Investing in European success

Innovating Cities in Europe and Worldwide
Investing in European success
Innovating cities in Europe and worldwide

European Commission
Directorate-General for Research and Innovation
Directorate I – Climate Action and Resource Efficiency
Unit I.3 – Sustainable Management of Natural Resources

Contact: Marie Yeroyanni
E-mail: RTD-INNOVATING-CITIES@ec.europa.eu
RTD-PUBLICATIONS@ec.europa.eu
European Commission
B-1049 Brussels

Manuscript completed in March 2019.
Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information.


Luxembourg: Publications Office of the European Union, 2019


© European Union, 2019
Reuse is authorised provided the source is acknowledged. The reuse policy of European Commission documents is regulated by Decision 2011/833/EU (OJ L 330, 14.12.2011, p. 39).

For any use or reproduction of photos or other material that is not under the EU copyright, permission must be sought directly from the copyright holders.
Investing in European success

Innovating cities in Europe and worldwide
TABLE OF CONTENTS

Foreword

Introduction

I. Energy and climate 11
   1. FASUDIR – Enhancing energy efficiency across diverse urban areas 12
   2. CETIEB – Making Europe’s buildings more energy efficient 14
   3. EFFESUS – Adapting heritage environments to modern requirements 16

II. Nature-based solutions 19
   1. OPENNESS + OPERAS – A new approach to managing local ecosystems 20
   2. GREEN SURGE – Blossoming partnerships for our cities’ parks and plants 22
   3. TURAS – Nature-based solutions for urban dwellers 24

III. Green lifestyles in resilient cities 27
   1. IMPRINTS – Research enables early warning for flash floods 28
   2. RAMSES – New tool to help urban planners prepare for climate change 30
   3. GLAMURS – A recipe for “time-rich” sustainable lifestyles 32
   4. MILESECURE-2050 – Pioneering citizen manifesto for secure, clean energy 34

IV. Food on the move 37
   1. EUNOIA – Think smart for better transport planning 38
   2. SOLUTIONS – Sustainable transport – pass it on 40
   3. FOODMETRES – Home-grown food for the metropolis 42
   4. Strength2Food – Buy locally, buy quality: sustainability in public food procurement 44

V. People (social innovation and engagement) 47
   1. ARTS – Mapping out routes towards environmentally sustainable cities 48
   2. URBAN NEXUS – Sustainable cities of the future: harnessing all the expertise 50
   3. SEiSMiC – Bringing urban actors together for social innovation 52
   4. ENSUF – Mind the gap: coordinating urban development in Europe 54

VI. From Europe to the world 57
   1. NANOMATCH – Booster shots for historical buildings 58
   2. HERCULES – Europe’s landscapes – a better view 60
   3. ICEC – It takes a neighbourhood to build a city 62
   4. EN-SUGI – Together for sustainable cities: an international research alliance 64

EUROPEAN CAPITAL AWARDS 65
Paris: European Capital of Innovation 2017 65
Amsterdam: European Capital of Innovation 2016 67
The cities of the future will not just be made of brick or marble: they will actively respond to the changing lives of modern people, encouraging us to care of each other and our environment. Urban innovation is as much about social cohesion as it is about energy efficiency, circular economy, urban mobility or smart technology. In modern cities, science is an everyday reality for people, where they will be actively involved in the innovations and discoveries that shape their lives. In fact, I think of an evolution of science towards a triangle between the public, scientists and data, with the public firmly at the top.

I cannot stress enough how ambitious we need to be and what a crucial role science and innovation will play in finding new breakthrough technologies and business models for solving global challenges, which will need to be tested and implemented in urban settings. Whether it is finding solutions to air pollution, water management or integrating migrants, cities are forever at the frontier of the social and environmental challenges that Europe and the world are facing.

“Augustus boasted, not without reason, that he found it [Rome] of brick, but left it of marble. He made it safe too for the future, so far as human foresight could provide for this.”

Gaius Suetonius, The Lives of the Twelve Caesars
This booklet shows concrete examples of how EU research and innovation investment is transforming our cities, from the air and water to the way we eat and move, and how these changes reflect on society, the climate and the economy.

We have great responsibility as policymakers to take action at the right time. We must act now, together and with conviction because, quite simply, we cannot afford not to act.

Carlos Moedas,
European Commissioner for Research, Science and Innovation
INTRODUCTION

Innovating cities: a global challenge

Currently, 75 % of Europeans live in cities. This is projected to increase to 85 % by 2050, resulting in over 36 million new urban citizens. Cities are major contributors to challenges related to climate change, air quality, waste, health, transport, the economy, social cohesion, immigration, natural disasters and the consumption of natural resources (energy, water and food security). The complex nature of urban contexts calls for innovative and sustainable solutions developed through participatory approaches and social innovation to create safer, healthier and more prosperous cities.

The booklet “Investing in European success: Innovating cities in Europe and worldwide” describes outcomes from EU investment in research and innovation (R&I) for cities and with cities. The policy agenda that underpins the projects described here contributes to the 2030 Agenda for Sustainable Development, and the EU Urban Agenda, which focuses on better regulation, better funding and better knowledge exchange. It is also in line with the United Nations’ action-oriented New Urban Agenda, which focuses on housing, systemic urban design and planning, innovative governance and financing mechanisms for cities, and builds on Sustainable Development Goal 11 “to make cities and human settlements inclusive, safe, resilient and sustainable”.

Investing in a sustainable future

In the last few decades, the need for research and innovation into sustainable urban development has become more pressing. Research and innovation activities are focusing more attention on the changing environmental, economic and social factors, within a continuing trend of urbanisation. Through the different themes of the Seventh Framework Programme for Research and Technological Development (FP7), the EU has contributed to this research with a total investment of approximately EUR 1.9 billion. This investment is continuing in Horizon 2020, the EU’s current research and innovation programme, with a total investment of about EUR 3.1 billion. The European Commission also promotes urban sustainable development with other actions, such as innovative procurements (PCPs/PPIs), inducement prizes, and the European Capital of Innovation Award.

In line with the objectives of Horizon 2020, the new ‘Innovating Cities’ R&I strategic agenda¹ is mobilising and helping cities to address complex and cross-cutting challenges. It also helps to develop integrated, innovative solutions within the concept of a ‘city ecosystem’.

This booklet showcases EU-funded projects that are transforming our cities into living laboratories to solve the problems of their own making. Their success can inspire public debate on the kind of cities we want, and will help the development of future R&I programmes and related urban policies. Outstanding examples deserve a closer look, such as the cities of Amsterdam and Paris, recent winners of the European Innovation Capital Award. These visionary cities lead by example and show the impact of innovations in key areas of urban living, such as social innovation, inclusion, health and well-being.

¹ More information about the “Innovating Cities” strategic research and innovation agenda can be found on https://europa.eu/1FJ89Oq
Investing in European success
I. Energy and climate
From ancient city centres built up in the Middle Ages to decades-old high-rise apartment complexes, all types of urban areas stand to benefit from solutions developed in the FASUDIR project to help decision-makers select optimal sustainable retrofitting strategies.

The main outcome of the project is an integrated decision-support tool and related repository of energy-efficiency technologies. These allow urban retrofitting projects to be modelled in a 3D environment with different heating, insulation and other energy-efficiency solutions tested virtually.

“The decision support tool enables retrofitting projects to be designed from the ground up, taking into account the input of different stakeholders such as local residents, investors and public officials,” explains Giulia Barbano, the project’s dissemination manager at iiSBE Italia R&D.

It also means the technologies and materials used in the retrofitting are “optimally suited to the local climate, type of construction and societal and economic factors”.

The web-based tool allows project managers to select technologies and systems that can be applied at building and district scale, offering information on expected energy performance as well as cost considerations, potential social impacts, energy synergies and user comfort. By testing different solutions virtually, decision-makers can easily and quickly optimise retrofitting strategies and take better advantage of economies of scale, while energy efficiency innovations gain greater visibility through inclusion in the repository.

Used widely, the FASUDIR system made a significant contribution to improving the energy efficiency and cost-effectiveness of urban areas.
areas across Europe, helping to meet the EU’s target of cutting energy consumption by 20% by 2030. It also generated economic benefits for the construction sector and improved quality of life for urban residents.

**Crucial feedback**

Crucially, the approach enables stakeholders to provide feedback on projects before work begins, allowing decision-makers to address concerns and adapt retrofitting sustainable strategies to the local context. Such stakeholder feedback loops have been at the heart of the innovative design of the FASUDIR system from the outset.

“Key actors have been involved from the start of the project in the decision-support tool development through the establishment of local project committees, including experts on urban planning and retrofitting in all project countries,” Barbano says.

To validate the approach, the FASUDIR team conducted three case studies in diverse urban areas in Europe: a prefabricated housing estate in Budapest, a residential development in Frankfurt built in the 1970s, and part of the historic city centre of Santiago de Compostela, a UNESCO World Heritage site. For instance, the scores for the FASUDIR indicators identified domains where the district of Heinrich Lübke Siedlung in Frankfurt was poorly performing. These aspects were visualized using a scoring system for district indicators and meaningful colour codes. Models developed in the project case studies form the basis for retrofitting projects to improve energy efficiency, while commercial versions were set and developed by the project partners for wider application in the construction market.

“The three pilot areas are very different in terms of building ownership, population profile, climate and retrofitting needs,” Barbano says. “The fact that the FASUDIR tool offered effective and sustainable solutions in each case reflects the high potential of the system to address the retrofitting needs of a variety of urban areas.”
If Europe is to achieve its energy efficiency targets for 2020 and 2050, one vital step is to modify the continent’s vast stock of buildings to make them much more energy efficient.

Refurbishing old buildings to improve energy efficiency often leaves them so tightly sealed that indoor air quality suffers, with possible damaging consequences for human health and productivity.

The EU-funded CETIEB research project worked to solve this problem by devising innovative ways of both monitoring and controlling the indoor environment in the most cost-effective ways possible, so that Europe can achieve the ‘best of both worlds’ – highly energy efficient buildings together with optimal indoor air quality and climate.

It is estimated that, in Europe, people spend more than 90% of their time indoors, and that in more than 40% of these enclosed spaces people suffer from health or comfort-related complaints. As far back as 1984, the World Health Organization (WHO) reported an “increased frequency in buildings with indoor climate problems”. This phenomenon later became sufficiently widespread to be given its own name: ‘sick building syndrome’. So the problem is not new. But it is being given new impetus by the increased focus on energy efficiency.

One solution developed by the CETIEB team is a plant-based ‘biofilter’ to clean indoor air. This consists of a ‘living wall’ of plants, with an air fan and a water pump being used to draw air and pump it up through the roots of the plant. The plants act as a simple decorative feature, while the roots cleanse the air of volatile organic compounds, a class of chemicals which can be damaging to human health. The clean air is then passed back into the room.

The research team also pioneered the use of special purifying molecules built directly into walls or other surfaces. This technique involves mixing titanium dioxide (TiO₂), or titania, into a thin surface layer of plaster. Titania is a photocatalyst which, when activated by light, automatically oxidises and removes pollutants and pathogenic micro-organisms from the air.
A further novel technique developed by CETIEB uses what are known as ‘phase-change’ materials (PCMs). These materials give out heat when they freeze or solidify, and absorb heat when they melt. Built into walls, they can act as an efficient form of insulation or heat storage.

“By using a phase-change material which freezes at 18 °C and melts at 25 °C,” says project coordinator Jürgen Frick of the University of Stuttgart, Germany, “we can regulate the temperature fluctuations of a room. If the temperature falls to 18 °C, the PCM freezes and heats the room. When it rises to 25 °C, the PCM melts, energy is absorbed, and the room is cooled.”

Accurate monitoring mechanisms developed in CETIEB can detect patterns and changes in the environment. This information can be fed into ‘intelligent architecture’ systems which automatically trigger adjustments in the room’s heating, ventilation and air-conditioning. Here, too, the CETIEB has developed a method of detecting VOCs using infra-red light which can identify VOCs at the level of parts per million. Even lower concentrations can be detected using metal oxides. The research team has also set up a ‘thermal comfort system’ which uses infra-red light focused on walls and floors to monitor heat patterns and even assess how these patterns are affected by the number of people in a room at any given time.

The techniques developed by the CETIEB team were tested at demonstration sites around Europe and in Taiwan, and a patent has been applied for in relation to the thermal comfort monitoring system. CETIEB techniques also contributed to the enhancement of design and construction market of Smart Home & Living with respect to comfort issues and health, in particular for elderly people.
An EU-funded project has developed and brought to market unique tools and methodologies for ensuring historical buildings meet modern environmental and energy-efficiency standards while preserving their original character.

Because 40% of the European housing stock was built before 1960 and 23% pre-1945, researchers within the EFFESUS project had to develop a new generation of methodologies, technologies and tools for adapting old buildings to modern requirements on a very large scale. At the same time, they had to be aware of the diversity of urban areas around the continent in terms of building materials, architectural design and climate.

And it was not just improving the energy efficiency and environmental footprint of the buildings themselves that the team needed to consider, but also the comfort and wellbeing of their inhabitants.

Dealing with the past

Historic buildings consume around 4% of all energy in the EU and produce 3% of CO₂ emissions. Increasing use of solutions, such as those developed in the EFFESUS project, can help Europe meet its CO₂ emissions reduction targets and make historic buildings, in particular, more energy efficient and comfortable to live in.

“Historic buildings were constructed in a totally different technology and energy context, and they were also built to address quite different expectations of living quality and comfort to those of today,” says Aitziber Egusquiza Ortega, a management team member at Fundacion Tecnalia Research & Innovation in Spain, which coordinated the project. “So the conservation of our historic cities must be linked with the design of strategies to reduce maintenance costs, energy consumption and CO₂ emission, but also to increase their comfort and liveability.”

The project has developed four innovative solutions: an aerogel insulation for cavity walls; an insulating mortar; a radiant reflective coating; and upgraded original windows.

Another key EFFESUS deliverable is a decision support system (DSS). This is an ecosystem of
tools and methodologies to support evidence-based diagnosis and decision-making. The DSS helps the decision-maker to identify and prioritise retrofit measures to improve the energy performance of historic districts. The key components include a multiscale city data model, a solutions repository, and a categorisation tool. Notably, EFFESUS was implemented in Santiago de Compostela (Spain), Visby (Sweden) and Genoa (Italy), and provided evidence for decision making by the city municipalities based on its direct positive impacts (economic, cultural heritage, energy consumptions and environmental) and the interest of the citizens in the implementation of the EFFESUS results. The project solutions achieved a reduction of energy demand of 45% up to 72% for heritage protection degree 3-4; reduction of CO₂ emission of 91% up to 95% for heritage protection degrees 3-4; and savings of EUR 2.3 million in the building stock of the above studied cities.

“From the beginning, EFFESUS was focused on generating solutions to be used and exploited. The heterogeneity of both the consortium and the results, ranging as they do from software tools to mortar, has required the development of different exploitation plans and strategies with different partners involved in each one,” says Egusquiza.

SME partners critical to innovative solutions

Some 22 other partners from 10 EU member countries plus Turkey and Norway participated in the project, which ran for four years until August 2016. The interdisciplinary consortium included several SMEs, with 36% of the project budget allocated to supporting their collaboration with large companies, research institutions and end users.

The project was structured around 10 work packages, from conceptualisation and categorisation and through to research and development of tools and products, and education, awareness, dissemination and training. To address the diversity of heritage sites, seven case studies were conducted in cities around Europe and with differing climate conditions. The cities all belonged to different historical periods and were constructed using different materials and architectural and urban patterns.
Investing in European success
II. Nature-based solutions
A new approach to managing local ecosystems

The EU-funded OPENNESS project aimed to encourage informed, sustainable land, water and urban management by tapping the potential of ecosystem services and natural capital. Researchers are uploading the results from 26 case studies into a pioneering online resource.

Humans benefit from ecosystems in many ways – through the provision of clean water, the decomposition of waste and the pollination of crops by bees and other insects, for example. These direct contributions of ecosystems to human well-being are known as ‘ecosystem services’. The term ‘natural capital’ refers to ecosystem elements – including soil, air and water – that directly or indirectly produce value for people.

Despite improved understanding of the links between ecosystem health, ecosystem service provision and human well-being, ecosystem services and natural capital are still hard to apply operationally to policy and management problems.

The EU-funded OPENNESS project sought to address this by developing new tools, methods, knowledge and good practices that can be applied to land use planning or by businesses. A new online reference source was developed to offer easy access to the results.

Real-world analysis

Launched in December 2012, the project successfully completed 26 case studies, all of which involved local actors. Case studies covered urban areas, forests, mixed rural countryside, coasts and wetlands and address questions ranging from energy use, water management, food production and land use planning.

This multi-scale case study approach was central to the project’s objective of grounding ideas and theories on real-world observations and analysis.

“Partners in Brazil have tested opportunities for operating ecosystem services involving bio-
energy production and native vegetation areas in the São Paulo sugar-cane belt,” said project coordinator Eeva Furman, director at the Finnish Environment Institute SYKE, Finland. “The work included workshops, interviews with farmers, meetings with decision-makers, public opinion surveys and pollination experiments; 21 ecosystem services were identified, 11 of them in forests.”

**Making results available**

Results from these case studies were translated into applicable tools, methods and information, all of which are freely available on the Oppla platform, an online resource developed in cooperation with the EU-funded OPERAS project.

“Oppla empowered European communities to improve natural resource management for human well-being,” says Furman. “This online resource is available.”

The project’s guidance on the concepts of ecosystem services and natural capital is also available.

“There are 16 synthesis papers currently available on the project website, which explain various concepts such as non-monetary valuation, human well-being, good governance and competitiveness,” says Furman. “In addition, we have produced two policy briefs, one of which is on nature-based solutions and ecosystem services, and several scientific papers, all mentioned in the website library.”

As part of their work the researchers have identified 20 key EU policies that stand to benefit from the project’s findings. These include the Biodiversity Strategy to 2020, the Water Framework Directive and the Renewable Energy Directive.

The project, which was completed in May 2017, helped integrate the concepts of ecosystem services and natural capital into current land-use practices and forest management processes, in Europe and around the globe.
There is more to green spaces than parks, and there is more to parks than being pretty. In addition to boosting public health, our cities’ leafy infrastructure can generate income for the community and help to mitigate the impact of climate change, for example. The GREEN SURGE project has broken new ground for the management of this crucial resource.

“We don’t use our cities’ green spaces optimally,” says project coordinator Cecil Konijnendijk van den Bosch of the University of Copenhagen. “Integrated and innovative approaches are needed.”

The project set out to address this need by completing analyses of 20 European cities and establishing learning labs in five of these cities. The project also produced a handbook on urban green infrastructure planning, policy briefs, an overview of the state of the art, new methodology and fresh data.

No patch too small

A park is an example of a public green space, but it is not the only one. Consider other pockets, such as trees lining the streets, green roofs on public buildings, and landscaped roundabouts. GREEN SURGE focused on the role and management of this infrastructure.

“We want to see if we can improve approaches to planning such spaces,” Konijnendijk says. “We also see a need for better governance approaches, for example to involve the various stakeholders – local communities, government actors and researchers, etc. – in their design.”

Promoting this collaboration ties in with the central concept of biocultural diversity, which includes the integration between biological variety and the culture of users, he explains.

“Biocultural diversity is rooted in the interaction between local people and local nature,” he says. “The fact that different communities use parks in different ways, for example. There’s no such thing as ‘simply a park’. There are many different definitions, many different shapes, many different roles.”
Establishing perennial alliances

The project’s city portraits, which explored settings across Europe, bear witness to this variety. Five of these case studies – Bari, Berlin, Edinburgh, Ljubljana and Malmö – were successfully developed into urban learning labs.

“In these labs, we worked with local researchers, authorities and communities to jointly formulate key questions that research can help to address,” Konijnendijk explained. “We hope that we can make some contributions in this way, for example to local planning processes, the development of new parks, or closer integration of less-involved resident groups.”

In Ljubljana, for instance, special attention focused on the participation of younger adults who had been out of work.

GREEN SURGE has also conducted a review of the literature in its field. The project built on this body of knowledge and produced new insights and methodology. For example, the team has worked out how to assess biocultural diversity, analysing the specific benefits and ecosystem services provided by the various types of green space, and successfully finding ways to measure these benefits. The projects broadened the approach of urban planning by including the ecological dimension and created a network of urban living and learning labs (e.g. in the cities of Milan, Bari, Utrecht, Gliwice, Rotterdam, Malmö, Ljubljana, Barcelona, Berlin and Edinburgh).

Beyond mere foliage

Even the tiniest pocket park can be productive – notably as a public health asset where people can sit and unwind, or as part of a wider strategy to mitigate the impact of climate change. However, quantifying these benefits is no easy task, Konijnendijk notes.

“In one part of our project we studied house prices, for example,” he says. “We have figures for Stockholm and Malmö clearly showing that greener areas generally have higher house prices. We have also looked into other types of benefits that could be measured objectively, such as tourism or storm water regulation.”
Nature-based solutions for urban dwellers

Big city life can mean a lack of green living spaces, especially in more crowded, less affluent urban areas. TURAS, an EU-funded project, demonstrated ways to add green to the grey – transforming stressful urban areas into more liveable and sustainable spaces where local communities can thrive.

With over half of the global population living in an urban area, concerns are rising over the impact such dense concentrations of people have on climate change, environmental health and human well-being.

TURAS demonstrated functional examples of nature-based solutions that aim to offset and reduce the negative effects of urbanisation. The project’s 20 partners worked with 12 cities on pilot projects demonstrating concepts for ecological sustainability.

One of the project’s high-profile designs is an open wire-frame structure with living plants that form walls and a roof. The project developed a demonstration of the concept, called a ‘green living room’, at a 140 m² site on top of Ludwigsburg’s town hall carpark in Germany. It opened in April 2014. The space has 7000 shrubs and 128 plane trees and provides a self-contained urban oasis where people can stand, sit and meet in the shade.

A mobile version, about the size of a transport container, fits on a truck and can be moved to any city street. An on-board water tank and an irrigation system keep the plants alive, and a modular cube form allows the structure to be easily expanded on-site. The structure has been displayed in Zagreb (Croatia), Bonn and Frankfurt (Germany), London (UK), Brussels and Antwerp (Belgium), Ljubljana (Slovenia) and Krems (Austria).

“Green Living Rooms are an example of how a green comfort zone solution can be realised in high-density urban areas on heavily sealed surfaces where competition for usable space is at a premium,” says project manager Marcus Collier.
The project also implemented other nature-based solutions involving local communities in partner cities in Belgium, Bulgaria, Denmark, Germany, Ireland, Italy, the Netherlands, Serbia, Slovenia, Spain, and the UK.

These demonstration projects included concepts for green spaces, disused urban sites, the circular economy, urban sprawl, ecosystem services, air and noise pollution, sustainable buildings, climate change adaptation, biodiversity, energy efficiency, flood management and urban agriculture. TURAS living nature-based solutions and new urban design helped Rotterdam, Stuttgart and London, for example, to mitigate higher flood risks and researchers to look at new ways of using up rain water, such as green walls and roofs. In Brussels, Rome and Seville, TURAS provided innovative green solutions to support sustainable local businesses, while in Dublin and Nottingham, nature-based solutions were implemented in derelict sites and achieved to improve urban biodiversity and urban community life.

TURAS has led to a new company, Osmos, which is taking up the initiatives pioneered by TURAS. Osmos aims to engage local communities in developing a sustainable urban economy. Another outcome has been the Reusing Dublin programme in Ireland. The programme identifies vacant and derelict sites in Dublin as part of a campaign to transform them into affordable housing, among other uses.
III. Green lifestyles in resilient cities
Research enables early warning for flash floods

An EU-funded project improved an early-warning operational platform by adding features to help forecasters more accurately predict weather-related disasters such as flash floods and mud slides – a way to better protect people and infrastructure.

Of all natural hazards, Europe suffers most from flooding. In the six years from 1998, Europe was hit by more than 100 floods. The flooding caused 700 deaths, displaced nearly 500 000 people and resulted in EUR 25 billion of damage.

Flash floods have a short response time – between 15 minutes and 2 hours (maximum 3 hours). They can occur anywhere in a basin and are the result of heavy rainfall. They are also more difficult to forecast accurately than hurricanes, blizzards or river floods.

Rainfall is highly variable and the tools for forecasting heavy rain can only ‘see’ a couple of hours into the future. Providing residents and first responders with advance warnings is a major challenge. Floodwater’s capacity to trigger debris flow, mudflow and landslides in steep mountainous areas such as the Mediterranean coast and the Alps is one more complication.

Seeking to minimise the damage, an EU Directive of 2007 required all EU countries to prepare detailed maps of flood risk by 2013, and create risk management plans by 2015.

The results of the EU-funded project IMPRINTS have helped governments do just that. The team was tasked with improving probability-based rainfall and flood forecasts, and developing tools that regional and national authorities could use to prepare their risk management plans – as well as their capacity to deal with flash flood emergencies and any resulting debris flow.

IMPRINTS focused on improved short-term rainfall forecasts as the best possible tool for anticipating flooding. Currently, there is a gap in our capacity to predict rainfall: meteorological models can forecast rainfall from six hours to few days in advance, while
meteorological radars provide good short-term forecasts, up to two hours in advance. But the crucial window between two and six hours is a major challenge for rain and flash-flood forecasts.

The IMPRINTS team developed a number of techniques to fill this gap. In mountainous areas, the NORA system is a promising alternative. By comparing current radar images with archived radar images, it detects similarities to improve forecasts.

The team was also able to develop a high-resolution flash-flood module that has since been included in the European Flood Awareness System (EFAS). The module allows EFAS to anticipate flash floods more than 24 hours in advance, anywhere Europe.

Team members were also able to quantify the threshold for the amount of rainfall liable to produce flash flooding and/or debris flow in different landscapes and terrains. This information provides a very first warning of likely debris flow events.

The project resulted in an operational early-warning platform that extends to hydrological warnings based on rainfall anticipated by meteorological models (a few days in advance) and by weather radar networks (a few hours in advance).

The platform is able to transform the information provided by the rainfall forecasts into hydrological forecasts, as well as to combine these forecasts with information about vulnerability and flooding risks. The Early Warning System for Flash Flood and Debris Flow can be used to support risk management – including through the implementation of the EU Flood Directive.

The platform design, which ensures that it can be easily adapted to any basin in Europe, has already been tested in six European river basins.

The IMPRINTS team disseminated the project’s results and produced audio-visual material for policymakers, risk managers, water companies and the local authorities.
New tool to help urban planners prepare for climate change

Climate-change-related rising sea levels, urban floods and heatwaves could cause destruction and take lives in cities. The extent of these impacts will depend on how well and how quickly urban planners implement adaptation measures. The EU-funded RAMSES project has developed methodologies and a handbook to help urban planners estimate damage and adaptation costs, and transform cities.

“In terms of sea floods, the RAMSES project provided comparable damage cost estimates for more than 150 European cities,” reports RAMSES project coordinator Jürgen Kropp.

The analysis shows that when sea levels rise, damage costs rise even faster due to the nature of assets in cities and how a flood may affect them.

Other cities need to be more concerned about hotter temperatures. Cities are heat islands and by the end of the century, their heat burden – extreme heat and longer heat waves – could increase tenfold compared to today. To cope with these risks, the project calculated health costs and other losses and costs for adaptation. Window blinds, air-conditioning, or working at cooler times of the day can help a city adapt.

Advanced models for standardised methodologies

The overarching idea of the methodologies is to estimate how much detail is needed to provide cost estimates, which are scientifically sound and useful for urban planners. Based on detailed stocktaking, it was feasible to identify how climate risks may affect more than 500 European cities.

Top-down modelling studies were complemented by bottom-up approaches providing much more qualitative details. For example, bottom-up methods looked at how urban floods would cause traffic jams and how this may create costs. Top-down models were applied Europe-wide, detailed approaches were used in case studies about London, Bilbao, and Antwerp.
The RAMSES methodologies consider a city’s land-use, infrastructure and asset construction and combine this knowledge with advanced model approaches.

“Using the developed methodologies allowed us to draw interesting conclusions, which we discussed with city stakeholders in case studies,” reports Kropp.

**A handbook for sustainable urban transformation**

Based on the case studies, the RAMSES project has developed a handbook that can guide urban planners through 11 steps to adjust their urban planning. This adaptation cycle for transformation gives hints on how to estimate the costs of certain actions. “Enabling planners to consider many more variables and with greater accuracy than before, this cycle is a recipe for the transformation of any city,” says Kropp.

Urban planners must first be aware of climate risks. The estimated damage and costs of adaptation enable them to compare and justify the potential benefits of adapting cities and changing policies.

“Unfortunately, detailed impact assessments conducted in isolation cost money and take a long time. The standardised methodologies developed in the RAMSES project are a step towards a more scientifically sound and concise assessment of the key facts and economic risks,” explains Kropp.

Urban planners now also have access to a new online tool – On Urban Resilience – that includes explanations from climate change adaptation and resilience experts. With access to this online video library, and the standardised methodologies and handbook, urban planners can draw more accurate conclusions from the data and make planning decisions that matter.
A recipe for “time-rich” sustainable lifestyles

As consumption-driven material affluence increases, and our ecological footprint with it, the general happiness and well-being of stressed Europeans paradoxically decreases. An EU-funded project is researching how to turn this conundrum on its head.

‘Cash rich, but time poor’ is an old adage but appropriate in better understanding the impact of work-life balance, consumption patterns and other economic, social, cultural, political and technological factors on sustainable lifestyles, and on the transformation towards a green economy.

The EU-funded GLAMURS project studied in detail how certain lifestyles influence sustainability goals in seven different European regions. They developed comprehensive models of lifestyle changes in key domains of sustainability, and evaluated them in terms of economic and environmental effects.

GLAMURS studied lifestyle choices alongside the actions of so-called ‘sustainability pacesetters’, including food, clothing and energy cooperatives, repair cafes, eco-villages and even bio-regions.

The project team set out to show how the lifestyles of sustainability pioneers, for example, could inspire regional actors to make the changes needed to become sustainable, green economies. Case studies and regional analyses also provide insight into how to scale up good practices.

The project has examined “participatory visions” of the future, according to project coordinator Adina Dumitru of Spain’s Universidade da Coruña.

“We use a method called back-casting scenario development to define a series of visions of the future showing sustainable lifestyles and a green economy in each region, as well as the pathways to reach those visions,” Dumitru says.

GLAMURS’ sustainable lifestyle models have been developed at individual, community and society levels.

The importance of being time rich

A series of GLAMURS workshops, which applied the back-casting scenario method, resulted in
14 ‘visions’ clustered into three main groupings: urban green growth, urban sufficiency and rural sufficiency.

“Work focused among other issues on refining the visions and assessing their environmental and macro-economic implications, as well as the implications for policy when we analysed them in conjunction with people’s social, environmental and wellbeing motivations,” says Dumitru.

Of particular importance to people’s wellbeing is what the researchers call “time affluence” – making time for things that matter and moderating the pace of life. Time affluence is affected by giving people a sense of control over the organisation of work and leisure, which is an important motivator and starting point for leading more sustainable lifestyles.

Policy impact

GLAMURS’ findings have made important policy and legislative waves. Ricardo García Mira – a former project partner who has been elected to the Spanish Parliament – has tabled a legislative proposal for a new framework to support sustainable lifestyles in Spain.

“This was long overdue and I have been impressed by the wide interest and support we received from a variety of stakeholders,” he says. “We are placing sustainable lifestyles on the public agenda, because although there is a lot of talk about climate change, focusing on sustainable lifestyles emphasises the shared responsibility for change that we have as a society.”

Although the project ended officially in December 2016, the partners continued meeting with each other and disseminating the results of their research, says Dumitru.

“The partners will do a lot of work together beyond the project finish line, to publish their exciting findings,” he adds. “Their results are interdependent so it is paramount we work together, and we will be doing so during the next few years.”
An EU-funded research team has studied the impacts of economics, social cohesion, technology as well as geopolitical and environmental issues on secure and sustainable energy supplies in Europe. They developed a pioneering citizen manifesto for energy governance and the transition to reliable, renewable sources.

Driven by growing awareness of the threat that climate change poses to societies in the coming decades – and the very real risk of a widening energy gap – the EU-funded MILESECURE-2050 project set out to explore how Europe could achieve energy security while addressing complex and sometimes contradictory environmental and social forces.

Project coordinator Patrizia Lombardi of Italy’s Politecnico di Torino explains: “Energy supply security and climate-friendly energy systems are crucial to the European Energy Union, but often conversations on security and decarbonisation run on parallel tracks. As the EU envisions its energy trajectory for the coming decades, our research has tried to understand if the sustainability and security conversations can be brought closer together.”

MILESECURE-2050’s partners – from 10 institutions in 8 EU countries – developed guidelines and new governance models for energy transition. This work underpinned the existing knowledge-base and policy framework supporting inclusive and sustainable growth and societies in Europe.

They identified the context through which energy security is defined and managed at the global, European, national and local scales, including sustainable cities. And from that, the team produced quantitative and qualitative models and scenarios for the evolution of energy security both within and outside the EU.

The people factor

The changes needed to achieve the transition to reliable renewable energy sources are fundamental, and people are important sources of knowledge, according to MILESECURE-2050’s pioneering citizen-led energy transition governance manifesto.
“Because of the far-reaching consequences of energy transitions, it is vital to make use of the widest possible range of knowledge: not only technological and scientific expertise, but also local, practical and even tacit knowledge, knowledge created by civil society, and anticipatory perspectives on how society should be organised,” notes the manifesto.

As such, the project explored wider socio-economic factors to establish more inclusive ‘human-based governance’ models to the energy transition. It created a database of some 1,500 European case studies representing “anticipatory experiences of energy transition” (AEs) which developed environmentally sustainable ways of producing, consuming and transporting energy.

MILESECURE-2050 also identified and clustered driving factors of sustainable, secure energy transition in three main domains: market, external and governance factors; social, political movement and grassroots factors; and personal, cultural and site-specific factors. The consortium partners then developed a set of energy transition scenarios up to 2050.

The project’s results are still being disseminated at meetings and exhibitions, even though it ended in 2015.

Today, cities and urban areas account for 60% to 80% of global energy consumption and emit around the same share of CO₂. Two MILESECURE-2050 partners have opted to continue working together in a different EU project named POCACITO focusing on a decarbonisation roadmap at city level. Other partners are working on disseminating MILESECURE-2050’s results, including through open access journals, and plan to collaborate further on decarbonisation research projects.
Investing in European success
IV. Food on the move
The more planners know about how people move around a city, the easier it is for them to develop sustainable transport policies. EU-funded researchers have used data from personal smart devices to shed light on urban mobility and improve transport planning tools and models.

As city dwellers go about their day, they typically send a few texts, use a smart ticket to access public transport or do some shopping with their bank card. Data from these activities can build up a picture of when and why populations move around a city over time.

The EU-funded EUNOIA project has developed tools that analyse this information to better understand what drives people’s travel decisions. Using these, the project team has improved a common forecasting model to help policymakers more easily balance the interests of citizens, the environment and the economy. Finally, case studies with the tools on bicycle-sharing schemes in Barcelona, London and Zurich show how local authorities can use the innovations to promote sustainable travel.

The data provides greater detail than traditional mobility surveys and can be kept constantly up-to date says deputy project coordinator Ricardo Herranz of Nommon Solutions and Technologies SL, a Spanish SME that provides decision support technology.

The data provides greater detail than traditional mobility surveys and can be kept constantly up-to date, he explains. “It helps policymakers evaluate infrastructure better – which limits planning mistakes – so citizens can have better services,” he adds.

New frontiers

EUNOIA’s main innovation was a prototype tool that uses mobile telephone records to measure population movements around a city, such as the number of trips in a certain direction or how many people attend an event, he says.

At the same time, EUNOIA researchers improved the science behind analysing mobility data, in particular learning how people travelling in
groups make decisions. They also developed a tool so planners can more easily visualise demographic data and understand results.

These results were used to improve MATSim, an open-source transport simulation model. Project researchers tested the tools and model upgrades on bike-sharing schemes in Barcelona, London and Zurich, where they were able to use mobile phone data and transport ticket records to analyse trips and to model transport demand.

The research is of great value for planning and managing urban transport, says Herranz. It could also help create new products and services for the transport sector. Indeed, a start-up, Kineo, founded by project consortium member Nommon and project advisor Luis Willumsen has developed commercial uses of the project’s tools and methods for extracting travel data from mobile phone records.

Future steps will be to merge different data sources into single modelling tools, and gather data for modelling from rapidly developing countries, for example through crowdsourcing. On an even bigger scale, other work could help develop a ‘science of cities’, says Herranz, which would model cities’ development over different timescales and lengths and through different city interactions to continue to improve city planning.

Further horizons

EUNOIA demonstrates the potential of new, non-conventional data sources to fine-tune urban simulation models and double-check their results, adds Herranz. The research avenues opened up by the project team have already been explored more extensively in later research projects such as INSIGHT.

Meanwhile, Barcelona, London and Zurich have continued their work with EUNOIA partners in new projects, and a variety of private and public institutions have employed Kineo’s solutions to acquire and visualise demographic travel information.

https://www.insight-fp7.eu/
Sustainable transport – pass it on

Could it be easier and greener to travel around your city? A solution might already exist. People around the world are coming up with clever ideas for low-carbon, high-quality transport. An EU-funded project helps cities learn from the best.

If you are ever stuck in a city traffic jam, do you wonder how other cities deal with the problem? Moving people and goods more sustainably can cut pollution, save energy and boost the economy. So, rather than reinventing the wheel, why not borrow good ideas?

The EU-funded SOLUTIONS project helped cities in Europe, Asia and Latin America to adopt proven policies and technology on six themes: public transport, transport infrastructure, city logistics, network and mobility management, integrated planning and clean vehicles. Started in 2013, it supported five partnerships between cities with successful policies and cities that want to improve in similar areas, while offering training and advice to other cities.

“Cities can learn a lot from sharing expertise and taking home new solutions to their own transport issues,” says project coordinator Oliver Lah of the Wuppertal Institute for Climate, Environment and Energy, based in Germany.

“A project like this helps avoid the mistakes of the past, leapfrogging emerging economies to sustainability.”

And the project’s networking approach can reveal business opportunities and streamline development funding. For example, Bremen in Germany has shown Belo-Horizonte in Brazil how to boost cycling through cycle sharing, infrastructure and road safety measures. Mentored by the Chinese city of Hangzhou, Kochin in India is considering integrating its new metro system with water transport and other low-carbon transport options – such as cycling and electric three-wheelers.

Other cities are using the network and training to make mobility more sustainable. They have been assisted in this by the project’s catalogue of over 60 successful transport measures from around the world, as well as knowledge-sharing kits and policy implementation kits.
Policy partners

To build its core network, the project launched a call in 2013 for cities to join. Five of the 19 successful cities were chosen as leading cities, to act as mentors on transport policies; five were designated as take-up cities, looking for solutions to existing problems. Leading and take-up cities paired off in twinning workshops. Each pair then picked measures for the take-up city from policies suggested by the project members.

Support for cities during the take-up process included advice from lead city peers and SOLUTIONS experts, policy analysis and visits. Policymakers from the remaining nine cities received policy advice and attended workshops to share knowledge and build their capacity to develop sustainable mobility measures.

Online training courses and materials are also available on the project’s website. Meanwhile, academic publications and urban transport events are providing a wider platform.

One outcome of this sharing is the Urban Mobility SOLUTIONS Network, launched in 2017, which sustained the partnerships established in the project and included a focus group on transport research in Mediterranean partner countries. Together with the partner UN HABITAT – the UN’s programme for human settlements – SOLUTIONS has also developed the Urban Electric Mobility Initiative (UEMI) to promote electric mobility in urban areas. UEMI was launched at the UN Climate Summit in 2014 and progress was presented at the UN Climate Conference (COP21) in Paris in late 2015.

Although SOLUTIONS ended in 2016, the city networks and partnerships carried on after that date and have been sharing ideas and working together for more sustainable transport.

https://www.caif.eu/
https://unhabitat.org/
http://www.uemi.net/
The EU-funded FOODMETRES project was dedicated to the production, processing and distribution of food in metropolitan areas. It focused on the development of shorter, more sustainable food supply chains, designed to take account of the needs and constraints of stakeholders and underpinned by regional hubs for processing and distribution.

“FOODMETRES has created a new awareness of the potential of food regions around cities,” says project coordinator Dirk Wascher of Wageningen University and Research in the Netherlands.

The researchers have developed guidance, decision-support tools and a typology of short food supply chains to inform the dialogue about possible approaches. Collaboration between city authorities and the contributors involved on the business side is crucial, as a wide array of technical, logistical, organisational and governance aspects must be addressed.

Fertile ground for cooperation

“What we propose is to change the spatial arrangement by bringing all actors together rather than letting them act against each other,” says Wascher. This, however, was only one part of the project’s activity. FOODMETRES also explored the idea of metropolitan food supply clusters, a concept that addresses the need for greater resource efficiency by grouping processing and distribution infrastructure.

The team conducted case studies in Berlin, Ljubljana, London, Milan, Nairobi and Rotterdam. Details of these, along with other project outputs, are available through the FOODMETRES knowledge portal.
“At the moment, food production in metropolitan areas is influenced primarily by large-scale, international agricultural policies and business opportunities arising in global trade, rather than by the needs of the city at their centre,” says Wascher. To provide a particularly striking example, he points to the case of Rotterdam, a city surrounded by agricultural activity mainly geared to export.

This activity is, of course, an asset to such regions, he notes. However, the location of export food activity is largely arbitrary, driven by forces other than strategic spatial planning.

“You could redistribute production differently, by consciously looking at the supply potential around the cities, and at the city’s needs,” he explains.

**Back to the city’s regional roots**

The considerations are not solely related to food. There are also requirements to meet in terms of recreation and nature conservation, he adds, but all these objectives are currently pursued independently of each other.

“Nature conservation is fighting a lonesome battle to preserve areas that may be dedicated to other functions,” he explains. This aim could be furthered in collaboration with the wider food planning of the region.

The project’s findings suggest that collaborative, coherent spatial planning can shape solutions for each and every city, and the partners are keen to spread the word.

“Policymakers can now link the surroundings of the city with inside needs far more consciously,” Wascher concludes. “I think cities should be more active in this respect, and make stronger demands to get their land back for their employs.”
School meals do not matter only to kids and their parents. Like other services within the scope of public-sector food procurement, they also matter economically. Determination to source produce locally and sustainably can make all the difference to a region’s farmers, as can labels protecting its specialities. An EU-funded project is connecting the dots.

The STRENGTH2FOOD project is analysing the leverage of quality and procurement policy for the creation of shorter, more sustainable food supply chains.

“We have three main objectives,” says project coordinator Matthew Gorton of the University of Newcastle upon Tyne, in the United Kingdom. “One is to improve the effectiveness of the EU’s food quality schemes – the ones associated with protected designations of origin. The second is to improve the effectiveness of public sector food procurement. And the third is to stimulate the development of short food supply chains.”

STRENGTH2FOOD is conducting research and case studies that will feed into recommendations for policymakers and practitioners. The crucial first steps included a review of the scientific literature and the definition of indicators. The project then started to road test these indicators in four pilot studies.

Of logos and livelihoods

Public procurement has supply chain effects that can be leveraged to advance societal aims and boost sustainability – and so does quality policy, Gorton explains.

“The labels help smaller producers, who are never going to be the most cost productive, to maintain a place within food supply chains,” he notes. “They also offer an opportunity for farmers to add value to their production and receive fair or better returns from their produce, but this is only possible if there is a meaningful connection with consumers.”

More specifically, STRENGTH2FOOD will focus on the EU quality schemes ‘Protected Designation of Origin’, ‘Protected Geographical Indication’ and ‘Traditional Speciality Guaranteed’.
Participants

United Kingdom (coordinator), Belgium, Croatia, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Serbia, Spain, Thailand, United Kingdom, Vietnam

www.strength2food.eu

H2020 Proj. No. 678024 Total cost €6.9 M EU contribution €6.9 M

Part of the project is dedicated to analysing the impact of the schemes and their uptake, with the aim of finding ways to improve their effectiveness in countries that do not have a strong tradition of using them.

Recent changes in the EU’s rules on public procurement have widened the scope to harness it as a driver of change, Gorton explains. The update notably expands the definition of the ‘most economically advantageous tender’, giving contracting authorities more leeway to consider social and environmental elements. Procurement contracts could, for example, be set up to include a proportion of organic or fair trade produce.

“Member States have quite a degree of flexibility in terms of how the relevant Directive is implemented,” says Gorton. “So there are different models of school meal procurement in different countries. We will compare the economic, social and environmental impact of these models.”

Broad alliance

STRENGTH2FOOD has built a broad alliance of contributors to look at public food procurement in depth. “We have farmers involved, farmers’ cooperatives, ministries, regulation agencies, manufacturers and retailers. Basically we try to bring in actors along the entire food supply chain,” he says.

Many of these partners have never worked on EU-funded projects before, says Gorton, who sees their involvement as an excellent way to obtain new practitioners’ input and fresh advice. It is also a way to make research more relevant to practitioners, he notes, and potentially a chance for practitioners to influence policymakers.

“What they can do individually may often be quite small, but being part of a larger consortium creates a synergistic effect,” Gorton says.
V. People (social innovation and engagement)
The EU-funded ARTS project identified ways for cities to speed up the transition to more environmentally sustainable living conditions by bringing together local authorities and civil society. ARTS investigated how sustainable initiatives can take off and continue in the longer term.

The project studied transition initiatives and their interactions in five European city regions: Brighton, Budapest, Dresden, Genk and Stockholm. In total, over 500 initiatives were mapped and screened. Of these, around 70 initiatives were studied in depth.

The research team realised that activities using nature-based solutions sparked more social innovation in cities and accelerated the transition towards sustainability by creating new and better connections among stakeholders. An example is where an empty urban space in Budapest was turned into a green space with bicycle parking spaces.

“A key part of the process was that we engaged a wide range of stakeholders – for example, scientists, civil society and city officials – and generated knowledge about the drivers of and barriers to the quick uptake of sustainability solutions,” says project leader Niki Frantzeskaki of the Dutch Research Institute for Transitions, the Netherlands.

**Bee Plan, solving environmental issues collectively**

A good example of a ‘transition initiative’ is the ‘Bee Plan’ in Genk, Belgium. Here, public servants worked with a team of volunteers to strengthen bee populations in and around the city. The idea came from a documentary about the plight of the insects shown at a public meeting, which included a brainstorming session. The city assembled a working
group of bee-keepers, city services, environmental organisations and interested citizens to develop a plan that addressed all of the issues that arose during the brainstorming.

In 2014, Genk adopted the plan to improve bee habitats, especially on public/communal land to educate and encourage citizens to provide ‘bee friendly’ features on their property, and to support local bee-keepers. The success of the process showed that sustainable practices can be quickly embedded in formal governance structures while simultaneously supporting a variety of sectors and departments as part of a wider awareness campaign. Today, it is a model that can be used for other city projects and initiatives.

As a result of Bee Plan and other city initiatives, ARTS identified five ways to speed up the transition towards sustainability: upscaling (increasing the numbers of supporters or users); replicating (creating a model to be copied in another city); coupling/partnering (pooling resources, skills and capacities); instrumentalising (capitalising on opportunities to secure resources to keep the initiative going); and embedding (bringing the initiative into existing governance systems).

Most of the researchers have engaged with local governments in their region, and will continue their transdisciplinary research beyond the end of the project.

“A key message from the project is that it’s important to think of new governance approaches in Europe that are more collaborative in terms of engaging civil society earlier in the process and taking into account knowledge from civil society when new sustainability actions are being laid out,” concludes Frantzeskaki.
Investing in European success

Sustainable cities of the future: harnessing all the expertise

The EU-funded URBAN-NEXUS project has designed and tested novel approaches, including café-style debates and visualisation techniques, to help promote multi-stakeholder dialogue and knowledge sharing in cities and regions. The goal: more integrated sustainable urban development for cities of the future.

As home to more than 70% of the population, the decisions made in Europe’s cities have a major impact on future developments, from how to reduce carbon emissions and improve energy efficiency to integrated transport and mobility solutions.

URBAN-NEXUS tried and tested various formats and techniques for ‘consulting’ Europe’s citizens on future city developments. One approach, called dialogue cafés, was especially successful at giving different stakeholders the chance to air their views. Armed with this kind of input, city planners can then take into account the wider impact of urban projects on the economy, the environment and on people’s health and well-being.

A series of five dialogue cafés were organised in which sector experts, NGOs, civil society, local authorities, the private sector and government officials were encouraged to debate pressing issues. The debates were grouped into five sustainable urban development themes: urban climate resilience, health and quality of life, competing for urban land, integrated data and monitoring, and integrated urban management.

Creative yet methodical

Before each of the five ‘dialogue cafés’, a synthesis report of the issues – including key messages about the impact of the specific theme on urban development – was put together to facilitate the debates. Afterwards, a summary of the discussions was drafted, as well as a follow-up report with adjusted key messages and conclusions.

Techniques were used to ensure a rich exchange of ideas and knowledge. For example, a ‘speed-
New road projects, for instance, need to be explored from different perspectives, which is where the café dialogues came in.

“The café debate set out both the driver’s perspective of wanting fast roads to get from A to B and the community’s perspective that roads might lead to less space for pedestrians and to children having fewer safe places to play in,” he says.

One recommendation from the debates was that city authorities should reconsider their role in urban development projects, and give stakeholders more room to design their own environments.

The URBAN-NEXUS multi-stakeholder approach also provided valuable input for current European Commission projects and programmes, such as SEISMIC which helped to tackle Europe’s biggest urban problems by engaging citizens, identifying social innovation needs and contributing to future urban policies and research strategies.

As urbanisation in Europe continues to gather pace, urban centres are growing but also shifting in nature. New urban actors are challenging traditional state and market structures by producing goods and providing services in a collaborative way in European cities.

Novel forms of civic involvement, such as “civic hacking” and co-design across modern cities, are gaining popularity while calls for greener, better-connected, stronger, more inclusive and less anonymous communities continue to grow alongside better mobility, urban planning and renovation.

It is this kind of citizen involvement in urban development and social innovation which the EU-funded SEISMIC project helped to foster. The objective was to improve health and well-being for those living in cities and to enhance engagement with their urban surroundings.

The project used national stakeholder networks to bring into direct contact a variety of urban actors, including citizens, architects, planners, administrators, entrepreneurs, NGOs, interest groups, educators, scientists, policymakers and more.

The mobilisation of such a range of actors for a discussion on differing visions of urban development and social innovation has led to “refreshing and innovative solutions and mutual learning”, says SEISMIC project leader Paul Erian.

The EU-funded SEISMIC project is bringing together a wide variety of actors to identify and overcome challenges relating to the growth and transformation of urban areas. These national networks will promote increased civic engagement in social innovation in cities.
Such a plurality of social perspectives is key to achieving an in-depth analysis of urban dynamics, particularly when accompanied by transnational meetings to exchange experiences and good practices both between and within different European cities.

Challenges and concerns related to urban development naturally depend largely on the national context. For example, citizen concerns in Sweden on civic participation and city greening differ from those in Turkey, where other issues are considered more pressing.

**Inspiration from cityscapes**

Building these bridges between citizens and other urban actors has led the project to an action-oriented ‘living lab’ approach focusing on concrete actions and solutions rather than the more traditional theoretical approach to stakeholder debate. This includes a series of “walkshops” instead of “workshops”, adds Erian.

Each international walkshop featured around 80 participants from all 10 partner countries visiting chosen public spaces. There they can engage directly with those implementing pedestrianisation or commercialised public spaces, for example. Artistic sessions were also held at the beginning of the project, encouraging participants to visualise and then draw their dream city, making the discussion more graphic and transferable.

SEISMIC has also led to the publication of a book of the same name which outlines the project’s objectives, methodology and outcomes. Examples of policy influence are detailed, including the project’s interventions in the JPI Urban Europe’s Scientific Research and Innovation Agenda (SRIA). These policy recommendations and others outlined in the book are a direct result of innovative and eclectic networking strategies between different stakeholders.

In a bid to continue the legacy of the SEISMIC project, a number of the transnational working group participants have continued to work together and apply for other funding streams to continue what they have already begun.
Over 70% of European citizens live in urban areas, which vary greatly in character between countries and cities, and even within a city. Besides being centres for economic development and public services, European cities and urban areas can also be areas of social polarisation, poverty concentration and unemployment.

Although addressing these concerns is a priority for EU funding, in the past there has been a gap between research outcomes and result implementation in urban development, leading to the disappointing delivery of initially promising results.

With this in mind, JPI Urban Europe established ENSUF, a joint EU-funded transnational call for projects, to try to overcome the ‘implementation gap’. Funded projects in urban development will involve stakeholders from the start of the process.

Changing world

As Europe and the world transform at an ever-increasing speed, both people and environments can be left behind. The coordinator of the transnational call, Wieske Bressers, uses cities as an example: “In certain countries in Eastern Europe, some cities have been completely abandoned while others are growing very quickly, which means they are all undergoing forms of transformation.”

In response, Bressers wants the projects answering the call to ask: “What problems does a city face in the process of transformation? And what kind of strategy should they have to cope with it?”

Social polarisation often accompanies the transformation of cities, with divisions appearing between rich and poor. Work on fostering social cohesion between and among communities is
essentially for a promising future for Europeans, as well as for improved public services and access to them.

Bridging the implementation gap

An international panel of researchers and experts has assessed 43 project applications on behalf of JPI Urban Europe and selected the best 20 proposals, thanks to a budget of EUR 25 million – EUR 5 million of which came from the EU.

Bressers explains the importance of co-creation in these projects, which is mandatory for many activities: “In a city, or a specific neighbourhood, a project could launch a pilot on a certain topic where researchers, innovators, policymakers and citizens are all working together in a Urban Living Lab.”

This approach is an attempt to encourage researchers, cities and other interested parties to work together from the outset. Stakeholders also help to inform the research and innovation process, in terms of the feasibility and accessibility of applying the results effectively.

Throughout the projects, the co-developers share ongoing results and problem-solving discussions. Partners from previous JPI Urban Europe projects also attend certain meetings to share their own experiences and challenges. JPI Urban Europe coordinates the programme management side of the projects.

JPI Urban Europe also coordinates the projects’ communication and dissemination activities, ensuring that the results are widely disseminated to benefit of both future research and potential beneficiaries.

Bressers underlines that better coordination on several levels means the ENSUF “would help to overcome current urgent and long-term economic, social and environmental challenges in cities and urban areas”.

The coordinator hopes that with these new methods ENSUF projects will bridge the gaps between research disciplines and among important urban players – citizens, decision-makers, cities and consumers.
Investing in European success
VI. From Europe to the world
Booster shots for historical buildings

Looking at Europe’s flamboyant cathedrals, it is easy to forget that even stone does not last forever. Without effective conservation, gargoyles erode, stained glass shatters, and choir stalls eventually rot. EU-funded researchers have produced innovative compounds to protect our cultural heritage.

The EU-funded NANOMATCH project has developed nano-structured compounds for the preservation of stone, glass and wood in historical buildings. A product for the consolidation of glass came on the market. Several other products – designed to consolidate stone or counter the acidification of wood – are also essentially ready, says project coordinator Adriana Bernardi of the Institute of Atmospheric Sciences and Climate of the Italian National Research Council (CNR).

However, she notes, a few more tweaks are needed to prepare them for large-scale commercialisation, which should take another two or three years.

A healthy injection of stone

NANOMATCH set out to address a major conservation challenge: the degradation of calcium-based stone. In many cases, polymer-based products are used to consolidate this type of stone, explains Patrizia Tomasin of the CNR’s Institute for Energy and Interphases, one of the project’s key scientists.

“But none of these really solve the problem,” she notes. “They deteriorate and can actually make the problem worse.”

There are other types of new consolidants, she adds, but few of the products currently on the market penetrate very far into the stone. Specific difficulties linked to polymer-based substances include discoloration over time, which means that the repairs can be quite noticeable. They are also difficult to remove if further treatment is needed.

NANOMATCH developed an elegant solution to this challenge: a calcium-based product that diffuses into the tiniest fissures and partly evaporates, depositing nanoparticles that react with air and moisture to bind the carbonate structure.
of the substance and adapted it for high-humidity environments. The new consolidant is used to reinforce glass with micro-fractures. It is based on the same principle as the substance proposed for stone, but it uses aluminium particles rather than calcium.

NANOMATCH has also applied the calcium-based compound on wood. This treatment protects wood from acidification, and can also be combined with a biocide to guard it against various tiny, destructive organisms.

The project ended in October 2014, and the consortium is now considering how to make its compounds available on the market. The glass consolidant should soon be on the market, Bernardi reports.

More fine-tuning will be needed to prepare the other compounds for commercialisation, notably to optimise evaporation speed. However, samples are available to restorers upon request.

Participants
Italy (coordinator), France, Germany, Netherlands, Romania, Spain, Turkey

www.nanomatch-project.eu

FP7 Proj. No. 283182 Total cost €3.1 M EU contribution €2.5 M

of the stone. It’s not quite liquid stone, but it’s a liquid that transforms into stone. “At the end of the process,” says Tomasin, “our product has the same composition.”

This innovation was tested at four sites. Treated and untreated samples of stone were exposed to the elements at the Basilica of the Holy Cross in Florence, the Cathedral of Oviedo, Cologne Cathedral and the Stavropoleos Monastery in Bucharest.

The results were encouraging, says Pockelé, even compared to the more advanced products that are currently available. NANOMATCH’s consolidant is highly soluble, he reports, depositing a particularly large amount of molecules even in very thin fissures deep inside the stone.

NANOMATCH also completed the development of a consolidant for glass, a process initiated by an earlier project dedicated to stained glass windows.

Several of the partners from this predecessor project were involved in NANOMATCH as part of the team that demonstrated the efficiency
Europe boasts landscapes that are breathtakingly beautiful – and essential for wildlife, communal activities, human well-being and local economies. An EU-funded project gathered data on how these landscapes are changing, to help manage them wisely for the long term.

The EU-funded HERCULES project helped landowners, public authorities and NGOs protect and manage Europe’s diverse landscapes. The project team researched how and why landscapes change – from both climate and human behaviour. They developed a programme to predict the impacts of new land uses and help keep land heritage safe.

Landscapes are vital to rural economies and local products, biodiversity and a healthy ecosystem. They also provide irreplaceable views, historical heritage and outdoor recreation, which in turn can attract visitors and tourists.

Understanding a landscape’s history and predicting its future development are vital to keeping these benefits alive, says project coordinator Tobias Plieninger of the University of Copenhagen, Denmark. “Landscapes are co-created by people and the environment. We have to bring them back together,” he says.

HERCULES built on the European Landscape Convention (ELC), which promotes European cooperation to protect, manage and plan European landscapes.

The three-year project has compiled information about the causes, patterns and outcomes of landscape variation. And to help researchers and policymakers better understand these, it has developed a new system for classifying landscapes.

Project partners have also held a number of workshops and developed an online platform – the ‘Knowledge Hub’. These allow researchers, stakeholders and the general public to share data and advice on good land management.

Information centre point

Much of the project’s information about long-term landscape change has been collected from archaeological, historical, environmental and
Participants

Germany (coordinator), Belgium, Denmark, Estonia, France, Greece, Netherlands, Slovenia, Sweden, United Kingdom

From Europe to the world

Knowledge Hub. This web-based application – developed by the project partners – is a store of detailed social and geographic data, presented through maps. Its interactive platform allows users to view regional changes, add information and model future developments.

“The Knowledge Hub is a central component of HERCULES,” says Plieninger. “Our aim was to provide tools that make landscape management more tangible.”

The case study fieldwork was successfully finalised, as well as the data analysis, the landscape modelling and policy recommendations.

HERCULES significantly improved understanding of the value of cultural landscapes – for land users and policymakers, he says.
European cities and urban areas are diverse, vibrant places to live – kaleidoscopes of cultures and ethnicities and reflective of a new kind of ‘super diversity’. To better understand what works and what doesn’t in terms of successful integration, cities are turning towards their diverse neighbourhoods for insights.

This neighbourhood-centric approach to urban integration was led by the EU-funded ICEC project, part of the JPI Urban Europe initiative. In search of successful neighbourhood integration policies, the project sent researchers to Amsterdam, Vienna and Stockholm to compare the aims, structural features and outcomes of each city’s neighbourhood development programmes.

“Our aim was to understand how living together works out and how active participation in local initiatives affects, or doesn’t affect, an individual’s sense of belonging and the quality of the inter-ethnic coexistence within their neighbourhood,” says project coordinator Yvonne Franz of the Austrian Academy of Science.

Urban living labs

The project set out to answer two key policy questions: what political measures work best for strengthening the integrative power of an urban neighbourhood? And how can cities promote inter-ethnic coexistence in the local context?

To answer these questions, ICEC used urban living labs, which allow researchers to immerse themselves in the communities being studied and directly engage with residents, public actors and private stakeholders.

“As you can imagine, it takes a lot of time to get access to local residents and gain their trust before they’ll answer questions about their liv-
Participants
Austria (coordinator), Netherlands, Sweden

www.icecproject.com
Interethnic Coexistence in European Cities Total cost € 1.4 M

ing conditions,” explains Franz. “But these living labs helped us gain in-depth insights as, instead of testing products with end users, we unravelled the daily lives of our local experts – the residents – in real time.”

The importance of belonging

After assessing local initiatives and residents who participated in selected initiatives, the project reached some valuable conclusions. For example, researchers learned that fleeting contacts, such as simple greetings and chit-chat, are significant in creating a sense of belonging to a neighbourhood.

As these fleeting contacts lay the foundation for a higher degree of neighbourhood attachment, policies could help people living in a neighbourhood get to know each other by organising initiatives such as courses at a centre, community gardening programmes or cooperative childcare services.

“This desire to recognise and be recognised tends to disregard ethnicity, meaning policy measures should focus more on creating casual opportunities for residents to interact than on ‘forcing’ integration,” adds Franz. “Most people appreciate coexisting next to each other without intensive interaction on a regular basis, which is why peaceful interethnic coexistence in super diverse neighbourhoods is best achieved via a lot of joint, local efforts by both public and private actors.”

Next steps

The project worked to convert its observations, conversations and evaluations into cross-city comparative findings and significantly contributed to future learning and implementation practices. In addition to the development and distribution of these best practices via journals, articles, conferences and the project’s website, ICEC also published a policy book that aims to generate interest at a larger scale. This policy book was published as a multilingual handbook for policymakers and local stakeholders.
Funding agencies from around the world are backing this research, which will focus on the development of innovative solutions. This joint endeavour – EN-SUGI – is to develop holistic approaches for the management of food, water and energy, which are usually considered in isolation.

**Redesigning the food-water-energy nexus**

A city is, in a way, a system of systems, explains James Taplin, the urban living innovation lead at Innovate UK. “However, the food system, the water management system, the energy system and so forth tend to have been developed in silos and don’t always work well with one another,” he says. “Sometimes, they actually antagonise one another. We really have to start thinking about city systems in an integrated way. If we don’t start dealing with this now, we’re going to be faced with a much bigger challenge a little bit further down the line.”

EN-SUGI was launched specifically with this aim in mind. It will fund projects that are developing new approaches to the management of what is referred to as the “food-water-energy nexus of systems”.

Technically speaking, EN-SUGI is a call for proposals issued jointly by the Belmont Forum – a group of agencies funding global environmental change research – and the Joint Programming Initiative Urban Europe.

It draws on financial support from agencies in 22 countries, and a substantial contribution from the EU via a dedicated ERA-NET Cofund project. The combined funding available for this call is EUR 34 million.

---

The world’s cities account for less than 3% of its land surface, but they are already home to much of its population. By 2050, two thirds of us are projected to be living in urban areas, where joined-up management of food, water and energy will be increasingly important. A group of EU-funded projects is about to explore this sustainability issue.
**Participants**

United Kingdom (coordinator), Argentina, Australia, Austria, Belgium, Brazil, China, Cyprus, France, Germany, Japan, Latvia, Netherlands, Norway, Poland, Qatar, Romania, Slovenia, South Africa, Sweden, Turkey, United States (Arizona, California, Connecticut, Michigan, New York)

www.sugi-nexus.org

| H2020 Proj. No. | 730254 | Total cost | €18.6 M | EU contribution | €5 M |

---

**Bumper crop of bright ideas**

Proposals were submitted by March 2017, and the projects selected for funding started in June 2018. Some 90 applications were submitted, Taplin reports. Many of the agencies involved are keen to fund applied research and innovation, he says.

“What we were expecting to see across many of the projects was an applied element – research solutions translating into concrete innovations that actively change urban environments for the better,” he notes.

Project selection, says Taplin, has been a complex process, given the diversity of the criteria and constraints of the agencies involved.

“It can be difficult to bring different sets of processes together,” he observes. “But we all work very well together, and we are approaching this cooperation very constructively. We all want to get the greatest possible number of great projects out there.”

Sustainability is a global challenge, and it needs to be addressed at a global scale, Taplin notes.

The partnerships on which EN-SUGI is based create a relevant scope for research into possible solutions, he adds. So who cares if the practical arrangements aren’t necessarily a walk in the park?

“EN-SUGI’s global reach is exciting, it is challenging, and it is absolutely the right level to be looking at,” Taplin concludes.

All 15 funded SUGI projects address the need for innovative and integrated solutions and are framed in the context of the urban food-water-energy nexus. They involve 134 researchers and project partners from business, public authorities and civil society in 22 countries.
VII. European Capital Award
Investing in European success

Paris: enabling agile, sustainable and inclusive growth

Recognition for Paris as the European Capital of Innovation 2017 is a tribute to the city’s capacity to reinvent itself, opening the city space to international innovators and talent whilst ensuring that innovation brings social and economic benefit to both its periphery and centre.

Climate change, pollution, migration crises, exclusion phenomena, terrorism and new citizens’ aspirations were the triggers for the transformation that Paris has undergone over the past 10 years in order to adopt a new, innovative approach to “making the city”.

Today, in line with the COP21 and the Paris climate agreement, the French capital is committed to being ever more autonomous, sustainable, circular, resilient and smart, and to creating an environment which will enable all actors – residents, companies, non-profit organisations and universities – to participate in day-to-day operations and the creation of the smart city of tomorrow.

To this aim, the city built more than 100,000 square metres of space for start-up incubators. It also hosts the world’s largest start-up campus – Station F – which can house more than 1,000 start-ups.

The municipality has become a ‘facilitating platform’ by scaling up its efforts. It has been reviewing its modes of intervention and developing disruptive tools and methods to enable innovators in the private, public, non-profit, and academic sectors to make the city more agile, sustainable and inclusive.

Easy to reproduce, this dynamic is already inspiring other major cities (the European Commission is ready to launch a ‘Reinventing cities’ call for proposals based on Paris’ successful experience) and Paris shares it via many global city networks.

Paris rebuilds and renovates what it already has. Through the Arc of Innovation, a network of projects spanning the city, it is ensuring that its periphery benefits socially and economically from innovation. The city also spends 5% of its budget on projects proposed and implemented by citizens.

For instance, citizens were consulted on the redesign of seven of Paris’ biggest squares, including Place de la Bastille and Place du Panthéon. Citizens participated in the ‘demolition party’ held for the Place de la Nation, an urban space that will become much greener and pedestrianised. ‘ParisCulteurs’ is another smaller yet important example of
how Parisians are taking ownership and using urban spaces for gardening or urban farming.

These achievements contributed to the French capital being awarded the title of European Capital of Innovation 2017. The city is using a prize of EUR 1 million to scale up and expand the city’s innovation efforts. Part is dedicated to hosting this year’s FabCity Summit, a European and international summit of city innovators, designers, makers, architects, business and others who are contributing to building the city of the future. Their efforts will be showcased in a one-week FabCity showroom open to citizens and others at the Parc de la Villette. The summit will also convene all cities that were finalists in previous editions of iCapital.

Recognising urban innovation

The European Capital of Innovation (iCapital) Award was created by the European Commission in 2014 to acknowledge the role that cities play in encouraging innovation and connecting people and places.

Paris followed in the footsteps of Amsterdam and Barcelona. The Dutch capital – named iCapital in 2016 – has a long-standing commitment to grass-roots social innovation and its vision of a socially inclusive and vibrant future. Barcelona became the first iCapital in 2014 rewarded for introducing new technologies to bring the city closer to citizens.

MORE INFO:
The European Capital of Innovation Award (iCapital)
https://ec.europa.eu/research/prizes/icapital/index.cfm
Amsterdam: innovation enables urban inclusion

Amsterdam’s status as Europe’s Capital of Innovation (iCapital) 2016 is in recognition of the city’s long-standing commitment to grass-roots social innovation and its vision of a socially inclusive and vibrant future. The city intends to use its iCapital status to strengthen existing initiatives and support new citizen-inspired ideas.

The Dutch capital was awarded the title in April 2016 by a panel of independent experts who judged that the city has built an effective ‘innovation ecosystem’ connecting citizens, public organisations, academia and businesses. A prize of EUR 950,000 will be used to help scale up and expand the city’s pioneering efforts to nurture and grow locally inspired innovation.

Smart inclusive cities: “This prize is for citizens,” says Gerard den Boer, coordinator of EU strategy and development in Amsterdam. “We can provide the opportunities, but it is citizens who can really make a difference. We’ve also shown that you don’t have to be a large or super smart city to innovate in this way.” To this end, two open calls for local projects in the fields of health and talent development will be launched, along with a support and learning programme designed to establish a sustainable network of innovators across the city.

“The goal is not only to make Amsterdam the most innovative city in Europe, but also the most inclusive city,” says den Boer. City authorities, he adds, want a place where all citizens – regardless of education, background or location – are involved in shaping their neighbourhood and forging connections with high-tech innovation partners, such as well-known universities.

Amsterdam has teamed up with Glasgow (one of nine 2016 finalists) to develop a pan-European Cities of Innovation network, the objective of which is to enable cross-border collaboration and to explore the optimal role of local governments in fostering city-wide innovations.

Locally sourced solutions

Amsterdam has built up an effective ‘innovation ecosystem’ on a firm understanding that R&D and scientific excellence are not enough on their own. “We know that we also have to pay attention to openness, entrepreneurship and livability,” says den Boer. “Innovation in Amsterdam has a purpose: to implement, learn and grow. Our policy is to be agile, to go where the energy is, not top-down but rather bottom-up.”

In practice, this means setting up ‘urban platforms’ that offer universities and citizens opportunities to meet and share ideas –
both online and offline – and creating unique partnerships, such as Amsterdam Smart City (ASC). This initiative brings together a variety of stakeholders to solve urban challenges, such as enabling better mobility. For example, ASC launched a three-year project in 2014 to give residents of Amsterdam’s Nieuw-West district the chance to store locally produced solar energy in their electric car batteries, or to feed it back to the grid.

Another initiative, StartupAmsterdam, was founded by entrepreneurs and governmental bodies. Bringing different elements of the city together sparked new ideas, such as the ‘Startup in Residence’, in which 10 start-ups sought to solve 10 urban issues in three months. They received a guarantee that solutions developed would be implemented by the city government. This again underlines the cooperative aspect of Amsterdam’s approach to innovation and its commitment to locally sourced answers.

Recognising urban innovation

The Capital of Innovation award was created by the European Commission in 2014 to acknowledge the role that cities play in encouraging innovation and connecting people and places. Amsterdam follows in the footsteps of Barcelona, which became the first iCapital for introducing new technologies to bring the city closer to citizens (there was no award in 2015).

The Catalan city pioneered the use of new technologies to foster economic growth and citizen welfare, through open data initiatives, sustainable city initiatives, and by providing better smart services. For example, sensors have been installed throughout the city to monitor traffic patterns, parking spaces, street lights, air pollution and even rubbish bins.

The experiences of both Amsterdam and Barcelona are instructive for other European cities keen on encouraging urban innovation that benefits everyone.

MORE INFO:

The European Capital of Innovation Award (iCapital)

http://ec.europa.eu/research/innovation-union/index_en.cfm?section=icapital
Getting in touch with the EU

IN PERSON
All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

ON THE PHONE OR BY E-MAIL
Europe Direct is a service that answers your questions about the European Union. You can contact this service:
– by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
– at the following standard number: +32 22999696 or
– by email via: https://europa.eu/european-union/contact_en

Finding information about the EU

ONLINE
Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU PUBLICATIONS
You can download or order free and priced EU publications at: https://publications.europa.eu/en/publications. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

EU LAW AND RELATED DOCUMENTS
For access to legal information from the EU, including all EU law since 1952 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu

OPEN DATA FROM THE EU
The EU Open Data Portal (http://data.europa.eu/ueodp/en) provides access to datasets from the EU. Data can be downloaded and reused for free, both for commercial and non-commercial purposes.
The European Union has recognised sustainable urbanisation as a global challenge. EU research and innovation programmes are helping cities to become inclusive, safe, resilient and sustainable in Europe and other cities worldwide.

This booklet showcases 23 successful EU-funded projects on urban innovation that are transforming our cities into European and global actors pursuing open research and innovation, dealing with energy and climate, urban transport, nature-based solutions, green lifestyles in resilient cities, food, social innovation, well-being, cultural heritage and urban governance. It takes a closer look at outstanding cases, among which the much-praised cities of Paris and Amsterdam, recent winners of the European Innovation Capital Award.

Research and Innovation Policy