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Maximising Europe's Low Carbon Activities

Moving from Individual Projects to Challenge-led, Transition Programmes

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INTRODUCTION

Martin is a dynamic Chief Executive of Coventry, a medium-sized English city. It has recently received additional funds to promote cycling and his transport officers have drawn up their suggestions for new cycling infrastructure and road lay-out. "I said to them this will please the existing bike riders and the aficionados but I want us to reach wider.

"I told them to draw a bigger picture. Just installing a set of new cycle lanes was not enough. We need some systems thinking to take us out of the professional silo."

Set aside a chunk of the money for cycle hire schemes; bike maintenance classes; links with schools and community organisations. Get doctors and community nurses to promote the health benefits of cycling. I want us to reach beyond the usual suspects."

Here, in a nutshell, is the challenge for low carbon projects all over Europe. Are they standard initiatives which can be pursued by the normal procedures of professional practice or do they require qualitatively new thinking that can reach out and make transitions happen? This paper argues forcibly for the latter. Martin's approach looks at the issue from the other end of the telescope. For him, the critical first question is not 'where do we spend the money?'

"Rather he starts by asking the broader policy question – in this case, how do we get a significant increase in the number of people cycling in the city? Once you pose the question as a broader policy challenge then the answers are different."

They reach across different professional boundaries; they combine the social with the technical; and require the active co-operation of a range of actors. In this instance, Martin was asking for traffic engineers to engage with health professionals. Of course, the capital spend on the infrastructure remains important but it is shaped and influenced by the wider strategic purpose.

This story is just a small insight into the type of new thinking that is occurring across Europe. There is a growing recognition among cities of the limitations of a traditional project approach. In response this paper seeks to show that:

- The challenges which Europe faces as it addresses climate change require a concerted drive for low carbon transition through systems innovation.
- A number of major cities are beginning to respond in this way and how this thinking can be strengthened and consolidated.
- Based on its in-depth case studies there are a set of common features which 'badge' this approach and which many towns and cities could follow and adopt.
- European institutions should respond to this thinking and promote this approach in the implementation of the 2014-2020 European Structural and Investment Fund (ESIF) programmes.



1. MOVING BEYOND INDIVIDUAL PROJECTS

The past decade has seen the emergence of new policy thinking in Europe on the transition to a low-carbon society. The designation of climate change as the 'biggest market failure ever' made by the Stern Review, The Economics of Climate Change 2006¹ has led to a widespread view that such a transition has to involve public and governmental action, as well as emergent market processes. Cities are absolutely central to this process.

Across the whole of Europe there is a groundswell of activity as towns and cities tackle the issues of climate change. Drawing on the goodwill of many citizens; the activity of the voluntary sector and many private companies; the commitment of councillors; and the dedication of officials, hundreds of imaginative and innovative low carbon projects are underway. More than 5,600 civic leaders have signed up to the Covenant of Mayors and made ambitious declarations of their intent for their own municipality to meet and indeed exceed Europe's 20-20-20 targets.

Each signatory to the Covenant has written and agreed a Sustainable Energy Action Plan (SEAP).

“ Each municipality has individual low carbon projects at the grass-roots level. However, the overall impact is limited. ”

The general picture is that these projects are often isolated initiatives, unrelated to each other, lacking in strategic coherence and with no agreed perspective on how to generalise and scale them up. The SEAPs frequently stay on the shelf with little monitoring of progress.

“ The gap between individual grass roots projects and high level policy aspiration remains huge. ”

Currently across Europe, the whole of this low carbon endeavour amounts to far less than the sum of its parts. A key policy task is to set out an approach and a methodology that will remedy this shortcoming and help towns, cities and regions to chart a path for successful low carbon transition.

New policy thinking on the 'transition' to a 'low-carbon society' has emerged gradually. Narratives of the need for transformative responses to the crisis of environmental sustainability have moved slowly from the political margins to the mainstream. This has been accompanied by a change in policy landscape from a focus on climate change as a scientific 'problem' to a new interest in innovation 'solutions' for a transition to sustainability.

Ambitious targets to reduce their greenhouse gas emissions are being adopted by governments across the world. From the 2008 Climate Change Act in the UK, through the 'Energie Wende' in Germany to the 12th Five Year Plan (2011–2015) in China, the challenge of limiting the extent of harmful climate change is being expressed in new types of policy commitment.

The European Union (EU), through its Roadmap for moving to a competitive Low-Carbon Economy (EU 2011a), aims to reduce domestic European greenhouse gas emissions by 80% by 2050. As the world's third largest carbon emitter Europe has a crucial global role to play. Significant changes need to be evident in the near term, in particular 2020; and the medium term 2030, in order to achieve the 2050 target.²

The Emerging Urban Dimension

It is only since the Stern report on the economics of climate change that there has been his sea change in policy outlook. There is now a widespread recognition in influential policy circles of an urgent need to reshape fundamentally the pattern of economics and society of the modern industrialised world if we are to avert catastrophic impacts on planet and people. Hence the greater interest in a society led initiatives for transition based on transformative innovation.

Until now, there has been relatively little success in applying this approach in a systemic way at the urban level, where the majority of carbon emissions actually occur. Across Europe there are hundreds of imaginative and innovative low carbon projects underway. A key policy task is to set out a methodology that will help cities and regions to maximize the potential of these projects and chart a path for successful low carbon transition. Drawing on the insights of systems innovation and sustainable transition management thinking from the academic and policy arena,³ the partners in the Climate KIC Transition Cities' programme have been developing a novel framework at the intermediate city level.

The Climate Knowledge Innovation Community (Climate KIC) is a major EU climate change programme funded by the European Institute of Innovation and Technology (EIT). Transition Cities is one of its big flagship projects. It is tackling the task set out above in two ways.

Firstly, it is focusing on more comprehensive approaches by showing how to develop low carbon clusters. This dovetails with thinking being undertaken within the European Commission which shows an increasing interest in more systemic methods.

Secondly, it is studying the kinds of wide-ranging, broad initiatives that cities have already taken to tackle big climate change issues and how successful these have been in achieving high impact. The case studies assess the potential of developing a clear methodology for defining these challenge-led demonstrator programmes which could then be used by cities across Europe.

The two elements are intimately connected: a cluster policy which enables cities to work thematically on the main priorities for action – buildings, energy and mobility - and a challenge-led demonstrator approach which breaks the clusters into bite-sized chunks and promotes stakeholder partnerships to maximise the learning and economies of scale that arise from a focused, concentrated approach.

This report concentrates on this second task. It assesses six separate cases where cities have recognised the **limitations of a traditional project approach** and moved towards more comprehensive programmes. These have sought to address major low carbon challenges that these cities face. The report analyses the programmes that have been and are being undertaken; discusses the initiatives with key stakeholders; draws out some key lessons that will help to scale out this approach in the future; and suggests common features that characterise a challenge-led approach.

The report concludes by relating this thinking to the broader innovation models currently being developed by the European Commission. It suggests that the Commission's own thinking on this topic can be modified and strengthened by the insights from this Transition Cities work.



¹ Stern, N. 2006. Stern review report on the economics of climate change. London: HM Treasury, Cabinet Office. http://webarchive.nationalarchives.gov.uk/20130129110402/http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf

² The Roadmap to a Resource Efficient Europe (COM(2011) 571) http://ec.europa.eu/environment/resource_efficiency/about/roadmap/index_en.htm
The EU's 2030 goals for climate and energy. http://ec.europa.eu/clima/policies/2030/index_en.htm

³ For a selection of examples see:

Geels, F.W. and J. Schot. 2007. Typology of sociotechnical transition pathways. Research Policy 36: 399–417.

Steward, F. 2008. Breaking the boundaries. Transformative innovation for the global good. London: NESTA.

Geels, F.W. 2011. The multi-level perspective on sustainability transitions: Responses to seven criticisms. Environmental Innovation and Societal Transitions 1: 24–40.

Steward, F. 2012. Transformative innovation policy to meet the challenge of climate change: sociotechnical networks aligned with consumption and end-use as new transition arenas for a low-carbon society or green economy, Technology Analysis & Strategic Management, 24:4, 331-343 <http://dx.doi.org/10.1080/09537325.2012.663959>

2. CLIMATE KIC'S URBAN POLICY AGENDA

2.1. Climate KIC's initial Pioneer Cities project collected and assessed a range of low carbon projects which have been recently or are currently being undertaken within seven cities – Birmingham, Budapest, Castellon, Frankfurt, Modena/Bologna and Wroclaw.

Analysing more than one hundred projects and drawing on the insights in transition management thinking pioneered by the Dutch Key Systems Innovation network the project proposed

a new approach for cities that gives shape and coherence to this diverse range of low carbon activity and provides the link between individual grass-roots projects and overall strategic ambition set at the city level.

Our approach gives a pathway for change which bridges these two levels and gives a route to move from the one to the other. This systemic approach complements the thinking being developed by DG Enterprise and DG Regional Policy.



2.2. In Pioneer Cities projects were grouped into clusters which are focussing on a similar outcome. Currently, all too often, low carbon projects are just seen as individual initiatives. Some are well-run, others less so, but rarely are they linked together into a coherent policy story. Pioneer Cities sought to rectify this deficiency by setting out a clear framework of the intermediate level into which low carbon projects can be clustered.

The broad platform areas of built environment, transport and energy networks were disaggregated into arenas defined by a more specific socio-technical system change to which the projects contribute. This was done by investigating the similarities between different innovation projects in the Pioneer Cities in the context of the wider knowledge base about transitions. Six transition clusters have been defined: enhancing the energy efficiency of buildings through design or retrofit; enabling the

users of buildings to actively manage their demand for energy consumption; combining the generation of heat or cooling with power; connecting the bio-waste stream with energy production; developing low emission vehicle systems; integrating multiple modes of mobility to reduce car dependence and produce new types of mobility behaviour.

Together these capture a large proportion of the innovation projects identified. Some of the arenas put more emphasis on technological change while others envisage a bigger role for behavioural change.

2.3. Pioneer Cities has borrowed the concept of 'clusters' from industrial policy and sought to apply it spatially, to the challenges facing cities and urban areas, as they seek to meet EU targets in different aspects of climate change.

By clustering projects in this way cities can maximise their potential in terms of learning from the individual project, sharing these experiences and then setting realistic targets for progress over the next 5-10 years. Crucially, it is not a question of focussing on especially innovative or heroic path-breaking projects, though there are some.

Rather this method seeks to draw on the full range of low carbon initiatives already being undertaken and to maximise the learning and expertise from all of them in a systematic way. For cities to meet their climate change targets it is the everyday and mundane practices of institutions, private companies and councils that have to change.

“ By clustering projects, cities can deepen their understanding and gain a wider awareness of transition thinking. ”

Crucially, this creates the context and opportunities for practitioners to both broaden and scale-up their initiatives and to pursue clear and specific outcome targets. The methodology proposed offers **six focused arenas** where districts, towns and cities can pool their knowledge and set out a systematic path of change with meaningful targets. Such manageable arenas are practical and targeted; they avoid the danger of vague generalities or over-ambitious claims that are often heard or read in the statements of city leaders.

This is a new way to think about how to transform a city and from the initial workshops Pioneer Cities believes it is a distinctive and valuable approach spanning three critical areas of buildings, energy and mobility and sub-divided to cover the social and community dimensions as well as the technical. It is this approach that the Pioneer Cities team is pursuing in its successor project Transition Cities.

2.4. What has become apparent through this work is that, in a number of cases, cities are moving in this direction. Explicit cluster development remains rare, but most of these cities have already **recognised the limitations of an individual project approach and begun to pursue broader strategies.**

Real experience on the ground is driving public authorities to recognise the limits of individual project development and see the need to look at the bigger picture. In Frankfurt, the authority wanted to cut energy emissions by half and reduce energy usage in buildings.

There was a similar wish in Birmingham to reduce the energy inefficiency of its housing stock. In Modena and the Emilia Romagna region the pressing issue was how to help small businesses to engage with the energy efficiency and renewable energy agenda.

How to reduce the dominance of the car and introduce a wider mobility agenda has been the driving force behind the mobility initiatives in Wroclaw, Castellon and Valencia. In all these cases, it was very clear that an individual project approach was completely inadequate. A more strategic approach addressing the particular challenge in a more comprehensive fashion has been attempted.

The six case studies vary in size and ambition. None have arisen from an explicitly theoretical approach. All have been prompted by the need to address a particular aspect of the climate change challenge. A common framework has been used to assess each of these broader initiatives.

Each case study begins with some city specific context; the origins of the scheme are explained; its main features are described; some results are given and shortcomings assessed; future potential is outlined, along with key lessons. Then the report analyses common features of these programmes and the potential for replication. There then follows a further chapter which relates these developments to the EU's policy work on broad models of innovation and suggests how these city experiments can modify and strengthen current EU policy thinking.

3. CASE STUDY 1

THE TRANSITION TO COMBINED HEAT AND POWER (CHP) IN FRANKFURT

In 1990 there existed one small combined heat and power (CHP) station in Frankfurt with a capacity of just 150 kilowatts (kW). Today, more than three hundred small CHP plants with a capacity of under 5 megawatts (MW) are in operation. Change on this scale does not happen by chance. It is a prime example of how a city can adopt long-term strategies for change and make a significant difference to its energy usage and efficiency.

Paul Fay should know. He has been involved from the beginning. He was employed by the Frankfurt Energy Agency when it was created in 1990 and today he is its officer responsible for energy planning. The driving force behind the initiative was the Red-Green coalition then running Frankfurt, which in 1990 became a founding member of the Climate Alliance, a grouping of European cities. Its challenge was to cut energy emissions by 50% by 2010.

To achieve this goal, the city set up the Energierferat, a municipal energy agency with the responsibility to enact energy policy. It saw as a key challenge the existing inefficiencies of the energy production system in Frankfurt. It decided that a big increase in both CHP plants and district heating systems were crucial measures to address these shortcomings and meet these goals.

2. The Case for CHP

Why the focus on CHP? Combined heat and power (CHP) and district heating and cooling (DHC) have been proven to be reliable and cost effective technologies to meet both urban heat and electricity demand and to reduce CO₂ emissions at an economically feasible cost.

Combined heat and power generation, sometimes known as cogeneration is the simultaneous generation of power and heat in one plant. CHP thus reduces the need for additional fuel combustion for the generation of heat and avoids the associated environmental impacts such as CO₂ emissions.

Cogeneration is an approach; it is not dependent on a single technology. It can be applied in all cases where electricity is produced by thermal combustion whether based on fossil or renewable fuels. CHP plants convert 70%-90% of the fuel source into useful energy. Their efficiency is further improved by the fact that the plants are generally sited near the user. Thus, transmission and distribution losses are reduced to a minimum or simply do not occur. To compare: traditional, fossil-fuelled power generation only reaches an output of 35%-40% of the fuel sources, while distribution and transmission losses lower the efficiency by another 9%.



The city of Frankfurt recognised that due to the efficiency of CHP, this approach holds enormous potential when it comes to reducing Greenhouse Gas Emissions (GHG). There was political consensus on the matter so when a Christian Democrat was elected as Mayor in 1994 there was no change in policy.

3. The Frankfurt Initiative

3.1. The Municipal Energy Agency was founded as a local energy agency for Frankfurt to promote CO₂ reduction and to develop an energy strategy for the city. Its activities concentrate on improving energy efficiency and reducing energy consumption in all parts of the city. The City Council decided in 1990 that distributed co-generation should become a major part of the City's climate protection programme. Following resolutions of the City Council, the Energierferat started to perform systematic studies on potential sites for distributed co-generation systems. A consistent method for evaluating the technical feasibility and economic viability was developed and refined over time. The studies also covered the environmental impact of co-generation and, in some cases, tri-generation.

3.2. By the time Energierferat started its work, it could already benefit from the local municipal utility's experience with co-generation and district heating systems. The utility company (Mainova) had started the operation of a district heating system in 1928, when it first used the surplus heat from co-generation to supply the University hospital and office buildings in the nearby harbour. But there were relatively few large plants in operation in 1990 and just one small plant. Since 1990, strong co-operation between Energierferat and the local utility "Mainova" has promoted the technology, involving more and more stakeholders and made the city Germany's CHP-capital.



3.3. At the beginning progress was slow. As Fay recalls, "The Agency had to overcome professional resistance with the big power companies claiming that it was difficult to connect combined heat and power plants to the electricity grid." There was also the question of scale with some anxiety about the creation of a lot of small producers.

3.4. However, the Energy Agency took the strategic decision to focus on small schemes. They began by looking at thirteen sites with a high heat and power demand such as hospitals, public swimming pools, offices. These were selected for feasibility studies. In the beginning, only sites outside the district heating service areas were investigated in order to avoid competition between district heating and co-generation. The focus of these studies was on technical viability, taking into account neither the state of the installed heating system nor the readiness of the building-operator to invest in a "new" technology.

As a result, only one project in a hospital was carried out as an immediate outcome of these studies in 1994. However, with an annual operating time of over 8,200 hours in the first year of operation, this tri-generation project in a hospital was very successful.

In the light of these studies, sites for further studies were selected, taking into account economic and emotional aspects in addition to technical criteria. Further studies were also carried out for particular institutions, e.g. old people's homes, hostels and workshops for the handicapped.

To date more than 350 feasibility studies have been prepared for hospitals, office buildings, old people's homes and other areas with high heat and/or electricity consumption. On average, a ratio of two out of ten projects analysed in feasibility studies is actually carried out. In addition to feasibility studies for new or existing buildings, the Energierferat prepares case studies on energy supply alternatives for new urban development schemes which often result in new CHP plants or connections to existing district heating areas. This process has been given the title systematic discovery planning.

3.5. As a result of this process distributed CHP generation in small and medium sized units in the city has increased from 0.1 MWel to 31.8 MWel (office buildings, swimming pools, hospitals

etc.) between 1990 and 2013. In total 300 CHP plants were installed with sizes ranging from 5 kWel (kindergarten) to 4000 kWel (German Federal bank).

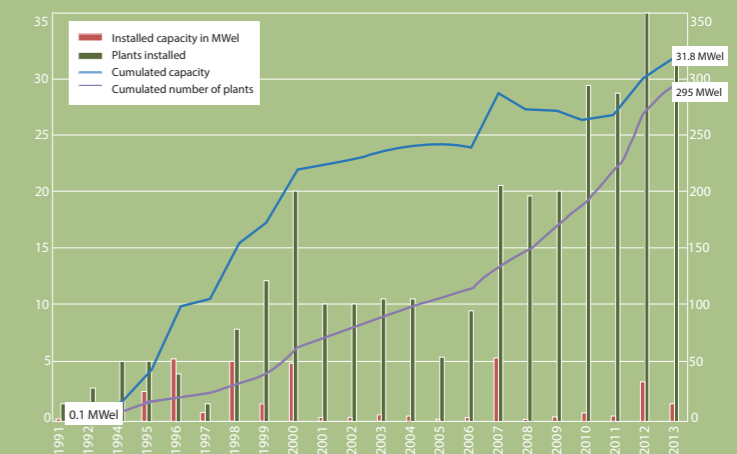
Due to the positive results with CHP-plants experienced by both building owners and energy managers, the reputation of CHP has increased enormously.

As Fay reports it,

"we created a CHP friendly climate in Frankfurt. It needed staff to organise and manage it. If we hadn't done that, then nothing would have happened."

Today, 47% of the total energy demand in Frankfurt is met by CHP, 44% by district heating where 90% of the heat is generated by CHP and 3% in small CHP units. Among the different sectors, the residential buildings sector supplies 12% of its energy demand with CHP, industry 65% and services more than 50%.

Figure 1: Development of CHP <5MWel in Frankfurt am Main 1991 - 2013



The great number of projects already realised as well as the long list of further potential sites for co-generation plants clearly show that there is still a high potential for CHP plants and on site electricity production as part of an integrated supply in Frankfurt. There is potential to introduce more renewable energy elements into the CHP system although Fay acknowledges that "for now the majority rely on natural gas."

3.6. The Energy Agency's work over more than two decades has focussed on three main areas: energy planning and CHP; office buildings and electricity savings; and residential buildings and renewable energies. Its main work has been to act as an enabler and facilitator seeking to apply the city's long-term goals and turn them into practical reality. Thus it organises round tables with relevant partners and stakeholders; conducts feasibility studies as the first step of a project; proposes the legal and regulatory context for the city's buildings and spatial plans; and acts as a repository of expertise.

“The Agency is not a competitor to other investors but rather a project enabler and organiser.”

It has generated a pool of relevant expertise that spans traditional professional silos and has brought the themes of energy efficiency, climate protection and economic development together. As the recently retired Head of the Agency Werner Neumann expressed it, “We set up a new structure in 1990 to deliver these policy targets. Municipal energy policy was a new concept. We made it happen.”

3.7. The experiences of Frankfurt may be transferred and applied to other European municipalities. The potential for small scale CHP, with its concomitant 30%-40% reduction in primary demand for energy, is very significant and could provide a significant contribution to reducing CO2 emissions relatively rapidly even in a liberalised market.

While the Energy Agency explores these CHP developments it continues to pursue other areas of climate protection. As Fay says, “we look at the spatial planning of new developments and use local authority instruments to shape and influence existing and new areas. We can develop and extend district heating in this way and get agreement to build new district heating pipelines. Too many cities do not use the powers that they have. Too often they ignore these possibilities.”

4. Conclusions

The main success factor in the widespread promotion of CHP units has been the involvement of the Energy Agency as an arms-length, independent consultancy service able to search for suitable sites for small CHP units, and able to promote regular exchange between itself, the local utilities and other key stakeholders.

Frankfurt has established a friendly climate for CHP. Together, the systematic search for potential customers/sites for CHP, the development of planning tools, the offering of free consulting service and the after “sales” customer service (satisfied customers will help to convince new clients) led to the success of this element of the city’s climate protection policy.

The total installed electrical power of small CHP units <5 kW rose from 100kW in 1990 to 31,8 MW in 2013. The 295 units in operation reduce CO2 in Frankfurt by more than 90,000 tons per year.

The plants are technically working well to the satisfaction of the users. The great number of projects already realised as well as the long list of further potential sites for co-generation plants clearly show that there is still a high potential for CHP plants and on site electricity production as part of an integrated decentralised supply in Frankfurt am Main. It is an example of the long-term thinking and planning necessary to achieve climate protection and energy efficiency goals. It is also an example of how a challenge-led approach can bring results and have a high impact.

4. CASE STUDY 2

THE ENERGY FUND FOR BUSINESSES IN THE EMILIA ROMAGNA REGION

1. Introduction

Emilia Romagna is the Italian region that has long been well-known for its productive small and medium-sized industries and its extensive micro company sector. Many of these enterprises have been interested in the potential of both energy efficiency measures, to cut their fuel bills, and for setting up renewable energy schemes (In Italy there has been a very successful solar energy drive on industrial premises).

“The SMEs were aware of the potential value of such initiatives but found the credit procedures either too complicated or too costly.”

The regional department for Economic Activities and Sustainable Development, led by the former regional councilor, Giancarlo Muzzarelli, recognized that many small and medium enterprises were finding it difficult to access credit from the banks for energy investments. Thus, it was identified as a key issue for the Region to facilitate the access to the credit for energy investments for SMEs. Addressing this structural problem, the EU Structural Fund programme offered a solution. It was the driving force behind the initiative which approved the creation of a revolving Fund for soft loans in the framework of the 2007-2013 ROP-ERDF (Regional Operational Programme of the European Regional Development Fund).⁴

2. Setting up Fund

2.1. The 2007-2013 Regional Operational Programme allocated 347 million euro to the Region and these financial resources have been mainly intended to support Emilia-Romagna to reach the Lisbon and Goteborg objectives of growth on research and development, the creation of the knowledge society and the dissemination of sustainable development.

The “Energy Fund” proposal is related to Priority 3 – “Energy and Environmental Regeneration and Sustainable Development” of the ROP and it is a financial engineering instrument to support business innovation towards green products and production processes. The revolving fund for soft loans has been set up in October 2011 with the aim to increase energy efficiency investments within enterprises, to introduce new RES plants, to promote the setting up of new companies in the field of green economy, to encourage investments geared towards energy efficiency or to reduce the amount of energy embedded in products.

The Energy Fund can count on a total amount of resources of 23.7 million euros, 9.5 million of which (40% of the total amount) is provided by ERDF 2007-2013, and the remaining 60% by private financial partners.

2.2. The Energy Fund is a revolving fund for small companies and micro-businesses. It is designed to support investments that will

“enhance the energy efficiency of their factories, produce energy from renewable sources, and provide new services”

and systems that enable the reduction of energy consumption from traditional sources. A consortium composed of Unifidi and Fidindustria Emilia Romagna manages the fund⁵.

These are both guarantee consortia whose goal is to facilitate the access to credit for economic and productive activities, through collective guarantees given to the banks in case of either short or long-term loans. For this specific “Energy Fund” initiative, the two consortia have joined in a temporary grouping. Unifidi is backed by regional trade and craft associations (C.N.A., Confartigianato) and has a really significant profile with 77,000 associated companies.

Its establishment was originally strongly supported by the Region. Fidindustria is drawn from the more established and larger economic sectors, and it is composed of the industrial associations (Confindustria, Confapi) and the regional Chambers of Commerce.

2.3. To get the initiative off the ground the Emilia Romagna Region initially issued a public tender for the management of the Energy Fund. Unifidi and Fidindustria combined for the specific purpose of applying for the contract to manage the Fund. Once chosen as the programme manager, they organized an initial campaign of communication and dissemination in order to promote and to raise awareness of the initiative.

Unifidi-Fidindustria arranged several meetings in the head offices of the Chambers of Commerce throughout the Region. Enterprises, industrial and craft associations and consultants were invited to join the meetings. The aim was to explain the features of the fund and to answer questions coming from the attendees. The fund was also publicized by the industrial and craft associations directly to their associates.



⁴ http://fesr.regione.emilia-romagna.it/homepage-1?set_language=en

⁵ For the specific initiative, the consortium composed by Unifidi and Fidindustria is called “ATI Rotative Funds”. The Italian acronym “ATI” stands for “Associazione Temporanea di Imprese” (Temporary Association of Companies).

2.4. Unifidi-Fidindustria also managed the organisation of getting support from the banks – the private financial partners of the initiative. Several meetings were arranged with the banks interested in joining the initiative. Four banks signed the agreement for providing the private supply (60%) of the loans. The agreement between Unifidi-Fidindustria and the banks had the main purpose of defining the operative methodology for managing the whole procedure of agreeing the loans.

2.5. This indicates the political and organisational complexities that have to be addressed when undertaking a more wide-ranging, challenge-led programme of this type. At the same time the consortia engaged the Climate KIC partner AESS, the Modena Energy Agency, as the technical adviser to the programme. AESS provides the Fund with the necessary specialist expertise to evaluate business proposals and to ensure that they are focused on the programme's main objectives.

3. Experience so far

3.1. Four calls have been undertaken: three in 2013 (March–April, July–November and December) and one in 2014 (starting from April, which is still open at the time of writing). In the first two calls, the loan had a maximum duration of 4 years and allowed investments between €75,000 and €300,000. Starting from the third call (December 2013) the Fund was extended to a maximum duration of 7 years, and both the minimum and maximum thresholds were extended, so investments can now range from €20,000 to €1,000,000.

3.2. The overall rate of interest charged to the beneficiary is equal to the weighted average of two rates:

Public funding portion (40%): A.P.R. (Annual Percentage Rate) of 0.00%. Originally, the public funding portion had a cost of 0.5%, reduced to 0.00% with the third call.

Private funding portion (60%): A.P.R. composed by the 6-months EURIBOR (previous month average) with the addition of a maximum spread of 4.75%.

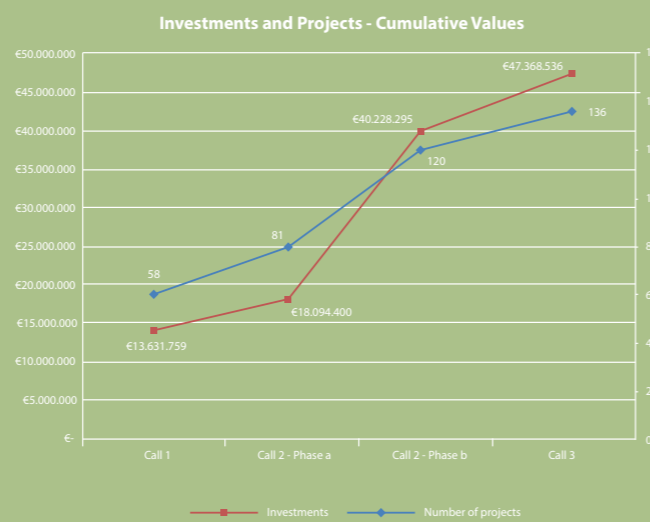
The overall weighted A.P.R. is equal approximately to 2.75%–3%. This compares favourably to efforts to do similar investments through normal channels. Here, the interest rates for enterprises would be around 5%. Definitely, one of the strength of the initiative is that within the large spectrum of possible amounts of investment ranging from €20,000 to €1,000,000, the interest rate remains the same.

3.3. The beneficiaries of the loan are SMEs located in Emilia Romagna which intend to make energy investments within the Region aimed at reducing energy consumption, producing innovative equipment, systems and services (ESCOs⁶ included) for the reduction of energy consumption from traditional sources and for the production of energy from renewable sources. The following activities are selectable in the application form:

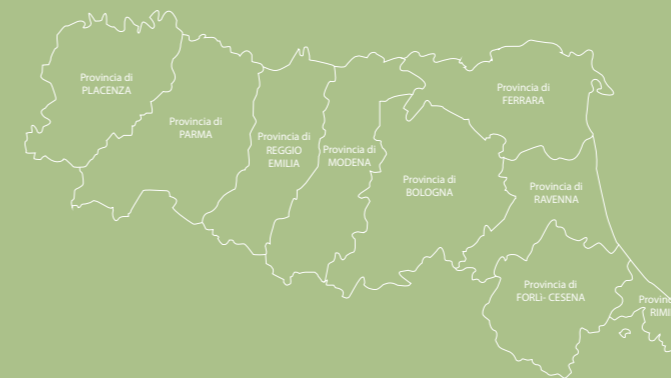
- Improvement of energy efficiency of enterprises;
- Development of renewable energy sources;
- Development of smart grid projects;
- Creation of shared networks for the production and/or self-consumption of energy from renewable sources;
- Development of goods and services intended to improve energy efficiency and development of renewable energy sources.

Around half of the projects have come from enterprises in the manufacturing sector with another 12% coming from construction enterprises. The remainder are scattered across a range of economic activities. The initiative is dedicated to micro, small and medium-sized enterprises. Nevertheless, most of the companies that have applied for money up till now can be classified as microenterprises, employing fewer than 10 people and with a yearly turnover that is less than € 2 million.

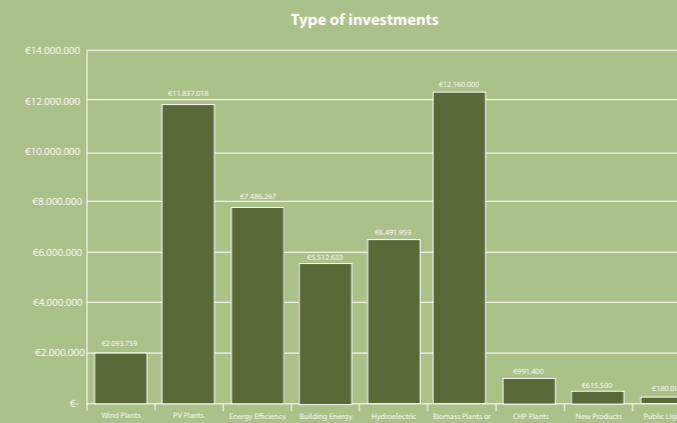
In total 136 projects have been submitted up to now⁷ for a total amount of investments of € 47,368,536 with an average on € 348,298 for each project. The charts below presents the projects submitted for each call:



3.4. The “Energy Fund” is a regional programme covering all of the nine provinces in the Region, and it has attracted applicants from across the whole Region.

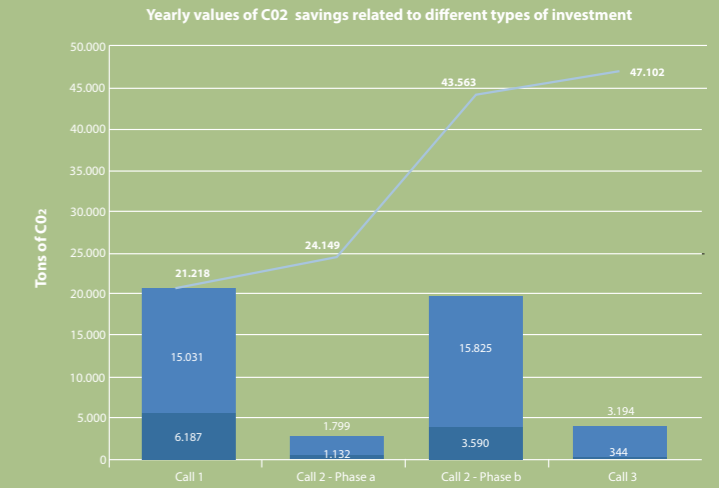


The largest number of projects has come from the provinces characterized by a higher rate of industrialization, namely Reggio Emilia, Modena, Bologna and Ravenna. The following figure represents the types of investment for the submitted projects.



A part from the photovoltaic plants, the biggest type of investments to date is in biomass plants. Of the twenty-five related projects, fourteen are based in rural areas, ten in industrial sites and only one in an urban area. A wide range of biomass types is being used in these projects, with wood chips and food waste being prominent. From the information available made available with the application forms, more than half of the projects uses biomass coming from sources less than 70 kilometres far from the using plant.

The realization of the submitted projects involves energy and environmental benefits primarily associated to fossil fuels consumption savings and to the production of energy from renewable sources. The chart below represents an approximate estimation of carbon savings related to the initiative.



4. Overall assessment of the initiative

The programme has been flexible and with simplified application procedures. With the third call, important modifications were applied to the parameters of the loans:

- Adjustment of the thresholds for eligible investments;
- Extension of loans duration;
- Reduction of the public part cost from 0.5% to zero.

This change produced more applicants to the Fund with a direct effect in terms of triggered investments.

- The Fund is helping enterprises to make investments that otherwise, without a similar financial support instrument, they probably would not have undertaken.
- After the technical evaluation of the project, the enterprises have to pass two financial (creditworthiness) assessments: the first one carried out by Unifidi-Fidindustria, the second one by the banks (private financial partners of the initiative). Up to now, **60 projects** have passed both the technical and the entire financial assessment.

This has been a strategic intervention to tackle a structural problem. It needed the prospect of a long-term guarantee Fund to bring the intermediary organisations together and invest the time and effort to bring the Fund to fruition. The high response to the programme indicates the degree of interest that exists amongst companies. There is potential to replicate this approach across other EU regional programmes.

More information available at www.fondoenergia.eu

⁶ Acronym for “Energy Service Companies”.

⁷ All the following numbers, updated to 24 September 2014, refer to the projects submitted in the four calls opened in 2013 (three: March–April, July–November and December) and 2014 (starting from April, which is still open).

5. CASE STUDY 3

ADDRESSING THE CHALLENGES OF BIRMINGHAM'S HOUSING STOCK

1. Introduction

Birmingham proudly states that as a city it was the cradle of the Industrial Revolution. During the 19th century Victorian era it was 'the city of a thousand trades.' Along with the surrounding metropolitan area – the aptly named Black Country to the West and the city of Coventry to its East, this was the heart of British manufacturing. Later, during the 20th century, the engineering, machine tool and automotive industries dominated the region.

One of the legacies of this early industrialisation and concomitant swift urbanisation is that the West Midlands has some of the oldest housing stock in Britain.

“ 25% of Birmingham’s housing stock dates from before the First World War. ”

The rebuilding of Birmingham post-Second World War followed an American model with motorways and highways driven through the city and new tower block estates replacing inner-city slums. At one stage the city had 427 tower blocks built with poor insulation, expensive underfloor heating and no combined heat and power or district heating systems.

In terms of energy efficiency this has left the West Midlands metropolitan region with a disastrous legacy. On a scale of A-G (A as the most energy efficient) 61% of West Midlands households score E or below. In 2006 there were no households which had an A energy efficiency rating; only 4,777 had a rating of B; and just 8% rated at C, while 91,946 households had the lowest energy efficiency rating G, amounting to 4% of the total.⁸



2. Birmingham Energy Savers (BES): The Thinking Outlined

2.1. When in late 2005 Paul Tilsley became deputy leader of Birmingham City Council (BCC) with responsibility for the environment he says that “the city’s profile on the issue was subterranean.” Gradually, he got the interest and backing of the corporate players on the city’s local Strategic Partnership. The first breakthrough came with a Combined Heat and Power station deal for part of the city centre with the utility company Cofely in 2006. Then with the key officers “we got the partners’ agreement to a 60% reduction in the CO2 target for 2025.

We began to develop a reputation for Birmingham’s interest in this area and began lifting the profile.” The politicians and officers turned their attention to housing and recognised the council needed to act. It established an approach to rectify the situation and improve the energy efficiency of flats, houses and buildings and gave it a brand, Birmingham Energy Savers (BES).

2.2. BES was a major retro-fit programme designed to improve 15,000 homes in its Phase 1. Pathfinder pilot period; tackle 45,000 homes in Phase 2 from 2013-2015; and spread across the West Midlands region in Phase 3.

It was designed with six key outcomes in mind: to cut CO2 emissions; to reduce the cost and level of energy used by homes and businesses; to improve comfort and energy security; to cut fuel poverty among tenants and home owners; to maximise job creation and investment through capturing opportunities in the supply chain; and to be self-financing.

2.3. At the time Tilsley encountered relatively little opposition. He argued the case in simple terms. “Firstly, it would make homes more energy efficient and save people money. Secondly, it would create jobs. As with the other initiatives on CHP and solar power I saw the basic engineering potential for Birmingham with its industrial heritage. If we could get things started here, then new jobs could also be created. Thirdly, it would help to eradicate fuel poverty.” Although the Liberal Democrats were the junior partner in the coalition, the Conservative majority let the project proceed.

There was some grumbling and ‘silo thinking’ within council Departments as the initiative cut across departmental boundaries but nothing major. As Tilsley recalls, “BES was a beautiful concept: it ticked all the boxes. At that time, very few opposed the thinking.”

2.4. It was left to the officers to bring the project partners together and develop the detailed profile.

“ The model had financial, economic, social and environmental dimensions. ”

The four elements were interdependent and the programme only works with all four operating in tandem.

On funding the finance comes via borrowing with the golden rule being that there must be no upfront costs to the householder. The public authority acts as the guarantor of the process since it alone can raise the borrowing needed and steer the processes, while the procurement process shapes and organises all the links in the chain.

On the economy, consistent engagement with companies ensures there is a good supply chain with a range of companies able to do the work. The programme is technology-neutral so it supports all types of energy efficiency actions e.g. wall and roof insulation; PV; geo-thermal; modern boilers; new lighting; smart metering; etc. No preference is given to any one technology and this gives space for new companies with innovative products. On the labour side, there is a commitment to ensure companies have skilled, trained staff.

On social issues engagement with citizens and winning their trust is seen as absolutely crucial. This means winning support in local communities; getting neighbourhood champions; using the knowledge of the council to help the programme to target those in fuel poverty, especially the elderly and those in more disadvantaged communities. These tasks entailed the creation of a new type of job: the energy assessor, who has a pivotal role. Road-shows with community groups and voluntary organisations helped to build up trust and find programme champions; and with companies to build the supply-chain.

For Birmingham Energy Savers to work it needs housing professionals, construction companies, innovators, council staff and community groups to understand the whole picture and links in the chain. The overall goal was to reduce CO2 by 7.5kT per year by 2016.

3. Difficulties Encountered

3.1. The initial pilots proceeded well. The procurement process went smoothly and the overall contract was won by Carillion, a large building and energy services company.

3.2. An early focus was on the large number of post-war tower blocks owned by the municipality. Some of the older blocks of flats identified for improvement had very poor levels of insulation as they were heated using electric storage heaters. These caused the residents to have very large energy bills or under-heated properties or a combination of both. The improvements planned for these properties included external wall insulation, flat roof insulation and replacing the electric space and water heating

with a gas-fuelled community heating scheme. Calculations of the energy use of the properties were made before and after the improvements using specialist software.

These improvements made a substantial reduction in the energy requirements of the properties, cutting both energy bills and carbon emissions. The properties with most reductions were the top floors which were difficult to heat with no roof insulation. Annual estimations of the energy requirements before the improvements peaked at just over 10 tonnes in the worst properties, with the cost of heating estimated at nearly £1,500 per year.

Following the improvements, revised estimates of energy use ranged from 1.8 tonnes to 2.5 tonnes, with some properties showing a reduction of over 100 tonnes over the expected lifetime of the improvements. The annual costs of the worst properties were reduced to around £500, a reduction of £1,000 every year.

Overall calculations of CO2 savings are difficult to provide given the different conditions of the tower blocks, the variations between individual flats and the differential impact of specific measures on each of them. For a group of three 10 storey blocks in South-West Birmingham the programme estimated the following savings.

Table 1. CO2 Use in the Tower Blocks

	Before Retrofit	After Retrofit	Annual Saving
Worst Properties	10.3	1.8	8.5
Best Properties	3.9	1.3	2.6

This gave an estimated lifetime saving for these 10 storey blocks of between 3,000 to 3,500 tonnes of CO2. Savings on a larger 15 storey block with six flats per storey rather than four were significantly less since this block had already been previously modernised, so here the overall lifetime savings were estimated at 1,500 tonnes of CO2.

Three things are clear from this work. Firstly, that these type of energy efficiency measures reduce the fuel bills and improve the daily lives of the flat dwellers.

As Richard Bubb, who undertook the research analysis put it, “Having visited all of the blocks, it’s quite clear that the improvements have made a substantial difference to the living conditions of the tenants.” Secondly, that these type of measures significantly reduce the amount of CO2 used in domestic heating.

However, thirdly, it also indicates that calculating an accurate figure for CO2 savings per block is a difficult art and that carbon accounting will not be easy.

⁸ West Midlands Regional Observatory (2006). Low carbon housing: developing a baseline for refurbishment – data taken from the English home condition survey (Department of Communities and Local Government).

3.3. However, the wider element of the programme focused on owner-occupiers and the private-rented sector quickly encountered major problems and faltered. There were two main difficulties both related to national government. Firstly, too many procedures and processes were placed in the way of private householders. Mumtaz Mohammed the BES programme manager describes it as “a long, convoluted process.” To access the Green Deal monies a householder had to have an energy performance assessment; then get advice from individual builders on different technical options they could pursue e.g. boilers, double glazing, external wall insulation; get these all costed; then have a separate financial assessment; before being offered a Green Deal loan. They then encountered the second major problem, namely that the interest rate which the government offered on loans to finance the work was set at 7%.

This was far above existing bank loan rates and acted as a strong disincentive to owner occupiers. Finally if an owner occupier did want to proceed with a Green Deal they were asked to read a thick, detailed package of documents and then sign them. Mumtaz reports that on average the entire process has been taking between three to six months. Not surprisingly the take-up of this national scheme has been extremely low. By April 2014 only 2,439 householders across the whole of the UK had signed up to the scheme.⁹ As Tilsley acknowledges, “The government Department put too much bureaucracy at the front of the process.” Effectively, it has sunk like a stone.

4. Charting a New Course

4.1. In response, the Council and BES have had to readjust dramatically. Basically, the individual owner-occupier leg of the programme closed down. Instead, BES had to focus on the large council and social housing stock in the city. “We need to be innovative to continue the programme” says Mumtaz so they are looking at a range of financial options. As a first step they are using the council capital works programme for the renovation of tower blocks, looking at heating, insulation and structure.

Secondly, while it is still operational they are using the national government ECO –energy company obligation- funding for those blocks with electric central heating and no insulation, where this funding is most applicable. However, the changes to ECO announced by national government in November 2013 reduced energy companies obligation to use ECO funding, meaning that this source for retrofitting improvements to apartment blocks was sharply cut back.

Thirdly, BES is exploring the new Renewable Heat Incentive programme to help promote combined heat and power schemes and biomass. He is confident that all this activity will generate an annual investment programme of more than £10 million.

4.2. Then BES is exploring other areas where long-term engagement is required. One area is schools where the Department for Education has launched a programme –Salix - providing 100% interest-free loans specifically for schools in England. Under the BES label Birmingham has launched a £400,000 pilot and is considering a block proposal for 27 special schools in the city.

4.3. Drawing on the energy efficiency expertise, funding knowledge and organisational capacity that it has drawn together BES is looking at other areas. These include the potential for energy performance contracting; discussing with large commercial landlords the potential for a Commercial Green Deal on office buildings; and whether there is potential for initiatives in the private rented sector.

At the same time, BES continues to offer Green Deal prospectuses to private owner occupiers but now focuses on those most ‘able to pay’ and inevitably has to deal with individual enquiries spread over a wide geographical area rather than being able to concentrate on specific neighbourhoods.

4.4. Obviously, the failings of the national Green Deal programme have severely disrupted the initial hopes and aspirations of the BES programme. As Mumtaz openly acknowledges “our old key performance indicators will have to be changed.”

However, he is clear that even in these changed circumstances having a co-ordinated approach is vital. “BES is a package. We have capacity and expertise and can offer a package of measures that enables systemic change to occur.”



6. CASE STUDY 4

SHIFTING THE PATTERNS OF MOBILITY IN WROCLAW

1. Introduction

Life in the Polish city of Wroclaw has changed enormously over the past twenty-five years. With the collapse of the old regime the country has opened up its economy and social life. The balance of trade has swung dramatically towards the countries of the European Union. After a difficult period of transition the economy has grown considerably and in Lower Silesia there are rising living standards and now in its capital Wroclaw very low unemployment.

Car ownership has been one of the symbols of this change. Within a population of 634,000 there are 380,000 cars.

“ For many car ownership has become the status symbol within the new Poland: a sign that you have ‘made it.’ ”

However, alongside this sharp growth in car ownership and usage have come the problems common to many cities in other parts of the industrialised world: congestion and sometimes gridlock; a rising number of accidents; a downgrading of public transport; air pollution and environmental degradation; and an increasing feeling that the city is moving in the wrong direction.

2. Developing Public Transport Infrastructure

Over the last decade or more there have been efforts to rectify these shortcomings. There have been some improvements to the dilapidated tramway infrastructure. These have been accompanied by wider attempts to improve the public transport system. The flat topography of the city makes it suitable for cycling and a number of cycle pathways have been built. Some of these projects have been quite significant.

2.1. A major concern has been to **provide a faster, more efficient and user-friendly public transport system** and to encourage a greater use of public transport in the city. The most substantial recent project has been the development of an Intelligent Transportation System based on cameras and fibre optic cables.

This €30 million scheme developed in cooperation with a Bordeaux-based transport information company enables cameras set above the roads with special software to adjust the traffic lights and align them to tram and bus movement so as to give priority in traffic for public transport.

In addition over a hundred kilometres of fibre-optic cable have been laid across the city to connect up all the intersections, bus and tram stops to the Transport department’s data centre, while there is a rolling programme to install live passenger information signs at these stops. Every public transport vehicle has been fitted with a GPS system connected with an on-board computer that ‘communicates’ approaching to the intersection and supplies location and demand information directly to the central data control point.

Thanks to the precise location of all vehicles the Traffic Management Center can make better decisions for traffic lights and display accurate tram or bus arrival time information on special LED panels. Project Director Blazej Trzciniowicz is justly proud of the new system. “This is a new element for our city. It is the first in Poland.”

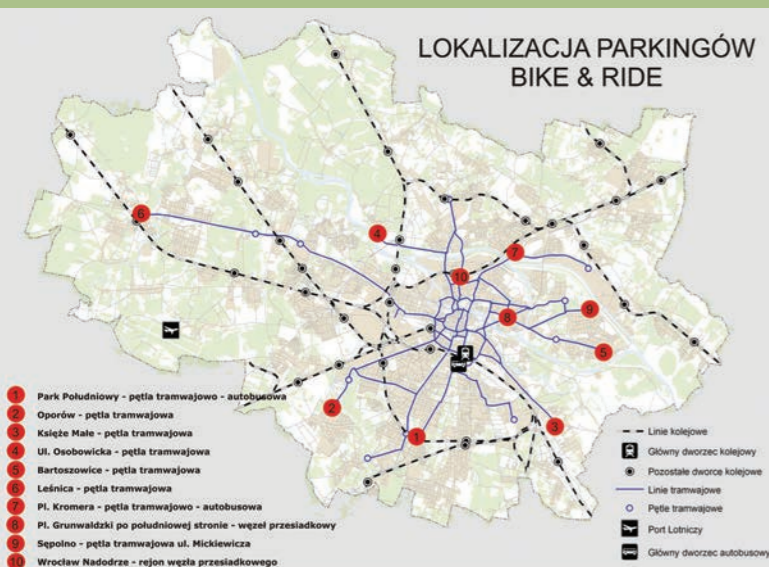
2.2. ITS is a complement to initiatives such as Tram PLUS, a large infrastructure project for the improvement of public transport, particularly convenient and fast tram services for the settlements Gaj and Kozanów and to service events organized at the Municipal Stadium. The €180 million project undertaken between 2008-2013 aimed to improve the quality of the public transport system in Wroclaw with the construction and modernization of 5.3 km of new tram tracks, 37.85 km of reconstructed tram tracks, the purchase of 26 modern low-floor trams and building several integrated interchanges. An integral part of the Tram PLUS Project was the construction of modern tram stops with specially designed furniture, flooring and electronic elements to help passengers use trams and make tram travel more efficient and comfortable.

2.3. The city has sought to develop its bicycle network over the last two decades. In 2005 it adopted the “Concept of Primary Routes Network Bicycle” and “Design and Implementing Standards for Bicycle routeing system Wroclaw City” within the Study of Conditions and Directions of Spatial Development of Wroclaw which indicated an official recognition of the cycling dimension within the planning process.

By 2010 the network had expanded to 160 km and the city had established a Council for the development of cycling. The same year saw the adoption of Cycling Policy Wroclaw 2010 and a 4 year cycle programme. During this period ten bike and ride parking sites have been built at rail and public transport hubs, while a city-wide bike rental scheme has been introduced. Currently, Wroclaw has over 200 bikes in 32 stations with more than 21 000 registered users.

⁹ Domestic Green Deal and Energy Company Obligation in Great Britain, Monthly report Department of Energy and Climate Change. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/312499/Monthly_Statistical_Release_-_Green_Deal_and_ECO_in_GB_20th_May_Final.pdf

Bike & Ride Network



2.4. Thus, it is evident that transport authorities have spent significant sums on the modernisation of Wrocław's traffic infrastructure. However, overall these have remained as individual projects designed to address specific weaknesses in the city's transport infrastructure. They were not strategic attempts to address the transport challenge and to shift the city's overall model of mobility.

3. A Challenge-Led Approach

3.1.

“ This was not surprising. Developing and delivering on individual projects is the ‘normal’ way that things happen in everyday life. To adopt a ‘challenge-led’ approach requires conscious action and intervention by the key relevant stakeholders. ”

It comes when they recognise both the scale of the problems they are facing and the limitations of piecemeal initiatives taken to address them. That is what has happened in Wrocław.

3.2. On 19th September 2013 the city of Wrocław adopted a Mobility Policy of the City of Wrocław. This key guiding document was prepared by the main transport and planning agencies in Wrocław, bringing together the key local stakeholders. It sought to address all the city's mobility and transportation problems. It formed a major element of the City's development strategy aimed at ensuring a high quality of life for all of its residents and was seen as a key part of the issues defined in the Wrocław Strategy in 2020 Perspective.

This change of approach on transportation issues was expressed symbolically by a change in terminology, with Transportation

Policy being replaced by the phrase with Mobility Policy. As one of the architects behind the new policy Blazej Trzciniowicz explains,

“The last years of the 20th century, and the first decade of the 21st century have shown that in order to develop modern cities in a way that is coherent, consistent and friendly to their residents, there is a need for a fresh look at the issues related to the movement of goods and people. A particularly important element of this fresh look is to move away from an over-concentration on the transport infrastructure, and to take a broad look at behaviour. This trend is reflected in the reduction of use of the transport concept to the benefit of the mobility concept, which reflects a broader and more comprehensive view of the principles of movement shaping a city.”

Trzciniowicz states that the new thinking shows that,

“Shaping sustainable mobility requires, above all, that the city gives priority to the development of non-car modes of transport, because the mobile future of the city, and to a large extent the surrounding metropolitan area, lies in efficient public and bicycle transportation, as well as pedestrian traffic. This will be facilitated by the creation of a coherent public transport network, enhanced with bicycle transportation, and public spaces for pedestrian traffic, as well as supplemented by a well-functioning road system. Such an approach will permit a new mobility culture to develop.”

3.3. The document sets out clearly the general goal of the Mobility Policy of the City of Wrocław, namely, the creation of optimal conditions for the efficient and safe movement of people and goods in the city and the metropolitan area, while complying with the requirement to limit the burden of transport on the environment. The general goal should be implemented based on the development of Wrocław as a city of sustainable mobility.

3.4. The main target of this strategy is to achieve a significant modal shift within the city's mobility patterns. The policy calls for a constant increase in the share of non-car trips in the total number of trips in the city. By 2020 the share of non-car transport - understood as public and bicycle transportation as well as pedestrian traffic - shall not be less than 60%, while the most important goal for the upcoming years is to overcome current negative upward trend in the share of car traffic in urban travel.

Flowing from this overall objective the following goals were set:

1. improvement of transport accessibility of the city and the metropolitan area,
2. strengthening the role of public and bicycle transportation as well as pedestrian traffic as a basis for sustainable functioning of the city and the metropolitan area,
3. the integration of the city and the metropolitan area transport systems as well as transport systems on the regional and country level,
4. an improvement in the quality of transport,
5. an increase in the level of movement safety,

6. a reduction of the negative impact of transport on the living conditions of residents and natural environment.

3.5. Policy Implementation Principles

Measures for the implementation of the Mobility Policy of the City of Wrocław will be implemented while observing the following principles:

1. shaping of the transport system in harmony with the surroundings,
2. shaping of the transport system, depending on the characteristics and preferred accessibility of different areas of the city,
3. influencing demand for movement, and way of satisfying it,
4. priority for the use of existing transport infrastructure in relation to its rebuilding and expansion,
5. preferences for the expansion of public and bicycle transport as well as pedestrian traffic infrastructure in relation to individual car transport infrastructure,
6. maintaining an appropriate balance between expenditures for the construction of new transport infrastructure, and expenditure on the maintenance of existing resources,
7. taking into account the needs of persons with reduced mobility, in the planning, design, and implementation of transport infrastructure,
8. co-operation with third parties for the integration of the city and the metropolitan area transport system.

Logo of Mobility Policy



It is intended that measures carried out on the basis of aforementioned principles will lead to an increase in the share of public transport and non-motorized traffic - pedestrians and cyclists - in the total number of trips in the city, thereby contributing to the development of sustainable mobility.



4. Implementation

The Mobility Policy identifies fifteen areas for concerted action where measures have to be taken to ensure that the strategy's goals are met.

- spatial planning,
- shaping of sustainable mobility
- public transport
- movement safety
- social dialogue
- movement of pedestrians and persons with reduced mobility
- bicycle transport
- parking policy
- transport of persons by passenger car (private)
- freight transportation
- air transportation
- organisation and management
- economics and finance
- environmental protection
- monitoring and modelling of transport behaviour.

There are detailed suggestions for action within each of these areas. The organisation of all this potential activity, the engagement of all relevant stakeholders and the funding of the potential initiatives will be major tasks which will require significant managerial capacity and resources. The Policy document then identifies a total of thirty-three areas for systematic monitoring in order to gauge progress towards the city's overall goals. Almost all of these areas are due to be monitored annually.

The overall Steering Group meets monthly and oversees the thirty-three monitoring indicators. All the key departments and agencies involved have to report progress on a regular basis while efforts to engage with key stakeholders are underway. The Steering Group reports regularly to the city Mayor. Its chair, Marek Zabinski, Head of Urban Planning is fully aware of the scale of the task. “ This is a new type of document.

“ We are wanting to change the spirit of mobility. But there isn't going to be a revolution. It is a long-term effort to change the mentality of society. We can change the engineering but we need to change the wider thinking.”

His colleague on the Steering Group Zbigniew Komar agrees. “We need to learn from other cities and how they are changing inhabitants' mobility behaviour. That is the weakest part of our experience.”

Marek notes that this requires new ways of working and new governance. “The mobility strategy is not part of the administrative structure of the municipality. We have set up a team that is cross Departmental. We have to find the resources and methods to make this cross-cutting approach work. And we need to work across the agglomeration because currently we have 200,000 people coming into Wrocław each day by car.”

5. Turning Aspiration to Reality

Wroclaw knows that in its transformation into a modern, 21st century city, mobility is one of its main challenges. It has recognised that on their own big transport projects are not enough. They have set out a broader context in which to address this challenge, to bring the major stakeholders together and try to respond in a strategic fashion to the issue.

The Mobility document sets very demanding targets which will be exceedingly difficult to meet. Furthermore, this will be a rigorous test for the type of challenge-led approach being advocated by the European Commission and being explored in Transition Cities. A number of questions remain open about the strategy.

- Can Wroclaw create the type of cluster that will help deliver its ambitious strategic objectives?
- Where will it find the human and financial resources to meet its main goals?
- To date the extent of citizen engagement with the strategy has been limited and the questions remains as to how the Group will convince citizens and companies about the benefits of this approach.
- Can the other cities use a similar approach?
- And together can they maximise the benefits of clustering and show how this enables progress to be made on a major low carbon challenge that every city faces?



7. CASE STUDY 5

TACKLING THE CHALLENGE OF CO2 EMISSIONS IN BUILDINGS: THE FRANKFURT EXPERIENCE

1. Introduction

The use of heat and energy within all types of buildings is one of the main sources of CO2 emissions across Europe. Hence, it is a key target for reductions within the EU's 20-20-20 strategy with the goal of cutting back by one-fifth the overall use of energy in buildings. This should be one of the easier targets to reach, since

“ many of the technologies are already available and the changes in organisational and citizen behaviour required are not as radical as those required in the mobility field.”

2. National Context

As with energy production the starting point here has been the political recognition of the need for far-reaching change. This has had both a country-wide, federal dimension within Germany, which has been reinforced by cities taking their own initiatives. The German federal government has been setting Energy Efficiency Directives (Energieeffizienz Verordnungen ENEC) for more than two decades. This is because the building sector, mainly residential buildings (though non-residential buildings are often addressed by the same measures) is regarded as the key to greater energy efficiency in the country.

This concept has been reinforced by the German Energy Concept developed by the Merkel government in 2010 and subsequently modified following the shift in German energy policy after the nuclear accident in Japan at Fukushima in March 2011. The latest Energy Efficiency Directive in May 2014 sets higher energy standards for new construction. Previously, legislation had set energy efficiency standards for residential buildings which had helped to set heating and hot water standards within domestic apartments and houses and to lower the average use of kilowatt energy per hour.

3. The City Dimension

However, the city of Frankfurt has not just simply operated this national framework. Rather it has been pro-active and taken decisions to supplement and reinforce it by introducing its own higher standards. This has involved three elements:

- an insistence on a high quality regulatory and procurement framework within the city;
- a willingness to introduce and test out new building techniques;

- and a programme geared to changing citizen's behaviour with regard to energy usage.

It has drawn on the expertise within its urban planning and construction, energy management and energy agency departments and its arms-length housing association to pursue this approach.



3.1. Since 1998 the city has focused on 'cost-effective' as opposed to 'the cheapest' construction. Mathias Linder is the Head of the Energy Management Unit within the council's Planning and Construction Department. He and his staff of ten drew up extensive guidelines based on a building's life cycle costs and not just on its immediate construction cost. 'The Guidelines for Economic Building' produced by the Frankfurt Urban Planning Department¹⁰ shows the serious attention given to reducing energy consumption in the city's schools and public buildings.

The aim is to minimise the capital, operating and environmental follow-up costs over the life-time of the building. Elements included in the key quality criteria include minimisation of material consumption and the primary energy demand of building materials while throughout the document there is an emphasis on energy efficiency, reduction of heat loss, attention to insulation, as well as the potential to maximise the use of solar energy.

It began in 1998 as a professional initiative. The Guidelines were initially applied just to the public buildings in the city, notably schools, day care, community and social centres, swimming pools, police stations, etc. However, this represents a significant segment of the city's building stock with one thousand facilities

¹⁰ <https://www.frankfurt.de/sixcms/media.php/738/Guidelines-for-Economical-Construction.pdf>

and two thousand five hundred buildings. As Linder says, “My staff developed a simple tool to calculate the life cycle costs and to convince the city treasurer and external audit of the benefits.”

As a result after several years they were able to extend this approach more widely. “We had enough good practice and showcase examples to convince politicians that this life-cycle model was the most economic way to go” explains Linder. “There was relatively little resistance from politicians. They were keen to pursue climate protection measures.” As a result since 2005 all public construction projects and all contracts concluded with architects and engineers have been subject to these guidelines.

As the document states, “These guidelines apply for all new construction and renovation projects conducted by the City’s administration, municipal institutions, city businesses, and all buildings constructed for the City of Frankfurt as a PPP model.”¹¹ Thus, this sets the framework for construction and renovation companies, architects and engineers within the city. So, for example, when the Riedberg Campus and new suburb was developed in the North of the city on former city-owned land, all the developments had to meet these higher standards.

3.2. One key element of the guidelines is the commitment to passive housing, a quality standard combining high comfort with very low energy consumption and thus lower energy bills. In 2004 the city built its first school to passive house standard and in 2005 introduced this requirement in its Regulations for new schools and day care centres.



On 6th September 2007 the city council passed a resolution stipulating that all new municipally owned and municipally-used buildings had to be of Passive House Standard. This means that the passive house (PH) construction method is the standard construction method for the municipality. The PH Standard is defined by a maximum heating energy demand of 15 kWh/per square metre/per year.

The obligation also applies to private investors buying municipal property as a construction site. If, for whatever reason, it is not possible to construct a PHS building, the energy efficiency requirement still obliges developers to stay 30% below the national building energy performance (EnEV) standard.

Through the introduction of this obligation, the municipality has sought to lead by example.

The aim of the policy has been to raise public awareness and acceptance of the PH concept; demonstrate to investors its economic viability and other benefits (e.g. improved working and living conditions due to better indoor climate); and also – by way of increasing the demand for passive houses – incentivise the construction industry to further advance their PH construction skills and technologies.

The policy is one measure within the “Klimaschutzkonzept”(Climate Protection Concept) of Frankfurt, which includes a wide variety of initiatives to promote energy efficiency and climate protection measures. The policy is designed by the Department of Energy (Energierreferat) of the City of Frankfurt and is implemented by the City of Frankfurt’s Planning and Construction Office (Hochbauamt).

“ It is a demonstration of the public authority leading and shaping a crucial area of economic activity. ”

3.3. The regulation on passive housing did not come out of thin air. The concept was developed by Professor Feist at the Technical University of Darmstadt in 1992 and initially only applied to individual, detached houses.

However, a decade later it was extended to bigger housing units and apartment blocks. The concept attracted the interest of Frank Junker, the Chief Executive of the municipal housing and property company ABG, responsible for more than 50,000 housing units within the city. It began to construct its new buildings according to passive house standards. As Bernd Utesch, head of the spin-off company ABGNova explains it, “The Chief Executive took the risk early on.

He saw that passive housing was a good product and so was keen to take it up.” Today over 1,600 apartments have been built to passive house standard. In addition the building regulations mean new public buildings such as schools and day-care centres have been built to passive house standards while 50 further projects and a new hospital are in the pipeline.¹²

This has not been a trouble-free process. Utesch acknowledges that “there has been some resistance from builders. And some architects see a conflict between good design and energy efficient principles. They think it means ‘all cubes, that everything has to be rectangular.’” But most of these issues have been overcome. “The quality department within ABG has thermal heat specialists and designers who have helped to iron out initial difficulties.

We have trained our building workers since a key issue is the quality of the installation works. And with a growing market we have brought down the cost gap between ordinary housing and the passive standard.”

The strength of Germany’s social market economy means that Frankfurt does not just shape the market through its regulations but directly acts within it through its own municipal housing company. Thus, it has been able not just to argue for its better building standards but also to test them out and show that they work. Linder confirms this. “We have trained the architects, engineers and technicians in this work. The public sector has been the training ground.

ABG is not resting on its laurels but looking for further improvements. The 78 unit apartment block in Gutleutviertel is a pioneering example. Here the installation of photovoltaics, the use of facades and big energy storage batteries creates **the potential for an apartment block to produce energy rather than just consume it.** “We are moving on to the Plus Energy house” says Utesch proudly. “We are evolving, innovating, developing.”

Much remains to be done. Two-thirds of ABG’s housing stock needs refurbishment to higher energy efficiency standards. The company is looking to the KfW bank for cheap loans to help with its refurbishment programme and there is much other privately-owned housing, office and factory stock in the city that needs attention. But the municipality has put a framework in place that gives a priority to high quality, energy efficient measures for both refurbishment and new housing stock.

3.3. Schemes for changing energy behaviour

The city has accompanied these regulatory and project measures with **specific initiatives geared at influencing citizen behaviour.**

Frankfurt saves electricity is one example. Over 4,000 households and organisations – churches, SMEs, associations have registered for the campaign where electricity saving is rewarded with a cash bonus. People who reduce their electricity consumption by at least 10 per cent within a year receive a bonus of €20 from the city plus 10 cents for every additional kilowatt hour saved.¹³ The Catholic social association Caritas has trained more than 50 unemployed people as energy advisors to make the checks and give the advice to householders and the scheme has been replicated in other cities.

It is estimated that 10-20% of energy reduction targets can be achieved by changes in behaviour and greater awareness about energy consumption. A smart energy management programme has been developed by the Energy management service of the Buildings Department. It has installed remote controlled meters for electricity, gas/heat and water in more than 250 municipal buildings, along with a user engagement and awareness raising campaign.

50% of the savings realised will be transferred to the users of the buildings and 50% of the savings will be used for further energy saving measures. A variant of the scheme is used in schools where Umweltlernen organize energy information workshops in

schools and set up and support Energy Teams (teacher, students, the concierge) to analyse demand and implement measures to save energy and water. 50% of the savings realized are transferred back to the school.

A recent initiative is the establishment of an integrated energy advice centre. This responds to the concern about insufficient authoritative information and inadequate knowledge on energy saving leaving people uncertain of what measures they should take. Saving energy needs to be transformed into action via qualified expertise and in the knowledge that sound advice is being given in the right manner. A new association has been created with funding from the municipality, Energiepunkt FrankfurtRheinMain e.V. This is an association of twenty partners including the municipality, craft guilds, energy companies, energy advisors, tenants associations and architects to offer an independent and quick to access energy advice.

The city has been engaged in a variety of programmes aimed at changing individual behaviour. It believes there is no simple answer or single route to follow. The approach has varied according to the target audience and the setting. Often the focus and emphasis is on reducing the costs of energy rather than any broader climate change dimension.

At the same time, a variety of different financial incentive measures have been used. These different approaches are seen as an important complement to the regulatory changes and higher technical standards. After all, there is no point in good insulation if householders simply turn up the heating or office employees just waste electricity.

4. Conclusions

Frankfurt monitors carefully its carbon footprint, although assessing the precise impact of these policies on energy usage and CO2 emissions is complex. Since Frankfurt drew up its first carbon footprint (excluding traffic) in 1987, savings of approximately 8 per cent have been achieved, with the majority coming from industry and commerce.

Just 2% has been saved via domestic households. However over this period the population has increased by 9.3 per cent and 24 per cent more homes have been built, while the number of people per household has decreased.

These demographic and social trends indicates both how hard it will be to reach significant carbon reduction targets in households but also how important the efforts in this area are.

¹¹ Ibid. p. 5.

¹² See *Passiv Houses in Frankfurt – building the future. 2013* https://www.frankfurt.de/sixcms/media.php/738/ER_PHT2013_BroENG_DINA4_FINAL.pdf

¹³ See www.frankfurt-sparr-strom.de

8. CASE STUDY 6

CHANGING THE MOBILITY PARADIGM: THE IMPACT OF NEW BICYCLE SYSTEMS IN CASTELLON AND VALENCIA

1. The Rise of the Bike

The bicycle has been absent from Spanish cities for decades.

In the 2001 census there were no major Spanish cities where cycling had even 1% of the modal share of transport. Recently, things have begun to change. To deal with growing problems of congestion and pollution a range of transport initiatives have arisen. One element of this shift in political understanding and public opinion has been the resurrection of the bicycle as a means of urban travel. A key dimension of this has been the implementation of systems of public bicycle hire as a suitable alternative for urban travel, not only from the point of view of mobility but also to improve the environment in the city and the health of its citizens. The system of public bicycle hire offers a new option of flexible and convenient public transport and promotes healthier citizens. New cycling schemes have been introduced in Santander, Seville, Gijon and Cordoba. Both the Spanish partners in Transition Cities have been at the forefront of this trend and have introduced significant cycling schemes in the recent past.

2. BICACAS

“ In order to promote urban bicycle transportation, the City of Castellón was an early innovator. ”

In January 2008 it introduced a bicycle rental service called BICICAS as a part of its Sustainable Mobility Action Plan. The service bicycle hire scheme (BICACAS) consists of a network of 49 automated bike parking stations, where 350 bikes are available for the public to use in the city. This bicycle hire system is maintained, conserved and managed in full by the city council for the following purposes:

- Provide an alternative to private motorized transport to move within the city of Castellón.
- Improve the urban environment by reducing the problems of air, noise and visual pollution.
- Strengthen the social fabric and civic values by integrating the cycling community in the everyday life of the city.

The bicycle loan system that the city of Castellón uses has been developed, designed and manufactured in Spain. Currently the system has over 3,300 active users with an average daily use of 1,369. This compares with around 10,500 people using the public buses on a normal working day. During 2013 a total of 350,000 journeys were made with these bikes.

The use of the bicycle rental system (BICICAS) provides the following benefits:

- Energy and environmental benefits as the use of bicycles is totally clean and emits no fumes of any kind. In addition, the bicycle is silent and does not contribute to noise and air pollution.
- Improving the quality of life and physical and mental health.
- Easy to use and accessible to most of the population.
- Eases traffic congestion.
- Produces cost savings for the user.
- Optimizes the use of public space.

3. Valenbisi

In Valencia, the service branded Valenbisi consists of 2,750 bicycles distributed around 275 stations, set up in different parts of the city to promote the use of bicycles and its integration into the transport system. Users register – the annual fee is €27 – and with their card are able to hire a bicycle in any of the stations and return it to any of the other 275 available around the city. The first 30 minutes of use are free on every bicycle. This service runs 24 hours a day, 365 days a year.

The initiative has been taken by Valencia City Council but it has organised the service as a public-private partnership. It has contracted the management of the service on a 20 year contract to JCDecaux, the advertising company which has also become a leader in the provision of public bicycle services. Valenbisi applies modern information technology in its bike docking and locking systems and in the use of cycle membership or Valencia travel cards to access the system. The scheme was launched in June 2010 initially with 50 stations and 500 bikes and just 242 subscribers. The scheme got off to a flying start; by the end of 2010 there were 150 stations and 1,500 bikes in operation which then expanded to the current capacity of 275 stations no more than 300 metres apart and 2,750 bikes. Within a year there were 79,000 subscribers to the scheme and by November 2011 this had reached 100,000.

Samuel Saez, the Chief of the Data transport planning unit in Valencia, says that “the big excitement and large expectations generated by the start of the scheme have now subsided.” The number of registered users has now fallen to 68,500 and the figure has stabilised. “This is normal. It is what you would expect.” Usage remains high. On average during weekdays each bike is used ten times a day. During a week in October 2014 the average daily number of users was 22,791. Most journeys are short, usually around twenty minutes and the average distance covered is 2.5 kilometres.

(The figures for tourist users are longer.) Of the current users, 56% are men and 44% are women. There is a youthful age profile with 29% of users aged between 18-25 but this is not exclusively a scheme for the young. 43% of all users are aged over 36.

It was inevitable that a scheme which expanded so quickly and attracted such a large number of users experienced some teething problems. For instance, at some favoured destinations at peak times there were no empty docking stations where the cyclist could leave their bike; and at some peak times no bikes were available for use. Peak usage times are between 7.30 to 8.30, then around 14.00 and then in the early evening.

More generally, the huge increase in cycle usage created some tensions with both motorists and pedestrians, neither of whom were used to this number of cyclists in the city. Similarly, the traffic infrastructure was not geared or shaped to the needs of cyclists, for example inadequate cycle pathways; absence of cycle traffic lights; absence of general cycle parking as people began to use their own bikes for travel.¹⁴

The enormous growth in cycling had an unexpected impact on public transport usage with a drop in bus passengers. Samuel Saez reports that 53% of Valenbisi users switched from public transport. However, with buses moving more than 300,000 users a day, he considers that the scheme “has had a relatively low impact on bus passenger numbers.”

However, Saez acknowledges that the system is expensive both to initiate and maintain. With the recession biting deep into the Spanish economy, there is now less income available for the large-scale poster advertising which Decaux undertakes and which was expected to provide the flow of revenue to underpin the Valenbisi service. While the city is reluctant to discuss commercial aspects of the programme, both Saez and JC Decaux emphasise that there are no plans to expand the system, despite its huge success.

Instead Saez emphasises a distinctive but defined role for the public cycle hire programme.

“ It is part of a complementary system. It shows how cycling can be part of the city and it is encouraging people to both own and use their own bikes. Valenbisi has acted as a catalyst to promote the take-up of cycling in the city. Our traffic sensors now tell us that there are now two private cyclists for every one cyclist using Valenbisi. ”

Overall, cycling now accounts for 4.7% of the modal share of transport journeys in Valencia. This is a significant increase compared to a few years earlier, but it is clear that Saez expects further growth to come from an increase in private cycle usage.

4. Wider Impact

The success of the initiative has encouraged the development of a wider Master Plan for the use of the bicycle in Castellón de la Plana. This sees the bicycle as an essential means of promoting sustainable transport and secure mobility in cities as it combines the advantages of a private car: fast, free and versatility, with social, economic and environmental advantages, namely that it is suitable for almost all ages, the cost is very affordable, it consumes no petrol, does not pollute the air and makes no noise. Plus cyclists can claim to be the only vehicle where users create positive externalities because use improves their health.

The Master Plan is comprehensive. To ensure that all people can bike around the city it offers no simple recipe. Bike lanes are seen as necessary but not sufficient. The Plan emphasises the need to go further with planning policies to promote cycling as a whole. The Plan is seeking to recognise the bike's potential as a means of transport and analyze the problems faced by cyclists daily so that from this the city can adapt for its more widespread use. This is the objective of the Master Plan for the use of the bicycle in Castellon, get the bike to become a mode of everyday transport through overall planning of the city so that the bike rider is safe and comfortable and using the bicycle becomes easy. The Master Plan for the use of bicycles in Castellón includes planning measures in relation to bicycle infrastructure and parking and proposes measures to promote cycling and to integrate the bicycle into urban life. To achieve these objectives coordination between different departments that plan and manage the various activities in the municipality is required: environment, urban planning, mobility, along with the various associations who attend the Forum of Mobility. This is the way that efforts shall be coordinated and the bicycle enhanced as a mode of transport integral to everyday life. The objective is to lift the share of cycling in the city's modal transport pattern.

The approach in Valencia is similar. It is clear that the take-up of the Valenbisi scheme has exceeded all expectations. It has shown that cycling as a form of transport has real potential within a Mediterranean city – it is not a strange Dutch custom! However, the transport policy makers stress that it is just one element of the policy mix. “Users are changing their behaviour. We are getting people moving from private vehicles to public transport. Cycling is a part of this.

Citizens want more bike ways and more facilities for bikes. More paths lead to more cyclists. We have 125 kilometres at the moment.” But Saez does not just stress the physical infrastructure. “As well as increasing these bike ways, we are moving to a ‘slow’ streets policy. The maximum speed in all one-way streets with a single-line of traffic will be 30 kilometres per hour. They will all have cycle access. We think this will give a real boost to cycling.”

Thus, it is clear, the Valenbisi programme is having a wider policy impact. It has begun to change the mobility culture of the city. It is important not to over-exaggerate its role but it has a significant impact on shorter journeys, while as a high profile public scheme it helps to shift transport patterns and is facilitating the wider uptake of cycling within the city.

¹⁴ For additional data and analysis see Jose Carlos Giron Marin. Estudio de la Implantacion del Sistema de Alquiler de Bicicletas en la Ciudad de Valencia. Junio 2012. Universidad Politecnica de Valencia.

9. COMMON FEATURES

These case studies **cover the critical areas of buildings, energy and mobility, where cities have to reduce sharply their CO2 emissions** if they are to meet their EU and Covenant of Mayors targets. While there are significant differences amongst these six case studies, taken as a whole they show **a set of common features**, which can be followed elsewhere.

9.1. A clear thread is that the goal of wholesale systemic change is qualitatively different from just organising a big project. For instance, the Frankfurt programme on CHP was conceived as a concerted, long-term drive to shift the character of electricity and heat production in the city. It was not about building a few new CHP plants. As such, it needed a whole new set of organisational arrangements within the city to bring about this transformation.

In Wroclaw the authorities understood the shift of thinking required to go from big individual, transport infrastructure projects to the much broader and comprehensive challenge posed by altering the mobility culture of a whole city. They were clear that substantial capital investment in tram infrastructure, modern passenger information technology networks and cycle paths while all of themselves important and necessary, were insufficient to meet that challenge. Rather the city needed to see mobility as an overarching challenge requiring concerted actions by all the city's stakeholders. This feature is clear elsewhere too.

9.2. The policy advice proposing more all-round, comprehensive approaches has often come from officers, civil servants and policy-makers. However, in making choices of this kind, politics is absolutely central. Nowhere have these challenge-led, high impact initiatives simply arisen from the market or spontaneously.

They have all required conscious intervention and leadership. Thus, the public cycling schemes in Valencia and Castellon needed the municipality to take the initiative. In the smaller city, they did this as a council organised initiative; in the larger city as a public-private partnership. Thus, the form of the initiative may differ but the common thread is that it required political decisions to change the public realm and offer a new transport dimension to the city. The driving force behind the energy fund was the Emilia Romagna region which approved the creation of a revolving fund for soft loans under its 2007-2013 ERDF programme. In Birmingham, it was the Cabinet member responsible for environmental issues; and in Frankfurt in 1990 it was the SPD-Green coalition.

9.3. Yet it is clear that to succeed with such ventures public authorities cannot act alone. Every one of the broad initiatives Transition Cities has examined illustrates the crucial role of a wide range of stakeholders. Everywhere, it is clear that while local politicians have to take the lead with these challenge-led approaches, they will only make their mark if the full range of relevant stakeholders is extensively engaged. Comprehensive programmes of this kind rarely work as council-only or regional government initiatives. Thus Birmingham Energy Savers had to engage from the very start with the broad range of construction companies, small trading businesses and third sector and community organisations; the Energy Fund needed two major business intermediary organisations to organise it; Frankfurt needed to engage with its energy utility companies and potential clients.

9.4. Generally, a challenge-led approach requires innovation. It is rarely just a larger version of business as usual. In many instances this is institutional or organisational innovation, a change in governance arrangements. The most long-standing example of this has been in Frankfurt right at the beginning of their move to serious environmental politics. In 1990 they established the Energiereferat, an arms-length, independent consultancy service able to search for suitable sites for small CHP units; provide specialist advice; and to promote regular exchange between itself, the local utilities and other key stakeholders.

This clustering of expertise and knowledge was crucial in generating momentum and maximising the potential gains of the CHP programme. To get the revolving energy fund scheme operational in Emilia Romagna required a new type of cooperation between two existing business organisations and then agreement with four banks. Valencia developed its public bike scheme as a public-private partnership with J.C. Duceaux. Birmingham tendered for its energy efficiency programme and awarded the long-term contract to Carillion, a major construction and energy service company. The effect of these new arrangements is to cluster knowledge, facilitate learning and exchange and generally help to give focus to the initiative and avoid fragmentation and isolation.

9.5.

“ Frequently, this type of challenge-led programme requires other types of innovation and a break from the customs of everyday practice. ”

In relation to regulatory standards, to provide the most effective framework for energy efficient homes in Frankfurt, the city parliament had to introduce their own building standards, far stricter than those of the Federal government.

For Emilia Romagna to help SMEs improve the energy efficiency of factories and their use of renewable energies a new set of financial arrangements were required. The existing procedures were simply not suitable for the task.

Furthermore, on occasion these more comprehensive programmes require more extensive public engagement and at times there is a need to overcome opposition.

For instance, there was significant resistance from some house-builders in Frankfurt to the new tougher regulations on house-building standards.

9.6. To sum up, the challenge-led approach embraces five distinctive elements:

- A conscious decision that a new broad type of initiative is required;
- Political leadership able to take responsibility and win a cross-party consensus
- The engagement of a wide range of relevant stakeholders so that an all-round comprehensive approach can be adopted with some guarantee of success
- A willingness to innovate with new forms of organisation and governance which clusters knowledge and reduces the dangers of fragmented, unconnected projects.
- A preparedness to break from business as usual and be open to new thinking, whether it be in regulation, financial and procurement arrangements or public engagement.

Challenge-led, transition programmes encompass most, if not all, of these elements. They form the 'label' by which such programmes can be recognised. These case studies offer important findings. They suggest a way to maximise the impact of low carbon initiatives and an approach that can be replicated by cities and regions across Europe. How should this shape wider EU thinking on innovation and climate change?



10. BROADER INNOVATION MODELS AND EVOLVING EU POLICY

10.1. The challenge of 20/20/20

On climate change the EU has set out its position very clearly. The main target is to reduce greenhouse gas emissions by at least 20% by 2020 compared to levels in 1990. About two thirds of the current greenhouse gas emissions are linked to urban areas. To kick-start the necessary transition process to a low-carbon economy, a series of demanding climate and energy targets – known as the “20-20-20” targets to be met by 2020 – have been put in place. These are:

- a reduction in EU greenhouse gas emissions of at least 20% below 1990 levels;
- 20% of EU energy consumption to come from renewable resources;
- and a 20% reduction in primary energy use, compared with the projected levels, to be achieved by improving energy efficiency.

The achievement of these 2020 targets, the medium-term 2030 targets and the longer-term, more substantial goals of an 80% reduction by 2050 is no simple matter. It will not be achieved by a ‘business as usual’ approach. Rather it shall require a combination of low carbon, technological advances with systematic transformations in the organisation and patterns of production, consumption and behaviour. These latter are a main focus of Climate KIC’s Making Transitions Happen platform¹⁵ and its Transitions Cities programme.

10.2. EU Innovation Policy

On innovation the EU has recognized that a fast changing world demands new insights and thinking. Nowhere is this more true than with innovation policy. Its strategy ‘**Putting Knowledge into practice: a broad-based innovation policy for the EU (COM[2006]502)**’ signalled a shift away from innovation as a linear process to a new ‘broad-based’ approach. It argued that the ability of society to develop new solutions needs a ‘wide partnership’ of social actors from ‘not only the business sector, but also public authorities at national, regional and local level, civil society organisations, trade unions and consumers’. It declared that innovation takes ‘many forms’ such as novel advances in organisations, services and business models, and is not limited to new technologies alone. This ‘broad-based’ perspective is radically different to the traditional focus on knowledge transfer from science into practice. As former European Commission President Jose Manuel Barroso expressed it clearly in a speech to the European Parliament,

“ Innovation is about research and development but it is about changes to workplace organisation too. And new processes and business models. ”

It is becoming more open and collaborative. Once the preserve of a select elite, it now involves a much wider range of actors. It tends to happen at the inter-section between different disciplines. It is sometimes disruptive... Often it is employee- or consumer driven.¹⁶

These two elements of thinking are combined in the EU climate and energy document (COM [2008]30). This introduced a new strategy of a ‘**comprehensive path**’ for the ‘**transition towards a low-emissions economy**’. In order to achieve this transition in practice, the most significant emission reducing innovations in the decade to 2020 will draw on existing technologies, while capacity for more radical future change will also need to be established in this period.

The innovations needed for emissions reductions will involve consumers as well as producers, through changes in the ‘energy-efficiency’ of everyday consumption as well as in the shift to low carbon alternatives in the production of energy. The social capital to achieve this will need the direct engagement of a diversity of social partners such as public authorities, economic actors, educational institutions and citizens alike.



These two policy strands relate to a third policy dimension, that of **place and space**. The EU increasingly recognizes the importance of the spatial dimension and territorial cohesion in its documents, including in the revised treaties. The role of neighbourhoods, localities, cities and wider metropolitan areas is widely acknowledged in a whole array of arenas. That is why the Commission launched in 2008 the “**Covenant of Mayors**” to endorse and support the efforts deployed by local authorities in the implementation of sustainable energy policies. Transition Cities brings these three policy strands together.

¹⁵ <http://www.climate-kic.org/themes/making-transitions-happen/>

¹⁶ President Barroso at European Parliament 13 October 2009.

¹⁷ **The Smart Guide to Service Innovation. Brussels 2012.** http://ec.europa.eu/enterprise/policies/sme/regional-sme-policies/documents/no.4_service_innovation_en.pdf

¹⁸ *Ibid.* page 5.

10.3. Models of Service Innovation

10.31. The momentum to sustain this policy shift within the European Commission has continued. In its key policy documents such as Innovation Union the Commission has deepened and strengthened its broad concept of innovation and expanded on its parameters.

10.32. An important example of this on-going shift was the creation of the European Service Innovation Centre established in 2012. This thinking has been developed more clearly and explicitly in the guidebook ‘The Smart Guide to Service Innovation’ jointly produced by DG Enterprise and DG Regional Policy.¹⁷ The introduction states that

“to achieve sustainable growth and jobs across Europe, a broad concept of innovation will need to be followed.”¹⁸

The Guide stresses that the broader, comprehensive model of service innovation “advocated by this guide requires altogether **new instruments** to be developed and designed.”¹⁹ The Guide specifically recognises the need to go beyond the level of the individual firm when developing innovation policy and describes the importance of the sectoral dimension meaning the overall business environment and the wider market level. Along with the company dimension it looks at these different levels and proposes a range of relevant potential innovation activities. But its emphasis and weight is geared to the wider eco-system that enables new ideas to be nurtured systematically across a defined geographical space. Here, the Commission is explicitly recognising the limits of innovation at the level of the individual start-up or company. Rather it is emphasising that the way to maximise growth and impact is through implementing a systemic approach.

10.33. One of these new instruments the Commission terms ‘**large-scale demonstrators**’ which “is a new approach for stimulating innovation. It provides regions with a tool to better link all public and private actors...it offers a context and incentives for developing, testing and implementing new approaches in addressing specific challenges and problems. In this way, traditional innovation policy is turned on its head. Instead of supporting the commercialisation of research and innovation as such, large-scale demonstrators support the testing of solutions to address a specific challenge. In other words, the concept starts with the problem and not the solution.”²⁰ As the Guide explains, “The concept is outcome and user experience orientated and calls for a clear ‘owner of the challenge or problem, such as a municipal authority, to take the lead.”²¹ This is a crucial departure from traditional innovation policy and is an indication of the evolution of Commission thinking as it works through the implications of the policy switch to a broad model of innovation. It also indicates the key role of public organisations in the creation of challenge-led initiatives. This is precisely the arena in which Transition Cities is operating.

¹⁹ *Ibid.* page 14.

²⁰ *Ibid.* page 16.

²¹ *Ibid.* page 16.

²² **The Smart Guide to Service Innovation.** page 15

10.4. Strengthening Commission Thinking

The evidence of the case studies in this report shows how much urban policy thinking is evolving in parallel with the new approaches being developed by the European Commission. However, there are **a number of important distinctions** between the approach which cities have been pursuing and that outlined in the EU’s Smart Guide to Service Innovation.

10.41. Firstly, Transition Cities has an urban or metropolitan rather than wider regional focus. There is a balance to be struck here between density and concentration on the one hand and the need for a canvas that is sufficiently wide to achieve economies of scale on the other.

Across Europe it is often the large city or wider metropolitan area – sometimes defined as ‘the travel to work area’ or the ‘functional economic region’ – that best corresponds to actual economic realities on the ground. These two emphases – urban and regional – can be complementary.

Indeed, one of our case studies is regional. But it is important for the European Commission in developing its thinking to be explicit and acknowledge that there is a distinctive urban dimension to a clustering approach which does have specific advantages that can be lost in more diversified, heterogeneous regional settings.

Other elements within Commission thinking do include this specific urban dimension, such as within the ESIF regulations and in the work on smart cities. It would be sensible if this spatial diversity was recognised explicitly in future editions of the Smart guide to Service Innovation.

10.42. Secondly, Transition Cities specifically defines its cluster approach as ‘challenge-led’ with an emphasis on high impact transition.

To define the approach as ‘large-scale demonstrator’ is conceptually confusing. The Commission recognises the difficulty of its own definition when The Smart Guide says “The ‘large-scale’ does not refer to the amount of financial support provided for a particular project but to the extent of the roll-out of a staged process of experimentation and implementation with accompanying support.”²²

When you need to clarify your own definition in this way, then the initial terminology is clearly inadequate. The paragraph continues, “This approach aims at ‘demonstrating at large-scale’ the potential impact of service innovation and ‘service system’ solutions to specific challenges.”

It would be clearer and simpler to just define the approach as ‘challenge-led’ and to call for ‘challenge-led, transition demonstrator programmes.’

10.43. Two examples from our case studies show why. Firstly, the example from Frankfurt serves to show why the term ‘large-scale’ is open to confusion. The city of Frankfurt has extended the number of its small combined heat and power station over the last two decades from 1 to 295. This is a huge increase in the **number** of units but the **size** of these stations has been small and thus the term ‘large-scale demonstrator’ to describe this initiative would be confusing. Rather, Frankfurt has sought to address **the challenge** of its previously inefficient energy and heating system by a number of means including the systematic introduction of small CHP units in the city, as well as medium-sized and larger units and extended district heating systems. Taken as a whole this initiative is more clearly defined as a ‘challenge-led transition programme.’ That terminology would best reflect the shift in thinking that the Commission is trying to develop.

The second example from Wroclaw shows that the term ‘large-scale demonstrator’ does not capture the potential **qualitative nature** of the initiatives that are being pursued. It appears to suggest a quantitative programme. In Wroclaw, the authority has been very clear that the challenge is not only the size and extent of investment in transport infrastructure but explicitly that the challenge is to change the mobility culture of the city, the transport authorities and the citizens. Hitherto, substantial capital resources have been invested in the city’s transport infrastructure but the new mobility plan is designed to meet the transport challenge in a qualitatively different way. Hence, its objectives cannot be defined as a ‘large-scale demonstrator’ programme. Rather it needs to be described as a challenge-led, transition programme which is seeking new policy objectives.

10.44. We think that the Commission should **adjust its policy** on these issues. That would give a specific urban dimension to its policy statements and greater clarity to the type of systemic, high impact challenge-led programmes it is seeking to encourage.

10.5. The Challenge-led, transition approach and ESIF Programmes

This is particularly important because the findings of this report should be used to influence the activities funded by the new 2014-2020 ESIF programmes. The Commission’s determination to follow a broad model of innovation is shown by its commitment to facilitate synergies between EU funding sources and, in particular, to link together its research and its Structural Fund programmes. Its regulations for the 2014-2020 programmes explicitly call for a strengthening of the coordination and complementarities between the ESIF and Horizon 2020 programmes and for member states to make full use of a range of provisions identified in the regulations to combine funds from both programmes.²³

The findings from these case studies are particularly important here. Along with its work on clusters, Transition Cities is suggesting that a challenge-led, transition demonstrator approach is the way to get high value and real impact from low carbon programmes. **The focus on a clear challenge helps to build a critical mass of activity and avoid the dangers of piecemeal fragmentation and isolated, stand-alone projects that have little wider impact.**

There are sizable allocations for low carbon initiatives within the 2014-2020 ESIF programmes. The potential for a ‘pepper-pot’ approach with low carbon projects being scattered across Europe’s regions is a real danger. DG Regional Policy needs to minimise this risk. It should avoid the possibility of a patchwork quilt of unrelated, low carbon projects springing up across Europe. Rather it should be **encouraging a challenge-led, transition approach as a model to be followed across its ESIF programmes.** This targeted approach focusing on key challenges would give a concentration of resources and help the whole of ESIF’s low carbon activity to add up to more than the sum of its parts.

11. CONCLUSIONS AND RECOMMENDATIONS



11.1. This report is showing how a number of Europe’s municipalities have begun to bridge the gap between grass-roots low carbon initiatives and high level political aspirations. **Transition Cities offers a twin track to bridge this gap: a cluster policy which enables cities to work thematically on the main priorities for action – buildings, energy and mobility - and a challenge-led demonstrator approach which breaks the clusters into bite-sized chunks and promotes stakeholder partnerships and cooperative working to maximise the learning and economies of scale that arise from a focused, concentrated approach.**

11.2. The Transition Cities Steering Group and officers from all the cities have been involved with the preparation and writing of this report. Their main recommendations for action are as follows:

- To publish the full report with an executive summary and to circulate widely.
- For cities to consider whether the cited examples can be tested in other cities.
- In relation to their clusters on buildings, energy and mobility, each city to consider potential areas for new challenge-led, transition approaches.
- For Transition Cities to consider the most effective ways of measuring and evaluating progress on these types of programmes.
- To develop transition training materials based on each case study for use within the Climate KIC education and transitions learning programmes.
- To explore and test the potential for a ‘labelled’ challenge-led demonstrator programme.
- To discuss with the European Commission the promotion of a challenge-led, transition approach as a model to be followed across its ESIF programmes.
- To discuss with the European Commission the policy issues raised in this report concerning challenge-led demonstrators.
- To share and discuss the report with appropriate European policy networks and the Sustainable Transitions Research Network.

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December 2014

²³ Common Strategic Framework Annex 1. Paragraph 4.3. and Articles 55(8), 60(2) and 87(2)(c)(v&vi)



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