequence of this is that the well-heeled companies leave for new sites and the inner city site becomes run down. City planners respond to this but in many cases and for different reasons, local authorities are not able to make a transition to sustainability. Traditional approaches cannot provide the primary solution to environmental and spatial problems in urban areas.

After all, for a vital, economically robust, habitable city, it is important that residents are able to live agreeably in a clean, healthy and safe environment as well as work, shop and pursue leisure activities there. The inner city industrial sites are potentially outstanding at providing balanced employment and economic activity in the city, and boosting opportunity for the development of medium sized and large businesses, crafts and small businesses or a combination of different types of companies.

### Scientific objectives and approach

This project focuses on two interrelated approaches: Improving the management and decision making process in the revitalisation of urban industrial sites and optimising and sustaining the socio-economic and environmental impact of the sites.

A healthy socio-economic development, competitiveness and employment in cities needs a balanced supply of industrial activities within city boundaries; local authorities need management support and experience to create an integrated strategy for a city where people can work and live.

The main objectives of this project are to provide authorities with knowledge and practical tools to create a new partnership with industry and the public, based on awareness, transparency and openness to dialogue in order to improve and maintain optimum sustainability, in both environmental and socio-economic terms.

### Expected impacts

Local authorities in five cities from five countries will be assisted in the revitalising process of urban industrial sites by executing case studies. For these case studies existing economic and environmental models as well as decision-making tools will be improved and developed to work together in one toolkit. This toolkit will be tested in the MASURIN project.

The results and knowledge developed in MASURIN will be disseminated in international Working Conferences, which will be held in different countries. Finally the project aims at realising national and international networks of cities dealing with the issue of the sustainable (re)vitalisation of urban industrial sites.

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## **OPTIAS (Development of a Management Concept for Optimising the Location Strategy in Urban and Suburban Commercial Properties)**

**Project Reference:** CRAF-1999-70880  
**Contract Type:** Craft

**Start Date:** 01-09-2002  
**End Date:** 31-08-2004  
**Duration:** 24 months

### **Problems to be solved**

The action and management concept to be developed for selecting effective strategies for a policy of locating commercial facilities will eliminate the conflicting and potentially confrontational development of commercial areas of the city and the surrounding area. The objective is to improve economic and ecopolitical development, competitiveness and employment in municipal centres and neighbourhoods.

The increasing volume of traffic to reach leisure, business and industrial locations burdens the municipal infrastructure without improving the mobility of the individual. Commercial land management defined by synergies can lay out commercial areas in such a way that an ideal distribution of companies per commercial area is found.

The economic relevance is based on the commercial structures emerging from stagnating development. A decline of urban vitality associated with this will be stopped. New growth impulses will be set at the same time.

The ecopolitical and social objective is to create a meaningful mixture of workplaces and shopping and leisure facilities, in which direct proximity to the facilities frequented daily increases the mobility of the individual and thus creates additional free spaces.

### **Scientific objectives and approach**

Forecasting and monitoring ideal distributions of businesses in the sense of best practices will be achieved by applying economic evaluation methods (shareholder value, activity based accounting, risk analysis of commercial properties, networks for value appreciation). Simulation and visualisation methods will describe the development of economic spaces on the basis of various scenarios.

The shareholder value method and the life cycle based method, which are regarded as new in this context, will serve to qualify and support a future-oriented potential for success. Despite the scrutiny of investment decisions and location selection procedures, management for commercial land is advantageous only when detached from the life cycle of the settlement structures. For that reason, the life cycle of commercial areas will play an important role in the prototypical tool to be created.

### **Expected impacts**

The project deliverables consist of the two components

- Methodology of instructions for action for configuring and evaluating commercial settlement structures and
- Scenario analysis (simulation) of the development of commercial settlement structures.

The product is the basis of developing a future oriented, co-operation based land and location policy. Using both components, potential users are in the position to reorganise existing, inefficient commercial lands and to configure the restructuring and to specify clusters of services. What is more, both components can be utilised separately.

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## **SUPER (Sustainable Urban Planning and Economic (Re)development)**

**Project Reference:** EVK4-2002-00565  
**Contract Type:** Accompanying Measure

**Start Date:**  
**End Date:**  
**Duration:** 24 months

### **Problems to be solved**

SUPER is directed at the clustering of four projects in the area of sustainable urban planning and economic development. MASURIN, OPTIAS, COMET and ECOPADEV. This clustering will enhance the coordination of the outcome of the four projects and will strengthen their individual impact.

### **Scientific objectives and approach**

As a result, the mission set for SUPER is to add value to the individual research projects and policy development through exchange of information and exchange of views across topics related to urban planning and economic (re) development and create a greater impact of the four projects through joint dissemination, and joint agenda setting for future R&D in the area of sustainable economic urban development.

To reach the objectives, the following approach is chosen. There will be Internal Meetings for participants in the cluster of the four projects that will have the form of workshops in which objectives are reviewed and views exchanged. To facilitate the exchange of views a SUPER Website will be launched. This website will serve as a reference for all project partners of the four projects. Common objectives will be formulated in the Common Cluster Position Paper and be presented in the External Meetings to the Commission and to other interest groups in different countries.

A Clearing-House will be set up consisting of an interactive database with practical information, cases, examples etc. Audio-visual material will be produced and placed on the website and be made available as Video. Based on the outcome of the process of exchanging views and defining objectives, shortcomings and potential bottlenecks will be identified and addressed in so-called Thematic Research Papers. In the final Conference, the authors of the thematic research papers will present their views. The objective of the conference is to formulate and disseminate a common Agenda for Future Research activity within the European dimension in the area of sustainable urban planning and economic (re) development.

### **Expected impacts**

Following the objectives and Work Plan, the expected impacts of SUPER are that the partners will be able to match the results and deliverables of the underlying projects in a joint position paper, set up an ongoing knowledge exchange platform (clearinghouse) that policy makers will use in their work and create discussions in the relevant platforms on RTD topics for the 6<sup>th</sup> Framework and national R&D schemes.

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## **URBAN CATALYSTS (Strategies for temporary uses- potential for development of urban residual areas in European metropolises)**

**Project Reference:** EVK4-2000-00544  
**Contract Type:** Cost sharing contract

**Start Date:** 01-04-2001  
**End Date:** 31-03-2003  
**Duration:** 24 months

### **Problems to be solved**

Centrally located residual areas are increasingly important to the urban development of European cities. Revitalising these wastelands is often economically and politically difficult. Yet numerous unplanned uses emerge in these areas which often evolve into intensively used public and semi-public spaces, and become the starting point for new services and media enterprises. These unplanned uses are founded on informal economies outside of traditional city planning and project development, and are therefore displaced after a short time, even though they offer great potential for urban and economic development as well as social integration and stabilisation.

### **Scientific objectives and approach**

The aim of 4Urban Catalysts' is to examine strategies for temporary use and to develop instruments and methods, which integrate its potential into modern city management and urban design. To this end, the project will develop and deploy the Internet-based communication system Urban-od which is a marketable planning product for these cities or developers interested in exploiting the potential of temporary use in residual urban areas.

The research project will examine the potential of temporary uses in the long-term development of residual urban spaces as well as existing obstacles in development, create a catalogue of measures for activating residual areas and for applying temporary uses as a basis for lasting urban development, and apply and check these in five areas in Naples, Vienna, Berlin, Amsterdam, and Helsinki. The catalogue of means will consist of structural, city planning-related, legal, economic, and city management-related measures, and will be developed with the help of an Internet-based forum, Urban-os.

### **Expected impacts**

The application of the research results will permit communities, city planners, project developers, and citizens to activate unused urban areas by optimally using existing resources. New forms of project development make citizens into initiators and developers of urban development. The social structure is strengthened, and active public spaces as well as a foundation for a long-term economic development are created.

The developed methods will permit those involved:

- to recognise existing potential and resources which can be activated in residual urban areas
- to eliminate developmental obstacles
- to stimulate interaction between potential partners and generate temporary activities both with the help of the Internet-based forum
- to support the further development of the activation processes and allow it to be transferred into a lasting development.

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## **4.2 Protection, conservation and enhancement of European cultural heritage**



### 4.2.1. Improved damage assessment on cultural heritage

#### Summary Table

ACRONYM	NUMBER	TITLE PROJECT WEB-SITE
<b>BIOBRUSH</b>	EVK4-2001-00060	Novel approaches to conserve our European heritage: Bioremediation for Building Restoration of the Urban Stone Heritage in European States
<b>CARAMEL</b>	EVK4- 2000-00029	Carbon content and origin of damage layers in European monuments
<b>DEMOTEC A</b>	EVK4-CT-2002-00563	Development Of A Monitoring System For Cultural Heritage Through European Co-Operation
<b>ESDCON</b>	EVK4-2001-00265	European Salt Damage Conservation Network
<b>FIRE-TECH</b>	EVK4 2001-00072	Fire Risk Evaluation to European Cultural heritage-Quantification of priorities and optimisation of fire protection strategies
<b>FRIENDLY HEATING</b>	EVK4-2001-00007	Friendly heating: comfortable to people and compatible with conservation of art works preserved in churches
<b>IDAP</b>	EVK4-2001-00099	Improved Damage Assessments of parchments
<b>IMPACT</b>	EVK4- 2000-00031	Innovative modelling of museum pollution and thresholds
<b>ITER</b>		Isotopic Technologies applied to the analysis of ancient mortars <a href="http://www.iter-eu.com">www.iter-eu.com</a>
<b>LIDO</b>	EVK4- 2000-00517	A light dosimeter for monitoring cultural heritage: development, testing and transfer to market
<b>MIMIC</b>	EVK4-2000-00040	Microclimate indoor monitoring in cultural heritage preservation
<b>MODHT</b>	EVK4-2001-00020	Monitoring of Damage in Historic Tapestries
<b>MULTI-ASSESS</b>	EVK4-2001-00010	Model for multi-pollutant impact and assessment of threshold levels for cultural heritage
<b>ONSITEFOR-MASONRY</b>	EVK4 2001-00091	On-site investigation techniques for the structural evaluation of historic masonry buildings
<b>VIDRIO</b>	EVK4 2001-00013	Determination of conditions to prevent weathering due to condensation, particle deposition and micro-organism growth on ancient stained glass windows with protective glazing

### 4.2.2 Development of innovative conservation strategies

ACRONYM	NUMBER	TITLE PROJECT WEB-SITE
ASSET	EVK4- CT 2000-0023	Assessment of suitable products for the conservation treatments of seas-salt decay
BACPOLES	EVK4-2001-00009	Preserving cultural heritage by preventing bacterial decay of wood in foundation poles and shipwrecks
BIODAM	EVK4-2001-00286	Inhibitors of biofilm damage on mineral materials
BIOREINFOR-CE	EVK4- 2000-22027	Biomediated calcite precipitation for monumental stones reinforcement
CATS	EVK4- 2000-00028	Cyanobacteria attack rocks:control and preventive strategies to avoid damage caused by cyanobacteria and associated microorganisms in roman hypogean monuments
COALITION	EVK4- 1999-20001	Concerted action on molecular microbiology as an innovative conservation strategy for indoor and outdoor cultural assets
COLLAPSE	EVK4-CT-2002-00088	Corrosion of Lead and lead-Tin Alloys of Organ Pipes in Europe
COMPASS	EVK4-2001-00015	Compatibility of Plasters and Renders with Salt loaded Substrates in Historic Buildings
CONTROLLED PAPER CLEANING	EVK4- 1999-35001	Controlled paper cleaning using laser technology
DIAS	EVK4-CT-2002-00080	Integrated tool for in situ characterization of effectiveness and durability of conservation techniques in historical structures
HISTO-CLEAN	EVK4-CT-2002-30011	Intelligent Measurement Technology For Laser Cleaning Of Historic Buildings And Monuments
INKCOR	EVK4-CT- 2001-00049	Stabilisation of Iron Gall Ink Containing paper
LASERACT	EVK4-2001-00279	Laser multitask non destructive technology In conservation diagnostic procedures
MASTER	EVK-2001-00243	Preventive Conservation Strategies for Protection of Organic Objects in Museums, Historic Buildings and Archives
MIP	EVK4-2001-00215	Transitional Metals in Paper
PAPYLUM	EVK4-CT-2000-00038	Chemiluminescence: a novel tool in paper conservation studies
ROCEM	EVK4-2001-0059	Roman cement to restore built heritage effectively

#### 4.2.3 Foster integration of cultural heritage in the urban setting

ACRONYM	NUMBER	TITLE PROJECT WEBSITE
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<b>SUIT</b>	EVK4-CT-2000-00017	Sustainable development of urban historical areas through active integration within towns
<b>APPEAR</b>	EVK4-CT-2002-00091	Accessibility Projects. Sustainable Preservation and Enhancement of urban subsoil Archeological Remains <a href="http://www.in-situ.be">http://www.in-situ.be</a>



## INCO International Co-operation in research

ACRONYM	NUMBER	TITLE PROJECT WEBSITE
ARCHI-MED	ICA3-1999-00002	Archaeological composites in Mediterranean architecture : baked glass ceramics alteration and re-creation
CAHRISMA	ICA3-1999-00007	Conservation of the acoustical heritage by the revival and identification of the Sinan's Mosque's acoustics
CHIME	ICA3-1999-00006	Conservation of historical Mediterranean sites by innovative seismic-protection techniques
FORTIMED	ICA3-1999-00003	Restoration and use of the early medieval fortifications in the east Mediterranean countries
HERCOMANES	ICA3-1999-00004	Heritage conservation and management in Egypt and Syria
JEWELMED	ICA3-1999-00005	Comparative Analysis Of Manufacturing Technologies In Goldsmithing And Silversmithing From The VII To The I Century B.C In The Mediterranean Area <a href="http://www.ejtn.org">www.ejtn.org</a>
TEXMED	ICA3-1999-00001	New materials and eco-sustainable technologies for the conservation and restoration of textiles

## 4.2.1 Improved damage assessment on cultural heritage

### **BIOBRUSH (Novel approaches to conserve our European heritage: Bioremediation for Building Restoration of the Urban Stone Heritage in European States)**

**Project Reference:** EVK4 2001-00060  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

#### **Problems to be solved**

BIOBRUSH will investigate how bioremediation can be used for conservation of stone and brick in heritage buildings as well as specific stoneworks and frescoes mostly affected by indoor and outdoor air pollution. It will focus on identification and culture of appropriate non-pathogenic microorganisms able to destroy mineral salty crusts as well as organic compounds, and of other bacteria, which, on the contrary, can produce "bio-calcite" consolidating stone materials. Treatment combinations will be tested in laboratory and in-situ under different climatic conditions and in urban and industrialised areas of Northern and Southern Europe. This innovative method is expected to be reversible, well controllable and possibly cheaper compared to current practice. Recommendations for these practical conservation strategies will be established in close collaboration between the scientific partners and the end-users including conservators and industries.

#### **Scientific objectives and approach**

1. To investigate bioremediation for conservation of stone and brick in heritage buildings throughout Europe.
2. To use microbes to remove salts by crust mineral destroying processes and consolidate by mineral-forming biocalcification.
3. To screen, select and test suitable stone materials, safe microorganisms and practical delivery systems.
4. To assess performance, durability and risk for innovative treatment combinations on stone

#### **Expected impacts**

1. Data set on types of materials, micro-organisms and delivery vehicles (initial by 9 months; completion by 15 months)
2. Culture collection of safe micro-organisms for conservation use (initial by 18 months; complete by 33 months)
3. Choice of treatment options (initial 15 months ; final 33 months)
4. Impact of bioremediation on stone properties (complete 24 months)
5. Performance and risks of new treatment on building stone in different climates (complete by 30 months) and brick in the laboratory and then on heritage buildings in European cities and urban environments.
5. To identify the environmental constraints imposed by climate within Europe.
6. To work closely with industry and conservators to recommend practical treatment strategies based on bioremediation for conservation practice to protect the European cultural heritage.

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## **CAMEL (Carbon content and origin of damage layers in European monuments)**

**Project Reference:** EVK4-2000-00029  
**Contract Type:** Cost-sharing contracts

**Start Date:** 22-12-2000  
**End Date:** 21-12-2003  
**Duration:** 36 months

### **Problems to be solved**

This project aims to contribute to the understanding of black crusts growth in multi-pollutant influenced atmosphere, by focus on the key role of carbon particles as a vector of pollutant transport, deposition and transformation when embedded in patinas. Our comprehensive study will include measurements of soot particles in aerosols and in patinas including the two different fractions organic and elemental carbon. A new methodology for carbon analysis in patinas will be developed and a careful selection of target sites will allow us to constrain the role of the different combustion sources. Also, aesthetic damage to monuments will be related to the soot content of the crust. We will provide a formal and a user-friendly version of the modelling of particle transfer to be utilised for soiling estimates under present conditions and for future scenarios. The ultimate goal is to propose soot-based atmospheric thresholds.

### **Scientific objectives and approach**

#### **Expected impacts**

- selection of target sites (month 1) aerosol data set (month 12) black crust carbon analytical procedure and data set (month 12 and 34) source
- apportionment in black crust (month 27) input meeting for data transfer (month 23) and soot-based aesthetic index (month 26) formal and user friendly
- version of a transfer function model for soot particles (month 31) meeting with end-users; preliminary presentation of a set of soot thresholds (month 32) and soot-based threshold tree (month 36)

### **Coordinator**

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## **DEMOTEC A - Development of A Monitoring System For Cultural Heritage Through European Co-Operation**

**Project Reference:** EVK4-CT-2002-00563  
**Contract Type:** Accompanying measure

**Start Date:** 01-02-2003  
**End Date:** 31-07-2004  
**Duration:** 18 months

### **Problems to be solved**

DEMOTEC-A aims to establish a network of experts and users to discuss and outline a common European observation system for comparative assessment of the state of preservation of cultural heritage. Large scale monitoring of cultural heritage on site is a relatively weakly developed field of research throughout the world, no international standards exist as of today. In near urban areas cultural heritage suffer from lack of integration and decay as the cities expand. At the other end of the scale, cultural heritage environments are left to natural degradation, overgrowing and loss of meaning, where areas are left abandoned or due to the effects of changing agricultural policy. These landscape development trends represent a serious challenge to cultural heritage management throughout Europe (ESDP 1999: 30; OECD 2001). Also the "Landscape Convention" (ETS 176) encourages public authorities to adopt policies and measures at local, regional, national and international level for protecting, managing and planning landscapes with their heritage contents throughout Europe. The user side to the development of a monitoring system is therefore very important and heavily stressed in DEMOTEC-A.

### **Scientific objectives and approach**

The main objective is to initiate the development of a European monitoring system that establishes links between the various scales of monitoring site today. These scales most often are a landscape level, a monument or building level and a very detailed level (example: decorated surfaces). The basic innovative idea of the project is to develop a better understanding of how data obtained in different scales relate to each other and how data from different disciplines can be integrated into one monitoring system of inherent information at a reasonable prize. This includes traditional registration, monitoring and condition assessment in the fields of archaeology, architecture/engineering and conservation combined with geographic information systems (GIS). GIS secures efficient application of integrated geographic and statistical analysis to large sets of data. A joint European execution of such a system-development offers both economical as well as scientific benefits. Related to monitoring of cultural heritage values such a development would implicate application of international standards related to techniques, methodology, threshold values and reporting standards as well as structuring a pathways towards the community.

### **Expected impacts**

The main objective of the accompanying measure is through exchange of experience, research results and testing towards a pilot model, to develop the framework for a European monitoring system based on co-ordinated indicators that help assess in a standardised way the state of cultural heritage preservation. The goal is to provide the basic concepts and framework for such a system that will, eventually, when developed, visualise the state of preservation of the European heritage to citizens, management and politicians as well as facilitating management decisions. In total DEMOTEC-A aims to establish a common framework for further development of tools to protect the diverse cultural values linked to European landscapes as part of Europe's common heritage.

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## **ESDCON (European Salt Damage Conservation Network)**

**Project Reference:** EVK4-2001-00265  
**Contract Type:** Thematic Network

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

The preservation of cultural (art) objects and buildings is central to our quality of life. A major cause of damage is the growth of salt crystals within porous materials such as stone and plaster resulting in desegregation and loss of the object surface. However, crystal formation can now be predicted by state-of-the-art geochemical (computer) models, and safe environmental conditions identified. Our objective is to improve conservation practice, Europe wide, for historical stonework and cultural objects affected by salt damage. This will be achieved using the world wide web to: (i) promote, teach, and apply advanced models for predicting the conditions leading to salt damage; (ii) organise and coordinate user groups focussing on conservation problems. Network outputs will be improved and innovative conservation strategies, increased collaboration between researchers, practitioners and decision-makers, and stimulation of new research.

### **Scientific objectives and approach**

Overall, to improve conservation practice for buildings, historical stonework, and cultural objects affected by salt damage. Specific objectives are structured around a development period, two project meetings, and a "launch" conference:

1. Establish a network website with a novel computer model for calculating the environmental conditions leading to salt damage, and for training and user communication.
2. Initiate and operate the network to: identify key salt damage conservation problems, establish user groups and mediate their research and conservation activities, develop tutorials, and evaluate best conservation practice for different types of salt contamination.
3. Open the network publicly at a conference/workshop for researchers and end-users, including hands-on instruction in its use and discussion of future salt damage research.

The principal management and development tasks for initiating, operating, and delivering the conservation and cultural heritage benefits of the network are as follows:

1. Transfer an existing salt damage (computer) model to the World Wide Web, and set up the network website and bulletin board. This involves FORTRAN, html, and general computer programming. Test the model and website (key network members) and revise for use by the full network.
2. At the first network meeting: identify key conservation problems among the user community; oversee the formation of user groups; establish a range of conservation sites and objects for evaluating the use of the model. Tutorials on the application of the salt damage model to key conservation problems will be produced.
3. At the second network meeting the steering committee, and principal network members, will review and finalise the website, bulletin board, and draft tutorials. The tutorials will be integrated into the website and all pages converted into French, German, Greek, Italian, Spanish and Portuguese. An evaluation of best conservation practice for objects and monuments contaminated by different types of salt mixtures will be initiated.
4. The network launch conference/workshop will focus on: publicising and opening up the network as a general resource, discussion of the recommendations for best conservation practice, establishing the critical problems requiring new research into salt damage redemption, and future network developments. Organisation of the meeting involves design and production of publicity material, presentations by user groups, and a guide to the use of all aspects of the ESDCoN network.
5. The mature network will be actively managed for 6 months after the launch conference/workshop. The steering committee will act to maintain and strengthen user collaborations and particularly establish new training courses-and research projects.



## Expected impacts

Key overall deliverables:

1. ESDCoN multi-language website with:
  - conservation tool (computer model);
  - (ii) bulletin board for communication;
  - contact details/interests of all network members;
  - on-line tutorials.
2. Recommendations of best conservation practice for objects contaminated with different salts, based upon the activities of usergroups.
3. Launch conference/workshop, which publicises, presents and instructs in the use of the mature network and conservation tool.

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#### *4.2.1 Improved damage assessment on cultural heritage*

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## **FIRE-TECH (Fire Risk Evaluation to European Cultural heritage-Quantification of priorities and optimisation of fire protection strategies)**

**Project Reference:** EVK4-CT-2001-20006  
**Contract Type:** Thematic Network

**Start Date:** 01-02-2002  
**End Date:** 31-01-2005  
**Duration:** 36 months

### **Problems to be solved**

FIRE-TECH is a *Thematic Network* to analyse the fire behaviour of a series of ancient construction products and provide information on existing technologies for fire protection and their efficiency, cost and applicability to various types of cultural heritage projects. A fire risk analysis method and a quantitative decision method will be defined and described in a guidance manual for all concerned authorities and owners of fire-vulnerable artefacts.

### **Scientific objectives and approach**

This proposal has two main objectives:

1. To develop a quantitative decision method able to prioritise between series of fire protection projects for different cultural heritage, on the basis of the highest reduction in expected fire losses for the investment made. The following parameters will be taken into account: the 'value' of cultural heritage, the fire risk, and the efficiency of the fire protection and its cost.
2. To provide authorities, owners of cultural heritage, preservationists and other potential users of the results of this study with: - a fire risk evaluation method - information on the fire behaviour of ancient construction products the existing technologies for fire protection and their efficiency, cost and applicability in cultural heritage protection projects.

### **Expected impacts**

1. Governments and corporate/private investors - owners will have better information on the fire prevention in cultural heritage buildings through the provision of:
  - a. Detailed information on fire prevention systems and products
  - b. Risk analysis methods
  - c. Quantitative decision model
2. Insurers will be able to better evaluate the fire risk in Cultural Heritage and to improve the performance of their business.
3. This project will also improve the acceptability of fire safety engineering for the protection of Cultural Heritage rather than the application of prescriptive regulations.
4. The fire safety industry expects to extend its market. Potentially, the need for new or adapted products will be demonstrated. This will lead to new opportunities.
5. The partners in this consortium will improve both their knowledge and reputation on the field of protection of Cultural Heritage. Publications in scientific journals will give them better access to research grants and participations in research consortia both on the national and international scenes. It will support their participation in the international standardisation, both at CEN (TC 127) and ISO level (TC 92).

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## **FRIENDLY HEATING (Friendly heating: comfortable to people and compatible with conservation of art works preserved in churches)**

**Project Reference:** EVK4-2001-00007  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

FRIENDLY HEATING aims to develop and test a prototype of a modular and controlled heating equipment for churches and other places of worship or historical buildings, ensuring comfort of the people present while remaining compatible with the conservations of the art works. The equipment will diffuse warm air circulating only in the seating area. The indoor microclimate of these premises including a number of parameters such as humidity, air flux and temperature will be studied to avoid moisture, dust and air leakages and condensation. Guidelines and best practice recommendations will be produced for an optimal utilisation of the equipment, taking into account a range of various weather conditions.

### **Scientific objectives and approach**

For protecting artworks in churches, or in historical buildings heated only at times, a heating system is proposed which is able to contain heated air just in the area where people stay. Warm air will be emitted from diffusers sited at the base of benches and will be then sucked out together with the moisture released by people by means of a low pressure operated by suction openings on the upper part of the benches. No leakage of air enriched with heat, moisture and dust, will be allowed from the seating area, and the artworks in proximity of walls will remaining conditions absolutely safe. The plant will be designed after knowledge of the local climate and will be planned with the help of simulation models. In order to verify the efficiency of this system, some surveys with tracers added to the warm air will check that warm air remains only in the seating area, without leakage. Field monitoring will be used as feed-back to set-up the system.

In a church, heated only one day per week for church services, the problem of combining cost of heating, comfort and conservation is still unsolved.

The environment is generally uncomfortable for churchgoers and very often the air is dangerous for conservation. During liturgical services, the dynamic regime associated with air heating and release of moisture from people can generate conflicting situations. The sudden warming of the air causes a drop in the relative humidity and artworks with short-time thermal inertia (e.g. paintings on canvas and historical tapestries) are dehydrated and contract. On the other hand, the walls remain cold, below the dew point, and part of the moisture emitted by people condenses on surfaces that remain cold due to their large thermal inertia like frescoes, statues, stucco decorations on walls, ceilings and stained glass. To protect artworks in churches, we propose a heating system, which is able to contain heat to the area where the churchgoers congregate. The system will emit warm air at low temperature and at very low velocity from diffusers sited at the base of pews. This will be integrated with heating foils at low temperature sited in bench furnishing. In order to reduce the ambient dispersion of warm air, this will be partially sucked up by means of tubes with suction openings placed on the upper part of the pews. At the same time, this suction will remove part of the dangerous excess moisture emitted by people breathing. Due to the combined effect of moderate bench heating, and air suction, heat will mainly remain concentrated in the area where people congregate, and the relatively modest leakage of air enriched with heat, dust and moisture will not affect the artworks in proximity of walls. Artworks will remain in safe conditions.

### **Expected impacts**

#### **Main Events**

- 1) Kick-off Meeting: Rocca Pietore, 28-29 April 2002
- 2) Presentation to the Mayor, the Priest and the Town People: Rocca Pietore, 29 April 2002
- 3) Discussion with the Soprintendenza Beni Artistici e Storici del Veneto and the Soprintendenza Beni Ambientali e Architettonici del Veneto Orientale, Venice 2 May 2002
- 4) November: Installation of the external Weather Station and the indoor automatic sampling

#### **Next Events**

#### 4.2.1 Improved damage assessment on cultural heritage

- 1) Installation of the novel Heating System Prototype
- 2) Annual Meeting with the participation of the Stakeholder Group: 11 January 2003 Rocca Pietore.
- 3) Multidisciplinary Field Survey: (6-18 January 2003)

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## IDAP (Improved Damage Assessments of parchments)

**Project Reference:** EVK4-2001-00099  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### Problems to be solved

IDAP aims to improve the damage assessment of parchments (e.g. manuscripts, scrolls, charters, book covers) by the correlation between the observed state of preservation and measured conditions, through non and/or micro-destructive techniques to study their hydrothermal, thermochemical, and thermophysical properties, chemical composition and structural damage. Complementarity and variations will be sought in the choice of the samples with respect to their nature, origin, treatment and storage conditions, and geographical distribution. Artificial ageing of new parchments will supplement damage studies of historical materials. The main deliverables including recommendations to conservators and restorers will be an improved visual and microscopical "Parchment Damage Assessment Programme"(PDAP) developed together with an "early warning system" to detect latent fatal damage in the parchment structure, and a "Digitalised User-Friendly Parchment Damage Atlas"(DUPDA) describing all significant damage characteristics. This will help avoid damaging preservation actions and wasting resources.

### Scientific objectives and approach

In line with the programme objectives of the thematic programme, The City of Tomorrow and Cultural Heritage (4.2.1) the objectives of the project is to improve the damage assessment of parchment by the correlation between, the observed state of preservation and the measured condition, using complementary non-destructive and micro-analytical assessment. The improved damage assessment will be the basis for improved conservation planning and conservation and restoration of parchment.

The objectives will be achieved by establishing and make available for the end-users in conservation and restoration of parchment on the Internet and/or CDR:

1. A Parchment Damage Assessment Programme (PDAP).
2. An Early Warning System (EWS).
3. A Digitalised User-friendly Parchment Damage Atlas (DUPDA).

### Expected impacts

The milestones and expected results of the project will include a database with the data and results on damages on parchments obtained by visual, microscopic and advanced chemical and physical assessment based on non-destructive and microanalytical methods. The expected major results of the project will be PDAP, EWS and DUPDA. The latter also including the precautions and recommendations on storage and treatment of the parchment in different stage of deterioration with links to all relevant data from the advanced micro-level chemical, structural and thermochemical analysis.

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#### 4.2.1 Improved damage assessment on cultural heritage

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## **IMPACT (Innovative modelling of museum pollution and conservation thresholds)**

**Project Reference:** EVK4-2000-00031  
**Contract Type:** Cost-sharing contracts

**Start date:** 11-09-2000  
**End date:** 11-08-2003  
**Duration:** 35 months

### **Problems to be solved**

The problem of pollution damage to cultural heritage in museums, galleries and archives is one faced by cultural heritage institutions throughout Europe. Yet, although most institutions are aware of the pollution problem, and are keen to deal with it, they frequently lack the expert knowledge to make informed decisions about what might be the best approach to pollution control for them. Only the largest and most prestigious institutions can be expected to employ conservators or scientists with any knowledge in this area. Many smaller institutions may employ no conservation staff at all. In addition, many architects and designers who work on cultural heritage buildings also lack knowledge of the types of pollution damage that can occur in museums.

This project aims to develop a software tool to assist museums in dealing with the problem of pollutant damage to indoors cultural heritage. The tool will enable museum staff, architects and engineers to make sensible decisions about pollution control for their organisations.

### **Scientific objectives and approach**

The main objectives of this project are:

- to assist museums in the control of damaging gaseous pollutants by the production of a public domain (web-based) software tool that can
- predict indoor pollutant concentrations from outdoor concentrations and building parameters;
- give information on the damage this pollution is likely to cause, and suggest suitable deposition-based control thresholds;
- assess the impact of different pollution control strategies and encourage museums to adopt best practice in preventive conservation; and
- develop materials suitable for use as passive pollution absorbers in museums

The software tool will include a model of pollutant behaviour in museum buildings that will predict indoor concentrations from outdoor concentrations and building parameters. An expert systems-type component will give information on object damage likely to be caused by the predicted pollutant concentration, suggest possible remedial strategies and compare outcomes of different strategies.

Underpinning the software tool is a deposition-based steady state model of pollutant behaviour indoors. This will use deposition velocity data measured in the project for gases such as sulphur dioxide, nitrogen dioxide, ozone, formaldehyde and hydrogen sulphide on building fabric and finishes and object materials.

### **Expected impacts**

The successful outcome of the project will be improved, more energy-efficient pollution control in museums and galleries throughout Europe, particularly in smaller institutions, which do not possess specialist staff who have detailed knowledge of these issues.

### **Coordinator**

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#### 4.2.1 Improved damage assessment on cultural heritage

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## **ITER (Isotopic Technologies applied to the analysis of ancient mortars)**

**Project Reference:** CRAF-1999-700990  
**Contract Type:**

**Start Date:** 01-04-2002  
**End Date:** 31-03-2004  
**Duration:** 24 months

### **Problems to be solved**

ITER proposes to test isotopic techniques on ancient Roman Mortars, with the objectives to demonstrate their scientific validity and understand, why roman mortars are so resistant to physico-chemical alteration; to collect all data in a database, with the aim to produce the mortars more accurately and to develop new products.

This project proposes to test innovative isotopes analytical methods, in complement to the traditional ones. Isotopic analysis offers some major advantages as compared with conventional analytical techniques, like:

- Provenance and geological history of material
- Determination of manufacturing parametres (e.g. burning temperature)
- Weathering and physico-chemical processes

Three sites are investigated in Italy (Rome Valle dell'Aniene), Germany (Xanten Colonia Ulpia Traiana) and Israel (City of Beit-Shean (1-2 Sec. D.C), Cesarea Marittima (Harbour of Herodes 30-40 a.C-200 d.C.)

Typical modern mortars, industrially available, will also be investigated to compare their parametres with ancient ones and to enable the analytical testing methods to be standarised. The results are stored in the form of an innovative database. In the final phase of the project the scientific and technical knowledge about ancient mortar production will converge in a production sample of an improved mortar.

### **Scientific objectives and approach**

- To understand why roman mortars are resistant to physico-chemical alteration
- To test and evaluate the scientific validity of isotopic analytical investigations and methodologies on ancient building materials
- To produce prototypes at laboratory scale, of mortars based on the knowledge and data gained for a better conservation of cultural heritage

### **Expected impacts**

#### **Coordinator**

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## **LiDO (A light dosimeter for monitoring cultural heritage: development, testing and transfer to market)**

**Project Reference:** EVK4-2000-00016  
**Contract Type:** Research

**Start Date:** 01.02.2001  
**End Date:** 31.01.2004  
**Duration:** 36 months

### **Problem to be solved**

Lighting is one of the most important factors enabling visitors to fully enjoy the visual aspect of art. However, light also has to be considered as a threat to many works of art, as demonstrated by numerous examples. The lighting situation indoors can be characterised by a number of commercially available instruments (luxmeters and radiometers). However, this equipment is not appropriate for routine applications in museums. An obvious attempt to avoid complicated measurements is to use a simulation material on which the effect of light can be studied. Therefore, this proposed project has been conceived with the following objectives: i) the investigation of different combinations of dyes/matrices/substrates and their response to different light levels by laboratory and field exposure, ii) the development of a standardised preparation method and quality control for light dosimeters. The aim of this project is to develop and test light dosimeters for monitoring cultural heritage and to promote their transfer to market.

### **Scientific objectives and approach**

The new dosimeters consist of sensitive dyes embedded in a polymer matrix, which is applied on a substrate (glass or paper). The sensitivity of the new prototype dosimeters is investigated after exposure in climate chambers (different radiation levels combined with defined temperature and humidity conditions). The colour change of the dosimeters is studied to determine threshold values for light induced effects, saturation effects, time dependence, spectral sensitivity, synergetic effects with other parameters etc. The quantification of the fading process will deliver data, which are easy to interpret. The field applications are realised in four museums where the lighting conditions are characterised with commercially available equipment: the Uffizi Gallery in Florence, the Victoria and Albert Museum in London, the Musée Cognacq-Jay in Paris and several historic houses in Prague. The project team consists of seven partners from five countries. Three research providers are responsible for the preparation of light dosimeters and the analysis of colour change: Fraunhofer-Institut fuer Silicatiforschung ISC (D), Centre de Recherche sur la Conservation des Documents Graphiques CRCDG (F) and Istituto di Fisica Applicata "Nello Carrara" IFAC-CNR (I). Two end-users, the Victoria & Albert Museum (UK) and the State Institute for the Care of Historical Monuments SUPP (CZ) are responsible for the field exposure of light dosimeters and accompanying measures. Particle Technology (UK) and Dr. Dieter KockottUV-Technik (D) are two SMEs involved in the project from the beginning and ready to promote a marketing strategy for light dosimeters.

The outcomes of the project will increase the awareness of conservators and curators about possible light damage on cultural heritage objects and promote the application of light dosimeters as a new working tool in preventive conservation.

### **Expected impacts**

Light dosimeters, developed in this project, will provide a new tool for conservators and curators for quantifying the effect of light in museums before damage on sensitive objects occurs. The decisive milestone in the work programme was the mid-term assessment of the project, when results of laboratory and field tests have been discussed with an external expert. The second milestone at the end of the project will assess the fields of application for different types of light dosimeters, followed by the implementation of the marketing strategy. The results will be presented at a public workshop in Florence on 27/28 November 2003. For more information see: [www.lido.fraunhofer.de](http://www.lido.fraunhofer.de)

### **Coordinator**

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## **MIMIC (Microclimate indoor monitoring in cultural heritage preservation)**

**Project Reference:** EVK4-2000-00040  
**Contract Type:** Cost-sharing contracts

**Start Date:** 22-12-2000  
**End Date:** 21-12-2003  
**Duration:** 36 months

### **Problems to be solved**

The ability to identify and assess damage to cultural heritage in museums, in particular by indoor pollutants, is a major and growing concern for many curators and conservators. The purpose of this project is to evaluate the effect of pollutants, threshold values for damage, and local microclimatic anomalies using economical damage dosimeters. These have been developed and the novel contribution in this project is to extend their capabilities with the use of quartz crystal piezoelectric technology to provide a simple method for evaluation, eventually on a continuous basis. Monitoring of microclimatic conditions would also be performed and passive sampling techniques will be used to measure pollutant levels. The resulting data will assist those responsible for historic buildings in improving the protection of precious paintings and tapestries, particularly on outer walls, from deleterious environmental effects.

### **Scientific objectives and approach**

### **Expected impacts**

### **Coordinator**

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## MODHT (Monitoring of Damage in Historic Tapestries)

**Project Reference:** EVK4 2001-00020  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### Problems to be solved

MODHT seeks to improve the conditions of conservation of ancient tapestries through a better understanding of both the materials and methods used in their construction including the mechanism of degradation of the natural polymeric fibres at molecular level and their viscoelastic properties. The project will involve the production of model tapestries using traditional materials and methods, and a reference database for historic tapestries. Such knowledge will be used to define an assessment method for tapestries for use by curators and conservators-restorers to improve conditions of displays and storage.

### Scientific objectives and approach

### Expected impacts

### Coordinator

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## **MULTI-ASSESS (Model for multi-pollutant impact and assessment of threshold levels for cultural heritage)**

**Project Reference:** EVK4 2001-00010  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

MULTI-ASSESS will assess the individual and synergetic multi-pollutant effects of wet and dry deposition of gases in particular sulphur, nitrogen, ozone, nitric acid- and of particles on deterioration and soiling of cultural heritage objects. A multi-pollutant model will be developed on the basis of an extensive field and laboratory exposure programme using passive and validated samples in 30 test sites from 18 countries including all parts of Europe and with a link to North America. The dose-response functions of the model will be used to identify and map areas exceeding threshold values. A tool-kit will be proposed for rapid risk assessment of corrosion and soiling of these chemical agents to objects of cultural heritage facilitating decisions concerning the care and restoration of buildings and others heritage objects by central and local authorities. The project will contribute to the improvement of European legislation on urban air pollution and will be also related with world-wide regulations in the field of cultural heritage conservation and, de facto, with economic factors.

### **Scientific objectives and approach**

- To develop a multi-pollutant deterioration and soiling model of wet and dry deposition of gases and particulates on materials used in objects of the European cultural heritage
- To use model results for assessment of pollution threshold levels and to recommend levels to be implemented in the future development of EU Directives on urban air quality in order to minimise the pollution effects on historic and cultural objects.
- To then demonstrate the usefulness of the approach by mapping areas exceeding threshold levels in Europe using available environmental data from the EMEP programme, by identifying cities exceeding threshold values using the EEA "Airbase" database and by mapping areas exceeding threshold levels in a selected urban area.
- To propose a tool for rapid risk assessment of the impact to objects of cultural heritage.

### **Expected impacts**

- Validation and results of passive samplers for HNO<sub>3</sub>, particulates and soiling.
- Dose-response fcn for materials used in objects of cultural heritage (OCH) .Pollution threshold levels for the future review of EU directives on pollutants limit values for preservation of OCH in a similar way as health and vegetation.
- Mapping of risk areas in Europe.
- A tool for rapid assessment of the deterioration risk to OCH, consisting of a kit of selected material specimens and passive samplers for pollutants.

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## **ONSITEFORMASONRY (On-site investigation techniques for the structural evaluation of historic masonry buildings)**

**Project Reference:** EVK4-CT-2001-00060  
**Contract Type:** Cost-sharing contracts

**Start Date:** 2001-11-01  
**End Date:** 2004-10-31  
**Duration:** 36 months

### **Problems to be solved**

ONSITEFORMASONRY aims to improve methodologies for inspection and assessment of ancient and often inhomogeneous masonry mainly consisting of brick, stone and mortar. The project approach will be to set up a diagnostic methodology based on promising Non-Destructive Techniques (NDT, in particular those based on radar, ultrasonic and sonic systems) with other “minor destructive” ones, allowing to evaluate the loading capacity of the masonry, to develop a positioning sensor for effective data acquisition and software for combined data analysis and reconstruction, as well as new models for structural evaluation and redesign. It will lead to the establishment of future standards by developing guidelines according to the type of materials and structures. It will also enable, at a lower price and more rapidly, end-users and owners to overcome damage effects resulting from the aggressive environment e.g. floods, earthquakes and various settlements, traffic vibrations, air pollution. It should therefore help to keep and reinforce the general safety and enhance the initial and/or new function of the historic building.

### **Scientific objectives and approach**

The main objectives of the research project should consist in an improvement of cost/benefit ratio for investigation and diagnosis as follows:

- Improvement on current techniques for better analysis, prediction and early prevention of environmental damages of Cultural Heritages (caused by ageing, microclimate, seismic and traffic vibrations and by dead loads) to avoid higher costs in strengthening and repair intervention
- Production of investigation methodologies to allow more frequent assessment of Cultural Heritages with lower costs
- Development of methodologies for effective integration of different techniques for the diagnosis and control of the efficiency of intervention
- Evaluation and use of the results and data as input of structural analysis aimed to detect the residue load carrying capacity of the structures
- Contribution to future standards of building assessment, by developing guidelines for the application and integration of the techniques according to the type of materials and buildings as information tool for end-users.

### **Expected impacts**

- Reduction of the impact of environment damages of historic structures on the safety and quality of life for EU citizens
- Knowledge about the state of deterioration of any building or structure supporting the management of Cultural Heritage and reducing the effect of construction on the environment to a minimum
- Employment opportunities will be created in the technology supply sector (new technologies), in the inspection and structural assessment of Cultural Heritages (more services, also due to new recommendations) and in tourism (enabling the access of visitors to a higher amount of buildings)
- Increase of the market for non-destructive assessment of historic structures requires more service providers (mostly SMEs)

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## **VIDRIO (Determination of conditions to prevent weathering due to condensation, particle deposition and micro-organism growth on ancient stained glass windows with protective glazing)**

**Project Reference:** EVK4 2001-00013

**Contract Type:** Research

**Start Date:**

**End Date:**

**Duration:** 36 months

### **Problems to be solved**

The aim of VIDRIO project is the identification and improvement of the best practice to preserve ancient stained glass windows in their original context, taking into account their exploitation by mass tourism.

The research is based on laboratory study/simulation and field survey to develop a deep knowledge on the correlation between ancient stained glass, protective glazing and environmental variables.

Two monuments, the Sainte Chapelle of Paris and the Cathedral of Cologne will be considered, both included in the UNESCO's World List of Cultural Heritage. With the agreement of the European Community the research - in Sainte Chapelle has been reduced for its administrative and managing problems, and a complete scientific programme at the St. Urbain's Church in Troyes (France) has been added to the project.

The innovation of VIDRIO project is to provide a global, multidisciplinary approach to the problem: for the first time the deterioration process of stained glass and the efficiency of protective glazing will be analysed from a physical, chemical and biological point of view, without neglecting aesthetic and artistic aspects. From a physical point of view, the project will study the microclimate between the ancient glass and the protective one, and a new dew point sensor will be developed and improved to detect the condensation. As regards the chemical aspect, the glass surface deposition and the air content of anthropogenic and natural particles will be analysed. Moreover, from the biological point of view, the full-range microbial contamination on glass and its direct environment will be investigated, by using molecular biology means, without being limited to a specific group of bacteria or fungi.

The final goal is to provide a methodology to preserve ancient stained glass window, to control deterioration and to try to identify the thresholds of danger from the largest point of view: physical, chemical and biological.

### **Scientific objectives and approach**

- To reach a better understanding of stained glass windows deterioration
- To furnish a reliable methods to evaluate the environment of stained glass windows and establish the most appropriate methodologies to avoid/minimise the effects of environmental parameters
- To furnish the thresholds of environmental parameters to avoid weathering and constitute a milestone for developing a normative for the best practice to preserve stained glass windows
- To improve and test on the site of a dew point sensor connected with an alarm system to monitor/ stop condensation on the glass panes.
- To found the profound basis for better construction of protective glazing
- To make more exploitable historic buildings and churches.
- To vitalise an important marketing concerning stained glass presentation and restoration.

### **Expected impacts**

- Test and improvement of new dew point device with an alarm system to avoid condensation.
- Physical, chemical and microbiological field tests to found the thresholds to avoid deterioration.
- Glass analysis composition, paint morphology weathered and glass sensors exposed.
- Analysis of selected original samples.
- Simulation tests in laboratory.
- Methodology and thresholds of danger.
- Basis for a better construction of protective glazing.
- Mid-term assessment, TIP, Reports and public., web page for Cordis

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## 4.2.2 Development of innovative conservation strategies

### ASSET (Assessment of suitable products for the conservation treatments of sea-salt decay)

**Project Reference:** EVK4- CT 2000-0023  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

#### Problems to be solved

This project will select suitable protective products for sea-salts accumulating on stone and brick masonry monuments conditioned by marine environments. The products should isolate sea-salt trapped in the pores and prevent the further penetration, in relation to the environment conditions in which European historic buildings may be exposed to sea-salt effects. On the other hand, the project will elaborate methodologies for selecting the best conservation strategies for treatment of coastal historic monuments.

#### Scientific objectives and approach

The purpose project intent to pursue the following objectives:

- to prepare, apply and control suitable products for conservative interventions on surfaces able
- to prevent further penetrations by sea-salt;
- to immobilise the already present sea-salt creating a memory effect.
- to contribute to safeguarding buildings of the cities where the behaviour of stone and brick masonry is conditioned by the marine environment.

#### Expected impacts

- Selection of suitable protective products for sea salt
- Environment of application of products and control of their effectiveness
- Methodologies of conservative treatment for sea salt decay
- Strategical Planning for the European Cultural Heritage

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## 4.2.2 Development of innovative conservation strategies

### **BACPOLES (Preserving cultural heritage by preventing bacterial decay of wood in foundation poles and shipwrecks)**

**Project Reference:** EVK4-2001-00009  
**Contract Type:** Research

**Start Date:** 01-02-2002  
**End Date:** 31-01-2005  
**Duration:** 36 months

#### **Problems to be solved**

BACPOLES aims to better understand bacterial degradation of wood in wooden foundations poles and archaeological sites in soil or water in such conditions where little or practically no oxygen is present. The project will initially rely on a study made in various European countries on local soil and water conditions as well as measurement techniques, and then on the analysis of chosen wood samples which will be analysed on chemical, physical, biological and dendrochronological aspects. For the first time, the wood attacking bacteria will be isolated and identified, using advanced molecular DNA biology. Techniques will be developed for the prediction, diagnosis, and curing environmental damage, possibly utilising specific phages against bacteria under strict controlled conditions. These techniques could be of great use to those responsible for the conservation, preventing expensive renovations or excavations for historic buildings.

#### **Scientific objectives and approach**

Submerged wood was considered safe from biological decay due to the absence or low oxygen content under water. Recently it became clear that bacteria cause degradation of wooden foundations and archaeological wood. Wood in cultural heritage is especially vulnerable to bacterial degradation because the process is so slow. Under optimal conditions severe bacterial degradation can occur within 50 years. In less optimal conditions wood can be resistant for decades or centuries. The process of bacterial degradation has to be understood in order to develop protection strategies. Identification of the attacking bacteria is a main goal and is the key to solving the problem. So far it has been impossible to identify the responsible bacteria. The latest developments in molecular DNA technology will be used. After identification of the bacteria, protection strategies will be developed based on the ecology of the bacteria and the possibilities to use phages (an innovative new medical techniques but new to wood science) will be explored.

#### **Expected impacts**

- A first review (18 months) includes a survey of the appearance of bacterial degradation across Europe.
- A second review (made after 24 months) includes a list of wood attacking bacteria (published for the first time) and a correlation between bacterial degradation and environmental circumstances.
- The final report (36 months) includes concept preservation strategies / methodologies, which could be directly implemented in the conservation activities of the industrial partners, modified for specific users, or compared with European standards.

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## **BIODAM (Inhibitors of biofilm damage on mineral materials)**

**Project Reference:** EVK4-2002-00098  
**Contract Type:** Research

**Start Date:** 01-12-2002  
**End Date:** 30-11-2005  
**Duration:** 36 months

### **Problems to be solved**

Incorporation of protective chemicals into biofilm communities damaging rocks in European heritage buildings is studied. Application of biocides and apoptosis signals into rock biofilms by light induction of targeted areas and compounds will be tested in the laboratory, on field exposure sites, and on monument rocks with anisotropic characteristics. Biocides, cell wall conditioners, and apoptosis signals will be introduced into biofilm communities using a photodynamic conditioning device developed by the consortium. Targeted cracking of resistant biofilm organisms and of extracellular polymeric substances by photodynamic treatment is a major issue. Successful biocide application, intensifier control, effects on biofilm and rock material will be controlled. Incorporation into the European market will be guaranteed by end-users in the project. Added European market value will be analysed using statistical data on biocides in USA and Europe.

### **Scientific objectives and approach**

The aim of this project is to develop new conservation products, methodologies and technologies to preventing biofilm re-colonisation of treated stone materials, to evaluate their effectiveness, toxicity and environmental behaviour and to establish the applicability of these methods in substitution or addition to traditionally used industrial biocides. The new approaches to biocontrol will be the use of inhibitors of coloured cell pigments and exopolysaccharides, of cell permeabilizers, and of apoptosis (self-induced cell death) inducers (e. g. mycosporines). Some compounds are derived from antioxidant research in medical approaches, others from naturally occurring systems. The application way to be developed will be the use of photodynamic treatment.

### **Expected impacts**

The expected results of the project are:

- The development of a new generation of chemical compounds for the inhibition of biological colonisation of stone materials especially by coherent biofilms and networks.
- The demonstration of the suitability of new chemical treatments not based on their killing properties to control biodeterioration.
- The production of a prototype of photodynamic treatment device for destroying deteriorating microorganisms.
- The transfer of the developed strategies and compounds to enterprises for their direct exploitation in different markets.

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## **BIOREINFORCE (Biomediated calcite precipitation for monumental stones reinforcement)**

**Project Reference:** EVK4- 2000-00037  
**Contract Type:** Research

**Start Date:** 01-02-2001  
**End Date:** 31-01-2004  
**Duration:** 36 months

### **Problems to be solved**

Monumental stone decay is a consequence of the interaction between the material and the environmental parameters such as water, heat, atmospheric pollutants and living organisms. This interaction starts at the stone surface and progress inward leading to progressive increasing of stone porosity and weakening of the cohesion of the mineral structures. Conservation of monuments foresees in most cases the application of consolidating products in order to strengthen the weathered stones and to avoid dwindling of material. Numerous kind of products both inorganic or organic have been used to this aim but almost all have showed, in time, different negative results, such as colour changes, crust formation, glossy appearance and substrate exfoliation. Furthermore, the synthetic organic products are normally formulated and applied in solvent, thus contributing to the increase of the environmental pollution. The project will contribute to improve the social objectives of the Community. The use of natural products together with their application in aqueous solvent improves the health and safety of the working conditions of technical staff operating in monument restoration. The technological transfer of innovative and highly specialised treatments will enhance the know-how of technical personnel contributing to improve the possibility of employment. The correct use of scientific methodologies in the field of conservation of monumental buildings can sensibly reduce the inevitable risk of stone damage due to empirical conservative interventions, and consequently decrease the cost maintenance.

### **Scientific objectives and approach**

The objective of the project is to develop and validate a new methodology for monumental stones conservation based on biomineralisation processes. This could satisfy the request for more durable and safer products in order to reduce the costs, delay the maintenance interventions and pose no risk both for the personnel and the environment, conciliating the end-users and stakeholders with the application of innovative treatments.

The molecular biology and the bacterial genetic engineering are the innovative technologies chosen to improve the bio-mediated calcite precipitation method. These tools will be applied for finding the genetic expression of crystal formation in bacteria. This will be cloned and the bio-inducing proteins will be overproduced by an appropriate expression vector (host cell). With these bio-derived low cost renewable macromolecules, a Bio-Mediated calcite Treatment (BMT) will be developed for the stone reinforcement, due to new calcite precipitation inside its porosity. The BMT will be finally validated, by end-users, in monumental test sites application.

### **Expected impacts**

Public and private institutions involved in historical buildings repair and maintenance need safer methodologies for stone materials and the environment. Once the new method is successfully validated we can apply, for the restoration of monumental stones, a new treatment based on a product of the same nature of stone substrate, with the prospective of a longer lasting efficiency and a lower environmental impact. The safeguard of the cultural heritage is awaiting for scientifically endorsed new materials and procedures for conservation and if this problem will not resolved the monumental stones are exposed to a serious chance of loss or damage. The new method will demonstrate its maximum efficiency for calcareous stones (like marble and limestones). The main deliverable of the project will furnish, in very short time, the end-users with a new tool to improve their skilful to perform safer and more reliable restoration interventions of monuments in line with a sustainable development.

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## **CATS (Cyanobacteria attack rocks: control and preventive strategies to avoid damage caused by cyanobacteria and associated microorganisms in Roman hypogean monuments)**

**Project Reference:** EVK4-2000-00028  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-01-2001  
**End Date:** 31-12-2003  
**Duration:** 36 months

### **Problems to be solved**

The problem of conservation, restoration and exploitation of Roman hypogea is part of the more general need to safeguard of the Cultural Heritage of Europe. This heritage has a significant influence on the economy of nations rich in archaeological remains, including most of the Mediterranean countries, and influences two main socio-economic factors: the significant amount of human and financial resources needed to preserve important archaeological sites and the improvement of both tourism and the quality of life through a sustainable management of the artistic patrimony of Europe.

It has been described for other environments that the metabolic activity of cyanobacterial biofilms leads to the biotransformation and biodecay of substrata. In Roman hypogea, the mechanisms that cause severe damage mostly to calcareous substrata, and that are consequent to the development of phototrophic and heterotrophic microorganisms, still have to be understood. Accordingly, CATS will answer the following two major and essential questions in order subsequently to develop control and preventive strategies: (i) How does microbial activity alter the mineralogical, textural and geochemical features of rocks? (ii) What conditions limiting growth of cyanobacteria can be safely applied in Roman hypogea?

### **Scientific objectives and approach**

To achieve these central objectives different types of microsensors are developed. These are used to quantify biologically induced variation of gases and ions on the colonised lithic substrata. Data on the petrological and geochemical characteristics of rocks and on structure, function and diversity of biofilms are integrated with those obtained using microsensors in order to describe and model the damage of rock surfaces. This part of the project ends with the construction of a multiparametric portable device based on microsensors that is produced as a new tool for microbial monitoring. In the other part of the project, a pilot study is set up to investigate the possibility of using a new lighting system providing wavelengths poorly used by cyanobacterial photosynthesis. This will drastically decrease the growth of cyanobacteria and therefore the quantity of organic matter available to the associated heterotrophic populations. Subsequently, the new lighting system will be experimentally set up *in situ* in order to confirm the laboratory results. At the end of this part, the public response to the innovative strategies proposed will be tested and the benefit to cost ratio of a new illumination system in Roman hypogea will be evaluated. In addition to the physical approach, newly identified biomolecules related to iron metabolism and cell-to-cell signalling pathways are checked for their ability to interfere with bacterial and, especially, cyanobacterial metabolism by removing factors indispensable to microbial development. The application of these environmental biotechnologies under laboratory conditions should provide a new method to control and prevent growth of phototrophic biofilms.

Protection and management of the artistic legacy found in hypogean monuments has to be addressed by a complete, and complex multidisciplinary scientific study. CATS approaches the problem by including geological, hydrochemical, microclimatic, environmental, and microbiological studies. The combination of all these data will be used to construct a physical-chemical model, or a simplified representation, of the complexity of the hypogean environment and of the biological-mediated decay processes occurring inside it. In addition, the research will determine whether changing the wavelengths used for illumination would cause a decrease in the growth of unwanted cyanobacteria and also whether active biomolecules can be used to prevent and control the development of cyanobacteria-dominated biofilms. CATS uses methods that are not harmful to the environment and contributes to increase knowledge of (new) organisms. On this basis, the development of non-destructive and safety methods for control and prevention of cyanobacterial biofilms will be accomplished. Moreover, the feed-back of the public (the final end-users) towards the new lighting technique will be evaluated and will initiate a new means of interaction with citizens.

## Expected impacts

CATS might lead to a solution for the conservation of Roman hypogea and its results be applied in various fields of conservation. This might generate new employment for highly skilled technical staff members of SMEs active in the cultural heritage domain of conservation. In addition, a sustainable use of cultural resources will be the basis on which touristic activities, new infrastructures and job opportunities could develop.

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## **COALITION (Concerted action on molecular microbiology as an innovative conservation strategy for indoor and outdoor cultural assets)**

**Project Reference:** EVK4-1999-20001  
**Contract Type:** Coordination of research actions

**Start Date:** 1-04 2000  
**End Date:** 31-03-2003  
**Duration:** 36 months

### **Problems to be solved**

Concerted action on molecular microbiology as an innovative conservation strategy for indoor and outdoor cultural assets (COALITION). Micro-organisms are responsible for destruction of monuments, statues and cultural heritage assets, which includes the decay (biodegradation) of stones, mortars, bricks, mural paintings, woods, glass, paper, etc. The use of traditional methods of study is biased by the limitation imposed by the conservation of the work of art and the very rare availability of often extremely small samples. This can be solved using micro-analytical molecular biology techniques. Until now, the existing research initiatives in this field were only providing a fractional overview of the whole issue of cultural heritage biodegradation. This concerted action, led by very experienced European scientists and leaders of major Institutes and research programmes in the EU, includes 21 international and national research projects and represents an attempt to provide European scientists, conservators, restorers and other end-users with better access to information and improved technology to face cultural heritage biodegradation.

### **Scientific objectives and approach**

The overall objective is to develop an internally consistent Europe-wide plan for cultural heritage conservation able to provide strategies for minimising biodegradation. COALITION brings the latest developments in molecular microbiology to the attention of cultural heritage end-users and stakeholders. Molecular microbiology is envisaged as an innovative conservation strategy, that minimises sampling and optimises diagnostic studies on microbial contamination of cultural assets, permitting the design of most effective treatments for eliminating active microbial communities and biodegradation. This approach can be used for testing the efficiency of biocidal and cleaning treatments. COALITION aims to strengthen the interaction between microbiologists, conservators and restorers by promoting collaboration within different professional bodies. COALITION surveys the requirements of the conservation/restoration community for microbiological diagnostic procedures, evaluating the present state of scientific knowledge concerning molecular techniques, and identifying the critical gaps in knowledge, which will require particular attention in the future. COALITION achieves its objectives by organising three thematic workshops. The workshops are bringing together the concerted action members with external experts and independent observers. The specific tasks, concurrent with the workshops, will produce the following deliverables: Generation of an inventory (database) of the microorganisms associated with the damages to different materials and cultural assets, as revealed by molecular and microbiological techniques. The database will provide access to information on biodegradation of cultural heritage and will be made accessible to cultural heritage stakeholders and end-users. Review of novel molecular methodologies in the field of cultural heritage with the aim of minimise sampling and optimise diagnostic studies on microbial contamination of cultural assets. Panel discussion with stakeholders and end-users and the transfer of technology from the research community to the conservation/restoration community. For an effective dissemination, guidelines for evaluation of microbial activities in biodegradation processes, and for health protection of restorers will be prepared at the end of the concerted action. These guidelines will be of interest for microbiologists, conservators, restorers, and in general for all cultural heritage stakeholders and end-users and disseminated as publication and as electronic newsletters. In addition, COALITION is organising an Advanced Course and an International Conference on Cultural Heritage and Molecular Microbiology for presenting to the scientific community the results obtained along the three years of activity.

### **Expected impacts**

COALITION helps to develop new markets for goods and services with high skill and expertise, as the know-how of the molecular fingerprint for evaluate conservative interventions on monuments will be

transferred to a large range of professionals, which will create new employment. . The methodologies and techniques to be introduced saves considerable time, effort and money in restoration processes, permitting an affordable evaluation of the efficiency of biocides and traditional material's cleaning methods. Detailed knowledge on the hazardous properties of microorganisms in cultural heritage is of great interest for residential or professional uses for human health protection.

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## **COLLAPSE (Corrosion of Lead and Lead-Tin Alloys of Organ Pipes in Europe)**

**Project Reference:** EVK4-CT-2002-00088  
**Contract Type:** Combined

**Start Date:** 01-01-2003  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

The organ belongs to the core of European culture reflecting its diverse histories, traditions and stylistic periods. The European heritage of the organ is preserved in numerous historical instruments. One major threat to this heritage is the indoor atmospheric corrosion of lead and lead-tin alloys of organ pipes. The problem has accelerated and when the pipes have collapsed there is no other way to solve the problem than replacing the historic pipes with modern ones – and a part of the sounding cultural heritage is forever lost. The aim of this project is to solve the corrosion problems by developing a new conservation strategy for historical organ pipes.

In doing this, we will also be creating methods which will be generally applicable to any cultural, industrial or public environment affected by this kind of damage. (*Sustainable Urban Development in the European Union*; 28.10.98)

Safeguarding the organ heritage at the same time implies safeguarding the most important European historical city environments; the magnificent organs from, e.g., the Baroque period, display the wealth and visions of prospering European regions. (*Fifth Environmental Action Pr.*; OJ EC C138/1993)

### **Scientific objectives and approach**

There are at present no effective methods to prevent organ pipes from being corroded, and to save the valuable instruments, which have already been damaged. Moreover, there is no consensus on the reasons for the increased rate of corrosion attack.

The COLLAPSE project objectives are to define relevant methods and products as well as to create conservation strategies in order to combat the corrosion of lead and lead-tin alloy organ pipes.

1. Through field studies and laboratory experiments identify the factors which cause indoor atmospheric corrosion of lead-tin alloy organ pipes in order to avoid or improve corrosive environments.
2. Develop methods to clean, protect and preserve already corroded pipes from further corrosion.
3. Demonstrate the recommended conservation strategies and products in a case study using the historical Stellwagen organ (St. Jakobi church, Lübeck) severely affected by corrosion.

### **Expected impacts**

A scientific report will create a basis for further undertakings and dissemination activities among researchers, organbuilders, heritage organizations, universities, Churches and other relevant organizations. A “popular” report will be prepared in order to communicate the results of the project to the public. A European corrosion treatment guideline will be developed to contain methods, products, and materials recommended to be used for prevention of corrosion of lead and lead-tin alloys, treatment, restoration and conservation of corroded organ pipes.

The new products, applications and systems to be developed in COLLAPSE will offer cultural institutions, parishes, SME:s and authorities new tools and methods to prevent pipe corrosion and thereby safeguard the cultural organ heritage.

The results will be applicable to the European cultural heritage in general (for conservation, restoration and European museum activities) and also on a general level in many other different areas, such as industrial enterprises, universities and independent research organizations.

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## **COMPASS (Compatibility of Plasters and Renders with Salt loaded Substrates in Historic Buildings)**

**Project Reference:** EVK4 2001-00015  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

COMPASS is designed to deepen the current knowledge and understanding of the damaging mechanism involving the salt transport and the interaction "substrate-rendering" in the built cultural heritage and to provide architects and owners of buildings with clear guidelines for the choice of better compatible, salt resistant render and plaster mortars. An expert system will be developed offering more functions than current diagnostic tools, taking into account the materials, the damage mechanisms, the environmental and climatic circumstances, and giving advice on the possible repair measures. It will also define requirements for salt compatible renders.

### **Scientific objectives and approach**

The main aim of this project is to provide those in charge of the maintenance of the built cultural heritage (architects and advisors, and also owners and heritage authorities) with clear guidelines for the choice of better compatible (salt resistant) render and plaster mortars. The verifiable target is a final deliverable in the form of an expert system with clearly defined functionality.

Related aims are:

- To develop a transport and degradation model for the substrate – render combination
- To define requirements for salt compatible renders
- To develop adequate accelerated test method s) for the assessment of salt compatibility of renders and plasters

### **Expected impacts**

### **Coordinator**

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## **CONTROLLED PAPER CLEANING (Controlled paper cleaning using laser technology)**

**Project Reference:** EVK4-1999-35001  
**Contract Type:** Exploratory awards

**Start Date:** 26-11- 1999  
**End Date:** 25-04- 2000  
**Duration:** 5 months

### **Problems to be solved**

The objective of this project is a laser cleaning suitable for accurate and safe restoration of paper objects. Focus lies on the incorporation of a reliable control system, consisting of one or more suitable detectors. In order to successfully introduce this technique in the paper conservation world, it is necessary to define the boundary conditions in which later cleaning can be safely applied for the restoration of paper objects. The main reason for an extensive research project is that there is still insufficient knowledge of fundamental processes occurring when laser light interacts with paper and the material to be removed. The research comprises of a systematic study focusing on a selection of paper and dirt materials. The initial work will focus on the definition of conservation problems that cannot be treated in a conventional way. Based on these problems, certain categories of paper and dirt material will be selected. Subsequently, a choice of experimental parameters, like laser wave length and fluence, will be systematically varied.

### **Scientific objectives and approach**

### **Expected impacts**

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## **DIAS (Integrated tool for in situ characterization of effectiveness and durability of conservation techniques in historical structures)**

**Project Reference:** EVK4-CT-2002-00080  
**Contract Type:** Cost shared project

**Start Date:** 01-11-2002  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

The main goal of the project is to develop a valid and cost-effective tool for in laboratory and in situ non-destructive assessment of residual mechanical properties of building stones, as well as, stone consolidation treatments. This will be achieved through the design, construction and validation of an integrated portable tool including micro-Drilling, Indentation and Acoustic devices in modular form and associated Software (DIAS). It also implies the development of a reference user-friendly database of standard and non-standard mechanical properties for a wide variety of stones, also useful, among others, in cases of repair by choosing appropriate stones in the quarries. This project – which should lead to a marketable equipment – is expected to improve our understanding of the degradation mechanisms such as mechanical loads or various types of weathering in damaged parts of historical buildings and monuments. Further, the applications of DIAS tool may be extended to rock-like materials such as concrete and ceramics.

### **Scientific objectives and approach**

The main Project goal is to develop this technology through the design, construction and validation of an integrated portable tool. The components of this tool are special Drilling, Indentation and Acoustic devices and System management software (DIAS). The main Project's objectives can be summarised as follows:

1. Design and construction of a portable, integrated device (DIAS) for in laboratory and in situ non-destructive reliable and cost-effective characterisation of the strength and stiffness of stones and rock-like materials.
2. Development of reliable in laboratory and in situ testing as well as data back analysis procedures for the quasi-non-destructive estimation of elasticity and strength of stones.
3. Development of a reference user-friendly database of in situ and in laboratory standard and non-standard (via DIAS) mechanical properties for a wide variety of stones and relevant software of the integrated DIAS instrument.

The project is divided into five (5) Work Packages (WP) namely:

WP-1: Establishment of quasi-non-destructive (microdrilling and indentation) and non-destructive (non-linear acoustics) techniques through laboratory tests, modeling and standard laboratory testing. Finally, execution of lab testing on stones with the integrated DIAS tool.

WP-2: Surveys in pre-selected quarries specimen sampling and preparation and application of DIAS tool in quarries and monuments for in situ measurements and further validation.

WP-3: Design, construction and calibration of DIAS tool together with its software

WP-4: Data regression analyses, construction of database of test results

WP-5: Exploitation and dissemination of Project's main deliverables such as DIAS tool, database in the form of CD-ROM and "suggested methods" for in situ evaluation of mechanical properties and damage of NBS structures

### **Expected impacts**

The main deliverable, which is the Portable DIAS tool with its system software and database, will furnish scientifically and technically sound support to conservation interventions of Cultural Heritage structures, to the in situ characterisation of building materials and quarry products. Hence it will increase the competitiveness of research, technology and quality control of stone-products and stone-conservation procedures in Europe.

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## **HISTO-CLEAN – (Intelligent Measurement Technology for Laser Cleaning of Historic Buildings And Monuments)**

**Project Reference:** EVK4-CT-2002-30011  
**Contract Type:** Craft

**Start Date:** 01-02-2003  
**End Date:** 31-01-2005  
**Duration:** 24 months

### **Problems to be solved**

Building and monument preservation of cultural heritage in Europe is a current problem due to the decay of surface-work. This preservation goal is made all the more important since it is our continuous task to preserve and restore our cultural heritage. Different cleaning methods such as sandblasting, chemical flushing and laser are available, but the quality of the cleaning processes is difficult to evaluate today. What is especially missing is a suitable real time measurement technology that would allow a quality assurance during the ongoing cleaning process.

This is of special importance for laser cleaning of monuments and building surfaces, where the cleaning parameters such as pulse intensity and frequency can be (and have to be!) adjusted properly in order to achieve the desired cleaning result, and, most important, to avoid damages and to limit the removal of material from the surface of the monument to the absolute minimum.

### **Scientific objectives and approach**

So far, the micro and macro visual impression and the micro topography of a building's surface-work could be measured only with high sophisticated scientific instruments used in laboratories, such as auto focus testing devices for topography. To achieve this, samples had to be removed from the building and measured in a laboratory. Furthermore, to date there are no mobile, affordable and easy-to-apply methods or devices available for use by Small and Medium Enterprises (SMEs) providing the surface cleaning of buildings and monuments. For their use on-site, methods and devices are needed that generate easy to interpret values and numbers in order to quantify results in an objective and reproducible way.

Objective of the proposed CRAFT project is to develop a new measurement technology for mobile and non-destructive evaluation of the effectiveness of laser surface cleaning of historic stone surfaces. The technology has to be capable of determining the surface topography and, at the same time, the micro and macro visual impression of the surface. The measured data have to be processed in a suitable way to assess the performance of the surface treatment in terms of conservation and restoration.

### **Expected impacts**

The new technology will enable the SMEs providing the cleaning services to decide which cleaning parameters to utilise in a particular situation for an optimised renovation process. In addition, it will minimise the consumption of time and energy for the cleaning process and the production of hazardous dusts, what is of special importance for the health of the workers. Another goal of this project is the generation of a sound basis for a European standard that helps to assure a consistent quality of surface cleaning work performed throughout Europe.

For the owners of historic buildings and monuments, mainly public authorities, the new measurement technology will reduce the overall expenses for surface cleaning, and therefore will preserve the limited funds available to the endeavour of preserving cultural heritage via restoration and renovation. In addition, it will help to avoid unintended damages during cleaning processes and provide the means by which to evaluate long-term results of the cleaning. This again helps to enhance the value and lifetime of the affected buildings and monuments. For these reasons, not only the group of SME proposers, but also the European Community in total will benefit from the introduction of this new technology.

### **Coordinator**

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## **INKCOR (Stabilisation of Iron Gall Ink Containing paper)**

**Project Reference:** EVK4-CT- 2001-00049  
**Contract Type:** Research

**Start Date:** 01-03-2002  
**End Date:** 30-11-2004  
**Duration:** 33 months

### **Problems to be solved**

InkCor aims to improve our knowledge about historical ink components and explain their relative corrosive properties through the oxidative degradation of paper and cellulose. A database of historical metal-tannate ink components will be used to develop a new non-aqueous conservation treatment based on the impregnation of paper by a combination of alkali and suitable anti-oxidants.

This treatment will be evaluated in view of its interest to the end-users responsible for conservation.

### **Scientific objectives and approach**

The principal objective of InkCor is to develop a system for non-aqueous stabilisation of ink corrosion on paper. The objective calls for a significant improvement of the present know-how of the phenomenon of ink corrosion. A deeper insight into the historical ink composition will be needed, as well as their relative corrosive properties. A simple identification method of corrosive inks will be developed. Available non-aqueous deacidification will be improved and combined with suitable antioxidant formulations. The mission will be achieved through a multidisciplinary approach, involving policy makers, conservators, conservation scientists, physicists and analytical chemists.

### **Expected impacts**

#### **Coordinator**

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## **LASERACT ( Laser multitask non destructive technology in conservation diagnostic procedures )**

**Project Reference:** EVK4-2001-00096  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

Various laser measurement techniques successfully applied in medical and industrial diagnostic sectors have not yet been developed and adjusted for use in the field of conservation of Cultural Heritage. Since each technique implies distinct operation characteristics solving specific problems that cannot correspond to the complexity of diagnostic problems involved in the field of Cultural Heritage their transfer to this new field of application is obstructed from their fragmented applicability.

Therefore the concept is to integrate techniques that are based on the same fundamental physical principles in one articulated flexible sensor-device capable to provide the desirable complementarity operating in a standardised and universal mode as a user-friendly on-field transportable system. Structural diagnostics in art conservation lacks novel alternative tools and it is assumed that this essential advance will allow and promote the wide use of laser diagnostic techniques in art conservation discipline enhancing both fields.

### **Scientific objectives and approach**

The work will be based on integrated implementation of advanced laser measurement techniques and micro-laser development to output a novel multi-task sensor based on spatial multiplexing technology for structural assessment thus greatly advancing the state-of-the-art in current methods and practices. This objective will be reached through complementary progress of non-intrusive and remote measurement techniques and prototype laser-sensor instrumentation in parallel with continues evaluation, assistance and contribution of existing restoration experts and industrial partners of the consortium.

The proposed work is meant to constitute a substantial advance in art diagnostics to provide a valuable irreplaceable tool for restoration companies, authorities, and restorers of any European country and beyond.

### **Expected impacts**

The project addresses a long-standing known European problem, which is certainly of major interest for the EU and beyond the frontiers of a single state. The costly and time-consuming procedure of restoration involving risks of subjective diagnosis for intervention and poor maintenance remains of major ethical and practical concern to European restorers, restoration authorities and city councils.

The ultimate aim of the project is the realisation of non-destructive methodology and instrumentation allowing remote non-contact access to investigate the structural condition of items of Historical and Cultural importance. The resulted diagnostic system aims to succeed universal standards of operation for variety of conservation applications. Thus can refer to historical buildings and monument fabric, wall paintings in interior and exterior decorations, wood paintings, etc. Despite this broad field, the investigation will be generalised by focusing into characteristic complex diagnostic problems to allow approaching a standardisation of inspection procedures. Moreover of opening a new market for first time the objective structural analysis will improve the mobility of human potential in a pan-European level since the training won't depend on local-site expertise.

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## **MASTER (Preventive Conservation Strategies for Protection of Organic Objects in Museums, Historic Buildings and Archive)**

**Project Reference:** EVK-2001-00243  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

All over Europe objects in museums, historic buildings or in archives are being affected either by display or by storage conditions. Unsuitable environmental conditions are a serious cause of decay, frequently made worse because the effects may remain invisible for a long period. By the time the damage is noticed, the whole fabric and structure of an item may already be weakened.

The key to the survival of these objects is achieving an acceptable environment indoor, and vital to this is a sustainable management of the cultural property including better preventive conservation strategies.

### **Scientific objectives and approach**

The MASTER project aims to provide conservation staff in museums, historic buildings and archives with a new preventive conservation strategy for the protection of cultural property, based on an early warning system assessing the environmental impact on organic objects. An important part of the early warning system will be the development of an effect sensor for organic materials (EWO-sensor) assessing deterioration of organic materials indoor. The EWO-sensor will clarify the risk for decay in the museum during a short exposure and help the conservators to take action before damage to the object is observed.

Current approaches to preventive conservation of organic objects will be reviewed through consultation with end-users. What is learned through this process will be used to design a preventive conservation strategy for organic materials, based on the early warning system.

The innovative aspect of the preventive conservation strategy that this project will develop is that the early warning system including the EWO-sensors will provide a relatively cheap and easy way for museums as a first step to evaluate the quality of the environment they provide for organic objects. This represents a considerable step forward, when previously museums had to rely on analysing a wide range of diagnostic parameters, such as light, RH, temperature and pollution to answer this question.

### **Expected impacts**

The MASTER Project will provide new conservation strategies for the preventive conservation of the organic objects in museums, historic buildings and archives to be used all over Europe, in order to safeguard the objects from a damaging environment before damage occurs to the objects on display or in storage. The early warning system will provide:

- An early warning sensor (EWO-sensor) for organic materials indoor
- Evaluation criteria for impact assessment
- A revised and refined new preventive conservation strategy for organic materials in museums, historic buildings and archives.

On a long-term basis the early warning system developed in the MASTER-project should become a routine tool for assessment of indoor air quality in museums, based on specific degradation rates which will support the implementation of EU environmental regulations (e.g. on Environmental Impact Assessment, EIA Directive – 85/337/EEC and amended EIA Directive 97/11/EC).

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## **MIP Transitional Metals in Paper**

**Project Reference:** EVK4-2001-00029  
**Contract Type:** Thematic Network

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

By means of working-meetings and workshops the present state of conservation science and technology related to transitional metals in paper will be exchanged and new conservation strategies & technologies will be discussed and related to the needs of the end-user. Research is done at different levels; thus the network will deal with stakeholders coming from 12 research institutes, 2 suppliers and 10 end-users, holding the problem. The project consists of 5 work packages with their own WP-leader. Participants will be put into three disciplines: science, suppliers and end-users. Subsequently 8 themes will be established as degradation mechanisms, inhibitors, and analyses. The network dissemination will deal with the needs of the end-users, technology possibilities, and publication will be done in Int. Journals. Short-term exchange of participants is allowed for improving knowledge and technology.

### **Scientific objectives and approach**

The aim for the network MIP is to exchange present knowledge related to the effects and on how to reduce the effects of transitional metals in paper and how to fit in these results to innovative conservation strategies consists of assessment methods and treatment technologies. A secondary objective is to disseminate to the end-users frequently and to act as the interface between science, development and end-user.

The work for this thematic network is divided into 5 work packages. The initial work package (WP-1) will be the prediction for the success of the network. Here, by means of each representative per participating member, the most recent state-of-the-art will be established as well as the proposed areas/disciplines. The areas/disciplines shall take care for following the needs for futures developments by discussing present developments. The actual themes will be established for further developments and dissemination (this is for example organised in WP-2). Also co-operations can be set up in comparable fields of work. In WP-3 short term scientific missions are included. Each member will have the possibility to exchange, ONCE during the running time of this network, a (young) worker with another institute/organisation etc. for the maximum of 2 weeks per year. This is needed as more institutes; suppliers and/or end-users are involved than participating in this network. The work package -WP4-, actually the hearth of our network, will deal with the developments of the established eight themes mechanisms, ageing techniques, analytical tools, ink deterioration, inhibitors, deacidification, conservation strategies and environmental protection - related to the aims of this thematically network. Strategies will be discussed and developed further related to the needs in order to conserve/preserve our heritage. Needs, gaps, and how to solve the gaps will be discussed and isseminated, WP-5 finally deals with the project management, the ears, eyes and mouth of our network.

### **Expected impacts**

- Knowledge exchanges between researchers, suppliers and end-users on the state-of-the-art in technology and needs related to the effects of transitional metals in paper.
- Themes in research and conservation needs (as treatment technologies). Improved communication between science, supplier and end-user.
- Yearly workshop proceedings and network report.
- Common publications and combined research strategies.
- Mid-term assessment.
- Enhancing the contribution and role of suppliers.

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#### *4.2.2 Development of innovative conservation strategies*

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## **PAPYLUM (Chemiluminescence: a novel tool in paper conservation studies)**

**Project Reference:** EVK4-CT-2000-00038  
**Contract Type:** Research

**Start Date:** 01-07-2001  
**End Date:** 31-10-2004  
**Duration:** 40 months

### **Problems to be solved**

This project will develop a new prototype instrument that, combined with non-destructive sampling and the evaluation of the data obtained by this new tool, will be able to predict paper lifetime as well as rate of degradation of paper-based library materials and thus, the adequacy of existing conservation treatments. The results will be extremely useful for planning future conservation strategies and orientating thousands of European libraries and archives towards the best practices in this field.

### **Scientific objectives and approach**

### **Expected impacts**

The Papyrus project is aimed at the construction of an advanced, much needed and non-destructive chemiluminescence instrument for the assessment of the degree of material degradation (i.e. damage) or stabilisation specially adapted for working with historical paper samples. On the basis of scientific data obtained by the new instrument, we will be able to predict paper lifetime, assess the adequacy of existing conservation treatments and propose actions to substantially retard the inherent degradation of paper-based European cultural heritage thus improving its accessibility to the general public. The new instrument, enabling us to measure extremely weak light during oxidation of organic materials, may find extended application in the fields of polymer stabilisation and in food chemistry for the assessment of oxidative stability.

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## **ROCEM (Roman cement to restore built heritage effectively)**

**Project Reference:** EVK4-CT-2002-00084 - ROCEM  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 36 months

### **Problems to be solved**

Highly hydraulic binders, known as natural or Roman cements, were key materials to cover facades of buildings in the period of European Historicism and Art Nouveau (19th/early 20th century). Roman cements were produced by firing marls - clay containing limestones - below their sintering temperature and grinding burnt stones to a required fineness. They distinguished themselves from other hydraulic binders principally by a very short setting time, typically 7 - 20 minutes, warm yellow-to-brown colour, little shrinkage on setting and good durability to atmospheric influences and salt crystallization.

These features made Roman cement a favoured material for economic and easy manufacture of durable mortar decorations for the exterior of buildings. Unfortunately, the material is no longer available on the market and there is currently an absence of any broader information on its characteristics, ageing behaviour and adequate technologies for protection and restoration. Consequently the fundamental principle of modern conservation - that the historic buildings should be repaired by using materials which are compatible with the original historic substance - cannot be met when restoring the large preserved built heritage of European Historicism and Art Nouveau.

### **Scientific objectives and approach**

- To raise awareness of the industry and professionals involved in the care and restoration of the nineteenth century built heritage as to the need for re-introducing adequate restoration materials and techniques that closely match the original material properties.
- To provide a description of the optimum raw materials, calcination parameters and post production processing, which would permit the re-introduction of Roman cements to the conservation market.
- Attaining these principal objectives of the project requires:
- Study of historic Roman cement mortars collected from a representative number of existing buildings to provide compatibility criteria for the new binders/mortars.
- Study and selection of the optimum raw materials, since their chemical and mineralogical composition is a key parameter controlling the hydraulic nature and appearance of the final burnt material.
- Determining and optimising laboratory-based calcination parameters to obtain high quality Roman cements.
- Production of a pilot scale quantity of the Roman cement to obtain sufficient amount for further work, to assess feasibility of the transfer from laboratory to commercial condition, to support introduction to the market.
- Development of new mortars and compare them to ones collected from historic buildings.
- Evaluation of the developed mortars in workshop use and on-site conservation work.
- Implementation of a dissemination strategy including a Technology Profile for enterprises interested in technology transfer and exploitation together with an Advice Note and regional courses for restoration workers and policy makers.

### **Expected impacts**

The essential advance consists in bringing back to the market an historic material and technology, which has a long record of excellent durability, to address properly the conservation needs of the vast built heritage of the nineteenth and beginning of twentieth centuries.

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## 4.2.3 Foster integration of cultural heritage in urban setting

### **APPEAR (Accessibility Projects. Sustainable Preservation and Enhancement of urban subsoil Archeological Remains)**

**Project Reference:** EVK4-CT-2002-00091  
**Contract Type:** Cost Shared

**Start Date:** 01-01-2003  
**End Date:** 31-12-2005  
**Duration:** 38 months

#### **Problems to be solved**

APPEAR's focusses on accessibility, conservation, better integration, enhancement and "exploitation" of archaeological sites in closed urban subsoil, this meaning to make them accessible to the public while ensuring an adequate protection when necessary. This implies the participation of actors (city and urban planning authorities, citizens, associations for conservation of cultural heritage, building companies etc) with contradictory interests. The project will provide practical tools and procedures to help decision-making as well as methodological resources required with a view to sustainable socio-cultural development.

#### **Scientific objectives and approach**

Stakeholders also lack a methodological framework specific to the enhancement of buried heritage. The choices that are made to deal with the numerous difficulties at the implementation of an accessibility project are frequently inappropriate and made at random. Experience shows that paradoxically, sites are not always the major concern, but may become a "pretext" for the creation of a museum complex. In the same way, the decision-making process often implies methodologies that are mostly used in museums, and that often turn out to be poorly adapted to problems generated by integrating archaeological sites into the urban setting. In the short or long term, this could lead to disastrous consequences for the remains' conservation and/or to rejection by the population. By gathering experts, practitioners and end users from different European countries, the APPEAR project will approach the issue from two different but complementary points of view: urban governance and the archaeological sites' enhancement possibilities. One of the main challenges consists in making such sites accessible to the public, offering scientific, pedagogic and aesthetic quality, while ensuring an optimal protection and enhancement level.

#### **Expected impacts**

The APPEAR project aims at proposing an integrated action plan for a global approach based on the completion of accessibility projects, beginning with the planning stage up to the exploitation stage. In concrete terms, it will develop the "existing practices" base, which will provide end users and all actors concerned by this issue with reference examples. It will give them a useful basis to defend the choices they made at different stages of the development of accessibility projects. In addition, the APPEAR guide will provide them with tools for decision-making and permanent self-assessment, including useful resources for implementing specific interventions for conservation, integration, enhancement and management of archaeological sites in the urban setting. In order to make accessibility projects fit into a perspective of sustainable urban development, the methodological and practical resources will necessarily be developed in logic meeting evolutivity, flexibility, adaptability and applicability criteria.

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## **SUIT (Sustainable development of urban historical areas through an active integration within towns)**

**Project Reference:** EVK4-CT-2000-00017  
**Contract Type:** Research

**Start Date:** 1-12-2000  
**End Date:** 30-11-2003  
**Duration:** 36 months

### **Problems to be solved**

The networks of buildings, monuments, streets, squares and parks uniquely define the European towns and cities that are the palpable, if unconscious, cultural horizon for those who live and work in them. Built heritage, as well as satisfying the mundane requirements of shelter and comfort, brings essential stability and richness to our lives and provides the singular, evolving expression of the achievements, values and identity of specific communities. As a consequence present conservation policies tend more and more to consider entire urban areas as significant pieces of cultural heritage. Yet the preservation and conservation of European historical urban areas raise specific questions. These areas are 'living' systems, involving social dynamics, technical and building networks and the presence of people living in it. Their sound conservation suggests they must be kept within sustainable development activity cycles. As a consequence the active conservation of such historical areas should fall under the present Environmental Impact Assessment directive (97/11/EC) as well as the forthcoming Strategic Environmental Assessment directive (COM (99)73). These procedures will constitute a reference framework within the SUIT research.

### **Scientific objectives and approach**

The SUIT project aims at establishing a flexible and consistent Environmental Assessment methodology to assist with the active conservation of historical areas. This methodology will be designed to help municipalities and local authorities in assessing the suitability of new urban developments which will promote sustainable exploitation of urban and architectural cultural heritage. The methodology will also help to match existing historical areas with current socio-economic requirements, through an active integration of this heritage within new development projects. This general objective has been declined along three tangible research activities :

- 1) Development of an Environmental Assessment methodology devoted to the active conservation of historical areas, from the identification of urban heritage issues to the evaluation of effectiveness of the adopted conservation measures.
- 2) Development of tools and methods devoted to historical areas quality analysis, capable to support an objective and reliable Environmental Assessment procedure.
- 3) Development of knowledge and ability training supports to encourage experts, stakeholders and decision-makers to gain a common urban culture throughout the process of an Environmental Assessment applied to the active conservation of an historical area.

### **Expected impacts**

The outcomes of the research will mainly be targeted at municipalities and town councils, which normally lack the expertise to handle complex research prototypes and state-of-the-art techniques. It has thus been considered that the main operational outcome of the project should consist of the camera-ready version of a *"Guideline about the Environmental Assessment of the effects of certain plans, programmes or projects upon the heritage value and long-term sustainability of historical area"*.

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## INCO projects on cultural heritage

### **ARCHI-MED (Archaeological composites in Mediterranean architecture: baked glass ceramics alteration and re-creation)**

**Project Reference** ICA3-1999-00002  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-05-2000  
**End Date:** 01-05-2003  
**Duration:** 36 months

#### **Problems to be solved**

The ARCHI-MED programme concerns baked glass-ceramic composite materials used for architectural decoration in the Mediterranean countries. These materials present various types of problems for urbanists, town planners, architects and companies which have responsibility for rehabilitating certain old buildings (private houses, palaces, mausolea, mosques etc) thanks to their presence on walls or floors.

#### **Scientific objectives and approach**

- To understand, in order to control, the processes of deterioration of these materials and of their supports.
- To develop precise data regarding the physical characteristics (texture, component parts) of these materials, in order to reproduce them.

Several steps will be taken simultaneously:

1. Updating of knowledge relating to former production techniques in two specific countries over several centuries with regard to glass-ceramics production: Turkey (region of Iznik) and Spain (region of Valencia) from workshop excavation data.
2. Laboratory research, with exchange of competencies and of materials. This work will be undertaken in Bordeaux, France where research has been undertaken for about twenty years into these composite materials and in Meknes, Morocco, where a team will specialise in this field.

Scientifically, the principal strategy consists in proceeding:

- by distinguishing deterioration of mechanical origin from that of a physicochemical origin - in micro-observations (electron microscopy, specific elementary analyses Auger spectroscopy, XPS spectroscopy)
- texture studies by using a new method of texture analysis, developed in Bordeaux and associated with cathodoluminescence and electron microscopy
- studies of the colour using a ground spectroradiometer which allows field measurements -
- experiences of re-creating these materials

#### **Expected impacts**

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## **CAHRISMA (Conservation of the acoustical heritage by the revival and identification of the sinan's mosque's acoustics)**

**Project Reference:** ICA3-1999-00007  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-02-2000  
**End Date:** 01-02-2003  
**Duration:** 36 months

### **Problems to be solved**

In the conservation and restitution of historical monuments, usually concepts related only to visual sense are taken into consideration. However, preserving architectural heritage should include preserving of the acoustical heritage, especially for the spaces having acoustical importance such as concert-opera halls and religious buildings. By the aid of new expression techniques, the concept of architectural conservation has recently won different dimensions. By the developments of software technology, it is now possible to recreate environments belonging to one of the different period of the building in virtual reality and present it together with the artificial environment visualising the cultural features of the related period. Till nowadays these works were limited by visual perception, however it is possible to recreate different environments effecting human's various perceptions. CAHRISMA Project has been undertaken with the mentioned context. In this work, by the evaluation of Sinan's mosques (well known because of their acoustical qualities besides others) and Byzantine churches (which influenced Sinan's architecture), a concept that allow to upgrade the architectural heritage is innovated in order to be able to cover acoustical and visual properties for the spaces having acoustical importance.

The work is started from the identification and recovery of the current traditional data on the materials, details, construction processes and properties of the selected mosques and churches; their acoustical properties is evaluated and compared by means of measurements, computer aided modelling and psycho-acoustical surveys; selected architectural work is visualised in real time 3D virtual environments; finally this data is used to develop a synchronised real time system to be able to create integrated virtual environments with virtual humans. Those virtual environments are then used in the virtual revival and reconstruction of the ancient acoustical heritage. Materials' initial acoustical properties is modelled by means of the computer technologies and used to create the initial acoustical environments virtually; the whole process is called virtual restitution. For the situations where architectural restoration and conservation are not available, this system will provide virtual conservation which will have the main advantage to cover both visual and acoustical properties of the real environments, thus the most close virtual environment to the real one, will be developed.

### **Scientific objectives and approach**

The basic objective of the CAHRISMA project is to upgrade the architectural heritage concept by innovating and implementing the concept of "Hybrid Architectural Heritage" in the field of conservation and restoration. Hybrid Architectural Heritage is a new way of identification that covers acoustical characteristics besides visual peculiarities. The objective described above is reachable by the coordination of architecture, acoustics, psychoacoustics and computer sciences. For this context, increased interdisciplinary and trans disciplinary features should be used.

Specific scientific and technological goals of CAHRISMA project are summarized as follows:

- Identification of the recent and initial acoustical peculiarities of the Sinan's mosques and Byzantine churches, by acoustical measurements and computer aided modelling tools.
- Evaluation of psycho-acoustical and subjective characteristics of these worships spaces.
- Integration of acoustical and visual virtual environments into an interactive 3D real-time system.
- Creation of an integrated real-time system for CD-ROM of 3D architectural models with realistic virtual humans.
- Comparison of the mosques and churches acoustics and review of the acoustical influence of Byzantine churches on Sinan's mosques.
- Determination of the optimum acoustical conditions for mosques by the comparison of subjective parameters obtained from psycho-acoustical surveys with the objective parameters obtained from measurements and calculations.

- Conservation and restitution of the selected monuments architectural heritage (acoustical and visual) in a virtual environment.

A methodology that has apparent benefits both in identification and conservation fields is developed in order to transport the “Hybrid Architectural Heritage” into virtual environment. This methodology covers the combination of visual and acoustical features of the architectural spaces in interactive 3D virtual environments. By the utilisation of the mentioned methodology, for the situations where architectural conservation and restoration are not available, virtual conservation and restoration will be provided. The methodology of the project consists of the following steps:

1. Acoustical identification and evaluation
  - Objective identification and evaluation (measurements, calculations)
  - Subjective identification and evaluation (psycho-acoustical surveys)
2. Creation of the Virtual Environment
  - Visual simulation (simulation of spaces, simulation of people)
  - Acoustical simulation
  - Combined 3D real time simulation with virtual people
3. Evaluation
  - Examination of the specific acoustical properties of selected worship spaces
  - Assessment of the psycho-acoustical characteristics of these worship spaces
  - Determination of the optimum acoustical conditions for mosques
  - *Conservation and restoration of the architectural heritage of selected monuments (acoustical and visual) in a virtual environment*

## Expected impacts

Conceptual and practical innovations and improvements in the fields of acoustics, lighting, simulation technologies, architecture, conservation- restoration and tourism will be created by the achievement of the objectives and goals of this wide frame research. Besides the conservation of the architectural heritage and development in the related scientific fields, this project will contribute to the increase of interest for historical monuments and enhance touristical curiosity, attracting attentions to a different feature. Humanity will protect and attend to an important and different part of his past by the application of the concept and techniques utilised in this project. The Research Project CAHRISMA, will emphasise the role of Euro-Mediterranean Partnership within the international scientific field and will undertake an important support to the advertisement of marvellous work of arts.

Moreover, virtual heritage reconstructions usually focus on displaying architecture or artefacts with virtual humans playing only minor roles. In the real world, however such places are, or have been, populated by smaller or larger number of people. In the context of CAHRISMA Project, a methodology was developed for reconstruction of the real-world scenarios with larger numbers of virtual humans involving in real-time. Several possible applications of virtual humans in the cultural heritage domain can be foreseen: the realism of the reconstructed architectural spaces can be increased by populating them with virtual characters; intangible cultural heritage, such as various ceremonies, rituals, dances or certain significant historical events can be preserved by transferring real-world actions into virtual worlds.

More specific impacts are listed below:

- Establishing an innovative point of view into the architectural conservation field as to cover acoustical heritage.
- Encouragement of the usage of the virtual reality in archaeological sites and edifices of architectural heritage.
- Pioneering in developing methodologies to determine design guidelines for good acoustics in domed spaces.
- Inclusion of the virtual human characters into cultural heritage simulations.
- Increasing the interest in the acoustical comfort in the mosques.
-

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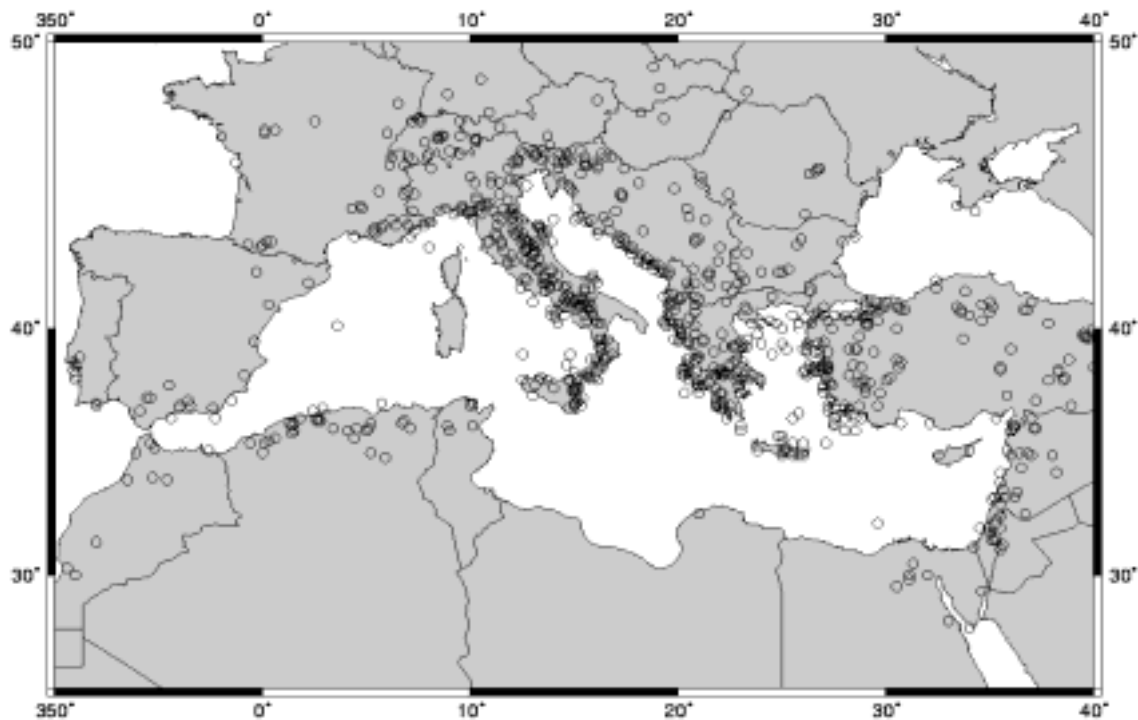
## **CHIME (Conservation of historical Mediterranean sites by innovative seismic-protection techniques)**

**Project Reference:** ICA3-1999-00006  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-04-2000  
**End Date:** 01-04-2003  
**Duration:** 36 months

### **Problems to be solved**

The Mediterranean area is probably one of the richest areas in the world in terms of cultural and historical heritage. The area was the birthplace of a diversity of civilizations, including; the Ancient Egyptian, the Greek, the Roman, the Phoenician, and the Arab-Islamic civilizations. As a result, there exists an invaluable wealth of cultural and historical sites in this area. Unfortunately, a number of these sites are located in seismically active areas, and many of them have already suffered various degrees of damage during past earthquakes. It is the responsibility of the concerned Mediterranean countries to take appropriate measures to protect and preserve their cultural heritage from potentially future earthquakes.



**Figure 1. Historical seismicity of the Mediterranean (NOAA catalog)**

Modern seismic retrofit techniques applied to existing structures, such as the addition of steel moment resisting frames or reinforced concrete shear walls, waste the historical value of an ancient building because they are aesthetically apparent. Base isolation, which consists of placing isolators and/or dampers at the foundation level, requires only minor structural modifications to the building, specially at the foundation level where they are not aesthetically apparent. As an alternative small size devices could be distributed across the structures to dissipate energy. These devices can eventually be made intelligent (semi active control), provided that their properties be the result of a suitable control process.

## Scientific objectives and approach

The following components form the projects:

- Selection of historic buildings (in Tunisia and Egypt the have already been identified).
- Ambient or forced vibration testing of the selected building in order to obtain the structure modal signature (frequency, mode shape, damping ratios).
- Calibration of the structure model so that the linear elastic response of non-isolated structures represents accurately the measured response.
- Shake table tests of HDR bearing to get their uniaxial and biaxial behaviour under shear loading.
- Development of analytical models and elaboration of systems identification method to fit the measured data.
- Implementation of a suitable hysteretic analytical model in 3D-Basis.
- Implementation of software able to analyse structural system with distributed damper and dissipation devices.
- Implementation of appropriate control laws for the semiactive devices.

## Expected impacts

- Hazard and Analysis of selected sites and Vulnerability Assessment of selected case studies.
- Retrofitting solutions for the monument which were investigated.
- Extension to similar structures as minarets and rural churches.

## Coordinator

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## **FORTMED (Restoration and use of the early medieval fortifications in the east Mediterranean countries)**

**Project Reference:** ICA3-1999-00003  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-05-2000  
**End Date:** 01-05-2003  
**Duration:** 36 months

## Problems to be solved

The primary objective of this proposal is the development, establishment and dissemination of a holistic approach for the consolidation and restoration of masonry monuments of the East Mediterranean Countries and especially the Early Medieval Fortifications as they consist a common cultural feature for the region. The stability, the functional behaviour, as well as the historical and environmental background of the old fortifications, envisaged as an integrated whole, would be primarily taken into account in order to manufacture and implement new repair materials while maintaining the authenticity of them and their incorporation to modern urban centres or natural landscape. The dissemination and exchange of knowledge and experience will be steadily encouraged through a wide range of activities: Consultancy, short term training facilities, workshops and regular meetings of partners.

The work will be implemented in two stages

- Stage A
  1. Evaluation of existing materials and masonry behaviour by using expert systems supported by the use of in-site and laboratory tests. From this diagnosis stage much knowledge about materials and degree of deterioration of fortifications will be released. The co-operation among partners will make possible exchange of that knowledge and a kind of global understanding in combination with geographical and historical evolution of East Mediterranean area.
  2. Proposals on repair materials and restoration techniques based on the results of the first stage. Compatible repair mortars and grouts based on appearance - strength -elasticity - porosity properties of existing structure will be suggested followed by guidelines for their application and monitoring.
- Stage B

A multidisciplinary proposal concerning revitalisation and proper use of medieval fortifications combining pure restoration, urbanism and landscaping aspects. The proposals in each case will include principles of use, which will serve modern social purposes having always in mind the basic concept of Chart de Venice and relevant international agreements about incorporation of historical sites to urban centres or natural landscapes.

## Scientific objectives and approach

## Expected impacts

## Coordinator

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*INCO projects on cultural heritage*

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## HEROCOMANES (Heritage conservation and management in Egypt and Syria)

**Project Reference:** ICA3-1999-00004  
**Contract Type:** Cost-sharing contracts

**Start Date:** 04-04-2000  
**End Date:** 03-04-2003  
**Duration:** 36 months

### Scientific objectives and approach

The fundamental goal of this research project is the upgrading of management systems able to restore and conserve historic sites, monuments and objects. It will seek to supply the inputs of knowledge required to optimise intervention and assist in decision-making. The research focuses on the late nineteenth and early twentieth century city centres of Cairo and Aleppo. It breaks new ground in the nature of subject matter and goes hand in hand with a conservation process, which has recently embarked in both cities. It will contribute to the definition of an appropriate inventory method of valuable objects, in addition to an analysis approach homing in on three levels: the area the street and the edifice; with analysis fine-tuned to building materials and techniques, and assess the economic feasibility.

There are three main lines of action in view:

1. To determine the lie of the land with respect to the protection of the Egyptian and Syrian sites dating back to the late nineteenth and early twentieth centuries. This will involve: reviewing the concept of heritage and the goals of conservation; assessing the legal, financial and operational tools and means implemented ; investigating the nature of the listing (general, detailed), the selection and classification criteria, the methods for gathering and sorting data;
2. To define the conceptual and methodological framework for selecting listed objects, in addition to an analysis approach homing in on three distinct levels
  - area level: to enable the assessment and classification of particular urban forms
  - street level: to form sets of edifices according to architecture, construction and style
  - edifice level: with analysis fine-tuned to study structures, building materials and techniques, particularities and deformations
3. To devise suitable systems for managing urban heritage in modern inner cities, while taking into account the constraints and socio-cultural, political and economic contexts prevailing in the two countries

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## **JEWELMED (Comparative Analysis of Manufacturing Technologies in Goldsmithing and Silversmithing From The seventh to the first Century B.C in the Mediterranean Area)**

**Project Reference:** ICA3-1999-00005  
**Contract Type:** Coordination of research actions

**Start Date:** 29-02-2000  
**End Date:** 28-02-2002  
**Duration:** 24 months

### **Problems to be solved**

Several initiatives in the Fourth Framework have been fostering the identification, analysis, preservation and dissemination of manufacturing technologies in goldsmithing and silversmithing from the 7<sup>th</sup> to the 1<sup>st</sup> century B.C. in the Mediterranean area. The project aims at collating data and experiences gathered in such projects in order to contribute to the reutilisation of manufacturing technologies in goldsmithing and silversmithing in:

- education activities,
- training of qualified competencies for Museum restoration activities ,
- restoration of archaeological artefacts and handcrafting SME market promotion.

The project will focus on three major activities:

- -identification of technologies
- comparative studies
- utilisation of supporting technologies

The identification of technologies will proceed through extensive analysis of data gathered by other projects and in libraries, museums and scientific organisations. The comparative study will consist of detailed description of methodologies of techniques identified, with the input of specialists from the scientific, archaeological and technical organisations participating in the project. The utilisation of supporting technologies is a two-fold approach. At one hand, chemical and materials techniques will contribute to the identification of the production processes, the alloys used, the solder composition and to reconstruct the technological history of the artefacts. On the other hand, Information Technology will be utilised to provide infrastructure for anotating, archiving and interrelating the collected data.

### **Scientific objectives and approach**

### **Expected impacts**

### **Coordinator**

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## **TEXMED (New materials and eco-sustainable technologies for the conservation and restoration of textiles)**

**Project Reference:** ICA3-1999-00001  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-04-2000  
**End Date:** 01-04-2003  
**Duration:** 36 months

### **Problems to be solved**

There is an urgent need, jointly acknowledged by EU Member States and MPCs, to preserve Textile Heritage. Hence, R&D project-TEXMED- intends to find out appropriate and eco-sustainable solutions to problems of conservation and restoration of the Euro-Med Textile Heritage; to transfer the project results to the final users. Such ambitious targets will be achieved through: integration of research activities on advanced, different but complementary research topics, simultaneously considered and carried out by a multidisciplinary team; training of curators, restorers, etc.

### **Scientific objectives and approach**

#### **Expected impacts**

Thus, expected results are: new formulations and innovative technologies (free of toxic and/or harmful solvents) for the conservation and restoration of textiles; non-destructive methodologies for identifying nature, origin, colour, dye and manufacturing of fibres composing textiles; ad hoc treatments toward exhibition of textiles stored at Museums, Art Galleries, etc. in the Euro-Med Area

A selected number of textile artefacts of archaeological, historical and artistic interest, belonging to different ages in the history (7<sup>th</sup> millennium B.C - 2<sup>nd</sup> century A.D; 16<sup>th</sup> - 19<sup>th</sup> century A.D) and with different origin (Egyptian, Galician, Italic, Spanish origin) will be deeply characterised for setting up tailored conservation and restoration treatments toward exhibition. Such artefacts will be available to be investigated from Euro-Mediterranean Area, related to the trinomial Cultural Heritage-Environment-Tourism.

What is more, the achievement of the objectives will strengthen the EU scientific and technological excellence in preserving and using Cultural Heritage and the co-operation among different Euro-Med Institutions ready to share their know-how and experience to jointly achieve common goals.

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**4.3 Development and demonstration of technologies for safe, economic, clean, effective and sustainable preservation, recovery, renovation, construction dismantling and demolition of the built environment in partnership for large groups of buildings**



### 4.3.1 Sustainable construction and reconstruction of large groups of buildings and urban infrastructure

**Summary Table**

ACRONYM	NUMBER	TITLE PROJECT WEB-SITE
<b>CRISP</b>	EVK4-CT-1999-20002	Construction and city related sustainability <a href="http://crisp.cstb.fr/">http://crisp.cstb.fr/</a>
<b>CURE</b>	EVK4-2002-00502 CURE	Centre for Urban Construction and Rehabilitation: Technology Transfer, Research and Education
<b>HQE<sup>2</sup>R</b>	EVK4-CT-2000-00025	Sustainable renovation of buildings for sustainable neighbourhoods <a href="http://hqe2r.cstb.fr">http://hqe2r.cstb.fr</a> or <a href="http://he2er.cstb.fr">http://he2er.cstb.fr</a>
<b>IRMA</b>	EVK4-2001-00240	Integrated decontamination and rehabilitation of buildings, structures and materials in urban renewal
<b>PRESCO</b>	EVK4-CT-1999-20003	European thematic network on practical recommendations for sustainable construction <a href="http://www.jbase208.eunet.be">www.jbase208.eunet.be</a>
<b>RISK-UE</b>	EVK4-CT-2000-00014	An advanced approach to earthquake risk scenarios with applications to different European towns. <a href="http://www.risk-ue.net">www.risk-ue.net</a>
<b>RUFUS</b>	EVK4-2002-00099	Re-use of Foundations for Urban Sites
<b>SAFEFLOOR</b>	EVK4-CT-2000-00020	Low risk and totally recyclable structural buildings
<b>SHE</b>	EVK4-CT-2002-00104	Sustainable housing in Europe
<b>SUREURO</b>	EVK4-CT-1999-00008	Sustainable refurbishment Europe <a href="http://www.sureuro.com/">http://www.sureuro.com/</a>
<b>WAMBUCO</b>	CRAF-1999-71118	European Waste Manual for Building Construction <a href="http://www.wambuco.net">www.wambuco.net</a>

### 4.3.2 Optimum use of urban land and rehabilitation of brownfield sites

ACRONYM	NUMBER	TITLE PROJECT WEB-SITE
<b>CABERNET</b>	EVK4-2001-00022	Concerted action on brownfield and economic regeneration network <a href="http://www.cabernet.org.uk/">http://www.cabernet.org.uk/</a>
<b>HYGEIA</b>	EVK4-2001-00014	Hybrid geophysical technology for the evaluation of insidious contaminated areas
<b>NORISC</b>	EVK4-CT-2000-00026	Network orientated risk assessment by in-situ screening of contaminated sites <a href="http://www.norisc.com">www.norisc.com</a>
<b>RESCUE</b>	EVK4-CT-2001-00068	Regeneration of European sites in cities and urban environments <a href="http://www.rescue-europe.com">www.rescue-europe.com</a>

## 4.3.1 Sustainable construction and reconstruction of large groups of building and urban infrastructure

### CRISP (Construction and City Related Sustainability Indicators)

**Project Reference:** EVK4-1999-20002  
**Contract Type:** Thematic network

**Start Date:** 05--09-2000  
**End Date:** 05-08-2003  
**Duration:** 36 months

#### Problems to be solved

The Sustainable Construction concept aims at the creation and responsible management of a healthy built environment based on resource efficient and ecological principles. It takes account of environmental and life quality issues, social equity and cultural issues, and economic constraints. Sustainability indicators constitute one of the bottlenecks in moving towards more sustainable construction and cities. Indicators are needed to precisely define sustainability criteria and to measure the performance of the construction industry and the built environment. Decision-makers and policy-makers need indicators to evaluate economically viable and technically feasible strategies to improve the quality of life, whilst at the same time increasing resource use efficiency. Numerous actors in the construction and development process need tools and guidelines based on indicators to improve current practices and the quality of construction. The Network aims to co-ordinate current research work defining and validating such indicators and implementing them to measure the sustainability of construction projects (buildings and built environment) in cities. This includes the activities of identifying and maintaining indicator sets together with implementing them to compare sustainability at a number of levels: individual buildings, large groups of buildings at both the urban and suburban levels as well as for whole urban areas. Implementation in construction activities at the scale of a city, a region or a country is also to be explored.

#### Scientific objectives and approach

CRISP brings together the work of a carefully selected set of 24 skilled teams that bring to the Network the results achieved in a wide range of national and international projects in this field from across the breadth of Europe. The main activities of the Network are to define a framework and general methodology for construction and city related sustainability indicators, stimulate and co-ordinate the development of such indicators, gather and organise indicators within a database including information on validation, testing and criteria of use, and widely disseminate the results of the research carried out.

In order to facilitate the use and uptake of these indicators, dissemination is to take place through a Newsletter, an active Website developed to be useful to the needs of the end users. Regular conferences and meetings will conduct discussions with a range of different target groups. Four sub-areas are to be addressed by four teams or clusters: the product cluster, the building cluster, the urban blocks cluster and the process/strategy cluster.

#### Expected impacts

CRISP aims to develop and validate harmonised criteria and relevant and efficient indicators to measure the sustainability of construction projects particularly within the urban built environment. Through the range of indicators, which will be dealt with, the project will contribute to improve the quality of life in urban communities and to promote sustainable development assessed in economic, architecture, environmental, social and cultural terms. Challenges which will be considered through the indicators are for instance linked to the preservation of natural resources, air quality, noise, health and safety, waste, economic competitiveness, employment, deterioration of infrastructure, urban sustainability, environmental loads of construction, socio-cultural aspects etc.

Other impacts include also better co-ordination of the development of sustainability indicators for construction and cities, improved consensus on the indicators available and on the criteria of their use,

better understanding and application of these indicators by relevant end-users such as planners, developers, designers, standardisation bodies, authorities, contractors and materials producers. These end-users will benefit greatly from an authoritative, relevant and agreed source of information on indicators. It will enable them to develop more appropriate performance targets, tools and standards in order to improve the level of sustainability of the built environment.

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## **CURE Centre for Urban Construction and Rehabilitation: Technology Transfer, Research and Education**

**Project Reference:** EVK4-CT-2002-80005  
**Contract Type:** Accompanying measure (NAS-2 project)

**Start Date:** 01.02.2003  
**End Date:** 31.01.2006  
**Duration:** 36 months

### **Problems to be solved**

- High costs of constructing
- High consumption of water and energy during construction work and use of urban structures
- Unsatisfactory safety and comfort conditions of urban structures
- Low effectiveness of urban land use
- Big number of accidents on construction sites and road accidents
- Deterioration of the existing building stock, especially historical buildings
- Gap between science and implemented innovation

The problems mentioned above have been in the area of the Centre's interests for many years.

### **Scientific objectives and approach**

- Improvement of skills and qualification of engineers and researchers in the field of urban construction and rehabilitation
- Building the capacity of the Centre to be internationally recognized as the centre of excellence in the field of urban construction and rehabilitation.
- Enhance the Centre's participation in the European Programmes, especially in the coming 6th Framework Program of EU

The objectives will be reached by conducting International PhD studies, Postgraduates studies, Summer courses and EUROCODES courses. Dissemination of the research results will be done through organization of international conferences and thematic workshops. The participation of the leading experts from EU in these activities will enhance the state-of-the-art.

### **Expected impacts**

The research results, due to close cooperation with industry, will be transformed into innovations and applied as:

- Improved methods of design and manufacturing
- New material technologies
- Safe road transport system
- Methods of sustainable urban renewal
- Methods of preservation of cultural heritage

Application of all mentioned above achievements contributes to improving the quality of life of people living in newly designed structures as well as in old buildings.

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## **HQE2R (Sustainable renovation of buildings for sustainable neighbourhoods)**

**Project Reference:** EVK4 – CT – 2000 – 00025  
**Contract Type:** Combined research and demonstration project

**Start Date:** 01-07-2001  
**End Date:** 31-01-2004  
**Duration:** 30 months

### **Problems to be solved**

Many European cities have to deal with neighbourhoods, both in the old city centres and in newer suburban areas, which have a range of serious development problems. At the same time existing methodologies and tools for planning and development are mostly designed for the level of the city or the single building. Decision aid tools are needed to help cities (all the departments or technical services as well as elected people) and their local partners (residents, visitors/users, public administrations, social housing owners, industrials, local business) to manage their neighbourhoods in the direction of sustainable development. Very generally, this means bringing together environmental, social and cultural and economic concerns. The neighbourhood is relevant because it represents an effective scale of intervention for dealing with many environmental and social problems and for developing a participative approach. In addition, it is the scale at which the majority of people experience the city on a day-to-day basis, and one that can benefit from renewal in the face of current urban trends.

As represented by the HQE<sup>2</sup>R-logo the project primarily focuses on the two scales of buildings and neighbourhoods, but also takes into account the larger levels of the city or conurbation and even the global. HQE<sup>2</sup>R strives to integrate existing LA21 processes, but is not restricted to municipalities involved in a Local Agenda 21.

The project has to address a range of different problems:

A/ with the actors:

- to provide methodologies and tools for a cross-cutting approach to municipality services and to analyse and disseminate experience,
- to develop new cross-cutting and multidisciplinary tools or models covering the main topics of sustainable development,
- to reinforce local governance: representative democracy is in crisis and participation procedures are often unclear, poorly understood, in many cases under-financed and in some cases unwelcome.

B/ Concerning the concept of Sustainable Development:

- Some EU Member States have been slow to recognise sustainable development as an urban concept: new competencies and new actors have to be included in urban planning; part of the problem is that laws and regulations are very recent and require new tools and new actors. In some contexts there is not yet any jurisprudence.
- In detail the guiding principles of sustainable development have to be specified for the neighbourhood level.

C/ with practice:

- communicate European best practice examples
- support is needed to handle contradictions between the three fields (economy, social, environment).

### **Scientific objectives and approach**

This project, which combines research and demonstration aspects, aims to provide a new methodological framework for regeneration that will improve the quality of life for residents and users. Decision aid tools will be developed at both levels: buildings and neighbourhoods. The methodology and the new tools

(indicators, models) will be tested on 14 cities in seven Member States (Denmark, France, Germany, Italy, the Netherlands, Spain, and the United Kingdom).

All city managers and stakeholders involved will have better information (through indicators and the technique – economic and environmental models) concerning every aspect of sustainable development: economic, social, environmental and the needs of inhabitants or users – including interactions between the various impacts – and gain assistance in choosing actions which will best meet their main (SD) objectives. So all European municipalities and cities will be able to work towards a sustainable development, improving the quality of life for all the users and residents.

### **Expected impacts**

The main result will be the development of a new methodological framework (HQE<sup>2</sup>R) - with newly adapted tools focussing on buildings and neighbourhoods - which:

- is a strong decision support tool for municipalities and their local partners and which will direct them towards sustainable reconstruction of their cities and improved quality of life; using the indicators, they will be able to diagnose and improve their understanding of their neighbourhoods, the black spots, and the needs of inhabitants and users, with the technique – economic models, they will improve their understanding of what to do. For example in the case-study-neighbourhood of Angers social housing has many difficulties and vacancies. Here the models should help the municipality to choose between demolition and renovation for some buildings;
- is multidisciplinary, integrating environmental, economic & social factors and including all the actors especially with respect to the participation of users and inhabitants (governance);
- is multilevel, considering buildings and neighbourhoods but also the position of the neighbourhood within the city and the conurbation as a whole. It also considers - at least as mental background - possible effects up to the global level;
- provides for assessment by indicators adapted for sustainable development (at the specific scale of the neighbourhood);
- is a methodological framework generally applicable in Europe.

The main issues will be:

- Improvement of the quality of buildings, notably in respect of the quantitative and qualitative aims of the users and inhabitants;
- improvements in comfort;
- conservation of resources and reduction of environmental impacts;
- Improvement of the quality of life through a better use of space, at the levels of the neighbourhood and of the conurbation;
- Controlling the cost of mobility, based on functional neighbourhoods with accessible public services, shopping and private services.

The main impacts expected are:

- a better quality of life for most of the inhabitants;
- a reduction of the use of resources and impacts on the environment;
- a reduction of global costs (including externalities);
- a better governance and an improved urban democracy;
- an improvement of the decisions from elected people.

### **Results of the first year:**

- Documentation and analysis of existing methods and tools;
- Definition of general sustainable development targets as a baseline for local specification;
- Definition of basic elements of the built environment of the neighbourhood considered as a micro-urban territory;
- Development of an “Analytical Grid” as a guiding framework for assessment (inventory, diagnosis and evaluation) of neighbourhoods by crossing SD-targets and neighbourhood-elements;
- Development of a scheme of “indisputable indicators” to support the assessment process;
- Drafting of three evaluation models for testing in the case-study-neighbourhoods.

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## **IRMA (Integrated decontamination and rehabilitation of buildings, structures and materials in urban renewal)**

**Project Reference:** EVK4-2001-00240  
**Contract Type:** Research

**Start Date:**  
**End Date:**  
**Duration:** 48 months

### **Problems to be solved**

Most buildings and structures contain substances of significance to the environment and the human health. Some buildings have been constructed from materials containing substances considered harmful today, e.g. asbestos, PCB, heavy metals, certain paints etc.

In the context of urban renewal the major problems are:

- that very little practical applicable knowledge on the decontamination of buildings and materials is available;
- that there are no accepted technologies or guidelines for the decontamination of polluted buildings and materials;
- that there are no standards for the classification of decontaminated buildings and materials as “clean”;
- that the means of classification of polluted soil cannot be applied to recycled materials;
- that a considerable amount of vandalism (graffiti) results in the need for decontamination;
- that the health and safety of personnel carrying out work on contaminated buildings is insufficiently regulated.

### **Scientific objectives and approach**

Some of the most important challenges of urban development are the rehabilitation of old buildings, minimisation of waste and the recycling of materials. The scientific objectives consist of a sequence of measures to identify and manage contaminated structures and buildings.

The main objective is to develop and implement a general “City Concept” comprising a tool box of improved technologies and processes, together with decision-making and management tools, for sustainable urban renewal, focusing on contaminated buildings, in order to the environment from hazardous compounds and save reusable buildings and materials.

This includes:

- Minimisation of risk to occupants of buildings
- Health and safety of construction and demolition workers
- Reduction of waste
- Preservation of buildings and resources

### **Expected impacts**

All developments, findings and recommendation achieved through the project will be collected and condensed into a “Code of Good Practice for Works on Contaminated Buildings”. The initial results could be introduced into the construction practise on a short-term basis (after 1 year), and in the medium-term (after 2-3 years) the complete Code i.e. “City Concept” would be available for application. The “City Concept” will contains guidelines and recommendations for the integrated management of decontamination of large groups of buildings in cities, and re-use of buildings, structures and materials.

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## **PRESCO (European thematic network on practical recommendations for sustainable construction)**

**Project Reference:** EVK4-1999-20003  
**Contract Type:** Thematic network contracts

**Start Date:** 27-06-2000  
**End Date:** 26-06-2004  
**Duration:** 48 months

### **Problems to be solved**

The PRESCO-network has as a main objective to define a European Code of Practice for Sustainable Building. The Code should contain widely accepted and scientifically supported guidance for the construction of sustainable buildings for residential, commercial and industrial use. Not only environmentally friendly construction technologies, but also social inclusion of elderly and disabled are considered through the study of adaptable housing and building.

Furthermore, the network covers all phases of the life cycle of a building, going from inception and feasibility study through design and construction to use and refurbishment, and finally to decommissioning, dismantling and disposal. The Code should enable all construction industry stakeholders to incorporate in the short-to-medium term the sustainability idea in their projects.

Since in the long run, environmental design tools based upon the life cycle assessment methodology will be used in the design process of buildings and constructions in order to get more sustainable buildings, the network aims also to play a key role in this evolution. The network offers tool developers opportunities to compare, to benchmark and to improve their systems, which in most cases have been developed for national use. Results are to be compared and discussed in order to define a common baseline offering a harmonised approach for assessment and design methodologies.

The effect of the application of the Code of Practice on the final result of the different assessment tools will be verified in order to have a performance test of the assessment tools. This last step will enable at the same time a first review of the Code of Practice.

### **Scientific objectives and approach**

During the second year of the project, the project has progressed well in all fields. One of the most important focus areas was the work on the European Code of Practice for Sustainable Building. After the collection of more than 200 recommendations for sustainable construction, the network started discussions to improve the quality of the collected set of recommendations. By means of network meetings, task group meetings and local network meetings, suggestions were made to change the content of the recommendations and the structure of the database in which they are collected. A complete review of the database system and the recommendations was performed before the PRESCO-CRISP workshop.

The organisation of this workshop, which took place in Ostend (BE) on the 24th-25th of June 2002, has been the other important task in the second PRESCO working year. The aim of the workshop was to receive input from discussions between external participants and network members on the draft version of the Code of Practice. During a series of parallel sessions, participants were asked to comment on specific themes related to sustainable construction.

The third and fourth issue of the PRESCO newsletter have been published during the second year. The third issue gave information about national legislation on aspects related to sustainable construction and contained an article on the progress of work within the project. The latest issue reported on the PRESCO-CRISP Workshop of June 2002. All issues of the newsletter also contain a news section, which gives information about European developments in the field of sustainable construction and interesting events on topics related to sustainable construction.

### **Expected impacts**

“Given the pace of growth, the prevailing pattern of urbanisation has serious negative implications for global sustainability. In this regard, the relative neglect of cities - particular rich cities - is difficult to

reconcile with physical reality. Approximately 64% of the worlds' production/consumption and pollution is associated with cities in rich countries. In short, half the people and three-quarters of the worlds' environmental problems reside in cities; and rich cities, mainly in the developed North, impose by far the greater load on the ecosphere and global commons. Some of the most common problems are: Ozone concentrations during the summer, high environmental noise levels, increased water consumption, increasing land use to provide the populations of large cities and to absorb the emissions and wastes they produce, energy consumption and CO<sub>2</sub>-emissions,..."

The PRESCO network will significantly contribute to the solution or reduction of these problems, by offering practical recommendations for sustainable building and construction and by enhancing the development of environmental assessment and design tools. Major savings on energy and CO<sub>2</sub>-emissions will be stimulated by measures in which energy-oriented design for construction and renovation together with new building services technologies and combined heat and power generation play a significant role.

Important points of interest in sustainable building concern the indoor climate, the adaptable buildings and the inclusion of elderly and disabled. Urban people live in the built environment, but spend 90% of their lives indoor. The quality of the living and working indoor environment is especially important for health, comfort, productivity, safety and security. In 20 years, a quarter of the population will be more than 60 years old. Their special requirements for comfortable and autonomous living must be properly observed, by stimulating adaptable and adapted buildings.

At the mid-term of the project, the network has already made a lot of progress. The network has developed already a good draft of the Code of Practice, which ensures that the final document will be of very high quality. PRESCO has also taken up an important role in the dissemination of information on sustainable construction, with the publication of the PRESCO newsletters and the elaboration of a PRESCO website (<http://go.to/presco.net>). Finally, preparatory actions have been taken with regard to the second part of the PRESCO work package "Inter-Comparison and Benchmarking of LCA-based Environmental Assessment and Design Tools". Several demonstration projects have been visited during the first two years and a kick-off discussion session was organised during the PRESCO-CRISP Workshop.

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## **RISK-UE (An advanced approach to earthquake risk scenarios with applications to different European towns)**

**Project Reference:** EVK4-2000-00014  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-02-2001  
**End Date:** 31-03-2004  
**Duration:** 38 months

### **Problems to be solved**

Decision makers in earthquake-prone cities need concrete figures of the possible impact of seismic event. RISK-UE will develop a general and modular methodology for creating earthquake-risk scenarios that concentrates on the distinctive features of European towns, including both current and historical buildings. It will be based on seismic-hazard assessment, a systematic inventory and typology of the elements at risk and an analysis of their relative value and vulnerability, in order to identify the weak points of urban systems. The resulting scenarios will give concrete figures of direct and indirect damage of possible earthquakes. With the participation of urban council representatives, the methodology will then be applied to seven selected cities from the EU and Eastern Europe for its adaptation and validation. A European cities network for seismic-risk reduction will be created during a final symposium.

### **Scientific objectives and approach**

### **Expected impacts**

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## RUFUS (Re-use of Foundations for Urban Sites)

**Project Reference:** EVK4-2002-00099  
**Contract Type:** Research

**Start Date:** 01/02/03  
**End Date:** 31/01/06  
**Duration:** 36 months

### Problems to be solved

The redevelopment and reconstruction of urban areas is fundamental to the economic sustainability of cities, their environs and the European Community. Buildings in major European financial cities have a working life of about 25 years and in regional centres about 40 years. Underground development of services and infrastructure in urban centres already confines the location of building foundations. Over several generations of buildings the ground will become congested to the point where no space is left for the new foundations so stifling new development and inhibiting economic sustainability. It is essential therefore that redevelopment uses as much as possible of the existing buildings to reduce the environmental impact of the reconstruction.

### Scientific Objectives and approach

This project aims to provide ways to overcome the barriers, both technical and non-technical, to the re-use of foundations for sustainable development. The barriers to the re-use of foundations are that the extent, location and integrity of the remaining foundations may not be known with confidence because the owners of the present generation of city buildings do not generally possess a good record of their foundations. The load capacity of the foundations will generally not be known with confidence as little is known about foundation performance changes with time. There will be questions about the durability of the materials in the existing foundations because they are difficult to assess.

Non technical issues include the insurance of buildings with re-used foundations, professional indemnity insurance for construction professionals and legal aspects.

This project will provide 5 innovative developments for safe, economic, sustainable preservation, renovation and construction in inner cities. The guidance will be a 'Best practice handbook' on the re-use of foundations to include guidance on the remediation/upgrading of existing foundations, guidance on the measurement and analysis for testing of existing foundations beneath buildings to assess durability, integrity and geometrical shape and foundation loading performance, guidance on 'smart' foundations for new foundations and an 'as built' documentation system to future proof new foundations.

### Expected Impacts

This project will provide the European Community with guidance, based on sound technical research, to re-use foundations, so speeding up the redevelopment of urban sites while at the same time significantly reducing the resource consumption and creating sustainable redevelopment. The guidance will enable the construction industry across Europe to make a significant contribution to the sustainable development of urban centres.

By re-using the foundations, the use of raw materials is reduced, the energy consumption for construction is reduced, the volume of soil from foundation construction is virtually eliminated and the construction time significantly reduced with consequent reduction in the whole life costing of a building.

Similarly if a building can be redeveloped for a change-of-use, without the need for additional or up-graded foundations, the savings in energy, raw materials and disposal of spoil can be substantial.

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## **SAFEFLOOR (Low risk and totally recyclable structural buildings)**

**Project Reference:** EVK4-2000-00020  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-02-2001  
**End Date:** 31-03-2004  
**Duration:** 38 months

### **Problems to be solved**

- A high percentage of victims and people injured during and after earthquake disaster is due to the heavy structural elements necessary to be removed during the rescue operations. To cut down response time by 15% will reduce the injured during earthquake. If we do not provide a lighter and easy disassembling design the victims due to the traditional dead load of the building will be maintained.
- A great number of accidents which occur in the Construction Sector (the most important industrial activity in urban areas) derive from the need to transport heavy loads in site areas. To cut down loads in site area by 70% during structural works will reduce the current figures of victims in construction accidents.
- Lack of rationality within the construction process. The final product of this project will permit a major rationality in the construction of building and a reduction of the construction period. Consequently the high environmental impact in urban areas due to the construction activity will be also reduced.

10% of noise disturbs produced in the site.

20% dust contamination.

20% of traffic disturbs.

25% of labour accident risk

15% of works period.

### **Scientific objectives and approach**

- Through the use of composite materials and high strength concrete, integrating the finish pavements we aim to develop a totally new and technologically advanced light structural element. During the project we will pursue the following objectives:
- To develop a construction procedure that allows the structure to be quickly assembled and disassembled by stages.
- To reduce the building square meter cost, in terms of foundations, structure and indoor pavements.
- To integrate the finished pavement into the structural floor member.
- To optimise the materials to lower the structural floor dead load down to 80 Kg/m<sup>2</sup> (a reduction of the 70% regarding the actual products)
- To optimise the combination of high strength concrete and composite materials (carbon fibre and Aramida), using prestressing techniques)
- To develop a calibrated software programme to help designers calculate the building structure.

### **Expected impacts**

In the consortium the construction partner is interesting to solve these problems in order to improve the productivity, the quality, the safety and security in sites, as well as the environmental impact of the construction activity.

The composite materials industry is interesting to solve some problems linked to the application of these materials in the construction sector and regarding the design, the calculation and the construction process.

The universities and research institutes involved in this project want to look deeply into the durability, recycling and seismic behaviour of composite structures.

The rescue organisations are interested in developing new structural system more suitable to facilitate the rescue operation.

If the consortium can resolve these problems we will provide to the society a low risk structural element, we will improve the productivity of the construction industry, and the European composite material technology will surpass the levels already existed in EEUU or Japan.

As a result of the weight of the construction materials being reduced, the plant and equipment used during said construction shall be lighter and quieter. Because the items to be moved shall be lighter, construction rates shall be higher and construction periods shall be cut down. The impact upon the urban environment "The City of Tomorrow" can be summarised as follows:

### Expected impacts:

- A 10% reduction in the level of noise caused by the construction of buildings in the towns.
- A 20% reduction in truck traffic (for material transportation purposes), with respect to current traffic.
- As a result of the overall weight of the building being reduced and consequently the loads transmitted to the ground being lighter, it shall be possible to build on grounds currently considered unsuitable and located in the outskirts of towns. A more rational utilisation of the ground available in the big cities

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## **SHE (Sustainable Housing in Europe)**

**Project Reference:** EVK4-CT-2002-00104  
**Contract Type:** Demonstration

**Start Date:**  
**End Date:**  
**Duration:** 60 months

### **Problems to be solved**

The need is a widespread diffusion and application of sustainable housing. The challenge is to move from the extraordinary to the ordinary procedure, balancing the investment cost with the economic, environmental and social benefit. The SHE project, proposed by social housing organisations, aims to manage the building process of some 900 sustainable dwellings, according to Agenda 21, to develop a set of best practice solutions. A set of workpackages and some innovative work tasks (participation and social/economic aspects) are defined. A team of experts will give scientific support in specific topics. A permanent wide dissemination will be developed towards targeted groups. Expected results are practical methodologies to improve assessment of best practice solutions, direct participation and involvement of the citizen and integrated approach.

### **Scientific objectives and approach**

The SHE project challenge is to move sustainable housing from the "extraordinary" to the "ordinary" procedure, balancing the investment cost with the economic, environmental and social benefit. This action requires complete renovation of the decision-making process, which has to involve all the different parties from the early stages. The SHE project aims to:

1. assess and demonstrate the real feasibility of sustainable housing, using pilot projects for some 900 sustainable dwellings,
2. integrate sustainability and closer participation of tenants in the principal stages of the construction decision-making process, at a reasonable level of cost and with high potential to be replicated,
3. develop best practice solutions, to set up quality assessment and guidelines, based on the direct experience acquired and
4. create a methodology to plan environmentally friendly property - equipping all stakeholders with the understanding of long-term costs and benefits of sustainable construction. The SHE project is coordinated by Federabitazione, a national Italian Housing Cooperative Association.

The principal proposers are social housing organisations from Denmark, France, Portugal and Italy that, due to their institutional calling, are accustomed to involve the future residents and to interact with all the subjects.

Moreover, a team of acclaimed experts (universities, public and private research centres and the Italian Institute for bio-architecture) will give scientific support on specific topics to each pilot project at the different stages of the overall project, in order to ensure the organisation of scientific support, exchange and homogenisation within the project. A set of workpackages are defined as "vertical actions", with specific assessment and target evaluation criteria: Architectural, Environmental and Energy Design both on a neighbourhood and building scale, Construction, Energy and Environmental Monitoring and Evaluation, Reporting and Dissemination, used to generate involvement and to convince. These innovative work tasks form the innovative philosophy of the project and consist of "participation" and "social aspects and economic analysis - monitoring and evaluation", aiming to elaborate upon a specific tool in order to allow a follow-up to the social situation and to prepare satisfaction inquiries. Monitoring activities, defined according to specific protocols and strategies, will be used in order to assess in practice, the effects and effectiveness of the technical and socio-economic issues.

A permanent exploitation plan of project results will be developed, using different forms of interactive dissemination towards targeted groups of end users (designers, networks, citizens, policy makers, etc). Monitoring and evaluation will document the financial, functional and social appeal of this proposed approach, thus stimulating assessment as common and not experimental practice for urban development.

### **Expected impacts**

Assessment of best practice solutions for the sustainable constructions, in order to move "from the experimental to the ordinary". Definition of new procedures to ensure effective direct participation of the final users in the decision-making process and social inclusion. Integrated approach aimed at building up the cities in accordance with sustainable principles, through the setting of evaluation criteria and ecological labelling of the entire building process.

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## **SUREURO (Inspektoren - sustainable refurbishment Europe)**

**Project Reference:** EVK4-1999-00008  
**Contract Type:** Research

**Start Date:** 03-01-2000  
**End Date:** 29-02-2004  
**Duration:** 48 months

### **Problems to be solved**

In the member states there are about 80 000 residential areas and 56 million flats that have been built since 1950. At the moment 170 million people are living in post war mass housing areas. As the consortium well knows, housing companies need to periodically refurbish their housing stock and the demand for sustainable refurbishment is high – both from EC and the member states. Today there is no integration of refurbishment strategies with sustainability and not enough participation of tenants. Many refurbishment processes are only focused on technical issues and initial costs.

### **Scientific objectives and approach**

SUREURO will provide housing companies with practical management tools for integrating sustainable development and tenant participation in their refurbishment management process without exceeding the normal costs for the tenants, who are taking part in the project. SUREURO will also develop design tools for construction companies, designer and engineers; models for better planning, design and technical specifications of refurbishment projects. Finally SUREURO will test and implement new, flexible technical concepts for sustainable transformation of existing housing areas. The result is a unique and innovative knowledge based information system for the total process. The partnership consists of seven big housing organisations from seven different countries within the European Community. To assist the housing organisation in the project there are several research organisations and industrial companies also involved. The project consists of six work packages. In April 2002, two housing organisations and six other organisations in the Czech Republic and one organisation in the Slovak Republic joined the project under the name SUREURO NAS.

The first three are the technical work-packages working in six steps:

1. Conceptual process models,
2. Inventory of existing tools and technologies (best practices in the seven countries),
3. Analysing and improvement,
4. Development of toolboxes,
5. Testing in seven national refurbishment processes and
6. Finally deliver European models and toolboxes. WP1 for management tools, WP2 for Design and Process tools and WP3 for Technical tools and solutions for refurbishment and sustainable technologies.

WP4 are the seven National Projects with their state of the art reports and testing the results from the first three work packages. In WP5 at the end of the four-year long project the models and tools will also be tested in three, from the project independent housing companies. Two in a member state, Czech Republic, and one in an associated country, Italy. WP6 will result in a knowledge system and give the most important deliverables with tools in a click able computer-friendly way, similar to what is used in geographic information systems. They include guidelines that consider different climate-conditions, laws and regulations. This also means that they shall be flexible to future knowledge and technologies. It is important to notice that the models are developed in a way that all actors in a refurbishment project can use them. These actors are housing companies, the municipality (politicians and officials), tenants, architects, consultants and contractors. The interplay between these actors shall be developed and lead to a win-win situation for all actors at all levels including the environment. It is important that the refurbished projects mean a result with healthy and comfortable indoor climate. It is a main goal that the refurbishment shall be possible to carry out within normal costs so that the tenants shall have the possibility to stay in their dwellings afterwards. SUREURO also considers environmental, social, economical, technical, architectural criteria in all stages.

### **Expected impacts**

SUREURO aims to provide housing companies and local decision makers with practical management tools for integrating sustainable development and tenant participation in their refurbishment management process while maintaining normal and affordable costs for tenants. It will also test and implement new concepts for sustainable transformation of existing housing areas. Deliverables include a knowledge based information system consisting of models and tools for all those involved in the refurbishment process and integrate a refurbishment protocol and guidelines. The potential financial and scientific impact of SUREURO is felt to be significant.

The target groups for SUREURO are mainly:

1. Government authorities, city planners and local authorities in the areas of sustainability, who can use the results for coming planning and regulations;
2. housing companies, who can use the models in their future refurbishment processes;
3. tenants and their organisations, who can use the models in their demands for environmental living conditions;
4. Construction companies, designers, architects etc in co-operation with housing companies.

The project results will be directed mainly at markets in member states, CEEC-countries, NDC's and other developed countries. The continuous dissemination – international congresses and seminars in the countries involved together with the involvement of independent experts and international organisations in the area help to ensure the efficient uptake of results.

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## **WAMBUCO (European Waste Manual for Building Construction)**

**Project Reference:** CRAF-1999-71118  
**Contract Type:** CRAFT

**Start Date:**  
**End Date:**  
**Duration:** 24 months

### **Problems to be solved**

### **Scientific objectives and approach**

The overall goal of the production of a European Waste Manual for Building Construction which will be used as a tool by the building industry to optimise waste management during the building process. The specific aims of the project are:

1. Producing planning aids incorporating trades-specific waste parameters in order to achieve a reduction of building waste by up to 25 per cent by weight.
2. Optimising the separation of building-site waste and increasing the proportion of separated re-usable materials of more than 75 per cent by weight
3. Reducing emissions produced by waste-disposal traffic by up to 40 per cent
4. Increasing the productivity of all trades by more than 2 per cent
5. Increasing the interest of building sponsors, architects and investors in a low-waste and recycling-oriented approach to building
6. Reducing the amount of work required on the building site for the transport of materials and waste materials
7. Reducing the threat accidents and fire on building sites
8. Reducing resource and the cost of materials

Within the framework of detailed country studies, approaches to low-waste and recycling-oriented building will be identified. Based in these approaches, an appropriate form of building waste management is to be developed and implemented in five countries within the European Union. In conjunction with training centres for the building trades, potentials for building-site waste avoidance in the case of building construction will be investigated at the level of individual trades.

As first step, a central waste management logistics system for building projects will be established by the research institutions. The central waste management structure will connect all participating firms and waste management facility within the building project. On selected building sites, the research institutions will co-ordinate the collection by small and medium-sized building and waste management enterprises of data concerning building performance and waste potentials.

Training and further training centres of the building industry will be involved in the research project. On their rehearsal construction sites, experimental programmes will be conducted focusing on the testing of low-waste building procedures. This will effect sensitivity towards waste avoidance, and lay the base for curriculum adaptation.

The links between building performance and waste yield will be analysed for wall, ceiling, floor, facade, roof and cladding constructions. The building parameters influencing waste yield will be analysed, and optimisation measures involving variable material input will be conducted with regard to the use of materials and packaging,

The research institutions will translate the waste-yield data provided by the two research programmes into key waste parameters relating to building practices. The results of the research project will then be compiled and presented in the form of a European Waste Manual for Building Construction.

### **Expected results**

#### **Milestones**

- Country studies of waste management strategies on building sites
- Trade-specific requirement descriptions for waste management
- European Waste Manual

#### Expected results

- Waste management optimisation in the building process
- Productivity increase in the building process
- Net product increase in waste processing

#### Exploitation of results

- CD-ROM version of Waste Manual
- Concept for the marketing of the Waste Manual within the EU with emphases on Internet presentation, conferences, presentation of model building sites, and training.

### Coordinator

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### 4.3.2 Optimum use of urban land and rehabilitation of brownfield site

#### CABERNET (Concerted Action on Brownfield and Economic Regeneration NETwork)

**Project Reference:** EVK4-CT- 2001—20004  
**Contract Type:** Concerted action

**Start Date:** 01-01-2002  
**End Date:** 31-12-2004  
**Duration:** 36 Months

#### Problems to be solved

Brownfields (or derelict land) result from changing patterns of industry and development in many regions. The loss of the industry, the resulting unemployment and the reluctance of new investors to take on the technical problems and liabilities associated with brownfield sites, affect the economic prosperity of the region, particularly in urban locations. Municipalities are often unable to revitalise brownfield from within their own resources, and their city centres and environs remain degraded and under-utilised.

Finding solutions for “brownfield” sites is therefore an increasingly important part of effective policies aimed at a sustainable future for land and in particular cities. It is relevant for example to taking forward “Sustainable Urban Development in the European Union: A Framework for Action (COM(98)605)” and the proposed 6<sup>th</sup> Environment Action programme of the European Community.

#### Scientific objectives and approach

CABERNET aims to facilitate new practical solutions for urban brownfields. The Network is focusing on four key objectives which are: better awareness and shared understanding of brownfield issues across stakeholder groups; development of a conceptual model for brownfield issues; coordinated research activities across different sectors and countries and identification of best practice and other tools.

The Network consists of 49 Members and 6 Coordination Team members originating from 21 countries across Europe and different stakeholder groups. The Members will work in a series of structured meetings towards integrated and phased outputs. Information and conclusions will be actively disseminated via the network web site ([www.cabernet.org.uk](http://www.cabernet.org.uk)) and other fora throughout the project.

#### Expected impacts

CABERNET's vision is the enhanced rehabilitation of brownfield sites. Potential users such as regional and municipal authorities, industry and small businesses, as well as professionals and scientists, will have access to better information, to new tools and to a wider perspective of the issues. CABERNET will inform thinking by creating a new intellectual and practical framework, bringing together the key aspects of the environment, economy and social and cultural heritage associated with sustainable regeneration of brownfields.

The key deliverables will include: accessible information and position papers on the state of the art and on issues; a conceptual model; new research projects; and new tools including checklists, benchmarks, and practical guidance.

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## **HYGEIA (Hybrid geophysical technology for the evaluation of insidious contaminated areas)**

**Project Reference:** EVK4-2001-00014  
**Contract Type:** Research

**Start Date:** 01-12-2001  
**End Date:** 30-11-2004  
**Duration:** 36 months

### **Problems to be solved**

Rehabilitation of brownfields, contaminated sites and waste disposal sites is a crucial issue in the perspective of sustainable development and is a costly task, which affects the planning of urban and infrastructure development. With the present assessment techniques, the estimate of the budget required for rehabilitation is often very rough and the risk of an unexpected remarkable growth of the costs during operations strongly discourages the private investments on brownfields. Thus, for effective rehabilitation planning and engineering safety and efficiency, it is extremely important that sub-surface is accurately imaged prior to the commencement of remediation. Currently, however, there is no dedicated technology that can provide reliable and consistent high resolution sub-surface information for the wide variety of ground conditions met in this field. Geophysical methods have a tremendous potential for the 3-D evaluation of used/contaminated ground but current techniques are unfit to satisfy end-user's requirements.

There is an urgent need for a reliable non-intrusive technology for subsurface characterisation of contaminated land based on an integrated approach.

### **Scientific objectives and approach**

The project is designed to address this problem for the most important brownfield typologies by development of a combination of geophysical techniques (seismics, GPR, resistivity) capable of mapping heterogeneities in the 0-50 m space without disturbing the medium by means of highly cost-effective and rapid acquisition, processing and inversion/interpretation of data.

The proposed system shall provide

- full 3-D imaging of brownfields and contaminated sites to the depth of interest for rehabilitation purposes
- identification of pollution sources, contaminants flow paths and accumulation and
- evaluation of connections between brownfields and aquifers.

Advancement of the state-of-the-art will be pursued through

- development of dedicated acquisition tools to enhance performances of Ground Penetrating Radar (GPR) and multi-component seismic prospecting
- development of novel dedicated procedures based on the integration of the geophysical methods applicable to the different typologies of brownfields and contaminated sites (seismics, GPR, resistivity) and
- implementation of algorithms to obtain enhanced information from brownfields and contaminated sites, with particular reference to processing, inversion and modelling software dedicated to integrate seismic and GPR data analysis.

Further objective of the project is the definition of guidelines, applicability, limits and costs of correct and effective use of proposed technology.

### **Expected impacts**

HYGEIA will provide

- classification of brownfield and contaminated sites of use to plan management and rehabilitation based on information about past use of land
- survey technologies based on the integration of seismics, resistivity and GPR. Among them, surface waves and Same Wavelength Electromagnetic and Elastic Prospecting (SWEEP) to overcome present limits of the individual geophysical methods
- innovative seismic and GPR data acquisition tools for enhanced shallow high resolution prospecting



- original software for data processing, modelling, inversion and interpretation, which is instrumental to obtain enhanced subsurface information and push the proposed geophysical methods to their limits
- databases of physical properties and geophysical data from laboratory and field experiments that will help selection of useful techniques in future studies
- Theoretical models and simulation algorithms which allow quantitative validation of survey results
- Decision support system and end-users guidelines which will serve as reference for rehabilitation industry and allow safe and cost-effective exploitation of the proposed technology.
- In synthesis, end-users may expect to obtain from the project databases and technology for rapid and cost-effective high-resolution non-invasive evaluation of used/contaminated land to minimise costs and risks of rehabilitation actions.

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## **NORISC (Network oriented risk-assessment by in-situ screening of contaminated sites)**

**Project Reference:** EVK4-2000-00026  
**Contract Type:** Cost-sharing contracts

**Start Date:** 12-08-2000  
**End Date:** 08-07-2003  
**Duration:** 35 months

### **Problems to be solved**

NORISC aims at the revitalisation of contaminated sites in urban areas. The project combines and integrates new and existing methods in order to provide a standard guideline for efficient risk assessment of contamination profiles. This guideline will enhance site characterisation and risk assessment and minimise time and cost for investigation, redevelopment and remediation. The approach is based on combinations of measurement methods within geophysics, geochemistry and hydrogeology as well as data processing with GIS, geostatistics and modelling. Measurement methods will be focused on in-situ screening including both existing and new methods that will be developed and tested. The guideline will be established in the form of a decision support software system. This will be a valuable tool for city planners, decision makers, landowners, and investors. The software will be integrated with the management support system COSIMA. The consortium consists of cities, research institutes, universities from Germany, Hungary, Sweden, Greece, Italy, USA.

### **Scientific objectives and approach**

The aim is to combine and integrate new and existing site investigation methods in order to provide site investigation software and a standard guideline for efficient risk assessment of contamination profiles in urban areas. The approaches in the guideline will be based on combinations of measurement methods within geophysics, geochemistry, biochemistry and geology/hydrogeology as well as data processing with GIS, geo-statistics and modelling. Measurement methods will be focused on in-situ screening including both existing and new methods. The software and guideline will be developed and tested against quantifiable and quality criteria established in the evaluation plan. Real field tests will be performed. The guideline will be established in the form of a decision support software system. This will be a valuable tool for city planners, decision-makers, landowners, investors and stakeholders. An interface will be developed in order to be able to integrate the software with the most common GIS systems, which will improve this management support system.

### **Expected impacts**

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## **RESCUE (Regeneration of European sites in cities and urban environments)**

**Project Reference:** EVK4-CT-2001-00068  
**Contract Type:** Research

**Start Date:** 01-03-2002  
**End Date:** 28-02-2005  
**Duration:** 36 months

### **Problems to be solved**

The process of industrial change has resulted in the creation of so-called „brownfields“ across Europe, particularly in urban areas. These sites present particular challenges to national and regional policymakers, including the remediation of hazards to human beings, groundwater and ecosystems. But there is also a need to facilitate the reintegration of rehabilitated sites into the property market and to ensure that they can be brought back into new economic uses.

The management of the increasing amount of derelict land in inner city locations is one of the most important issues on the agendas of today's urban planners and property related private stakeholders. Taking into account the ongoing consumption of open space for housing, retailing and industry, it is recognised that a sustainable built environment cannot be achieved without re-integrating derelict land into the property markets and encouraging development back to central urban locations. To meet these overall goals, RESCUE aims to develop cost-effective tools and strategies for the sustainable reclamation of contaminated land to be used by stakeholders, land planners, consultants and public authorities.

### **Scientific objectives and approach**

The main objective is to develop and test a systematic holistic approach to sustainable regeneration of European brownfield sites. RESCUE desires to raise the standard in brownfield regeneration projects in terms of both the sustainability of the built environment and the quality of urban life. RESCUE intends to develop sustainable and cost effective tools for the reclamation of derelict land to be used by all stakeholders. By reducing the costs of land rehabilitation, RESCUE will help to overcome the current obstacles in brownfield regeneration, contribute to reduce the demand for greenfield development, and therefore save natural resources. In addition to this, RESCUE will provide both scientific and practically tested guidance for the formulation of European policy.

The principal methodological approach of RESCUE is to analyse and evaluate current practice in brownfield re-development and to derive improvements for the applied procedures. Based on practice in industrial core regions in France (Nord-Pas de Calais), United Kingdom (North East Region), Poland (Silesia) and Germany (Ruhr Region, South of Leipzig), the regeneration process will be broken down into the main steps of decision making and analysed along transnational workpackages.

### **Expected impacts**

The expected impact of RESCUE is the acceleration of brownfield redevelopment by introducing a new standard for the integrated approach for all stakeholders. The key element of RESCUE will be the Manual of a European System Approach for Sustainable Brownfield Regeneration. It will conclusively integrate the validation feedback into a holistic system approach that may be used throughout the European Community as well as in EU accession States. The manual should be disseminated throughout Europe to practical end users and scientific networks. It will also be available on the RESCUE homepage on the internet. It will be a substantial decision making tool for stakeholders, public administration and financial funding bodies. It will provide checklists, performance indicators, evaluation criteria and examples of best practice that have been evaluated within RESCUE. Economic tools for the enhancement of brownfield regeneration will be proposed (e.g. tax incentives etc.). Furthermore, decision making tools for funding organisations on the national, regional or even European level will be part of the manual.

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## **4.4 Comparative assessment and cost effective implementation of strategies for sustainable transport systems in a urban environment**



## 4.4.1 Strategic approaches and methodologies in urban. Planning towards sustainable transport

Summary Table

Acronym	Number	Title Project Website
<b>ARTISTS</b>	EVK4-CT2001-0059	Arterial Streets towards sustainability <a href="http://www.tft.lth.se/artists/">http://www.tft.lth.se/artists/</a>
<b>ASI</b>	EVG3-2002-00508	Assess implementations in the frame of the Cities-of-Tomorrow programme
<b>ASTRAL</b>	EVK4-2000-00737	The diffusion, exploitation, transfer and take-up of research results from a cluster of research projects undertaken under Task 4.4.1 of the City of Tomorrow and Cultural Heritage Key Action <a href="http://www.lutr.net/index.html">http://www.lutr.net/index.html</a>
<b>CITY FREIGHT</b>	EVK4-2001-00078	Inter- and intra-city freight distribution network <a href="http://cityfreight.org/Contents.html">http://cityfreight.org/Contents.html</a>
<b>ECOCITY</b>	EVK4-2001-00061	Urban development towards appropriate structures for sustainable transport <a href="http://www.ecocityprojects.net">http://www.ecocityprojects.net</a>
<b>ISHTAR</b>	EVK4-2000-00707	Integrated software for health, transport, efficiency and artistic heritage recovery <a href="http://www.ishtar-fp5-eu.com/">http://www.ishtar-fp5-eu.com/</a>
<b>PLUME</b>	EVK4-2001-00218	Planning and Urban Mobility in Europe <a href="http://www.lutr.net/index.html">http://www.lutr.net/index.html</a>
<b>PROMPT</b>	EVK4-1999-00015	New means to promote pedestrian traffic in cities <a href="http://www.vtt.fi/yki/yki4/prompt.htm">http://www.vtt.fi/yki/yki4/prompt.htm</a>
<b>PROPOLIS</b>	EVK4-1999-00022	Planning and research of policies for land use and transport for increasing urban sustainability <a href="http://www.Itcon.fi/propolis/index.htm">http://www.Itcon.fi/propolis/index.htm</a>
<b>PROSPECTS</b>	EVK4-1999-00013	Procedures for recommending optimal sustainable planning of European city transport systems <a href="http://www.ivv.tuwien.ac.at/projects/prospects.html">http://www.ivv.tuwien.ac.at/projects/prospects.html</a>
<b>SCATTER</b>	EVK4-2001-00083	Sprawling cities and transport: from evaluation to recommendations
<b>SUTRA</b>	EVK4-1999-00034	Sustainable urban transportation <a href="http://www.ess.co.at/SUTRA/">http://www.ess.co.at/SUTRA/</a>
<b>TRANSPLUS</b>	EVK4-1999-00009	Transport planning, land use and sustainability <a href="Http://www.isis-it.com/transplus.htm">Http://www.isis-it.com/transplus.htm</a>
<b>VELOINFO</b>	EVK4-2001-00068	The European Network for Cycling Expertise



#### 4.4.2 Comparative assessment and demonstration of novel transport forms and related infrastructure

ACRONYM	NUMBER	TITLE PROJECT WEBSITE
<b>CYBERMOVE</b>	EVK4-2001-00051	Cybernetic Transportation Systems for the Cities of Tomorrow <a href="http://www.cybermove.org/">http://www.cybermove.org/</a>
<b>ECTOS</b>	EVK4-2000-00698	Ecological city transport system: demonstration, evaluation and research project of Hydrogen fuel cell bus transportation system of the future. <a href="http://www.ectos.is/">http://www.ectos.is/</a>
<b>EDICT</b>	EVK4-2001-00058	Evaluation and demonstration of innovative city transport <a href="http://www.edict.info">http://www.edict.info</a>
<b>MOSES</b>	EVK4-2000-00042	Mobility Services for Urban Sustainability (car sharing) <a href="http://www.moses-europe.org">http://www.moses-europe.org</a>
<b>NETMOBIL</b>	EVK4-2002-00560	New Transport system concepts for enhanced and sustainable personal Mobility
<b>STARDUST</b>	EVK4-2000-00590	Towards sustainable town development: a research on deployment of urban sustainable transport (driver assistance systems) <a href="http://www.trg.soton.ac.uk/stardust/index.htm">http://www.trg.soton.ac.uk/stardust/index.htm</a>

## 4.4.1 Strategic approaches and methodologies in urban planning towards sustainable transport

### ARTISTS (Arterial Street Towards Sustainability)

**Project Reference:** EVK4-CT2001-00059  
**Contract Type:**

**Start Date:** 2001-12-01  
**End Date:** 2004-11-30  
**Duration:** 36 months

### Problems to be solved

Arterial streets present a major challenge to sustainable urban planning, as they attempt to meet four basic urban space functions without having enough space. Arterial streets are main channels for through-going traffic between different parts of the city (1), provide access for the various kinds of traffic to buildings (2), are often major market places (3), and are meeting points where residents and visitors meet, talk and take part in events (4). The aim of the project is to improve the basis for decisions to resolve the conflicts between the four functions, taking into account a broad set of social, economic and environmental factors. This enables re-design of arterial streets in such a way as to improve the quality of life on urban arterial streets and achieving more sustainable travel patterns.

Consequences due to unsolved conflicts between functions at arterial streets are very evident today and have been so for decades. Remote indoor hypermarkets are to a certain degree a consequence of falling level of service for shoppers and shopkeepers in arterial streets. The allocation of too much space to private cars has resulted in high levels air pollution, noise, accidents etc. Loneliness among residents is one of consequences of too many cars and too much noise.

Today, the city administrations often have poor knowledge about the effects of alternative solutions to the predominating “highway design”, which primarily focus on the capacity and speed of private cars.

### Scientific objectives and approach

The project elaborates and tests a practical method, which facilitates the access to new knowledge and motivates to changing standpoints. This encourages city administrations to chose more innovative and sustainable solutions when re-designing arterial streets.

The project develops a method for functional classification of arterial streets. Tools to measure the performance of arterial streets are elaborated, enabling city administrations to “benchmark” the streets in a holistic approach primarily based on a few core factors. On the basis of these methods and tools the project describes the current state of 38 arterial streets, and examines short- and long-term effects of different re-constructions, street designs and management strategies. Barriers and possibilities to more sustainable arterial streets are focused upon through the analysis of previous decision-making processes.

Innovative tools for providing new alternative options to problematic arterial streets and presenting and discussing effects of new designs in an understandable manner are elaborated and tested.

### Expected impacts

The final report will consist of Best Practice Guidelines for changing arterial streets. This development starts early in the project, as we must assure that these guidelines must be produced in a way that makes them useful to local authorities throughout Europe. To ensure the best possible spread of the Guidelines the partners will organise – in addition to a web-site, a brochure and a special distribution of the Guidelines themselves – very comprehensive knowledge transfer through seminars and workshops with local and central decision makers and experts, where an active participation from these groups of stakeholders is sought.

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## **ASI (Assess implementations in the frame of the Cities-of-Tomorrow programme)**

**Project Reference:** EVG3-CT-2002-80013  
**Contract Type:** Accompanying Measure

**Start Date:** 01-02-2003  
**End Date:** 31-01-2005  
**Duration:** 24 months

### **Problems to be solved**

The concept of life quality (LQ) is increasingly important in socio-economic research. The main problem however is, that LQ is an abstract concept, and a homogeneous definition is hard to be found. LQ is influenced by many components like culture, religion, health status, income, age, mobility preconditions, job satisfaction, etc. Besides the definition is influenced by the fact that, i.e. the representative of what discipline, measures LQ. The main objective of the project is to provide knowledge about the practice of life quality assessment by different disciplines in connection with different types of public measures in the area of town planning, transportation and mobility.

Transport and mobility play an important role in the concept of LQ as they are central elements of the integration in society. Due to the strong engineering focus taken in this area so far, too little action has been taken to understand, what difficulties different groups and sub-groups of people have with transport and mobility, as the need and interests of the relevant segments of the population are not considered appropriately. Solutions in the transport and mobility area developed according to the methods suggested in ASI, will be more effective and more efficient, because they meet the needs of the target groups, i.e. different groups of citizens in different parts of Europe.

### **Scientific objectives and approach**

The main objective is to improve the understanding of the assessment of groups of citizen's LQ by responsible politicians and experts. This will be done by the evaluation of how mobility policies of five implementations in the frame of LUTR (Land Use and Transport Research Cluster) of the Key Action Cities of Tomorrow (CoT) affect LQ. Evaluation will be based on expert interviews, dealing with the following questions: How is LQ of different groups of citizens affected by town planning, transport and mobility conditions and how is it assessed by the responsible people. The main product of ASI will be an advice for improved assessment processes. The product will consist of a toolbox for the assessment of LQ in connection with town planning, transport and mobility, a databank concept, and guidelines for implementations. The developed instruments will be tested in a pilot study.

### **Expected impacts**

The toolbox for assessing LQ and the databank, where – to start with - comparable data about LQ assessment and results produced in the frame of LUTR-projects in different parts of Europe are gathered, will simplify research work and will improve the basis for practical work. If the tools developed in ASI will be used regularly in the town-planning, mobility and transport area there will be a positive impact on the sustainability and on the ability of policy-makers to make effective contributions to the improvement of LQ of European citizens.

### **Coordinator**

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## **ASTRAL (The diffusion, exploitation, transfer and take-up of research results from a Cluster of research projects funded under Task 4.4.1 of the City of Tomorrow and Cultural Heritage Key Action)**

**Project Reference:**

**Contract Type:**

**Start Date:**

**End Date:**

**Duration:**

### **Problems to be solved**

This Accompanying Measure is designed to achieve the diffusion, exploitation, transfer and take-up of research results from a Cluster of research projects funded under Task 4.4.1 of the City of Tomorrow and Cultural Heritage Key Action. Task 4.4.1 aims “to develop planning tools, assessment methodologies and best practices aimed at managing future transport demand through integrated land use and transport planning, reducing individual motorised vehicle movements and encouraging greater use of collective and other sustainable modes”. These actions are all focused on reducing the adverse impact of current trends in urban transport on environment and sustainability, safety and security, social cohesion and opportunities, and the efficiency of the urban economy.

All of the Cluster projects have been selected as offering key contributions to the solution of these problems. However, their benefits will be realised to a greater extent by drawing on the potential synergies between them, and by ensuring that they are effectively coordinated with related national and regional projects, hence contributing to the realisation of European Research Area. This is the principal focus of ASTRAL.

### **Scientific objectives and approach**

The principal objective of ASTRAL is to assist cities, national governments, international organisations, non-governmental organisations, interest groups and individuals in obtaining maximum benefit from the research undertaken by the Cluster.

This objective will be achieved through a series of five sub-objectives; each associated with a technical Work Package. WP10 involves a Technical Workshop to identify key areas of interaction between the Cluster projects and to ensure greater synergy and more efficient use of resources. WP20 identifies and provides a summary of related national and regional research projects, and encourages their participation in the Cluster’s workshops and website. Details of such projects will be disseminated on the website, and regularly updated. In this way, each project will benefit from greater awareness of related research elsewhere. WP30 provides a first Dissemination Workshop, with end users, to present initial results, to discuss future research directions, and to identify the best ways of disseminating results and achieving take-up. The resulting deliverable will recommend good practice for dissemination among governments, cities, NGOs and citizens. WP40 involves design, development and maintenance of an interactive website for use by Cluster researchers, other national and regional projects and the full range of end users. It will provide results, and enable cities, and citizens, to access advice on good practice and tools for developing sustainable strategies. WP50 provides the final Dissemination Workshop. It will be designed on the basis developed in WP30, and will encourage take-up of best practice as identified not just in the Cluster projects but also in related national and regional projects. WP60 provides coordination, management and quality assurance.

### **Expected impacts**

The work of all the Cluster projects is focused on assisting cities in developing sustainable land use and transport strategies which will substantially reduce the adverse impacts of transport on the environment, safety, social cohesion and economic efficiency. ASTRAL will enhance these impacts by developing the potential synergy between the projects. Its main contributions to national governments, cities, interest groups and citizens will be through its two Dissemination Workshops and its Interactive Website. The first Dissemination Workshop will encourage end users to specify the approaches to dissemination, exploitation and take-up, which are most appropriate to their needs. The Interactive Website and second Dissemination Workshop will draw on these recommendations to encourage widespread take-up of the Cluster’s and other related projects’ recommendations.

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## **CITY FREIGHT (Inter- and intra-city freight distribution network)**

**Project Reference:** EVK4-2001-00078  
**Contract Type:** Shared cost RTD

**Start Date:** Jan. 1, 2002  
**End Date:** Feb 29, 2004  
**Duration:** 26 months

### **Problems to be solved**

Road freight transport has increased dramatically in the past decades within the urban conglomeration, and prognoses for the future indicates that the growth has not come to an end. The negative aspects of this growth are most visible in all European urban areas: congestion to which lorries and small delivery vehicles contribute, noise emissions, emission of pollutants and accidents are problems that decrease the quality of the urban environment substantially.

The problems of freight transport are still augmenting even if more and more cities are imposing limitations for delivery of shopping centres by heavy vehicles. Time windows for delivery were introduced. Initiatives for urban freight distribution were undertaken. Although most of the developments mentioned above have started only recently (roughly in the last decade), first results can yet be identified. Moreover, some first results seem very counterintuitive: instead of reducing congestion, some Urban Distribution Centres generate more freight vehicle movements than before.

### **Scientific objectives and approach**

A comparative analysis of these effects for different cities and situations in Europe has not been carried out until this moment. Within this project, the socio-economic and environmental impacts of changes in freight transport and door-to-door delivery in a variety of European conurbations will be analysed in a systematic and innovative way.

In order to do that, CITY FREIGHT will carry out an analysis of some selected supply chain schemes that are already functioning in Europe and carry out an evaluation of their impacts in an urban context, making use of a common assessment methodology.

More precisely, the objectives of the CITY FREIGHT project are the following:

- Identify and analyse working of innovative and promising logistic schemes in the seven countries represented in the project consortium as well as the urban policies which could accompany their implementation in order to promote a more sustainable development;
- Set up a list of criteria and a common assessment method for evaluating those logistic schemes and the related accompanying policies (legal framework, land use planning, road traffic regulation, pricing,);
- Analyse their internal technical, economical and environmental efficiency;
- Design, for one city or one urban region in each country, one or more implementation scenarios of these schemes and related accompanying policies;
- Assess and optimise the scenarios according to the criteria of a sustainable development of the city;
- Present guidelines for implementing integrated strategies that could be recommended as "Best Practices";
- Disseminate and exploit the Best Practice Guidelines through collaboration with the Local Authorities for the design of concrete implementation plans of integrated strategies in each of the case study cities.

### **Expected impacts**

Public administration is becoming more aware of the importance and diversity of the factors of urban freight traffic. In the past the actions were mainly limited in controlling and restricting road traffic. At present there are significantly more areas of interest, such as economic efficiency, spatial planning, land management and environmental protection. In that general context, the aim of the CITY FREIGHT project is to provide guidance to the range of interested stakeholders (government, regional, or local authorities, network operators, shippers and consignees on the Best Practices for analysing their city freight problems as well as for designing and implementing integrated strategies to solve them.



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## ECOCITY (Urban development towards appropriate structures for sustainable transport)

**Project Reference:** EVK4-2001-00061  
**Contract Type:**

**Start Date:**  
**End Date:**  
**Duration:**

### Problems to be solved

Urban growth usually happens in contradictory ways to the concept of sustainable settlement development. Spatially diffused and functionally segregated settlement structures tend to cause growth in traffic volumes as well as increased pressures on the environment. Measures to promote sustainable transport modes in isolation are stultified by these trends, still dominating settlement planning concepts and their implementation. The resources to be conserved for future generations - land (urban sprawl), energy sources (fossil fuels), the environment, as well as human resources (health, quality of life) - are particularly jeopardised.

In contrast to this trend, the objectives of the European Union for the development of sustainable settlements and for the improvement of urban environments specifically imply to *support a polycentric, balanced urban system* and to *promote resource-efficient settlement patterns, that minimise land-take and urban sprawl*.<sup>2</sup>

The project team contributes to the implementation of these objectives by designing model settlements for specific sites to demonstrate the feasibility and desirability of future urban living compatible with sustainability requirements. The concepts developed provide the basis for urban places to continue being the engine of social, cultural and economic development in the future.

### Scientific objectives and approach

To overcome the above problems of urban development requires the consistent integration and implementation of specific often already tested individual solutions. The overall goal of the project is, hence, to develop settlement patterns for sustainable cities (ECOCITIES), emphasising the implications for an environmentally compatible transport system. Strategies to design a space- and energy saving settlement structure will thus give priority to the requirements of sustainable transport (convenience for pedestrians, efficient public transport and goods' distribution logistics) as well as energy efficiency, environmental quality and the utilisation of alternative sources of energy.

Necessary conditions of sustainability to be operationalised are compactness – selection of suitable sites - and a balanced mix of land uses. The approach of ECOCITY is to develop a common concept, design model settlements in six participating countries (in experts round tables creating scenarios, integrating sustainability in all sectors and considering multiple cross-sector interrelations in the definition of solutions) and to work out general guidelines for planning.

### Expected impacts

The products to be developed in the project mentioned above, properly disseminated, should have a substantial impact on the growing community of urban planners interested in an improvement of current planning practices. It is to be expected, hence, that further developments of the concept will be stimulated as well as an increasing application of the projects results can be expected in the future.

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<sup>2</sup> Sustainable Urban Development in the European Union: A Framework for Action; Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, Brussels 1998

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## **Participants**

## **ISHTAR (Integrated Software for Health, Transport efficiency and Artistic heritage Recovery)**

**Project Reference:** EVK4-CT-2000-00034  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-06- 2001  
**End Date:** 31-05- 2004  
**Duration:** 36 Months

### **Problems to be solved**

European cities face common challenges concerning their quality of life: degradation of the urban environment, significant risks for citizens health, traffic congestion causing stress and economic inefficiency, progressive damage of the artistic and monumental heritage. Additional difficulties derive from the lack of integrated tools that allow cities to make balanced decisions on a wide range of issues. The aim of ISHTAR Project is to build an advanced software suite for the analysis of the effects of short term actions and long term policies to improve the quality of the environment, citizen's health, conservation of monuments. The suite will include both existing and newly developed models, covering the areas of citizen's behaviour, transport, vehicles emissions noise and safety, pollutants dispersion, buildings related atmospheric emissions, health, and monuments degradation. These tools will find integration in the use of a GIS and user-friendly interface software. The models suite will be an innovative tool for advanced urban management and will allow the integrated analysis of the various environmental effects of technical and non technical measures. This will represent an attractive alternative to the usual separated analysis of the effects of such measures on the various elements of the urban environment.

### **Scientific Objectives and Approach**

The integration of a large number of software tools and the creation of specific modules for the advanced simulation of key processes such as transport behaviour and its direct impacts on the urban environment will allow the build-up of an innovative and powerful decision support tool for urban policies optimisation. The achievement of a high spatial and temporal flexibility in the use of the tool will maximise the possibility of use from local short term actions to widespread long-term policies, thus being of interest for different categories of users. A high level of technical innovation, in terms of both development of new tools needed and balanced integration of these with existing and marketable tools, will create a new method and an innovative software tool for assessing urban policies. Specific modelling efforts will be performed in the representation of policies effects on citizens behaviour, in the integrated 24hr simulation of traffic emissions, noise and safety, in the microscopic analysis of air pollution effects on health and monuments. The maximisation of the European Added Value, deriving from a wide and geographically representative consortium, the development of Stakeholders oriented activities, based on a thorough organisation of dissemination, and the contribution to a widespread socio-economic issue, represented by the decreasing urban quality of life, will originate a potentially huge market for results dissemination and exploitation. The exploitation of the models suite will begin within the Project with the application of the tool to the analysis of measures tested in the seven involved cities: Athens, Bologna, Brussels, Graz, Grenoble, London and Rome. The designed strict coherence with EU Policies for Environment, Transport, and Urban Life Quality, together with the proper liaison with relevant Projects in the whole 5th FP, will guarantee the expected resonance of the project within EC research effort.

### **Expected Impacts**

The key result of ISHTAR Project will be the realisation of a multi-impacts models suite for the assessment of a wide menu of measures for urban life quality. The application of the tool to the measures tested in the involved cities will provide indication of tool usefulness, accuracy, applicability and estimation of impacts on health, environment, monuments. The users involvement will provide evidence of the impact of the performed research. The availability of the ISHTAR suite will allow in future public administrations and consultant companies to run integrated and advanced environmental assessment of short-term actions and long-term policies for the improvement of the urban quality of life. This twofold opportunity can bring environmental and health benefits on one side, and employment opportunity and improved efficiency of the urban system on the other. The main immediate beneficiaries of the new decision support tool will be the local authorities, having the chance of optimising integrated

and not conflicting urban policies, and citizens living in cities where the recovery of public health, transport efficiency and artistic heritage will be carefully designed and measured.

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## **PLUME (Planning and Urban Mobility in Europe)**

**Project Reference:** EVK4-2002-20011  
**Contract Type:** Thematic Network

**Start Date:** 1-11- 2002  
**End Date:** 30-04-2005  
**Duration:** 30 months

### **Problems to be solved**

Across Europe there is a common challenge to improve the quality of life in urban communities, and to ensure the competitiveness of cities, whilst promoting sustainable development. All cities face common challenges relating to air quality, noise, urban sprawl, traffic congestion, waste, economic competitiveness, job creation, security, social inclusion, and maintaining a deteriorating infrastructure, built environment and cultural heritage. At the heart of these issues is the fundamental question of how to improve urban planning, in particular the planning of land use linked to a more sustainable urban mobility. The question for urban policy-makers and planners is how to integrate these distinct disciplines at the policy level and operationally, given the different actors involved. The question has existed for many years, but has remained unsolved, mainly due to inadequate channels of communication between researchers, planning officials and policy-makers. A number of research projects exist that deal with the question of how to implement integrated strategies for sustainable development and sustainable urban mobility. There is now a major challenge is to ensure that the results of these projects are exploited to the full in the next few years by matching research outputs to user needs, enabling the means of information exchange, seeking agreement on best practice, and promoting the early introduction of new policies, measures and tools into urban and regional planning.

### **Scientific objectives and approach**

The objective is to facilitate the transfer of innovation in the field of planning and urban mobility from the research community to end-users. The approach is based on a periodic synthesis of research findings and case studies, presentation of conclusions and recommendations to a selected group of local authorities and networks, and active exploitation of project results by national facilitators who will reach out to end-users to promote implementation of best practices.

### **Expected impacts**

The PLUME network is an ambitious project to establish, for the first time, a network bringing together experts and end-users with the explicit aim of exploring and exploiting best practice in the field of sustainable planning, development and mobility in the urban areas of Europe. It is innovative in terms of scope, scale and the breadth of the involved actors.

PLUME will assist cities in developing sustainable mobility strategies, improve health, enhance the environment, increase safety, improve accessibility and reduce social exclusion, increase efficiency, and enhance quality of life in all of these ways and by facilitating citizen involvement in transport policy development.

The network will create the conditions for the widespread introduction of innovative policies, measures and tools for sustainable urban planning and mobility based on best practice.

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#### *4.4.1 Strategic approaches and methodologies in urban planning towards sustainable transport*

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## **PROMPT (New means to Promote Pedestrian Traffic in Cities)**

**Project Reference:** EVK4-1999-00003  
**Contract Type:** Cost-sharing contracts

**Start Date:** 26-02-2000  
**End Date:** 25-02-2003  
**Duration:** 36 months

### **Problems to be solved**

Problems related to traffic, congestion, parking, traffic safety, noise and pollution, and to physical, functional and qualitative decay of our urban environment in general, are today particularly acute in European cities. Since the 1950's the trend has been in all European cities to become more and more car-oriented. Car traffic increasingly occupies public spaces of the cities and causes pollution, noise and casualties. This has happened despite many efforts to regulate it in cities. At the same time the share of the non-motorised transport modes is declining all over Europe, although bicycling in some European cities plays an important role. Several European policies bring forward the problems concerning quality of life, equality, parity of access to basic services, social inclusion, regeneration of urban areas, sustainability of the urban environment, pollution, condition of buildings, public spaces, cultural heritage and the balance of the urban system. The increase of the use of cars in our cities is one significant cause for all these problems. A revival of walking in cities would be a simple and natural way to remedy many of the above-mentioned problems. It would reduce the use of cars and enhance the use of public transport and thus decrease the pollution load. It would also promote the social life in the public spaces and improve the parity of citizens. The promotion of walking would also have many other positive consequences by, for example, improving citizens' physical condition and opening again their eyes to the details and richness of the surrounding nature and physical milieu. However, the problem remains how to effectively promote city walking.

### **Scientific objectives and approach**

The main goal of PROMPT is to promote walking in cities. Its concrete objective is to develop for that purpose new innovative tools and generic solutions for city actors involved in urban planning and design as well as decision making. The approach of the project is to consider all the causes enhancing or hindering walking in parallel. The scope ranges from the overall urban structure to the detailed street level. The tools and solutions are aimed at problem identification, design and planning as well as implementation of the considered measures in different local or European wide situations. The project is based on the analysis of certain existing towns in the participating countries and of some relevant case areas in them.

The analysis is made according to six different themes:

1. safety,
2. accessibility,
3. comfort,
4. attractiveness,
5. intermodality and
6. implementation.

Although one can promote walking by considering each of these issues one by one, it is crucial to consider how they work together: the whole is not the sum of its parts. Thus, a multidisciplinary approach is utilised to find good comprehensive solutions for the identified problems. Different user categories, climatic conditions, different situations in the urban structure and cultural values of the site are also taken into account in the analysis.

### **Expected impacts**

The planners', designers' and decision makers' knowledge about how to promote walking in practice is being considerably improved through the establishment of new tools and solutions and their effective dissemination during and after the project. This, in turn, is expected to increase the share of walking in the future transport bringing along the benefits stated above. The main benefits will be the decrease of harmful impacts on the environment as well as the improvement of the accessibility to the public spaces, the health of the citizens, and their equality regardless of car ownership, health or disability. The increase of walking means also reductions in vehicle and road investments. Further, it means fewer costs in



pollution abatements, less accidents and injuries and less damages in buildings. The impacts are difficult to quantify beforehand, but the project aims also at making some more concrete estimation of them. The main beneficiaries are the citizens themselves as well as the city authorities in many ways.

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## **PROPOLIS (Planning and Research of Policies for Land Use and Transport for Increasing Urban Sustainability)**

**Project Reference:** EVK4-1999-00005  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-01-2000  
**End Date:** 28-02-2003  
**Duration:** 38 months

### **Problems to be solved**

More than three-quarters of the population of Western Europe live in cities. Their quality of life, health as well as safety are to a considerable extent affected by the environmental quality, provision of and access to services, and safety of their home cities. Part of the economic efficiency of urban regions is lost due to urban congestion and pollution. Methodologies are needed for predicting and mitigating negative changes and for bringing about positive ones. PROPOLIS project addresses these issues by enabling the prediction of the impacts of urban transport and land use policies. The problems of growing traffic and the sprawl of urban areas together with the associated adverse environmental, social and economic impacts are experienced everywhere in Europe. Therefore, accumulating know-how, developing methodologies and searching for sustainable urban policies is no doubt of strategic importance and a field meriting a European-wide approach and concentration of know-how and resources. PROPOLIS contributes to the implementation of many of the EU's policies, especially environment, energy and transport. It also addresses questions of European wide interest and of strategic importance.

### **Scientific objectives and approach**

The objective of PROPOLIS is to research, develop and test integrated land use and transport policies, tools and comprehensive assessment methodologies in order to define sustainable long-term urban strategies and to demonstrate their effects in European cities. The work is executed through developing a set of indicators measuring the environmental, social and economic components of sustainability. Values for these indicators are calculated using enhanced urban land use and transport models and new GIS and Internet based modules. A decision support tool is used to evaluate the sets of indicator values in order to arrive at aggregate environmental, social and economic indices for the alternative policy options. To include the long run land use effects a time horizon of 20 years or more is used. The innovations of the PROPOLIS project are related to the integrated and comprehensive approach, to the common framework for analysis with different land use and transport models, to the combination of strategic interactive land use and transport models and GIS techniques. The feedback from the attributes of environmental quality to the locating process of households and firms is part of the innovation. The approach is also likely to produce innovative policy recommendations, as the system is able to reveal the interactions and multiplier effects by following the impact chains in the system.

### **Expected impacts**

PROPOLIS approach is used to systematically analyse policy options in 7 European cities to reach general recommendations for optimum combinations of different policy types. The strategies improve urban sustainability in general and radically reduce urban pollution and congestion without compromising economic efficiency and social sustainability. The benefits at the European level are mostly related to the general conclusions and recommendations for European urban regions. Efficiency increase will lead to improved competitiveness and employment, to better economy and welfare. The project also produces a set of well-defined indicators for use for benchmarking purposes throughout Europe. The national and local authorities in the case city regions benefit from the project by having updated and enhanced urban models and evaluation system available for their use. This system can be used when planning new policies, plans or large-scale projects. The system is especially well suited for environmental impact assessments, which are forced by law for any large-scale project. The achievement of the goal - to specify and demonstrate the effects of long term strategies that could be generally adapted in different European urban regions - would lead the way to better environment, land use patterns, transport systems, economy and social conditions for European citizens - towards sustainable development.

<http://www.ltcon.fi/propolis/>

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## **PROSPECTS (Procedures for recommending optimal sustainable planning of European city transport systems)**

**Project Reference:** EVK4-1999-00002  
**Contract Type:** Cost-sharing contracts

**Start Date:** 02-01-2000  
**End Date:** 31-01-2003  
**Duration:** 37 months

### **Problems to be solved**

PROSPECTS is designed to help city authorities meet the challenges set in "The Common Transport Policy" which advocates the achievement of sustainable mobility. Sustainability in that sense is currently jeopardised by the growth in car ownership and use, the parallel dominance of road vehicles in freight transport, and the decentralisation of urban land use. The resulting problems include congestion, which is extending over longer period and larger areas; increased pollutants, noise and visual intrusion; higher levels of fuel consumption, and hence carbon dioxide emissions, adversely affecting the global environment; higher numbers of road accidents; reduced accessibility by public transport and lower quality journeys on foot and by cycle, thus aggravating problems of social exclusion; and, though all of these, a deterioration in quality of life and in the efficiency of the urban economy. City authorities have available an increasing range of policy measures to tackle these problems and are actively seeking integrated solutions. However, it is often difficult to identify that combination of measures, which will achieve the optimal strategy for a particular city. Moreover, there are several barriers to implementing optimal strategies, including practical problems, lack of legislation, division of responsibilities, lack of finance and, above all, lack of public acceptance.

### **Scientific objectives and approach**

The principal objective of PROSPECTS is to provide cities with the guidance, which they need in order to generate optimal land use and transport strategies to meet the challenge of sustainability in their particular circumstances. The sub-objectives, each of which is associated with a separate technical Work Package, are to identify the decision making needs of cities. To assess and enhance evaluation tools to aid decision making. To assess and enhance forecasting and analysis tools for the land use/transport system. To publish a Decision-Makers' Guidebook and supporting Methodological and Policy Guidebooks. To disseminate the results and exploit the three Guidebooks and the enhanced tools.

The first Work Package involves defining cities' policy objectives, underlying trends and future scenarios, policy options, decision making processes and barriers to implementation. These are identified initially with the Core Cities and then tested through the wider survey. The second Work Package focuses on the tools necessary for evaluating strategies against the specified objectives, identifying optimal strategies in terms of these objectives, and presenting information to decision makers and the public in an easily interpreted form. It develops current methods for multi-criteria analysis and optimisation against objective functions, and extend their application to land use measures. It uses GIS tools to aid presentation of results. The third Work Package develops existing forecasting and analysis tools. It starts with a review of the requirements arising from the review of decision making requirements, and the ability of existing tools to meet those requirements. It then develops existing policy explorers and sketch planning models for application and testing in the six Core Cities, and enhances four existing Core City land use/transport interaction models. The models are used both to illustrate decision making methods and to test policy options.

### **Expected impacts**

The principal outputs are provided by the fourth Workpackage, which produces the three Guidebooks. The first of these is a Decision-Makers' Guidebook, designed for politicians, senior officials and the public, and outlining the approach to decision making, the policy options, and the support tools available. The second, the Methodological Guidebook, is designed for professionals, and provides more extensive advice on the support tools for evaluation, forecasting and analysis. The third, the Policy Guidebook, describes current experience with the full range of policy options, and is of interest to politicians, professionals and the public. The three Guidebooks, covering decision making, methodology and policy advice, will be designed for ease of use by city authorities, and by the public in their cities. The advice will enable them to enhance sustainability, the environment, social inclusion and quality of life through the design of more effective land use and transport strategies. In addition it should help in improving the efficiency and accessibility of the transport system, hence reducing costs and increasing

competitiveness. Our work in OPTIMA and FATIMA identified strategies, which increased economic efficiency by 20-30% over previously preferred strategies, using transport policy measures alone. We would expect to be able to improve further on this by including land use measures and we will assess the potential scale of these benefits for all our Core Cities. The advice will also help to identify the key barriers to implementation, and the case for overcoming them, thus facilitating the achievement of optimal strategies. In all of these ways cities' competitiveness, both economically and as places to live, should be significantly enhanced.

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## **SCATTER (Sprawling cities and transport: from evaluation to recommendations)**

**Project Reference:** EVK4-2001-00083  
**Contract Type:**

**Start Date:**  
**End Date:**  
**Duration:**

### **Problems to be solved**

Urban sprawl is widely spread over Europe. It induces high level of car use and, usually, congestion on roads giving access to city centres. To limit the damages caused by urban sprawl in terms of congestion, air pollution and energy consumption, numerous European cities are implementing suburban public transport services, such as heavy or light rail. But by improving the accessibility, they create an incentive for a new wave of urban sprawl.

Therefore, in parallel with these new public transport services, accompanying measures have to be elaborated and implemented, in order to prevent, mitigate or control urban sprawl. The proposed project tackles this issue in which land use and transport are closely mixed up. The key aim of the project is to promote sustainable development. In addressing transport, land-use and environment in urban context, SCATTER covers the most important threats to the well being of the majority of European citizens.

### **Scientific objectives and approach**

The first stage of the work is to improve the understanding of the mechanisms of urban sprawl and its impacts. WP1 will carry out a state-of the-art review of urban sprawl impacts and urban sprawl measurement techniques, in order to use the most appropriate techniques in the next stages. WP2 will carry out a systemic analysis of urban sprawl on basis of expert interviews, in 6 case cities: Brussels, Stuttgart, Bristol, Helsinki, Rennes and Milan. WP3 will carry out a statistical analysis of urban sprawl impacts (population and job location, trip demand pattern, and air pollution) in the 6 case cities.

The second stage of the project is to carry out a review of measures aiming to wrestle with urban sprawl (WP4). The review will include a bibliographical review and travels to the USA. American cities have been subject to urban sprawl for a longer time than those in Europe and an extensive work already exists there. WP4 will also include a review of the institutional barriers. WP4 will end with selecting the measures to be evaluated in the next stage of the project.

The third stage of the project is the quantitative evaluation of measures aiming to prevent, mitigate or control urban sprawl, as accompanying measures for cities implementing suburban public transport. To do that, simulations will be carried out using integrated land-use/transport models, in a sub-set of 3 case cities (Brussels, Stuttgart, and Helsinki). (WP5). WP6 will carry out the quantitative assessment of measures, using a common evaluation framework specifically designed.

Then, WP7 will provide concrete recommendations to local authorities, on how to design accompanying measures. WP7 will also design an "urban sprawl monitoring tool", addressed to concerned European cities. WP7 will also provide each of the 6 case cities with a practical programme of measures. In parallel with the technical workpackages, WP8 will step up a group of end users (cities) and organise 2 workshops to involve them in the research.

### **Expected impacts**

The key output will be a document setting up recommendations to European cities implementing suburban public transport, about accompanying measures aimed to prevent, mitigate or control urban sprawl, in order to meet the needs of a sustainable urban development. The recommendations will consist of best practices to design accompanying measures, together with an evaluation of their impacts and overall efficiency, possible barriers to implementation (in particular institutional barriers), and possible negative side effects. SCATTER will also design an "urban sprawl monitoring tool" addressed to local authorities. Finally, SCATTER will apply the research outcomes to elaborate practical programmes of measures for the 6 case cities.

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## **SUTRA (Sustainable urban transportation)**

**Project Reference:** EVK4-1999-00013  
**Contract Type:** Cost-sharing contracts

**Start Date:** 27-06-2000  
**End Date:** 26-12-2002  
**Duration:** 30 months

### **Problems to be solved**

Transportation problems are among the most pressing strategic development problems in many cities, often a major constraint for long-term urban development in general. The Problems to be solved are the inefficiency of urban transportation systems and underlying land use patterns, which negatively affect quality of life, economic efficiency, and the environment; the high (and often hidden) costs of urban transportation in both socio-economic and environmental terms; and in particular the environmental consequences both in terms of physical aspects that include land and resource use, ecological aspects, and human health problems. Tools for comprehensive strategic analysis that are directly useful to city administrations are lacking.

New strategies for sustainable mobility will require a combination of measures with impacts on improved land-use/economic development planning; improved planning, management and use of transport infrastructures and facilities; incorporation of the real costs of both infrastructure and environment in investment policies and decisions and also in user costs; development of public transport and improvement of its competitive position; continued technical improvement of vehicles and fuels; encouraged use of less polluting fuels; promotion of a more environmentally rational use of the private car, including behavioural changes.

### **Scientific objectives and approach**

These problems can only be addressed with a consistent and comprehensive approach and planning methodology that helps to design strategies for sustainable cities. This will include an integration of socio-economic, environmental and technological concepts including the development, integration, and demonstration of methodologies to improve forecasting, assessment and strategic policy level decision support.

From a technical perspective, the project aims to develop and apply an indicator based approach compatible with Agenda 21 and common indicators for urban sustainability for a baseline analysis, ranking and benchmarking (within the participating cities and across all of Europe) that will ultimately support a discrete multi-criteria selection mechanism. It will use traffic equilibrium modelling to evaluate alternative transportation policies, including multi-modal systems and their relation to land use, technological development, socio-economic development, and spatial and structural urban development (landuse scenarios) in general. Air quality modelling will be used to translate transportation scenarios and their resultant emissions into ambient air quality estimates and population exposure. Economic analysis and energy systems analysis and modelling using well established modelling approaches such as MARKAL, will identify and evaluate cost effective transportation scenarios, consistent with the larger economic and technological framework.

Environmental impact assessment is used for the comprehensive evaluation of alternative transportation scenarios, using a rule-based checklist approach to cover environmental effects beyond air pollution, such as noise, waste including the complete life cycle of vehicles, space and resource requirements for the transportation infrastructure and its maintenance, and the effects of accidents. The long-term development scenarios, defined for each of the case study cities, will consider the current base line, a do-nothing scenario and a set of probable development strategies in terms of demographic, socio-economic, spatial and structural (land use), and technological developments over the next decade and beyond (30 year horizon).

### **Expected impacts**

The primary expected impact is to improve the quality of urban life, health and safety by contributing towards sustainable transportation in sustainable, economically efficient, attractive, enjoyable and liveable, cities. Solutions for sustainable transportation leading to the improvement of the quality of life in urban communities and the associated urban regions, and thus the competitiveness of European cities are the goal. A better information basis, planning and decision support tools designed for the direct use



by city administrations is the means. Citizen and stakeholder participation in urban decision making processes, but also the underlying awareness building and educational aspects will be supported by making the project results available as a public information system on the Internet. SUTRA will also contribute to the implementation of European policies, Directives, and guidelines, including the European Community programme of policy and action in relation to the environment and sustainable development (OJ C 138, 17/05/1993), the Air Quality Framework Directive (96/62/EC) and several Community Directives and communications related to transportation and sustainable development.

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## **TRANSPLUS (Transport Planning, Land Use and Sustainability)**

**Project Reference:** EVK4-1999-00009  
**Type:** Cost-sharing contracts

**Start Date:** 04-01-2000 **Contract**  
**End Date:** 15-08-2003  
**Duration:** 44 months

### **Problems to be solved**

European cities are affected by pollution and congestion problems created by unsustainable transport patterns. This, to some extent, could be addressed in the long run by integrated land use and transport planning. The current problem to be solved is the lack of a consistent and widely spread bulk of knowledge and coherent institutional/action framework to integrate land use and transport policies at urban, regional and national level. This integration process is to be made towards common goals of sustainable transport and urban development. The lack of integration among 1) urban departments in charge of different policies, 2) layers of government -national, regional, local- with different planning and regulatory powers, 3) public administrations and citizens' associations or other private stakeholders interests, causes several socio-economic problems, including:

- social tensions coming from the realisation of projects which do not meet people needs,
- waste of economic resources which occurs when the impacts of non integrated projects are conflicting,
- exaggerated exploitation of environmental resources due to an irrational city development, which fails to minimise space consumption and travel needs. TRANSPLUS addresses these problems through the analysis of best practice and planning tools aimed at reducing private car use, fostering public and non motorised transport modes. The main contribution of TRANSPLUS to the solution of the urban problems is to promote and monitor the replication on an European-wide scale of the most effective integrated solutions, i.e. those which can be easily transferred between different member states and applied without any significant modification to existing institutional frame conditions. TRANSPLUS highlights also the possible modifications to the organisational, legal, financial and other non-technical national frameworks, which might facilitate integrated approaches.

### **Scientific objectives and approach**

The project embraces an integrated land-use and transport planning approach to manage transport demand and contribute towards the creation of a common understanding of the issues at stake and the possible ways to tackle them. TRANSPLUS initiates and fosters a continuous learning process involving consultants and European cities interested in exploring and adopting innovative policy measures.

The research process is articulated as follows:

1. System analysis of megatrends in urban development and strategic approaches towards sustainable transport. The latter includes three general categories -collective transport promotion; promotion of non motorised modes; restriction of motorised individual transport- and identifies specific strategies with close land use inter-relation;
2. Learning process involving researchers and users for the analysis, for each identified strategy, of the overall planning and implementation cycle, including the design of specific measures and ways of gaining political acceptance, and the evaluation of final outcomes and side effects;
3. Analysis of barriers to realisation and appraisal of structural compatibility and potential transferability of policies implemented in different contexts, based on the lessons learned in the analysis of significant practices;
4. Analysis of different methodologies to promote citizens, stakeholders and users participation to the different phases of policy planning and implementation;
5. Networking and dissemination activities supported by the development of a web site, realisation of an introductory brochure and subsequent newsletters, organisation of workshops enriched by the participation of interested cities, and the final production of TRANSPLUS guidelines. TRANSPLUS is included into a cluster of five research projects on "strategic approaches to integrate transport and land use planning".

### **Expected impacts**

These include:

- identification and evaluation of best practice case studies;

- assessment of best ways to combine land use and transport policies in the urban context neutralising barriers, ensuring compatibility and transferability between countries and cities, based also on citizens participation;
- identification and development of a consistent set of relevant indicators to evaluate the success of such policies;
- identification of practical criteria for land use and transport policies/infrastructures impacts evaluation, apt to be included in the eligibility criteria for infrastructure projects which require the EU financing, and widely dissemination of them using the TRANSPLUS guidelines;
- harmonisation of the national land use and transport planning and policy frameworks in EU Member States, thanks to the detailed knowledge of the barriers to the transferability of the most effective practices at the country and city level, and the identification of those potentially removable, produced by TRANSPLUS;
- support to the application of the EU Environmental Impact Assessment (EIA) directive in Member States, improving the knowledge about the typical environmental impacts of integrated land use and transport policies and projects, thanks to the analysis of best practices identified by TRANSPLUS;
- Finally, promotion of the European Spatial Development Perspective in the EU Member States, thanks to the common understanding and awareness of new more sustainable planning concepts and practices at all the levels of government -local, regional and national- created by the TRANSPLUS research and dissemination work.

The impacts listed above represent an overall improvement in the capacity to understand the viability of integrated solutions and their potential benefits in different frame conditions. But the success of any integrated solution depends on its practical application. This will be mainly reached through networking activities that ultimately will reach a significant sample of local decision makers. The idea is to supply them with valuable and constantly updated information on best practice, tools, indicators of integrated land use and transport policies. Interested actors will have the possibility to join the TRANSPLUS network, also beyond the project end, on a voluntary basis, continuing the exchange of information, know-how and strategic thinking about integrated approaches for sustainable transport and land use policies.

## Extension to Newly Accession States

According to the targets of TRANSPLUS, an extension has been proposed to selected Newly Accession States (Proposal No EVK4-2002-00550 – TRANSPLUS-ACCESS). The objectives of the extension are to include new participants from some Newly Accession States (NAS), namely Malta, Poland, Romania and Slovakia, within the running project. The extension to NAS will involve additional activities concerning:

- Assessment of both planning and implementation strategies;
- Analysis of barriers, potential solution and their transferability;
- Promotion of the integration of citizens and stakeholders in the urban decision making;
- Networking and dissemination.

Almost all the additional activities will be performed referring to specific case studies that each new partner will bring into the project.

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## **VELOINFO (The European Network for Cycling Expertise)**

**Project Reference:** EVK4-2001-00068  
**Contract Type:**

**Start Date:**  
**End Date:**  
**Duration:**

### **Problems to be solved**

Cycling is a daily mode of transport that needs to be facilitated as other modes. When treated this way (and not primarily as a recreational vehicle), the bicycle can alleviate urban transportation problems. The bicycle induces the reduction of congestion, air pollution and traffic accidents. To stimulate cycling, cities must take a range of infrastructural and promotional measures. The essential expertise on how to do this is practically unavailable for most transportation professionals outside a small group of member states. General transportation networks, such as ELTIS, do not contain enough specific expertise on cycling issues since cycling plays only a minor part compared to other transport modes.

Cycling policy, as an expertise, is new. It is not a specific curriculum in higher education; professionals learn by doing. There is a need for technical assistance. Standard procedures for urban planning give priority to motorised transport and neglect the needs of cyclists.

### **Scientific objectives and approach**

The high-level objective of VeloInfo is: supporting local authorities and experts to accomplish sustainable urban planning by establishing a WWW-based expertise centre on bicycle planning policies and bicycle use, of which the usefulness and continuity is ensured.

The usefulness and continuity of the expertise centre is ensured by (i) involving users and suppliers of cycling policy knowledge in the development of the system and (ii) making use of state-of-the-art technology for data storage, information disclosure and internet communication. Specific attention is given to creating a critical mass of content on bicycle policy information and use. The partners develop a sustainable business model to create a system that will continue to function after the project lifetime. The continuity of VeloInfo is guaranteed, by the combined force of industry, cities, expert institutes and cyclist organisations.

### **Expected impacts**

VeloInfo will be a WWW based expertise centre that supports cities to incorporate the bicycle in urban planning. Access to expertise on cycling is essential to a local authority that wishes to increase bicycle use, by regarding the bicycle as an ordinary and daily mode of urban transport. VeloInfo has the purpose to become a key centre of expert and knowledge on bicycle planning, supporting all European professionals on urban planning, infrastructure and transport.

A critical mass of content will be established that, on the one hand, ensures a sufficient coverage of cycling expertise according to experts and, on the other hand, contains the answers for at least 80% of the search requests of the users of VeloInfo.

Cities will use VeloInfo to find bibliography and experts on cycling policy. Cities can also find other cities, to learn from each other's experiences and best practices. New potential users entering the VeloInfo web site will be invited to use an interactive tool that helps them to find search terms and documents relevant for their specific situation.

Besides, the guided tour tool gives a rough estimation of what can be achieved by implementing cycling policy, in terms of, e.g., reduction of exhaust emissions, congestion, and traffic safety.

Experts will use VeloInfo to enlarge their expertise and to find other experts and local authorities that need support in developing cycling policy. All users participate in a network, which operates as a literature database, an expert system, and also as a discussion forum. VeloInfo thus offers a forum for the exchange of ideas, data, experience and expertise.

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## 4.4.2 Comparative assessment and demonstration of novel transport forms and related infrastructure

### CYBERMOVE (Cybernetic Transportation Systems for the Cities of Tomorrow)

**Project Reference:** EVK4-2001-00051  
**Contract Type:** Combined RTD/DEMO

**Start Date:** 01-12-2001  
**End Date:** 30-11-2004  
**Duration:** 36 months

#### Problems to be solved

In many urban environments, private automobile use has led to dramatic problems with respect to congestion, energy (our dependency on oil resources), pollution, noise, safety and general degradation of the quality of life. Therefore, historical city centres are facing severe problems, with traditional commerce declining and moving to the periphery, and they become less attractive to tourists. Although public transport systems have seen many recent improvements (mostly due to information technologies), in many cases the car still offers a much better service at the individual level. This leads to a constant increase in its use, hence to non sustainable development of urban transportation. Nevertheless, there is an increasing awareness that technology can contribute to a sustainable development of our European Cities if a global approach of sociological, economical, environmental parameters is attached to the studies on the mobility function.

#### Scientific objectives and approach

A new approach for mobility, emerging now as a complementary and generic solution to the private passenger car, offers the same flexibility and much less nuisances: small automated vehicles. They have the potential to form a part of the public transportation system and to complement mass transit and non-motorised transport, providing passenger service for any location at any time. Such systems can also evolve to provide door to door freight delivery or garbage collection. Experiments are under way in several places in Europe and in Japan and the first operational system (the ParkShuttles) started in the Netherlands at the end of 1997 and is being expanded. CyberMove approach is to concretely confront Cities Authorities with such technologies through demonstration activities aiming to address a broad range of barriers such as: technology confidence, customs, landscape scenery, user-friendliness.

#### Expected impacts

The advantages of autonomous driving capabilities and the new transportation systems, based on environment friendly vehicles, are numerous:

First, they provide reduction of congestion, and better traffic flow, air quality and energy conservation.

Second, the system is much safer than manual driving, so there is no need for a drivers' license and anybody can use it, including also people with handicaps and in particular elderly persons.

Third, the cars can be moved easily from one location to another, using fully autonomous driving platoon formations with a single driver.

Fourth, the cars can drive autonomously to a remote parking area when not needed, hence leaving valuable urban space free for pedestrians and cyclists.

Fifth, the concept and technologies are also appropriate for delivery of goods in city centres and even for garbage collection: the same infrastructure could be used by specifically adapted vehicles with delivery (or collection) "boxes".

Finally, flexible design will make it possible to optimise the overall system performance, taking into account the needs and requirements of the private consumer, the system operator and the public (e.g. municipality), permitting the system to operate in different modes at different times of the day, week and year.

#### Coordinator



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## **ECTOS (Ecological City Transport System: Demonstration, Evaluation and Research Project of Hydrogen fuel cell bus transportation system of the future)**

**Project Reference:** EVK4-2000-00033  
**Contract Type:** Cost-sharing contracts

**Start Date:** 01-03-2001  
**End Date:** 01-03-2005  
**Duration:** 48 months

### **Problems to be solved**

A consortium of leading European corporations within the area of hydrogen production and fuel distribution, vehicle manufacturing join forces in Reykjavik, Iceland to perform a real scale comparative assessment of the effect of changing the transport energy base from fossil fuel to regeneratively produced hydrogen. The ECTOS-project involves research, demonstration and evaluation of hydrogen infrastructure and fuel cell buses.

The research will focus on the socio-economic implications of transforming from one fuel to another, transport model research, life-cycle analysis, environmental monitoring and cost-benefit analysis Iceland has been chosen for the project as it is possible to run a hydrogen project in a CO<sub>2</sub> free manner, that is there will be no emission of greenhouse gases in the whole energy chain. Results and experience will then be channelled into other similar European projects through various dissemination activities.

### **Scientific objectives and approach**

### **Expected impacts**

### **Coordinator**

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## **EDICT (Evaluation and demonstration of innovative city transport)**

**Project Reference:** EVK4-2001-00058  
**Contract Type:** Cost-sharing contract

**Start Date:** 01-12-2001  
**End Date:** 31-05-2004  
**Duration:** 30 months

### **Problems to be solved**

There is an urgent need for sustainable forms of transport that will address problems of congestion, poor air quality and social inclusion in European cities. These should offer an alternative to the car, which will complement existing forms of public transport.

Those who do not have access to a private car should be entitled to a comparable level of comfort and flexibility in order that they should be able to benefit from economic opportunities offered at destinations not served conveniently at present.

The EDICT project assesses and demonstrates the concept of Personal Rapid Transit (PRT) as a potential solution to meet this need. The assessment is being undertaken in 4 European cities: Cardiff (Wales, UK), Eindhoven (Netherlands), Huddinge (Sweden), and Ciampino (Italy). Six further cities in EC and Accession countries will participate as 'followers'. These are Sigtuna (Sweden), Bristol (UK), Almelo (Netherlands), Reggio Calabria (Italy), Maroussi (Greece) and Olomouc (Czech Republic). Practical assessment of user and community benefits will be accomplished through full-scale demonstration in Cardiff. The results will be disseminated widely to provide information on best practice for assessment and introduction of PRT systems to improve future transport in Europe.

### **Scientific objectives and approach**

The specific objectives of the EDICT project are:

- To demonstrate and evaluate PRT in a European Capital City
- To examine the opportunities for PRT for practical improvement of both public transport and the environment in four European cities.
- To assess the environmental impact of PRT compared to other forms of transport, including energy, emissions, noise, visual intrusion, severance etc.
- To assess the key social economic and cultural issues of PRT systems in Europe.
- To assess, recommend and disseminate best practice for the evaluation and introduction of PRT.

Studies to evaluate the technical, environmental, social and economic effects of PRT will be undertaken in four cities, of different sizes, location and transport issues against a common framework agreed at the start of the work. Each local study will involve the definition of a preliminary PRT route to match existing and projected transport needs and to integrate well with existing public transport.

A demonstration of the PRT system will be undertaken in Cardiff (the capital city of Wales) so that public reaction can be assessed. 'Follower' cities will participate in and critique the project, thus gaining first hand knowledge of the benefits and issues that can confront cities introducing such systems. A leading Czech transport institute will provide insight into issues that are relevant to accession countries. Wide dissemination of the results during and at the end of the project will provide both the opportunities for extensive feedback on the work and means of making available the results of the work on a pan-European basis.

### **Expected impacts**

The project will deliver:

- guidelines for the assessment and development of PRT systems in other cities;
- an assessment of the technical, environmental, social and economic benefits of the PRT concept in 4 EU cities;
- an assessment of the potential for PRT across Europe;
- the direct benefits of a full scale demonstrator of a PRT scheme.

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Reggio Calabria (Italy)  
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## **MOSES (Mobility Services for Urban Sustainability)**

**Project Reference:** EVK4-CT-2000-00042  
**Contract Type:**

**Start Date:** 1-05-2001  
**End Date:** 31-10-2004  
**Duration:** 42 months

### **Problems to be solved**

Cities suffer from increasing traffic – not only from air-pollution, noise, and the threat of accidents but also from the way valuable space is used, often in unattractive ways. The high density European City has a huge potential for improvements in the urban environment potentially leading to more resource-efficient and sustainable development. Transport and Mobility are key factors in strategies that can bring about sustainable development. Improved vehicle and transport technology alone will not solve urban structural problems.

A fundamental change in mobility patterns and the impacts on both the urban and global environment (e.g. CO<sub>2</sub>-emissions) can be achieved with a more rational use of the car. The implementation of modern mobility services such as Car-Sharing can become a key element of more car-independent sustainable mobility patterns. As a result, the use of urban infrastructure can become more efficient; housing development will need less parking etc.

### **Specific objectives and approach**

MOSES will further develop Car-Sharing as a market-based mobility services to reduce the dependence on the private car – without restricting mobility. A key issue of the MOSES project is to integrate Car-Sharing into intermodal services and into urban development. The existing small-scale system of Car-Sharing is the starting point for significantly improved services. Its further development during the project will aim to integrate innovative technologies for user-needs orientated services, develop intermodal co-operation with other mobility services (e.g. public transport, taxi, cycling, delivery services etc.) and integrate these innovative services into strategies of urban revitalisation. MOSES is practice orientated and will examine the implementation under real-life conditions – with users in various Cities and under different conditions. MOSES will have sizeable positive impacts on the local environment and local traffic patterns.

The research will focus on the factors of growth (in terms of technologies, service tools, awareness, and integration) for successful implementation and acceptance by customers. To enhance the impacts of the project, MOSES will deliver guidelines for further exploitation of the car sharing concept.

### **Expected impacts**

In the MOSES project it is expected to achieve about 12.000 new Car-Sharers on all sites by end of 2004. Direct impacts will be reduced number of cars in the participating cities and more efficient use of infrastructure reduced mileage driven and higher use of environmentally friendly modes of transport (pollution reduction etc.). Indirect and more longer term impacts are expected through the studies and model projects aiming at the integration of car sharing into urban development (both new developments and regeneration) to recreate a more attractive urban lifestyle – as a precondition for sustainable urban development.

It is assumed that in European Union Cities about 10% of private cars could be replaced within less than a decade – reducing the demand for parking space by more than 10%.

At the EU-level a mileage reduction of about 30 – 50 billion kilometres annually could be achieved within one decade by these integrated mobility services– with an annual energy saving equivalent of about 6 – 8 million tons of CO<sub>2</sub>. The potential of energy saving is comparable to capital intensive high-technology measures in other fields.

The stakeholders for sustainable urban development will be addressed with a series of seminars at the MOSES sites, conference contributions, the MOSES website and some printed deliverables such as the final 'Guide for Actors'.

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## **NETMOBIL (New Transport system concepts for enhanced and sustainable personal mobility)**

**Project Reference:** EVK4-2002-00560  
**Contract Type:**

**Start Date:**  
**End Date:**  
**Duration:**

### **Problems to be solved**

The ability to undertake personal travel is regarded as an important indicator of the quality of life. However rapid growth of personal car travel and associated costs to our health, society, environment and economy has put transport high on both public and political agendas. NETMOBIL will support a project Cluster effort into research and demonstration of a range of innovative urban transport systems: automated driving systems with on-demand and door-to-door capabilities, personal rapid transit, advanced driver assistance systems and automated vehicle guidance systems.

The strategic objective is to support sustainable mobility by: reducing stop/start flows characteristic of urban areas through driver assistance and automation technologies; reducing urban pollution through use of automated electric vehicles; improving driver and passenger safety through driver assistance and automation technologies, and by developing high quality services through provision of door-to-door, demand responsive and high speed collective transport.

These technologies offer the potential for both better and safer transport and an improved environment, providing the opportunity to improve the quality of life for the whole urban community, including both the user and the non-user of the system. High quality sensitively designed public transport services also offer benefits in terms of increasing accessibility and reducing social exclusion. By supporting partner Cluster project research, NETMOBIL is supporting the EU policy initiatives for sustainable urban transport in Europe.

### **Scientific objectives and approach**

The principal objective of NETMOBIL is to enable local and national government bodies, international organisations, industry and commerce, interest groups and individuals to obtain maximum benefit of long term sustainability from the results of research undertaken by the Cluster of research activities within the field of: automated vehicles, personal rapid transit, advanced driver assistance systems and automated vehicle guidance systems, as well as their underlying technologies.

High quality research in the area of new vehicle technology for transport will be identified at regional, national and international level, and integrated within the NETMOBIL project. Synergies between the projects and common issues that would benefit from a co-operative approach, as well as gaps in research areas, will also be identified. The European potential would be determined and appropriate dissemination undertaken to encourage active exploitation of project results. New areas of research that will enhance Europe's position as a research leader will be identified.

### **Expected impacts**

The NETMOBIL Project will accelerate development and implementation of innovative urban transportation systems, through its support in bringing all the European actors of this field together to facilitate collaborative research into automated vehicles, to test and exchange best practices, share technological and regulatory development work, and disseminate information to the widest audience.

This should result in a much quicker exploitation of innovative urban transport technologies, as well as releasing potential benefits of innovative urban transport system products and services within the Community. The quality of urban transport should be improved, offering enhanced environmental performance of vehicles and improved safety for transport users and the workforce, contributing to a better quality of life, better health and safety, a better environment and better employment opportunities.

### **Coordinator**

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## Participants

## **STARDUST (Towards sustainable town development: a research on deployment of urban sustainable transport)**

**Project Reference:** EVK4-2000-00590  
**Contract Type:** Shared cost RTD

**Start Date:** 01-04-2001  
**End Date:** 30-06-2004  
**Duration:** 39 months

### **Problems to be solved**

Despite their differences, all European cities beyond a certain size are facing the same issues: air pollution, noise, congestion, management of waste, infrastructure maintenance, building maintenance, safety, viability of economic activities, protection of employment. 80 % of Europeans live in cities facing increasing problems of traffic pollution and congestion. Almost forty millions Europeans are annually exposed to pollution exceeding at least one air quality guideline. The problem is also reflected in the 2 % loss in GNP due to congestion and in the continuing growth of traffic.

European cities have therefore to implement efficient strategies in order to improve the quality of life in urban and suburban areas, whilst reducing social inequity, increasing the participation of citizens in decision-making process, and finally contributing to improve the economic competitiveness. These are the main objectives of a sustainable urban development.

The aim of STARDUST is to assess the extent to which ADAS (Advanced Driver Assistance Systems) and AVG (Automated Vehicle Guidance) systems can contribute to a sustainable urban development not only in terms of direct impacts on traffic conditions and environment but also in terms of impacts on social life, economic viability, safety, etc.

The majority of these systems were first designed to be used in an inter-urban context, i.e. on motorways. Now, progressively, they are considered for urban contexts and systems manufacturers are designing new prototypes adapted to urban contexts. For example, first Adaptive Cruise Control (ACC) systems were designed to be used on motorways, at speeds higher than 50 km/h. So do the first marketed ACC systems. Meanwhile, however, other systems aiming to adaptive longitudinal control of the vehicle have been developed (at a prototype stage) for use on urban networks. This again confirms how much the work proposed in STARDUST is a topical question.

### **Scientific objectives and approach**

STARDUST will carry out a global and quantified evaluation of the opportunity of the deployment of some selected ADAS/AVG systems. The selection of the systems to be evaluated will be made on the basis of a review of ADAS and AVG options to 2010. The impacts of the systems will be assessed at a city-level, in 3 case study cities, using semi-dynamic assignment models. The systems will then be evaluated, using an evaluation framework specifically set up, which will include environmental (congestion, energy consumption, pollutants emission,), social (safety, accessibility,), and economic indicators (accessibility to economic activities,).

The originality and the strength of the STARDUST approach are to combine analysis at behavioural, microscopic and macroscopic level, so that the final recommendations will be based on the actual driver behaviour, rather than on theoretical views. Most innovative in STARDUST is the integration of end user potential acceptance analysis (by means of stated preference surveys), investigation of the human factors issues (using data from instrumented vehicles, driving simulators, and microscopic modelling) and larger scale assessment of the impacts, at city-level (using semi-dynamic traffic assignment models). Besides, the results of the impact assessment will be compared between three Northwest-European cities (Brussels, Southampton, and Oslo), which again highly increases the reliability of the final conclusions. Finally, STARDUST will also carry out a review and synthesis of the existing analysis on the legal and institutional aspects of the deployment of the selected ADAS and AVG systems.

### **Expected results**

The final benefits from the project will be:

- an improved understanding of human interaction with ADAS/AVG technology;

- the re-calibration of large-scale traffic assignment models to represent the driver behaviour when supported by ADAS/AVG systems;
- a quantified assessment of the impacts of large-scale deployment of the systems, in the 3 case study cities, and a global, comprehensive and quantified evaluation of the systems; recommendations to the interested stakeholders : the Commission, cities and local authorities, governments and regional authorities, car and systems manufacturers.

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