Measure title: **Extension of Low Emission Zone**

City: **Suceava** *Project:* **SMILE** *Measure number:* **6.4**

A Introduction

The purpose of this measure was to reduce traffic emissions in the city centre, to create more "environmentally friendly areas" and to improve the quality of life in the city. The main objective of this measure was the extension of the existing Low Emissions Zone (LEZ), to create facilities for cyclists and pedestrians and to implement access vehicle restrictions in the historical centre of Suceava.

A1 Objectives

The measure objectives are:

- **Objective 1:** the reduction in emissions from public transport;
- **Objective 2:** the improvement of the quality of life in the city by extension of the LEZ; and
- **Objective 3:** the introduction of restricted vehicle access and creation of facilities for pedestrians to reduce congestion in city centre.

A2 Description

Suceava County is crossed by two major European roads: E85 Bucuresti – Suceava - Siret and E58 Halmeu – Suceava – Iasi, both passing through Suceava City and City Centre, as Suceava has no by-pass routes that would permit the diversion of transit traffic. This transit traffic is superimposed on the local urban traffic, which in itself already significantly exceeds the capacity available on the road infrastructure, and increases the negative impact of general traffic.
The City of Suceava is an important highway junction, where important highway connections with the neighbouring big towns converge. These consist of five national roads, four county and two commune roads.

The street network of the city is the result of development as a traffic junction and administrative, economic and cultural centre of the County

The national trend towards increasing motorisation is also relevant to the evolution of the traffic in Suceava. This has led to a serious aggravation of traffic problems that requires the enforcement of specific regulations and introduction of measures at local level, designed to counteract the effects. The degree of motorisation in the city increased from 41 vehicles per 1000 inhabitants in 1990 to 230 at the end of 2004 and to approximately **355** vehicles per 1000 inhabitants by 2008. (This calculated value takes into consideration the vehicles licensed in Suceava Municipality but disregards the vehicles which are registered in other neighbouring counties: those owned by companies and the transit traffic vehicles). This is creating physical discomfort and increasing the risks upon the population's health.

With continuous economic and social development, the administrative organisation of Suceava consists today of three main residential areas, ranked differently considering the quality of life, the degree of urbanisation and social services compliance with actual standards. The first area includes Obcine, George Enescu, Zamca and the Centre districts. The second area is the Burdujeni district and the third is Itcani district. The first area represents the core of local business and is a very important segment of residential area. The second area is residential and the life in the third area is carried out in poor conditions: public space is degraded. In the vicinity, a modern zone consisting of large houses was built and it is a

striking contrast with the rest of the area. The gaps between the development of different areas are growing, in the context in which the business sector evolves into attractive zones of the city, whilst the poorer ones are left behind.

During the CATCH project (2002 – 2005) Suceava Municipality implemented the concept of using traffic restrictions on the city's main streets. It has promoted a new concept for Suceava city, the LEZ concept. At the end of this project, 5% of the historical city centre was turned into a LEZ area, by transforming a part into a pedestrian area. The continuation of this street was transformed into a LEZ, being only closed to car access, which respected a certain timetable. (For a map of the LEZ area see page 9.) Also, the LEZ is initiated by introducing into service new clean public transport vehicles and the creation of Eco-routes, as part of the Measure 5.6.

SMILE aimed to finish what was started in CATCH, closing the remaining part of the historical sites of this street.

The Municipality, together with the Environmental Protection Agency (EPA), has policed the enforcement of this local regulation. The "Eco routes" for alternative fuelled buses (see measure 5.6) were the starting point for the design of the LEZ extension into other parts of the city. There are now permanent access restrictions for vehicles in the main LEZ in the historical city centre. This is in the form of one-way streets, controlled access only for residents' vehicles and other identified measures with similar effects. These are aimed at reducing the emissions caused by road traffic and improving the quality of life in the area.

In order to create and extend local facilities for pedestrians and cyclists there have been local events (festivals, concerts) in the LEZ in order to promote this area as a leisure zone and to raise citizens' support for extension of the measure. Improving the status of pedestrian infrastructure will increase the number of pedestrians to using them, especially for short distances.

During the SMILE project, the LEZ concept has also been extended progressively to other parts of the city, again through a combination of car traffic restrictions and Eco-routes.

A large amount of publicity has been conducted to market the introduction of these new LEZs both in Suceava and at the national level.

The Vehicle Related Emissions Monitoring Group - a partnership between Suceava Municipality, Suceava City Council, the Local Transport Company, Environmental Protection Agency and the Health Authority – has had an important role for the successful implementation of the LEZ. As part of SMILE, the work of the Group has been expanded and it became more proactive in its activities.

An evaluation study has been conducted in Suceava in order to measure the impact of the LEZ and restricted vehicle access into the heart of the city centre.

B Measure implementation

B1 Innovative aspects

Innovative Aspects:

- New organisational arrangements or relationships
- Enforcement

The innovative aspects of the measure are:

- **New organisational arrangements or relationships, locally** – The implementation of a small LEZ from previous European projects have had a very good impact on citizens. By the end of June 2005, 5% of the historical city centre was designated as an LEZ as part of previous European Projects. In SMILE the LEZ from the historical city centre will be spatially extended. The LEZ will be extended in other residential areas by means of introducing the concept of Eco-routes. Suceava Municipality intend to provide the general public with alternatives to the current traffic structure and to existing vehicles. They will also promote a different way of thinking about traffic impact on the environment and on people's health.
- **Enforcement, locally** – Innovative aspects are linked with the new ways of enforcing the compliance. At the local level, as detailed in the implementation description section, there are legal decisions adopted for: total closure of a segment of LEZ-in the city centre; opening an adjacent road (completed); and procurement of a Zone Urban Plan for the city centre.

B2 Situation before CIVITAS

During the AlterEco Project between 2000 and 2002 Suceava Municipality began the implementation of a low emission area in the city centre, by closing a section of the main street at the weekend and at night time during weekdays. The general public were very pleased with this measure, which provided them with a place where they can spend extra time without having to consider traffic.

The first steps in implementing the new approach on clean fuels and vehicles, environmentally friendly ways of travelling, low emission zones, mobility plans, promotion campaigns focused on raising public awareness with regard to the main topics tackled, were made within the CATCH (Clean Accessible Transport for Community Health). This proposed and implemented a few measures designed to introduce improvements in Suceava's public transport. This was done by means of providing more comfortable, accessible and efficient service and using cost efficient and environmentally friendly solutions. During CATCH a large publicity campaign was conducted to promote pedestrian and cycling facilities in the low emission area. The CATCH project was a prime example of pan-European collaboration with the view of exploring the possibilities for improving air quality. It raised the locals' awareness about the concept of sustainability and the problems associated with traffic congestion and high car ownership and usage.

In the city centre a main commercial street was closed to traffic thus transforming into a pedestrian area. Another part of the main street was closed at the weekend and from 7pm to 6am during working days (becoming a LEZ area as general emission levels decreased). At the end of the CATCH Project (in 2005) 5% of the historical city centre had been designated as an LEZ on these terms.

B3 Actual implementation of the measure

The introduction of the LEZ concept dates back to the CATCH project. The multiplication of the LEZ areas in other parts of the city and extension of the concept in the historical city centre, were the initiatives undertaken in SMILE project.

The progressive multiplication of LEZ areas in other residential parts of the city will start with the introduction of different kinds of traffic restrictions for other streets. They will be regarded as the beginning of implementing stricter regulations with regard to vehicle access. In the future, if feasible, these areas will become pedestrian areas.

The measure was implemented in the following stages:

Stage 1: Organising the implementation team and assigning the tasks *(Date: February–March 2005)* to be accomplished by each member, at each level – decision makers and executive staff; issuing the communication strategy for local media, citizens, residents of densely populated areas.

The measure implementation team included people from both official and executive positions. The organisation chart established hierarchies and tasks for each team member according to their authority and responsibility in the City Hall.

Stage 2: Procurement of the Feasibility Study to design the SMILE measures implementation

2.1 Organising the tendering procedure for designating the contractor *(Date: April 2005 – July 2005)*

The Feasibility Study for the design of this measure was considered a very important document that stood to support the activities that were deployed under Measure 6.4. The organising of the bidding procedure respected the Romanian legislation in 2005 and the tendering documentation gave information related to the multitasking character of the requested deliverable. We included objectives baseline conditions and drawbacks of the current situation. We also demanded solutions, time schedules for all activities proposed, costs incurred, identification of barriers, proposed solutions for overcoming them and other opportunities to be exploited as a continuation of t SMILE activities. The criteria chosen for designating the winning contractor would offer the lowest price proposing some technical feasible solutions.

2.2 Receipt of the Feasibility Study *(Date: March 2006)*

The contract resulted into a Feasibility Study.

This deliverable ascertained activities for marketing alternative fuel, for selection of new alternative vehicles and for the improvement of public transport and general traffic. Further decisions with regard to road traffic regulations, roads closures, transforming them into one-way routes and giving higher importance to buses have been taken.

The SMILE measures have been designed based on these findings.

Stage 3: Procurement of the Traffic Study for the city centre

3.1 Organising the tendering procedure for procurement of the city traffic study and the contracting process *(Date: March 2005 – April 2005)*

The project implementation team developed a market survey to identify the consultancy companies with relevant experience in this domain. The technical consultation between the City Hall team and the representatives of these market operators resulted in a well structured information base which was used to elaborate the Tender Process.

3.2 Receipt of the City centre Traffic Study deliverable *(Date: March 2006)*

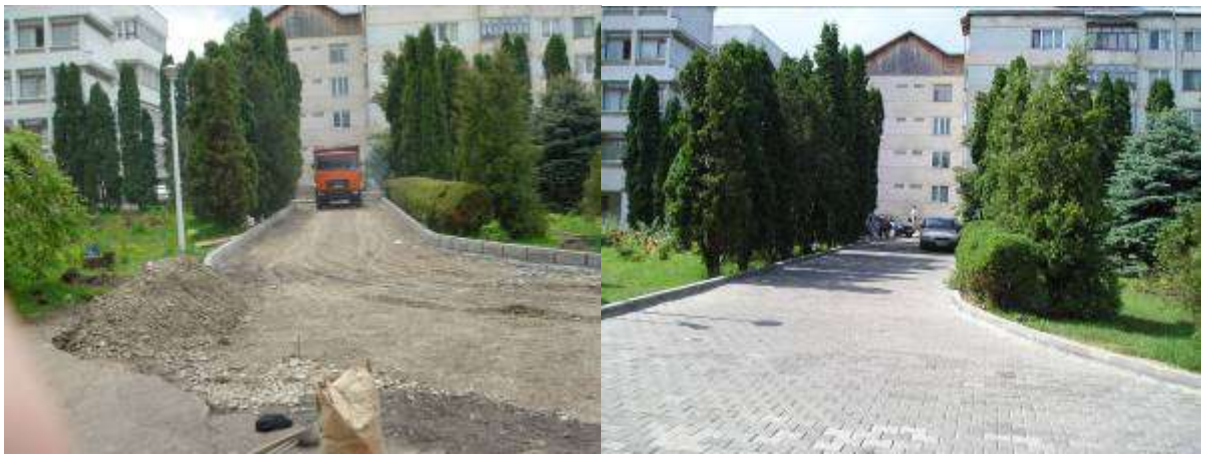
The contract resulted into a Traffic Study: a strategic traffic analysis of the zone and the main roads crossing the city and its historical centre.

This deliverable emphasised the main problems of road traffic and re-assessed the needs for mobility in Suceava. It made recommendations about bus routes, locations for bus stops, and timings for bus services. It also indicated one-way roads and stood as a base for further decisions at the road infrastructure allocation level. An important part of this traffic study referred to the main road crossing in the city, which is significant for the motorised traffic and public transport.

The traffic study revealed other possibilities in creating adjacent roads and new parking facilities, concurrent with the city economic development. Among these relevant findings, the study revealed the opportunity of opening a by-pass, "Vasile Bumbac" Street, as an alternative one-way route for the LEZ crossing street (Stefan cel Mare Street), reducing the road traffic in the LEZ. This was a preliminary measure viewed as support for the future total closure of the Stefan cel Mare part of the street, as designed in the SMILE project.

Stage 4: Road works for opening a dead end road on Vasile Bumbac Street to transform it into a one way by-pass *(Date: March 2006 - April 2006)*

This short by-pass, once opened to road traffic, offers an alternative route and a shortcut to by-pass the LEZ (Stefan cel Mare Street) thus creating an adjacent road. Its transformation is justified by the need to decrease day time traffic in the LEZ street with the view of bounding LEZ utilisation and create premises for total closure.



Stage 5: Implementing new traffic rules for restricting car access on some streets, by turning them into one way roads – with the purpose of LEZ concept extension by implementing it into other parts of the city.

5.1 *(Date: April 2006 - June 2006)* The first stage implemented special restrictions in some crowded residential areas that have been protected against heavy and intense traffic by means of introducing new regulations for vehicle access into some parts of the city. This decision was possible after consultations and in cooperation with the city Traffic Police. They offered support after implementation by watching over the areas and with traffic discipline. New signposts for the car access restrictions have been installed where necessary. The campaign deployed local media as well.

It is important to mention that this measure was carried out at the time of the first phase of the bus fleet modernisation, therefore these measures were designed to interlace with each other and to maximise a synergic effect.

5.2 *(Date: August 2007)* At the second stage new special restrictions for car access with exceptions for the zone residents were implemented.

Stage 6: Continuing the LEZ extension in the city centre *(Date: January 2006 – December 2008)* The LEZ was extended to cover a wider area of the city centre. The LEZ extension now involved a total closure of 35% of Stefan cel Mare Street (the part that was only partially closed at the end of the CATCH project). This combined a traffic diversion towards the main city road, Ana Ipatescu Street, which bordered the historical city centre. This is estimated to cover 20% of the core city centre. Therefore, this area is foreseen to become a "pedestrian area" at the point of completing the SMILE project. The concept of an LEZ implemented is a restriction to all traffic in the area with the exception of the clean buses introduced in SMILE. There is no attempt at differentiating access to the roads in the LEZ based on emissions levels of other vehicle types. This is because the car registration database (both nationally and locally) was not technically able to identify categories of cars according to their level of emissions.

Stage 7: Modernising the park, pedestrians' infrastructure and surroundings of the LEZ – the pedestrian area in the historical city centre *(Date: August 2006 – September 2006; July 2007; November 2008 – April 2009)*

Investments have been made in the zone to modernise pedestrian infrastructure, the sitting facilities, to make other attractive improvements and to turn the whole area into a pleasant urban space for citizens to meet and rest.

In addition to the main park located in the middle of the zone, the Central Park (Parcul Central) situated immediately after the pedestrian area will be modernised The first undertakings refer to the renewal and extension of pavement infrastructure, refurbishment of sitting facilities, introduction of irrigation systems. For spring, the green plots and the vegetation will be attended to.

This is a step forward towards further extending the pedestrian area in the historical part of the city centre.

Stage 8: Extension of the LEZ across the entire city by creating the Eco-routes *(Date: April 2006 - January 2007)*

The concept of the LEZ is also promoted as being areas where the only vehicles allowed are the new LPG vehicles running on the newly designated eco-routes, promoted in the measure 5.6.

Stage 9: Installing systems for restricting access through the LEZ *(Date: June 2007)*

The historical city centre is seen as a very important part of the city as a residential, business, tourist and local leisure area. Public administrations have made investments in this area and planned to continue in the same direction in the near future. The systems installed are specially used for traffic restriction purposes and therefore they are known by vehicle drivers as bounds for restricting traffic access. They will be further improved along with the House of Culture Esplanade.

This measure was implemented as a step forward in modernising the access system in the LEZ street, it was not regarded only as a disciplinary method but also as a boost to the LEZ street's importance.

The closure process wasn't possible as soon as hoped due to the importance of the street and the increasing number of vehicles in Suceava Municipality disproportional with the feasible extension of the road network. However to raise the awareness of car drivers, this system blocked access to the area. It is usually used to mark the closure of areas: removable plastic blocks bearing the traffic sign interdiction to access in both directions.

Stage 10: Mounting humps on roads to slow down the car speed *(Date: June 2007 – July 2007)* – in the vicinity of schools, kindergartens and in the neighbourhood of bus stops to

increase security for pedestrians and accessibility for public transport passengers. This was a precursory phase before preparing the new pedestrian areas and the LEZ extension.

Stage 11: Procurement of the technical solutions proposals for esplanade rehabilitation and architectural modernisation of the House of Culture, located in the pedestrian area of the historical part of the city *(Date: estimated end of 2008)*

The modernisation of the historical part of the city centre is further considered with these measures of rehabilitating the House of Culture esplanade and the building's architectural status as well. The final purpose is to change the face of the entire area in order to make it attractive for leisure activities. By getting people's full support it will become a 100% pedestrian area and when a further extension in length will be considered.

Stage 12: Procurement of the Zone Urban Plan – city centre *(Date: estimated end of 2008)*

The contracting process was carried out according to the national regulations and it was completed in 2007. This was a very thorough document as it had to take into consideration lots of diverse possible changes. These were determined by the trend in the economy, by private business developers, and the landowners who received the property rights back from the state. This was amplified by the increased demands in the travel sector, leisure activities and the continuously growing number of inhabitants.

The Zone Urban Plan has been released for consultations with citizen and political classes and amendments have been considered.

This plan includes in its provisions the measure of having 35% of the Stefan cel Mare Street in the historical city centre closed off and after validation; this will be put into practice. It will provide solutions for extending road infrastructure and an underground parking facility.

Stage 13: Procurement of the traffic study for the whole city

13.1 Contracting process *(Date: April 2008 – June 2008)* Organising the tendering procedure for procurement of a city traffic study and the contracting process. Due to financial restrictions, initially only a partial traffic study related to a segment of the main street crossing the city was procured. This general traffic study tackles the entire city road network and it will reveal solutions for building parking facilities. The study is also a vital step before implementing the concept of park and ride and park and walk, which were promoted at the conceptual level within the project.

The study was contracted at the end of SMILE project and the document will become available after project completion.

13.2 Agreeing and receipt of the traffic study for the Suceava city *(Date: January 2009)*

This study will be released in a draft version in December 2008. It will be considered for consultation with the view of coming to agreements and improving solutions identified for minimising the effects of motorised road traffic. It will be an important document to describe the current situation in figures and to project in guidelines the future applicable interventions. The findings and recommendations received could be brought to the attention of other cities confronting similar problems and they can benefit more of our experience and put into practice measures that were proved successful.

Stage 14: Total closure of the 35% of the Stefan cel Mare Street - turning into a pedestrian area

14.1 Elaboration of the regulations for the turning the street in a 35% extent into a pedestrian area *(Date: June 2006 – July 2006)*

With the support of the project team, a report has been completed, exposing the motivations and the benefits of the closure of this part of the street. The new regulations appeared as a result of consultations with political levels.

14.2 The implementation process *(Date: till end of 2008)*

This measure is far of being popular, especially to residents but also to shop owners with businesses in the area and to other traffic participants who make their trips to certain important institutions at the other end of the Stefan cel Mare Street. The decision was taken at a political level at the end of 2008 and will be put into practice.

Further investments will be made in the future, including creating cycling infrastructure and cycling zone with the view of extending the measure in other areas of the city.

Figure B1 – Map of Suceava city centre showing the focus of the original CATCH project LEZ area (shaded blue) and the extension to include the focus of the new SMILE project LEZ area (shaded green).

Stage 15: Evaluation activities

Process evaluation was the task of all measure leaders and reports were drawn periodically, according to the GUARD database and templates received. Having support from measure leaders and the information withdrawn from monthly Time Sheets, the evaluation manager drew out and filled out the Access database forms, provided by GUARD. The database is a simplistic tool in following the steps taken in the Measure's implementation.

Date: February 2006; September 2006; November 2007 – December 2007; ongoing 2008

The *impact evaluation* began with establishing the Baseline position, with estimating the Business-as-usual scenario (using the forecasting from historical data and projecting a possible future). Having this initial data, the evaluation team organised surveys and collected ex-post information, relevant to the technical analysis.

The society indicators - The first step was to establish the population to be sampled and the sample size. The sample size interviewed was calculated to get a +/- 5% confidence interval at 95% level of confidence. The pilot questionnaire and the staff appointed to administer the

surveys received proper training, in collaboration with the local University. The questionnaires surveys were deployed for a trimester on a yearly basis as a face-to-face interview method. This produced a good response rate, with complete coverage and good quality data.

The pollution indicator levels were measured within collaboration with the EPA. Suceava used their monitoring stations. Other data was collected on a trimester basis by surveys and another input came from the road sensors mounted at the junction in the city centre with the server based at the City Hall premises.

The transport indicators have been established with input resulting from manual counting within an important intersection.

Date: November 2005 – January 2006;

July 2006 – September 2006;

July 2007 – September 2007;

May 2008 – June 2008.

Stage 16: Promotion campaigns and Dissemination activities for LEZ extension

Dissemination of all measures, initiatives, results and outcomes and changing the life of target groups was a continuous process. It was evenly distributed throughout the year in all the years, updating the achievements of project targets and considering the step by step progress. The LEZ was tackled as an important topic and information was delivered accordingly, at workshops in schools, in consultation with citizens and within local events.

Local and national events are good occasions for gathering groups of citizens together. Such mentioned events were: New Years and Christmas parties, Romania's accession to EU structure, Suceava Days 22nd-26th of June, Mobility Week, Europe's Day 9th of May and traditional local festivals. These events were based within the pedestrian area in the historical city centre and the project SMILE is promoted at these occasions**.**

Large dissemination campaigns and consultations engaged with shop owners with commercial activities located alongside the Stefan cel Mare Street, with the view of exchanging opinions, collecting data about their expectations, ideas, getting support and an attitude of acceptance for the measure final progression.

Suceava Days attract large groups of citizens to the historical part of the city centre and in the LEZ area. Mobility Week and the 'Day Without My Car' celebrations are also launched from this point and continued with a march along the main roads of the city.

In 2008 an event worth mentioning for increasing the value of the historical city centre and the pedestrian part of Stefan cel Mare Street is the Religious Tourism Fair (to promote the brand Bucovina). This re-united in the city centre, exhibitors, children, citizens from Suceava County to take part inthe cultural and commercial events organised.


In 2008, Romania's National Day (1st of December), Christmas and New Year parties were organised, which exceeded the boundaries of Stefan cel Mare Street. There arrangements were specific to winter holiday and playgrounds for children. This street passes by the Central Park which is in the course of rehabilitation and modernisation of pavements and green spaces. At the same time, bicycle lanes are marked on this street, to allow children to ride their bicycles in this area. Taken as an assemble, the measures promoted within these occasions at the end of 2008 will promote the street more to non-motorised modes and will prepare t citizens for an eventual extension of the pedestrian area on Stefan cel Mare Street.


B4 Deviations from the original plan

N/A

B5 Inter-relationships with other measures

- **Measure 5.6** Alternative Fuel Bus Fleet

This Measure sets the base for the continuation of the extension of the LEZ in the city centre. The new LTC buses, of which 15 run on LPG fuel, are crossing the city centre on Eco-routes, the main road bordering the historical city centre and the park thus replacing the old ones. This has good environmental impacts on the level of emissions in the city centre, by reducing the main pollutants caused by public transport.

- **Measure 5.7** - Marketing for alternative fuels in the public and private sector

In a similar manner to Measure 5.6, Measure 5.7 considers LPG promotion campaigns in the private sector, which aims at increasing the number of taxis running on LPG fuel and in consequence the number of alternative vehicles that cross the LEZ demonstration area. The result is a reduction of pollutant emissions caused by private public transport and a continuation of the extension of the LEZ in the city centre.

- **Measure 11.7** – Information and Awareness Raising

The information and awareness raising in Measure 11.7 is aimed at supporting the Measure dissemination of results. This is increasing the public's reliance and support for the continuation of the LEZ extension and implementation of the complete closure of 35% of the Stefan cel Mare Street and turning it into a pedestrian area.

C Evaluation – methodology and results

C1 Measurement methodology

C1.1 Impacts and Indicators

NO.	INDICATOR	DESCRIPTION	DATA /UNITS
5	CO levels	CO concentration	µg/m3, quantitative, measurement
6	NOx levels	NOx concentration	µg/m3, quantitative, measurement
7	Particulate levels	Particulate (PM10) concentration	µg/m3, quantitative, measurement
12	Noise perception	Perception of noise	Index, qualitative, collected, survey
13	Awareness level	Degree to which the awareness of the policies/measures has changed	Index, qualitative, collected, survey
14	Acceptance level	Attitude survey of current acceptance with the measure	Index, qualitative, collected, survey
26	Average modal split-pkm	Percentage of pkm for each mode	%, quantitative, derived
27	Average modal split-vehicles	Percentage of vkm for each mode	%, quantitative, derived

Detailed description of the indicator methodologies:

- **Indicator 5: CO levels** – representative of the average hourly CO concentration. Data was collected using mobile monitoring stations belonging to EPA Suceava at critical points in the city.
However, due to delays in purchasing modern equipment there is no available data prior to May 2008 for this indicator. The procurement of 2 modern updated automatic stations for air quality monitoring took place in 2007 with installation and commissioning being completed in March 2008. Official data was made first made available in May 2008. From this month on, we have been able to monitor the data using a trustworthy source in two fixed locations relevant for the entire city. One of these two locations is in the city centre, in the LEZ area (shown as a purple square on the map, figure B1).

- **Indicator 6: NO_x levels** – represent the average hourly NO_x concentration on an annual basis. Data has been collected by the EPA Suceava using a fixed monitoring station, on an hourly basis, 24 hours / day.

- **Indicator 7: Particulate levels** - represents the average hourly particulate matter concentration on an annual basis. Data have been collected through one of the three fixed monitoring stations owned by EPA Suceava, located in the City Centre.

- **Indicator 12: Noise perception –** The measurement of noise levels were made only with reference to small but crowded areas, in locations where road traffic is more intense and the number of residents is high, therefore the degree of dissatisfaction is manifested by a larger number of citizens. In crowded urban agglomerations, the effect of noise is further aggravated by high concentrations of people living together. Therefore the surveys for collecting the qualitative data are deployed in such areas. One of the most relevant locations for this survey was the city centre, where a large number of questionnaires have been deployed.

% of population exposed, perceptions broken down into 5 different perception bands of L_{day}: classified by five answer options, two negative, two positive and one neutral (absolutely dissatisfied, partly dissatisfied, absolutely satisfied, partly satisfied and neither satisfied nor dissatisfied - neutral). The frequency of questionnaires was once a year, within a 3 months period, in 3 crowded locations.

An index of average perception was then produced by allocating a score to each type of response, as follows: *positive* +2, *partly satisfied* +1, *neutral* 0, *partly dissatisfied* -1, *negative* -2, and then converting these percentages into a weighted value, where 0 = neutral and the degree >0 or <0 indicates the average satisfaction or dissatisfaction with the noise level.

The target group was included inhabitants and visitors. The sample size interviewed were 380 people, calculated to get a +/- 5% confidence interval at 95% level of confidence

- **Indicator 13: Awareness level –** this indicator assesses the awareness of inhabitants and visitors of new integrated measures. It is carried out by surveys that took the form of face-to-face interviews and in-person questionnaires. In order to assess the knowledge and the impact of the information campaigns, the data collected is processed and the results are quantified for further conclusions.

The frequency of questionnaire deployment was once a year and the result takes form of an index of the value awareness of every surveyed person. This showed us what percentage of people have been reached and to what extent they have actually gained knowledge about the new measures, and thereby, whether or not and to what degree an information campaign has been successful.

The target group referred to the public and public transport passengers. Each target group was represented in the survey. The sample size interviewed were 380 people, calculated to get a +/- 5% confidence interval at 95% level of confidence.

- **Indicator 14: Acceptance level –** or the favourable reception / approval of the measure intend to assess satisfaction with the existence and the use of the measures. The method of data collection used was by surveys, using face-to-face interviews and in-person questionnaires. The frequency of questionnaire deployment was once a year. The result took form of an index of the value satisfaction of every surveyed person and set emphasis on the measures and their results, both in terms of existence and use.

Acceptance is classified according to four answers: i) satisfied with both existence and use, ii) satisfied with existence and unsatisfied with use, iii) unsatisfied with existence and satisfied with use, iv) dissatisfied with both existence and use. This classification intercepts the two-fold dimension of satisfaction with one indicator.

The target group referred to the general public classified by age, profession and public transport passengers. Each target group was represented in the survey. The sample size interviewed were 380 people, calculated to get a +/- 5% confidence interval at 95% level of confidence.

The indicators 13 and 14 are analysed in conjunction, because those who are aware of a measure may not be satisfied with its use or existence.

- **Indicator 26: Average modal-split – pkm -** the indicator measured passenger kilometres per transport mode in the demonstration area chosen in the city centre. Measurements are taken through surveys and counts at the main intersection, located close to LEZ, which makes the data collected there of interest for LEZ impact analysis (shown as a brown square on the map, figure B1).

The number of passengers and cars are obtained by surveys and counting. The counting was done by three people, each responsible for one entry point to the intersection. The total number of cars is calculated by summing up their records. They have been responsible for counting each day of the week, three hours each day, one hour in the morning (from 7 am to 8 am), one hour at noon (from 1 pm to 2 pm) and one hour in the afternoon (from 4 pm to 5 pm). The frequency is every day for one week every quarter of the year until the end of the project. An average figure for the three hour period for peak traffic is calculated from all the counts made during the one year.

We made the observation that for 2008, the data collection was for the first 2 quarters of the year in the same 2 weeks as in 2006 and the average value was calculated only for this half of the year.

It is essential to monitor how the modal split - pkm develops during awareness campaigns, improvements of public transport and other campaigns for the promotion of non-motorised modes. In particular, modal share of non-motorised modes are directly relevant for short distance trips, while longer distance trips lend themselves to shifts toward public transport.

- **Indicator 27: Average modal-split – vehicles -** the indicator measures vehicle kilometres per transport mode in the demonstration area chosen, in the city centre. Measurements are taken as for indicator 26.

The figures collected at the city centre junction are relevant because this is crossed by the main road. It is straight, shorter and offers the most fluent option for travelling across the city and in consequence it is used the most frequently. This leads to increased traffic displaced from the LEZ, as well as increases caused by the increased level of car ownership and the increased mobility brought about by increased economic prosperity.

C1.2 Establishing a baseline

In order to assess the impact of all activities and to emphasise the changes occurred with the implementation of Measure 6.4, we consider the year 2005 as defining the baseline position. From 2006 onwards, the data registered will be representative for the analysis of the effects. The values will be compared by opposing yearly values, collected at relevant times and time intervals.

Environment category indicators

Indicator 6: NO_x levels

1) The annual average concentration (the daily maximum for the 8 hours average) in the city centre for 2005 was:

- 16.76 µg/m^3

According to the regulations into force – Order no. 592/2002, issued by the Romanian Environment Ministry – which transposes the European Directives: Directive 96/62/EC, Council Directive1999/30/CE, Decision 2001/744/CE, European Parliament and European Council 2002/3/CE, the annual average concentration limit accepted for 2005 was 56.66 µg/m^3.
Therefore NOx levels were not exceeded.

2) The daily maximum concentration values measured in the city centre during 2005 were:

- 58.3 µg/m^3

Indicator 7: Small particulate levels

Two types of values were further considered:
1) The annual average PM_{10} concentration for 2005 was 46.9 µg/m^3, as compared to the annual average concentration limit of 53.33 µg/m^3, according to Order no. 592/2002 issued by the Romanian Environment Ministry.
Therefore, in 2005 the average annual PM_{10} concentration was not exceeded.

2) The daily maximum concentration values measured during 2005 was 157.72 µg/m^3, while the limit value was 66.67 µg/m^3, showing that on some extreme days the daily maximum was exceeded.

Indicator 12: Noise perception

The surveys for collecting the qualitative data are deployed in: the city centre; Obcini district (in the vicinity of the Suceava main highway from the south, direction Bucharest); and in Burdujeni district (in the vicinity of the exit towards east)

The City Centre intersection is a very important junction, as there is one of the two possible alternative ways for crossing the city from the southern part: Obcini district to the NW and NE parts and Itcani and Burdujeni districts. Compared to the second alternative for crossing the city, this one is shorter, traffic is more fluid and less sinuous. An overwhelming majority of drivers chose this solution rather than the other one. The City Centre junction is at the fringe of the historical part of the city centre which is to become a pedestrian area. The project team paid much attention not to transfer all problems caused by motorised traffic from a closed junction (Nicolae Balcescu Street with Stefan cel Mare) to the city centre's main junction, because the general impact on the population will be the sum of all individual impacts measured in the area.

Noise level monitoring and measurements were made by the EPA Suceava. The data collected from their statistical records: averages calculated on a bi-annual basis and the results for the city centre demonstration area are given in the following table:

Measured noise level

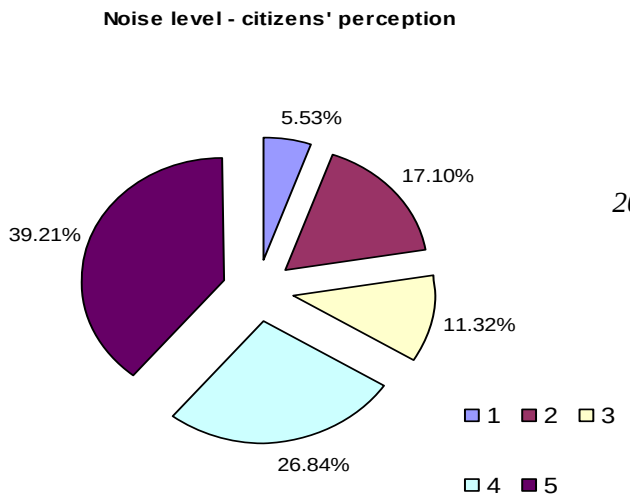
Location	L_{max} admissible	Semester I 2005		Semester II 2005	
		Noise maximum level after measurements	Exceeding values	Noise maximum level after measurements	Exceeding values
	dB	dB	% of measurements with exceeded admissible values	dB	% of measurements with exceeded admissible values
City Centre intersection	70	72.35	25	71.38	25

These values enabled us to assess the baseline for general noise levels in the intersection subject of measure 6.4, in the city centre, where there the crowded residential area is crossed by high traffic levels including the main bus routes. We mentioned that in this area, the main source of noise is generated by road traffic (vehicle engines - both commercial and private and horns).

As for the qualitative value, within the structure of the questionnaire designed for the general public, one question considered the perception of noise levels, broken down into 5 different perception bands of $L_{day.}$ The evaluation team considered it irrelevant to collect data reflecting the noise perception at night time, due to the fact that road traffic levels are very low during the night.

"How acceptable is the noise caused by the daytime road traffic in Suceava city?"

2005	1.Positive	2. Partly satisfied	3. Neutral	4.Partly dissatisfied	5. Negative
Noise	21 5.53%	65 17.1%	43 11.32%	102 26.84%	149 39.21%



2005 – Noise level perception

Therefore, we can underline that 5.53% of citizens have a "positive" perception, 17.10% appear to be "partly satisfied", 11.32% express a neutral position, 26.84% have a "partly dissatisfied" position and 39.21% are negative about the issue.

Converting these percentages into the index value provides a score for 2005 of -0.771.

Society category indicators

Indicator 13: Awareness level

To establish a baseline for the general public's acceptance level for measures related to finding the best pattern for urban transport in the city of Suceava. The CATCH project's results were considered and furthermore exploited. These sub-indicators referred to the general public's knowledge about the project measures and objectives, accessibility of information, the quality (accuracy) of information, the quantity of information and the channels used to deliver the information. The evaluation results emphasised a high level of knowledge: 75% for the LEZ extension (for various reasons, including the direct and instant impact on all citizens), compared with values for the related measures of 67% for alternative fuels and vehicles. 58% of the interviewed sample recognised the measure taken to rehabilitate the trolleybuses with the view of reducing pollution caused by public transport.

Indicator 14: Acceptance level

To establish a baseline for acceptance level, the CATCH project results were taken, regarding public perception, acceptance and attitudes toward the measures implemented, and in general toward demonstration measures that tackled issues about environmental friendly measures. The project focused on demonstrating at small scale: the impact upon the environment of LPG fuelled vehicles, the feasibility and effect of the introduction of emission reduction systems on municipal vehicles and vehicles; perception of the LEZ; and the perspective of transforming the city centre into a pedestrian area, hosting quality walking facilities.
The introduction of CATCH measures was regarded with satisfaction by the majority of respondents, 70% of whom agreed with alternative/LPG fuel promotion. 61% agreed with the introduction of the LEZ in the city centre and others' opinions were mainly s on the 3 intermediary levels of agreement. The disagreement of 25% of the sample came from the private car users and non public transport users. 61% of the respondents remained dissatisfied with regard to the installation of FPT systems on old public transport vehicles. The latter results was a good indication for the City Hall to begin treating the problems caused by the

public transport fleet more radically, thus undergoing a serious modernisation of the vehicles and facilities offered to public transport users.
With regard to public transport passengers they had a positive attitude (48%), an indifferent attitude (27%) and a negative attitude (25%) for the partial introduction of the LEZ.
The sample groups (respondents to the questionnaires) were chosen from all age categories, users (100) and non-users (50) of public transport means.
Socially, this project had an important impact on citizens' mentalities, behaviour and understanding, preparing them to accept new bolder actions and laying the foundation for implementing more outstanding measures and innovative solutions for urban public transport.
Practically, these results and conclusions were very useful in building the promotion and campaign strategy, considering the perception and the degree of interest shown by each category

Indicator 26: Average modal-split – pkm

City Centre junction		**2005**	
Distance per trip in the city centre study area - including LEZ - per vehicle by vehicle type (km)	Cars	0.34	
	PT buses	0.15	
	PT minibuses	0.15	
	Heavy vehicles	0.15	
	Commercial vans	0.25	
Number of vehicles observed by vehicle type (3 on-peak hours/day, average)	Cars	880	
	PT buses	151	
	PT minibuses	252	
	Heavy vehicles	21	
	Commercial vans	160	
Passengers / type of vehicle	Cars	2.9	
	PT buses	11.2	
	PT minibuses	16	
	Heavy vehicles	1	
	Commercial vans	1.5	
Total pkm in the city centre study area - including LEZ by type of vehicle	Cars	867.7	49%
	PT buses	253.7	14%
	PT minibuses	604.8	34%
	Heavy vehicles	3.2	0 %
	Commercial vans	60	3%

Regarding the distance per trip by vehicle type, the difference comes from the fact that buses have specific routes through the city centre (0.15 km), whilst private cars go all around, close to the location of interest (0.34 km). Commercial vans have greater mobility within the city centre demonstration area and LEZ as length of the trip (0.25 km).

Indicator 27: Average modal-split – vehicle km

City Centre junction		**2005**	
Number of vehicles by vehicle type (3 on-peak hours/day, average)	Cars	880	
	PT buses	151	
	PT minibuses	252	
	Heavy vehicles	21	
	Commercial vans	160	
Distance in the City Centre-including LEZ per vehicle by vehicle type (km)	Cars	0.34	
	PT buses	0.15	
	PT minibuses	0.15	
	Heavy vehicles	0.15	
	Commercial vans	0.25	
Total vkm in the city centre study area - including LEZ by type of vehicle	Cars	299.2	74%
	PT buses	22.65	6%
	PT minibuses	37.8	9%
	Heavy vehicles	3.2	1%
	Commercial vans	40	10%

To clarify the meaning of the traffic data, it is important to explain that the city of Suceava has an uneven distribution of housing, consisting of two main residential areas: a big residential area in the south – Obcini district and another one in the north-east – Burdujeni district. To travel from one end of the city to the other, the road infrastructure offers only one way and that is through the city centre. This is very close to the LEZ and passes through the junction used for the analysis, off which lies the main access point towards the LEZ. The third residential area is poorer and consists mainly of older houses. In their vicinity a modern residential area is erected and can be accessed crossing through the city centre junction and alternatively through a more sinuous and more difficult way.

Therefore, the traffic data collected for the demonstration area including the LEZ is a mixture of cars that go about their business within the city centre, through traffic on the main road and cars of city centre residents. The observations at the main junction would also pick up traffic that is forced to go around the LEZ because of its existence.

C1.3 Building the business-as-usual scenario

The business-as-usual scenario in the context of SMILE and the wider CIVITAS 2 evaluation methodology set by GUARD is a determination of what would happen at the end of SMILE if the particular measure had not been implemented. For its consideration we provide an assessment using historical data.

Within the 4 years since the SMILE project started, Suceava experienced social and economic development and continuous growth population growth. As the city is quite compact and spread over an insufficient area to accommodate such growth, the high density of population in a small zone brings about discomfort for the residents. Moreover, the combination of increased disposable monthly incomes, relaxed credit conditions offered by financial

institutions, the lack of properly dimensioned road infrastructure and parking facilities produced frequent congestion in the city, mainly in the city centre.

The CATCH project, in which the concept and partial introduction of an "environmentally friendly zone" was made, represented only a precursor and a small step towards building a better quality of life in the city. The part of Stefan cel Mare Street which was subject of restrictions to car access, became an insufficient measure when the number of cars increased, producing more congestion, and a higher level of noise and pollution in this sensitive area.

The data shows that by 2006, private cars were by far the most used vehicle type for travelling in and around and accessing the city centre. With regard to the development of pkm, vkm values and average modal split (see tables below), it is important to note and understand the significantly increased proportion of car traffic registered in 2006 compared to 2005. this is as a result of extensive private car purchases and an increased level of mobility both within Suceava and to Suceava as the regional capital. This can be explained based on some economic factors such as increased disposable monthly income, relaxed credit conditions, increased availability of second hand cars imported from elsewhere in Europe and, at the same time, increased incomes of local Romanian families, due to emigration of workforce. At the same time, the increased need for mobility and the poor service provided at that time by the local public transport (both private minibuses and local service buses) triggered an enhanced interest for privately owned cars.

Another factor which acted as a driver to the situation current in 2006 were people's mentality, according to which owning a private car is a matter of high social status. The image can be completed by the increased need for mobility, for work and leisure as well. When summing up these factors, the result led to an unprecedented growth in the number of cars in the city centre, whilst infrastructure coverage remained unchanged. At the same time public transport services were in a state of transition, with old vehicles being phased out and new vehicles due to enter service on a revised set of routes during the second half of 2006 and in 2007 (see measure 5.6).

Until the CATCH project was accomplished, this part of the Stefan cel Mare Street was regarded simply as any other road, accessible for motorised traffic. At the end of this project in 2005 its image and status were to an extent altered, due to awareness raising campaigns and the events organised in the area, to make use of the place for other purposes than traffic.

In the SMILE project, this new image was consolidated and more frequent closures of the Stefan cel Mare part of street occurred, along with the more and more events organised in that area. It changed the public's perception on the street's existence and utility. It changed motorised traffic patterns within the zone, but mentally citizens became more aware of the street's new image.

City Centre junction		**2005**	**2006**
Number of vehicles by vehicle type (3 on-peak hours/day, average)	Cars	880	6437
	PT buses	151	119
	PT minibuses	252	146
	Heavy vehicles	21	69
	Commercial vans	160	452
Passengers / type of vehicle	Cars	2.9	2.2
	PT buses	11.2	20.8
	PT minibuses	16	10.5
	Heavy vehicles	1	1.2

	Commercial vans	1.5	2
Total pkm / type of vehicle	Cars	867.7	4814.9
	PT buses	253.7	371.3
	PT minibuses	604.8	230.0
	Heavy vehicles	3.2	12.4
	Commercial vans	60	226.0
Modal split by vehicle type according to pkm	Cars	48%	85%
	PT buses	14%	7%
	PT minibuses	34%	4%
	Heavy vehicles	0%	0%
	Commercial vans	3%	4%
Total vkm / type of vehicle	Cars	299.2	2188.6
	PT buses	22.65	17.9
	PT minibuses	37.8	21.9
	Heavy vehicles	3.2	10.4
	Commercial vans	40.0	113.0
Modal split by vehicle type according to vkm	Cars	74%	93%
	PT buses	6%	1%
	PT minibuses	9%	1%
	Heavy vehicles	1%	0%
	Commercial vans	10%	5%

The reduction inbuses reflects the reorganisation of the routes in the city, with fewer vehicles passing through the measurement intersection. It is worth noting that the number of passengers per vehicle increased in line with the observations made in Measure 5.6. There is an increase in the total p/km for buses from 2005 to 2006, although this is not as great proportionally, either as the figure observed in Suceava as a whole, or for car p/km in the same period.

p/km and v/km for cars in the city centre demonstration area registered a significant upwards trend from 2005 to 2006, due to: increased private car ownership; insufficient road infrastructure to spread the traffic onto adjacent routes with connections to different zones of the city; and people's enhanced mobility requirements / desires. Also unrestricted access to the city centre demonstration area and the future pedestrian area during working hours spurred the trend. The increase in the number of cars, was not somehow abnormal or unexpected, as it pursued the European trend. If in 2005 there was about 1 car for 6 citizens, in 2006 the situation was about 1 car for 5 citizens.

The drop of percentages for public transport minibuses in 2006 comparing to 2005 is caused by the reduction of the total number (from 100 to 40 minibuses). Their operation has been optimised through regulation, and only part of this demand has been replaced by regular public transport.

Increased demand for services and goods driven by the city's economic development led to increases in heavy goods vehicle and commercial van traffic (and with no city by-passes in place local commercial and heavy transit traffic has no possibility to divert).

Overall there is a significant increase between 2005 and 2006 in the v/km and p/km observed at the intersection.

The period 2005 - 2006 when the provision of public transport was going through a radical transition (see measure 5.6), the economy was prospering, mobility was increasing and car ownership increased rapidly was something of a short term anomaly. The experts in Suceava City Hall consider that it would not have been possible to sustain the rapid rate of change which occurred in that period. It is not possible to predict with any certainty the level of traffic that would have been measured at the city centre junction if the SMILE project had not been implemented. (It must be remembered that there are no sophisticated land use and transport network models available in Suceava). Therefore, the situation at the end of 2006 is taken as the basis for comparison with the results measured in 2008 at the end of the project.

C2 Measure results

The results are presented under sub headings corresponding to the areas used for indicators – economy, energy, environment, society and transport.

C2.1 Economy

N/A

C2.2 Energy

N/A

C2.3 Environment

Indicator 6: NO_x levels

1) The annual average concentration (the daily maximum for the 8 hours average) for NO_x levels in the demonstration area were:

In 2006: 13.64 µg/m^3
The limit value accepted is 53.33 µg/m^3.

In 2007:15.75 µg/m^3
The limit value accepted is 50 µg/m^3.

For the NO_x indicator, we can underline that in the demonstration area, the annual average concentration values decreased by 19% from 2005 to 2006 and by 6% from 2005 to 2007, although from 2006 to 2007 there was an increase of 15%.

The main sources of NO_x in this area are general road traffic caused by both local and transit traffic and the increasing number of households located in the vicinity of the monitoring station using a household central heating.

2) The daily maximum concentration values measured during the year in the demonstration area were:
In 2006: 38.9 µg/m^3
In 2007: 37.9 µg/m^3

An analysis of these figures for the City Centre area showed that for NOx, the daily maximum concentration levels decreased from 58.3 µg/m^3 in 2005 to 38.9 µg/m^3 in 2006 and to 37.9 µg/m^3 in 2007. This meant a reduction of 35% of NOx from 2005 to 2007, in the city centre where the LEZ was implemented.

Indicator 7: Particulate levels - represent the average concentration of particulate matters on an annual basis. Data was collected through a monitoring station located in the city centre (see the map attached), having support from EPA-Suceava. Two types of values are further considered:

1) The annual average PM_{10} concentration for:

2006:

- 49.32 µg/m^3, the annual average concentration limit, according to the Order no. 592/2002, issued by the Romanian Environment Ministry is 46.66 µg/m^3.

2007:

- 41.81 µg/m^3, the annual average concentration limit, according to the Order no. 592/2002, issued by the Romanian Environment Ministry is 40 µg/m^3.

All values are over the admissible national limits, but we notice a decreasing trend for both measurements.

2) The daily maximum concentration values measured during the years:

- 2006 was 173.67 µg/m^3, whilst the limit value is 58.33 µg/m^3
- 2007 was 126.33 µg/m^3, whilst the limit value is 50 µg/m^3

The daily maximum concentration measured has also a general decreasing trend compared with the level of 2007, by 27% from 2005 to 2006 and by 20% from 2005 to 2007.

A complete picture is drawn in the table below, showing the yearly concentration in µg/m^3 measured in the City Centre:

2005				**2006**				**2007**			
NOx		**PM_{10}**		**NOx**		**PM_{10}**		**NOx**		**PM_{10}**	
Annual average	Daily max concentration	Annual average	Daily max concentration	Annual average	Daily max concentration	Annual average	Daily max concentration	Annual average	Daily max concentration	Annual average	Daily max concentration
16.76	58.3	53.33	157.72	13.64	38.9	49.32	173.67	15.75	37.9	41.81	126.33

Measure 6.4 is extending the "environmentally friendly areas" and the decrease of traffic in high density inhabited zones.

Indicator 12: Noise perception

The surveys for collecting quantitative data are deployed in: the city centre, Obcini district (in the vicinity of the Suceava main highway from the south, direction Bucharest) and in Burdujeni district (in the vicinity of the exit towards the east) The tables below bring illustrate the data collected at the City Centre main junction that draws the eastern line of the historical city centre.

Noise level monitoring and measurements were made by the EPA Suceava. The data collected from their statistical record and averages calculated on a semester basis are summed up in the following table:

Measured noise level

Location	L_{max} admissible	Noise maximum level after measurements						Exceeding values					
	dB	dB						% of measurements with exceeded admissible values					
		2005 S1	*2005 S2*	*2006 S1*	*2006 S2*	*2007 S1*	*2007 S2*	*2005 S1*	*2005 S2*	*2006 S1*	*2006 S2*	*2007 S1*	*2007 S2*
City Centre intersection	70	72.35	71.4	75.4	71.3	76.7	78.0	25	25	33.3	25	50	66.7

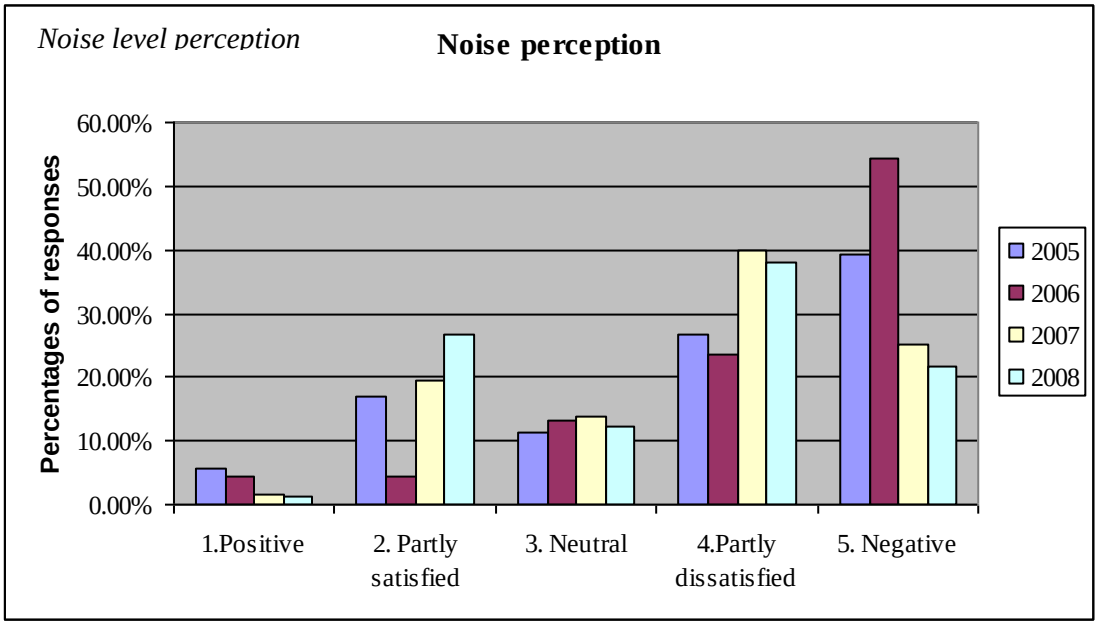
S1 = semester 1, S2 = Semester 2

These values enabled us to assess the trend of general noise levels in this intersection and in the middle of crowded residential area, which are crossed by high traffic levels and by buses. The main source of noise is generated by road traffic. The city centre intersection was affected by worsening noise levels - the variation was from 72.35 dB in semester I 2005 to 76.7 dB in semester I 2007 and from 71.4 dB in semester II 2005 to 78.0 dB in semester II 2007. This increase at the central junction is significant for a crowded area, but bearing in mind that the number of cars did increase. To a certain extent a fraction of total number of vehicles were diverted from the Stefan cel Mare Street toward the main road. Therefore the situation is explicable.

With regard to qualitative assessment of this indicator (deployed in crowded residential areas, crossed by the new bus fleet), within the structure of the questionnaire designed for general public, one question considered perception of the noise levels, broken down into 5 different perception bands of $L_{day.}$ The evaluation team considered it irrelevant to collect data reflecting the noise perception at the night time, due to the fact that road traffic is very low during the night. However, the option of extending the night bus service was taken into consideration, to prevent a certain trend from happening.

"How acceptable is the noise caused by the day time road traffic in the Suceava city?"

Noise perception	Positive	Partly satisfied	Neutral	Partly dissatisfied	Negative	Index
2005	21 6%	65 17%	43 11%	102 27%	149 39%	-0.771
2006	17 5%	18 5%	50 13%	89 23%	206 54%	-1.187
2007	6 1.58%	74 20%	53 14%	151 40%	96 25%	-0.676
2008	5 1%	102 27%	47 12%	144 38%	82 22%	-0.516



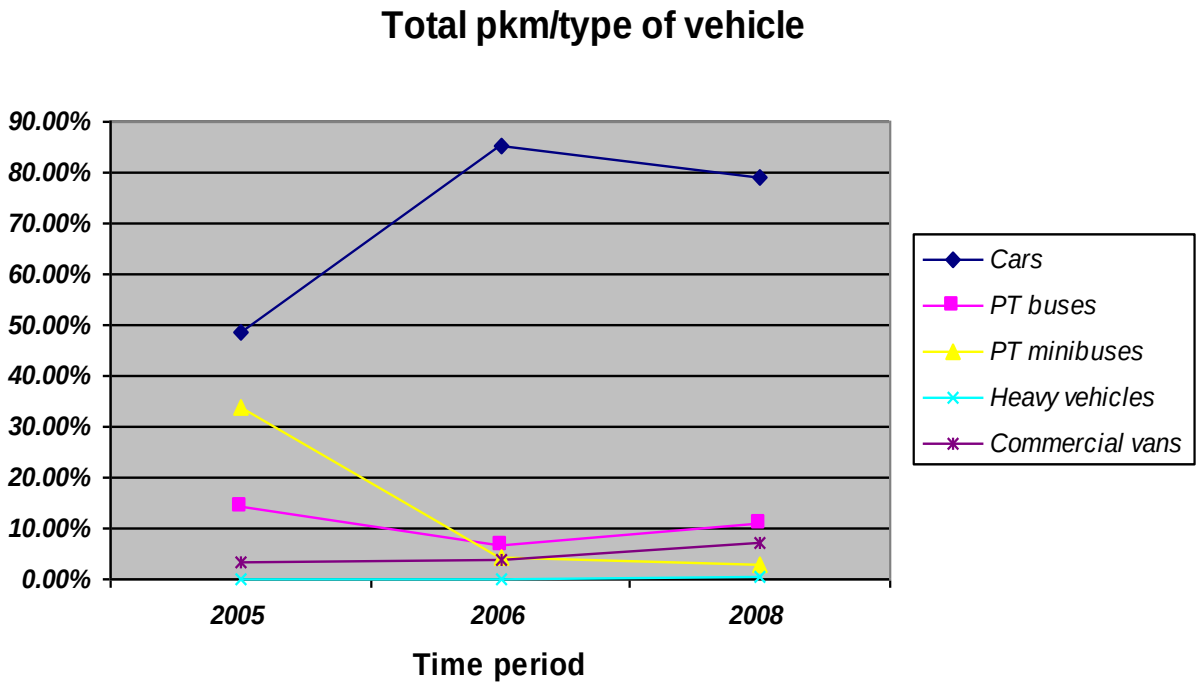
The chart and index data both show that the noise perception is mostly on the negative side of the chart. But it is important to emphasise that the noise perception registered a shift towards a more positive level in 2007 and improved marginally again in 2008.

Unlike the noise measurements, the perception results are not restricted to the area at the main intersection. They cover noise perception throughout the core city centre area and are more likely to be influenced by the LEZ and other SMILE measures.

C2.4 Transport

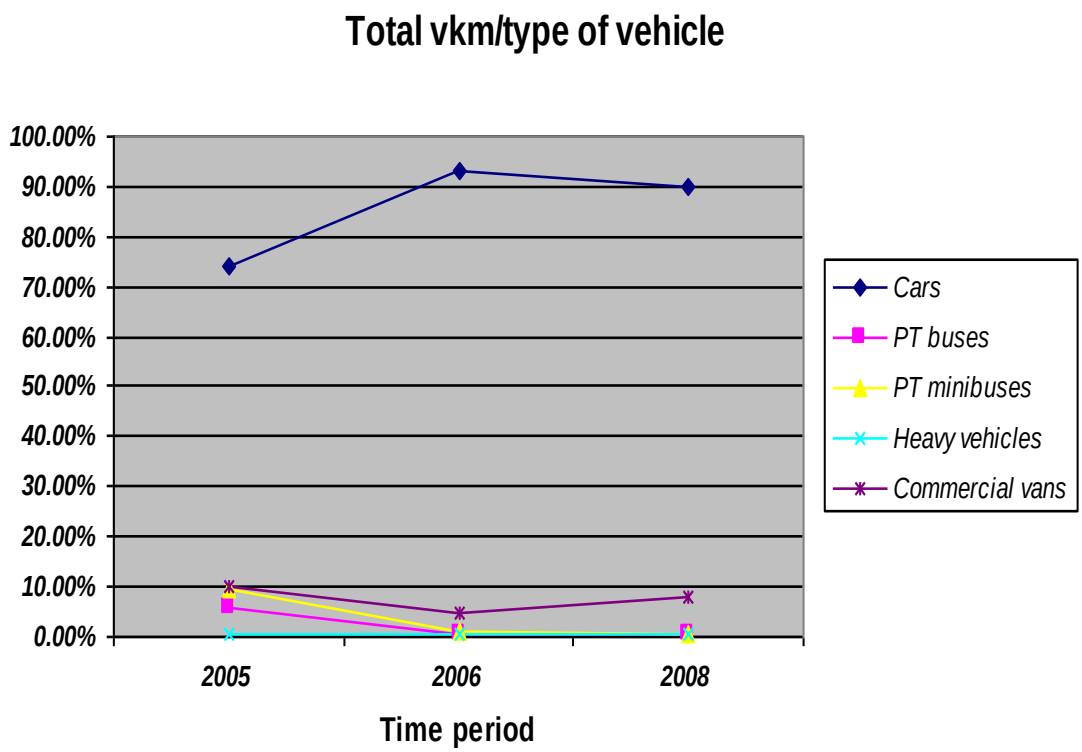
Indicator 26: Average modal-split – pkm

City Centre junction		**2005**	**2006**	**2008**
Number of vehicles by vehicle type (3 on-peak hours/day, average)	Cars	880	6437	5818
	Buses	151	119	113
	Minibuses	252	146	79
	Heavy vehicles	21	69	72
	Commercial vans	160	452	708
Passengers / type of vehicle	Cars	2.9	2.2	2.0
	Buses	11.2	20.8	33.0
	Minibuses	16	10.5	11.5
	Heavy vehicles	1	1.2	1.2
	Commercial vans	1.5	2	2
Total pkm / type of vehicle	Cars	867.7	4814.876	3956.24
	Buses	253.7	371.28	559.35
	Minibuses	604.8	229.95	136.275
	Heavy vehicles	3.2	12.42	12.96
	Commercial vans	60	226	354
	Cars	49%	86%	79%
	Buses	14%	6%	11%
	Minibuses	34%	4%	2%
	Heavy vehicles	0%	0%	1%
	Commercial vans	3%	4%	7%



Indicator 27: Average modal-split – vkm

City Centre junction		**2005**	**2006**	**2008**
Number of vehicles by vehicle type (3 on-peak hours/day, average)	Cars	880	6437	5818
	Buses	151	119	113
	Minibuses	252	146	79
	Heavy vehicles	21	69	72
	Commercial vans	160	452	708
Total vkm / type of vehicle	Cars	299.2	2188.6	1978.1
	Buses	22.7	17.9	17.0
	Minibuses	37.8	21.9	11.9
	Heavy vehicles	3.2	10.4	10.8
	Commercial vans	40.0	113.0	177.0
	Cars	75%	93%	90%
	Buses	5%	1%	1%
	Minibuses	9%	1%	1%
	Heavy vehicles	1%	0%	0%
	Commercial vans	10%	5%	8%



Commentary on transport indicators

Private cars remained in 2008 the most used vehicle type for accessing and transiting the city centre.

From 2006 to 2008, a slight but important change in modal split in terms of p/km has been observed at the main interchange. A decrease in the mode share of 6.4% for cars and an increase in the mode share of 4.6% for buses, indicated that the SMILE measures produced a small impact in the last 2 years of the project. Thus partially reversing the trend observed from 2005 to 2006. This result is further analysed under the spectrum of the increased number of private vehicles and private ownership that varied from 1 car for 5 people in 2006 to around 1 car to 2.8 persons (considering only the vehicles registered in Suceava Municipality which can be tracked as running in the city). Therefore, this an encouraging result, showing that changing the modal split in the city centre, though not easy, can be achieved to some degree, by implementing and enforcing a package of complementary measures. These results provide reassurance to the project team that further similar measures would continue the current beneficial trend. We consider that SMILE project provided a successful input and set the fundamental basis for the new measures that are needed and will be taken in the city.

The decrease in mode share for public transport minibuses from 2006 to 2008 is largely explained because following the regulation process (and associated reduction in numbers) in 2006, those that remained in service operated secondary routes and their presence in the city centre – the intersection studied here – was much rarer than in the past years.

We can link the increase of 4.6% in the p/km for buses from 2006 to 2008, to the results of Measures 5.6, 8.8 and 8.9 because the increase was in part due to the substantially increased ridership observed on each vehicle (increased from 11.2 to 33 people).

What does not transfer across directly from the results of Measures 5.6, 8.8 and 8.9 is evidence of the increased operational kilometres observed in measure 5.6. This will partly be linked to the reorganisation of the bus lines in 2006, which may have led to a reduction in buses being routed through the main intersection. It is also because part of the increase in bus

kilometres operated was due to the extension of services both to more outlying areas of the city and also to cover longer periods of the day. This would not be picked up by the traffic count process which was concentrated during 3 specific hours each day.

The city centre demonstration area, including the LEZ, is small and agglomerated. Cars and people are more attracted to it and diverting buses or minibuses to operate within the area would not lead to an improvement. This is why the decision was taken to monitor traffic at the neighbouring intersection, rather than within the core LEZ area. During the course of the project increasing levels of restriction have been placed on traffic on Stefan cel Mare Street. Through traffic is now diverted away from the LEZ via a new one way street and some traffic calming measures are in place. At present the political decision to completely close Stefan cel Mare Street (the main access to the LEZ) has not been taken. Hence, some vehicles do still access the LEZ to park close to the shops, banks, restaurants etc. However, vehicle numbers in this area have not increased to the same extent as on the neighbouring main through route.

In order to provide future benefits to the quality of life in the city centre, the only feasible solution is to introduce completely restricted car access in the part of Stefan cel Mare Street included as part of this project and to progressively extend the initiative for wider areas. The small distances within the zone and the walking facilities available make this a feasible approach.

Heavy vehicles and commercial vans have proved more difficult to handle due to the ongoing increased demand of mobility caused by economic development (linked to Romania's accession to the EU) and real estate market expansion. With no city bypasses built, heavy and commercial traffic whether local or passing through have no possibility to divert. There have also been increases in commercial traffic within the LEZ area as well as those observed at the main intersection.

The political barriers to a steady measure for closing the LEZ part of Stefan cel Mare Street have in fact now been approved in a vote of the local city council and it will come into force by the end of 2008. When the regulation for totally restricting car access into the LEZ street comes into force, the car use for entering the core LEZ area will be prevented. The will be with the expectation that bus use combined with extended walking, backed up by mobility management solutions, will become more important in the city centre area and the LEZ in particular, combined with a decrease in car use within the city centre and the neighbouring areas.

C2.5 Society

Indicator 13: Awareness level

Within the general public questionnaire we included the question regarding awareness of the SMILE project and nominally the measures implemented. The question was:

Table 18: "Have you heard of the SMILE project and the following measures implemented as part of the project?"

	Yes	No
2006 Extension of LEZ in the city centre	233 (61%)	147 (39%)
2008 Extension of LEZ in the city centre	308 (81%)	72 (19%)

Obviously, the percentage of those who heard of this group of measures increased in 2008 compared to 2006.

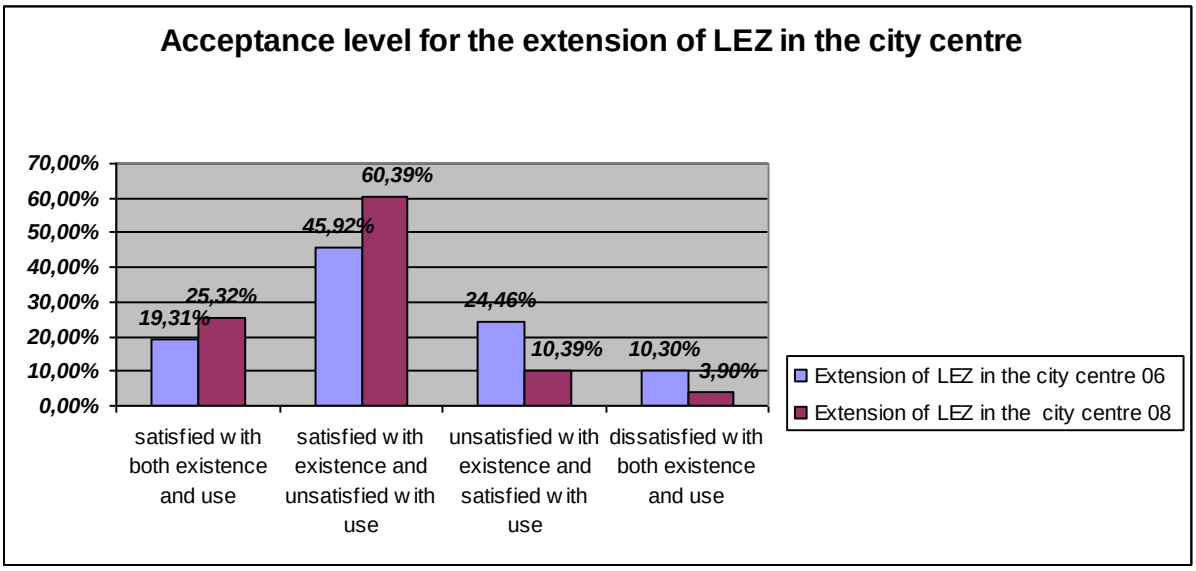
Indicator 14: Acceptance level

In order to establish the degree to which the main activities carried out in SMILE project and their outputs are accepted and the level of confidence for each of them by those who claimed to have heard of them previously, the following question was included:

Table 19: "How do you appreciate the measures taken by the City Hall within SMILE project to extend the LEZ in the city centre, and the future plans for closing part of Stefan cel Mare Street?"

2006	satisfied with both existence and use	satisfied with existence and unsatisfied with use	unsatisfied with existence and satisfied with use	dissatisfied with both existence and use
Extension of LEZ in the city centre	20%	46%	24%	10%
2008	satisfied with both existence and use	satisfied with existence and unsatisfied with use	unsatisfied with existence and satisfied with use	dissatisfied with both existence and use
Extension of LEZ in the city centre	26%	60%	10%	4%

Chart 15: The acceptance level for the measure studied:



In order to assess the satisfaction for LEZ existence in the historical city centre and its utilisation as a public space serving to host local public events, 4 categories of people were defined according to their opinions:

- satisfied with existence and use;
- satisfied with existence and dissatisfied with use;
- dissatisfied with existence and satisfied with use; and
- dissatisfied with both existence and use.

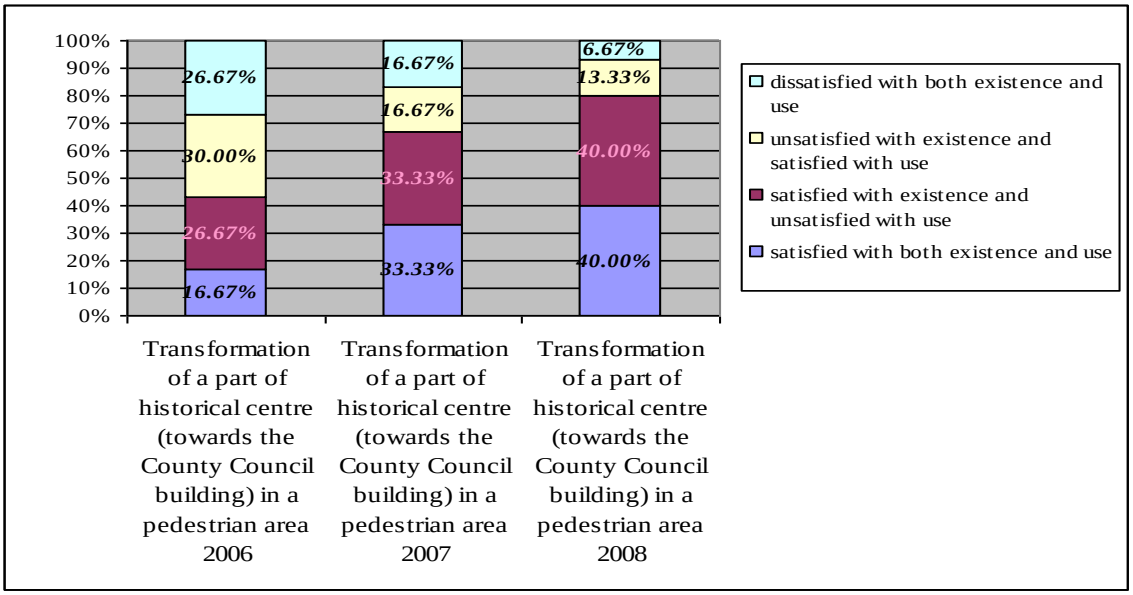
It is important to define the meaning of these 4 defined categories of people, because peoples attitude and acceptance towards the measure is motivated by personal interests. Therefore the first category includes people who become totally supportive to the implemented activities, without finding any discomfort in traffic restricting rules.
The second category understood the concept of the LEZ and is supportive to any further time length extension, including total closure of this part of the street, but they could see it used in a superior manner. In this respect, we highlight here the high percentages of people in this category: 46% in 2006 and increasing to 60% in 2008. This worrying trend of the indicator

was analysed within the project team and conclusions drawn were unanimously accepted: the poor status of the area regarding the House of Culture Esplanade and architectural details; pavement infrastructure within the park; the lack of proper infrastructure for sport activities; and the presence of cars during the working day and in the evenings. The third category includes people who would rather use the car within the area than using it as a pedestrian area, due to the work commitments which put pressure on them to drive through the zone to reach the sought destinations. These are allegedly people who are actively involved in business activities and who prefer to spend weekends outside the city, possibly in the mountains and in their own holiday houses. Also, it is important to underline here that the trend is downwards, showing an increase in acceptability of such measure of clearing the historical city centre of cars. In general, dissatisfaction could be explained by the fact that the closure of the LEZ street causes inconvenience to current car drivers who understand the benefits of such area but find hard to accept a change in their driving route and a prolongation of the trip duration. A percentage of people belong to the fourth category, those who can't find satisfaction or see advantages both in existence and use of part the historical city centre as a no car access area. Although, less significant as values, this category is considered to be an opponent of the measure and with the future project of area modernisation, there are hopes to sensitise them and to dissolve this category by merging it into the third category, in the worst case.

As previously stated, within the promotion campaigns related to Measure 6.4, a special category of citizens were addressed, namely shop owners and other businesses specifically having offices alongside the central LEZ street. It is a sensitive category, as their running costs in the city centre are one of the highest in the city. After 4 years of step by step project implementation, it has been possible to demonstrate the other benefits that would result from implementation of a cleaner zone in that city centre area.

In this respect, we laid down a short questionnaire that was given to a small section of the business community based in the LEZ (30 people interviewed) and the answers received from 2006 to 2008 have been compiled as follows:

2006	satisfied with both existence and use	satisfied with existence and dissatisfied with use	dissatisfied with existence and satisfied with use	dissatisfied with both existence and use
Transformation of a part of historical centre (towards the County Council building) in a pedestrian area	17%	26%	30%	27%
2007	satisfied with both existence and use	satisfied with existence and dissatisfied with use	dissatisfied with existence and satisfied with use	dissatisfied with both existence and use
Transformation of a part of historical centre (towards the County Council building) in a pedestrian area	33%	33%	17%	167%
2008	satisfied with both existence and use	satisfied with existence and dissatisfied with use	dissatisfied with existence and satisfied with use	dissatisfied with both existence and use
Transformation of a part of historical centre (towards the County Council building) in a pedestrian area	40%	40%	13%	7%



The results show a steady change in businesses' attitude and acceptance, due to the change in mentality but also due to accompanying structural changes that occurred in the area. The number of shops requiring commercial vehicles in the area has gone down and instead, other services set up their offices, mainly financial agencies, bank agencies, tourism agencies. Customers' access requirements to these premises are different, and can be achieved using the new pedestrian infrastructure created there.

C3 Achievement of quantifiable targets

No.	Target	Rating
1	Extension of LEZ - 35% of the LEZ became pedestrian	★★
2	Transformation of the historical city centre into clean area in a 20% extent	★★
3	Extension of the low emission zone in other parts of the city, starting with the Eco-routes implementation	★★
4	Reduction of emissions and noise levels in the city centre to improve the quality of life	★
5	Compliance with European air pollution directives, designed for Romania	★
NA = Not Assessed 0 = Not achieved ★ = Substantially achieved (> 50%) ★★= Achieved in full ★★★= Exceeded		

C4 Up-scaling of results

There is some limited scope for the further extension of the LEZ, both within the city centre and also to smaller suburban centres. However, in comparison with what has been achieved to date these extensions would have minor impacts.

C5 Appraisal of evaluation approach

The evaluation process and methodology were respected. The SMILE evaluation team had a stable structure during the last 3 years of the project (the most relevant ones) and the collaboration with City Hall partners (Environmental Protection Agency) made possible to collect accurate data for the purpose of this report.

The surveys, manual counting and questionnaires have been deployed in good conditions and have taken into consideration similar circumstances and relevant segments of the population.
The evaluation has highlighted the difficulties encountered in a city such as Suceava, in comparison with larger western-European cities which would be in possession or have access to a specific urban traffic model and associated environmental modules. These just do not exist for many small- medium sized cities in Eastern Europe. Therefore a more simplistic and less comprehensive approach has to be taken within resource constraints for the overall project.
In the near future financial allocation and human resources will be used for the implementation of measures and equipments necessary to monitor and keep under control things such as: pollution indicators; safety and security in traffic to reduce casualty incidents; road traffic congestion cases; and circumstances of law infringements. With these key elements at hand, the situation will be closely monitored, enabling the authorities to take immediate actions to avert negative factors.

C6 Summary of evaluation results

The key results are as follows:

- **Key result 1** – decrease in traffic emissions and an improvement in air quality within the LEZ area caused by reduction in public and private transport in the core historical centre;

- **Key result 2** – improved quality of life in the city centre by reducing pollutant emissions and noise levels caused by road traffic (6.02% NOx and 21.6% PM_{10} annual average levels decrease, 33% of respondents considered that noise is more acceptable in 2008 comparing to 2005);

- **Key result 3 –** improvements in the public's perception of the LEZ concept (6% increased satisfaction for existence and use of the LEZ in the city centre and 6% decrease of the number of people dissatisfied both with existence and use). This result is fundamentally necessary for Measure completion and for multiplication of similar actions in other parts of the city.

- **Key result 4 –** improvements in businesses' perception for the LEZ concept (increase satisfaction for existence and use of the LEZ in the city centre by 23% and 20% decrease of the number of business owners dissatisfied both with existence and use). We specify here that also the businesses located in the city centre changed, the area became more populated with mobile network agencies, tourism agencies, agencies of smaller banks, confectionary room, a pub, places that don't demand a daily presence during work times.

- **Key result 5 –** extension of pedestrian areas with a change of priority from vehicle access;

- **Key result 6 –** increasing the political involvement in potentially unpopular measures. Tackling the political media is vital for implementation of this activity, the acceptance and putting into force of such unpopular measures on short terms. The transformation of policy cannot be done rapidly, as they always take into consideration what the population desires and the process is quite complex in a varied community (these multiple changes incurred in this 4-year project had an important impact on mentalities and they pervaded naturally the life in the local community and they have been also accepted willingly).

- **Key result 7 –** confirmation of the environmental contribution of this Measure in preparation for compliance with the European air quality standards.

D Lessons learned

D1 Barriers and drivers

- mentality – private cars are still regarded as a matter of high social status and the facilities offered outweigh personal health and wider social benefits;
- Suceava city's spatial limitations – the city is quite compact and any closure of the streets can have a significant impact on road traffic unless properly planned, running the risk of triggering dissatisfaction from parts of the population;
- lack of national legal provisions for environmental protection policies – this hardened the process of imposing this kind of strict measures at a local level;
- infrastructure constraints – the city had a high density of people in the populated areas and too less adjacent roads to serve all users;

D1.2 Drivers

- political factors – politicians, particularly the mayor, were always supportive and willing to take measures to improve life in the city;
- a visionary and qualitative management of the city, tackling all the problems in a unitary way;
- EC funding programs which give the momentum for all interested applicants, re-uniting partners with different experience.
- Accession to the EC, which introduced new air quality guidelines and hence a requirement to consider environmental impacts of wider policies such as transport management.

D2 Participation of stakeholders

- **Stakeholder 1 –** primarily the local city council who are the single main partner in this measure, and who have driven it both at a political and officer level;

- **Stakeholder 2 –**the general public with their participation in the SMILE consultation process within Measure 11.7 offered feedback also useful for the purpose of the current Measure. Viewing the Measure results, we underline a positive trend for awareness and acceptance.

- **Stakeholder 3 –** car owners in general, and those who are residents in the LEZ were motivated by their own interests and showed moderate support for the LEZ extension in the historical city centre and other parts of the city. This is explained by acknowledging the negative impact created by excessive car utilisation and acceptance of fact that Measures must be taken. Having been constrained by city spatial limitations, lack of properly developed road infrastructure, poor and insufficient parking plots and the non-existence of parking facilities, it was expected to experience difficulties with this category.

D3 Recommendations

- **Recommendation 1 –** the city centre hosts a large number of residents besides the commercial businesses. The range of premises is big and ideally the LEZ would include a wider area;

- **Recommendation 2** – to prepare measures that would make the LEZ, at the size that it will be after completion of the current project, a more attractive part of the city centre to pedestrians. Therefore inducing to people the need to walk and experience other entertaining activities within this area is important.

- **Recommendation 3 –** develop associated policies such as park and ride, on street parking management and city centre car parks (facilitating a park and walk concept) in order to facilitate the movement of those who continue to use their cars for the journey to the city centre, but in a controlled way so that the city can generate revenue and control movements to the benefit of the city as a whole;
- **Recommendation 4 –** additionally, promotion campaigns should tend to prepare another way of thinking about traffic impact on the environment and on people's health;
- **Recommendation 5 –** to identify solutions for allotting space to bicycle infrastructure, in order to be able to cut down average modal split share for motorised vehicles within the city centre.
- **Recommendation 6** - with regard to cities experiencing similar problems, we suggest to seek locations where the LEZ concept can be implemented (partially or totally) and to organise personalised information campaigns for the general public, emphasising its main benefits according to their needs.

D4 Future activities relating to the measure

- to fully implement the closure of Stefan cel Mare Street as agreed by the city council
- to create bicycle lanes within the current LEZ
- to find ways of better managing commercial traffic access in the LEZ
- to modernise the House of Culture, the esplanade and the other amenities located in the area to improve the visual impact of the LEZ
- to continue the extension of the LEZ until the historical centre becomes a 100% pedestrian area
- to extend the LEZ to other residential parts of the city
- to find solutions to further restrict motorised vehicle access within the city centre and historical area
- to extend the LEZ and pedestrian areas in other parts of the city
- to further link the new ecological bus routes with the concept of access to the city centre
- to modernise existing parking spaces and to create new facilities, in the same time to restrict parking in the crowded areas
- to organise consultations with the public tackling this theme and to ensure compatibility between actions and expectations.