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Measure Evaluation Results

BOL 8.2 Illegal on Street Parking Reduction

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Executive Summary

Illegal on-street parking (i.e. double parking or parking in bus lanes) was one of the main causes of traffic congestion in Bologna. It also hinders public transport (PT) vehicles. To prevent this behaviour, the measure 'Illegal on Street Parking Reduction' aimed at implement an automated enforcement system called SCOUT. This system is based on cameras to support municipal police officers in issuing fines for illegally parked vehicles which obstruct public transport routes.

The police department was responsible for the management process. The service was carried out in two work shifts during the day (morning and afternoon), all year around. Two police officers were employed on each work shift (one operator drove the car; the other took the pictures with a special camera). At the end of the shift, the police officers downloaded data on the infringements and recorded the findings. This measure was one of the first examples of automated enforcement for illegal on-street parking in Italy. By improving police officers' performance, good results were expected compared to traditional enforcement. Thereby, the measure was implemented in the following stages:

Stage 1: System acquisition and installation (October 2008 - 2012) A first device was acquired in 2008, and a second device in 2011 to replace the previous one. These devices allow e.g. GPS localization, video transmission, licence plate recognition as well as biometric identification (by a fingerprint reader integration). The second device had still more functions including extended memory and links to different data bases for cross checks (e.g. stolen cars).

Stage 2: Enforcement activity (October 2008 - 2012) started in one bus route in order to detect illegal on-street parking (2008). It was progressively extended to include a second bus route (February 2010), an additional street (December 2010) where circulation modifications and road works for a new trolley bus lane were carried out and the main traffic flow axis to and from the city centre and within the centre itself (since December 9th, 2011).

The **evaluation strategy** for this measure sought to focus on indicators in the fields of transport and society. Firstly, data were collected from the ATC/TPER (Bologna bus operator) control system, in order to measure the improvement of PT quality in term of regularity. Secondly, the number of fines during the measure period was provided by the database recorded in the enforcement system itself. The number of infringements, through the fines issued, was considered a good 'dummy indicator' to measure the level of awareness and acceptance, assuming that a downward trend of infringements reflects a positive change in drivers' behaviours.

The **key-results** showed that the activities carried out by the Municipality were successful: a reduction in illegal on-street parking was observed, with reference to all types of infringement (a reduction of 53% of fines issued between 2008 and 2011 on bus route 14). In the mean time, positive results were obtained in terms of PT regularity, with particular reference to the month of December, when it was particularly high.

No significant barriers were identified, but the measure thrived because of one important **drivers**. Thanks to awareness campaigns run by the Municipality before SCOUT was introduced and modified, residents accepted the system and politicians promoted the system as well. This was a fundamental driver, with particular reference to shopkeepers who, understanding the possible advantages, did not impede the development of the measure.

Cities interested in these types of interventions must consider and evaluate in advance several aspects. Firstly, it is essential to communicate the features of new technologies and

the rules of the system to inform citizens on the concept. Secondly, it is **recommended** to take all stakeholders into consideration and to conduct a context oriented analysis of the focused area which may change during the year (e.g. during Christmas time commercial activities are busier; as a result traffic congestion increases in central areas). Finally, appropriate parking alternatives or mobility alternatives should be developed for the residents of the focused areas (providing authorized parking areas, intensifying PT services).

Overall, the evaluation showed that achieving the objectives of the measure was closely dependent on political will. Reciprocally, the positive results of the measure evaluation convinced the Municipality of Bologna to continue its efforts beyond the frame of MIMOSA project and to commit to provide further concrete and efficient solutions to parking related traffic problems: in September 2012 and November 2012, two additional SCOUT devices were introduced.

A Introduction

A1 Objectives

The Measure objectives were:

(A) High level / longer term:

(1) Improvement of quality of life

(B) Strategic level:

(1) To introduce Innovative Transport Telematics Systems

(2) To ensure that traffic regulations were respected

(C) Measure level:

(1) To reduce illegal on-street parking

(2) To improve public transport

A2 Description

Illegal on-street parking (i.e. double parking or parking in bus lanes) was one of the main causes of traffic congestion in Bologna. It also hindered public transport (PT) vehicles. To discourage this behaviour, Measure 8.2 helped the city to improve its automatic enforcement system. The system is based on using cameras to support municipal police officers in issuing fines for illegally parked vehicles obstructing public transport routes.

The improvement to existing ITS enforcement systems with cameras consisted of innovative mobile cameras (a portable device named SCOUT), designed to detect illegal parking and support municipal police officers' enforcement activities . The process consisted of:

- taking photos of illegally double-parked cars;
- automatic number plate recognition and fine process activation based on picture detection.

An upgrade of the system (requested but not still operative) was represented by an on-board GPS/Galileo satellite application to provide the exact position of the vehicles, thereby avoiding disputes when the fines were issued. This was a further control element additional to the legal requirements.

The police department was responsible for the management process. The service was carried out in two work shifts during the day (morning and afternoon) throughout the year. It covered the entire length of bus routes where the service was operative (Bus routes 13, 14, via Irnerio and the city centre). Two police officers were employed on each work shift (one operator drove the car, the other took the pictures). At the end of the shift, the police officers downloaded data on the infringements and recorded the findings.

The cost of the system depended on the features requested (between EUR 7.000 and EUR 10.000 for one mobile camera). Other costs referred to personnel (4 full-time police officers) and the car in use (small economy car/mini van); maintenance costs in comparison were very moderate. Of these costs, the Mimosa project financed management and implementation activities for the Measure development realized by Municipality of Bologna technicians and the Police Department.

The main features of SCOUT are reported in the following tables.

TABLE A2.1: Main SCOUT features



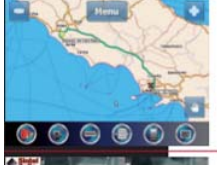


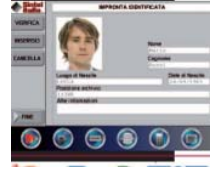


<p>Video recording</p>		<p>GPS localization</p>	
<p>Satellite surfing</p>		<p>Video transmission</p>	
<p>Automatic Number Plate Recognition</p>		<p>Biometric identification (by a fingerprint reader integration)</p>	
<p>Fine issuing</p>		<p>Radio and telephone communication</p>	

FIGURE A2.1: The SCOUT device



Scout is produced by Sintel Italia S.p.A. - Via Carlo Poma, 16, 00040 Pomezia (Rome)

FIGURE A2.2: Examples of illegal on-road parking detected by SCOUT



Source: Municipality of Bologna

FIGURE A2.3. SCOUT in action



Source: 'Corriere di Bologna'

B Measure Implementation

B1 Innovative Aspects

Use of new technology, nationally - This measure was one of the first examples of automatic enforcement for illegal on-street parking in Italy. It was expected to obtain good results from increased performance in comparison to traditional enforcement.

B2 Research and Technology Development

RTD activity focused on the reporting and evaluation of the initial implementation, the main features, the controlled bus routes and the initial results achieved.

At the beginning, the Municipality of Bologna used the ITS device to monitor one bus route (Bus number 14: Massarenti, San Vitale, Rizzoli - Ugo Bassi – A. Costa) in order to detect illegal on-street parking. Monitoring was carried out every working day (mornings and afternoons) by the Municipal Police Department. The following relevant aspects emerged from the data collected (the baseline for the Measure, as shown in part B) :

- for all illegal on-road parking, there was a reduction in infringements between 2008 and 2009 in the areas of bus route 14 where SCOUT was active. In particular, data showed a **55% reduction in parking in the bus lane** and a **38% reduction in parking in areas where vehicular access is prohibited**. The meaning of this data was that drivers knew and accepted this kind of enforcement and the number of infringements fell sharply;
- a consequent decrease in traffic congestion along the bus routes being monitored;
- a consequent improvement in the punctuality of buses at stops along the monitored routes;
- a low proportion of legal disputes to the number of fines issued (the device provided better proof of illegal parking with photographic evidence).

The ITS device was widely accepted, especially among public transport users and cyclists. They were able to quickly see the related benefits, such as an improvement in bus regularity and traffic congestion. In fact, one of the main purposes of the device is to provide concrete and efficient solutions to traffic problems.

The analysis was very important in identifying new applications for the system. Monitoring of a second bus route using the innovative mobile cameras (number 13, covering via Toscana, Murri, Santo Stefano, Farini, Lame and Saffi) began on 2nd February 2010. During 2010 the areas covered by the system were extended (via Irnerio).

B3 Situation before CIVITAS

Before CIVITAS illegal on-street parking (i.e. double parking) was not efficiently controlled and this phenomenon was highly detrimental to public transport and normal traffic flows. In the context of narrow streets, this attitude needed to be changed to better regulate the normal parking supply and leave the road free for circulation. Traditional enforcement was not enough to eliminate this destructive behaviour. The objective of this Measure was to decrease illegal on-street parking via electronic mobile enforcement, reduce traffic congestion and as a result facilitate road circulation (especially for the public bus fleet).

B4 Actual Implementation of the Measure

The Municipality of Bologna, thanks to a strong support from the institutions, was the first in Italy to adopt the innovative mobile cameras to monitor illegal on-road parking.

The Measure was implemented in the following stages:

Part 1 – System acquisition and installation *(from October 2008 to 2012)*

- The equipment was purchased (2008)
- In January 2011 the Police Department purchased a new SCOUT device with more functions, including extended memory and links to different data bases for cross checks (e.g. stolen cars). This device replaced the previous one, which was given to the local bus operator (ATC/TPER).
- The Municipality of Bologna has decided to expand the SCOUT service and thus bought new equipment and a new detection vehicle (2012).

Part 2 – Enforcement activity *(from October 2008 to 2012)*

- Enforcement activity started on one bus route (number 14: Massarenti, San Vitale, Rizzoli - Ugo Bassi – A. Costa) to detect illegal on-street parking (2008).
- Since February 2010 a second bus route (number 13, covering via Toscana, Murri, Santo Stefano, Farini, Lame and Saffi) has been monitored using the SCOUT device (only one device was in use and it was applied in both the monitored routes).
- Areas controlled by the system were expanded on 1st December 2010 (via Irnerio) due to changes to traffic circulation and road works for a new trolley bus lane.
- Since 9th December 2011, the SCOUT device has been used to monitor the main traffic flow axis to and from the city centre and within the centre itself.

B5 Inter-Relationships with Other Measures

None

C Impact Evaluation Findings

C1 Measurement Methodology

C1.1 Impacts and Indicators

The evaluation strategy for this Measure sought to focus on indicators across the areas of transport and society. These were obtained from the bus operator in Bologna (ATC/TPER) to measure the benefits obtained in public transport regularity (punctuality) and from the automatic enforcement system itself, in order to evaluate the trend of the infringements. The number of infringements can be considered a good 'dummy indicator' for measuring the level of awareness, considering that people are aware when they no longer park illegally.

TABLE C1.1.1: Measure specific indicators

Indicator	Evaluation area	Measure indicator	Impact	Indicator	Source of data
1	Transport	Measure specific indicator	Service reliability	Journey times regularity	Bus control centre
2	Society	Measure specific indicator	Awareness	Number of infringements	Municipal Police

Indicator 1 'Journey times regularity' was measured considering average journey times (routes 13 and 14) during the SCOUT implementation. Data was collected directly via ATC/TPER using the AVM (automatic vehicle monitoring) system.

For this indicator in particular, data was extracted from a selected stretch of the route covered by services 13 and 14, where the SCOUT device is active. The data referred to parts of the route where the great number of infringements was seen in the past.

- Route 13: Via Murri (towards city centre) between Villa Mazzacorati and Porta Santo Stefano bus stops.
- Route 14: Via Costa (towards city centre) between Martini and Costa bus stops.

Frequency: measurements were taken twice a year once the Measure was in force to check on the results. The selected months were January and December, when access to the city centre is normally high). Unit: average journey time and standard deviation (min.sec) for routes 13 and 14. In particular, the standard deviation shows how much variation or 'dispersion' exists from the average. A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data points are spread out over a large range of values. Standard deviation can be considered a valid indicator of the regularity of the service. Domain: journey (routes 13 and 14, all buses) without holidays and excluding Saturdays, Sundays and bank holidays.

Indicator 2 'Number of infringements' was measured by the number of fines (monthly average) issued for different types of illegal on-road parking automatically produced by the SCOUT system. The measure must be considered not only repressive, but above all a way of regulating on-street parking (e.g. facilitating parking for commercial use or next to schools). The automatic enforcement activity started *with* SCOUT, therefore no data for the

'before' situation is available. Moreover, the trend of infringements was evaluated separately for each route, in order to make better considerations.

Frequency: measurements were taken once a year once the Measure was in force to check the results. Unit: monthly average fines for each year. Domain: all SCOUT fines.

C1.2 Establishing a Baseline

Indicator 1 'journey times regularity'. The "before" situation for route 14 is represented by year 2008, when SCOUT was activated.

Considering that SCOUT was also activated in bus route 13 in February 2010, data available from December 2008 to January 2010 represents the base line and the 'before' situation in this case.

As explained before (see C.1.1.), data referred to a selected part of the bus routes 13 and 14 where the SCOUT device was active. The values obtained are not particularly significant by themselves, but the comparison between different time slots is significant.

The standard deviation is particularly important for evaluating journey time gaps between different time slots. A reduction in standard deviation means an increase in regularity.

Indicator 2 'number of infringements' For this specific measure the baseline is the first period after the implementation of the Measure. No real 'before' data is available since the system was not activated before 2008. Before the introduction of SCOUT, drivers were parking illegally on the streets and intervention by police officers was the only measure available. Therefore, baseline data refers to the period from (31/3/2008 to 31/12/2008) for route 14.

As reported above, in February 2010 monitoring using SCOUT was introduced for a second bus route (number 13, covering via Toscana, Murri, Santo Stefano, Farini Lama and Saffi). Consequently data from March-December 2010 can be considered the baseline for the Measure implementation.

C1.3 Building the Business-As-Usual Scenario

At the start of the evaluation process, a 'control routes approach' was taken into consideration to build the business-as-usual scenario for the first indicator, 'journey times regularity'. However, bus routes are not comparable because they vary in terms of street characteristics, traffic conditions and the number of passengers transported. Furthermore, SCOUT is only used in the most problematic parts of the route. For these reasons, the control lines approach was not followed. Otherwise, we can argue that without the implementation of this Measure, the journey time/standard deviation would have stayed at the values seen before SCOUT implementation. The first data available is from 2007, considering that the AVM (Automatic Vehicle Monitoring) system was introduced during 2006 and that this was an experimental year (2006 data is not reliable).

BAU for indicator n. 2, 'number of infringements', was built assuming that the level of infringements recorded in the first few months of implementation was constant.

C2 Measure Results

The results are presented under sub headings corresponding to the areas used for indicators.

C2.1 Economy

Not applicable.

C2.2 Energy

Not applicable.

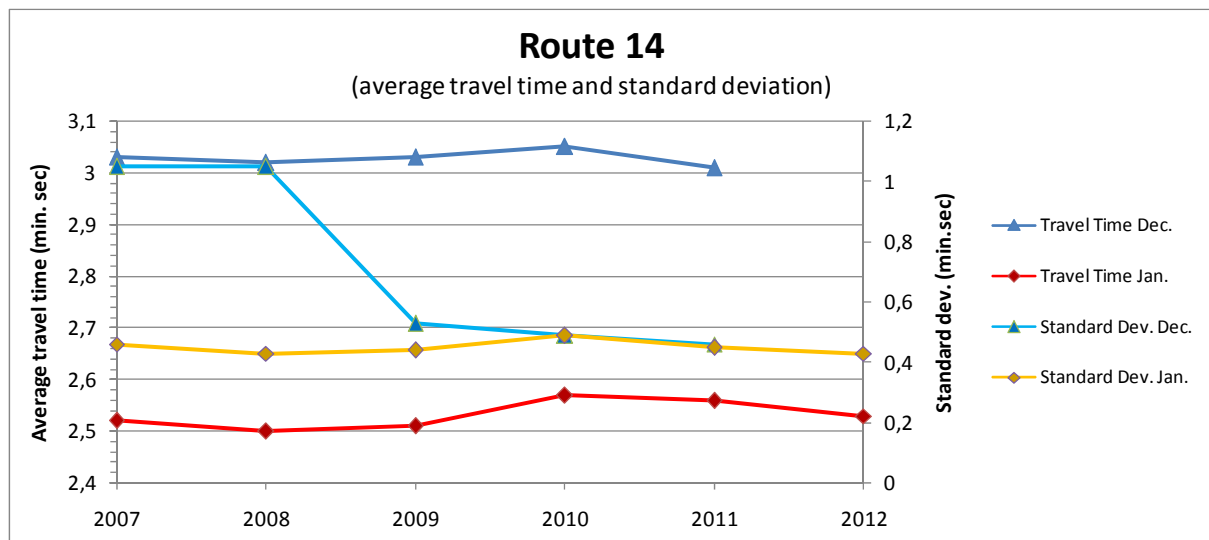
C2.3 Environment

Not applicable.

C2.4 Transport

Indicator 1 'journey times regularity'. Table C.2.4.1 shows results on average journey times and standard deviation for route 14 (SCOUT active since 31/3/2008). After the Measure was implemented, a positive trend was seen for standard deviation, with particular reference to the month of December. During this month both the standard deviation and average journey times were particularly high, probably because of Christmas traffic. This positive trend, first seen in 2007, continued during the following years. Smaller values of standard deviation stress an higher timing of reliability from PT, despite not significant changes in average journey time. This means the public transport before SCOUT implementation was affected by higher vagueness. As results shows the new system halve standard deviation in December, the month with higher traffic congestion problems and improve the regularity of the service also in January.

FIGURE C2.4.1: Indicator 1 'Journey times regularity' - Result - Route 14 (SCOUT active from 31/3/2008), relative table is available in References point (1).

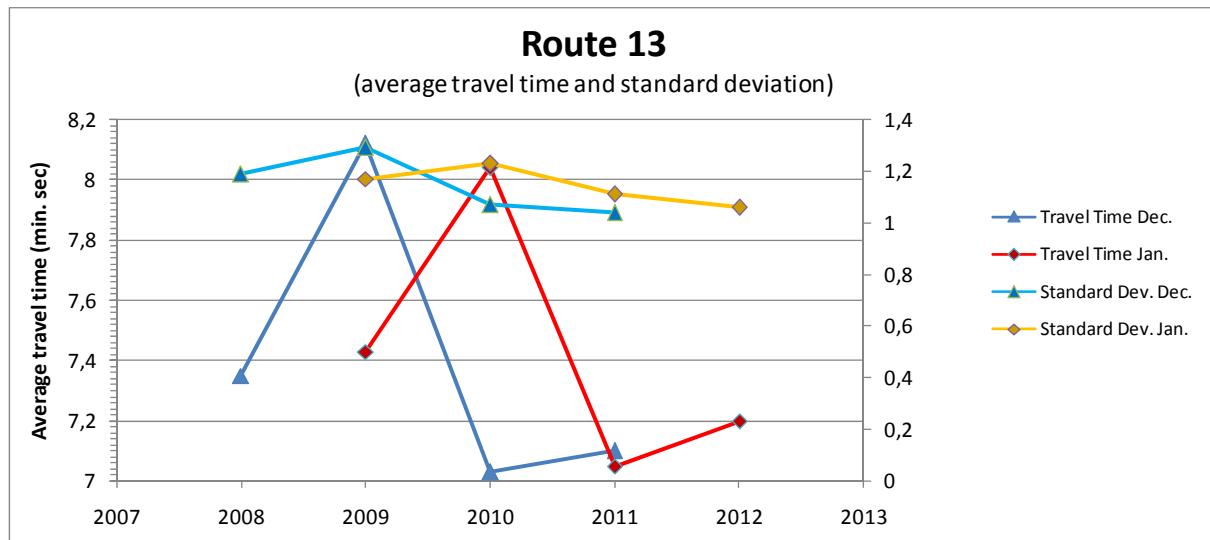


Source: ATC

The data reported below (see table C.2.4.2) shows the 'before situation' for route 13 and the initial data after activation, considering that the system was only implemented in February 2010. The data shows a high instability of standard deviation with the first improvements seen only in recent years.

Results from the second line implementation are not different from the first one. Same consideration could be considered valid: the new tool helped in timing respect reducing standard deviation. Differently from the first, Route 13 has benefit from SCOUT also in time of journey with a 5% of time gained, moreover no sensible differences occurred in travel time between December and January.

FIGURE C2.4.2: Indicator 1 “Accuracy of PT timekeeping” - Result - Route 13 (SCOUT active from February 2010,) relative table is available in References point (2).



Source: ATC

TABLE C2.4.1: Indicator 1 “Accuracy of PT timekeeping” - Transport result: standard dev. (min.sec) - Route 14

Period	Before (2008)	B-A-U (2007)	After (2012)	Difference: After/Before	Difference: After/B-A-U
December	1,05	1,05	0,46	-56%	-56%
January	0,43	0,46	0,43	0%	-6%

Comparisons between before and after data show good results with particular reference to December, when problems were greatest. Such a difference in the two months of evaluation (December and January) can be explained by the presence of the pre-Christmas period, influencing December data, when all Christmas shopping is normally concentrated and traffic increases. Weather conditions do not change significantly between December and January so the main differences are from citizens use of PT and traffic congestion caused by shopping times. The two lines analysed are different: Route 13 is not largely affected by Christmas flows (its travel time remain substantially the same between December and January), as far as Route 14 this is not true. The bus line registered differences in travel time between the two months caused by higher affluence of users during Christmas period.


The measure brought good results mainly during periods of high citizens affluence to city centre and results can be easily observed in regularity of the transport (standard deviation), the average travel time, being an average, is inclined to flatted results (time spot when good results could be observed are the peak hours, they are few compared to all day long).

C2.5 Society

Indicator 2 ‘Number of infringements’ The following table shows the number of infringements taken from the average of fines issued along route 14, by type of infringement committed. There was an initial reduction in all types of illegal on-road parking between 2008 and 2009, as was reported in the RTD analysis. Measure results confirmed that this trend was also followed during the years when the Measure was implemented.

This data indicates that drivers now know about and accept this kind of enforcement and therefore are changing non-correct driving behaviours.

TABLE C2.5.1: Indicator 2 “Number of infringements” - Result by type of fine (monthly average) - Route 14

Type of illegal on-road parking 	Infringements monthly average for 2008 (9 months)	Infringements monthly average for 2009 (12 months)	Infringements monthly average for 2010 (12 months)	Infringements monthly average for 2011 (12 months)	2011 percentage of reduction in comparison with 2008
Sidewalk	121	90	26	24	-80%
Double parking	60	47	21	30	-50%
In the bus lanes	22	10	3	5	-80%
At bus stops	30	23	7	10	-66%
On pedestrian crossings	10	8	3	7	-28%
Too far from the kerb or not parallel to the kerb	5	5	3	4	-22%
In areas where vehicles are prohibited	13	8	5	14	8%
In an intersection	11	8	4	10	-6%
No parking areas (with road sign)	220	190	82	117	-47%
Close to garbage bins	43	35	16	22	-48%
Other	2	2	1	10	400%
Total average	538	425	172	254	-53%

Source: Bologna Police Department

For every year, the most common type of illegal on-road parking was cars left in no-parking areas or in bus lanes, confirming the need to intervene to improve the PT regularity. Measure has highest influence on sidewalk illegal parking, this was one the main problem in Bologna with 121 monthly infringements and table above stresses how measure lowers this value to 24-26 units, which is comparable to the other infringements. Similar considerations could be done for double parking, where the number of infringements was halved. It is difficult to check where the Measure had lower influence considering the few number of fines registered in this categories (with relative high values of percentage variations).

TABLE C2.5.2: Society Results: number of infringements (monthly average) - Route 14



Before (2008) and BAU	After (2011)	Difference: After/Before/BAU
538	254	-52,8%

The total average number of infringements shows a 53% reduction in fines comparing before and after results.

TABLE C2.5.3: Indicator 2 “Number of infringements” - Results (monthly average) - Route 13

Type of illegal on-road parking 	Fines monthly average for 2010 (10 months) (*)	Fines monthly average for 2011 (12 months)
Sidewalk	82	66
Double parking	139	123
In bus lanes	73	66
At bus stops	53	58
At pedestrian crossings	11	17
Too far from the kerb or not parallel to the kerb	12	15
In areas where vehicles are prohibited	2	10
In an intersection	9	15
No parking areas (with road sign)	503	523
Close to garbage bins	94	78
Other	4	17
Total average	981	988

(*) Approx. value

Being the first two years of evaluation, the number of infringements recorded through fines issued along route 13 showed high average values compared with data on route 14, as shown above. Results from Route 13 are not so relevant as the first years of measure implementation on route 14 (comparing the same number of months with a proportion, infringements growth up to 200 fines). Probably the reason is to be found in citizens' behaviour which was influenced by the pre installation of the system on route 14.

TABLE C2.5.4: Indicator 2 “Number of fines” - Society Results: number of fines (monthly average) - Route 13



Before (2010) and BAU	After (2011)	Difference: After/Before and BAU
981	988	0,68%

C3 Achievement of Quantifiable Targets and Objectives

No.	Target	Rating
1	To reduce illegal on-street parking	★★
2	To improvement PT regularity	★
<p>NA = Not Assessed; ○ = Not Achieved; ★ = Substantially achieved (at least 50%)</p> <p>★★ = Achieved in full; ★★★ = Exceeded</p>		

Considering the results of the impact evaluation, the first objective was achieved in full, with a sharp fall in recorded infringements. The achievement of the second objective is less obvious from the evaluation results. The reason is the high instability of the results obtained, caused by the different variables influencing PT regularity: weather conditions, street conditions, general economic situations. The month of December was chosen because of the greater concentration of traffic during the Christmas period. Considering the good results seen in this period, for the route where the greater number of values is available, we can argue that the objective was substantially achieved.

C4 Up-Scaling of Results

Up-scaling this system would consist of applying mobile enforcement cameras more frequently along all arterial roads in the city, producing benefits for public transport. However, it is important to consider both residents' acceptance of this policy and parking supply/demand in neighbouring areas. Following this approach, as reported above, in December 2010 areas controlled by SCOUT were extended to include via Irnerio; since the end of 2011 part of the streets to/from the city centre have been included in the service. Since September 2012 a second SCOUT device has been applied.

Further up-scaling of the system would only be a good opportunity if it were part of a general plan investigating regular and stationary traffic in the considered area.

C5 Appraisal of Evaluation Approach

Monitoring fines made it possible to check sites where non-correct behaviours were concentrated and observe the trends over the years. By observing the fines issued via an automatic system recording all infringements, it was immediately possible to get information on changing driver habits and acceptance of the rules. Unfortunately, no data could have been used to evaluate the 'before' situation because the system was not activated. Perhaps the best way to determine the 'before' data would have been to 'theoretically fine' drivers using the same procedures as for the SCOUT process, without actually issuing the fines. This would have made it possible to collect data on illegal on-street parking without making people aware of it. On the other hand, it does take some time for drivers to realize that they are being fined more often. Therefore we can validate the followed approach.

Standard deviation is the most significant indicator to improve if we are to ameliorate bus reliability. In order to obtain more data for comparison, it might have been possible to introduce other indicators, such as the percentage of services arriving within an interval of planned times. Nevertheless, many external factors influence the results, such as weather

and general traffic conditions. For this reason it is fundamental to wait a sufficient period of time to build a historical series of data.

C6 Summary of Evaluation Results

The key results are as follows:

Key result 1 – Reduction of illegal on-street parking, with reference to all types of infringement (53% between 2008 and 2011).

Key result 2 – Positive results on PT regularity with particular reference to the month of December.

C7 Future Activities Relating to the Measure

Enforcement activity will continue on the routes where monitoring is already active. As a result of the Municipality commitment to provide concrete and efficient solutions to traffic problems, as per 24th September 2012, a second SCOUT device has been introduced. A third SCOUT device will be applied starting from November 2012.

D Process Evaluation Findings

D1 Deviations from the Original Plan

None

D2 Barriers and Drivers

D2.1 Barriers

Implementation barriers

Road works for a new trolley bus route – During the operational phase of this Measure, the Municipality of Bologna began a series of road works for a new trolley bus route. These interventions interfered in many cases with the planned routes.

D2.2 Drivers

Overall Drivers

Residents' acceptance – thanks to awareness campaigns run by the Municipality before SCOUT was introduced and modified, residents accepted the system. This was a fundamental driver, with particular reference to shopkeepers who, understanding the possible advantages, did not impede the development of the Measure.

Strong support through the Mimosa project – guaranteed both by Municipality managers and police department chiefs. The Measure objectives and tools were always taken into consideration by all managers, including new managers appointed during the project. This commitment provided technical and operational offices with effective help for all management activities.

D2.3 Activities

Overall activities

Because the Municipality's new chief of police shared the objectives and tools adopted for the Measure (see the second driver reported above), it was possible to improve the Measure implementation with three activities:

- **The purchase of a new tool** for the system to replace the old one. The SCOUT device was replaced in January 2011 with a new tool with more capacity and features, including an extended memory and links to other data bases).
- **The service was strengthened by purchasing an additional device and a new vehicle.**
- **The extension of the areas controlled by SCOUT**, facing the obstacles represented by road works (see the barrier presented above). First a second bus route was included in the service, then via Irnerio street and lastly the city centre.

D3 Participation

D3.1 Measure Partners

The Municipality of Bologna– COBO. Municipality technicians were involved in the project and validation activities, while the municipal police issued fines and collected data.

The public transport company ATC (renamed **TPER** in February 2012) contributed to planning activities, to data collection on PT timekeeping, one of the main beneficiaries of the Measure.

D3.2 Stakeholders

Car drivers/motorists who had to change their behaviour and have greater respect for driving rules and other road users – not only other drivers but also pedestrians and cyclists. Illegal on-street parking (i.e. double parking) was particularly detrimental to public transport and ordinary circulation. The Municipality provided several public pay-parking areas so that drivers could leave their cars and access shops in the city centre.

Public transport users who benefitted from a more reliable public transport service, unhindered by private cars left along transport routes.

Cycle/walking groups who benefitted from less congested streets.

D4 Recommendations

D4.1 Recommendations: Measure Replication

To communicate the new technological features and rules: although the system punishes illegal behaviours, it is essential to invest in awareness campaigns to explain that the measure is not only repressive but above all it is a way to regulate on-street parking (e.g. facilitating parking for commercial use or next to schools) and more generally to reduce traffic congestion. This is essential to obtain the co-operation of residents and to see good results.

To balance and preserve all interests involved. This means both investigating changing characteristics of the area during the year (e.g. during Christmas or the summer) and facilitating mobility for residents. Therefore residents must profit from authorized parking areas and from an efficient PT service.

D4.2 Recommendations: Process (Related to Barrier-, Driver- and Action Fields)

Shared interests between headquarters: Achieving the Measure objectives is closely dependent on political will. Local government commitment is decisive for the success of a measure that introduces potentially unpopular tools.

To proceed step by step: the success of the Measure also depends on a planned implementation process. Firstly, system testing must show achievable benefits for public transport and traffic congestion thanks to a reduction in illegal parking. Secondly, the system must be applied in an initial area, with extensive awareness campaigns. Only after obtaining and sharing the results from the initial area is it possible to enlarge the area controlled by the system.

To invest in a skilled team: with reference to the police officers involved in the operational activities, the Municipality of Bologna decided to create a skilled specialist team to take charge of monitoring. The team had the sensitivity required to manage the process and punish illegal behaviours, respecting the rules communicated before the service was active.

F Annex

(1) TABLE F1: Indicator 1 "Journey times regularity" - Result - Route 14 (SCOUT active from 31/3/2008)

Period	Average journey time (min.sec)	Standard deviation (min.sec)
December-07	3.03	1.05
December-08	3.02	1.05
December-09	3.03	0.53
December 10	3.05	0.49
December -11	3.01	0.46
January-07	2.52	0.46
January 08	2.5	0.43
January-09	2.51	0.44
January-10	2.57	0.49
January -11	2.56	0.45
January -12	2.53	0.43

Source: ATC

(2) TABLE F2: Indicator 1 "Accuracy of PT timekeeping" - Result - Route 13 (SCOUT active from February 2010)

Period	Average journey time (min.sec)	Standard deviation (min.sec)
December-08	7.35	1.19
December-09	8.12	1.29
December 10	7.03	1.07
December -11	7.10	1.04
January-09	7.43	1.17
January-10	8.04	1.23
January-11	7.05	1.11
January-12	7.20	1.06

Source: ATC