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Arriva North West and Wales Ltd (UK)
CTP (Italy)
Suceava Municipality (Romania)
Transport & Travel Research Ltd (UK)



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Merseytravel
Neil Scales
Chief Executive



Merseytravel is very proud to have been the lead partner of the CATCH consortium, making a positive contribution to the transport provision and thus to both the air quality and the health of the people of Liverpool, Potenza and Suceava. The technological initiatives implemented in the project along with the adoption of innovative methods to encourage behavioural change should ensure a lasting legacy which will improve our overall quality of life.



Liverpool City Council
Barbara Mace
Assistant Executive Member for Regeneration



Liverpool City Council is delighted to have been a partner in the European Union's Life CATCH programme and for the opportunity to work with our colleagues from other organisations on a range of innovative transport-related projects.

Liverpool is currently experiencing a renaissance which is providing major new opportunities for the city. However, we know that development and investment can also bring with it less positive aspects as we bring more people into the city, such as congestion, pollution and poor health as a result of traffic fumes and road accidents.

In Liverpool, we have problems of poor air quality and have declared two Air Quality Management Areas as a result of emissions from road transport.

We know that these are not problems that we can tackle in isolation. Partnership working

though the Local Transport Plan process, the award winning City Centre Movement Strategy together with our participation in the CATCH project has brought about and will continue to deliver tangible benefits to Liverpool, in terms of accessibility, safety, health and air quality.



Arriva North West & Wales
Bob Hind
Managing Director



Arriva North West and Wales were pleased to be partners in the CATCH project team. This represented an unusual opportunity for private and public sector organisations to work together on investigating, developing and implementing environmental initiatives on a hitherto unprecedented scale to achieve positive and tangible improvements in urban air quality. The co-operation and mutual understanding generated will give wider benefits to the community.



Potenza
Claudio Cicatiello
President of CTP



The CATCH project took place in the city of Potenza, the chief town of the Basilicata region, for which CTP provides public urban transport through STI (a controlled company).

A new local administration was elected in Potenza during the project. Unfortunately, the new administration had a different vision regarding the planned demonstration project, firstly because the new Mayor is not convinced about using tools to discourage car traffic in the central area of the town, and secondly because the priority is to implement other transport infrastructure works. These events have made it difficult for CTP to carry out a European project based on a concept of sustainable mobility. However the results of our feasibility study will remain available should there be a change in the local political outlook.



Suceava Municipality, Romania

Ion Lungu
Mayor



I would like to express my satisfaction related to the implementation of the CATCH Project in Suceava. The cooperation that we had together with the project partners over the last three years was for us an example of professionalism and good

practice in transport and traffic planning and reduction of city pollution. Also this project offered to Suceava Municipality the possibility to transfer the knowledge from European Union countries to our city and also to other cities in Romania.

I am very confident that we will have the chance to cooperate in future projects which will help us to implement in our city facilities for environmentally friendly transport in order to improve the quality of the life in Suceava.



Transport & Travel Research Ltd

David Blackledge
Corporate Director



CATCH has addressed an environmental problem that exists in cities in all EU member states and that will increasingly be felt in New Member States and Candidate Countries as economic activity expands, the population becomes wealthier, and car ownership increases. I hope that

the lessons learned from CATCH will help other cities to introduce mobility policies more closely linked to sustainable development goals.

Protection of the environment is one of the major challenges facing the European Union. Moreover, the transport sector figures prominently in the EU's Sixth Environment Action Programme and Sustainable Development Strategy. Achieving progress requires better integration of environmental considerations into transport policy-making at all levels – European, national and local. The Community Action Programme on public health also calls for an integrated approach ensuring the integration of environment and health concerns into other policy areas.

CATCH (Clean Accessible Transport for Community Health) was a demonstration project supported by the European Commission through the LIFE-Environment Programme, and was completed in August 2005. Its overall aims were

- To reduce the environmental impacts of transport through collaboration between public and private sector organisations.
- To foster greater understanding by the local community of the impacts of personal travel decisions on air quality, quality of life and the urban environment.
- To improve Air Quality directly through the use of clean fuels and reduced traffic, and indirectly through increased use of public transport, cycling and walking.
- To help the integration of Accession Countries by transfer of know-how and experience.
- To introduce enhanced methods of assessing the environmental and health impacts of transport and land-use measures.
- To make policy recommendations and guidelines based on best practice.

The core of CATCH was the development and implementation of an innovative approach to transport-related environment policy in Liverpool (UK), coupled with transfer of knowledge and experience to Accession Countries and to Southern Europe through the participation of partners from



Romania and Italy. Measures implemented included substantial investment in clean fuel technologies, introduction of a radical Air Quality Management policy, pro-active measures to spread the use of clean fuels, implementing Community Mobility Plans incorporating sustainable transport modes in partnership with community groups, housing providers and regeneration companies, and implementation of innovative pollution monitoring techniques. The project was accompanied by a comprehensive evaluation of its impacts on the environment, health, energy consumption and a variety of transport indicators, and a wide dissemination programme.

The Context

Transport in the EU is becoming less and not more environmentally sustainable. Growth in energy use and greenhouse gas emissions from transport is jeopardising the EU's ability to meet its target to cut emissions by 8% by 2008-2012 to which it is committed under the Kyoto Protocol.

Road transport is a major source of most of the local air pollutants covered by EU Air Quality Directives. Pollutants

from road transport are particularly important in busy, urban areas where meeting EU objectives is likely to prove most challenging. Cutting road transport emissions is a key part of local air quality management.

The high level of urbanisation within Europe (80% of the population lives in cities and towns) means that there is a strong urban dimension to many of the Community's environmental policies. The urban environment is increasingly discussed as a subject in its own right as reflected in the emerging Thematic Strategy on the Urban Environment.

This report summarises the contribution of CATCH to the above issues and draws some lessons for policy-makers

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The CATCH Demonstration in LIVERPOOL

Introduction

A number of measures have been implemented in and around Liverpool city centre. They focused on technological innovation, improved facilities, awareness raising and better information provision regarding transport choices with beneficial environmental impacts. All activities have been designed to meet the overall objectives of the CATCH project.



Air Quality Improvements

In June 2004, Liverpool City Council declared an Air Quality Management Area (AQMA) in its city centre. This means that the council predicted that the air quality within the area would not meet the UK Government's National Air Quality Objectives for particular pollutants by the prescribed deadline of 31st December 2005. The main pollutant of concern that led to the declaration of the AQMA is nitrogen dioxide, the main source of which is known to be road traffic. Nitrogen dioxide and other oxides of nitrogen (NOx) are believed to increase susceptibility to infection and aggravate asthma. In children exposure may result in coughs, colds, phlegm, shortness of breath, chronic wheezing and respiratory diseases including bronchitis.

Levels of particulate matter in the air were found to be close to, but below the levels currently considered acceptable and the council will keep this under review. Particulate matter is made up of a range of materials, some of which can be seen in the form of sooty deposits and some of which are not visible to the naked eye, but which all have the potential to cause significant damage to health by penetrating deep into the lungs.

To address the problem the council has produced an Air Quality Action Plan, which proposes a range of detailed options which could be implemented as a package of measures with the intention of reducing air pollution. The measures range from the introduction of a Low Emission Zone in the city and the introduction of cleaner vehicles in fleets to requiring that all developers produce travel plans as

part of any planning consent. A draft action plan has been approved by the UK Government's Department for Environment, Food and Rural Affairs (DEFRA), and the council are undertaking a public consultation exercise which will be completed in Autumn 2005.

As the main source of the air pollution is road traffic, the action plan will be incorporated into the Local Transport Plan (LTP) for Merseyside (2006-2011). The LTP will outline how a fully integrated and sustainable transport network will be delivered while contributing toward meeting the air quality standards within the AQMA. This is a tough target to meet, as emissions of NOx must be reduced by 40%, with a nominal target to achieve this reduction by 2011.

Harmful Exhaust Emissions Reduced in Liverpool City Centre

Arriva North West and Wales Ltd, the largest bus operator in Merseyside, fitted filters to remove harmful pollutants from the exhausts of 88 of their buses. The filters are able to reduce emissions of several types of pollutant, but it is their ability to reduce particulate matter that is of greatest interest, due to the impact of particulates on our health as described previously. However, particulate traps do not reduce NOx, which as reported earlier is a particular problem in Liverpool.



The buses all operate on services into the city centre, from a base at Speke which is located in the suburbs of Liverpool, approximately 10 km to the south of the city centre.

In October 2004 Arriva fitted enhanced pollution reduction equipment to a further 16 buses which serve the city centre. This equipment includes a type of particulate filter similar to the ones previously installed, plus an additional system known as Exhaust Gas Recirculation (EGR). The benefit of the EGR is that it reduces NOx emissions from the vehicles it is fitted to by between 30 and 50%. To our knowledge this is the largest combined trial of particulate filters and EGR in the UK.

The fitting of particulate filters has produced significant reductions (approximately 90%) in the emission of particulates from the buses and the use of a combined EGR/particulate filter system has subsequently shown that this level of emission reduction can be combined with a reduction in the emission of NOx (around 35% in the case of the systems installed in CATCH). The use of this type of retrofit technology presents a cost effective solution to reducing emissions from the majority of the existing bus fleet prior to its replacement with vehicles which meet the latest tight emissions standards. However, without any form of subsidy it does present a significant purchase and ongoing maintenance cost to the vehicle operator which is unlikely to be compensated for by increased revenue in the competitive commercial market.

Hybrid Bus Fleet for the City Centre

In February 2005 Merseytravel introduced a city centre shuttle bus service, operating on a route that previously had poor public transport connections. It is operated by Arriva. Residential areas and new businesses are now connected to the main bus and rail stations in the city centre as well as the main business district of the city.

In addition to providing a much needed service, the buses use state-of-the-art hybrid electric technology. This is the first operational hybrid fleet in the UK. In effect the buses have a diesel engine which is only used to charge the batteries - it is the batteries that provide the motive power. An obvious benefit is that the bus is able to operate in zero emission mode for a large part of the route. Even when the diesel engine is running, the emissions from the exhaust are lower than for an equivalent conventional bus. However, technical problems have been encountered with the buses. These problems are accepted as part of the development process of what is still effectively a prototype and it is expected that the reliability will improve as the vehicles are further tested and improved in their operating environment.

The city centre shuttle bus service operates at a 15 minute frequency from 07.00 till 18.30. Since the start of the service the patronage levels have continued to rise steadily, and it now carries well over 3000 passengers each week. If the bus delivers its full potential in terms of reduced pollution levels as well as overall performance, then hybrids may become a standard specification for Merseytravel supported services in the future.

Liverpool City Council has also invested in cleaner vehicles for the council operated fleet, and have recently purchased a Toyota Prius (hybrid) and two Honda Civic IMA vehicles for use in their operations in and around the city centre.

City Centre Mobility Made Easier

Liverpool City Council has a strategic vision to improve the options available for all users to be able to move around the city centre. This is known as the City Centre Movement Strategy (CCMS). Essentially the strategy aims to create a world class city that is safe, attractive, clean and accessible, making best use of the city centre's key transport assets. This is clearly a wide ranging strategy that has resulted in many schemes all of which show much synergy with the objectives of the CATCH project. The CATCH project has contributed specifically toward the design phase of some of the walking and cycling initiatives contained within the City Centre Movement Strategy. Walking and cycling are being continually improved around the city. Specific initiatives to which CATCH contributed are wider street crossings, on-road cycle routes and phased pedestrian priority signals. Better signage and enhanced pedestrian areas are all part of the package of works being implemented.

The work toward delivering the CCMS is complementary to the development of the Air Quality Action Plan, in that the city is being designed to accommodate freer flowing public transport, less vehicular traffic on certain routes and promotion of healthier forms of transport. These actions combined with an improved aesthetic within the city will all help contribute to an improved quality of life for residents and visitors alike over the years to come.



To complement this work a cycle training scheme was launched in May 2005. Typically around 33% of adults in the UK own a bicycle but only 1% use them regularly and that is often for leisure purposes rather than as a transport mode integrated into their daily lives. Reasons commonly cited for people not cycling more are concerns about safety and lack of knowledge of suitable routes. The cycle training pilot within CATCH targeted novice cyclists. The training provider specifically liaised with schools, the health sector and local businesses to offer training to family groups.

Promoting change

The CATCH project has not been anti-car, but has been about offering choices that are the cleanest available. With this in mind the ECOtravel information bureau was set up and hosted by Merseytravel. The objective of ECOtravel is to provide both individuals and businesses with information about cleaner fuelled vehicles. The predominantly internet-based bureau (www.ecotravel.org.uk) provides information on potential cost savings and conversions of cars to alternative fuels, together with details of the environmental and health benefits on a local and global scale. Various marketing techniques have been tested during the project, with their effectiveness being monitored via hits on the website. It is intended that the ECOtravel service will continue to be offered to the residents of Merseyside as part of the development of a suite of smarter choices essential to deliver the next area's Local Transport Plan for 2006-2011.

One of the ways to promote sustainable transport and travel is to ensure that housing and business developers adopt a protocol whereby they fulfil commitments to provide such things as safe and secure cycle storage, public transport information points, travel plans for residents and low car or car-free developments. This protocol would be developed in tandem with a pan-Merseyside Supplementary Planning Document addressing sustainable transport by setting minimum standards for the provision of cycle parking and sustainable travel information provision in new developments at the planning stage.

Merseytravel and the Merseyside TravelWise Campaign worked with a housing developer in Liverpool in the hope of developing such a protocol. Initial work including surveying residents to establish existing travel patterns and to ascertain what they felt they needed to encourage them to use other methods of transport apart from the private car. Interestingly many city centre residents do not have access to a car, or if they do then they do not necessarily use it much and a high level of walking was noted among respondents.

Considerable work was done with the residents but the elements of work left to the housing developer to complete, such as upgrading cycle storage facilities, did not materialise. In part this was a symptom of the fact that the issue was not a priority for the developer, there was no statutory requirement to undertake the improvements and the developer was not a partner within the CATCH project.

An additional piece of work around inclusion of low car/car free housing within a proposed development was not started within the CATCH project timeframe, due to a slippage in the development timescale, an

issue outside the project partners' control. Instead a Healthy Travel Promotion project was developed which aimed to give the residents of Aigburth and Cressington in south Liverpool the opportunity to choose a healthier lifestyle through their personal transport choices. Residents of those areas were given the opportunity to join the pilot project, which required them to complete a travel diary. From the information received it was determined what would motivate particular groups to change their behaviour. Following this analysis, personalised free packs were given to the participants which contained ideas, tips and help in finding different ways to travel around Liverpool.



Impacts

The CATCH project demonstrations have resulted in significant reductions in pollutant emissions in Liverpool compared with the situation that would have occurred if CATCH had not been funded. (It is worth noting that a significant reduction in transport emissions will have occurred during the period of the project as a result of replacement of old vehicles with new ones which meet the latest, more stringent European emissions standards.)



The main environmental impacts of the project result from reductions in pollutant emissions as a result of the equipment fitted to the existing vehicles in Arriva's fleet and changes in personal travel behaviour leading to less use of private cars in the city. The impact of the emissions equipment is concentrated in reductions of particulates (and NOx although fewer vehicles were fitted with this technology) whereas the impact of the behavioural changes generally have a smaller absolute impact but over a wider range of pollutants. The exception to this is CO2 emissions, which are linked primarily to the amount of private car use in the city.

Taken together, the project measures have delivered the following changes in emissions in Liverpool:

- CO: reduction of 25.8 tonnes per year (equivalent to 2.6% of CO emissions in city centre)
- NOx: reduction of 3.9 tonnes per year (equivalent to 1.6% of NOx emissions in city centre)
- VOC: reduction of 5.9 tonnes per year (equivalent to 6.3% of VOC emissions in city centre)
- Particulates: reduction of 3.2 tonnes per year (equivalent to 22.2% of particulate emissions in city centre)
- CO2: increase of 279.4 tonnes per year (equivalent to 0.4% of CO2 emissions in city centre)

Although resulting from measures concentrated on the city centre, changes in emissions are not limited to the nominal CATCH project area of Liverpool city centre. This is because the buses within Liverpool operate on different routes throughout the city and the behavioural change measures will have an impact on journeys that are not restricted to a particular area.

It is disappointing to note that there has been an increase in CO2 as a result of the project. This is partly a result of a conflict between the impact of technical measures on local pollutant emission and on CO2. In this we have observed a 2% fuel consumption penalty as a result of installing the particulate traps. The increase is also due in part to the introduction of the new city centre shuttle service which has not as yet led to a corresponding

reduction in CO2 emissions from car traffic. However, we expect that as patronage on the city centre shuttle service continues to grow and the behavioural change measures continue to have an impact, CO2 emissions will fall below their original levels.

The nature of a demonstration project such as CATCH is that its scope is limited and it can only hope to influence a limited proportion of the transport occurring in an area. However, it is intended to demonstrate good practice and the potential impact of wider implementation of the project measures. With this goal in mind, examination of the individual measures has shown that the measures have the potential to have a greater impact if they were to be implemented on a wider scale. For example, the measures are estimated to have the following potential in Liverpool city centre:

- CO: reduction of 91.7 tonnes per year (equivalent to 9.4% of CO emissions in city centre)
- NOx: reduction of 107.4 tonnes per year (equivalent to 42.8% of NOx emissions in city centre)
- VOC: reduction of 13.2 tonnes per year (equivalent to 14.1% of VOC emissions in city centre)
- Particulates: reduction of 4.9 tonnes per year (equivalent to 34.0% of particulate emissions in city centre)
- CO2: reduction of 3580 tonnes per year (equivalent to 5.5% of CO2 emissions in city centre)

And if implemented more widely through Merseyside:

- CO: reduction of 1350 tonnes per year (equivalent to 4.2% of CO emissions across Merseyside)
- NOx: reduction of 1000 tonnes per year (equivalent to 19.0% of NOx emissions across Merseyside)
- VOC: reduction of 140 tonnes per year (equivalent to 4.9% of VOC emissions across Merseyside)
- Particulates: reduction of 40 tonnes per year (equivalent to 11.9% of particulate emissions across Merseyside)
- CO2: reduction of 50,940 tonnes per year (equivalent to 3.1% of CO2 emissions across Merseyside).



The CATCH Project in POTENZA

Overview

The CATCH project in Potenza focused around the development and implementation of a limited traffic zone (ZTL) and pedestrian areas in the historic town centre. The first half of the project consisted of the necessary studies to assess the transport situation in the town, resulting in a better understanding of the transport problems in Potenza and highlighting key issues to be addressed by a limited traffic zone.

From January 2003, in co-operation with the Comune (Town Council) of Potenza, CTP (the Italian CATCH project partner) founded, along with private companies, a new company called STI to manage and operate the public transport system in Potenza. The project was intended to support the subsequent implementation of the limited traffic zone through the purchase of a hybrid bus for use on the public transport systems within the central zone. The aim was to provide a low emission service allowing the population access to and around the central areas by vehicular means, thus supplementing pedestrian movements which were anticipated as the main mode of travel within the small central area.

The first stage of the project was to conduct a feasibility study to evaluate the specific activities to be implemented in Potenza. The feasibility study was divided into two phases: phase one a definition of the current transport circulation profile of the area using qualitative and quantitative data and the application of a mathematical model of the transport system, and phase two the design phase. Quantitative data in phase one was obtained through an extensive programme of mobility research, including on site surveys and origin-destination interviews. The information obtained from the surveys was analysed and used in the application of the mathematical model for Potenza's historical centre. Using results from the traffic survey and origin-destination interviews, the mathematical model was refined resulting in the simulation of the transport and mobility system function in the study area.

The first phase of the feasibility study highlighted the following priorities for Potenza:

- Vehicle parking: demand for parking in the city centre outweighs the current supply of spaces.



The growing extent of this problem suggests that this is a priority for Potenza.

- Private vehicle traffic: the centre's main arterial routes were often very congested. Traffic limitation in these areas should be considered a priority.
- Pedestrian areas and road safety: The entire road network for walking appeared unsafe due to inadequate roads, an almost complete absence of pedestrian pavements and inappropriate or illegal parking.
- Local public transport: Public transport within Potenza (which includes escalators, elevators and buses in an integrated system) is not well used. Public transport use needs to be addressed urgently.
- Public transport access: The organisation of public transport access to the historic town centre were highlighted as issues of concern leading to congestion of the narrow streets and unnecessary pollution.

The first phase of the feasibility study was concluded by developing a set of priorities to be carried out in the second phase of the study, these included:

- Increase areas where pedestrians have priority over vehicles
- Limit the number of vehicles entering the historical centre of Potenza.
- Reduce long term parking thus increasing the parking capacity for short term parking
- Reduce the number of circulating cars and reduce and manage parking demand in the zone where the "parking problem" is particularly serious.

Outcomes from the feasibility study suggested that a hybrid bus might not be suitable due to the hilly location of Potenza. The feasibility study also highlighted problems with transferring from inter-urban bus services to local public transport at park and ride sites. Constraints on access to the town centre via the existing escalator network was also considered a problem. The feasibility report also identified that, once the limited traffic zone was in place, acceptance of the access to the city centre would be dependent upon significantly improved interchange facilities and adequate real-time public transport information. As a result of this an application to move resources within the



equipment budget of CATCH from co-funding of the hybrid bus to co-funding of the real-time information equipment was made and there was a significant delay in getting approval for this from the Commission. Approval was eventually received. However, local political changes had begun to cause serious problems for the project, which resulted in a halt to the progress of the limited traffic zone and all associated activities.

The feasibility study highlighted significant environmental benefits from a modelling exercise, but these were predicted benefits that have not been tested by implementation to see if they would be realised in practice. It had also not been possible to establish the level and type of work that would be needed to gain public confidence in the proposed mobility scheme that would accompany the implementation of a limited traffic zone.



Recommendations for Potenza are:

- Open a Park and Ride facility along with reorganising the public transport service, in order to immediately provide an alternative to car use;
- Reorganise parking and introduce a new traffic circulation scheme in the historical centre;
- Develop new pedestrian areas and activate the restricted zones.

The expected results of the proposed limited traffic zone and associated measures in the recommendations are:

- 55% decrease in the number of private vehicle movements into the historical centre in the morning peak with an even greater decrease in the afternoon peak hours, with knock on effects for congestion on main roads;
- An increase in public transport use (from the current 10-15% to 40-50%) increased use of the escalators equal to 400% due to Park and Ride and an increase of passengers on elevators achieving the full capacity;
- A reduction in the emission of atmospheric pollutants from traffic in the limited traffic zone by 50% in the morning peak hour and more than 90% in the afternoon peak – a less significant, but noticeable reduction on the network in general on the areas around the ZTL of approximately 20%;
- An improved level of service in terms of average speed and congestion in the historical centre which is also apparent on the entire individual transport network.

The CATCH Demonstration in SUCEAVA

Overview

The aim of Suceava was to follow the project measures implemented Liverpool whilst bearing in mind Suceava's local economy and financial situation. A local consortium was set up to implement CATCH measures consisting of municipality officials, representatives from the County Council, the Prefecture, the Environmental Protection Agency, Local Transport Company and Traffic Police. Suceava Municipality commissioned a feasibility study to review the technical possibility of implementing CATCH and to carry out a public survey. The evaluation study was carried out by consultants on behalf of the municipality; the report provides both environmental impact and public awareness and acceptance results for specific measures in addition to general background information.

The CATCH project work was conducted against the background of a rapid increase in car ownership in Suceava - from 150 cars per 1000 inhabitants at the start of the project to an expected value of 250 by the end of 2005. This is expected to lead to increased congestion if messages relating to rational use of transport modes are not followed by Suceava's citizens.

Low Emission Zone Area



The extension of the low emission zone (LEZ) occurred very early in the project and was extremely well received by the local population. The low emission zone area within Suceava city centre was extended by converting a section of Stefan cel Mare Street into a pedestrian only area and closing the main part of Stefan cel Mare Street between 7.30 pm and 6.30 am weekdays and all the time during weekends. By doing this the area has been used heavily for municipal events and has been considered a success by the city and local population. The transformation of Stefan cel Mare Street into a pedestrian area at the weekend influenced a change in public attitudes and

enabled people to cycle, walk and car share. The extension of the low emission zone and access restrictions within the city delivered a reduction in traffic emissions and an improvement in air quality especially in the city centre. The further extension of the LEZ is considered to be a long term solution for improving the quality of life in the city centre.

LPG Fuel & Vehicles

The outcome of the feasibility report was that the use of electric vehicles in Romania is not practical due to reasons including unavailable technology and unsuitable weather conditions. The recommendation of the study was to concentrate on LPG as a clean alternative fuel. On this suggestion two LPG cars were purchased by the municipality in order to promote environmentally friendly vehicles. The first LPG municipal car was purchased in April 2003 and in comparison to the petrol car it displays the following reductions in emissions, 0.02% for carbon monoxide, 1.7% for CO₂ and 77% for unburned hydrocarbons. Over the last 2 years the LPG car travelled around 60,000 km on municipality business, with a consumption level of 10l/100km giving an estimated use of 6000 litres of LPG. The emission reduction for this municipal vehicle only is a saving of 10.2 kg CO₂ (5.1 kg/year). Based on this reduction in emissions and satisfactory operational performance another LPG fuelled car manufactured by a local car manufacturer, was purchased in June 2005.

LPG vehicles represent a mid term solution for emission reductions in the city of Suceava and in other cities from Romania. As documented later in this section, significant effort has been invested in promoting wider uptake of LPG following the Municipality's lead, with a view to realising a wider reduction in pollutant emissions from the car traffic in the city.

Vehicle Emission Reduction

The implementation phase of the CATCH project in Suceava included the installation of emission reduction systems on 5 cars in the municipality's car fleet and 10 Euro 2 minibuses in the local public transport company's fleet.

Of the cars converted by the municipality, 3 vehicles had a Euro 1 specification engine, one had a Euro 0 engine and one had a Euro 2 injection engine. Even after alterations were made to the cars to make them suitable for the emission reduction systems, several operational problems occurred on three of the vehicles and they eventually had to be removed from service. The emissions reductions for the system on a Euro 2 vehicle were good, with a 36% reduction in CO and an 89% reduction in HC. Even though emission reductions were good, new Euro 3 vehicles available in the city are already equipped



with this type of system and are considered more accessible and more efficient for emission reductions than re-equipping the older vehicles that are already in operation. Fitting particulate filters solely to municipal vehicles is not a solution for reducing overall traffic emissions, although the fitting of particulate filters to all existing minibuses could be a mid term solution for the improvement of air quality in the city centre.

Particulate traps were fitted to 10 Volkswagen minibuses which have been in use by the local public transport company since June 2000. The installation of the particulate traps was delayed due to financial difficulties and due to the vehicles needing alterations to make them able to accept the system. The systems were eventually fitted in June 2005, only 2 months before the end of the project. For evaluation purposes results could only be obtained from one minibus within the project period, but this showed that significant emission reductions were achieved by fitting the particulate traps. Hence this measure was felt to be cost effective and has been recommended for wider application as it could lead to a greater improvement in air quality within the city centre of Suceava.

Trolleybus Fleet Improvements

Ten trolleybuses operated by the local transport company were refurbished and re-entered service to replace 10 existing old Euro 0 buses with poor emissions performance. The implementation occurred relatively early in the CATCH project, so allowing 2 years for the evaluation study to quantify the level of reduction at the end of CATCH Project. The local project team estimated a total daily quantity of pollutants released in the atmosphere by the existing 10 Euro 0 buses to be 12.5 g NO_x, which is now removed from the local atmosphere as the trolleybuses are emission free as point of use. If a trolleybus operates for an average of 211 days per

year then this scales up to 2.64 kg NO_x per bus per year. The replacement of buses with refurbished trolleybuses is equivalent to a 100% reduction in emissions at point of use and electric vehicles are seen as environmentally friendly modes, although trolleybuses are restricted to a fixed network and so not as flexible as other public transport modes. The level of emission reduction is considered to be very good when compared with the cost of the system installation. The measure is considered to be a long term solution applicable in Suceava and also all cities in Romania where trolleybuses remain a common mode of transport.

Promotion Activities

Extensive promotion was carried out by Suceava as part of the overall CATCH project and within each individual technical measure. Promotional activities include:

- LPG was extensively promoted, surveys and meetings amongst car dealers and companies responsible for LPG implementation were organized, public surveys for users of LPG vehicles and the distribution of LPG material were carried out and events to promote LPG vehicles and LPG fuel were wide spread. Results indicated that in the last 2 years of the CATCH project there are approximately 574 LPG vehicles registered in Suceava, of which 219 were newly registered during the 2 year project period. There was also an increase in the number of filling stations selling LPG from 3 to 9. From the public survey results indicated that 90% of private users of LPG vehicles did not have any technical problems with the LPG equipment after at least 1 year and / or more than 10,000 km.
- Strong links were developed between Suceava Municipality and schools, high schools, public institutes and private companies to promote environmentally friendly ways of travelling, clean fuels and LPG cars. Posters, brochures and folders were also distributed during these times by town hall employees and volunteers from local NGO's.
- Events were also held in the low emission zone area to promote it and the positive impact it has on the quality of life in the city, pedestrian facilities, distribution of CATCH promotional material, car free days and environmentally friendly ways to travel.
- A questionnaire was conducted to establish the public's reaction to the project and measures proposed by the study. Results showed that respondents generally agreed with the CATCH measures. The exception to this was from non users of public transport and private car owners who were not pleased with the transformation of a main traffic street into a pedestrianised area.

Respondents to the questionnaire had a good level of awareness of the measures proposed by CATCH, with the exception of the installation of particulate filters. Although this was one of the more successful measures it is one that is not obvious to those who are not directly involved with the trial.

Summary

Overall Suceava reacted well to the environmentally friendly measures introduced to improve the surrounding environmental condition. The use of information materials alone was not considered enough to persuade residents of the measures' merits immediately, although once the costs and benefits were explained residents were able to see the advantages and became more accepting of the new travel plan policies that were introduced. Air quality has improved in Suceava during the course of the project, however, traffic characteristics outside the core city centre failed to improve throughout the project duration and congestion was still considered a major problem.

Recommendations for Suceava are:

- To obtain behavioural change in travel patterns public transport needs to provide more comfortable, accessible and efficient services making public transport more attractive, thus transferring travel demand from private car to public transport;
- To improve the quality of life within the city of Suceava emission levels need to be reduced, thus reducing the number of emission related health problems and consequently health costs for public authorities and inhabitants;
- To improve the overall environmental situation, reduce air pollution level and decrease accidents, new measures (such as speed restrictions, better public transport and proper segregation of pedestrians, bicycles and road traffic) must be introduced into the existing transport policy at a local level.

CATCH has considered transferability at three levels:

- Wider application of measures within the main project city of Liverpool
- Transfer of measures between the CATCH cities
- Transferability of measures at the wider European level

The potential results of the wider application of measures within Liverpool have already largely been discussed.

Intra-Project Transfer

Regarding the transfer of measures between the CATCH cities the project partners have met regularly

to exchange their experiences of implementing the CATCH project measures and to assess to what degree the measures could be implemented elsewhere.

At the project outset the main transferability aspect of the project was to assess if the Italian and Romanian partners could benefit from the experiences of the main demonstration in Liverpool. The following table summarises the degree to which the main measures in Liverpool are considered to be applicable in Potenza and Suceava and the extent to which they have been implemented or are planned to be implemented.

| Measure | Potenza | | | Suceava | | |
|-----------------------------|-------------------------|----------|----------|-------------------------|----------|----------|
| | Technically Applicable? | Applied? | Planned? | Technically Applicable? | Applied? | Planned? |
| Particulate Traps | Y | N | N | Y | Y | Y |
| Exhaust gas Recirculation | Y | N | N | Y | N | N |
| Hybrid buses | N | n/a | n/a | Y | N | N |
| City Centre Shuttle Service | Y | N | (Y) | Y | N | N |
| Air Quality Action Plan | Y | N | N | Y | N | Y |
| Support Infrastructure | Y | N | N | Y | Y | Y |
| Information Bureau | Y | N | Y | Y | Y | Y |
| Healthy Travel Promotion | Y | N | Y | Y | N | N |
| Pollution Monitoring | Y | N | N | Y | N | N |

Additional Notes:

It is worth noting that the topography of Potenza meant that hybrid buses were not considered to be applicable as part of the limited traffic zone feasibility study. However, part of the recommended scheme for the limited traffic zone involves a city centre shuttle bus and it is likely that the vehicle will run on LPG in order to minimise emissions in the city centre.

Although the political changes within Potenza stopped implementation of the limited traffic zone there are now plans as part of a new project, SMILE, to implement a mobility information office in the town and to run individualised marketing initiatives similar to the healthy travel promotion.

The degree of transfer from Liverpool to Suceava has been more successful. There is no topographical barrier as for Potenza. Instead the main barriers are financial and technological as the area is working very hard to bring standards closer to those in western Europe. In particular, lack of technological back up means that it is not feasible at the moment to consider use of electric or hybrid traction. Instead LPG has been chosen as the first step in the use of cleaner fuels.

Suceava has been successful in its extension of the low emission zone through upgrading the infrastructure for pedestrians in and around the central square, forming a pedestrianised area. They have also set up a small information bureau within the town hall to mirror the work of ECOtravel in Liverpool. There are plans to produce the town's first air quality action plan to mirror the transport plan which has now been produced. It is also worth noting that as a low emission zone is one of the measures contained within Liverpool's Air Quality



Action Plan some of the more general lessons learned from the feasibility study in Potenza may be applicable to the planning of the scheme in Liverpool.

External Transfer

The problems caused by atmospheric pollution from road traffic in urban areas are common throughout the world. The issues that have been addressed in the CATCH cities are in no way unique and many hundreds of other cities across Europe would be in a position to benefit from many of the measures, although the local situation in terms of the combination of policy and institutional frameworks that are in place mean that specific local solutions made up of appropriate combinations of measures from the list of possible options will provide the answer in each case. We have received feedback that the CATCH experiences as described in our newsletter have influenced at least one UK council, working with a private sector bus operator, to install particulate traps on buses in their fleet.

The measures demonstrated in CATCH are, in general, widely applicable across Europe. Many of the influencing factors for wider transferability will differ from city to city depending on the country in which they are located because national policies and legislation can have a strong influence on methodology and outcome. It is beyond the scope of this report to review all the necessary transport policy structures in order to conduct a systematic review. Instead readers should be aware of the context in their own country / region and consider the issues at a more general level, for example:

- sources of funding;
- levels of public (and political) awareness and acceptance;
- employment;
- the methods used for public participation;
- legislative, policy and cultural barriers to implementation;
- timescales for consultation, planning and implementation.



The purpose of CATCH was to trial a package of transport-related measures in an innovative partnership-based approach with a view to wider application. In this context the whole approach of the project represents best practice, but it is also worth highlighting some particular activities as below:



The installation of particulate traps on 104 buses within Arriva's fleet in Liverpool. The installation of additional exhaust gas recirculation equipment on 16 of these buses aimed at reducing NOx emissions, NOx currently being the pollutant of greatest concern in Liverpool city centre – the biggest trial of this technology in the UK.

The initiation of a city centre shuttle route to encourage interchange and support sustainable travel in parallel with the regeneration of Liverpool city centre operated by 6 diesel-electric hybrid buses – the first fleet of such vehicles in the UK.

Declaration of a formal Air Quality Management Area in Liverpool city centre and an associated Air Quality Action Plan, supported by the design of walking and cycling infrastructure support measures for installation as part of Liverpool City Council's city centre movement strategy. Implementation of a community cycle training programme to support the actions aimed at encouraging uptake of sustainable transport modes in Liverpool.

The establishment and operation of a one stop shop for sustainable travel information in Liverpool aimed at the local community and business groups, known as ECOtravel. Production of community mobility plans for 6 city centre developments, leading to the development of a developers protocol and a parallel supplementary planning document to help town planners integrate sustainable transport infrastructure and information within future residential developments. Running a healthy travel promotion initiative for an area on the edge of the city centre to encourage the community to change their travel behaviour to more sustainable and healthy options.

The development, implementation and testing of advanced pollution monitoring techniques in Liverpool City Centre with a view to establishing a real time particulate mapping system for the city using existing CCTV systems.

Implementation of a package of measures to improve air quality in Suceava following the experiences in Liverpool, including:

- The closure of a section of one of the main streets in Suceava and its transformation into a pedestrian only low emission zone.
- Purchase of two LPG cars by Suceava municipality that have been used in day-to-day public activities and in the promotion of clean fuels in the city
- Extensive public promotion of sustainable travel options in Suceava
- The refurbishment of 10 trolleybuses in Suceava leading to the removal from service of old polluting buses

Investigation of measures to improve air quality in Potenza following the experiences in Liverpool, focusing on a feasibility study and recommendations for the introduction of a limited traffic zone in the town of Potenza.

Conclusion/Barriers

The CATCH project measures are dependent upon a variety of technical, institutional and regulatory factors to enable their successful implementation. There are of course many barriers to this type of activity, particularly outside the scope of a demonstration project such as CATCH, where the LIFE programme funding has been a significant factor in delivering change. The barriers are discussed in detail in the project's Best Practice Report and have been categorised under the following six headings:

Political

The need for continued political support is key because the type of scheme introduced in CATCH is aimed at changing the balance in the use of various transport modes in the urban environment and as such challenges some of the standard behavioural patterns that have become established in the modern urban way of life. The contrast between the impact on changes in political regime part way through the project in Suceava and Potenza could not illustrate this more clearly as the new mayor in Suceava was extremely supportive whereas the new administration in Potenza blocked implementation of the feasibility study recommendations.

Institutional

The nature of public transport operating regimes can have a significant influence on what can be achieved in this sector. The de-regulated commercial bus operating framework in the UK places commercial constraints on operators whereas alternative frameworks such as re-regulation or the provision of quality bus contracts would enable passenger transport authorities to specify a minimum environmental standard for particular areas / routes and so ensure that environmental considerations are integrated into the standard service provision.

The split of responsibilities between public and private organisations varies from country to country and the benefit of expanded partnership working between different organisations that can influence an issue has been demonstrated in numerous situations within CATCH.

Financial

Environmental management often comes at a price. There is not necessarily a direct benefit to companies operating in a commercial environment from switching to a more environmental solution. There are, in some circumstances, grants available which can offset some of the initial capital cost of such measures, but these grants often overlook ongoing costs needed to sustain the investment such as training, operational costs and maintenance support during the initial installation period.

Local authorities in the UK are subject to restrictions on how they can use large parts of their income, which comes from central government. In particular, a large proportion of this income is restricted for use on 'capital' projects, which involve the purchase of items. In recent years this has led authorities to feel restricted in terms

of their ability to finance activities such as ECOtravel, the healthy travel promotion and other activities aimed at behavioural change.

Information, awareness and acceptance

In general people are resistant to change. Lack of knowledge and experience of proposed measures amongst those who live and work in the affected area can often lead to resistance to the measures unless a well structured and informative consultation process is followed. This is particularly the case for environmental issues where the consequences of people's actions are neither immediate nor always directly apparent e.g. the majority of vehicle emissions are invisible.

Technical

Projects such as CATCH which wish to test new technologies as part of a package of measures often face limited availability of suitable vehicles or equipment. A restricted choice of vehicle or supplier can have knock-on implications once the project is committed to that supplier.

Prototype vehicles, such as the hybrid buses often have problems at two levels - problems related to new technologies and systems and problems related to low production volumes which require bespoke solutions / procedures which are not tested. Even though major components may be proven they can still malfunction and the smallest of components can cause serious operational problems if they are not easily replaced due to lack of readily available replacements. Hence it becomes important that wherever possible funding should be available to allow new technologies to be properly tested and developed before they come to the market.

Legal / regulatory

In spite of efforts to develop a formal industry standard for the presentation of comparative emissions results for different types of vehicle demonstrating different clean fuel or drivetrain technologies no formal standard has been accepted across Europe. Instead certain national de facto standards are used (for example the London Transport Buses test cycle in the UK), but even this is not universally recognised as nationally representative.

Within the UK grants have been available in recent years in order to overcome the cost penalty associated with environmental technologies that are new to the market. However, for the past year these grants have been suspended because there has been a need to review them in relation to European State Aid rules. It appears likely that the grant programmes will receive such approval in the near future, but it is expected that the level of grants will be too low in order to provide a significant stimulus to the market. In this case the European State Aid rules will have blocked the very essence of the work being done in demonstration projects such as CATCH and many others.

Recommendations

The target groups for the project are local, national and European authorities, which mirror the three levels at which dissemination has occurred. The following table contains the main policy outputs of the project and indicates which level or levels to which they are relevant.

| CATCH Recommendation | Local | National | European |
|---|-------|----------|----------|
| Develop supplementary planning documents designed to set minimum standards for the provision of cycle parking and sustainable travel information provision in new developments at the planning stage | Y | | |
| Clarify the policy guidance linking transport and land-use planning (PPG13 in the UK) to be more explicit and empowering for local authorities on issues such as minimum standards for sustainable transport provision in new developments | | Y | |
| Adopt a partnership-based approach to transport-related environmental policy, so ensuring that all relevant actors are included within a project's decision making structure and allowing people to participate in discussions about topics to which they would otherwise not have been able to contribute, safe in the knowledge that there was political support for this approach. | Y | | |
| Encourage politicians to lead the process by providing support for a vision which the project can work towards | Y | Y | Y |
| Deliver programmes that combine complementary measures in order to deliver the maximum benefit within a single project structure. (The technical and behavioural elements of CATCH illustrate this perfectly.) | Y | Y | Y |
| Review government funding rules to allow the necessary flexibility to provide the optimum package of measures for a particular situation rather than restricting funding streams to specific types of measure. | | Y | |
| Produce long term funding plans for transport in order to remove problems associated with short term changes in the level of funding and technical focus of transport provision. Formalise the link between Air Quality Action Plans and Local Transport Plans - in the UK this is seen as a very positive step to providing the same level of certainty for a related policy area. | | Y | Y |
| Develop a formal industry standard for the presentation of comparative emissions results for different types of vehicle demonstrating different clean fuel or drivetrain technologies rather than relying on de facto standards which are not universally recognised as representative. | | Y | Y |
| Review the European State Aid rules and modify them so that they do not prevent the implementation of future technologies which will significantly improve the quality of life in European cities or have a positive impact on reducing climate change. | | | Y |
| Investigate alternative frameworks for public transport integration such as re-regulation or the provision of quality bus contracts that would enable passenger transport authorities to specify a minimum environmental standard for particular areas/routes and so ensure that environmental considerations are integrated into the standard service provision. | Y | Y | |