ENERQI

energy efficiency by using daily customers' quality observations to improve public transport

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Deliverable 2.1
State of the Art Report

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Start date of the action:	**29th of May 2010**	**Project website:**
End date of the action:	**28th of May 2013**	**http://www.enerqi-online.eu**
Duration:	**36 months**	

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PUBLISHABLE SUMMARY OF THE SURVEY OF METHODOLOGIES IN ENERQI

Purpose of this report

ENERQI is a European project, aiming to reduce fuel consumption and the related environmental impacts in the passenger transportation industry, by increasing the usage of public transport and reducing the usage of private cars. The basic philosophy of ENERQI is that an increase in public transport usage can be achieved if the Public Transport (PT) quality of services is improved and this is recognized and acknowledged by passenger's satisfaction. To prove this, a (common) methodology for "real time" monitoring PT quality and passenger satisfaction in several EU countries will be developed in ENERQI.

As a first step in the development of a common ENERQI methodology, this "state of the art report on best practices" has been made, with regard to measuring PT quality and customer satisfaction in Europe and the world today.

How was the review carried out

Best practices found in the *literature* on customers satisfaction surveys in 48 different mostly European sources and on the *internet* were analysed. For example the European BEST and QUATTRO projects provided valuable information. In addition to this, *case studies* from 12 European countries related to the (quality of) public transport systems where examined (Austria, Belgium, Bulgaria, Finland, France, Ireland, Greece, Luxembourg, the Netherlands, Portugal, Romania and the UK).

Customers satisfaction surveys: how to apply the theory to ENERQI

First of all, if we look at the theory behind customers satisfaction surveys, we can distinguish many different types of survey methods, design specifications, (key) indicators, types of data collection, scales but in general we can say that a distinction can be made between:

- *Qualitative research:* in which data is obtained from a relatively small group of respondents and not analyzed with statistical techniques.
- *Quantitative research:* which typically involves the construction of questionnaires and scales and utilizes statistical techniques.

and, if based on observations, between:

- *Observational techniques:* the researcher observes phenomena in their natural setting.
- *Experimental techniques:* the researcher creates artificial environment.

In the context of ENERQI , where we want to set up real time monitoring, a quantitative observed "attitude measurement" seems to be most suitable for measuring passenger satisfaction. The "passenger satisfaction indicators" that should be or that are usually measured are: availability, accessibility, reliability & time, price, information, customer support, comfort, safety, environment, and their lower level components.

Best practices as found in the literature on customers satisfaction surveys in 48 different mostly European sources and on the internet underpin this recommendation. For instance in QUATTRO project the transport quality factors are determined and analyzed hierarchically. Also a quality loop concept is presented combining: service quality targeted and delivered by the service provider, with service quality sought and perceived by the customer.

European Quality Standard EN13816

The findings of QUATTRO lead to the development of the European Standard EN 13816:2002 "Transportation – Logistics and services – Public Passenger transport – Service quality definition, targeting and measurement" which *defines service quality, targets and measurement guidance*. The main purpose of the standard is to promote a quality approach to public transport operations and focus interest on customers' needs and expectations, by specifying procedures most likely to:

- draw the attention of the responsible parties to matters to be considered;
- lead to relevant and well-founded decisions particularly with regard to the allocation of responsibilities;
- enable customers, and others, to compare service quality claims from alternative suppliers, reliably;
- contribute to the implementation of a process of continuous improvement.

> Many customers satisfaction surveys make use of this standard and also ENERQI will be built upon this EN 13816 standard.

BEST Project

In the BEST project, a standard PT survey is conducted every year since 2001 in a number of European cities, thus providing a database for the estimation of PT service quality and passenger satisfaction. This information is also used for in depth research and study of the elements of quality and passenger satisfaction and their relation to the local conditions of every city where the services take place.

> BEST mentions four new composite indicator, not included in the EN 13816 standard: overall citizens satisfaction, value for money, social image and loyalty of the customer. In the ENERQI methodology these four indicators will be taken into considerations.

Benchmarking

Other projects furthermore showed that benchmarking is an important tool. Certainly if it is incorporated in the management structure, the organization of Public Transport.

> It is useful to identify own strengths and weaknesses and as such it contributes to a long lasting strive to improve the performance. Therefore within ENERQI benchmarking will get a prominent place.

Results from 12 EU case studies carried out by ENERQI partners

In addition to the best practices found in the literature within ENERQI the cases of public transport systems which refer to 12 European countries: Austria, Belgium, Bulgaria, Finland, France, Ireland, Greece, Luxembourg, the Netherlands, Portugal, Romania and UK where examined. The population and area sizes of the cities and districts to which the PT systems refer, vary from a minimum population of ~ 80.000 people to a maximum population of ~ 4 million people and from an area of ~ 20 sq km to over 13.000 sq km. The PT systems in the areas examined cover all the range of PT modes, from suburban rail and train, to metro, tram, light rail, bus, trolleybus, microbus, on demand services and ferries. Nine of the examined cases refer to public PT systems and six refer to private PT operators. The PT share varies from small percentages in the regions (4-15%) to high percentages in the city centers (35-50%). In almost all of the examined cases there is a strategic or business plan which sets the vision and targets of the PT organization. The big variation observed in the components of the cases examined, showed that the issue of quality and passenger satisfaction in PT systems is complex and also that it is rather difficult to use it as a general approach for dealing with Energy and Environmental issues in a uniform way.

Based on the analysis of above mentioned cases, it proved essential for the purposes of quality improvement to:
- highlight the importance of having all the activities related to quality management, collected in one operational unit,
- allocate PT contracts to operators with the quality of the services being incorporated in the contract,
- relate quality certification of PT authorities and operators to pre defined Customer Charters,
- financially reward PT operators if they meet or surpass certain quality criteria which are included in the tender documents

In addition to this, and most relevant for the development of the common ENERQI methodology, analysis of the case studies from exiting European schemes showed that ENERQI should:

- make use of a "Barometer" type of presentation and monitoring, because it offers flexibility and speed in responding to issues raised by costumers,
- make use of innovative methodologies for monitoring PT quality for example through an internet survey based system,
- make use of volunteers who observe quality aspects on a regular basis,
- manage the way observations will be done to counteract the risk of only getting complaints or observations of incidents/incidental situatons.

Common elements from existing methodologies

There are a number of methodologies for quality management or passenger satisfaction measurement reported in the examined cases which cover the needs of specific organizations. All methodologies include common elements which can be roughly described as follows:

1. Determination of the indicators which better describe the level of quality in the PT system;
2. Collection of data related to the selected indicators;
3. Analysis of the collected data and estimation of the quality level;
4. Development of action plans for the improvement of the quality level;
5. Implementation of action plans for the improvement of the quality level;
6. Increase the customer satisfaction and the PT usage;
7. Collection of data related to the selected indicators to evaluate the success of the implemented actions.

The ENERQI quality loop incorporates all the above elements. It starts with setting of the desired quality level of public transport system. Periodic (monthly) collection of data for the key performance indicators is done through suitable observations; the information is input via internet application and stored to a central database. Quarterly reports are then produced identifying weaknesses and suggesting recommendations for improvement. The suggestions are transformed to quality improvement actions which lead to meeting or improving the desired quality level of service. The passenger receives better quality of services, which leads to higher satisfaction levels and this in turn leads to increase in public transport usage.

Figure: ENERQI Quality Loop

The ENERQI Quality Loop

<u>Lessons learned - recommendations</u>

The way the observations should be done is still open and will be determined in the next phase of the project. Based on the research, it is recommended to make use of *passenger surveys*. Additional mystery shoppers and direct performance measurements can be done.

The set of indicators to observe will be a *subset of the EN 13816:2002 certification*, because this is a basic reference point in many situations and it is thus recommended for all PT services

In terms of frequency the annual measurement is appropriate for reporting purposes, but *shorter intervals* are more useful for flexible quality responses to everyday challenges.

The *direct availability of survey results* to all employees in an organization means more awareness and consequently direct involvement of the personnel in the continuous effort for quality operations.

The size of the PT system surveyed is important for the formulation of the cost of the quality and customer satisfaction measurement.

The use of internet and mobile telephony and the extreme possibilities they offer for information spreading, communication and tele-working, gives great opportunities to lower the cost of quality management measures and at the same time increase speed and accuracy of the results. In the field of public transportation it seems that there is a lot to be gained by *exploiting the opportunities offered in the domain of contemporary technology* availability.

1   INTRODUCTION

1.1   The ENERQI Project – Brief Description and Objectives

ENERQI is a European project aiming to reduce fuel consumption and the related environmental impacts by increasing the usage of public transport and by consequently reducing the usage of private cars. This will be achieved if Public Transport (PT) quality of services will be improved coupled with passenger satisfaction.

To increase the usage of public transport a lot of work is usually put into the renewal of the public transport systems mostly resulting in new bus, tram or metro lines, new vehicles, changes in schedules and so on. Not always are the needs and expectations of the customers fully taken into account. To cope with this shortcoming, quality monitoring systems are being developed and implemented throughout Europe. Yet, it is often that European countries may implement quality monitoring without consulting or taking into consideration the results achieved in other European countries.

Most of these quality monitoring systems capture only indirectly or with large intervals the perceived customer quality. Quality expectations and needs of non-users are in general not considered. The extracted management information for decision making in relation to public transport quality improvements is poor. Surprisingly, the use of new technologies, like internet, monitoring software, databases and new customer involvement techniques is hardly taking place. These new, but already proven, technologies allow taking into account the real perceived customer quality on an almost continuous basis.

ENERQI will develop a common methodology for monitoring PT quality and passenger satisfaction by taking stock of all the existing monitoring schemes, through a survey of state of the art best practices in Europe and the world today.

ENERQI aims to disseminate gathered good practice quality monitoring throughout Europe. The setting up of a common framework will allow each urban public transport network to have a quality monitoring system adapted to the local context. Quality monitoring that allows for a real customer oriented feedback on public transport improvements.

For this, a monitoring system will be developed based on all the existing schemes in which the quality of public transport is monitored on a regular basis by the customers themselves. This makes it possible to use the monitoring system as a management tool for demand driven quality improvement, instead of the most used supply driven improvement programs.

The main goal of the ENERQI project is: learning by doing and learning by exchanging experiences about the customers' needs and expectations between public transport operators, authorities, passenger organizations and energy agencies in the participating

countries. Exchanges between the partners of the ENERQI project is a gateway for the dissemination to all local urban public transport stakeholders in Europe. [1]

1.2 State of the Art Report on Quality Monitoring and Passenger Satisfaction

The present state of the art report of ENERQI project, consists of an in depth literature and internet survey identifying and collecting existing methodologies and best practices for monitoring passenger needs and satisfaction in public transport services (public bus, metro, light rail etc). This inventory takes into account the actual state of the art and foreseen developments in the near future.

The inventory is based on the collection of existing methodologies and best practices in relation to Quality Monitoring systems of passenger satisfaction, used indicators, energy saving and emission reduction, and citizens' and users' involvement, internationally, at the EU level (considering both legislation and EU projects) and within the individual member states.

All ENERQI partners have contributed to this task with their own experiences on relevant methodologies. Knowledge obtained through consultation of their sector contacts and though their membership of the different European networks has been brought to the project. The participating public transport operators and authorities hold leading positions in the different European and national public transport associations, e.g. CARRIS is member of UITP's bus committee, Tisséo holds management positions in the European transport authority association POLIS and the GART. The participating public transport operator of East Brabant, ARRIVA is member of the ARRIVA Group, responsible for the transport of 1 billion of public transport passengers annually and represented in 12 countries. POLIS and its members hold a large collection of data on previous EU projects and results.

The information gathered has been grouped, analyzed and will be available for use as an essential input of ideas in the design, evaluation and dissemination of the common "Quality Monitoring and Improvement Methodology", in the context of ENERQI project. [2]

The report consists of 5 chapters, the first one being the present Introduction. In the following Chapter 2, a brief description is given of the marketing practices in Public Transport, as a preamble to the following literature and best practices survey.

In Chapter 3, two significant projects related to the measurement of PT quality and Passenger Satisfaction measurement are presented: QUATTRO and BEST. In QUATTRO the transport quality factors are determined and analyzed hierarchically. Also the quality loop

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[1] ENERQI, ANNEX I –Detailed description of the action, Part B page 3 of 73

[2] ENERQI, ANNEX I – Detailed description of the action, Part B page 26-29 of 73

concept is presented combining service quality targeted and delivered by the service provider with service quality sought and perceived by the customer. The findings of QUATTRO program mainly contributed to the development of the European Standard EN 13816:2002 which defines service quality, targets and measurement guidance. The standard is also presented briefly in this Chapter. In BEST program, a standard survey is conducted every year since 2001 in a number of European city operators, thus providing a database for the estimation of PT service quality and passenger satisfaction. This information is also used for in depth research and study of the elements of quality and passenger satisfaction and their relation to the local conditions of every city where the services take place.

In Chapter 4, the information collected through an internal ENERQI template survey, regarding quality management methodologies applied between the project partners is presented. The information comes from the members of the ENERQI project and basically presents own experience of the PT authorities or operators in European cities or districts. The elements of these surveys are grouped and cross analyzed in order to distinguish state of the art methodologies and best practices, to be used for the development of the ENERQI common methodology.

In Chapter 5, the main findings and conclusions of the survey are presented together with recommendations to be taken into account in the design of the common ENERQI methodology.

2   MARKETING APPLICATIONS IN TRANSPORTATION (PREAMBLE)

"Marketing in Public Transport is selling a full package of services - not only tickets – and this is requiring specific techniques and abilities". The trends of prevailing marketing practices during the past decades evolved according to the following patterns: In the 60's the trend was that "employees are creative personalities who can be stimulated by open minded management". In the 70's the concept of "strategic planning" prevailed. In the 80's the theory of "perfection and quality" emerged. In the 90's the theory of "client orientation" was developed. All of these approaches are still valid today and they are combined according to the requirements of any given specific situation.[3]

At present, in all kinds of business sectors, customer-centric, customer demand-oriented, improving customer satisfaction and loyalty management concepts are becoming the mainstream ideology, making customers the deciding factor for the survival and development of enterprises.

Scholars as well as professionals have conducted substantial research on the theories of customer satisfaction. A number of countries and regions have established customer satisfaction index models successively, and launched customer satisfaction measurement methodologies for various types of enterprises.

Quality is the soul of transit enterprises which provide travel services. In order to maximize the number of transit passengers and improve the perceived service quality, it is obvious that the pursuit of passenger satisfaction is an active and effective mean.

2.1   Marketing of Transport Services

Marketing is a whole business philosophy and process of satisfying needs; it is not just selling and advertising[4]. In the last decade, given the high and increasing levels of competition and the increasing demand for quality attributes, transport operators started adopting marketing principles to create more successful service companies.

Transit marketing can be a complex, multi-disciplinary undertaking. The development of more comprehensive marketing and branding programs involves many procedures among traditionally unrelated fields (e.g. consumer marketing, graphic design and transportation planning). While creating an identity or brand is a collaborative effort that brings together experts from these fields along with stakeholders (riders and potential riders), some tensions

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[3] Eng. Doina Anastase, Projects Manager, URTP, Romania, ENERQI partner

[4] Russell-Jones and Fletcher, 1999

or process obstacles may occur. Indeed, the multidisciplinary nature of such an exercise can make an already difficult process more challenging.

The fundamentals of marketing are: Offer the right product, to target customers, at a price which is acceptable, based on *their* perception of quality vs. value, at a cost that allows profitability. In this framework, a specific process (marketing process) is followed.

Situation Analysis
- Identify current position (research), capabilities, objectives and constraints

Market Segmentation
- Identify the segmentation variables and segment the markets (research)
- Develop profiles for each segment

Market Targeting
- Evaluate the potential and attractiveness of each segment
- Select the target segments

Market Positioning
- Identify positioning concepts for each target segment
- Select and develop the appropriate positioning concepts

The Marketing Mix
- Develop the marketing mix:

*Four **P**'s*	*vs.*	*Four **C**'s*
Product		**C**ustomer needs and wants
Price		**C**ost to customer
Place		**C**onvenience
Promotion		**C**ommunications

Through marketing theory and practice, market segmentation proved to be the first most important step. Market segmentation is basically the identification of distinct groups of customers for marketing purposes; if performed successfully provides valuable input to final company's strategy, linking research on different needs, attitudes and patterns of behavior with company's products and targets. That in the case of transit companies is linking different passenger's categories needs with transport services.

Obviously research plays the lead role in market segmentation.

2.2 Transport Marketing Research

Marketing research is the function that links an organization to its market through information. This information is used to identify and define marketing opportunities and problems; generate, refine and evaluate marketing actions; monitor marketing performance; and improve the understanding of marketing as a process.

Marketing research specifies the information required to address these issues; designs the method for collecting information; manages and implements the data collection process; interprets the results; and communicates the findings and their implications[5].

Methodologically, marketing research uses the following types of research methods[6]:

Based on questioning:

- *Qualitative marketing research:* is a set of research techniques, used in marketing and the social sciences, in which data are obtained from a relatively small group of respondents and not analyzed with statistical techniques. This differentiates it from quantitative research in which a large group of respondents provides data that is statistically analyzed. Examples include: in-depth interviews, focus groups and projective techniques.
- *Quantitative marketing research:* is a social research method that utilizes statistical techniques. It typically involves the construction of questionnaires and scales. Large numbers of people are contacted, usually in a survey. Marketers use the information so obtained to craft strategies and marketing plans. Examples include: Surveys and Questionnaires. Techniques include: Attitude Ratings (importance and satisfaction), Conjoint Analysis/ Stated Preference, Priority Evaluation, Revealed Preference, Willingness to Pay etc.

Based on observations:

- *Observational techniques:* the researcher observes social phenomena in their natural setting - observations can occur cross-sectionally (observations made at one time) or longitudinally (observations occur over several time-periods). Examples include product-use analysis.
- *Experimental techniques:* the researcher creates a quasi-artificial environment to try to control spurious factors, then manipulates at least one of the variables. Examples include test markets.

Transport researchers tend to use methods based on questioning (qualitative and/or quantitative).

2.2.1 *Qualitative Research Methods*

Qualitative research methods are used primarily as a prelude to quantitative research. They are used to define a problem, generate hypotheses, identify determinants, and develop quantitative research designs. They are inexpensive and fast. Because of the low number of respondents involved, these exploratory research methods cannot be used to generalize to the whole population. They are however, very valuable for exploring an issue and are used by almost all researchers. They can be better than quantitative research at probing below the surface for affective drives and subconscious motivations.

Most qualitative methods use a direct approach: they clearly disclose the purpose of the study and the organization that commissioned it. Questions are direct and to the point. Other qualitative techniques use an indirect approach. The true intent of the research is disguised, either by claiming a false purpose or by omitting any reference to the study's purpose.

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[5] American Marketing Association

[6] Malhotra N., 2006

The main types of qualitative research methods, used in transport marketing research, are: in-depth interviews and focus groups. Their main characteristics, appropriateness, strengths and disadvantages, are presented below.

2.2.1.1 In-depth Interviews

Main Characteristics

In-depth interviews are one of the most common qualitative methods. One reason for their popularity is that they are very effective in giving a human face to research issues. In-depth interviews are usually conducted face-to-face; they involve one interviewer and one participant and last between 30 and 60 minutes.

Appropriateness

Appropriate for in-depth probing of personal opinions, beliefs, and values as well as for addressing sensitive topics.

Strengths of method

The primary advantage of in-depth interviews is that they provide much more detailed information than what is available through other data collection methods, such as surveys.

They also may provide a more relaxed atmosphere in which to collect information— people may feel more comfortable having a conversation with you about their program as opposed to filling out a survey.

Shortcomings of method

The main disadvantage of this method is the existence of various types of bias. Interviewer as well as participants can be biased due to their stake in the program or for a number of other reasons.

This method is time-intensive. Interviews can be a time-intensive evaluation activity because of the time it takes to conduct interviews, transcribe them, and analyze the results. In planning data collection effort, care must be taken to include time for transcription and analysis of this detailed data.

Finally, it cannot be generalized. When in-depth interviews are conducted, generalizations about the results are usually not able to be made because small samples are chosen and random sampling methods are not used. In-depth interviews however, provide valuable information for programs, particularly when supplementing other methods of data collection. It should be noted that the general rule on sample size for interviews is that when the same stories, themes, issues, and topics are emerging from the interviewees, then a sufficient sample size has been reached.

Data collection

Interview data consist of tape recordings, typed transcripts of tape recordings, and the interviewer's notes. Notes may document observations about the interview content, the participant, and the context.

2.2.1.2 Focus Groups

<u>Main Characteristics</u>

Ideally a focus group should contain between six and eight people, anymore and you will not get enough detailed information from each person. It is generally a good idea to run two focus groups for each item. This is to protect against such issues as group think, where the results from a group might not be fully accurate.

A skilled moderator is crucial. The moderator needs to make sure that the conversation in a group is free flowing and has a natural tone while at the same time keeping the discussion on track and on issue. The moderator must also prevent individuals from dominating a group and ensure that all participants are involved and contribute equally.

Focus groups usually last for 1 to 2 hours, are recorder on video and the room usually has a large window with one-way glass (participants cannot see out, but the researchers can see in).

<u>Appropriateness</u>

Most appropriate for identifying group norms, eliciting opinions about group norms and discovering variety within a population.

<u>Strengths of method</u>

They gather good data on emotive issues as people are quite willing to give their opinions and impressions of items. They will allow you to develop an appropriate presentation through pointing out what things work or don't work for users. It can also be helpful to show groups several different designs in order to facilitate conversation on what it is they are looking for in a design.

Used early in the design process focus groups are also useful at gathering user requirements. People can talk about their expectations for a product/service. They also discuss similar products/services which have worked for them in the past and those which have not, allowing you to see which designs and functions are the most effective. This valuable information is then fed into the design process to ensure the production/application of an end product/service which people will want to use.

<u>Shortcomings of method</u>

There are however limitations to using focus groups. The main issue being that, in focus groups you learn what people say they do or think not what they actually do or think.

A major issue with focus groups is that there is the possibility of group thinking i.e. people expressing an opinion which is in line with the rest of the group even if that opinion is at odds with their own personal one. Another possibility is that one or two individuals will come to dominate the group, creating an inaccurate view of what users' overall opinions are. Because of these issues it is essential to have a skilled moderator carry out all focus groups.

Data collection

Same as in in-depth interviews.

2.2.2 Quantitative Research Methods

If quantitative marketing research is carried out correctly, both descriptive and inferential statistical techniques can be used to analyze data and draw conclusions. It involves a large number of respondents, tests of a specific hypothesis, and the use of random sampling techniques to enable inference from the sample to the population.

The general procedure followed in quantitative methods includes the following steps:

- **Problem audit and problem definition**: What is the problem? What are the various aspects of the problem? What information is needed?
- **Conceptualization and operationalisation**: How exactly do we define the concepts involved? How do we translate these concepts into observable and measurable behaviors?
- **Hypothesis specification**: What claim(s) do we want to test?
- **Question specification**: What questions to ask? In what order?
- **Sampling design specification**: What is the total population? What sample size is necessary for this population? What sampling method to use (cluster sampling, stratified sampling, simple random sampling, multistage sampling, systematic sampling, non-probability sampling)?
- **Research design specification**: What type of methodology to use?
- **Measurement / Scale specification**: How will preferences be rated?
- **Data type & data collection process**: primary or secondary data, in direct collection of primary data how to contact people (use mail, telephone, internet, mall intercepts)?
- **Codification and re-specification**: Make adjustments to the raw data so it is compatible with statistical techniques and with the objectives of the research (assigning numbers, consistency checks, substitutions, deletions, weighting, dummy variables, scale transformations, scale standardization).
- **Statistical analysis**: Perform various descriptive and inferential techniques on the raw data. Make inferences from the sample to the whole population. Test the results for statistical significance.
- **Interpret and integrate findings**: What do the results mean? What conclusions can be drawn? How do these findings relate to similar research?

Quantitative research "key" steps are: research design specification, measurement specification and data type. These are the steps that directly concern the interaction between the researcher and the customers.

2.2.2.1 Research Design Specification

Measuring individuals' value is difficult for most types of products; for transport services is a significant challenge since these values will be used for setting transport priorities and policies. Usually two approaches/ techniques are widely used: measurement of "attitudes"

using ranking and rating questions versus measurement of "preferences" using conjoint analysis methods i.e. Stated Preference, Priority Evaluation, Revealed Preference, Willingness to Pay etc. These methods are presented below.

A. Attitude ratings

As said above, understanding the public's attitudes, perceptions and knowledge in relation to transport services is important for the formulation and monitoring of transport policies.

Through attitude surveys, three main aspects are covered:
(a)   Knowledge aspect
      Awareness of existence of product/ service
      Perceptions of characteristics
(b)   Affective or liking aspect
      Overall feelings (satisfaction)/ preferences
      "Part-Worth" utilities
(c)   Intention
      Future behavior
      Ability and willingness to pay or spent time

For attitudinal questions it is probably the comprehension phase of the cognitive process that is the most difficult. The question designer needs to make sure that each respondent is considering the same topic and understanding it in the same way as all the other respondents. The temptation is to put in more words of explanation in order to make the meaning more clear. However, longer question wording means more work is necessary to understand it, especially in a telephone interview.

Common problems of the method:
•   The respondent may not have a ready-made opinion on the topic, so that the judgment phase of the process becomes laborious. This is where the difficulty of the "don't know" or "no opinion" response category arises.
•   The problem of the neutral opinion, particularly if the scale of attitudes ranges between positive and negative.

Some believe that the best advice is to include a neutral opinion, where it is relevant, as well as a "no opinion" option to separate the "don't knows" from those who were just about satisfied. In these cases it is useful to help the respondent build a model for processing their answers by using a regular table presentation (in self-completion modes) or repeating a regular phrasing pattern in verbal interviews. However, by doing this there is always a danger of respondents getting lazy and always ticking the same box in the pattern without thinking enough about the question, it may be advisable to vary the sense of some individual questions so that genuinely consistent answers do not fit a simple pattern in the table.

Finally on attitude scales, care should be taken not to include too many scale points which increase the stress on the respondent, and to label all the scale points meaningfully (not just the two extremes). *More details on ratings, scales and measurement are presented in section 3.2.2.2 later in this report.*

B. <u>Stated Preference (SP)</u>

SP analysis is based on mathematical models of decision making and the theory of discrete-choice analysis (Ben-Akiva and Lerman, 1985). This theory assumes that when presented with a set of options, people are able to calculate some metric of preference or utility for each option under consideration and will choose the option that they perceive to offer the highest utility.

SP methods have been used extensively in transport research both for demand forecasting purposes and to value the importance attached to different product features and travel attributes. As it concerns the latter mentioned, SP can be very helpful in determining what combination of a limited number of "transport attributes" is most influential on respondent (passengers') choice. In this framework, SP essential features are:

(a)   Passengers are offered hypothetical alternatives to evaluate.
(b)   The alternatives are characterized by a range of (precisely defined) attributes.
(c)   Trade-offs between attributes are an essential feature of the scenarios being evaluated.
(d)   The responses supplied yield information on the relative importance of the attributes being considered.
(e)   A series of situations are offered for evaluation.

The evaluation (response scale) can be: choice, ranking, metric rating, semantic rating. *More details on ratings, scales and measurement are presented in section 2.2.2.2 later in this report.*

<u>Strengths of method</u>

- estimates psychological tradeoffs that passengers' make when evaluating several attributes together
- measures preferences at the individual level
- uncovers real or hidden drivers which may not be apparent to the respondent themselves
- realistic choice or shopping task
- able to use physical objects
- if appropriately designed, the ability to model interactions between attributes can be used to develop needs based segmentation

<u>Shortcomings of method</u>

- Complex
- If too many options, respondents resort to simplification strategies
- Non-commitment bias
    - Affirmation bias
    - Justification bias « cognitive dissonance »
    - Habit
    - Strategic or policy responses bias
    - Protest bias
    - Socially unacceptable or "politically incorrect" answers – social norm bias
    - Focus bias
    - Attribute variations too small or unrealistic – ignored
    - Unfamiliarity

Regardless the aforementioned shortcomings, in transport marketing research, SP is claimed to perform well.

C. Priority evaluation

The priority evaluation method (also known as the priority-evaluation technique) is based on the simulation of choices in a market, and usually involves the use of social surveys to collect information.

A broad distinction can be drawn between the use of the method to identify preferences and use to measure behavioral responses. The priority evaluation technique mainly applies to the former scenario, and is designed around the identification of a set of attributes, each with a hypothetical value, and asked to rank attributes according to their importance. Values are then derived, according to the preferences given by respondents.

Strengths of method

The main strength of the approach is in providing a scientific basis and a comparable scale to evaluate aspects of the current situation against an ideal scenario, and to assess preferences. Obviously, this is important since without such an approach assessment of social, developmental or environmental conditions becomes highly subjective.

Shortcomings of method

The main difficulties are in the application of the method. There is a need to identify values to several sets of choices to obtain the values, and this can be problematic. For instance in the example used on childcare, some parents may wish to reduce the amount of childcare received and so improvements would save points in this situation. The analysis also relies on statistical analysis of the results and this makes it less attractive than other techniques (for example, Stated Preferences technique).

Because it is based on the use of surveys of respondents, the method is also relatively costly and subject to sample bias issues, and design bias. In particular, where the respondent is prejudiced by the proposed approximate value allocated, or where there is inadequate detail on the effects discussed and or misleading statements. There is also potential for hypothetical bias where the decision posed in the question does not involve real market behavior and there is no real incentive to think about and give answers that reflect their valuation. In some instances, for example in relation to environmental amenity, respondents may have imperfect information and a lack of experience of the impact on the utility being offered to them.

D. Revealed Preference (RP)

Revealed preference theory is a method by which it is possible to discern consumer behavior on the basis of variable prices and incomes (Samuelson, 1938). A consumer with a given income will buy a mixture of products; as his income changes, the mixture of goods and services will also change. It is assumed that the consumer will never select a combination which is more expensive than that which was previously chosen. Revealed preference theory deliberately ignores measures of utility and indifference. An empirical utility theory, it superseded cardinal utility in consumer theory.

There are two forms of RP used in transport, both concerned with explaining response (behavior) in terms of stimuli.

- Analysis of actual choices i.e. modal shares
- Analysis of revenue or trips

The main advantage of revealed-preference methods over stated preference methods is that they are based on people's actual behavior.

E. Willingness to Pay (WTP)

Many researchers prefer WTP rather than demand forecasts, since it can provide direct information on:
- How much to charge for product
- How much willing to pay for improvement
- Effect of price on demand
- Consumer surplus

Two methods are widely used in transport research.
(a) Transfer price
    Transfer price is just asking the following question: *How much more would you be prepared to pay on [your current mode] before you switched to travel by [alternative mode].*

    It can be expressed in time terms as well.

    Strengths of method

    - Direct measure of consumer surplus
    - Transfer price increase and decrease ought to be same if:
      - Small income effect implied
      - Compensatory utility maximization
    - Can identify asymmetries in behavior
    - Transfer times not necessarily the same
    - Can deduce individual's entire demand function with respect to price

    Shortcomings of method

    - Hard question to answer
    - Strategic bias – nothing in return for price change

(b) Contingent valuation method (CVM):
    - Related willingness to pay technique (but get a benefit)
    - Widely used in environmental valuation
    - Respondents are given information about the contingent market
    - Asked to provide willingness to pay for the good or service in question

    CVM can take two forms:
    - Open-ended CVM
      - Direct maximum of willingness to pay
    - Referendum or iterative bidding CVM
      - Pay an amount or not

Transport example:

How much in additional fare would you be prepared to pay in order to save 10 minutes in journey time?

     Or

Would you be prepared to spend 1€ more in fares to ensure that trains always arrive on time?

Responses indicate:

- *Benefits of improvements (values)*
- *How much can charge for improvements*

Strengths of method

- Easy to analyze and apply
- Regress values for each individual on relevant explanatory variables

Shortcomings of method

- Strategic bias still an issue (tends to be high values)
- Starting point bias
- Difficulty of providing strength of preference
- Tends to be specific to one attribute at a time

2.2.2.2 *Measurement Specification*

There are four general types of measurement scales:

(a) **Nominal:**

Dichotomous Scale Yes/No; Favorable/Unfavorable; Socio-demographic categorization

(b) **Ordinal/ Rank order:**

Rank ordering, preference, larger/ smaller

(c) **Interval:**

Intervals between adjacent ranks are equal

Differences between ranks can be compared (1 to 2 is same as 2 to 3 but 3 is not three times 1)

(d) **Ratio:**

Meaningful zero point. Can compare absolute magnitudes as well as differences

Aggregate data (passenger kms, average value of time, market share), Magnitude scaling, Willingness to pay.

The most commonly used scales in transport marketing research are:

A. Likert scale
B. Verbal scale
C. SIMALTO scale
D. Numerical scale
E. Constant Sum scale
F. Semantic Differential scale
G. Magnitude scale

H. Ungraded scale

In following these scales are described in more detail.

A. <u>Likert Scale</u>

Very common in attitude research, the Likert scale is easy to fill in but the bold statement introduces bias. Likert scales are highly used on satisfaction and/or importance questionnaires and they are always positively biased. You never see questions like: The restaurant was filthy - agree/disagree.

Likert scale essential features are:
- A series of statements relating to product
- Each attribute of interest has a separate statement
- Equal number of favorable and unfavorable statement about the attribute/ situation
- For each attribute/situation, provide a range
- Rating is degree of agreement
- Attach figures (1 to 5) to responses
- Add up scores for overall attitude measurement
- Can apply to satisfaction, importance and intentions

Example

	N/A	Agree strongly	Agree slightly	Neither agree or disagree	Disagree slightly	Disagree strongly
It is easy to get between platforms when changing trains	☐	☐	☐	☐	☐	☐

B. <u>Verbal Scale</u>

Verbal scales have the same logic of Likert scale but have the advantage of –compared with the Likert scale- incorporating the concepts of importance and satisfaction into the scale, thus reducing respondent confusion.

Example

	N/A	Very satisfied	Quite satisfied	Neither satisfied or dissatisfied	Quite dissatisfied	Very dissatisfied
Getting between platforms when changing trains	☐	☐	☐	☐	☐	☐

C. <u>SIMALTO Scale</u>

<u>Main features:</u>
- Simultaneous multi-attribute trade-off
- Fully descriptive verbal rating

Example

N/A	Level 1	Level 2	Level 3	Level 4	Level 5

Getting between platforms when changing trains	☐	Lifts available and staff to help	Lifts available but no staff	Subway or stairs and staff to help	Subway or stairs but no staff	-

D. Numerical Scale

Numerical scales are easy to fill in and can be used whatever the method of data collection. Numerical scales are ideal for analyzing data and communicating the results to colleagues. Average scores are easy for everyone to understand and paint a very clear picture of results and their implications. They illustrate clearly the areas to address, compared with the far less graphic frequency distributions that must be used to analyze verbal scales.

Numerical scales can also have more points than verbal scales. The differences between satisfaction survey results from one period to the next will often be very small and a wider scale enables the respondent to be more discriminating. Scales with more points discriminate better between top and poor performers, so tend to have greater utility for management decision making and tracking. Further, it is easier to establish covariance between two variables with greater dispersion (i.e. variance around their means). Covariance is critical to the development of robust models, such as those that identify drivers of satisfaction.

Example

	Totally satisfied	Very satisfied	Quite satisfied	Neither satisfied or dissatisfied	Quite dissatisfied	Very dissatisfied	Totally dissatisfied

Ease of getting between platforms when changing trains	N/A	1	2	3	4	5	6	7

Numerical scales can also be 0-100.

It should be noted here, that the scale used for the annual measurement of passenger satisfaction with PT services in the Netherlands, is from 1 to 10.

E. Constant Sum Scale

Allocate fixed number of points (usually 100) among several attributes.

- More difficult as more attributes
- Summing up or residual problems
- Not sensible for satisfaction (not relative – very good or poor on each would be 33 for each)

Example

Ease of getting between platforms when changing trains	30
Clear information about departure times and platforms when changing trains	20
Short connection times when having to change trains	50

F. Semantic Differential Scale

Semantic differential scale essential features are:

- Pairs of antonyms describe product/ status
- Rate the product/ situation on a scale between bi-polar adjectives describing each attribute
- Usually 7 point scale
- Only useful for satisfaction – importance becomes verbal scale
- Useful when no natural units – e.g. noise, décor
- Useful where units "complex" - e.g. reliability
- Useful to indicate differences between products

Example

Fast								Slow
Cheap								Expensive
Frequent								Infrequent
Reliable								Unreliable
Comfortable								Uncomfortable
Stressful								Not Stressful

G. Magnitude Scaling

Magnitude scaling essential features are:

- Based on the view that human subjects can make meaningful evaluations of the magnitude of their sensory experiences
- Interval scale with meaningful zero point
- Magnitude scale is uncommon

H. Ungraded Scale
- Descriptive scale without numerical or other grades

Comparison of different rating scales

- Likert (A), Verbal (B), SIMALTO (C) and Semantic Differential (F) ratings are fairly easy to answer

- Likert (A), Verbal (B) and Semantic Differential (F) response scales are often treated as interval measurement scales
- Likert (A), Verbal (B) and Semantic Differential (F) scales are not fine scales, have low discriminatory power
- Ungraded (H) scales need to be interpreted
- Numerical rating (D), Constant Sum (E) and Ungraded (H) scales are more discriminating (more informative) but more difficult
- Magnitude rating (G) is the most difficult scale to use

2.2.2.3 Data categories

Two forms of quantitative data are used (individually or combined):

- Primary
- Secondary

Primary data are collected specifically for market research purposes through the methods already described in section 3.2.1 (attitude ratings, conjoint analysis methods)

Secondary data are data primarily collected for other purposes. Sources of secondary data are:

- Census
  - Mode share, car ownership (behavioral)
  - Socio-economic and demographic (Segmentation/GIS)
- Survey data
  - National travel surveys
  - Family expenditure survey
  - Household Survey
  - Area O-D travel surveys
- Count (observational) data
  - Boarding and alighting/on-board counts
  - Traffic counts/ Monitoring use
- Sales/ Financial data
  - Over time or cross section
  - Aggregated or by product type
  - Cost data
- Published statistics
  - Annual reports
  - Published survey findings
  - Official returns

The advantages of using secondary data are plenty:

- Can be cheap source of good quality information
- Survey approached not appropriate
  - Market trends over time
  - External factors (e.g. economy, advertising)
- Can be better information (e.g. actual behavior)
- Can simply be additional information

Shortcomings of secondary data are:

- Not specific to problem investigated
- Sometimes not support detailed analysis of market, segments and attributes
- Unreliable/ unavailable/ insufficient

2.2.3   Methods for Passenger Satisfaction Index

Transport researchers often use more than one research design. They usually start with secondary research to get background information, then conduct a focus group (qualitative research design) to explore the issues. Finally they proceed with a full survey (design questionnaire, chose appropriate scales, apply proper research technique - usually combine importance and satisfaction) in order to devise specific recommendations for the client.

Attributes of transport services that are usually measured (passenger satisfaction indicators) are:

Availability, Accessibility, Reliability & Time, Price, Information, Customer support, Comfort, Safety, Environment.

Of course, the choice of attributes to be measured depends mainly on research's objectives. These PT attributes or quality measures, together with guidance notes on the methods of measurement are analytically elaborated in the European Standard EN 13816: 2002 which is presented in the following Chapter 3.2. Examples of applied marketing research methodologies in European cities, in the context of the ENERQI project, are presented in Chapter 3 ENERQI QUESTIONNAIRE TEMPLATE SURVEY, with aproxiamtely 20 cases.

Verwijderd: ENERQI QUESTIONNAIRE TEMPLATE SURVEY

2.3   Summary of Elements Useful to ENERQI Project

Marketing research uses research methods "based on questioning" or "based on observations". Transport researchers tend to use methods based on questioning (qualitative and/or quantitative). These are further subdivided in two types:

- *Qualitative marketing research:* data are obtained from a relatively small group of respondents and not analyzed with statistical techniques.
- *Quantitative marketing research:* utilizes statistical techniques. It typically involves the construction of questionnaires and scales. Large numbers of people are contacted, usually in a survey.

Qualitative research methods are used primarily as a prelude to quantitative research, using *in-depth interviews* and *focus groups*. These methods are usually conducted face-to-face, they provide detailed information but they may introduce various types of bias. Skilled interviewers and moderators are required for these two methods.

Quantitative Research Methods involve a large number of respondents, and the use of random sampling techniques to enable inference from the sample to the population.

The following "key" steps are crucial in the design of the quantitative research methodology, because they directly concern the interaction with the customers:

- Research design specification. Usually two approaches/ techniques are widely used:
  - measurement of *"attitudes"* using ranking and rating questions, versus
  - measurement of *"preferences"* using conjoint analysis methods
- Measurement / Scale specification
- Data type & data collection process

Regarding the *Research Design step*, in the context of ENERQI project, the "attitude measurement" seems to be most suitable for measuring passenger satisfaction.

On attitude scales, care should be taken not to include too many scale points which increase the stress on the respondent, and to label all the scale points meaningfully.

Regarding the *Scale Specification step*, the most commonly scales used in transport marketing research are:

A. Likert scale

B. Verbal scale

C. SIMALTO scale

D. Numerical scale

E. Constant Sum scale

F. Semantic Differential scale

G. Magnitude scale

H. Ungraded scale

The main characteristics of the above, in comparison are:

- Likert (A), Verbal (B), SIMALTO (C) and Semantic Differential (F) ratings are fairly easy to answer
- Likert (A), Verbal (B) and Semantic Differential (F) response scales are often treated as interval measurement scales
- Likert (A), Verbal (B) and Semantic Differential (F) scales are not fine scales, have low discriminatory power
- Ungraded (H) scales need to be interpreted
- Numerical rating (D), Constant Sum (E) and Ungraded (H) scales are more discriminating (more informative) but more difficult
- Magnitude rating (G) is the most difficult scale to use

Regarding the *Data Type & Collection step*, two forms of quantitative data are used, individually or combined, in transport marketing research:

- Primary data collected specifically through attitude ratings etc as described before.
- Secondary data primarily collected for supplementary purposes, through: census, surveys, counts, financial data and published statistics. Secondary data may be very useful for providing additional quality information.

The attributes of transport services that are usually measured as the "passenger satisfaction indicators" are:

Availability, Accessibility, Reliability & Time, Price, Information, Customer support, Comfort, Safety, Environment, and their lower level components.

References

Russell-Jones, N. and Fletcher, T. (1999) The marketing Pocketbook. Management Pocketbooks, Alresford, Hampshire.

Malhotra, N. (2006) Marketing Research: An Applied Orientation (5th Edition)

Ben-Akiva S. R., M., and Lerman, S. R. (1985) Discrete Choice Analysis: Theory and Application in Travel Demand, MIT Press, Cambridge, Mass.

Samuelson, P.A. (1938) A Note on the Pure Theory of Consumers' Behavior', Econometrica NS, vol. 5, pg. 353-54.

3   LITERATURE AND INTERNET SURVEY

The main literature sources which were used for the present research have been provided by the ENERQI partners. About 48 documents in digital form were provided, of which 19 were not in English language so they could not be used at this stage for the purposes of the present survey, but they have been included in the inventory as a reference for future use by other members of the project. A list of the collected documents is presented in the table of Appendix 1.

There is also immense information on the Internet, mainly from European sources related in some way with the topics of Sustainable Urban Transportation, Mobility Management, Sustainable Public Transport, Benchmarking and other Transportation Issues. There is much overlapping of information and alternative approaches for the above subjects.

When the scope of the survey is narrowed and focused to existing methodologies and best practices in relation to Quality Monitoring Systems of Passenger Satisfaction, Indicators used, Energy Savings and Emission Reduction, Citizens' and users' involvement, then the available information to a large extent coincides with the ENERQI partner's work which is presented in the next Chapter 4.

3.1 QUATTRO research program

One of the most important works in the field of Quality Management in Urban Public Transport is the research program "QUATTRO" (1998), carried out under the Transport RTD Programme of the EU's Fourth Framework Programme for Research, Technological Development and Demonstration.

One of the main contributions of the program QUATTRO is that it proposes to classify the main quality elements in public transport under eight groups of quality determinants with the following headings:

1. **Availability:** is about the basic coverage of the service, in geography, time and transport mode.
2. **Accessibility:** describes the interface with other transport modes and the physical access to transport services.
3. **Information:** covers the availability of information pertinent to the planning and execution of a journey or a pattern of journeys.
4. **Time:** is for the time used for planning and executing a journey or a pattern of journeys.
5. **Customer care:** contains the elements needed to make the journey(s) easier and more pleasant, typically through human presence.
6. **Comfort:** describes the physical comfort obtained though the design of or use of installations and vehicles/vessels, or resulting from ambient conditions.
7. **Security:** is about the actual degree of safety from crime or accidents and the feeling of security resulting from that and from other psychological factors.
8. **Environmental impact**: describes the different effects on the environment resulting from public transport.

These headings can be further analyzed. The overall quality of public transport is composed of a large number of elements. Which factors should be included in a quality index depends upon local conditions and priorities. A hierarchical list of service quality determinants aims to define areas where customers or potential customers may have certain expectations or demands, and where they can express a degree of satisfaction from the use of the service. The list of quality elements is based on the notion that three basic elements determine the position of a service on the market: its quality, its price, and its marketing. The list is useful in two ways:

1. Providing a way to define public transport by its qualities.
2. Providing raw material for showing quality elements e.g. against:
    i)   "Quality carriers" (terminals, intermediate stops, vehicles, staff etc.): The matrix can be used for the allocation of responsibilities in a contracting/tendering situation;
    ii) Journey stages: It can be used to analyze if appropriate levels of service quality are delivered throughout the complete journey;
    iii) Customer segments: It can be used to analyze the conditions offered to specific market segments, for example mobility impaired.

Table 3.1 - Hierarchy of quality determinants in public transport (levels 1 & 2)

Quality		
Level 1	Level 2	Level 3
1. Availability	1.1 Network 1.2 Timetable	…
2. Accessibility	2.1 External interface 2.2 Internal interface 2.3 Ticketing	…
3. Information	3.1 General information 3.2 Travel information in normal conditions 3.3 Travel information in abnormal conditions	…
4. Time	4.1 Length of travel time 4.2 Adherence to schedule	…
5. Customer care	5.1 Commitment 5.2 Customer interface 5.3 Staff 5.4 Physical assistance 5.5 Ticketing options	…
6. Comfort	6.1 Ambient conditions 6.2 Facilities 6.3 Ergonomics 6.4 Ride comfort	…
7. Security	7.1 Safety from crime 7.2 Safety from accident 7.3 Perception of security	…
8. Environment	8.1 Pollution 8.2 Natural resources 8.3 Infrastructure	…

It is also emphasized that the development of quality within the public transport sector is a continuous process. New technical solutions should contribute to the periodic updating of this list. It is therefore essential to develop a dynamic rather than a static definition of quality within the public transport sector.

The other important contribution of the program "QUATTRO" is the introduction of the service quality loop. Quality according to the service provider view can be described by the quality targeted and the quality delivered. Quality according to the customer view can be described by the quality sought and the quality achieved. The relationship between the four distinct views of the quality of a public passenger transport service is of the utmost importance and failure to recognize the differences that can exist between them, when applied to the same service, may significantly impede the efforts of the operator to achieve parity between the service quality actually delivered and that sought by service users.

The general principles of this concept are illustrated in figure below.

Figure 3.1 – Service Quality Loop
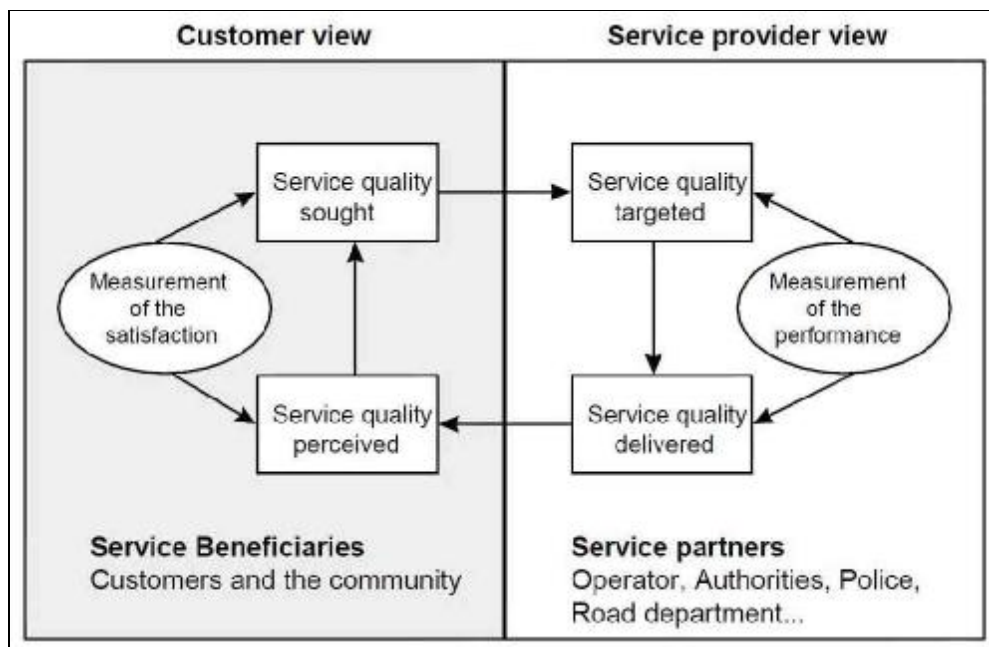
The elements and links of the quality loop are explained below.

Service quality sought

This is the level of quality, which explicitly or implicitly is required by the customer. The level of quality can be considered as the sum of a number of weighted quality criteria. The relative weight of these criteria can be assessed by qualitative analysis.

Service quality targeted

This is the level of quality, which the service provider aims to provide for the customers. It is influenced by the level of quality sought by the customers, external and internal pressures, budgetary and technical constraints and competitors' performance. When setting targets for the service to be provided, it is necessary for the following factors to be addressed:

- a brief statement of the service standard, e.g.:
  - we intend our passengers to travel on trains which are on schedule (meaning a maximum delay of 3 minutes)
  - we intend to provide a quick response to comments and complaints (meaning within 10 working days)
- a level of achievement, which is a statement or assessment of the percentage of customers benefiting from the standard service e.g.:
  - 98 % of our passengers find that their trains are on schedule
  - 95 % of our passengers find the escalator, which they want to use, in good working order
- a threshold of unacceptable performance. In each case, when the threshold is crossed, the service is considered not to have been adequately provided, immediate corrective action shall be taken, including possible alternative service, and customers may be compensated.

Service quality delivered

This is the level of quality achieved on a day-to-day basis. Delivered quality is measured from the customer viewpoint. It is not simply a technical evaluation showing that a process has been accomplished (thus, punctuality is about what is experienced by the customers throughout the journey, not just the amount of delay, for instance: in a train system scheduled to run at 10 minute intervals, if the first train is 10 min late, measurement will show that all trains run 10 minutes late. However, only the passengers on the first train will experience the delay, while passengers on following trains will experience normal journey times. NB: In practice, this may not always prove to be the case, especially where junctions are involved).

Delivered quality can be measured by using statistical and observation matrices (direct performance measures).

Service quality perceived

This is the level of quality perceived by the customer. Customer perception of the quality delivered depends on their personal experience of the service or associated services, on the information they receive about the service – from the provider or from other sources - or the personal environment.

Service quality differences may be noted as follows:
The difference between "quality sought" and "quality targeted" expresses the degree to which the service providers are able to direct their efforts towards the areas which are important to the customers.

The difference between "quality targeted" and "quality delivered" is a measure of the efficiency of service providers in achieving their targets.

Perceived quality sometimes bears little resemblance to delivered quality.

Perceived quality can be measured through surveys (soft measures). The gap between delivered quality and perceived quality is a function of the customer's knowledge about the service delivered and of personal or reported experiences with the service and/or personal background and environment.

The difference between "quality sought" and "quality perceived" may be taken as the degree of customer satisfaction.

(http://www.ocs.polito.it/biblioteca/mobilita/QUATTRO.pdf)

3.2 European Standard EN 13816: 2002

The full title of EN 13816 is: "Transportation – Logistics and services – Public Passenger transport – Service quality definition, targeting and measurement".

This European Standard is actually the result of the QUATTRO research program. The main purpose of the standard is to promote a quality approach to public transport operations and focus interest on customers' needs and expectations, by specifying procedures most likely to:
- draw the attention of the responsible parties to matters to be considered;
- lead to relevant and well-founded decisions particularly with regard to the allocation of responsibilities;
- enable customers, and others, to compare service quality claims from alternative suppliers, reliably;
- contribute to the implementation of a process of continuous improvement.

The requirements of the standard are such that entities, whether large or small, can benefit from its adoption and use.

Adoption of this European Standard may be appropriate for:

1. Public Passenger Transport services for which a single operator carries sole responsibility for all major quality criteria, or two or more parties share responsibilities, in accordance with an agreement.

   Compliance will assist service providers in the provision of public passenger transport that will more closely align with the expectations of the customers. To this end, provisions are made for using elements from a detailed definition of quality in public passenger transport presented as a list of quality criteria.

   The benefits of complying with the standard will be an improved ability to allocate the resources available to the tasks most likely to produce added customer satisfaction and revenue to the service providers.

   The standard includes recommendations for the preferred form and contents of agreements regarding quality between parties sharing responsibility for a public

passenger transport (PPT) system, and invitations to tender. The recommendations include a guideline for allocation of responsibilities for the relevant quality parameters.

The standard also includes guidance notes and recommendations on performance and satisfaction measurement and on survey methods (Annex C of the standard EN 13816).

2. Authorities in a tendering/contracting situation, requiring that the service be provided in accordance with this standard.

   In a tendering situation additional benefits are derived from applying this standard: The bidder will be certain that all quality criteria not specifically mentioned in the tender document will not be his responsibility, and respect national and European legislation, and he need not, therefore, add a contingency allowance to his bid in order to cover implicit responsibilities which may be a matter of national or local tradition.

   The bidder will be able to understand what is required of him more readily, as a result of the use of standard terms used in the list of quality criteria (Annex A of the standard EN 13816) and defined in the glossary (Annex B of the standard EN 13816).

   It is recommended that a tender document, which requires that the service be provided in accordance with this standard, also includes requirements for the level of quality and method of assessing the quality level agreed.

The quality criteria introduced in QUATTRO are included in Annex A of the standard EN 13816. The table of quality criteria, updated and complemented with level 3 of analysis as presented below in Table 3.2, is a very useful tool for the determination and selection of indicators and benchmarks to be used for the purposes of ENERQI project.

Table 3.2 – Quality Criteria in Public Transport (levels 1-3)

Quality Criteria		
Level 1	Level 2	Level 3
1. Availability	1.1 Modes	
	1.2 Network	1.2.1 distance to b/a points
		1.2.2 need for transfers
		1.2.3 area covered
	1.3 Operation	1.3.1 operating hours
		1.3.2 frequency
		1.3.3 vehicle load factor
	1.4 Suitability	
	1.5 Dependability	

2. Accessibility	2.1 External interface	2.1.1 to pedestrians
		2.1.2 to cyclists
		2.1.3 to taxi users
		2.1.4 to private car users
	2.2 Internal interface	2.2.1 entrances/exits
		2.2.2 internal movement
		2.2.3 transfer to other PPT modes
	2.3 Ticketing availability	2.3.1 acquisition on network
		2.3.2 acquisition off network
		2.3.3 validation
3. Information	3.1 General information	3.1.1 about availability
		3.1.2 about accessibility
		3.1.3 about sources of information
		3.1.4 about traveling time
		3.1.5 about customer care
		3.1.6 about comfort
		3.1.7 about security
		3.1.8 about environmental impact
	3.2 Travel information normal conditions	3.2.1 street directions
		3.2.2 b/a - point identification
		3.2.3 vehicle direction signs
		3.2.4 about route
		3.2.5 about time
		3.2.6 about fare
		3.2.7 about type of ticket
	3.3 Travel information abnormal conditions	3.3.1 about current/forecast network status
		3.3.2 about alternatives available
		3.3.3 about refund/redress
		3.3.4 about suggestions & complaints
		3.3.5 about lost property
4. Time	4.1 Length of trip time	4.1.1 trip planning
		4.1.2 access/egress
		4.1.3 at b/a-points and transfer points
		4.1.4 in vehicle
	4.2 Adherence to schedule	4.2.1 punctuality
		4.2.2 regularity

5. Customer care	5.1 Commitment	5.1.1 customer orientation
		5.1.2 innovation and initiative
	5.2 Customer interface	5.2.1 enquiries
		5.2.2 complaints
		5.2.3 redress
	5.3 Staff	5.3.1 availability
		5.3.2 commercial attitude
		5.3.3 skills
		5.3.4 appearance
	5.4 Assistance	5.4.1 at service disruptions
		5.4.2 for customers needing help
	5.5 Ticketing options	5.5.1 flexibility
		5.5.2 concessionary tariffs
		5.5.3 through ticketing
		5.5.4 payment options
		5.5.5 consistent price calculations
6. Comfort	6.1 Usability of passenger facilities	6.1.1 at b/a points
		6.1.2 on vehicle
	6.2 Seating and personal space	6.2.1 in vehicle
		6.2.2 at b/a points
	6.3 Ride comfort	6.3.1 driving
		6.3.2 starting/stopping
		6.3.3 external factors
	6.4 Ambient conditions	6.4.1 atmosphere
		6.4.2 weather protection
		6.4.3 cleanliness
		6.4.4 brightness
		6.4.5 congestion
		6.4.6 noise
		6.4.7 other undesired activity
	6.5 Complementary facilities	6.5.1 toilets/washing
		6.5.2 luggage & other objects
		6.5.3 communication
		6.5.4 refreshments
		6.5.5 commercial services
		6.5.6 entertainment
	6.6 Ergonomics	6.6.1 ease of movement
		6.6.2 furniture design

7. Security	7.1 Freedom from crime	7.1.1 preventative design
		7.1.2 lighting
		7.1.3 visible monitoring
		7.1.4 staff/ police presence
		7.1.5 identified help points
	7.2 Freedom from accident	7.2.1 presence/visibility of supports, e.g. handrails
		7.2.2 avoidance/visibility of hazards
		7.2.3 active safeguarding by staff
	7.3 Emergency management	7.3.1 facilities and plans
8. Environmental impact	8.1 Pollution	8.1.1 exhaust
		8.1.2 noise
		8.1.3 visual pollution
		8.1.4 vibration
		8.1.5 dust & dirt
		8.1.6 odor
		8.1.7 waste
		8.1.8 electromagnetic interference
	8.2 Natural resources	8.2.1 energy
		8.2.2 space
	8.3 Infrastructure	8.3.1 effect of vibration
		8.3.2 wear on road/rail etc.
		8.3.3 demands on available resources
		8.3.4 disruption by other activities

3.3 BEST Project

BEST stands for **B**enchmarking **E**uropean **S**ervice of public **T**ransport and is a project that started in 1999 with the overall objective to increase the use of public transport in European urban areas, by investigating the possibilities of the use of benchmarking techniques for policy objectives. The cities of Geneva, Helsinki, Vienna, Stockholm, Oslo and Copenhagen participated in the program in 2010 and the results are presented in BEST_REPORT_2010.pdf and are also available on the internet site http://best2005.net.

Another BEST objective is to strengthen focus on customers' needs, demands and expectations and to establish a learning process among public transport professionals. The main strategy is to learn from each other by comparing processes. As a spin-off of the BEST research work, a benchmarking group of cities has been created. A platform is created by a common survey made once a year among the citizens in each region. The survey focuses on public transport quality in relevant dimensions as perceived by the citizens of the region.

The BEST Survey is based on telephone interviews. 1.000 citizens are interviewed by telephone one week in March every year in each of the participating cities / regions about

their attitudes to public transport. The basic questionnaire consists of 20 questions and an extended version contains an additional 8 questions.

The results from the BEST Survey are presented in reports which show the results for both the individual city region and for all participating BEST city regions. The graph below is from the 2006 report and illustrates overall Citizen's Satisfaction with public transport in each city. The graph shows that Helsinki has the highest percentage of satisfied citizens in 2006 (81%) and Copenhagen has the lowest score (56%). Similar graphs are produced for the other parts of the survey.
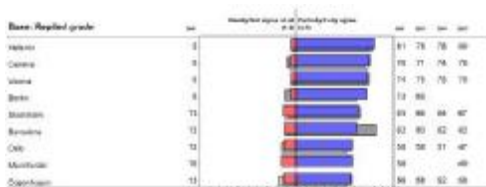
The participating cities take part in a mandatory BEST seminar held every year during the autumn. At the seminar the results of the BEST Survey are presented and discussed. The main objective with the seminar is to stimulate the exchange of ideas and experiences, and to help public transport professionals to develop and strengthen their professional networks.

After the seminar, Common Interest Groups (CIGs) are created based on the results of the survey. In the Common Interest Groups the processes and activities are compared within a specific and agreed area. If the group finds it necessary, additional CIG specific questions can be added to the BEST Survey.

By comparing processes, experiences and getting access to CIG specific benchmark data (from 2007), the participants get new ideas to implement in their own business. Evaluation of the results and progress of BEST is made once a year to secure effective use of resources.

In 2009 one of the BEST Common Interest Groups compiled the report on "the relationship between objective quality and customer satisfaction" (BEST2005_Common_Interest_Group_ Report_Febr_2009_Custormer_satisfaction_model.pdf). The findings and the theoretical underpinnings of the customer satisfaction concept are presented based on the surveys of three public transport companies in the cities of Stockholm, Helsinki and Oslo. The following selections from this report can be of value to the next works of ENERQI, in the design of a common methodology.

- Satisfaction is a complicated concept, derived from cognitive theory and psychological research. It is an abstraction we can only touch through measurements.
- It is important to get to know the customers better with regards to their needs, requirements and expectations. In this, customer surveys play an important part.

- Customer surveys indicate that for obtaining new passengers it is necessary to offer a well-developed range of travel services and simple and easy accessible information about how to travel with the offered services.
- Environmentally adapted transportation is a new demand from the customer's part in Stockholm.
- Stockholm conducts monthly Perceived Quality surveys by means of questionnaires handed and collected on board of the vehicles. Overall satisfaction, timekeeping, service frequency, information about disruptions, crowding, cleanliness and stuff attitudes are among the indicators monitored, in a scale from 1 to 7. It also measures residents' perceptions through a monthly Public Transport Barometer survey via telephone interviews. Overall satisfaction, value for money, departure times, proximity to stops, ease of buying tickets, environmental friendliness are among the indicators monitored. It also conducts 5 sessions per year of the People's Panel whereby a representative selection of county residents, via a web questionnaire, take a stance on a number of topical issues and evaluate the relative promotions.
- Analysis show that factors with great link to satisfaction are: Timekeeping, service frequency and crowding. Functioning information about disruptions and actions of the staff are also important factors for customer satisfaction.
- It is of interest the analysis result that: "it is not necessarily the case that an increased level of satisfaction leads to increased travel and vice versa"!
- In Helsinki, customer satisfaction is continuously measured via on-board customer satisfaction survey and yearly using the BEST Survey.
- The most important single quality factor in the questionnaire was reliability and timekeeping. Route network, intervals, and travel time were ranked as most important factors affecting perceived overall quality.
- Availability and reliability of core service factors, such as the quality of the vehicles, are essential to all public users. Value adding "soft" quality factors such as the driver's driving style, are only considered after the core factors.
- In Oslo the market information system is used for operator monitoring (fines), operator bonus/malus and customer's quality perceptions and satisfaction monitoring.
- Oslo is conducting customer surveys on board. The unit of analysis is the (present) journey, respondents are typically asked to rate their satisfaction on a scale from 1 (very dissatisfied) via 3 (neither…nor) to 5 (very satisfied). It was found that respondents use the scale subjectively and differently between questions. There are also indicators that the barrier to answering 1 or 2 instead of 3 is greater than moving from 3 to 4 or 5.
- It was also found that previous experiences influence the answers adversely, not positively. Expectations are important for the answers and respondents' satisfaction is largely relative to their expectations.
- Punctuality is considered the most important factor influencing total journey satisfaction but stop/station information is also considered important.

- Researchers from the "Service and Market Oriented research group" (SAMOT) at Karlstad University analyzed the BEST data and presented some interesting preliminary findings:
  - Firstly, satisfaction with public transport is a fairly stable construct of four basic factors: safety/security, system (supply and reliability), comfort and staff behavior.
  - Secondly, it was found that the frequent assumption that objectively "better" public transport (in terms of vehicle standards, route length, travel times, headways etc) has a far more spurious relationship with customer satisfaction scores. This indicates the importance of not looking at satisfaction scores in isolation, but properly interpret them against a system understanding and local conditions.

- Satisfaction often starts with the expectations a person has. Expectations seem to be based on and influenced by personal needs, word of mouth communication, and past experiences.
- Complaint data is an interesting complement to satisfaction surveys.
- Satisfaction is the result of a subjective evaluation process, a process where the objective attributes of public transport are interpreted and integrated with individual frames of reference.
- Satisfaction studies of various kinds are now providing input into central business processes, pointing out what is important, what is working well and where are the problems that need to be attended to. This is made possible when satisfaction studies are incorporated into comprehensive Market Information Systems, enabling direct links between satisfaction measurements, operational and managerial activities, and corporate missions.
- Finally, it is worth mentioning that four new composite indicators, not included into the hierarchical table of EN 13816 are used in the BEST Survey:
  - Overall citizen satisfaction
  - Value for money
  - Social image
  - Loyalty of the customer

  These should be considered in the common ENERQI methodology development.

(http://www.best2005.net/this_is_best)

3.4   SAVE BESTRANS Project

BESTRANS is a European project co-financed by the EC SAVE programme and aims at developing an internal and external benchmarking methodology for energy and emission performance in the urban public passenger transport sector and to carry out a benchmarking exercise with a number of European operators.

The main objectives of this project are:

1. to develop an internal and external benchmarking methodology for energy and emission performance in the urban public passenger transport sector usable all over Europe (including Eastern Europe);

2. to involve a great number of public transport operators from different European countries and with different characteristics in the benchmarking exercise;
3. to successfully carry out the benchmarking exercise and to start a continuous benchmarking between operators;
4. to synthesize the results of the benchmarking exercise into a valuable promotional tool;
5. to produce a benchmarking guide.

Research in the field of "benchmarking of energy and emission performance in urban public transport operations" showed that a huge number of energy saving and emission related good practices in public transport operations exist and that there is a great potential for improvements. However, a systematic approach to energy and emission management and benchmarking was nearly absent and very poor reference values for energy consumption and emissions existed, especially in the bus sector. Thus, an energy and emission benchmarking exercise among European public passenger transport operators is a tool needed to make companies aware of where they are in this field and constitutes a valuable incentive for the whole public transport community to make continuous improvements.

Benchmarking is an important tool for the continuous improvement in a company. It consists in a process of identifying good practices in other organizations and learning from them. At the same time it is a useful tool to identify the own strengths and weaknesses and allows monitoring the development process in the company by comparing results along time. It is considered as a most valuable tool to gather standards for improvement and insights, which can lead an organization to better performance.

(http://www.tis.pt/proj/bestrans/)

3.5   PROCEED Project

PROCEED is a European project under the Thematic Priority "Sustainable Surface Transport" and the Objective "New technologies and concepts for all surface transport modes (road, rail and waterborne)".

PROCEED is conducting research into public transport operations in small and medium sized cities and on how to improve its attractiveness to the users, its efficiency and effectiveness. The project mapped and analyzed successful cities cases, and this has lead to a tool for planning and delivering successful public transport. The project has given a better understanding of the key factors that influence public transport, as well as how the position of public transport in the transport system can be strengthened so its market share can increase.

PROCEED tackles the challenges and leads to an improved expertise and an extended knowledge-base, that on one hand helps to develop, implement and assess European policy, and on the other hand helps to plan, develop and implement effective and efficient public transport (bus) systems in small and medium sized cities (between 25.000 and 200.000 inhabitants) and their surroundings all over Europe. Such provision of high quality public

transport is an essential contribution to the European framework conditions supporting modal shift away from individual motorized traffic towards sustainable transport modes.

(http://www.proceedproject.net/index.php?option=com_content&view=section&layout=blog&id=5&Itemid=28)

3.6   SPUTNIC Project

SPUTNIC (Strategies for Public Transport in Cities) is a project funded by the European Commission under the 6th Framework Programme. It is dedicated to challenges faced by local and regional public transport systems in transition. These challenges include the emergence of a competitive environment, changing institutional frameworks and increasingly scarce financial resources. SPUTNIC seeks to help make public transport systems more attractive and efficient by providing:

- support to stakeholders to anticipate and prepare for emerging challenges;

- an overview of state-of-the-art knowledge and research; and

- specific guidelines and practical tools.

The project activities fall into four priority areas. Each priority area is supported by a working group of public transport professionals:

1. Market organization. This working group focuses on effective cooperation of public transport actors, tariff optimization and integration, innovative financing, incentive contracts and monitoring systems which improve system quality and reduce costs.
2. Customer relations. This group focuses on the interrelations between the providers and customers with attention to mobility data and travel patterns, the image of public transport, marketing strategies and customer-relations management, and integration of monitoring results in operations and services.
3. Corporate management. This group analyses organizational and management issues, including human resource development and management, performance indicators and knowledge management, business re-organization to improve efficiency of management, and cost management.
4. Equipment and operational aspects. The efforts of this group focus on operational and technical matters, including upgrading and modernization of infrastructure, second-hand rolling stock, safety issues, transfer of innovative technologies and operational and fleet management.

(http://www.sputnicproject.eu/)

3.7   CIVITAS Programme

CIVITAS - cleaner and better transport in cities - stands for CIty-VITAlity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

Within CIVITAS I (2002-2006) there are 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:
- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by:
- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organization of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS
- CIVITAS is co-ordinated by cities: it is a programme "of cities for cities"
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living 'Laboratories' for learning and evaluating

(http://www.civitas-initiative.eu/cms_pages.phtml?id=348&lan=en)

4   ENERQI QUESTIONNAIRE TEMPLATE SURVEY

4.1 Introduction

In order to proceed with the collection of good practices, literature, surveys and their outcomes, and previous project outputs, according to the decisions of the ENERQI project kick-off meeting held in Breda, the Netherlands 14-16 June 2010, a relative information collection template form has been developed and circulated among the ENERQI partners. The template form consists of four parts:

- The first part identifies the ENERQI partner and contact person who provided the information.
- The second part describes briefly the type of information provided, e.g. title, abstract, whether it is own experience or some other relevant literature, etc.
- The third part provides information about the local characteristics of the case that is presented, i.e. country, city, population, transport authority or operator, vision, Strategic or Business Plan, possible novelty and relation to ENERQI context.
- The fourth part provides the detailed description of the Quality Control Methodology which is applied in this case.

This questionnaire template has been used by ENERQI partners, for the collection of information about existing methodologies and best practices for monitoring passenger needs and satisfaction in PT services, from 12 European countries: Austria, Belgium, Bulgaria, Finland, France, Greece, Ireland, Luxembourg, the Netherlands, Portugal, Romania, and UK. In total 24 filled template forms were returned by the ENERQI partners covering 24 different cases which refer to PT operators or authorities, cities or countries, with respective applications of methodologies for monitoring passenger needs and satisfaction in PT services. All this information has been stored together in an MS-Excel worksheet (file name: ENERQI WP2 Template - Data Base.xls) which is the reference data base for this part of the work.

The ENERQI questionnaire template and the guidelines which were developed for its usage are presented in Appendix 2.

In the following, the main characteristics of each case are presented. For reasons of easy comparison

4.2 Presentation by Case

4.2.1 Graz AG (GVB), Austria, Graz, Quality Management System

- ~ 300.000 population, public company operator, buses and trams, modal share 19,9%, has a strategic plan with vision compatible with the ENERQI project.

- **Quality control system**: Telephone passenger portal for information provision and complaint management. Board of customers. Yearly census of performance and perceived quality in the GVB with telephone interviews plus an online survey.
- The **monitored criteria** are a selected subset of the EN 13816 hierarchical set.
- **Data is collected** by surveys **through subcontractor's** online questionnaires.
- Structured data entry in the **QM system data base** by QM staff.
- **Observers** are users (passengers) and staff. Communication process with observers: phone and e-mail. Own staff well motivated due to good work climate.
- Performance level: Complaint -> research -> feedback to customer in a positive way (within 3 days).
- Yearly performance assessment.
- QM department coordinates QM actions. **Motivation of the QM staff is a key issue of success.**
- ENERQI partner.
- **Case Novelty:** QM is now a single entity in the company. The QM system is database assisted, **based on DIN EN 13816.**

4.2.2 *Postbus, Austria, Region Aichfeld, Styria, Quality Management Agreement*

- ~ 50.000 population, public company operator, buses, modal share 15%, has a strategic plan with vision customer service oriented.
- The service is contracted by the regional government of Styria and the **Quality of the Service is part of the contract.**
- Quality indicators is the issue of interest for the ENERQI project. **The contract** details the transport system in general but **defines quality levels in a very detailed way**, e.g. vehicles (general but also cleaning and maintenance), qualification and appearance of driving personnel and timetable related and operational criteria. These **criteria are measured on a regular basis by personnel of the ordering party and there are penalties in case of non fulfillment.**
- The **monitored criteria** are a selected **subset of the EN 13816 hierarchical set.**
- **Data collection** is based on **ad-hoc observations with checklists by staff**, no special data processing required.
- High reliability of data is required because there are penalties (fines) involved in case of non fulfillment of performance levels defined in the contract.
- The winning argument of this system is, that **the QM process is part of the contract and defined in a very detailed way**.

4.2.3 *Átha Cliath – Dublin Bus, Ireland, Quality Management*

- ~ 1,2 million population, Semi-State Company (owned by Government), buses, has a strategic plan with vision customer service and economy of operation oriented.
- Relevant to ENERQI project in **involvement of users** and **quality indicators**.
- **Use EN 13816 structure** for customer satisfaction surveys since 2003.

- Performance targets are set out in **Service Contract and Customer Charter.**
- **Data collection**: observations, customer satisfaction surveys, quality audits. Area & bus depot, periodic 6 month reports.
- On-bus customer satisfaction surveys and off-bus observations. Web complaints survey (annual). **Observers used are external subcontractors** "trained" surveyors.
- Data is collected continuously and reported periodically. Feedback within 3 days.
- Senior Management responsible for quality improvement actions. National Transport Authority participates in discussions.
- **Cost of work is an issue** for quality monitoring process. Expenditure is **justified** if the company has a **Customer Charter** with quality commitments or if a public service has **quality requirements with associated payment,** it makes it much easier to justify necessary expenditure.

4.2.4 De Lijn Contracting Authority & Flanders PT Operator, Bus, Tram, Belgium, Quality Management

- ~ 6,1 million population, region of Flanders.
- De Lijn is **both contracting authority as well as bus and tram operator**. The tramways network is operated 100% by De Lijn, the bus network is for 50% outsourced to private contractors.
- The quality management system is embedded in the: Plan – Do – Check – Act cycle and has been **ISO certified**. At different management levels a strategy focused Balanced Scorecard has been introduced. The quality monitor is an integral part of the Balanced Scorecard, specifically covering its Customer Perspective.
- Contract with the government of Flanders, Customer Satisfaction Survey with travelers at least every two years. **Marketing department** developed a **Quality Measurement System**. Definition of Quality Monitor introduced in 2006 is now an integrated measurement tool which measures the strategic quality aspects and reports them in order to improve business processes and operations. It is a **strategic, long-term management tool** for the Flanders government and for the De Lijn management, and it is **also a tactical short term tool** for all middle managers, in every department of De Lijn.
- The quality monitor measures customer satisfaction in 2 different ways:
  - **Biennial customer satisfaction surveys: 3.000 in-depth face-to-face interviews at home** concerning satisfaction over the last year (carried out by Significant GfK, an independent market research company)
  - **Continuous customer satisfaction surveys:** on a yearly basis 90.000 paper and pencil questionnaires on board of the vehicles concerning satisfaction during the actual travel experience (also carried out by Significant GfK) – data is collected all year round

  The first strives to be a strategic study; the second is the tactic complementary.
- The monitored criteria are a selected **subset of the EN 13816 hierarchical set**.
- **Continuous study**: Paper and Pencil Interviewing "PAPI"-survey onboard (5 min), 90.000 surveys per year, reporting every quarter.

- **Biennial customer satisfaction survey**: Computer Assisted Personal Interviewing "CAPI"-survey at home in depth (30 min), 3.000 surveys. Both surveys use a 5-point-satisfaction scale.
- Both surveys are **conducted by an external market research agency**, 50 professional interviewers are used. Average number of surveys per day: 230. **No gifts or other initiatives**.
- **Reporting frequency** at several levels:
  - Company and entity level: every quarter
  - Line level: every quarter, but with moving average of the previous 4 quarters
  - Operator level: every 6 months
  - Contract level (for private contractors): every year
- **Performance level**:

  Minimum standard on satisfaction:
  - 80% for overall satisfaction
  - 70% for high priority factors
  - 60% for low priority factors

  Alarm level on dissatisfaction:
  - 5% for overall satisfaction
  - 10% for high priority factors
  - 15% for low priority factors
- Total participation of all employees in the sharing of Quality Monitor results. Clearly defined roles of all parties.
- Passenger information (especially at unanticipated circumstances) and system capacity have been shown as priority issues for action.
- **The De Lijn case should be further exploited in ENERQI project.**

4.2.5 *Merseytravel - Authority & PT Operator, Bus, Rail, Ferry, Merseyside Metropolitan County, UK, Quality Management*

- ~ 1,35 million population, Merseyside Metropolitan County. Merseytravel co-ordinates public transport in partnership with bus and rail operators, operates 9% of the network.
- Vision: "a world class organization and a world class transport system".
- **Quality Policy** under development **in compliance with ISO** 9001:2008.
- **Customer Service Excellence** – UK government standard for driving customer focused change within a public organization.
- Piloted a **mystery shopper exercise** across the Merseyside public transport network. Observers reporting from a customer perspective on their approach to stations, the journey and interaction with staff.
- Developing a **customer satisfaction methodology** to identify what customers' value as important and measure any service gaps with the level of satisfaction.
- The monitored criteria are a **selected subset of the EN 13816 hierarchical set**.
- **Mystery Shopping, by external field researchers**. Observers need to be representative of the local population. **Customer satisfaction surveys**. Annual reports for mystery shopping (spring) and customer satisfaction (autumn) surveys.

- **Customer feedback** on quality improvement actions.
- **Cost of implementation is a barrier for QM program.**

4.2.6 Helsinki 4 bus Operators - Finland, Continuous measurement of Passenger Satisfaction by using questionnaires

- ~ 585.000 population, Helsinki, Finland, modal share 64% PT in city center, 40% in wider area, 4 bus operators, **private companies**.
- PT authority has a **quality goal reflected in tender documents**.
- **Questionnaires** on all fixed rail means, buses with at least 1.600 daily passengers.
- Results over quality monitoring will be exploited for staff schooling, and **calculation of bonuses for tendered operators**. **Driver behavior is important**.
- **Case Novelty: PT operators are financially rewarded if they meet or surpass certain quality criteria in the tender document.**
- **Methodology**:
  - In 2008 altogether 12,401 passengers in Helsinki were asked to evaluate different quality factors.
  - The scale varies from 1 = poor to 5 = excellent.
  - The averages of marks for quality factors have been calculated by line, by mode of public transport and, in the bus traffic, by tender object and by operator.
  - The results will be exploited to develop public transport, in staff schooling, and in the calculation of bonuses for tendered operators.
  - The survey also contains valuable information on passenger profiles.
  - The survey has been assisted by 4–6 students who have, on vehicles, distributed questionnaires to passengers, and collected them filled in.
  - The survey activity is going on throughout the year, except for the month of December.
  - Passengers' satisfaction is followed up with a quarterly output, and a report is published semi-annually.
  - The passengers have been interviewed from Monday to Thursday between 6 a.m. and 6 p.m., and on Friday between 6 a.m. and, at latest, 2 p.m.
  - The number of chosen interviewees is determined by route quotas, and by morning peak, day time and evening peak-hours in relation to the distribution of passenger volumes.
  - The objective is to get at least 100 opinions for each route annually.
  - The survey also contains information on passenger profile and such questions as what kind of tickets the passengers use, whether they could have taken the journey on their own car, and in which city or commune they live in.
  - On bus, tram and Metro an assistant has distributed passengers, chosen by random, a map consisting of a questionnaire with pen and writing pad. The passengers have been asked to evaluate different quality factors on the respective line and to return the questionnaire map to the assistant when exiting. As for commuter trains, the assistant has interviewed passengers at stations. The assistant has completed every returned questionnaire with date, time and respective line number (or name of train station).
  - Observers are users (customers, passengers)
  - **Observers are interviewed by students and part-time workers from the unemployment office. The students/workers are paid (a small amount) for this.**
  - **The observers do not receive any money.**
  - The survey focuses on 4 bus operators active in the city.

- One part of the quality report is a comparison for all operators for the marks of the quality factors which the operators can contribute to.
- The average mark of each operator for each quality factor is the result of the mark of a single route weighed by its weekday boardings.
- The differences between operators become clear this way, and improvements or deterioration is made visible.
- **The passenger survey is not a sample in statistical terms**, because the age distribution of and other background information on passengers is impossible to get in advance. (It is not possible that the assistant starts with asking a passenger on his or her background and then refuses to continue with unsuitable interviewees. This kind of proceeding would irritate the passengers and delay the survey).
- To minimize a possible bias in the results, the **assistants have been instructed to pick up the interviewees so randomly as possible** with regard to their background (age, sex etc.).
- The objective is to **get at least 100 opinions for each route annually**.
- The most frequented lines have had larger samples.
- Passengers on neighborhood bus lines were not interviewed.
- **The objective is to get an opinion of approximately 11,000 passengers annually.**
- Questionnaires have been filled in on all tram routes, on the Metro, and on bus lines with at least 1,600 daily passengers.

- The **monitored criteria are a selected subset of the EN 13816 hierarchical set**.

- It is up to the PT operators to choose which improvements to do.

- **The case presented is relative to ENERQI and must be further exploited.**

4.2.7 Tisséo – Toulouse, France, Quality System

- ~ 900.000 population, PT modal share 16%, PT modes available: bus, metro, soon tramway, car pooling, minibus for disabled, car sharing, bike sharing. Complete PT system on the area of 118 municipalities. Tisséo - private operator(s).

- **Quality team** in Tisséo, to obtain AFNOR certification (called "NF Services").

- **Vision: customer service oriented and involvement of citizens and users.**

- Quality control is applicable to a part of the PT services offered.

- **The case presented is relative to ENERQI in involvement of citizens and users, quality indicators, PT improvements.**

- Three applications of quality control systems are presented below. The PT Image and Satisfaction Barometer, the Mystery Guests Surveys and the Panel of Mobility.

  A. PT Image and Satisfaction Barometer.
  - Evaluation of the satisfaction by PT mode, by users of each mode,
  - Evaluation of the image by PT mode and the operator's image,
  - Description of the last trip (for only one mode used: bus or metro) by PT users with specific criteria for each mode.
  - Quantitative data – mark and rate.
  - Chart and curves analysis. Simple and crossed extractions for each user's profile (bus or metro).
  - City of Toulouse and surrounding municipalities' surveys.
  - Yearly. 3 weeks, in October/November (out of holidays)
  - Surveys with subcontractors, telephone interviews.

- Observers are PT users and "non PT users" for mobility and image indicators.
- Simple information about the survey on the PT operator website and with the staff in contact with observers (agencies, call center, security)
- 1.550 observers, 15 years of age and more, no gift given
- **Cost: between 30.000 € and 50.000 €**
- Strengths: indicators followed for more than 10 years.
- Weaknesses: issued only once a year, and the survey a little too long for interviewees (nearly 20 min by phone)
- Sample reliability: more than 200 users of each mode (then projected regarding their proportion into the global PT users' population)
- Performance level targeted: Mark : more than 7/10, Rate : more than 80%
- Yearly benchmark measurement
- Yearly Quality reporting integrates survey issues and their evolution
- Each department defines his actions plan regarding survey's issues.
- This methodology is **simple** to be done **and cheap**, but **not really pleasant** for interviewees.

B. Mystery Guests.

- The monitored criteria are a **selected subset of the EN 13816 hierarchical set.**
- Data collection type: Rate (quantitative data)
- Simple and crossed extractions for each user's profile (bus or metro).
- Monthly data collection, weekly when non compliance is found.
- Field observers: sub contractors, professional mystery guests.
- Communication with observers into bus or metro stations.
- **Cost between 40.000 € and 60.000 €**
- Strengths: regularity of the process and real impact on operational staff.
- Weaknesses: professional point of view, not a real feedback from customers.
- Performance level targeted: between 80% and 90% regarding the indicator
- Frequency of mystery visits: 10 visits per month by mode line.
- Yearly Quality reporting integrates survey issues and their evolution.
- Barriers: This methodology needs a lot of field observers to be reliable (a staff improvement can be a solution).
- Driver: Regularity of the measure is the key of the operational staff reactivity when non compliance is detected.

C. Panel of Mobility.

- Indicators correspond to :
  - The evaluation of the satisfaction by mode, by users of each mode,
  - The evaluation of the image by mode,
  - Improvement for each mode,
  - In plus, specific thematic regarding executive needs.
- Quantitative data – mark and rate.
- Chart and curves analysis. Simple and crossed extractions for each user's profile (bus, metro, car, bicycle …).
- Area covered: City of Toulouse and surrounding municipalities.
- Report frequency: 3 times by year, then in option, focus group and 3 quick surveys are possible.
- Time period: 3 weeks during December, March and June (out of holidays) / 2 weeks for quick survey.
- Surveys with subcontractors, telephone interviews & internet.
- Observers are PT users and "non PT users".

- Communication with observers: Specific website, Media planning (launch of the recruitment) + information on the operator's website and at the field (station, bus and agencies).
- Number of observers: Between 900 et 1000 persons of 15 years old and more
- Gifts: Cumulated points to access to yearly lottery (gifts: bicycle, ipod nano)
- Cost: **Between 50.000 € and 70.000 €**
- Strengths: subjects close to the current events + number of subjects (at least 3 by survey) + the quickness to obtain issues and analyses.
- Weaknesses: difficulties to recruit + no to find subject + professionalization of the observers' point of view.
- Reliability: Under 50 persons, be careful on the analysis.
- Performance level: Mark : more than 7/10, Rate : more than 80%
- Frequency of benchmark measurement: 3 times by year, then in option, focus group and 3 quick surveys are possible.
- Each department defines its actions plan regarding survey's issues.
- Barriers: To realize some interviews on specific target, the number of observers needs to be important (more than 500 persons). It's why, to obtain this number and to keep it, the recruitment has to be regular.

- **The cases presented by Tisséo are relative to ENERQI project, must be further exploited.**

4.2.8 *HebrosBus– Plovdiv, Bulgaria, Quality Assurance System ISO 9001:2008*

- ~ 348.500 population, PT modal share 33%, PT modes available: bus, tram, shuttle bus. 6 transport private operators.

- HebrosBus – bus service, Private operator.

- Vision of HebrosBus covers: customer service, economy of operation, energy savings, environment, involvement of citizens and users, directly related to ENERQI.

- HebrosBus has an **integrated system for management (ISM) according to the standards ISO** 9001:2008, ISO 14001:2004 **& OHSAS** 18001:2007 and the cooperation with consultants on different projects and events.

- **Quality control system**:
  - ISM ensures the right provision of the service and the satisfaction of the expectations of all customers and stakeholders when realizing bus services, bus station services, maintenance and repair of motor vehicles, technical check aimed at preserving the health and safety and preventing the environmental pollution and its preservation.
  - The monitored criteria are a selected subset of the EN 13816 hierarchical set, plus attracting new customers & Staff care and conditions of labor.
  - Data is collected through questionnaires, analysis, reports
  - Data analysis: ISM management and weekly work meetings of the management staff
  - Way of data collection: Research, surveys, complaints and quality indicators, secret customers and internal control
  - Observers: Secret customers; internal control. Communication by telephone & e-mail. Trusted people of different age range; through incentives
  - Weekly or monthly benchmark measurement.
  - Quality improvement actions: Trainings and instruction sessions about working with the customers and activities in different situations, integration of new

systems, investments in improvement of the infrastructure and the buses of the company
- Quality results relevant to ENERQI context.

- The quality management system of HebrosBus can easily cooperate with the ENERQI Quality System and reach better results. Though the quality results are relevant to the current situation of HebrosBus and correlate to the possibilities for improvement of the public transport, HebrosBus would like to reach higher level of information exchange with its customers. On the basis of them, improvements and attraction of new customers will be realized.

4.2.9 *Quality Monitoring in Brabant and in The Hague, The Netherlands*

- **These two cases of Quality Monitoring in public transport, are in fact the basis for the ENERQI project.**
- "De Kwaliteitsverkenner" is a monitoring system of 60 bus lines in the Province of North Brabant in the Netherlands. This project started in 2005 and is fully operational. More than 500 customers observe each week all kinds of quality indicators.
- "De Kwaliteitsmeter" of the Dutch public transport operator HTM at The Hague (see: www.kwaliteitvanhtm.nl) works mostly on the same basis. **Every two weeks 500 observers report about the actual quality**. **Both systems are carried out by DTV**.
- In North Brabant Province, several cities are involved: Breda, Den Bosch, and Tilburg.
- ~ 2.440.000 population of Province of North Brabant, Bus and Train for the main connections (not involved in the monitoring), PT Modal Share 4%, 60 bus lines spread out over the total area of the province.
- ~ 490.000 population The Hague, PT Modal Share 27%, the whole city and its suburbs, all bus-, tram- and light rail lines
- Province of North Brabant:
  - Veolia and Arriva: bus
- The Hague:
  - HTM: bus, tram, light rail
- Just recently Veolia and Arriva started with making a strategic plan. Certainly they both will have a business plan, but they are not available for others. The province of North Brabant has just finished a new strategic plan in which they define their ideas about the quality and performance of public transport. **In the Netherlands some authorities are responsible for the improvement and for raising public transport's share. The operators are only responsible for the operation of the busses. This is the case in North Brabant.**
- HTM has a strategic plan for quality improvements in which the monitoring of customer satisfaction is a main issue.
- **Case Novelty: Monitoring has been done through an internet survey based system and makes use of volunteers who monitor quality on a regular basis. Each week tasks are assigned to the volunteers to do an observation on a certain line and time.**

- **Both cases are examples of how the ENERQI monitoring scheme should be done.**

- **Quality Control System:**
  - The basic quality monitoring consists of **subscribed customers**, **who observe pre-defined quality aspects on a regular basis**. In the project will be checked if there is any statistic differences when using own personnel or paid mystery guests. In fact **the ENERQI approach is a new step in the process of involving the passenger in the developments and improvement of the public transport system**. **The observer monitors on a regular basis a number of quality aspects** such as: punctuality of the bus, (professional) attitude and performance of the driver, the overall quality of the bus itself and the quality of the bus-stops. **The data is gathered by the passengers**. **The trip they monitor is randomly chosen by a computer program**, which guarantees that an independent sample is chosen from all the available trips. **Monitoring of incidents can and must be done separately**.
  - This regular monitoring will also allow measuring the effect of marketing and communication campaigns, for instance green branding or healthy life style campaigns on the changed perceived image of public transport.
  - The passengers import their findings into an **on-line database** by answering an **internet-questionnaire**. These questionnaires are in their mother language. Frequently reports are generated out of the database giving feedback and input to quality improvement actions. Implementation of these actions can then be measured giving further feedback on effectiveness and impact of the improvement actions. Finally an increase in customer satisfaction is expected and as such also an increase in public transport usage or breaking the virtuous circle which is leading to a downfall in the share of public transport.
  - The **monitored criteria are a selected subset of the EN 13816 hierarchical set**. Many **aspects of benchmarking** are already **covered in the tender documents and the contract of service**.
  - All analysis is done by using SPSS.
  - Reports are generated for each sub area, transport provider and if sufficient data is available for each line.
  - Reports are made on a regular basis. In North Brabant each month, quarter, half year and in The Hague 4 or 5 reports per year and an overall year report.
  - Data is collected through an internet survey
  - **Observers are regular public transport passengers who volunteer** to participate in the system as an observer
  - All **communication with the volunteers is mainly done by e-mail**. Furthermore there is during office hours the possibility to get into contact with a helpdesk.

    Other concerns about the observers:
  - In both cases 500 volunteers are involved.
  - Gifts, Province of North Brabant:
    - For each successful observation a volunteer gets a fee of € 3,-. The fee is paid in cash.
    - From the 1st of August 2010 this fee is reduced to € 0,50. No longer will the fee be paid in cash but through Gift Certificates
  - Gifts, The Hague:

- For each successful observation a volunteer gets a fee of € 0,50. The fee is be paid through Gift Certificates

- All reports are also distributed to the transport operator. Furthermore feedback on smoking, non hands free phoning is done on a daily basis. Feedback on complaints is done on a weekly basis.

- **Strengths:**

  - continuous monitoring through regular customers

  - frequent feedback

  - direct relation between actions and measurements

- **Weaknesses:**

  - no control on observations

  - input based on remembered quality, not real-time

- Only those results should be reported for which the actual statistical reliability reaches 90% or better.

- Mostly we work with **targets** like:

  - the average customer satisfaction must be 7.0 or better

  - the average given for the driver must be 7.0 or better

  - more than 70% of the customers are satisfied with …

- **Frequency of measurements**: depends on the reliability level, in both cases it was stated that on the level of lines we need **at least 25 observations per month**.

- In North Brabant there is no connection between quality improvement actions and quality monitoring process. Actions to improve quality are initiated on other grounds than the outcome of the monitoring. The monitoring is used to prove what's actually happening.

- In The Hague there is a strong connection. **Each improvement action is based on the results of the monitoring and is evaluated based on the results**. **It actually follows the way as has been set out in the ENERQI proposal.**

- An action plan should be based on perceived aspects which need to be improved. A feedback loop is essential to keep all stakeholders interested.

- Feedback of passengers' appreciation of **drivers' behavior** lead to a positive impulse in both ways. Drivers were surprised by the good results, became more aware of their influence and as such reflected this to the customers, which in the second stage resulted in an increase in passengers' appreciation.

- A better **cleaning of vehicles** leads to an improvement of the overall satisfaction and not only on the topic of tidiness.

- Lack of or **poor information in case of disturbance** is one of the major **dissatisfies for customers**. We see a difference on this between busses, trams and light rail vehicles. In busses the satisfaction is far better on this point because there's a direct contact between the passenger and the driver.

- In North Brabant we encountered **barriers** as a result of:

  - Tendering procedures which lead to disturbed relations between the authority and the transport operators. Due to lawsuits the original tendering was declared invalid.

  - Changes in terms of employment lead to several and long lasting strikes.

  - Both circumstances lead to a downfall in the public opinion about public transport quality and usefulness.

- **A lack of interest by decision makers in the results of the monitoring made it very difficult to implement improvement actions.**
- In The Hague HTM's management was aware of the necessity to improve quality. Therefore work capacity was appointed and related to certain improvement actions. Also for each action a project leader was appointed and made responsible for the effectiveness.

- **These two cases of Quality Monitoring in public transport, are in fact the basis for the ENERQI project.**

4.2.10 Passengers satisfaction with PT services in the Netherlands in 2007 - 11

- Annual measurement of passenger satisfaction with PT services in the Netherlands by using questionnaires.
- ~ 16,5 million population, the whole country the Netherlands, bus, tram, metro, electric trolley buses, waterway transport and regional rail, PT Modal Share 5%.
- **Case Novelty**: It is the **first national bench mark in PT quality measurements**.
- The **monitored criteria are a selected subset of the EN 13816 hierarchical set.**
- About 90,000 Questionnaires every year, in about 80 areas, marks in scale 1 – 10. **Observers are users**.
- Users are interviewed during 7 weeks at the end of the year, from Monday till Sunday between 6 a.m. and 23 p.m.

4.2.11 CARRIS bus & tram operator, Lisbon Metropolitan Area, Market search

- ~ 2,8 ml population of Lisbon Metropolitan Area, PT Modal Share 45-50%
- ~ 500.000 population of Lisbon city area, PT Modal Share 30%
- CARRIS is a bus and tram Operator, Public.
- **CARRIS has a certification process** and they are the first company with certification on more than 60% of their lines.
- **Mission:** CARRIS mission is the rendering service of public transport for urban surface vehicles, oriented by **Sustainability criteria**, contributing to a development that attends present needs without compromising the ability of future generations to meet their own needs.
- **Vision:** CARRIS assumes, conscientiously, its responsibility as an economical and social agent that acts on urban mobility domain, contributing to the development and sustainability of Lisbon and its metropolitan area, adjusting its activity to the market needs, optimizing resources use in order to increase the company's efficiency and to improve their service quality.
- CARRIS has exclusivity of surface PT in Lisbon Area – Bus and Tram.
- CARRIS also invests on the certification of its lines, and is currently the sole operator of public passenger transport to take bus lines and trams certified, currently 52 (60%) bus lines, based on the standards **NP EN 13816:2003** and ET.STP 01-1 : 2005; ET.STP 01-2:2005 and ET.STP 02:2005 certifying entity CERTIF - Association for Certification of Products.
- The certification of service lines seeks to ensure the:

- Achievement of the levels of service quality,
- Improvement of the company image,
- Increase the number of customers,
- Increase customer loyalty and customer satisfaction

- There are two systems of quality measurement, one is inherent to the certification process and provides annual assessment. **This quality control is assured by the independent certification entities; they use mystery clients and analyze the service in all aspects: Cleaning, frequency, delays, information**…

- Another system of quality measurement is **the barometer of customers (Case Novelty)** and, although it has a greater margin of error provides feedback more frequently. **In the barometer we use surveys, telephone and e-mail questionnaires**.

- The monitored criteria are a **selected subset of the EN 13816 hierarchical set.**

- **Both mystery guests and direct interviews with costumers are used for data collection**. The indicators used are directly given by the data collected. No elaborate data treatment is required. Data is collected for the whole range of the lines covered. Data is reported every yearly quarter. The market research company uses mystery guests and obtains reports directly from users. **The market research company has found the e-mail to be the best way to directly communicate with costumers enrolled in the reporting**.

- Regarding the observers:
  - 1.000 in total and by period we use 400; observers are mystery guests and current users of the service
  - **No gifts are given to observer costumers**
  - Costs are assumed by the marketing research company
  - Quarterly
  - The certification company is notified annually on the results. No transport authority is notified on a compulsory basis.

- The reliability of data should be around 4% error margin.

- The **Portuguese standards for the certification of urban bus set some reference levels for each Key Performance Indicator**. For example, for the indicator liability, is expected that 90% of the trips foreseen are undertaken.

- Indicators/benchmarks should be measured every 3 or 4 months.

- Since there are three different entities involved in the quality monitoring (a barometer, a customer satisfaction survey related to the certification process and the services and security certification), it is difficult to estimate values. However **the estimated cost for the barometer is between 30.000 € and 40.000 € / year**

- **Barrier: Getting observers active** for such a long period.

- **The cases presented by CARRIS are relative to ENERQI project, must be further exploited.**

4.2.12 Spain, Manual for the implementation of quality management in PT

- Documents provided in Spanish by Ministerio del Fomento, Spain

- The **document "Best practices and recommendations for improving customer satisfaction on public passenger transport by road"** is a document prepared by CETMO, at the request of the Ministerio del Fomento. One **objective** of this document is **to rebuild, update and adapt good practices and recommendations geared to help and guide those involved (directors, managers and operators ...) in improving the perception of customer service, and put them in a format accessible by Internet**. It is expected to be particularly useful to those responsible for planning the implementation strategies for customer satisfaction of public transport. This document is complementary to the "Handbook to support the Implementation of Quality Management According to UNE-EN 13816 lines of public transport by Road."

- Spain is developing skills for operators, requiring them in tender procedures to have their lines certified by the European standard of quality. E.g. the concession of the urban transport Bilbobús by Ayuntamiento de Bilbao - the contract for the provision of urban bus service obliges the operator to certify its service by UNE-EN 13816 in at least three lines over a period of two years after signing the contract.

- The **document "Manual to support the implementation of quality management according to UNE-EN 13816 in lines of public transport by road"** describes the **methods which are considered more useful to monitor customer satisfaction** in the service of passenger transport. This document identifies the following methodologies:
  - Focus groups, discussion groups and depth interviews
  - Reports of personnel in contact with the customer
  - Market research
  - Customer satisfaction surveys
  - Mystery Shopper
  - Following the statements of dissatisfaction (suggestions, complaints and claims)
  - Analysis of internal operating indicators
  - Direct measures of performance (real time)

4.2.13 Fertagus, Suburban passenger rail transportation, Lisbon, Portugal, Quality Monitoring Practice, Sustainability Report

- ~ 2,8 million population, PT Modal Share 35%, suburban rail, metro, tram, electric trolley buses, buses, waterway transport

- Fertagus is a **suburban passenger rail transportation** that crosses the Tagus River, connecting the south to the North of the Lisbon Metropolitan Area. Private Company.

- The **Sustainability Report** 2008 presents the **mission, vision and values of Fertagus**, as well as its sustainability strategy. It also presents its strategic objectives (which include objectives relating to service quality) and outcomes.

- Taking into account the principles of rule AA1000SES (standard developed by the Institute Social and Ethical Accountability), the sustainability report was developed taking into account the following stakeholders: customers, employees, suppliers, partners, investors and community. **The environmental performance indicators were selected considering the Guidelines developed by the Global Reporting**

Initiative (GRI) - Guidelines for sustainability reports in 2006, the company's experience and the Greenhouse Gas Protocol ("Protocol Greenhouse Initiative").

- The Sustainability Report contains the **criteria for calculating the environmental performance indicators, including estimates of CO2 emissions from direct and indirect consumption of electricity, petrol and diesel consumption**. It also considers the **index of customer satisfaction through a Global Satisfaction Index calculated without weighting on a scale 1-5**, which results from studies of Satisfaction and Customer Profile, performed every two years.

- **In this context this report is related to ENERQI context.**

- **Fertagus obtained certification for its Quality Management System** in November 2002 by NP EN ISO 9001:1995, being the first company of Public Transportation of passengers globally certified. In January 2005 it was granted the renewal of certification according to NP EN ISO 9001:2000.

- Certification of Fertagus applies to the design and implementation of:
  - Passenger transport along the main north-south rail
  - Road transport services that are complementary to the rail Fertagus stations
  - Service Maintenance of Electric Multiple Units
  - Marketing of Commercial Premises

- A PT line certification scheme is underway at the national level for rail services (until today it only exists for bus lines). It is likely that Fertagus will run for certification as soon as it becomes implemented.

- The quality monitoring isn't mandatory, although most of the public transport operators have management certifications (ISO 9001).

- **There is a legal order (Despacho 26811/2004 of December 24th) that states that all transport companies shall submit independent reports including information relating to social and environmental aspects of its business.**

- The publicly reported **information on the Image and Quality Survey** 2010 includes the following **indicators**:
  - What is the mode of transport that is used in alternative to Fertagus?
  - Which are the main reasons for not using private transport (congestion, fuel price...)
  - What is more important in business: efficiency, reliability, innovation...

- The **Customer Satisfaction Index** is calculated based on the outputs from this report.

- On the Image and Quality Survey 2010 conducted by the company to evaluate the satisfaction levels and profile of its customers, **the sample** included 1104 women and 930 men, all customers of Fertagus.

- The **Quality and Image surveys are conducted every two years** (the first was in 2006). These reports aren't available online, only a remark on the company website outlining the main results.

- The Image and Quality Survey is made using **direct and personal interviews** following a **structured questionnaire with open and closed questions**, with an average of 8 minutes to each interview. The information is collected in all time periods, during working days and weekends, at the station of origin in both directions.

- The **observers** used **are customers (users, passengers)**.
- The **strategic objectives of the company's sustainability report** published in 2008, included:
  - The **increasing of the global demand**, particularly outside of peak hours and on weekends, and non-regular trips - For this purpose four plans and actions were prepared, with an implementation rate of 90%, a target of 2% results of 3%.
  - **Conservation of the global customer satisfaction Index** - 72 plans and actions were prepared, with an implementation rate of 84%, a target of 4.3 (on a **scale of 1-5**) results of 4.34.
  - **Improve efficiency in the use of information systems** - 26 plans and actions were prepared, with an implementation rate of 65%, to be evaluated in 2009 (results not available).

4.2.14 Mediate (Methodology for describing the accessibility of transport in Europe)

- **Mediate is an EU Project**, 7th FP.
- In order that Europe's cities can assess the extent to which their public transport system is fully inclusive, the **Mediate Project aims to establish a common European methodology for measuring accessibility**.
- This will lead to the development of a self-assessment tool that can be used by policy makers to identify areas where upgrading will improve the accessibility of public transport in their city.
- In this way, Mediate will contribute to the provision of better and easier access for all.

4.2.15 Portuguese Standards of public passenger transport - urban bus routes

- NP4493:2010. This standard will be used for future audits for the certification of urban bus lines, along with NP EN 13816:2003.
- This norm refers to public transport of passengers – urban bus routes, and is intended to promote an approach with a certain level of quality, focused on the expectations and needs of customers, with a certain confidence level of reliability on the service provider.
- **This norm provides a quality monitor methodology, including quality indicators with levels of reference (threshold performance levels), and is relevant to the ENERQI context.**
- CARRIS is the only Portuguese operator whose routes are certificated according to the EN 13816. With the Portuguese norm it is expected that the other operators will follow suit, namely Rodoviaria de Lisboa (which is also in Lisbon Metropolitan Area) that have already made some efforts in this direction (Rodoviaria de Lisboa already monitors the customer satisfaction through annual surveys).
- The **customer charter** has the characteristics of quality of service that the operator undertakes to comply within this standard.
- The **data collection methods** applied according to the norm are:
  - **Mystery Client Survey**
  - **Direct measurement of performance**
  - **Client Satisfaction Survey**

- **The indicators / benchmarks** to be measured in the quality management process **are given in a table**, which also contains the performance levels (scores) required for each indicator, the unacceptable performance threshold, the measurement method and the periodicity.

- **This table can be very useful in the selection of suitable indicators / benchmarks for use in the ENERQI Common Methodology and is attached in Appendix 3 of the present report.**

4.2.16 STP Alba Iulia, Romania, Quality System

- ~ 80.000 population, Romania
- **S**OCIETATEA DE **T**RANSPORT **P**UBLIC S.A. (STP) ALBA IULIA, Romania, Private Bus Operator.
- There is a **local strategy plan** which is including a **sustainable development** of the current PT network.
- This strategic plan is:
  - **customer oriented** by extending the current bus lines network with new lines to a suburban area.
  - **environmental targets** by promoting low emissions new buses,
  - **energy savings** through increase of the PT share, and through adaptation of the transport program to the citizens needs.
- **This project is related to ENERQI context regarding:**
  - energy savings & emission reduction
  - involvement of citizens and users
  - increase the use of PT
  - quality indicators
- STP has implemented and **certificated** the SR EN ISO 9001:2008 **Quality Management System** from 2007; The Management System has been updated from then with the following certifications:
  - ISO 14001 - which gives the requirements for environmental management systems,
  - OHSAS 18001 - Occupational Health and Safety Management System,
  - EN 16001:2009 - Energy management systems and
  - ISO/IEC 27001 - Information Security Management System (ISMS) standard.
  - All this systems are working together as an Integrated Management System.
  - In completion to the 9001 system we have implemented the **EN 13816** provisions.
- The **monitored criteria are a selected subset of the EN 13816 hierarchical set.** Both quantitative and qualitative data are required to calculate the indicators. Charts, percentage values analysis required to calculate the indicators.
- The report frequency is two times a year.
- The time period – two weeks in February and 2 weeks in October.
- The data collection is made using the following sources:
  - **Questionnaires** handed by our staff
  - **Field observers**
- The following **types of observers** are used:
  - Until now clients were questioned using a simplified form to fill out, given from our controlling personnel, in the bus or at the stop station (before or after the trip).

- Part of the quality management system and investigation of the quality of the cleaning process of the buses is made before the bus enters service from the staff of the maintenance division.
- One feed-back is offered through the call-free phone line, where the customers can call us for free to give us reports about problems, improvement ideas, etc.
- In the future we will use trained mystery guests to fill a questionnaire on different lines, time, etc. after the trip. Direct contact with our staff.
- For the younger customers, who are familiarized with the use of the internet we will give the opportunity to fill on-line the forms (questionnaires). We will update our site (for now is still under construction) to give the possibility to fill on-line the forms (questionnaires).

- **Concerns related to observers.**
  - The number of observers has to be proportionally to the average number of customers. They should be 15 years old or higher.
  - Taking into account the types of observers (different ages, education, etc.) it can be possible to use a few types of data collection methodologies.
  - Observers' gifts can be in form of non paid trips, etc.
  - More than 50 users are recommended.

- Performance level not less than 80%.
- Indicator / benchmark measurement two times a year.
- Based on the **management analysis** (analysis of the data gathered from all sources) a **management plan of actions** is issued.
- **It is difficult to report a certain increase in number of customers to one quality improvement.**
- Action Plans required in order to achieve the targets: Staff training, investments costs, media campaign and information.
- As part of the Quality Management Action Plan, we have begun upgrading the quality of our service a few years ago. Newer and cleaner buses (satisfying **Euro 4 and Euro 5 norm**, low-floor buses with air condition, etc). New information system at the bus stop and in the bus, investments in the staff training, new image, cleaner vehicles, new e-ticketing system (with the possibility to count the number of trips made from our clients, etc.)
- **Difficulties are reported in recruiting and rewarding the observers.**

4.2.17 SC URBIS SA Baia Mare city, Romania, Quality System

- ~ 141.000 population, PT Modal Share 35%.
- SC URBIS SA, Bus Operator, Public, Buses, trolleybuses and microbuses.
- The major PT operator from Baia Mare city, SC URBIS SA, together with Baia Mare Municipality, is a partner of an European project whose acronym is AD PERSONAM.
- SC URBIS SA **major goal in this project was to draw the attention of car drivers on the benefits of PT network use for their daily trips to work/study place**, which should also diminish traffic congestion in their city, improve environmental protection, save time and fuels as well.
- The main steps done by SC URBIS SA in this project are:
  1. written messages signed by Baia Mare Mayor sent to about 10.000 persons (200 letters) and emails, kindly inviting them to involve by both answering a

questionnaire regarding their current way of moving in the city and giving their home/working mail address

2. intensive publicity of the project in local media channels, including an advertising spot

3. selecting 700 persons among the 1326 who answered the invitation, especially those who are currently using cars for going to work/study place

4. sending the 700 selected persons a personalized transport plan, on how to get from home to work and back, and a promotional free ticket for one week. The plan was mentioning the closest PT network stop (bus, trolleybus or tram) from home/work, the embarking times and the estimated duration of the two way trip

5. After the promotional week, the 463 persons who proved they used PT means by returning the validated tickets, received a season ticket for two months at a 40% lower price

6. 1.000 persons were interviewed by phone call regarding their rate of satisfaction by using PT services; 325 answered the interview, of which 67% declared they'll use PT network further on for different reasons: 53% for saving money, 29% for saving time, 9% to avoid stress, 5% for environment protection and 4% for other reasons.

   Among the 33% who won't use PT means further on, 75% are disappointed by the long duration of a trip and 25% by the system logistics.

7. project dissemination towards other PT operators for an exchange of experience.

- **The most important result** of SC URBIS SA Baia Mare actions is of **getting 105 new potential passengers interested to change old habits regarding their mobility by using local PT network** from different reasons:

  - saving money 49% and time 30%
  - avoiding stress 10%, environment protection 5% and other reasons 4%.

- There is a local strategy plan which is including a sustainable development of the current PT network. This strategic plan is:

  - customer oriented by extending the current trolleybus network with a new line to a sub urban area
  - environmental targets by promoting electric PT means (trolleybuses).

- Incentives proved to be a benefit of the currently applied quality monitoring system.
- **This project is related to ENERQI context regarding:**
  - energy savings
  - involvement of citizens and users
  - discouraging individual transport by cars
  - 105 new PT users is a final positive result or indicator.

4.2.18 The New TURSIB (Sibiu city), Romania, Quality System

- ~ 200.000 population, Sibiu city, Romania, PT Modal Share 41%, SC TRUSIB SA, Public bus company.
- Supported by Sibiu Municipality and a German consultancy company from Dresden (VCDB), SC TURSIB SA initiated a restructuring and modernization program of PT network in Sibiu, aiming at increasing the market rate of PT services and the number of the carries passengers, by mainly improving the quality of the offered services.

- An economic analysis of the routes operated by TURSIB and the results of a traffic study, conducted at the end of 2008, showed that 30% of the routes were operated with a low profit and 20% were operated at a financial deficit.
- The **objectives** of TURSIB Business Plan were to **offer a Public Transport service corresponding the passengers needs** and to **reduce the daily operated km** through the following measures:
  - to increase PT frequency
  - to reconsider the whole PT network and its timetable, mainly for the industrial areas, according to the companies staff working program in that part of the city
  - to reduce the duration of a trip, by mainly reducing waiting times at stops
  - to improve inter modality by assuring a smooth urban trip between two points with maximum one change of PT means
  - to make ticketing system more attractive to passengers by simplifying it; a nominal season ticket, valid for all lines and differentiated by time intervals (monthly, weekly or daily) proved to be a good solution for an improved mobility of the end users.
- Every displayed information offered by TURSIB was done with its logo and motto "We are moving the city" using the two specific colors of the PT operator: yellow and blue.
- Every stops of the PT network were endowed with timetables for each line and other useful information.
- Passengers are currently receiving from SC TURSIB SA printed leaflets and flyers with basic information on PT network major features and changes.
- Another implemented measure for improving PT services quality was **drivers** new suits/clothes and **training regarding their behavior** against passengers, which will be extended in the coming future to other staff categories working in direct contact with passengers.
- **As a result of these implementations the number of the carried passengers during the first semester of 2010 increased with 25% comparing with the same semester of 2009.**
- The number of passengers' notifications and complaints reaching SC TURSIB SA also decreased with about 80% for the same interval.
- **TURSIB business plan** was targeted on:
  - **customer service oriented** by making PT means and ticketing system more attractive
  - **energy savings** by reconsidering PT network and eliminating those overlapping trunks of different lines
  - **passengers involvement** by informing them on different ways
- Incentives proved to be a benefit of the currently applied quality monitoring system.
- **This project is related to ENERQI context regarding:**
  - **energy savings**
  - **involvement of citizens and users**
  - **discouraging individual transport by cars**
  - **PT users increased with 25%**
  - **Improved frequency of PT means**

4.2.19 Romania, National Survey on Quality System

- Romania, whole country.

ENERQI

- A **survey launched by URTP** addressing its members, PT operators from all over Romania.

- URTP updated its statistics regarding its members (PT operators) concerns on customers' observations for improving the quality of the services by launching a survey addressing all the 37 PT operators. 38% answered these questions and only two PT operators described a study case or project results.

- 21 PT operators of the 37 do have a website offering information about their services. However, very few websites are offering the possibility to receive passenger's opinion on the quality of these services. Here are the results of this survey:

  1. Did you know that a tendering process regarding local PT services supply has to include information about the quality of these services, according to SR EN 13816:2003 provisions?
     71% of the responders had a positive answer.
  2. What are the tools you are using in a Management Plan of the offered services, in order to inform passengers about your efforts to improve their quality?
     Most responders are equally informing passengers, in vehicles and at stops, about the offered services and are also investing for a more comfortable and safe trip. Publicity is used at a lower rate (36% of the responders).
  3. How are you evaluating passengers' expectations?
     Most responders prefer to have a direct communication (call centers) with their users. Half of them are also using surveys launched within PT network and less on their website.
  4. Who are your dialogue partners for improving the quality of the offered services?
     All responders are dialoguing with both real and potential passengers and with local authorities as well. Very few are dialoguing with other PT operators (21%).
  5. Quote with 1 to 8 (1=most important and 8 – least important) the quality criteria as described in SR EN 13816:2003, according to your priorities for increasing the quality of your services.
     The answers are detailed further on at 'Quality Control System (Methodology) chapter.
  6. What is the average rate you are managing to answer passengers' needs regarding your services quality?
     Most responders appreciated this rate between 50-100% and only 20% between 20-50%.
  7. If you deploy(ed) a case study or a project on ENERQI topic, we kindly ask you to describe its results.
     Two PT operators gave URTP a brief description of their project/study case.
  8. **Are you interested to become an ENERQI Follower?**
     79% are interested to become an ENERQI Follower.

Quality Control on a National level:

- Urban Public Transport operators of Romania are using a Quality Control System defined within a Manual of Integrated Management corresponding to SR EN ISO 9001:2008 and SR EN ISO 14001:2005 provisions. This system is defining both the quality policy of the performed services and the quality indicators to be monitored (GPS or manually so far) and monthly reported, in order to increase passengers satisfaction and their number.

- ISO certification is a result of an internal auditing procedures followed by an external audit which is concluded by ISO certification to be reconsidered every 3 years.

- ISO certification is compulsory for those PT operators who, together with the local transport authority, are:

  - participating in a route tendering or PT services contracting
  - requesting bank credits for either PT infrastructure or rolling stock investments
  - accessing European funds for these PT services development.

- Most private operators of Romania are ISO certified while public operators, either autonomous or commercial companies (subordinated to Local Councils) are aware of SR EN ISO 9001:2008 provisions but they are not all ISO certified.

- The **monitored criteria are a selected subset of the EN 13816 hierarchical set.**

- The collected data should reflect the real situation regarding:

  - passengers satisfaction
  - beneficiary satisfaction (local authority) comparing with contractual indicators

- The analysis of the collected data should be:

  - quantitative (number of passengers in different points of PT network or at different moments of a day, number/frequency of the running vehicles, etc.)
  - **qualitative (acc. to SR EN 13816:2003)**

- There are situations where the collected data are referring to the whole PT network or those areas where functional parameters of the network are changed.

- Reports are almost monthly and the analyzed interval is quarterly or annually.

- **The first three frequent ways of data collection generally used in Romania are:**
  - **telephone interviews**
  - **questionnaires**
  - **websites**

- **PT operators' staff are mainly used as observers** and less contractual survey specialized companies or volunteers.

- A direct down-top communication, either verbal or in written, is generally used with the accordingly trained staff on quality management issues.

- **Among the major concerns related to observers:**
  - **Lack of incentives are not motivating them to fulfill this additional/volunteer task to their daily current duties**
  - **Human factor is often influencing their feedback as a subjective one, depending on their state**
  - **Observers features (age, geographical area, education, habits) are also influencing their feedback**

- Those data regarding the **criteria** which are of interest for the targeted sample are more reliable, of which the most frequent are:

  - PT operator **staff behavior (mainly drivers)**

  - **Comfort of** their **daily trips** with PT system

  - **Last minute changes in timetables, routs, etc**.

- The monitored performance indicators should target that part of the PT network with a lower impact on the afflicted passengers.

- Each monitored indicator should be measured at least before and after a measure implementation.

- Quality improvement actions:

  - Corrective actions and an effective communication are recommended.

- Action Plans beside the application of investment costs:
    - effective working procedures and
    - staff training
    - should be included in an Action Plan as part of a Quality Control System.
- **Quality results related to the ENERQI context:**

    Baia Mare and Sibiu cities examples

- **Barriers to success:**
    - **Lack of cooperation between PT operators and some local authorities who are ignoring the basic local PT principles for a sustainable urban mobility but also the   importance of being themselves ISO certified**
    - **Some local authorities are postponing some measures of reorganizing urban areas with PT services promotion (priority in traffic) or encouraging a non loyal competition among PT operators in a same city**
    - **There are cities where public operators managers are selected rather based on political reasons and less on a corresponding professional expertise**
    - **Lack of funds for investments with considerable positive impact on quality improvements**

- **Drivers of success:**
    - **Some Mayors are effectively supporting PT operators, both financially and logistically, in order to increase the quality of their services**
    - **Periodical training of PT operator staff for achieving performance indicators of the concession contract**
    - **Rewarding positive achievements by offering different facilities to those involved in a Quality Control System (proposal).**

4.2.20 BHLS project - The (in)efficiency of trams and buses in Brussels: a fine geographical analysis

- BHLS project – focusing on **'Bus High Level Services'** in Europe, **comparing with BRT (Bus Rapid Transit)** already implemented in US, South America, Asia, since 2000

Brussels, Belgium. **Methodological aspects**:

- Data used and pre-processing: Our analyses were based fundamentally on the data that STIB/MIVB (Brussels) collects through its operating aid system (OAS). This system was implemented for its bus lines in the 1980s and then extended to the trams more recently in order to be able to follow the vehicles' progress in real time and take action if problems arose. To the extent that the OAS keeps a constant log of a certain number of types of information, including segment travel times, it "suffices" to recover these data and process them to be able to perform detailed analyses of the trams and buses performances.
- The approach that we took involved two inputs, as follows: The raw data were extracted from the OAS and pre-processed to be regrouped by 15, 30, or 60 minute periods, and then they were regrouped in a single database.
- This then made it possible to generate requests providing the indicators defined below for all the segments in the network. In addition, digitizing the STIB/MIVB network completely and assigning the STIB/MIVB standard code to each segment

(geo coding) enabled us to connect the data with their segments for mapping and analysis.

- The data that we used refer to all the segments between stops that were covered by the operator's trams and buses during the week from 6 a.m. to 11 p.m. from 15 September to 13 October 2006, inclusive. This period was sufficiently extensive to avoid atypical situations.

- In addition, we excluded the 5% of extreme travel times (minima and maxima) that often corresponded to unusual situations (vehicle breakdowns, driver absent or late when s/he theoretically should have clocked in, one-off work done at the start or end of the day, and so on).

- **Three measures of (in)efficiency**:

  The literature, operators, and authorities that organize transport usually define a certain number of indicators that enable one to analyze a network's efficiency (for a large range of them, see UITP, 2006). We defined three such indicators for our purposes. They relate to both the operator's and the passengers' interests. So, we added to the classical measurement of:

  - **commercial speed,** that of
  - **irregularity of service** and
  - **time lost** by the vehicles.

  Together, these three indicators give complementary information about the network's performances on the segment level.

  - **Commercial speed**
    - Commercial speed simply gives one an idea of the network's performance through the speed at which a trip may be made. For the passenger, it contributes to the total time of her/his trip. For the operator – and municipality that finances the service – the commercial speed has a direct impact on the number of vehicles to put on line to the extent that this figure is directly linked to the route travel time and frequency of service.

  - **Irregularity over a given period**
    - The segment travel times vary greatly over time. Beyond the peak and off-peak performance differences, one must also consider the variations over a given period, for example, the morning rush hour. For the operator, the variability of travel time for a given period makes it more difficult to draw up the timetables. This variability strains relations between management and the drivers as well as between the drivers and their passengers. The timetables are based on mean travel times, with the risk that vehicles will go by early or late. What is more, the known risk of delays requires scheduling more buffer time at the end of the line, which means putting more vehicles on the road, with the attendant increase in operating costs. For the passengers, the uncertainty of travel times means that they have to allow greater safety margins for all trips that require that they reach their destination at a specific time.

    - The irregularity of travel times is easy to detect through their standard deviations for a given period. However, the standard deviation is linked to the travel time itself, as segments that are characterized by high travel times more often have high standard deviations. To avoid such skewing, we looked each

time at the ratio of the standard deviation of each segment's travel time over the segment's mean travel time.

- **Time lost by the vehicles in a day**

  - As soon as the commercial speed fluctuates, one can assume that the deterioration in the travel time compared with the periods of maximum fluidity 9 (early in the morning or late at night) entails a time loss for the vehicles. This time loss can be calculated from the difference between the travel time at each period of the day and a fluid reference period (in our case, from 9 am to 10 pm), multiplied by the number of passes on the line.

  - From an economic and political standpoint, calculating the time lost at peak hours lets you deduce immediately the addition number of vehicles that must be sent out onto the road solely to make up for the slower commercial speed. This surplus can then be turned into a monetary value through the investment and operating costs to which it gives rise.

  - From an analytical and operational standpoint, fine mapping of the time losses, for example the time lost on an average day, lets one identify the segments that require more urgent action to improve the network's efficiency and operator's productivity and thus the efficient spending of public monies. Seen in this light, the indication of the time lost by all of the vehicles that run along a given segment each day complements the measurement of commercial speed most usefully, for it enables one to allow better for the volume of the supply that is concerned.

4.2.21 Athens Urban Transport Organization – OASA, relevant information

- OASA, (Athens Urban Transport Organization), is the (Metropolitan to be) Public Transport Planning and Monitoring Authority for the Greater Athens Area in the prefecture of Attica. The operators under the authority of OASA are: Sub-Urban Rail (1-2 lines), Attiko Metro (2 lines), ISAP Metro (1 line), Tram (3 lines), ETHEL (thermal buses, ~320 lines & 2.200 buses), ILPAP (electric trolley buses, ~22 lines & 370 trolley buses). Sub-Urban buses, National Rail lines, Municipal buses and Taxis are not under the responsibility of OASA. Although by law OASA has the ability to allocate contracts to operators for the provision of urban passenger transportation services, this has not been implemented yet. This comes along with the fact that OASA is not certified according to EN 13816 yet. The major problem that OASA is facing from the date of its institution in 1978, is economic sustainability as it depends on government subsidization and due to inability of the central government to fulfill its obligations, OASA is deeply in debt. Under the circumstances, passenger's satisfaction is not the primary vision of OASA and consequently measurement of passenger satisfaction is not a standard procedure for OASA, and it is done randomly. Therefore the results of ENERQI project would be extremely useful to OASA.

- ~ 3,5 million Greater Athens Area, ~ 4,0 million prefecture of Attica

- Sub-Urban Rail, Metro (2 operators), Tram, Thermal Buses, Electric Trolley Buses.

- PT Modal Share 28%

- Transportation Authority: OASA.

- Operators: PROASTIAKOS, AMEL, ISAP, TRAM, ETHEL, ILPAP.

- All belong to the public sector.
- OASA has completed its Strategic Plan in 2009. Quality plan is mentioned as a requirement, not fully developed in this document.
- **Vision of OASA Strategic Plan**:
    - PT is a public possession/asset and offers a basic level of mobility to all who do not have alternative means. As such PT is a major tool for social cohesion and acceptable life level.
    - PT must be a choice for a growing number of car owners, thus increasing the PT share.
    - PT must contribute to the decrease of air pollution and environmental improvement.
    - PT must be recognized by a big part of citizens as a valuable public investment.
    - PT contributes to road safety and reduction of road accidents.
    - PT is a means for improvement of (city) economic viability and attractiveness of urban environment.
    - PT must provide equal mobility distribution and accessibility to all categories of population and visitors of Attika, with special stress on vulnerable groups (disabled).
    - PT must contribute to the elimination of traffic congestion during working hours and days.
- Occasionally, at about every two years a customers' satisfaction survey was outsourced. Last, a big scale home interview survey was done in 2006-7. Such large scale surveys are repeated approximately every 10 years.
- Surveys are done with sub-contractors, using **staff of subcontractors as observers**.
- **Barrier** for application of quality monitoring process is the **cost of quality measures**.

4.3 Cross analysis of the PT systems cases examined

4.3.1 General Characteristics of the Examined PT System Cases

In this part of the state of the art methodologies investigation, 21 cases have been examined through the use of the ENERQI template data collection, all of which had something useful to contribute to the present survey.

The cases of PT systems examined refer to 12 European countries: Austria, Belgium, Bulgaria, Finland, France, Ireland, Greece, Luxembourg, the Netherlands, Portugal, Romania and UK.

The population and area sizes of the cities and districts to which the PT systems refer, vary from a minimum population of ~ 80.000 people to a maximum population of ~ 4 million people and from an area of ~ 20 sq km to over 13.000 sq km.

The PT systems in the areas examined cover all the range of PT modes, from suburban rail and train, to metro, tram, light rail, bus, trolleybus, microbus, on demand services and ferries.

Nine of the examined cases refer to public PT systems and six refer to private PT operators.

The PT share varies from small percentages in the regions (4-15%) to high percentages in the city centers (35-50%).

In almost all of the examined cases there is a Strategic or Business plan which sets the vision and targets of the PT organization. These vary between the examined cases but they are all more or less related to the vision and targets of the ENERQI project.

The main characteristics of the PT systems examined are presented in Table 4.1 below.

The big variation observed in the components of the cases examined, is an indication of the complexity of the issue of Quality and Passenger Satisfaction in PT Systems. This must be taken into account when a new general approach is attempted for the development of a Common Methodology for Monitoring PT Quality and Passenger Satisfaction in Europe, for dealing with Energy and Environmental issues in a uniform way.

Table 4.1 – Characteristics of PT system cases examined

Country	City/Region	Population	Modes in area examined	PT share %	PT Operator	Private/Public	Area Served	Type of services & lines examined	Strategic Plan	Vision	Relation to ENERQI
Austria	Graz	~ 300.000	bus, tram	20%	Graz AG GVB	public	127,58 sq km	8 tram, 27 bus, 8 night bus, 381 km network length	yes	Customer service Economy of operation Energy savings Environmental targets Users' involvement	Energy savings Emissions reduction Users' involvement Quality indicators PT improvements
	Styria, Region Aichfeld – conglomeration	~ 50.000	regional & interurban bus, rail	15%	Postbus	public		3 bus	yes	Customer service	Quality indicators
Belgium	Flanders region		bus, tram, metro		De Lijn	Public / private	13.500 sq km	bus, tram			
Bulgaria	Plovdiv	~ 350.000	bus, tram	33%	HebrosBus	private	102 sq km	11 bus	yes	Customer service Economy of operation Energy savings Environmental targets Users' involvement	Energy savings Emissions reduction Users' involvement Quality indicators PT improvements
Finland	Helsinki	~ 585.000	bus, tram, metro	50%	4 bus operators: Helsingin Bussiliikenne Oy (HelB) Concordia Bus Pohjolan kaupunkiliikenne (PKL) Veolia Transport	private		bus	tender documents		
France	Toulouse & wider area	~ 900.000	bus, metro, car pooling, minibus, car sharing, auto bike sharing system	16%	TISSEO	private	880 sq km	2 metro, 77 bus, 17 on demand		Customer service Users' involvement	Users' involvement Quality indicators PT improvements
Greece	Athens greater area	~ 4 M	suburban rail, metro, tram, bus	28%	OASA & subsidiary operators	public	4.400 sq km	suburban rail, metro, tram, bus	yes	Environmental targets	
Ireland	Dublin	~ 1,2 M			Átha Cliath – Dublin Bus	public		bus	yes	Customer service Economy of operation	Users' involvement Quality indicators

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Country	City/Region	Population	Modes in area examined	PT share %	PT Operator	Private/Public	Area Served	Type of services & lines examined	Strategic Plan	Vision	Relation to ENERQI
Luxembourg	Luxembourg city	~ 100.000	urban and regional bus	13%	Autobus de Ville de Luxembourg	public partly outsourcing	30 sq km	bus			
The Netherlands	Hague & Province of North Brabant	~ 490.000 & ~ 2,44 M	train, bus, tram, light rail	27% & 4%	HTM & Veolia and Arriva	private	98 sq km & 5.082 sq km	bus, tram. Light rail	yes	Customer serviceEconomy of operation	Energy savingsEmissions reductionUsers' involvementQuality indicatorsPT improvements
Portugal	Lisbon & Metropolitan area	~ 500.000 & 2,8 M	bus, tram, metro, boat	30% - 50%	CARRIS	public	85 sq km & 1.000 sq km	bus, tram	yes	Customer service Economy of operation	Users' involvement Quality indicators PT improvements
Portugal	Lisbon Metropolitan area	~ 2,8 M	rail, bus, tram, metro, boat	35%	CARRIS / Fertagus	private	85 sq km & 1.000 sq km	suburban rail	yes	Customer service Economy of operation Energy savings Environmental targets	Emissions reduction Quality indicators PT improvements
Romania	Alba Iulia	~ 80.000			STP SA ALBA IULIA	private	27 sq km	bus	yes	Customer service Energy savings Environmental targets	Energy savings Emissions reduction Users' involvement Quality indicators PT improvements
Romania	Baia Mare	~ 141.000	bus	35%	SC URBIS SA	public	15 sq km urban & 5 sq km suburban	bus, trolley bus, microbus	yes	Customer service Environmental targets	Energy savings Emissions reduction Users' involvement PT improvements
Romania	Sibiu	~ 200.000	bus	41%	SC TURSIB SA	public	121sq km urban & 151 sq km total	20 bus	yes	Customer service Energy savings Users' involvement	Energy savings Users' involvement PT improvements
UK	Merseyside (Metropolitan County)	~ 1,35 M	bus, rail, ferry		Merseytravel PTE/ITA	public	652 sq km	bus, rail, ferry	yes	Customer service Economy of operation	

In Table 4.2 below, the elements which are considered a novelty by the reporting PT systems are shown.

Table 4.2 - Novelty incorporated in the examined Quality Monitoring System

Examined Case – Operator, City, District, Country	Novelty
Graz AG (GVB) - Austria	• In previous years, the QM of the GVB was located in several different parts of the company. Now it has been unified and confined in one single entity dealing with the QM-process. All previous parts are incorporated there. • The system is database assisted • The system is based on the DIN EN 13816
Postbus - Austria	• The service is contracted by the regional government • The Quality of the service is part of the contract
Helsinki, 4 Bus Operators - Finland	• PT operators are financially rewarded if they meet or surpass certain quality criteria in the tender document.

HebrosBus - Bulgaria	• Integrated system for management (ISM) according to the standards:
	   - ISO 9001:2008,
	   - ISO 14001:2004 &
	   - OHSAS 18001:2007
	   • Cooperation with consultants on different projects and events

"Province of North Brabant - Veolia and Arriva", "The Hague - HTM" - The Netherlands	• Monitoring of PT quality through an internet survey based system • Use of volunteers who monitor quality on a regular basis • Each week (or two weeks in the Hague) tasks are assigned to the volunteers to do an observation on a certain line and time.
Annual measurement of passengers' satisfaction with PT services in the Netherlands by using questionnaires. http://www.ov-klantenbarometer.info/ - The Netherlands	• It is the first national bench mark in PT quality measurements in the Netherlands
CARRIS, Lisbon - Portugal	• The "Barometer" gives feedback and allows some adjustments in real time
Fertagus, Lisbon Metropolitan Area - Portugal	• At the national level, the quality monitoring practice through costumer surveys was relatively innovative (especially in the railway sector) in Portugal
SC URBIS SA, Baia Mare - Romania	• Incentives offered to the Operators proved to be a benefit of the currently applied quality monitoring system
SC TURSIB SA, Sibiu - Romania	

Based on the above information, it is very useful for the purposes of ENERQI project to highlight the importance of:

- Having all the activities related to quality management collected in one entity as indicated by Graz, or
- The importance of allocating PT contracts with the quality of the services being incorporated in the contract, as indicated by Postbus - Austria
- The importance of quality certification of PT authorities and operators is indicated by HebrosBus – Bulgaria, as a state of the art practice for organizations aiming at the provision of quality services.
- This is closely related with the existence of Customer Charters.
- In Helsinki PT operators are financially rewarded if they meet or surpass certain quality criteria which are included in the tender documents.
- Similarly in Romania, incentives offered to the Operators proved to be a benefit for the currently applied quality monitoring system.
- The "Barometer" as a method of monitoring passenger satisfaction, offers flexibility and speed in responding to issues raised by costumers, as indicated by CARRIS, Lisbon – Portugal.
- In the Netherlands, an innovative methodology for monitoring PT quality - through an internet survey based system, using volunteers who monitor quality on a regular basis according to tasks assigned to the them by the quality management team, to do an observation on a certain line and time - could be the base for the development of the common ENERQI methodology for quality monitoring and passenger satisfaction monitoring in PT systems, as indicated by the North Brabant and The Hague cases.

From the review of the detailed description of the methodologies used in the examined cases, the following findings are noted: There are several methodologies reported all of which cover the specific needs of the organizations that developed and use them for quality management and/or passenger satisfaction measurement, but almost all methodologies include certain common elements which can be roughly described as follows:

1. Determination of the indicators which better describe the level of quality in the specific PT system.
2. Collection of data related to the selected indicators.
3. Analysis of the collected data and estimation of the quality level.
4. Development of action plans for the improvement of the quality level.
5. Implementation of action plans for the improvement of the quality level.
6. Increase the customer satisfaction and the PT usage.
7. Collection of data related to the selected indicators to evaluate the success of the implemented actions.

The above steps are in line with the ENERQI Quality Loop as it is graphically displayed below in Figure 4.1

In the following, the identified seven basic common elements of the examined methodologies will be presented in a more detailed way.

Figure 4.1 – The ENERQI Quality Loop
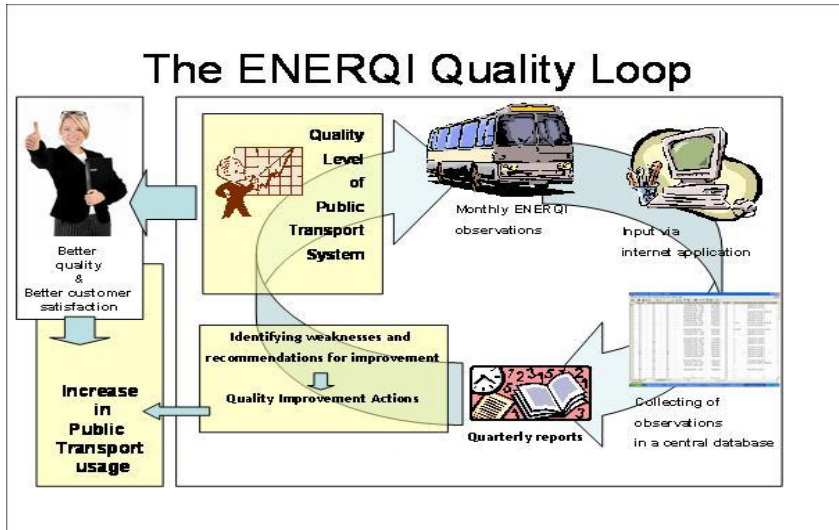
4.3.2 *Determination of Quality Level Indicators*

In almost all cases examined, the indicators used to measure the level of service quality are a sub set of the quality factors mentioned in the EN 13816:2002 European Standard. This is clearly stated in some cases e.g. the Atha Cliath, Dublin – Ireland case, or it is indirectly inferred. Every basic/simple quality element in the PT system can be placed or located somewhere in the hierarchical tree of the 8 major quality factors established by EN 13816.

There are a few composite indicators mentioned in some of the examined cases which are not directly derived from the EN 13816, such as:

- general or overall satisfaction,
- value for money,
- evaluation of the image,
- improvement for each PT mode,
- level of service, etc.

It is more objective and safer to start by choosing simple indicators which can be later combined to form composite indicators if necessary.

Depending on the existing level of service in the various examined cases, some PT organizations emphasize on the more basic quality elements such as:

- availability,
- accessibility,
- time,
- information,

while others emphasize on higher quality elements such as:

- customer care (behavior),
- comfort,
- environmental impact

There can be no universal recommendation for the indicators to be used in a common methodology. Every PT organization will have to choose the set of indicators that better suits its specific needs.

4.3.3 Data Collection Method for the Selected Indicators

This is a key issue, critical for the ENERQI project, especially for the design of the common methodology to be applied in the next phases of the project.

EN 13816, in Annex C "Guidance Notes on Performance and Satisfaction Measurement", suggests three ways for collecting the required data:
- Customer Satisfaction Surveys (CSS)
- Mystery Shopping Surveys (MSS) and
- Direct Performance Measures (DPM)

Some additional ways of collecting data are given from the experience of the examined cases of the ENERQI template survey, which are:
- Customers' satisfaction "Barometer" (CARRIS, Lisbon – Portugal)
- Passenger telephone portal for complaint management (AG (GVB), Graz – Austria)
- Following the statements of dissatisfaction (suggestions, complaints and claims) (Spanish Manual for QM)
- Board of customers (AG (GVB), Graz – Austria)
- Focus groups, discussion groups and depth interviews (Spanish Manual for QM)
- Reports of personnel in contact with the customer (Spanish Manual for QM)
- Analysis of internal operating indicators (Spanish Manual for QM)

The above methods can be applied in parallel and can be complimentary between them when quality management is sought in general terms. One of the factors that will determine which one will be used is the cost.

Since ENERQI's concept is based on the involvement of the customers / citizens and the measurement of customer satisfaction, emphasis must be placed on the improvement of CSS methodology in order to achieve the best direct customer satisfaction estimation avoiding bias and substitutes of customers. In this sense, the methodology for data collection presented at the North Brabant region and the Hague city of the Netherlands, is indeed the closest to the ENERQI targets. This methodology is using volunteer passengers to monitor quality of PT by reporting specifically selected indicators, through an internet based survey system, on a regular basis - weekly or every 2 weeks, for specific lines and times.

Issues related to this methodology are:
- How to select the volunteers?
- How many volunteers are needed?
- Should there be a gift to the volunteers in order to retain them? Money gifts are not recommended anymore. Ticket gifts or participation to lotteries seems to be a preferable option at present times.
- How to communicate with the volunteers? E-mail, internet and telephone communication seem to be the prevailing options.
- What should be the scale used in the questionnaire in order to register qualitative indicators of satisfaction? From the information collected in this report it seems that 1 to 5 points is the most frequently used scale in the presented cases, with the exception of the Netherlands where a scale from 1 to 10 is used.

4.3.4   Collected Data Analysis and Evaluation of the Quality Level

The analysis of the collected data may require the use of some statistical software i.e. SPSS (Brabant and The Hague – the Netherlands) or may be done by other computing tools such as Ms-Excel spreadsheet. The use of Internet based surveys and immediate introduction of the raw data into an appropriate Data Base facilitates and automates the analysis of collected data.

The next issue of concern is how often the results of the quality surveys should be reported. Depending on the usage of the quality survey results, the reporting period can be quarterly, half yearly, yearly, or every two years.

According to the survey of the examined cases, when the quality management is used as a strategic tool, the recommended reporting period is longer while when the quality management aims to short term improvements the measurement and reporting of the indicators should be done at short time intervals and preferably before and after the implemented improvements. In the case of De Lijn, Flanders – BELGIUM, the recommended reporting frequency is:
-   Company and entity level: every quarter.
-   Line level: every quarter, but with moving average of the previous 4 quarters
-   Operator level: every 6 months
-   Contract level (for private contractors): every year

4.3.5   Action Plans Development for Quality Level Improvement

Under the present perception that Quality Management is a strategic and / or tactical tool in the PT system, action plans must be coordinated with the quality monitoring process. In the survey of the examined cases, the quality reports are sometimes addressed to the senior management (Atha Cliath, Dublin – Ireland) for setting of priorities, or to the company's line level (De Lijn, Flanders – BELGIUM) for improving service attributes.

4.3.6   Action Plans Implementation for Quality Level Improvement

Action plans may consist of e.g. staff training, investments costs, media campaigns and information (STP, Alba Iulia – Romania), investments in improvement of the infrastructure

investments in new technological improvements, including information technologies (HebrosBus, Plovdiv – Bulgaria)

4.3.7   Increase of Customer Satisfaction and PT Usage.

The most prominent example of a PT system usage increase due to the implementation of action plans related to quality management program comes from TURSIB, Sibiu city – Romania. The number of the carried passengers during the first semester of 2010 increased by 25% in comparison with the same semester of 2009, as a result of action plans implementations. Also, the number of passengers' notifications and complaints reaching SC TURSIB SA decreased by about 80% at the same time interval.

4.3.8 Measurement of Success of the Implemented Actions.

The performance and satisfaction measurements must be repeated some time after the implementation of the action plans in order to evaluate the success of the these actions. According to STP, Alba Iulia – Romania, it is difficult to relate "one quality improvement" to a "certain increase in number of customers".

4.3.9 Barriers and Drivers of Success of the Quality Management Process

Last and very useful information gathered by the template survey refers to the identification of barriers and drivers of success of the Quality Management process in PT systems. The detailed information is presented in Table 4.3 below.

Table 4.3 – Barriers and Drivers of success of Quality Management process

Examined Case – Operator, City, District, Country	Barriers to the success of QM process	Drivers of success of QM process
Atha Cliath, Dublin - Ireland	Cost of work	If the company has a Customer Charter with quality commitments or If a public service has quality requirements with associated payment it makes it much easier to justify necessary expenditure
De Lijn, Flanders – BELGIUM		Define beforehand standards for every satisfaction measurement you do, for every factor. This avoids discussion afterwards and defines clearly when corrective actions are needed. Communication, involvement of the whole organization Empowerment of all the management levels to take action in their domain/range of responsibility
Merseytravel, Liverpool, Merseyside – UK	Cost of implementation, Ability to benchmark results with other PTE areas that may have a different quality system in place	
TISSEO, Toulouse – France, (PT image and satisfaction Barometer)	This methodology (Barometer) is not really pleasant for interviewees. Long telephone interview.	This methodology (Barometer) is simple to be done and cheap
TISSEO, Toulouse – France, (Mystery guests)	This methodology (mystery guests) needs a lot of field observers to be reliable. A staff improvement can be a solution.	Regularity of the measure is the key of the operational staff reactivity when non compliance is detected.

Brabant and the Hague – the Netherlands	In North Brabant barriers were encountered as a result of: Tendering procedures which lead to disturbed relations between the authority and the transport operators. Due to lawsuits the original tendering was declared invalid. Changes in terms of employment lead to several and long lasting strikes. Both circumstances lead to a downfall in the public opinion about public transport quality and usefulness. A lack of interest by decision makers in the results of the monitoring made it very difficult to implement improvement actions.	In the Hague HTM's management was aware of the necessity to improve quality. Therefore work capacity was appointed and related to certain improvement actions. Also for each action a project leader was appointed and made responsible for the effectiveness.
CARRIS, Lisbon - Portugal	Getting observers active for such a long period	
STP, Alba Iulia - Romania	Difficulties in recruiting and rewarding the observers	
National survey - Romania	Lack of cooperation between PT operators and some local authorities which are ignoring the basic local PT principles for a sustainable urban mobility but also the importance of being themselves ISO certified Some local authorities are postponing some measures of reorganizing urban areas with PT services promotion (priority in traffic) or encouraging a non loyal competition among PT operators in a same city There are cities where public operators managers are selected rather based on political reasons and less on a corresponding professional expertise Lack of funds for investments with considerable positive impact on quality improvements	Some Mayors are effectively supporting PT operators, both financially and logistically, in order to increase the quality of their services Periodical training of PT operator staff for achieving performance indicators of the concession contract Rewarding positive achievements by offering different facilities to those involved in a Quality Control System (proposal)

The main identified barriers of success are:

- cost of work for the quality & satisfaction surveys,
- lack of interest by the decision makers,
- difficulties in recruiting, rewarding and retaining observers,
- lack of cooperation between PT operators and Local Authorities,
- lack of professional expertise of top managers.

The main identified drivers of success are:

- existence of a Customer Charter with quality commitments - makes it necessary to perform QM procedures,

- communication,
- involvement of whole organization,
- support from Local Authorities.

5 CONCLUSIONS AND RECOMMENDATIONS

The challenge of contemporary Public Transport organizations (authorities and operators) is not only to offer "statistically estimated" high level services, but to make sure that the customers, existing or candidate, know about the high level services provided, are satisfied by them and are willing to eliminate the use of their private car or other motorized personal modes of transport, thus contributing to the decrease of fossil fuel consumption and related environmental impacts.

These concepts which are under discussion for at least the last two decades, have been adopted by EU and its member States and have been studied, researched, have been reflected in norms and standards and are starting to be implemented by pioneer transport authorities, organizations, institutions and operators.

Having done an extensive literature and internet survey on relative research programs and having examined information gathered through a purpose designed questionnaire template which was addressed to European PT organizations cooperating in the ENERQI project, the findings of this task have been documented in the present "State of the Art" report on PT "Quality Monitoring and Passenger Satisfaction".

In the following, the main findings of this task are summarized and presented under the topics of conclusions and recommendations, in order to contribute to the development of a common methodology for monitoring PT quality and passenger satisfaction in EU countries, or to be used independently by the Academic community or other PT organizations.

5.1 Conclusions

In almost all of the examined documents and practices, the following elements have been identified as key issues / constituents of the best practice methodologies for measuring passenger satisfaction from Public Transport:

- Identification of the key indicators / benchmarks that need to be monitored in order to guarantee the desired quality of the PT level of service and passenger satisfaction.
- Collection, measurement and calculation of the selected indicators / benchmarks, by whom, how often and at what cost.
- How this information should be used to improve quality of service.
- Methodology to measure and evaluate the effectiveness of applied measures in PT usage and environmental impacts.
- Usage and exploitation of the enormous capabilities of existing contemporary technologies such as the internet and modern telecommunications for collecting, storing, processing and presenting of necessary information.
- Dissemination of this knowledge to other similar organizations.

The ENERQI loop which graphically presents the fundamental ENERQI principles, incorporates the above elements. It starts with setting of the desired quality level of public transport system. Periodic (monthly) collection of data for the key performance indicators is

done through suitable observations; the information is input via internet application and stored to a central database. Quarterly reports are then produced identifying weaknesses and suggesting recommendations for improvement. The suggestions are transformed to quality improvement actions which lead to meeting or improving the desired quality level of service. The passenger receives better quality of services, which leads to higher satisfaction levels and this in turn leads to increase in public transport usage. The main conclusions about these issues are presented more extensively below.

The issue of selection of the appropriate **indicators / benchmarks** in a PT quality monitoring and passenger satisfaction system, has been the subject of a number of earlier research projects (QUATTRO etc). Today all relative information is collected, condensed and covered very effectively by the EUROPEAN STANDARD EN 13816:2002 – "Transportation – logistics and services – Public passenger transport – Service quality definition, targeting and measurement". This standard is directly or indirectly used in the majority of state of the art cases examined in this report.

The recommended methods for the **measurement and collection** of the PT quality and customer satisfaction **indicators,** in accordance with the EUROPEAN STANDARD EN 13816, are:
- Customer Satisfaction Surveys (CSS),
- Mystery Shopping Surveys (MSS) and
- Direct Performance Measures (DPM)

Apart from the above three methodologies, the following have also been recorded in the present survey:
- The "Passenger Satisfaction Barometer"
- Passenger complaint management
- Focus groups, discussion groups and in depth interviews
- Reports of personnel in contact with the customer
- etc

A mixture of the above methods has been recorded in use by the PT organizations examined in the present work.

Another important issue addressed in the survey refers to **who should make the observations** relative to customer satisfaction. Should the customer (user, passenger) provide the answer directly by responding to an appropriate questionnaire, paper and pencil form or internet based, or should paid staff be used to make an interview with the user on the site or over the phone or at home, or should a professional, paid person pretend to be a passenger and provide relevant information acting as a "mystery shopper". In the various cases examined many different approaches were used: Volunteers rewarded or not for their services, random sample from the passenger's body, reporting on their personal daily trips or given clear directions which specific itinerary runs to examine. There is not a unique clear answer to the question but the most advanced trend from the Netherlands which is to be evaluated by the ENERQI project, proposes the use of volunteer observers on predefined itineraries.

On the issue of the **frequency of the observations**, whether the measurement of indicators should be a constant daily procedure, weekly, monthly, quarterly, half yearly, annual, longer period, or ad-hoc, the cases examined in this report indicate big variations. The annual measurement is appropriate for reporting purposes, but smaller periods may be more useful for flexible quality responses to everyday challenges. The issue is directly related to cost.

Although the **cost** is not given in detail in the examined cases, it is indicated that Public Transport operators or authorities should be prepared to spend 30.000 € - 70.000 € per year, in order to have a good feeling of the quality of services offered and the respective customer satisfaction achieved. The size of the PT system surveyed is important for the formulation of the cost of the quality and customer satisfaction measurement.

The **usage of survey results** is a key issue for the effectiveness of the Quality Management procedure in any transport organization, especially to the operators. The direct availability of survey results to all employees in an organization means more awareness and consequently direct involvement of the personnel in the continuous effort for quality operations.

Measurement and evaluation of effectiveness of transportation operators and the concept of sustainable development: The quality management system in transportation operators is traditionally focused on measuring and evaluating the transportation oriented characteristics of the service provided (availability, accessibility, information, time, customer care, comfort, security). A relatively new but very significant concept in the quality management, measurement and evaluation of the effectiveness of transportation services is expressed by the last category of indicators incorporated in the EUROPEAN STANDARD EN 13816:2002 referring to "Environmental Impact" (pollution, natural resources, infrastructure). A quality and energy management system, giving emphasis on environmental impact and energy saving objectives, is implemented and reported in the "STP Alba Iulia" case in Romania, which is indicative of the way to go for contemporary transport organizations aiming at sustainable development.

The use of the internet and mobile telephony, offer extreme possibilities for information spreading, communication and tele-working. This gives great opportunities to lower the cost of quality management measurements and at the same time increase speed and accuracy of the results. In the field of public transportation it seems that there is a lot to be gained by exploitation of the opportunities offered in the domain of **contemporary technology** availability.

It is obvious from the results of the present survey, that some PT organizations and operators are already making significant progress and moving ahead towards the future of sustainable operations and development. This experience can be very useful to all relevant organizations that are starting now their effort for sustainable operations and its **dissemination** should be facilitated.

The following issues have also been selected from the current survey as being of importance for the purposes of the ENERQI project and are presented in brief:

Complaints management is a voluntarily provision of information regarding the (dis)satisfaction of customers which should be parallel to the main Quality Survey program of many organizations.

Customer satisfaction Barometer could be an item under the topic of immediate foreseen developments. It is understood that it has many desirable characteristics like imminence of results, but needs further evaluation and development.

Certification is a very important factor for PT success. It is has been revealed that all public transport organizations which present some interesting methodology and performance results, are in one or more ways certified.

5.2 Recommendations

The mix of **indicators / benchmarks** selected for monitoring of a PT service will depend on the specific conditions and challenges that each organization is facing, and its quality components that need improvement or change. The indicators should fall under the eight groups of quality determinants (Availability, Accessibility, Information, Time, Customer Care, Security, Environmental Impact), which have been presented analytically in Table 3.2 – Quality Criteria in Public Transport in Chapter 3 above.

Additionally to EN 13816, four new composite indicators have been selected from the BEST Survey and are recommended for consideration under the common ENERQI methodology development. These are:
- Overall citizen satisfaction
- Value for money
- Social image
- Loyalty of the customer

One of the targets of ENERQI project is the **involvement of citizens** and users in the quality and satisfaction measurement procedure. Thus, the methodology applied in the North Brabant region and in The Hague in the Netherlands is the most appropriate to be used as a base for the development of the ENERQI common methodology. This consists of the following elements: Selected volunteer passengers are used to monitor quality of PT by reporting specifically selected indicators, through an internet based survey system, on a regular basis - weekly or every 2 weeks, for specific lines and times.

The following methods for measuring passenger satisfaction should also be recommended for consideration.
- The "Passenger Satisfaction Barometer"
- Passenger complaint management
- Focus groups, discussion groups and in depth interviews

- Reports of personnel in contact with the customer

On the series of critical questions regarding: "Who and how makes the observations? Should it be a "mystery shopper"? Should the observers be volunteers? Should the volunteers receive some kind of a reward for their service? Should they be a random sample from the passenger's body? Should they report on their personal daily trips or should they be given clear directions which specific itinerary runs to examine?" the recommended approach is the following: For the purposes of the ENERQI project and the targets set, based on the Brabant and Hague experience, **it is recommended to use Volunteer Passengers as observers**, with some incentive in order to participate on a rather stable basis. The incentive should not be a money reward, but it could be participation in a lottery with some attractive presents. The number of the volunteers should be large enough to allow a partial selection for specific lines and times surveys according to the requirements of the Quality Monitoring (QM) program of the system. The ideal situation would be that, volunteers report on their personal daily trips, which coincide with the requirements of the QM program.

If the recording procedure of the **observation** results is **automated and internet based**, the measurement could be a constant and daily procedure. If the analysis procedure is also automated, then the reporting could also be quite frequent. For the needs of middle management, quarterly reporting is recommended, while for the needs of top management yearly reporting is sufficient to set priorities.

According to the survey information, authorities should be prepared to spend 30.000 € - 70.000 € per year in order to have a satisfactory estimation of passenger satisfaction. It is easier to justify **the cost** of these surveys when there is a **Customer Charter** or when the contract of the PT services includes clauses about quality and customer satisfaction directly related with bonus / malus reward.

In case that a **contract** exists between authorities and operators for the provision of PT services, it is recommended that the operators' financial reward is **directly connected to the customer satisfaction results**, when they meet or surpass certain quality criteria of the tender documents. This is a positive factor for the better exploitation of the quality survey results to the benefit of the users.

Energy savings and emissions reduction are major targets of the ENERQI project, therefore the measurement and evaluation of effectiveness of transportation operators in relation to these factors should have a prominent position in the common ENERQI methodology.

The best **usage of internet, mobile telephony or other contemporary technologies** should be among the objectives of the ENERQI common methodology, in order to achieve economies and effectiveness.

It is obvious from the results of the present survey, that some PT organizations and operators are already making significant progress and moving ahead towards the future of

sustainable operations and development in PT. The lessons learnt from such organizations and operators who are leaders in the field of passenger satisfaction measurement and quality control, should be documented and **disseminated** to all relevant organizations, which are either starting now their effort for sustainable operation, or unfortunately moving in the wrong direction, aiming only at economic survival, by ignoring the customer and his satisfaction from the services offered.

Complaints management should be given special attention regarding short term issues resolution.

Customer Satisfaction Barometer is recommended as a relatively easy and cheap practice to implement. It could benefit by the use of high level technology such as the Internet and mobile telephony.

The **EN 13816:2002 certification** is a basic reference point under this topic and it is recommended for all PT services. There are also other certifications of quality assurance, e.g. of the ISO family, for more general application which have been reported. This should be an issue for further examination, consideration and recommendation.

APPENDIX 1

List of Documents Collected – Inventory

List of documents collected and reviewed

No.	Partner	Sender	Date	File Name or Internet Link	Country or Location referred	Description	Comments
1	CRES	Vassilis Vavakos	30/08/10	013816_EN-en_2002.pdf	European Countries	The EU Standard	
2	DTV	Johan Janse	24/06/10	20090909 customer satisfaction surveys - international comparison.doc	9 countries	Customer satisfaction surveys at railway companies - A comparison of methodology and outcomes	Report on comparison of methodologies - satisfaction surveys
3	DTV	Johan Janse	24/06/10	IPTS presentation.ppt	Beoordeel uw bus	Quality Scouts - Presentation in English	Interesting presentation
4	DTV	Johan Janse	24/06/10	Paper ETC 2003.doc	Dutch city of 's-Hertogenbosch	CUSTOMERS' WISHES IN RELATION TO THE REDEVELOPMENT OF INNER-CITY RAILWAY STATION AREAS	Paper on customer's wishes and redevelopment of train stations (infrastructure)
5	DTV	Johan Janse	24/06/10	Presentation - The BEST way ver. 1.1.pdf	European Countries	BENCHMARKING IN EUROPEAN SERVICE OF PUBLIC TRANSPORT	Interesting presentation
6	DTV	Johan Janse	24/06/10	PT Quality in France.ppt	France	Perceptions of the use public transport quality norms in France	Presentation - EN 13816 related
7	DTV	Johan Janse	24/06/10	Updated Paper Workshop Programme 3 April.pdf		IPTS Conference 2008 Thursday 3 April - Paper programme / No actual papers included just titles	
8	DTV	Johan Janse	24/06/10	Visitekaartje piramide UK animatie.ppt		Pyramid of Customer needs - ! Slide presentation	Explicit presentation of the satisfaction pyramid
9	DTV	Renske Martijnse	06/07/10	Renske_Finland_Research on Passengers_satisfaction_Helsinki_2008.pdf	Helsinki	Passengers' satisfaction with public transport services in Helsinki in 2008 - Paper	Report regarding Passenger Satisfaction in Finland
10	DTV	Patrick vanEgmond	26/08/10	2009 France observatoire_de_la_mobilit ENG.pdf		Report - In French language (6 pages)	Translation of article in English
11	DTV	Patrick vanEgmond	26/08/10	PT Quality in middle sized French cities CERTU.pdf	France	Article	Article on PT Quality in middle sized French cities
12	DTV	Renske Martijnse	13/09/10	BEST_REPORT_2010.PDF		Best Report 2010	Very useful and relevant to this report document
13	DTV	Renske Martijnse	13/09/10	BEST2005 Common Interest Group Report Feb. 2009_Custormer satisfaction model.pdf		The relationship between objective quality and customer satisfaction - Report	Useful document and relevant to this report
14	DTV	Patrick vanEgmond	13/09/10	ENERQI_WP2_Template_for_Information_Collection GENERAL INFO FRANCE and City of Luxembourg.doc	Luxembourg	WP2 Template	
15	DTV	Renske Martijnse	13/09/10	ENERQI_WP2_Template_for_Information_Collection_Finland_Helsinki_DTV.doc	Finland - Helsinki	WP2 Template	

No.	Partner	Sender	Date	File Name or Internet Link	Country or Location referred	Description	Comments
16	DTV	Renske Martijnse	13/09/10	Oslo graphic overview methodology.doc		Ruter's Market Information System (MIS) - (1 page)	Oslo Methodology outline for Passenger Satisfaction monitoring
17	DTV	Renske Martijnse	13/09/10	WP2_Tallinn_opinion survey on PT.docx	Tallinn	Opinion survey on public transport (2 page report)	
18	DTV	Johan Janse	17/09/10	ENERQI_WP2_Template_for_Information_Collection_NL.doc	The Netherlands - Breda, Den Bosch, Tilburg, The Hague	WP2 Template	
19	DTV	Johan Janse	17/09/10	Questionnaire for Quality Scouts in the Netherlands_ENG_final.docx	The Netherlands	Questionnaire for quality scouts in the Netherlands	Questionnaire
20	DTV	Johan Janse	27/09/10	ENERQI_WP2_Template_for_Information_Collection_final (2).doc	The Netherlands, whole country, no particular city	WP2 Template	
21	DTV	Patrick vanEgmond	08/10/10	La qualit de service dans le secteur des transports ENGV2.doc		Paper - Translation in English language	Useful information relative to EN 13816 - translation from French
22	EAP PLOVDIV	Ina Karova	12/10/10	ENERQI_WP2_EAP_HebrosBus.doc	Bulgaria, Plovdiv	WP2 Template	
23	FGM-AMOR	Red Wolfgang	21/09/10	ENERQI_WP2_Graz_GVB.doc	Austria - Graz	WP2 Template	
24	FGM-AMOR	Red Wolfgang	21/09/10	ENERQI_WP2_Regionalbus_Aichfeld.doc	Austria - Styria, Region Aichfeld – conglomeration	WP2 Template	
25	GRAZ	Dr. Jutta Manninger	25/06/10	ENERQI Service Quality in PPT EN 13816.pdf	European Countries	Service Quality in Public Passenger Transport EN 13816 - Presentation about EU Standard EN13816	Presentation - introduction and summary of EN13816
26	POLIS	Gabriela Barrera	10/09/10	ENERQI_WP2_Flanders FINAL.doc	Belgium - Flanders	WP2 Template	
27	POLIS	Gabriela Barrera	13/09/10	ENERQI_WP2_Liverpool FINAL.doc	England - Liverpool	WP2 Template	
28	POLIS	Gabriela Barrera	15/10/10	Customer Charter 2011.doc	Ireland, Dublin	Customer Charter 2011	Customer Charter from Carris - Very useful in conjunction with Schedule B, (No. 30 in this list)
29	POLIS	Gabriela Barrera	15/10/10	ENERQI_WP2_Dublin FINAL.doc	Ireland, Dublin	WP2 Template	
30	POLIS	Gabriela Barrera	15/10/10	Schedule B measurement discription.doc	Ireland, Dublin	PERFORMANCE OBLIGATIONS	Performance Obligation - Schedule B - Átha Cliath – Dublin. Contract terms (see in conjunction with Passenger Charter, no. 28 in this list)
31	STP Alba Iulia	Dan Darja	02/09/10	ENERQI_WP2_Template_for_Information_Collection_STP Alba Iulia.doc	Romania - Alba Iulia	WP2 Template	Has been read and fed into the Data Base
32	TiS	Ana Gama	11/08/10	Carris_Customer_Charter.docx		CARRIS - Customer Charter (1 page)	Customer Charter from Carris

Met opmaak: Fins

Met opmaak: Engels (V.S.)

No.	Partner	Sender	Date	File Name or Internet Link	Country or Location referred	Description	Comments
33	TiS	Ana Gama	11/08/10	ENERQI_WP2_Template_for_information_collection CARRIS_Final20100811.doc	Portugal - Lisbon	WP2 Template	
34	TiS	Ana Gama	11/08/10	ENERQI_WP2_Template_for_Information_Collection_ES norm__Final20100811.doc	Spain	WP2 Template	
35	TiS	Ana Gama	11/08/10	ENERQI_WP2_Template_for_Information_Collection_FERTAGUS_Final20100811.doc	Portugal - Lisbon	WP2 Template	
36	TiS	Ana Gama	11/08/10	ENERQI_WP2_Template_for_Information_Collection_mediate_Final20100811.doc	EU project	WP2 Template - Mediate (Methodology for describing the accessibility of transport in Europe)	
37	TiS	Ana Gama	11/08/10	ENERQI_WP2_Template_for_Information_Collection_pt norm_Final20100811.doc	Portugal	WP2 Template - Portuguese Standards of public passenger transport - urban bus routes	
38	TiS	Ana Gama	11/08/10	norma_en.docx	Portugal	Table - Assessment of service conformity (7 pages)	Useful table with performance indicators and ratings
39	TiS	Ana Gama	11/08/10	Questionnaire_Barometro_Carris_3a_Vaga_200712_en.doc	Portugal	Questionnaire (3 pages)	Questionnaire
40	TiS	Ana Gama	06/09/10	CARRIS Client profile and satisfaction analysis .ppt		Market Research - CARRIS - Presentation	Useful case study - Carris customers
41	TISSEO	Marie Fourcade	01/09/10	ENERQI_WP2_Template_for_Information_Collection - Tisso part1.doc	France , Toulouse	WP2 Template - Quality system of Tisséo	PT image and satisfaction barometer
42	TISSEO	Marie Fourcade	01/09/10	ENERQI_WP2_Template_for_Information_Collection - Tisso part2.doc	France , Toulouse	WP2 Template - Quality system of Tisséo	
43	TISSEO	Marie Fourcade	01/09/10	ENERQI_WP2_Template_for_Information_Collection - Tisso part3.doc	France , Toulouse	WP2 Template - Quality system of Tisséo	Panel of mobility of urban area of Toulouse
44	TISSEO	Turgy Jonathan	14/09/10	Questionnaire TISSEO 2008-27-10 EN.doc		Excerpt from questionnaire (5 pages)	5 pages questionnaire from Tisséo
45	URTP	Doina Anastase	01/09/10	ENERQI_WP2_Information_Collection_URTP partner_Baia Mare city.doc	Baia Mare city	WP2 Template	
46	URTP	Doina Anastase	01/09/10	ENERQI_WP2_Information_Collection_URTP partner_EU project.doc	EU project	WP2 Template	
47	URTP	Doina Anastase	01/09/10	ENERQI_WP2_Information_Collection_URTP partner_national level.doc	URTP partner_national level	WP2 Template	
48	URTP	Doina Anastase	01/09/10	ENERQI_WP2_Information_Collection_URTP partner_Sibiu city.doc	URTP partner_Sibiu city	WP2 Template	

List of documents collected but not used in WP2 because not in English language

No.	Partner	Sender	Date	File Name or Internet Link	Country or Location referred	Description	Comments
49	DTV	Johan Janse	24/06/10	De Lijn kwaliteitsmonitor.ppt		Presentation - Quality Monitor - In Dutch language	Not usable because of Dutch language
50	DTV	Patrick vanEgmond	26/08/10	2009 France observatoire_de_la_mobilit Image de PT.pdf		Report - In French language (6 pages)	Not usable because of French language
51	DTV	Patrick vanEgmond	26/08/10	2009 France observatoire_de_la_mobilit_synthse_utp Image de PT.pdf	France	Conclusions synthesis - In French language (2 pages)	Not usable because of French language
52	DTV	Patrick vanEgmond	26/08/10	BUS Luxembourg ilres_enquIte satisfaction 2009.pdf	Luxembourg	Presentation - In French language	Not usable because of French language
53	DTV	Patrick vanEgmond	26/08/10	ENERQI_WP2_Template_for_Information_Collection GENERAL INFO FRANCE and City of Luxembourg.doc	France and Luxembourg	WP2 Template	Temporary - has been succeded by final version for France & Luxembourg
54	DTV	Patrick vanEgmond	26/08/10	General Doc on Qualite_service 2003.pdf		Paper - In French language	Not usable because of French language
55	DTV	Patrick vanEgmond	26/08/10	horizon_2010_manifeste2001 UTP.pdf	France	Paper - In French language	Not usable because of French language
56	DTV	Patrick vanEgmond	26/08/10	IAURIF QualitГ de service EU comparison 2005.pdf	EU Countries	Study - In French language	Not usable because of French language
57	DTV	Patrick vanEgmond	26/08/10	Mesurer la qualitГ de service. Definition d'indicateurs PREDIT2001.pdf		Study - In French language	Not usable because of French language
58	DTV	Patrick vanEgmond	26/08/10	Methods of measurement QualitГ de service 2000 Predit.pdf	France	Research Report - In French language	Not usable because of French language
59	DTV	Patrick vanEgmond	26/08/10	QualitГ de service DOM TOM RГunion FR.pdf	France	Technical Report - In French language	Not usable because of French language
60	DTV	Patrick vanEgmond	26/08/10	RATP qualite_de_service22_06_05.pdf	France	Presentation - In French language	Not usable because of French language
61	DTV	Johan Janse	17/09/10	20090415 - GOV1 eindrapport monitoring.pdf	The Netherlands	Report in Dutch	Not usable because of Dutch language
62	DTV	Johan Janse	17/09/10	Jaarrapportage Kwaliteitsverkenner jan-dec 2009.pdf	The Netherlands	Report in Dutch	Not usable because of Dutch language
63	DTV	Johan Janse	28/09/10	OV-klantenbarometer2009 handout met kaft versie def.pdf	The Netherlands	Background information about a national quality observation benchmark conducted in The Netherlands once a year since the year 2001	Not usable because of Dutch language
64	GRAZ	Dr. Jutta Manninger	25/06/10	GVB 2009 11 Online-Befragung Prsentation.pdf	Austria	Presentation - Online-Kundenbarometer - In German language	Not usable because of German language
65	GRAZ	Dr. Jutta Manninger	25/06/10	Qualittskontrolle Busreinigung Erfassungsbgen_10_02_10.doc		Form template to fill-in - In German language	Not usable because of German language

No.	Partner	Sender	Date	File Name or Internet Link	Country or Location referred	Description	Comments
66	GRAZ	Dr. Jutta Manninger	25/06/10	Qualittskontrolle Erfassungsbgen_09_12_10.doc		Form template to fill-in - In German language	Not usable because of German language
67	POLIS	Gabriela Barrera	15/10/10	ENERQI_WP2_Template_for_Information_Collection v2.doc	Ireland, Dublin	WP2 Template	Temporary - has been succeded by final version for Dublin

List of documents collected from the internet and other digital sources

No.	Partner	Sender	Date	File Name or Internet Link	Country or Location referred	Description	Comments
68	CRES	Vassilis Vavakos	30/08/10	Athens OASA - Research of Intensions.pdf		Internet search	
69	CRES	Vassilis Vavakos	30/08/10	Attiko Metro_February 08.pdf		Internet search	
70	CRES	Vassilis Vavakos	30/08/10	Outstanding innovation in public transport award winners.doc		Internet search	
71	CRES	Vassilis Vavakos	30/08/10	QUATTRO.pdf		Internet search	
72	CRES	Vassilis Vavakos	30/08/10	SPUTNIC - 1-MO-Egger.pdf		Internet search	
73	CRES	Vassilis Vavakos	30/08/10	SPUTNIC - 3-CR-Barta.pdf		Internet search	
74	CRES	Vassilis Vavakos	30/08/10	SPUTNIC - 9-FC-Emig-Final.ppt		Internet search	
75	CRES	Vassilis Vavakos	30/08/10	sustainable-urban-transport-plans-main-document.pdf		Internet search	
76	CRES	Vassilis Vavakos	30/08/10	Thematic Strategy on the Urban Environment.pdf		Internet search	
77	CRES	Vassilis Vavakos	30/08/10	TISSUE final report.pdf		Internet search	
78	CRES	Vassilis Vavakos	30/08/10	TREND SETTER - evaluation-report-innovative-soft-measures.pdf		Internet search	
79	CRES	Vassilis Vavakos	30/08/10	TREND SETTER - evaluation-report-public transport.pdf		Internet search	
80	CRES	Vassilis Vavakos	30/08/10	TREND SETTER - evaluation-report-transport-management.pdf		Internet search	
81	DTV	Johan Janse	24/06/10	http://www.best2005.net/	International	BEST Project - EU	
82	DTV	Johan Janse	27/09/10	http://www.ov-klantenbarometer.info/index.php?p=1	The Netherlands	Background information about a national quality observation benchmark conducted in The Netherlands once a year since the year 2000	
83	UITP	Dellis Constantin	18/06/10	http://www.uitp.org/publications/pics/pdf/4IMC.pdf	Malaga – November 2007	References to UITP papers	
84	UITP	Dellis Constantin	18/06/10	http://www.uitp.org/publications/pics/pdf/5IMC.pdf	Lisabona – October 2009	References to UITP papers	
85	UITP	Dellis Constantin	18/06/10	http://www.uitp.org/publications/pics/pdf/EN.pdf	Vienna – October 2005	References to UITP papers	
86	UITP	Dellis Constantin	18/06/10	http://www.uitp.org/publications/pics/pdf/HMCP.pdf	Paris – November 2003	References to UITP papers	

No.	Partner	Sender	Date	File Name or Internet Link	Country or Location referred	Description	Comments
87	UITP	Dellis Constantin	18/06/10	http://www.uitp.org/publications/pics/pdf/MBP.pdf	Best practices in Marketing (published in 2003)	References to UITP papers	
88	UITP	Dellis Constantin	18/06/10	http://www.uitp.org/publications/pics/pdf/MPTB.pdf	barcelona – October 2001	References to UITP papers	
89	UITP	Dellis Constantin	18/06/10	http://www.uitp.org/publications/pics/pdf/SW.pdf	Social Data presentation in 1998	References to UITP papers	

APPENDIX 2

ENERQUI Questionnaire Template and Guidelines

for the Collection of Existing Methodologies on Quality Monitoring and
Passenger Satisfaction

ENERQI - Template for the Collection of Existing Methodologies

GUIDELINES FOR TEMPLATE USE

Collection and use of existing methodologies

According to Annex I, the aim of ENERQI Work Package 2 is:
1. To collect all methodologies and lessons learnt from previous projects and studies.
2. To provide an essential input into Work Package 3 for the development of an integrated and easy-to-implement methodology.
3. To give an overview of existing practices and indicators evaluation for dissemination purposes.

The first task of Work Package 2, will be _an in depth literature and internet survey_, identifying and collecting existing methodologies and best practices, for monitoring passenger needs and satisfaction in public transport services (public bus, metro, light rail etc.). This inventory will take into account the _actual state of the art_ and _foreseen developments_ in the near future. This overview will form an essential input in the design of a common "Quality monitoring and improvement" methodology of Work Package 3, evaluation and dissemination.

Identified relevant projects in Annex I, to be used as a basic input for Work Package 2:
- QUATTRO (Annex I page 16/68) √ [7]
- BENCHMARK (page 16/68)
- BEST (page 16/68)
- Existing monitoring systems in the Netherlands (page 16/68)
- Experiences taking place in Denmark and Belgium (page 16/68)

- SAVE BESTRANS (page 24/68) √
- BEST, 5th FP (page 24/68)
- PROCEED, 6th FP (page 24/68) √
- SPUTNIC,6th FP (page 24/68) √

Other data to be taken also into account:
- Evaluation of quality improvements in CIVITAS (page 24/68) √
- Literature (page 24/68)
- Studies (page 24/68)

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[7] "√" indicates that relevant information has been located at the Internet

- EN 13816: Transportation – Logistics and Services – Public passenger transport – Service quality definition, targeting and measurement (page 28/68) √
- Experiences of quality improvement initiatives (page 24/68)
- Experience built up in existing quality monitoring systems in the individual European Member States, by public transport operators monitoring the quality of their delivered services. (Mostly done by ad-hoc paper questionnaires, small user panels and focus groups or use of so-called mystery guests).

Research in the past years has focused in general on the quality of production and not on the perceived quality by the customer (a very important issue which is still a "black box" for many public transport companies in EU countries).

What should be aimed at the first task of this Work Package, is the identification and collection of "new" methodologies and best practices which incorporate to some degree the following elements:

- increased weight in stakeholders' awareness, citizen and user involvement,
- appropriate indicators for quality monitoring,
- use of the obtained knowledge on customers satisfaction to improve public transport,
- relation of quality improvements in public transport with "Energy Savings and Emissions Reduction".

All ENERQI partners are expected to contribute to this task with their own experiences with relevant methodologies through previous project outputs, good practices, literature, passenger satisfaction surveys and their outcomes and by arranging contacts from whom more information can be obtained. This information can apply to international level, EU level (considering legislation and EU projects) and within the individual member states.

It is expected that the majority of methodologies that will be identified and examined will refer to specific public transport operators which operate at a specific country (or countries) and location (or locations). Experience has shown that public transport operators and services vary dramatically from country to country and that the practices and solutions applied in one case may not be applicable in another case.

Table template for the collection of existing methodologies information.

To facilitate the collection of the information required for Task 1 of Work Package 2, especially in the cases where the methodology described is not supported with written documents, a template table has been developed. This template will be used by all partners of ENERQI in order to collect and present the basic information of each case examined in a uniform way.

The template is structured in such a way that the information is grouped in four levels of detail, regarding:

- the ENERQI Partner providing the information,
- the Type of Information Provided,
- the Local Information,
- the Quality Control System (Methodology) Detailed Description.

If more than one cases are presented by a partner, a separate template table should be filled with the appropriate information for every separate case of a methodology presentation or other information provided.

The template table with explanatory notes for filling in information, is attached at the end of this document.

ENERQI: Collection and use of existing methodologies

Existing Methodologies Template

Information Provider	
In the next two lines please fill the name of the ENERQI participant/partner and the name and surname of the person who is providing the information and should be contacted for possible clarifications.	
ENERQI participant/partner name	
Responsible/contact person	

Type of Information Provided	
In the next line please give the title of the project, study, report, article, presentation or the case for which information is provided in this table.	
Title of Information Provided	
Keeping in mind that the aim of this task is "an in depth literature and internet survey", it is important to clarify what kind of information is provided so that the effort is kept focused, under control and does not risk being drowned by two much and not too relevant information. From the next bulleted lines please select and check the one that better describes the type of information provided. You can write in the space provided next to it additional information e.g. "Relevant Literature: Presentation from the Proceedings of UITP Congress, June 2009, Vienna", or "Relevant EU Project: 6th FP PROCEED", etc.	
• Relevant EU Project	
• Relevant Literature	
• Other Relevant Project	
• Case Study	
• Relevant Methodology	
• Own Experience	
• Contacts for Information Gathering	
• Other Information	
At the line below please provide an abstract of the information in English. This can be a copy paste from the relevant source or a translation if the original is not in English. *IMPORTANT NOTE: It must be ensured that the report will be available in English for the purposes of ENERQI project.*	
Abstract in English.	
At the line below please give all the available and appropriate links to the Report or Abstract or Website of Relevant Organization or Relevant Contact Person. Please attach the original report if available and of appropriate size. Alternatively the internal website (http://draft.fmg-amor.at/energi/internal) can be used as a temporary storage place for the original report and the link should lead to it.	
Links: to Report or Abstract, to Organization Website, to Contact Person etc.	

<table>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2" align="center">Local Information</td></tr>
<tr><td colspan="2">If you are providing detailed information about a local case study, with a methodology for measuring user satisfaction and implementing quality improvements in the public transport (PT) services, in the next five lines please give the general information regarding the country and city name of the case study. Also please give the population of the city examined, the modes and operators that provide public transportation services in the city, e.g. suburban rail, metro, tram, electric trolley buses, buses, other (monorail, etc). Any additional information is useful for the description, understanding and comparison of the PT system e.g is every mode run by a different operator, what is the structure of the PT system, public or private operators, control mechanism, etc. What is the modal share for the public transport in the area (% using PT)?</td></tr>
<tr><td>Country</td><td></td></tr>
<tr><td>City</td><td></td></tr>
<tr><td>City Population</td><td></td></tr>
<tr><td>Modes and Operators in the city

(Buses, Tram, Metro, etc)</td><td></td></tr>
<tr><td>Modal share (% using PT)</td><td></td></tr>
<tr><td colspan="2">Specific information about the Case Study.

Case study area: Please describe the study area examined. Is it the whole city and the complete PT system? Is it a sector of the city or the area served by a specific operator? Is it a PT line or a number of lines?</td></tr>
<tr><td>Case Study Area</td><td></td></tr>
<tr><td colspan="2">In the next four lines please provide information about the PT Operator in this Case Study.

Please give the name of the Operator.

Is the Operator a public owned company (does it belong to the state?) or is it a privately owned company? NOTE: Public Transport (PT) Services may be provided by Public Owned Operator Companies or by Privately Owned Operator Companies.

Please give the total served area by the Operator, in sq km.

What is the type of public transport service provided by the Operator? Is it Metro, Tram, Bus service, other?</td></tr>
<tr><td>Operator Name</td><td></td></tr>
<tr><td>Is the Operator a Public or Private company?</td><td></td></tr>
<tr><td>Total served area by the Operator, in sq km</td><td></td></tr>
<tr><td>Type of public transport service

(Metro, Tram, Bus, etc.)</td><td></td></tr>
<tr><td colspan="2">Planning.

It is important to know if Quality is a major objective, clearly stated in the Strategic, Business or Quality planning of the Operator. It may be possible that public transport operations are used by the Operators only as a profit bearing enterprise or that they are considered as minimum services to the less wealthy citizens. In the difficult economic circumstances that many European member states are entangled these days, it may be possible that the prime target of some PT Operators is survival alone. The purpose of the following two lines is to clarify the attitude and will of Operators in the examined case studies regarding their commitment to quality services, and issues relevant to the objectives of ENERQI project. Please provide the vision of the PT Operator examined in this Case Study, as it is given in relative documents (Strategic Plan etc.) or as it was given to you by the Operator.</td></tr>
<tr><td>Does the PT Operator of the examined Case Study have a Strategic Plan or</td><td></td></tr>
</table>

Business Plan that incorporates a Quality Plan?	
What is the vision of this Strategic Plan (or Business Plan or Quality Plan)? Is it • Customer service oriented, • Economy of operation, • Energy savings, • Environmental targets (emissions reduction) • Involvement of Citizens and Users? • Other	

Closer examination of the existing quality monitoring and control system of the case study.

Does the quality control system examined apply to all PT network of the City or only to selected routes?

Is there some novelty or state of the art elements incorporated in the examined quality monitoring system? Please describe.

Is the examined quality monitoring system related to the ENERQI project context?

Please give your answer for the above, in the following three lines.

Does the quality control system apply to all PT network or to selected routes only?	
Is there some novelty or state of the art incorporated in the examined Quality Monitoring System?	
Is it related in any way with ENERQI project context: • Energy Savings? • Emission Reduction? • Involvement of Citizens & Users? • Quality Indicators? • PT improvements?	

Quality Control System (Methodology) Detailed Description

Please try to include in the description of the Quality Control System (Methodology), as much information as you can by taking into consideration the following:
• How do you adapt and implement a good practice for improving the service quality for public transport customers?
• On the basis of which information do you decide?
• How do you at present monitor the improved performance? (indicators, etc.)

Description of quality control system:	

In the following fifteen lines please try to include specific information regarding the Quality Control System (Methodology) examined in this case study. The answers should be in free text format, descriptive and qualitative. They should not be yes/no type answer.

What are the monitored criteria and indicators for measuring the level of service provided? For example, according to EN 13816: • Availability, • Accessibility, • Information, • Time,	

• Customer care, • Comfort, • Security, • Environmental Impact, • Other.	
What kind of data collection is required to calculate the indicators?	
What kind of data analysis is required to calculate the indicators?	
What is the level of detail to which the collected data should be available? • area covered, • report frequency, • time period.	
Way of data collection? • Surveys, with sub-contractors, • Questionnaires, • Telephone interviews, • Other, • Field observers.	
Types of observers used? • Users, • Staff, • Mystery guests, • Other.	
What is the recommended communication process with the observers?	
Other concerns related to observers: • Number and characteristics of observers, • Observers gifts or other initiatives, • Cost issues, • Type and frequency of feedback to transport operator, • Type and frequency of feedback to transport authority, • Methodology strengths and weaknesses.	
What is the reliability of data that should be targeted? (Representativeness of sample concerns)	
What is the performance level that should be targeted?	
How often should each indicator/benchmark be measured?	
Quality improvement actions – how are they coordinated with the quality monitoring process?	
What Action Plans are required in order to achieve the targets? • Application of investment costs in order to account better performance, • Other.	
From your experience, do you have any	

quality results related to the ENERQI context? If so, please describe (including the specific quality improvement measures applied).	
Identify observed barriers and drivers for the successful application of the quality monitoring process.	

At the line below please provide an abstract of the information in English. This can be a copy paste from the relevant source or a translation if the original is not in English.

IMPORTANT NOTE: It must be ensured that the report will be available in English for the purposes of ENERQI project.

Abstract in English.	

At the line below please give all the available and appropriate links to the Report or Abstract or Website of Relevant Organization or Relevant Contact Person. Please attach the original report if available and of appropriate size. Alternatively the internal website (http://draft.fmq-amor.at/enerqi/internal) can be used as a temporary storage place for the original report and the link should lead to it.

Links: to Report or Abstract, to Organization Website, to Contact Person etc.	

APPENDIX 3

Portuguese Standards of public passenger transport NP 4493:2010

Indicators / Benchmarks

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Service Offer	Line	Distance between Boarding/Landing Points	All Boarding/Landing Points should stand in a distance <= 400m	At least one of the Boarding/Landing points is within a distance > 400m	Mystery Client Survey	Semiannual
	Operation	Operation Period	95% of days in which they fulfill the established period of operation (it is a permissible variation of five minutes for more on the schedule).	>10% of days in which they didn't fulfill the established period of operation.	Direct measurement of performance	Daily
		Frequency	90% of the frequencies of passing vehicles are> = 2vehic./h (it is permissible a frequency of 1vehicle/hour between 0-6h)	>20% of the frequencies of passing vehicles are different from the reference service)	Mystery Client Survey	Semiannual
		Capacity	The vehicle capacity must be in line with its service approval	At list one of the vehicles has a capacity that isn't in line with its service approval	Direct measurement of performance	Daily
					Mystery Client Survey	Semiannual
	Reliability	-	90% of the planned journeys are made	>15% of the planned journeys aren't made	Direct measurement of performance	Daily
					Client Satisfaction Survey	Annual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Accessibility	Tickets	Acquisition in line	100% of vehicles or Boarding/Landing points allow the acquisition of tickets in the line.	>5% of vehicles or Boarding/Landing points don't allow the acquisition of tickets in the line.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Acquisition outside the line	100% of the selling points have transport titles that are usable in transport line	>10% of the selling points haven't got transport titles that are usable in transport line	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Validation	100% of travels allow the validation in the vehicle or at Boarding/Landing points.	>5% of travels don't allow the validation in the vehicle or at Boarding/Landing points.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Time	Time Travel	Acquisition in line	100% of vehicles or Boarding/Landing points allow the acquisition of tickets in the line.	>5% of vehicles or Boarding/Landing points don't allow the acquisition of tickets in the line.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
	Timetable Accomplishment	Acquisition outside the line	100% of the selling points have transport titles that are usable in transport line	>10% of the selling points haven't got transport titles that are usable in transport line	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Validation	100% of travels allow the validation in the vehicle or at Boarding/Landing points.	>5% of travels don't allow the validation in the vehicle or at Boarding/Landing points.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Information	General information	In the vehicle	100% of the vehicles have general information in accordance to the reference service.	>15% of the vehicles don't have general information in accordance to the reference service.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		At Boarding/Landing Points with shelter	90% of Boarding/Landing Points with shelter have general information in accordance to the reference service.	>20% of Boarding/Landing Points with shelter haven't got general information in accordance to the reference service.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		At Boarding/Landing Points without shelter	90% of Boarding/Landing Points without shelter have general information in accordance to the reference service.	>20% of Boarding/Landing Points without shelter haven't got general information in accordance to the reference service.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		At stations and shops with non-automatic selling	100% of stations and shops with non-automatic selling have general information in accordance to the reference service.	>15% of stations and shops with non-automatic selling haven't got general information in accordance to the reference service.	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		At automatic selling points	100% of automatic selling points have general information in accordance to the reference service.	>15% of automatic selling points haven't got general information in accordance to the reference service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Provided by other means	100% of information provided by other means is in accordance to the reference service	>10% of the information provided by other means isn't in accordance to the reference service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Information	Travel information in normal situation	In the vehicle	100% of the vehicles have travel information in accordance to the reference service.	>10% of the vehicles don't have travel information in accordance to the reference service.	Mystery Client Survey **(MCS)**	Semiannual
					Client Satisfaction Survey	Annual
		At Boarding/Landing Points with or without shelter	95% of Boarding/Landing Points with or without shelter have travel information in accordance to the reference service.	>20% of Boarding/Landing Points haven't got travel information in accordance to the reference service.	**MCS**	Semiannual
					Client Satisfaction Survey	Annual
		At Boarding/Landing Points with electronic panel	100% of Boarding/Landing Points have travel information in accordance to the reference service.	>20% of Boarding/Landing Points haven't got travel information in accordance to the reference service.	**MCS**	Semiannual
					Client Satisfaction Survey	Annual
		By the bus crew	100% of the bus crew provides travel information in accordance to the reference service.	>15% of the bus crew doesn't provide travel information in accordance to the reference service.	**MCS**	Semiannual
					Client Satisfaction Survey	Annual
	Travel information in troubled situation	In the vehicle and Boarding/Landing Points	90% of vehicles and Boarding/Landing Points have travel information in troubled situation in accordance to the reference service.	>15% of vehicles and Boarding/Landing Points haven't got travel information in troubled situation in accordance to the reference service.	**MCS**	Semiannual
					Client Satisfaction Survey	Annual
		By the bus crew	100% of the bus crew provides information in troubled situation in accordance to the reference service.	>15% of the bus crew doesn't provide travel information in troubled situation in accordance to the reference service.	**MCS**	Semiannual
					Client Satisfaction Survey	Annual
		Provided by other means	100% of information provided by other means is in accordance to the reference service	>10% of the information provided by other means isn't in accordance to the reference service	**MCS**	Semiannual
					Client Satisfaction Survey	Annual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Customer Support	Commitment	Customer Orientation	100% of the vehicles of the line and selling points provide a copy of the customer charter	>20% of the vehicles of the line and selling points don't have available a copy of the customer charter	Mystery Client Survey	Semiannual
	Interface with the client	Complaints	95% of the complaints are responded in accordance as defined in the reference service	>10% of the complaints aren't responded in accordance as defined in the reference service	Direct measurement of performance	Monthly
					Client Satisfaction Survey	Annual
	Personnel	Formal service	100% of situations the contact officers perform the service according to defined in reference service	>10% of situations the contact officers don't perform the service as defined in reference service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Technical aspects of care	100% of situations the bus crew perform the service according to defined in reference service	>20% of situations the bus crew doesn't perform the service according to defined in reference service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Personal presentation	100% of situations the employees of the service provider have a personal presentation according to defined in reference service	>10% of situations the employees of the service provider haven't got a personal presentation according to defined in reference service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
	Ticket options	flexibility / fare integration	100% of vehicles and selling points have full information on tariffs in use	>10% of vehicles and selling points haven't got full information on tariffs in use	Mystery Client Survey	Semiannual
		Special fares	100% of vehicles and selling points have full information on tariffs in use	>10% of vehicles and selling points haven't got full information on tariffs in use	Mystery Client Survey	Semiannual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Comfort	functionality of facilities available	At Barding/Landing points	100% of Boarding/Landing points are according with the referenced service	>20% of Boarding/Landing points aren't according with the referenced service	Mystery Client Survey	Semiannual
	Number of seats and individual space	Capacity use	Capacity used < 90% in any hour period	Capacity used > 100% in any hour period	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Index of seats	100% of vehicles have an index of seats according to defined in the referenced service	>5% of vehicles have an index of seats not as defined in the referenced service	Direct measurement of performance	Monthly
	In route	Technical performance of the crew member	95% of the crew members have a performance as defined in the referenced service	>10% of the crew members haven't got a performance as defined in the referenced service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
	Environmental conditions	atmospheric	95% of vehicles are according to the referenced service	>10% of vehicles aren't according to the referenced service	Direct measurement of performance	Daily
					Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Weather protection	100% of vehicles are according to the referenced service	>5% of vehicles aren't according to the referenced service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Tidiness	95% of vehicles, boarding/landing points and selling points are according to the referenced service	>20% of vehicles, boarding/landing points and selling points aren't according to the referenced service	Direct measurement of performance	Daily
					Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Luminosity	90% of vehicles are according to the referenced service	>15% of vehicles aren't according to the referenced service	Direct measurement of performance	Daily
					Mystery Client Survey	Semiannual

				Client Satisfaction Survey	Annual
	Noise	95% of vehicles are according to the referenced service	>5% of vehicles aren't according to the referenced service	Mystery Client Survey	Semiannual
Ergonomics	Equipments conception	90% of boarding/landing points are according to the referenced service	>15% of boarding/landing points aren't according to the referenced service	Mystery Client Survey	Semiannual
				Client Satisfaction Survey	Annual
	Vehicle ergonomic conditions	100% of vehicles are according to the referenced service	>10% of vehicles aren't according to the referenced service	Mystery Client Survey	Semiannual
				Client Satisfaction Survey	Annual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Personal/ Public Safety	Crime Prevention	Rate incidents on board	Rate incidents on board of vehicle <= 3,0	Rate incidents on board of vehicle >4,0	Direct measurement of performance	Monthly
					Client Satisfaction Survey	Annual
		Illumination	95% of vehicles, boarding/landing points and selling points have an adequate level of illumination	>10% of vehicles, boarding/landing points and selling points have an inadequate level of illumination	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Visible Monitoring	100% of vehicles, boarding/landing points and selling points have monitoring equipment, and have visible informative elements	>10% of vehicles, boarding/landing points and selling points have monitoring equipment, don't have visible informative elements	Mystery Client Survey	Semiannual
	Accident prevention	presence / visibility of media	100% of vehicles are according to the referenced service	>10% of vehicles aren't according to the referenced service	Mystery Client Survey	Semiannual
					Client Satisfaction Survey	Annual
		Prevention/Signaling of dangers	100% of vehicles are according to the referenced service	>10% of vehicles aren't according to the referenced service	Mystery Client Survey	Semiannual
		Accidents rate	Rate accidents on board of vehicle <= 55,0	Rate accidents on board of vehicle >60,0	Direct measurement of performance	Semiannual

Characteristics			Assessment of service conformity			
			Level of requirement	Unacceptable performance threshold	Measurement Method	Periodicity
Environmental Impact	Pollution	Pollutant emissions	All vehicles are according to the referenced service	At least one of the vehicles isn't according to the referenced service	Mystery Client Survey	Semiannual
		Visual pollution	90% of vehicles, boarding/landing points and selling points are according to the referenced service	>10% of vehicles, boarding/landing points and selling points aren't according to the referenced service	Mystery Client Survey	Semiannual
		Vibrations	85% of vehicles aren't according to defined in referenced service	>20% of vehicles aren't according to the referenced service	Mystery Client Survey	Semiannual
		Odors	85% of vehicles are according to the referenced service	>20% of vehicles aren't according to the referenced service	Mystery Client Survey	Semiannual