Principles of successful high quality public transport operation and development

DELIVERABLE 4
Guidelines for European High Quality Public Transport in small and medium sized cities

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Authors:
Per Gunnar Andersson, Trivector Traffic (Sweden)
Malin Gibrand, Trivector Traffic (Sweden)
Lena Fredriksson, Trivector Traffic (Sweden)
Stephan Krug, Ingenieurgruppe IVV (Germany)
Dirk Meinhard, Ingenieurgruppe IVV (Germany)
Michaela Kargl, Austrian Mobility Research FGM – AMOR (Austria)
Wolfgang Red, Austrian Mobility Research FGM – AMOR (Austria)
Rob Jeuring, ECORYS Research and Consulting (The Netherlands)
Fred Van Remoortel, Vectris (Belgium)
John Austin, Austin Analytics (United Kingdom)
Alicia Garcia de Miguel, Equipo de Tecnicos en Transporte y Territorio (Spain)
Despina Alexandropoulou, National Technical University of Athens (Greece)
Nick Papachristou, National Technical University of Athens (Greece)
Bengt Holmberg, Dpt. of Technology and Science, Lund University (Sweden)
Lena Winslott-Hiselius, Dpt. of Techn. and Science, Lund University / Trivector (Sweden)
Marjan Lep, University of Maribor, Faculty of Civil Engineering (Slovenia)
Mitja Klemencic, University of Maribor, Faculty of Civil Engineering (Slovenia)
Vytautas Grigonis, Vilnius Gediminas Technical University (Lithuania)
Marija Burinskiene, Vilnius Gediminas Technical University (Lithuania)
Jost Wichser, Inst. for Transport planning and Systems, ETH Zürich (Switzerland)
Milena Scherer, Inst. for Transport planning and Systems, ETH Zürich (Switzerland)
Harrie de Heij, City of Almere (The Netherlands)
Jurgen Goeminne, City of Sint-Niklaas (Belgium)
Ben Van Eynde, City of Sint-Niklaas (Belgium)
Rainer Klein-Lüpke, Stadtverkehr Euskirchen GmbH (Germany)
Andreas Solymos, Grazer Stadtwerke AG Verkehrsbetriebe (Austria)
Iztok Strukelj, Veolia Transport Štajerska d.d.Slovenia (Slovenia)
Pat Stringer, Brighton & Hove Bus and Coach Company Ltd. (UK)
Ingemar Lundin, Jönköpings Länstrafik AB (Sweden)
Andrius Samuilovas, Klaipeda keleivinis transportas (Lithuania)
Gintaras Neniskis, Klaipeda keleivinis transportas (Lithuania)
Isidro Gonzalez Delgado, Consorcio de Transportes de Asturias (Spain)
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ABOUT PROCEED

PROCEED – Principles of successful high quality public transport operation and development – is a 3-year project (10/2006-09/2009) co-financed by the European Commission within the 6th RTD Framework Programme.

PROCEED helps to plan, develop and implement effective and efficient public (bus) transport systems in small and medium sized European cities.

Detailed analysis of data and experiences of 67 small and medium sized European cities in 24 European countries has led to a better understanding of success factors and pitfalls for efficient and effective public bus transport. Based on the outcomes of this analysis work and based on the findings of previous studies and projects, PROCEED is developing guidelines and tools to support planners, operators and decision makers in order to improve the quality of public transport. These tools include all aspects of public transport planning and operation, such as methods for analysing the market, developing and upgrading the infrastructure, financing of High Quality Public Transport services, managing of such services, marketing strategies, etc. Verification by practitioners ensures that all PROCEED tools are useful and valuable for transport planners and transport operators throughout Europe.

PROCEED project Consortium

Project Coordinator: Trivector Traffic (Sweden)

Project Partners:
Austrian Mobility Research FGM-AMOR (Austria)
ECORYS Research and Consulting (The Netherlands)
Ingenieurgruppe IVV (Germany)
Vectris (Belgium)
Equipo de Técnicos en Transporte y Territorio (Spain)
National Technical University of Athens, Faculty of Civil Engineering (Greece)
Lund University, Department of Technology and Science (Sweden)
University of Maribor, Faculty of Civil Engineering (Slovenia)
Vilnius Gediminas Technical University, Department of Urban Engineering (Lithuania)
Institute for Transport planning and Systems, ETH Zürich (Switzerland)
Austin Analytics (United Kingdom)

Subcontractors:
CTA Consorcio de Transportes de Asturias (Spain), Jönköpings Länstrafik AB (Sweden),
City of Almere (The Netherlands), Stad Sint-Niklaas (Belgium), Veolia Transport Štajerska d.d.Slovenia (Slovenia), EGIS Mobilité (France), SVE Stadtverkehr Euskirchen GmbH (Germany), Klaipėda keleivinis transportas (Lithuania), Brighton & Hove Bus & Coach Company (UK), Grazer Stadtwerke AG – Verkehrsbetriebe (Austria)

Project Website: www.proceedproject.net
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The PROCEED project analyzed 67 urban public transport systems in small and medium sized cities and developed 55 specific guidelines on how to improve urban bus transport planning and operations in such cities so as to deliver high-quality public transport (HQPT). In addition to these specific guidelines, PROCEED developed a set of 16 high level guidelines describing “tips and tricks” to help guide overall system planning and operations for HQPT. This section presents these high level guidelines; the specific guidelines are presented in the following chapters.

**Recommendation 1: Build solid political support for HQPT projects.**

It is important to obtain broad political consensus for HQPT to ensure that planning and service can continue even in the event of a change in local government. HQPT is a long-term project too valuable to undergo controversial discussions during election campaigns. Therefore it is important that a climate of agreement on the basic features of the public transport system be sought from all involved stakeholders including representatives of all major political parties and other important interest groups.

The city of **Sint-Niklaas (Belgium)** has developed strong local political support and interest in HQPT over a long period of time and this has resulted in a number of concrete achievements. See Guideline 5.11

**Recommendation 2: Seek secure and long-term financing.**

An HQPT system depends on adequate funding. Financing operating and investment costs is a long-term process. Consequently, HQPT needs the support of all major stakeholders and local political parties. Furthermore, the public transport agency must always be mindful of its own responsibility for improving the cost effectiveness and efficiency of public transport service, even if there is strong political support to cover deficits.

The **Versement Transport** tax system in **France** provides an example of a secure, long-term financing system: see Guideline 3.3.

**Recommendation 3: Implement measures to support public transport.**

High quality public transport should not be implemented in a vacuum. To be successful cities must implement measures that “push” people out of their private automobiles as well as HQPT measures that “pull” them into public transport. It is ineffective to spend large amounts of money for high-quality public transport in situations where cheap access by private cars to the city centre is available or where parking control is weak. Providing both HQPT and cheap parking will contribute to a failure of the public transport investments.

The city of **Cambridge (UK)** provides an example of where bus priority, extensive Park & Ride, and a high-frequency urban bus network has been matched with tight and well-enforced parking controls combined with high city-centre parking charges. For more information see
Recommendation 4: Make public transport a city planning priority.

Public transportation should be fully integrated into all levels of the city planning process. If public transport is not considered at the very beginning of an urban development activity, it may result in inefficient and high cost service. While urban development must consider many different criteria (including, e.g. available space, accessibility by car), its integration with public transport must be a high priority, and there should be a strong co-operation between urban design and transport planning sections.

Integrating land use and transport planning must be done at all levels of the planning process from area master plans to site specific detailed plans. Furthermore, it is also critical to work closely with urban planners to optimize public transport in complicated situations such as cities with a historic urban core or pedestrian shopping districts. In these cases planners must develop solutions that provide public transport stops as near to their passengers’ final destinations as possible, but without negatively impacting the urban environment.

In the new town of Almere (The Netherlands) public transport was an integral part of the plans from the very beginning of the development. See Guideline 2.1 for more information.

Recommendation 5: Clearly assign public transport responsibilities to involved actors.

HQPT requires a clear assignment of responsibilities. In cases where the responsible public authority differs from the public transport operator, each player must recognize that customers are not interested in the organisational details of the transport service, but only in the quality of service. A clearly defined interface strategy towards public transport customers helps to avoid failures in service quality and/or conflicting messages being given to the customer by different organisations. See Guideline 3.5 for further information on this topic.

Recommendation 6: Use best-practice ideas from other cities and operators.

It is possible to learn much from reviewing best practices. While best practice examples are not always fully transferable to other cities, regular exchange of experiences among planners and decision makers from different cities helps prevent “reinventing the wheel” or repeating the mistakes of others. Best practice ideas are especially important for critical political decisions. Studying real life examples during a site-visit may persuade decision-makers to support HQPT plans in their own cities.

The subcontractor cities and operators within the PROCEED consortium have demonstrated their commitment to follow this Recommendation by being so willing to visit and learn from others’ experiences through participating in site visits during the project. Other examples of willingness to learn from best-practice elsewhere are special-interest groups of bus operators and cities that visit foreign locations on study trips. One such group is BRT UK (consisting of UK operators, city authorities, and consultants) whose members have visited Bus Rapid
Transit systems in Caen, Rouen and Nantes, Eindhoven and Haarlem in recent years. See http://www.brtuk.org

**Recommendation 7: Prepare a detailed analysis of the service area.**

It is critical to fully understand the urban area to prepare effective HQPT plans. This means collecting as much information on geographic distribution of inhabitants, jobs and travel attractions, travel behaviour, working centres, etc. as possible. Since travel patterns change over time a public transport network has to be adjusted regularly in order to guarantee high market penetration. See Guideline 1.1 for further information.

**Recommendation 8: Implement quality management procedures to analyse performance.**

Quality management helps public transport operators deliver the high service quality that passengers expect and helps ensure that funds spent on public transport produce the maximum effect possible. Collecting performance data, interviewing passengers and analyzing the public transport market is the basis for further improvements and changes in an urban bus system. See Guideline 1.4 for further information.

**Recommendation 9: Think tram, use bus.**

The flexibility of a bus system is its Achilles heel, since route changes can easily result in complex network structures that are difficult for customers to understand. In contrast, frequent changes are difficult to implement in tram networks. Furthermore, tram tracks are highly visible providing strong customer orientation. Therefore, the "Think tram, use bus" process aims to design an attractive bus network by adopting major characteristics of tram systems in the planning of bus systems. These characteristics include high frequency, direct routing, dedicated lanes, co-ordinated vehicles and platforms, and prioritisation measures at intersections.

An example of where this concept has recently been introduced is Swansea (UK) which has just launched its ftr Metro system (in September 2009) using articulated tram-like buses and extensive bus priorities and bus-only roads. More information on this new network can be found at http://goftr.com/swansea/

Guideline 2.3 also explains more about the concept of ‘Think tram, use bus’, in the context of a bus service hierarchy.

**Recommendation 10: Deliver high quality throughout the “package”.**

HQPT aims to provide a service that competes with private cars (high availability, good comfort, etc.). Therefore, public transport services must be “as good as possible” in all respects. Frequent service will not attract customers if, for instance, buses are of poor quality, dirty or badly maintained.

However, providing top-level quality and standards in all aspects of operation is expensive and, consequently, the goal is to balance the quality of each element so that it contributes to a consistent quality level for the overall system (vehicles, stops, level of service, customer
information, tariff system). Extremes should be avoided: single strategies that are too ambitious may cause financial problems and poor quality in any one element may destroy the image of the whole system.

The Fasttrack system in the Kent Thameside area (UK) is characterised by many integrated high-quality features, such as high-quality vehicles, frequent operation, high-quality stops, excellent information, easy-to-understand and fast ticketing, and an extensive network of bus-only roads. Full information can be found at http://www.go-fastrack.co.uk/

**Recommendation 11: Public transport service levels should provide high availability throughout the day.**

Frequency, operating times, and walking distances to transit stops are key-features of an HQPT system. Public transport service should be as frequent as possible. With short intervals (10 minutes or less) people stop using timetables and instead experience what is effectively a ‘turn up and go’ system.

Providing frequent service is a challenge in smaller cities. However, a standard service interval should still be fixed, since this can serve as a memorable backbone for the public transport system (‘Buses run every 15 minutes.’). Given typical travel time budgets for local trips, standard service intervals should not be lower than 30 minutes.

Operating hours should also be standardized on all bus lines serving a city. Most people prefer a ‘higher service frequency’ system (a sparse network) rather than a ‘shorter distances to stops’ system (a dense network with infrequent service). However, the best solution is always a trade-off between frequency and access time, and should especially consider the needs of elderly people and those with physical disabilities.

When fixing the level of service, it should be appreciated that demand is not infinite. If a new urban bus system has reached a certain market share with moderate standard service intervals, any improvement in frequency will contribute to a more or less linear increase of costs, whereas demand may increase by a much lower extent.

See Guidelines 2.4 and 2.6

**Recommendation 12: Develop integrated public transport systems.**

The agency responsible for local and regional public transport service need not be the same, but both public transport systems must be closely integrated so as to appear as one seamless system. When new services are planned, serious consideration needs to be given to the assignment of tasks and the roles of other public transport modes. Integration includes a common approach to customer information, co-ordinated timetables, physical coordination (interchange points) and consistent tariff schemes.

The city of Dundee (UK) has successfully integrated operations of different bus companies, despite them being in competition. This is through developing a very strong and high-quality information system, with real-time information (including via SMS), good at-stop printed
information, and very high-quality city centre on-street interchanges. See http://www.dundeetravelinfo.com/

**Recommendation 13: Continuous marketing is critical for success.**

The public transport industry tends to underestimate the value of marketing. However, research shows that in some cases ‘soft’ techniques, such as marketing, can be more effective in attracting new customers than ‘hard’ techniques, such as providing more buses or lines. An urban bus service needs continuous marketing and strong, well-designed ‘branding’ to enter and remain in the minds of potential customers and citizens. A good and positive image of the urban bus system among all citizens is a major factor in delivering success.

Many cities in France have very strong local public transport brands, which are continually being developed. There are many examples that could be quoted but one city where the website is available in English is Brest: see http://www.bibus.fr/?langueid=2

**Recommendation 14: Provide continuity in the public transport system.**

A high-quality urban bus system depends on innovation and continuity. Innovation helps keep the system attractive to the users in the long-term and presents a positive image to the public. However, changes always cause a loss of system knowledge, making it harder for customers to use the system. Too many changes in a short period of time will adversely affect a system’s positive image. Therefore, service and timetable changes should be planned carefully and concentrated on one date, and all changes to the system should be widely communicated.

The bus company in Brighton (UK) is continually developing its brand and network, while maintaining continuity. Services are changed only on two specific dates each year. See its website at http://www.buses.co.uk. This also shows (in the ‘Interesting Information’ section of the website) how its brand has been gradually modified over the years.

**Recommendation 15: Provide an attractive fare structure and an easy ticketing system.**

Public transport fares are an important factor in attracting customers, especially in smaller cities since many passengers are users of public transport by choice and have discretion to use other modes or not to travel at all. Attractive fare structures can be developed for the different main user groups. When considering fare structures it is important to remember that the attractiveness of a tariff system rests not mainly on a low price strategy, but rather on easy comprehension and usability as well as on high perceived “value”. Tickets that closely fit passenger needs, and ticketing systems that allow everyone to easily obtain a ticket, help increase public transport use and effectiveness.

See Guideline 5.15 for more information.

**Recommendation 16: Carefully consider new technologies.**

Many different computer-based technologies are present in public transportation including: onboard devices, computer-based operation control systems, traffic light prioritisation and ticket vending machines. Some of these systems are essential, others are helpful, and still
others are simply ‘nice to have’. Since each technological system involves a capital investment and continued operating costs they should never be introduced for their own sake, but must be clearly justified. Learning from best practices from other cities is especially helpful in assessing the need for new technology.

**Guidelines 2.13 and 2.14** show the application of new technology to customer information.
0. INTRODUCTION

0.1. Background

PROCEED – Principles of successful high quality public transport operation and development – is a 3-year project (10/2006-12/2009) co-financed by the European Commission within the 6th RTD Framework Programme.

PROCEED has developed guidelines to help to plan, develop and implement effective and efficient public (bus) transport systems in small and medium sized European cities. The guidelines are designed to help decision makers and transport planners (e.g. public transport authorities, local authorities, operators, consultants) efficiently and effectively develop, upgrade, finance and manage urban bus systems and related mobility services, to arrive at ‘High Quality Public Transport’ (HQPT) systems. HQPT is defined as:

- A quality of Public Transport service that is generally perceived, by local politicians and in the media, to be reliable, frequent, good-value, reasonably comfortable (throughout the journey), reasonably fast, operate at convenient times, and to be suitable for most core journeys between key traffic generators (including residential areas) and the town / city centre. For some aspects of the service (different for each system) quality levels will be very high (not just ‘reasonable’). In addition, for a significant number of users the service will also enable other cross-city or orbital journeys – either direct or through convenient interchange – and for some the service will be of sufficient coverage to replace a personal car (or second car).

HQPT is essentially a subjective term, meaning slightly different things to different people, but HQPT can generally also be expected to have the following characteristics in addition to those mentioned above.

- Service on core routes will have ‘tram-like’ features: comfortable, fast, frequent
- There will be a significant degree of bus priority
- There will be a strong focus on passenger / customer service and on ease of use
- The system will be efficiently operated, minimizing costs for a specific level of service
- Services will be well-integrated with each other, and the system as a whole will be well-integrated with other modes
- The system will be strongly branded
- There will be a noticeable amount of public support for the system, perhaps even local pride in it
0.2. How to use this document

The guidelines are, in the first instance, addressed to practitioners in urban public transport, and are intended to answer practical questions such as:

- Which measures and combination of measures in marketing and operation are most efficient in attracting more customers to the public transport system?
- How can a bus system achieve success similar to that of a tram system?
- How can improvements in public transport systems be financed?
- Which marketing strategy is best suited for a special target group?

The major goal of the guidelines is to include all aspects to be considered when planning an HQPT system. Giving all available solutions for each aspect in detail would exceed the guideline document and the project’s focus. The specification of details can be manifold and is sometimes influenced by national standards; therefore, it cannot be covered by a European-wide document.

The guidelines cannot provide a list of ready-to-go ‘recipes’ for implementation because the local specific features, the size of the town and its structure are very dominant. Consequently, it is important to understand that the reported guidelines have to be adapted to the local context.

Planning an HQPT bus system means considering a set of 5 main tasks providing the general structure to this guideline document:

- to make a proper analysis of the local situation and the respective user needs
  → Guidelines on "Methods for market analysis",
- to draw-up a network design that fits the local public transport demand
  → Guidelines on "Developing and upgrading Network and Infrastructure",
- to ensure the system’s financing
  → Guidelines on "Financing",
- to establish an efficient system management
  → Guidelines on "Management",
- to carry out comprehensive marketing
  → Guidelines on "Marketing strategies".

At the head of each guideline is a table (example is below) which indicates the types of stakeholder that the guideline is aimed at, the level of planning to which the guideline applies, and the nature of the impact that the guideline will have. The relevance of each single guideline for the respective type of stakeholder, planning level or guideline impact is set to:

<table>
<thead>
<tr>
<th>Importance</th>
<th>Relevant</th>
<th>Not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>Not relevant</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Each guideline is structured according to a set pattern, which provides information under the following keywords:

- **Guideline**: This sentence - highlighted in a blue box - provides the core message of the guideline. Each guideline gives a concise clear advice to follow.

- **Explanation**: Explanatory information to understand the respective guideline is provided below this keyword. Selected analysis results from PROCEED’s case study analysis, which covered 67 small and medium-sized European cities, are described here.

- **Critical issues**: There are often limitations regarding a specific guideline or recommendations or special conditions to consider. If applicable, this information is given here.

- **Good practice examples**: There are, of course, several examples of HQPT in Europe. Reference is made especially to the respective case studies as part of the PROCEED database. These examples cannot be regarded as the only good practice examples available; however, they give an impression of how things can be organised when implementing high-quality public transport elements.

- **References and background reading**: Reference is given here to related literature and to other available sources of information which provide additional information to the user of the guidelines.

- **Related guidelines**: This item refers to other PROCEED guidelines.

The general aim is to keep each guideline and its description as short and simple as possible. However, there is often additional information attached to a single guideline which is useful to know when discussing the issue. Consequently, **background information** is put in grey boxes attached to the relevant guideline.

Some recommendations cannot be assigned to a single guideline as described in the guideline chapters of this report since they refer to more than one guideline or make reference to some “tips and tricks” underlying some transport solutions for urban bus planning. Therefore, so-called “high-level guidelines” have been established as additional recommendations in this introduction.

### 0.3. Filtering and selection system

In order to assist users to apply the Guidelines to their own situation, both professional and geographical, we have devised a filtering and selection system which points users to the guidelines that are most relevant to them.
There are a large number of guidelines covering all fields of urban bus planning in small and medium-sized cities and the professional background of users of the guideline document can be quite diverse: e.g. there might be an existing urban bus system for which improvements are being planned, or there is no urban public transport system at all in a small and medium sized city.

In order to allow good accessibility to a specific field of interest, the guidelines are clustered by a system based on the different user needs as there are:

- Varying relevancies of a respective guideline to different stakeholders (e.g. operators): Is this guideline fundamental / minor important / not relevant for a specific user group?
- Different levels of the planning process: At which level of the planning process can the guidelines help?
- Different impact of a guideline: Is the guideline demand-effective or does it contribute to organisational optimisation?

The three criteria listed above allow access to the guidelines from three different starting points. This contributes to a filtering and selection system that provides the user with exactly the guidelines which are useful for his / her work. The system will be applied as part of the Internet-based guideline documentation as a final project outcome of PROCEED to be found at PROCEED’s website: http://www.proceedproject.net.
Figure 0-1: Access system for filtering and selecting the respective guidelines

- Relevance of a respective guideline to different stakeholders
- Different levels of the planning process
- Different impact of a guideline

Guidelines
The users of PROCEED’s outcome may differ according to the national organisational framework of public transport. Therefore, a broad definition of the different user groups is needed. With respect to the guidelines, the following user groups of the guidelines can be determined:

Decision makers
- **Definition:** not directly involved in the transport planning process but in need of certain information to support public transport on a political level
- **Examples:** politicians, leading personnel in public administration

Public authorities
- **Definition:** there are often public authorities responsible for organising and administrating public transport services
- **Examples:** public transport authority at local / regional level, municipal / regional planning department

Public transport operators
- **Definition:** body with a duty to provide a certain public transport service as agreed with the public authorities (or providing such a public transport service under rights granted by legislation)
- **Examples:** staff from operators at management level, strategic planning level

All three parties involved can obtain additional support from (external) consultants and others. For the respective questions consultants have to fall back on the knowledge of one of the three stakeholders identified.

The planning process from political decision to system operation (Figure 0-2) gives additional guidance to the user. The assignment of each guideline to one planning level contributes to a clear structured system helping the user to find the respective guideline for his / her planning or operational purposes:

Level 1: Master plan and political
Level 2: Market analysis
Level 3: System planning
Level 4: System Operation
Figure 0-2: 4 levels of the planning process related to urban public transport systems

Level 1: Master plan and politics
- Goals
- Suggested strategies
- Who pays & what

Level 2: Market analysis
- Selection of strategies
- Specification of market goals

Level 3: System characteristics
- Network / infrastructure
- Financing

Level 4: System operation
- Management
- Marketing
- Additional aspects

Quality circle
When aiming for an improvement of a public transport network, attention has to be paid to the quality pyramid, as described in chapter 1.1 Basic analysis. Firstly, the basic supply level has to be dealt with, then comfort and service orientated aspects since further key elements of a HQPT system are part of the agenda. In order to assign the expected impact of each guideline in accordance with the quality pyramid, the following clustering is provided:

*Impact 1: Basic service*

Guidelines considering characteristics that are a ‘must’ to create a basic supply level

*Impact 2: Quality upgrade*

Guidelines regarding other, generally comfort and service-orientated aspects of the supply (to be considered if the above given characteristics are fulfilled).

*Impact 3: Organizational improvement:*

Guidelines aiming at an optimisation of issues such as financing or management
1. GUIDELINES ON "METHODS FOR MARKET ANALYSIS"

1.1. Basic analysis

If commencing a HQPT urban bus network, or radically redesigning an existing network, carefully analyse the local conditions and the local travel demand patterns to ensure realistic estimations of the expected travel demand potential.

<table>
<thead>
<tr>
<th>(1) Target stakeholders</th>
<th>(2) Planning level</th>
<th>(3) Guideline Impact</th>
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<td></td>
<td>- Operations</td>
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</table>

Explanation:

Basic analysis of a city or town’s local conditions aims at objectively assessing the economic and financial impacts of intended service improvements in public transport. This enables a city council’s political decisions to be soundly based.

In the case of smaller cities (approx. 25,000 – 75,000 inhabitants), it should be checked carefully whether the municipality provides all the necessary prerequisites for a high-quality urban bus system, considering its location, size, population density and the concentration of the town centre. For example, small towns as part of a greater conglomeration may have travel demand patterns with a high share of commuting into neighbouring towns, resulting in a low share of local trips, which can be targeted by a local bus service.

Fields of interest to be studied before considering improvements in local public transport refer to all aspects affecting public transport demand to any extent (e.g. number and spatial distribution of inhabitants). For examples see ► Background information: Fields of interest with regard to basic analysis.

In medium-sized cities (≥ 75,000 inhabitants) transport demand modelling or other sophisticated transport engineering methods for network re-design and network optimisation are available and are usually of high benefit. On the other hand, the usage of transport modelling in small towns and cities (approx. 25,000 – 75,000 inhabitants) is rare and often not necessary.

Prior to the planning phase a local transport master plan could be set up dealing with all transport goals and modes while raising the question of how to reach the city centre (or other key area) with modes other than private cars. While an integrated local transport master plan covering all modes of transportation might exceed the requirements of smaller towns in terms of costs and complexity, the approach is recommended at least for medium-sized cities.

When starting basic analyses aiming for a HQPT system, external experts / consultants experienced in the field of urban public transport may support the decision-making process by providing the necessary studies (e.g. an initial feasibility study).
For political decisions it is essential to consider transferability, seeing *best practice* elsewhere. Studying real-life examples by site visits may persuade decision-makers to aim for high-quality urban public transport.

**Critical issues:**

Always keep in mind the need to follow the ‘*quality cycle*’ (Figure 1-1). The elements of the quality cycle are: plan, act, evaluate (monitor and review) and improve.

![Figure 1-1: Principle of the quality circle](image)

The life cycle of a public transport product is not long-term, as customers’ needs change. It is therefore recommended that significant *reviews of bus services be carried out on a regular basis*. The size and scope of such significant reviews varies depending on the extent of changes in land-use, population and employment growth, transport policies, user lifestyles, etc., as well as on the characteristics of the continuous monitoring process. In any case, it is recommended that reviews be performed every 3 to 5 years.

**Good practice examples:**

- **Donostia-San Sebastián (Spain):** The city has created an office for General Land Use Planning by restructuring several departments based on participation and coordination of various administration levels. This has led to a general mobility policy whose main aim is to limit car use.

- **Hasselt, Leuven, Sint-Niklaas (Belgium):** The Flemish public transport operator ‘De Lijn’ aims at a certain service level appropriate to the demand level (above the basic supply level which is fixed by law), using a tool called "Netmanagement". This tool applies standardised and objective study methods to reveal new network needs.

- **Luzern (Switzerland):** The "Zweckverband öffentlicher Agglomerationsverkehr Luzern" (ÖVL) ([http://www.oevl.ch](http://www.oevl.ch)) is in charge of the organising and financing of public transport services in the city and its surrounding urban areas. Three employees in ÖVL’s office run a small operations centre. One member of each municipality involved is responsible for discussing and elaborating an appropriate service for his "customers". This ensures that local knowledge, specific local needs, Origin-Destination trip patterns and planned developments are taken into account in the planning process.
• **Germany:** Public transport master plans are required by German law. These plans usually cover medium term strategies (including analysis of local patterns, supply and demand figures as well as basic network and timetable design and financing) and should be updated every 5 years. The authority in charge is either the county or city administration (depending on the size and status of the city).

• **UK:** As part of the evidence-base for Local Transport Plans, Local Authorities carry out Accessibility Planning, where they analyse for each town / suburb / village within their area the available access by bus and other public transport to centres of attraction (shops, hospitals etc.). These actions serve to develop strategies for improving accessibility and are one input to decisions on focussing investment in public transport.

**References and background reading:**


**Related guidelines:**

4.2 Monitoring the performance of operation
Background information: Fields of interest with regard to basic analysis (examples)

The following overview (Table 1-1) provides examples for basic features to be studied in order to perform a basic analysis. The overview can only provide examples and give indications on what to study because data availability may differ widely between countries or even between cities within one country.

<table>
<thead>
<tr>
<th>Field of interest</th>
<th>Major question to answer</th>
<th>Sources of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhabitants</td>
<td>How many people are living in each area of the city?</td>
<td>Municipal data sources (e.g. residents registration office)</td>
</tr>
<tr>
<td>Large traffic generators</td>
<td>Where are major work places like industrial estates, business parks, head offices of banks or other big traffic generators like hospitals, schools, high-density dwelling areas and shopping malls?</td>
<td>Municipal data sources, own surveying and mapping</td>
</tr>
<tr>
<td>Spatial structure of the city</td>
<td>Which sub-centres exist within the city? Which streets are suitable for urban buses? What are the typical distances between the city centre and residential areas / suburbs?</td>
<td>Municipal spatial development plan, own surveying and mapping</td>
</tr>
<tr>
<td>Development areas of the city</td>
<td>Where are new residential areas or business parks planned in the short-, mid- and long term?</td>
<td>Spatial development plan of the municipality, own surveying and mapping</td>
</tr>
<tr>
<td>Integration with neighbouring municipalities</td>
<td>What is the share of commuting (work, education) into neighbouring cities?</td>
<td>Data on commuting from traffic surveys or from national social insurance institution</td>
</tr>
<tr>
<td>Share of private purchasing budget spent locally</td>
<td>Do people do their shopping locally or do they travel to neighbouring municipalities?</td>
<td>National / regional / local statistics department</td>
</tr>
<tr>
<td>Role of tourism in the town</td>
<td>Are there incoming tourists (e.g. in a spa) generating additional trips on public transport?</td>
<td>Ratio between inhabitants and overnight stays</td>
</tr>
<tr>
<td>Quality of existing public transport services</td>
<td>What is the frequency and coverage of current regional lines? What role does the rail service play within the urban area?</td>
<td>Current timetable and network plan of public transport services</td>
</tr>
<tr>
<td>Role of ‘competing modes’</td>
<td>What is the share of bicycle trips, what is the availability of parking in the city centre, what is the ‘inclination’ of the local parking policy?</td>
<td>Local transport plan, own surveying and mapping</td>
</tr>
<tr>
<td>Financing and legal framework for urban bus services</td>
<td>Which is the responsible administrative body (it need not be the municipality itself, but could be a regional authority)? Which funds are available for local PT?</td>
<td>Studying the legal framework, funding programmes</td>
</tr>
</tbody>
</table>
1.2. **User needs and expectations**

Put user needs at the heart of the urban Public Transport business.

<table>
<thead>
<tr>
<th>(1) Target Stakeholders</th>
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<tr>
<td>- Operations</td>
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</table>

**Explanation:**

The **aim** is to measure and interpret behaviour, and evaluate citizens’ expectations in the area of public transport travel. Identified user needs contribute to service improvements and optimisation of the urban bus service.

Mode choice is not only determined by hard facts like travel time and comfort features, but to a large extent by the **image** of the respective mode in public discussion. Consequently, the perception of users and non-users of public transport has a large influence on market penetration: The higher the satisfaction of passengers, the greater their acceptance becomes, followed by increased usage and recommendation of public transport to others.

**Customer satisfaction** is an important area for public transport agencies and providers to pay attention to. Where bus services are contracted, surveys are likely to be carried out to map passengers’ satisfaction levels in order to decide and calculate the operator’s bonus or penalty (where such a scheme exists). Furthermore, surveys help to clarify user needs and expectations.

Users should be carefully categorised into various **user groups** (users with similar patterns), including

- Regular / non-regular users
- Time-dependent markets
- Special users (tourists, elderly etc.).

Users could also be grouped by **trip purpose**. The most relevant groups are often segregated into commuting (work / education), provision of service (shopping, medical services etc.) and leisure.

A fairly simple method to **monitor user and non user perception** is the ‘customer barometer’. In various European countries, a number of local / regional public transport networks are taking part in an overall benchmarking scheme to compare user / non-user perception between the companies / cities. Usually, these surveys are done by telephone interviews. The customer barometer provides data for target-oriented marketing measures and the definition of a quality-oriented corporate strategy.

In some countries (e.g. Italy), **national surveys** are launched with the initial goal of measuring and interpreting behaviour, and evaluating citizens’ expectations in the mobility
area. These surveys are conducted countrywide. Their results can be refreshed annually through direct telephone interviews throughout the country.

Sometimes, **stated preference surveys / conjoint analyses** are used to investigate preferences for different quality elements, the value of travel time and / or ‘soft’ quality attributes such as information provision, staff attitude and vehicle comfort. Both methods are used regularly within telephone interviews, written questionnaires or Internet based studies, but require a commitment to the use of high-level market research programmes.

An approach to attract new users is the **‘free ticket’ to potential users** to make them try the service. Interviews with these new users will then reveal useful information on user perception and likely improvements.

An **open participation process** is also used in some cases (in some European countries), which enables city officials to identify user needs based on their opinions. The surveys and participation process enables the identification of needs in terms of new lines, new frequencies, new timetables, new itineraries, etc.

Equally important for the investigation of user needs and expectations, and for optimising involvement in the public transport planning process and operation, can be **forums with consumer organisations**, expressing their needs to the public transport authority and / or the operator. Consumer organisations involved are often:

- Organisations of public transport users
- Organisations of cyclists
- Organisations representing schools / students
- Organisations of elderly / retired people
- Organisations of disabled persons
- Residents’ associations
- Chambers of Commerce (organisations of companies)
- Environmental organisations
- Organisations for traffic safety.

Furthermore, **systematic analyses of user complaints** can help in learning more about user needs.

It is recommended that surveys be **repeated on a regular basis** (e.g. every year).

**Critical issues:**

When carrying out such research it should be recognised that **users and non users** (or potential users) could be part of the same market group. Where this is seen to be the case public transport authorities or operators tend to carry out perception surveys which cover both users and non-users.
Good practice examples:

- **Germany:** Since 1999 public transport operators and associations have taken part in a nationwide benchmarking study (“ÖPNV-Kundenbarometer”) on a voluntary basis. In 2008, 32 participants (most of them medium and large enterprises) measured customers’ satisfaction with 32 performance criteria such as overall service provision, frequency, connections, punctuality, cleanliness, comfort, information, friendliness, and the degree of cost-coverage.

- **Larissa (Greece):** An extended survey with questionnaires covering user groups, trip purposes, customer needs, customer satisfaction etc. was conducted in the year 2001. Data updates have been performed regularly since, mainly using passenger counting methods.

- **Luzern (Switzerland):** An international mobility research institute has conducted a comprehensive mobility analysis in the Luzern region. A written questionnaire, telephone surveys and personal interviews covered the topics: "inner city", "potential for public transport" and "travel behaviour". The study referred to all transport modes used in the region and aimed to understand citizens’ travel patterns.

- **Ljubljana (Slovenia):** In the city of Ljubljana methods for travel demand and market investigation are used regularly by the municipal administration, including Internet surveys, household questionnaires, telephone surveys, and manual passenger counting.

- **Martin (Slovakia):** In the city of Martin several methods are used to identify travel demand and market investigation, including Internet surveys / internet panel, in-bus questionnaires, and automatic passenger counting.

- **Sweden:** The Swedish association SLTF regularly carries out measurements of customers’ satisfaction with public transport. All cities participate in the Swedish Public Transport Association’s (SLTF) "Satisfied customers’ barometer" (“Kundbarometern”). Telephone interviews are carried out every month, ten months a year. The interviews include 25-30 questions regarding the inhabitants’ attitudes towards local transport. As regards customer satisfaction a Satisfaction Customer Index is calculated (Nöjd Kundindex, NKI). The index is measured on a scale from 1 – 100.
References and background reading:


Related guidelines:

5.1 Knowledge base about your (potential) customers
1.3. Market analysis / Monitoring of demand

Systematically monitor usage of the Public Transport system in order to ensure that the system performs to maximum effect.

<table>
<thead>
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<td>X Operations</td>
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Explanation:

The aim of market analyses as well as monitoring of actual demand is to collect data that provides public transport management (at authority level or operator level) with objective assessments of current circumstances, past trends, and existing concerns, as well as unmet needs.

A detailed knowledge of the existing demand level and demand structure is necessary in order to identify problems and to plan accordingly. Various tasks can benefit from a systematic collection of demand data:

- Network redesign and network changes (e.g. how many transit passengers are affected by a change of branches between cross-city lines?),
- Detailed planning and efficiency considerations (e.g. how many people are using a certain service / run and is the service still in line with overall economic considerations?),
- Tariff calculations (e.g. what happens if the zoning of the fare structure is changed?),
- Share of revenues between several operators (e.g. how many trips are done by tickets issued by another operator?),
- Marketing measures (e.g. how can low ridership figures be increased in a certain residential area of the city?),
- Statistical data for urban transport planning (e.g. how many trips do citizens make by bus each year?).

There are two main methods to gather demand information:

- Monitoring of ridership figures in many European countries is usually done by manual counting carried out periodically (e.g. once a year). Also automatic counting systems are used to ascertain how many passengers enter and leave the bus at each stop. Sometimes ticket sales can also be used.
- Analyses of existing public transport demand are mainly done by market surveys inside the vehicles during the trip. Passengers are counted and asked about their trip purpose, origin and destination (trip length and transfer information), ticket use
(revenue information), and customer satisfaction. Bus questionnaires are held fairly regularly in 79% of all cities participating in PROCEED’s case study survey.

Demand varies from day to day with seasonal influences and unforeseen incidents, resulting in different demand levels on the same service. Consequently, the sample for data collection should be fixed at an appropriate level based on statistical knowledge in each country. In Sweden, for example, experience has shown that data from the months October or April are the most appropriate to use as an average for the whole year.

Especially if the service is contracted, decision-making bodies (e.g. public transport agencies) are not directly involved in service operation on a regular basis and, therefore, detailed data is not automatically available. However, access to accurate information for decision-making bodies helps in making decisions on where and when which service should be provided and supports actions designed to improve performance. The public may also be interested in knowing how well the service is being provided and may need convincing that public transport provides a valuable service. For that reason, a clear procedure for performance data flow should be agreed between the authority and the operator considering the respective role of each player. The data flow should preferably be clearly stated within the contract.

**Systematic monitoring** is a necessary prerequisite for success. Surveys done from time to time with different methods will deliver non-comparable results, which may not be useful to identify trends. Consequently, data comparability between surveys from different years should be considered. A yearly interval (exceptionally 2-yearly) can be regarded as a minimum requirement for the above given surveys. For examples see ► Background information: Approach to market analysis in The Netherlands.

**Critical issues:**

When performing market surveys keep in mind the **aims of the survey** and carefully prepare:

- Design of sample frame and sampling methodology
- Survey mechanisms (distribution / type of survey)
- Questionnaire design (content / phrasing / clarity / format, etc.)
- Quality control (accurate inputting and coding)
- Analysis (accuracy / reliability / representativeness)
- Interviewer effects.

**Good practice examples:**

- **Avilés (Spain):** In Avilés surveys in stations are done annually during the month of November. These surveys compile information about the origin and destination of users as well as types of users. Customer satisfaction levels are also measured.

- **France:** In France, compendia of statistical analyses on urban transport networks are produced by CERTU ("Centre d’Etudes sur les Réseaux, les Transports, l’Urbanisme et les constructions publiques" – Public study centre for networks, transport, urban planning and public construction), in partnership with GART
(“Groupement des Autorités Responsables de Transport” – Group of Transport Authorities) and UTP (“Union des Transports Publics” - Public Transport Union). These data allow comparison between networks at a national level as well as time-series analysis of the performance of individual urban transport networks. Regarding data collection, a household traffic survey (“enquête ménages déplacements” - EMD) is one of the key data collection tools for analysis of travel habits. It provides reliable data which is comparable in space and time. The surveys are carried out every ten years at the level of urban area and the region. This survey is carried out according to a standard methodology at a national level, developed by CERTU.

- **Germany:** Passenger surveys are conducted on a regular basis in almost all public transport associations throughout Germany in order to split revenues between operators based on individually verified earnings. The related findings on demand figures and customer behaviour are in many cases used to re-design or optimize public transport networks and timetables.

**References and background reading:**


**Related guidelines:**

1.4 Monitoring of performance

4.3 Operation control systems
Background information: Approach on market analysis in The Netherlands

There are three national surveys monitoring trip behaviour in The Netherlands. Mobility research (A), public transport user satisfaction (B) and public transport passenger kilometres (C). Also relevant is the customer complaints and feedback registration (D).

A. MON (= Mobility research Netherlands): The survey consists of a household questionnaire in combination with individual trip diaries. The survey is carried out throughout the year (every month a sample of 4,350 addresses is drawn and also a spare sample of 4,350 addresses); the net result on a yearly basis is 50,000 completed (individual) trip diaries + about 24,000 accompanying household questionnaires. The database allows analyses at the local level.

B. Klantenbarometer (= customer satisfaction local and regional public transport): This survey aims to monitor the user satisfaction of regional and local public transport services in the Netherlands. This is done by a yearly questionnaire to be completed by the public transport traveller during his / her journey-stage. The questionnaires are randomly distributed among travellers when entering the vehicle and collected (80,000-90,000 per year) when leaving it. Travellers are asked to give an overall assessment on the actual journey-stage, as well as on aspects such as travel information, ticketing, ease of access to the vehicle, social safety, comfort, travel time, price, and general comments. Also ‘background’ information is asked, such as car availability, age, travel frequency and activity at the destination. The 7,000 to 8,000 stages per year are randomly selected out of all stages stratified by region and mode (bus/tram/metro/regional rail). The KPVV (Kennisplatform Verkeer en Vervoer = Knowledge Platform on Traffic and Transport that supports local authorities in their efforts to develop and implement traffic and transport policy) is responsible for the survey, which is carried out in all Public Transport areas. The results are publicly available on the Internet.

C. WROOV (Fare box revenues and allocation): Since 1980 the Netherlands has maintained a national system for urban and regional public transport fares. The system offers passengers the benefit that they can travel throughout the country using the same ticketing system. Fares are based on the number of geographical zones ‘crossed’. A regular national (WROOV) survey is carried out among passengers (that guarantees 95% accuracy and is carefully evaluated by independent accountants, transport companies and the Ministry of Transport) to map the use of national tickets, which determines the allocation ‘keys’.

D. Customer Feedback: In most concessions the operator has to register the customer comments and complaints received, including the replies and actions, and regularly provide an overview to the public transport authority.
1.4. Monitoring of performance

Public Transport Authorities can measure customers’ satisfaction and performance by standardised measurement methods like the Customer Satisfaction Survey. Operators can make use of self-assessment models to assess their own production quality.

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</table>

Explanation:

Performance measurement data provides public transport management with objective assessments of current supply with regard to service quality. Regularly monitored aspects regarding the existing service include, for instance, punctuality of bus services, likelihood of getting a seat, cleanliness of buses, and condition of bus stops. Key management uses of a performance measurement system include: Service monitoring; Evaluation of financial performance; Management functions; Internal communications; Development of service design standards; Communication of achievements and challenges; and Promotion of community benefits.

The quality loop approach has been accepted as an EN standard but it is not the only option. Under the standardised measurement procedure described in the European Standard EN 13816:2002, three relevant methods for service quality measurement are described:

- **Direct Performance Measurements (DPM)**
  Performance measurement is the process whereby an organization establishes the parameters within which programmes, investments, and acquisitions are measured for desired results. This process of measuring performance often requires the use of statistical evidence to determine progress toward specific defined organizational objectives.

- **Mystery Shopping Surveys (MSS)**
  Mystery shopping is a tool used by market research companies to measure quality of retail service or gather specific information about products and services. Mystery shoppers posing as normal customers perform specific tasks—such as purchasing a product, asking questions, registering complaints or behaving in a certain way – and then provide detailed reports or feedback about their experiences.

- **Customer Satisfaction Surveys (CSS)**
  One can measure customers’ satisfaction by using CSS. The definition of the threshold value for a certain quality criterion depends on the community’s service quality level. This can vary considerably across Europe, but the measurement method can be used universally. The methods above are standardised procedures (see Annex C of EN 13816:2002; see examples from EN15140:2006).
Regarding production quality, the operator can make use of self-assessment. A self-assessment model known as EFQM model (The European Foundation for Quality Management “Excellence model”) is widely used in other industries and is also suitable for the public transport industry.

A benchmark is a standard of excellence of achievement against which other similar things, services or products are measured or judged. Standardisation and certification are part of the quality assurance process. Quality partnerships are schemes drawn up by a local authority aimed at implementing a local bus strategy where responsibilities are set between different actors.

Tools discussed in connection with quality management and continuous improvement processes in public transport (Figure 1-2) are explained in more detail as ► Background information: The quality loop / Self-assessment models / Benchmarking / Standardisation and certification / Quality partnership / Service guarantees and service charters.

Critical issues:

If a certain quality level is agreed in a contract, the actual quality needs to be checked regularly by independent standardised procedures during the whole contract period. This applies especially to cities with gross contracts (where the revenue risk is taken by the public transport authority), since the motivation of the operator to provide the intended quality is not given by the market itself.

Surveys in which the judgements of surveyors or customers are involved cannot exclude personal or emotional judgements. The contributions of such effects to determining essential financial consequences like bonuses or penalties for contract partners therefore have to be considered carefully.

Punctuality of buses is not always within the scope of the operator’s management. Heavy traffic may interfere with public transport punctuality. On the other hand the reliability of service is strongly connected to maintenance (bus depots), dispatching, and availability of...
spare resources (in vehicles and staff) etc. In small cities, where no computer-based operation control system is in use, the monitoring of punctuality requires expensive measurement procedures.

**Good practice examples:**

- **Brighton & Hove (UK):** Customer service is a fundamental ethos of the bus operator, and Brighton & Hove buses have one of the highest customer satisfaction rating in the UK. Monitoring of performance is a key element in achieving high customer satisfaction, and the performance of service operation (including performance of front-line staff) is monitored on a regular basis. There is a draft Bus Punctuality Improvement Plan that represents a joint commitment (between the city authority and the bus operator) to achieving continuous improvement in the punctuality and reliability of bus services for an agreed period of 5 years, extending thereafter by mutual consent. The data from the city’s Real-Time Passenger Information Systems is a fundamental element in this.

- **Hasselt, Leuven, Sint-Niklaas (Belgium):** The Flemish public transport operator ‘De Lijn’ has a policy of continuously measuring customer satisfaction by written surveys on the bus. Every 3 months 11,000 interviews are performed which are then combined with the results of a 2-year household survey concerning satisfaction measurements. In both measurements 11 quality factors are surveyed: Drivers’ attitude, punctuality, information and communication, interconnections, comfort (e.g. seating likelihood) and capacity, safety, cleaning, frequency and regularity, or price.

- **Groningen (The Netherlands):** A Bonus / penalty – also based on punctuality - is used in Groningen; derived from customer feedback.

- **Larissa (Greece):** A timetable reliability programme is used in Larissa city, which exhibits high frequencies and good reliability. More specifically, a daily-performance monitoring programme is implemented by bus drivers and bus owners. With this programme potential deviations from schedule are reported and evaluated.

- **Luzern (Switzerland):** The bus operator is ISO 9001:2000 and ISO 14001 certified. These international standards regarding quality and environment management ensure that customers receive a service that has a high quality with high safety, and is environmentally friendly. Furthermore, the operator works according to the OHSAS-standards 18001:1999 that considers Health and Safety at work. Also, quality reviews from Switzerland Tourism and other awards have been obtained. Customer satisfaction is measured every second year, and the questions regarding the public transport service refer to such items as supply (availability), cleanliness of buses and bus stops, and friendliness of the drivers, etc. The ÖVL and the Cantonal Department of Public Transport initiated this survey, and in 2004 the public transport service achieved 71 out of 100 points in the rating of customer satisfaction.
• **Ljubljana (Slovenia):** The international standard EN 13816:2002 is implemented as a Mystery Shopping Survey to perform quality control. The cleanliness of vehicles is measured; but the public transport authority uses the results only for information.

• **Luleå (Sweden):** The 'condition' of the bus stops (cleanliness, illumination, damage etc.) is regularly monitored through a customer satisfaction index.

• **Kaunas, Klaipeda (Lithuania):** Every autumn trolleybus and bus operators are evaluated by a customer satisfaction index that is calculated by monitoring passengers’ opinion of the service quality provided, including aspects such as punctuality, cleanliness of vehicles, driving culture, politeness of drivers etc. In Kaunas city the city authorities regularly monitor punctuality, cleanliness and the state of the bus stops. An authority control team monitors the operators’ work without giving any prior notice. If any major deviations are detected penalties are imposed on the operators. In Klaipeda there is a website for public transport, where regular monitoring of customers’ satisfaction with regard to the public transport service quality takes place. The city’s public transport authorities regularly monitor punctuality, cleanliness and the state of the bus stops. Also, public transport time-schedule punctuality is checked by a vehicle traffic control system where data is sent using GPRS.

• **Rijeka (Croatia):** In Rijeka internal control of punctuality is performed regularly, based on data from the GPS-based system.

• **Zürich (Switzerland):** Zurich public transport operator (VBZ) has two quality standards regarding a vehicle’s passenger capacity: a) The average annual passenger load of a vehicle run should not exceed 2 pers./m² standing area. b) The run with the highest passenger load should not exceed an annual average of 4 pers./m² standing area. The database is derived from the on-board automatic passenger counting system.

**References and background reading:**

EN 13816:2002 Public passenger transport - Service quality definition, targeting and measurement.

EN 15140:2006 Public passenger transport - Basic requirements and recommendations for systems that measure delivered service quality.


**Related guidelines:**

4.2 Monitoring the performance of operation
The concept of the service quality loop (Figure 1-3) distinguishes between:

- Customer view, and
- Service provider view.

Where:

- “Service providers” are: Operators, Authorities and also Police and Road (Infrastructure) departments (these can be seen also as the “production” side)
- “Customers” are users and also the community

**Figure 1-3: The quality loop (PORTAL 2003)**

The service provider view distinguishes between “targeted” service qualities and “delivered” service quality. Targeted service quality is set by authorities. There could be a difference between tendered quality and actually contracted quality; which implies a quality partnership as an agreement.

The service quality definition is a “set of quality criteria and appropriate measures for which the service provider is responsible”. Level of quality is the “sum of weighted quality criteria”.

The service quality targeted (by the provider) should correspond to the quality sought (by customers). The discrepancies between sought and targeted quality are influenced mostly by budgetary and technical constraints.

This results in a set of targeted quality criteria values, written down “in numbers”, which are mostly thresholds.

The customer view differentiates between perceived quality (by users) and expected quality (by community or users associations).
Background information: Self-assessment models

**The EFQM self-assessment model:** For several years, the EFQM has been developing an efficient model of self-assessment for quality management at the level of a company or of a production system. The EFQM defines self-assessment as “taking a hard look at your organisation and scoring it against an ideal or model (the EFQM model in this case). The results indicate the organisation’s strengths and areas for improvement and provide the basis for future strategy and improvement plans…” In the public transport sector, self-assessment can certainly lead to an improved knowledge of system and company performances.

**The EQUIP model:** EQUIP was an EU funded research project under the 4th Framework Programme which developed a self-assessment method for public transport operators, as a first step in a benchmarking process. The approach is described in a handbook (EQUIP 2000).

Background information: Measurement of customers’ satisfaction and performance

The measurement can be used for a large number of criteria, which have an impact on the quality of a public transport system. In some cases an “in conformity” approach is used:

- Service quality (e.g. friendliness of drivers)
- Vehicle quality (e.g. cleanliness)
- Driving quality (additionally, customer feedback can be used for monitoring purposes).
- Punctuality of services: The punctuality of service is “in conformity” if 95% of departures are on time. A departure is judged as “on-time” if the delay is less than three minutes and the departure is not more than one minute early. The measurement method is DPM. Quality control for punctuality can also be monitored by real-time information systems.
- Bus stop quality (e.g. cleanliness, and accuracy of stop information).
- Information tools (e.g. availability): The availability of service is “in conformity” if 99% of phone calls are answered, if 95% of calls are answered within three minutes and if 90% of answers are correct. The measurement method in this case is DPM by Mystery Shoppers.
- Sales facilities (e.g. availability): The quality of ticketing service is “in conformity” if 90% of customers succeed in buying the most appropriate ticket on the ticket vending machine. The measurement method in this case is MSS.
Background information: Benchmarking

A Benchmark is a standard of excellence or achievement against which other similar production units or organisations are measured or judged. The basic idea of benchmarking is for the organisation to locate ‘competitors’ level of performance in a certain field that is superior to its own, and by doing that some item that is worthy of emulation is identified. Benchmarking is a process which - simply speaking - consists of the organisation:

→ Figuring out what to benchmark,
→ Finding out what the benchmark is (what is the standard of excellence?),
→ Determining how it is achieved (What methods or processes produce those results?),
→ Deciding to make changes to its own business practices that will enable it to meet or even to exceed the benchmark.

Best Practice is the means by which this ‘benchmark’ level of performance is achieved. Benchmarking can be described as the systematic comparison of the performance of an organisation against that of:

→ Other departments/subsidiaries (internal benchmarking)
  Internal benchmarking is not specific to public transport. Administrative, financial or other general management practices are benchmarked between departments inside many companies using value analysis techniques.

→ Other organisations or competitors (external benchmarking)
  External benchmarking between operators is not very common. The main reasons are confidentiality, the lack of efficient tools to identify comparable practices, and a lack of “no blame” cultures, often combined with a reticence to openness.

The main goal of benchmarking is to build on the successful experiences of others instead of "re-inventing the wheel".

Background information: Standardisation and certification

Standardisation and certification are part of the quality assurance process. Quality assurance consists of “all the planned and systematic activities implemented within the quality system and demonstrated as needed to provide adequate confidence that an entity will fulfil given requirements for quality”. The standard defines the “systematic activities” and certification; the assurance that the standard will be respected.

The International Organisation for Standardisation (ISO) defines standards as “documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose”. AFNOR, the French organisation for standardisation, published a French standard (ref. NF X50-805) entitled “Quality within transportation services – Identification of the quality criteria for passenger transport” in April 1997, and has revised and improved it since.
Background information: Quality partnerships

The concept of “quality partnership” is relatively recent in the public transport sector. A quality partnership is a scheme drawn up by a local authority aimed at implementing a local bus strategy, in which both the authority and signatory operators commit to certain actions. It first appeared in the UK in the beginning of the 1990s as a consequence of the deregulation and privatisation in 1986 of the UK Bus Industry (outside London and Northern Ireland). Prior to deregulation local authorities had had a formal service co-ordination role, although the benefits that this achieved varied between areas. Quality partnerships emerged under deregulation from a recognition that good partnership working was essential to growing the business for bus travel. The concept is generally only applicable to cases where bus services are run commercially outside any contract with a public authority, since in the case of a contracted operation the contracting authority can specify the level, type and quality of service to be delivered.

Background information: Service guarantee and service charters

The urban public transport user has a certain level of expectation and is not concerned with the way the service provider manages production activities in order to reach this level. The user is concerned with the service (Does the service fulfil my expectation?) and one of the main expectations concerns the reliability of the service. Consequently, the question is: How can the urban public transport user “trust” the service?

The concept of the service guarantee has been developed as an answer to this question. An operator or responsible authority may wish to be able to provide the urban public transport user with a guarantee of service level or quality.. Ideally, the guarantee should be applicable at every hour of the day, every season of the year, and anywhere on the network.
2. GUIDELINES ON "NETWORK AND INFRASTRUCTURE"

2.1. Integrated public transport planning and land use planning

Refer to a vision (set in the urban transport policy/plan) which stays, and carefully integrate transport planning with urban land use planning at an early stage.

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Explanation:

To be able to create a sustainable and attractive city it is necessary to develop a planning strategy which favours accessibility of “green transport modes”, such as public transport, bicycle, walking, etc. To be able to create the best possible conditions for these modes, they have to be considered in the very first stages of the planning process. Otherwise the result is often lack of space or difficult planning conditions for these modes. In order to achieve high quality bus corridors in urban areas, it is crucial that land use planners, right at the start of the land use process, plan space and infrastructure for public transport into the various land uses of the city.

Recommendations that can be found within the HiTrans project (HITRANS 2005a) can be summarised as “the importance of integrating land use and transport planning”. Examples of this are:

- Select for investment in public transport those corridors that have a land use that can enable maximisation of both accessibility and patronage;
- Focus development along corridors and at public transport nodes;
- Ensure that this development supports public transport use,
- Use public transport to revitalise the city or parts of it,
- Provide complementary transport policies to support a high quality public transport service, e.g.: urban design and traffic measures to promote pedestrian and cycling access to stations, parking policies that complement rather than undermine public transport, and management of public transport to make best use of high quality services.

The implementation of a policy on served / unserved areas may assist in delivering a trade-off between social and economic demands. Because small and medium-sized cities usually have some low-population-density areas on the edge of cities, public transport provision to 100% of the citizens may fail due to inappropriately high costs. Therefore, the policy should be to fix the minimum standard of access for citizens to the public transport network (e.g. 90% of the inhabitants should live within 400 metres walking distance to the nearest bus stop). In order to achieve such a policy, public transport has to be considered as an integral
part of the land use planning. Citizens living in unserved areas may be provided with a basic public transport supply (e.g. a dial-a-ride service).

**Critical issues:**

It is essential to stress the importance of an integrated planning approach for local decision makers. This can be made through seminars and workshops where an integrated mobility policy is presented and discussed. The policy gives the framework of how the development in land use planning should proceed in the city. All political decisions in the future must be evaluated against the policy; does the decision follow the policy or is it a contradiction? In conclusion, it is technically and economically possible to define sustainable transport solutions for any city, but their implementation depends on the strong political will of local policy makers.

A good co-operation between urban developers, planners, financial and transport planners is a prerequisite for success. Often different ‘departments’ of the local administration have responsibilities for land use planning and the implementation of the land use planning guidelines.

Several cities studied by PROCEED have agreed strategies for integration of public transport planning and land use planning. Localisation policies seek to locate functions with high transport generation near to public transport, but the policy is sometimes affected by other aspects that are prioritised higher. There has to be a detailed consideration between all aspects affecting decision-making.

**Good practice examples:**

- **Almere (The Netherlands):** The city of Almere is situated north of Amsterdam, Netherlands. It was planned and developed as a completely new settlement in the early 1970s. Since the first inhabitants moved into Almere (1976) the yearly growth has been about 6,000 inhabitants each year. By 2010 the city will have approximately 200,000 inhabitants. From the start of the development of Almere public transport was an integral part of the plans (e.g. dedicated bus lanes, and accessibility standards - the majority, about 90%, of the houses and businesses are within 400 metres of a bus stop). Therefore, the public transport buses in Almere can now use an extensive network of dedicated bus lanes (the total one way length is 105 km). The buses have priority at all intersections. The average speed of the MAXX bus system (26 km per hour) is comparable with light rail. The lines are as much as possible cross-city (i.e. from one district via the City Centre / Central Station to another district).

- **Freiburg (Germany):** The city of Freiburg developed two new residential areas (Rieselfeld, commencing from 1994, and Vauban, a former military camp, starting from 1997 as a ‘car-free’ neighbourhood) and considered public transport objectives from the early beginning of the urban land use planning. The tramway was extended to both areas. The tram line to Rieselfeld had been already opened before completion of the new settlement which supported the image of a neighbourhood with attractive public transport connections. The city has about 220,000 inhabitants.
• **Jönköping (Sweden):** The city of Jönköping has integrated sustainable transport visions into their urban planning vision. This means that sustainable transport modes such as public transport are always taken into account when planning and/or developing areas in the city. This has been especially important for the continuity of the development of Jönköping’s trunk line network.

• **Linköping (Sweden):** The future urban development including the master plan for Linköping is based on new buildings around two new bus roads (which are planned to be tram lines in 15-30 years time).

• **Parma (Italy):** In Italy the national policy establishes a comprehensive perspective, integrating all modes of transport and giving balanced consideration to the needs of all stakeholders. It required that a local plan should be based on a clear and concerted policy aimed at reducing the market share of private motorised traffic by providing more environmentally friendly ways to travel. The local administration of the city adopted the PDU (Urban Mobility Plan) to define the principles for the organisation of passenger and freight transport. The plan contributes to reducing private car traffic, and to increasing the use of alternative transport modes. It also intends to develop maximum interaction between all parties concerned.

• **Sint-Niklaas (Belgium):** In the 1990s, a "traffic calming plan" for Sint-Niklaas (Belgium) was set-up, fixing three focal points of urban development: the market place, the main station and the shopping centre with many activities for town and region in-between: all together forming a "corridor". Thus, the concept for restructuring “mobility” follows the spatial structure. Between these three nodal points priority is given to urban, local traffic and life. Pedestrians and cyclists received an upgraded network and a busway was built to connect all three nodal points along the corridor, with all buses using the busway, or at least a part of it. A logo (Figure 2-1) was used as a communication tool to explain the new concept that the mobility plan proposed.
Figure 2-1: Logo of the mobility plan of Sint-Niklaas (Belgium) outlining the bus corridor in city centre (bus way starting from the station in the north via the market place to a shopping centre in the south, grey = railway lines, coloured = bus lines, black = motorways/trunk roads)

References and background reading:


Related guidelines:

2.2 Planning objectives
2.2. Planning objectives and levels of planning

Set up clear visions and goals before planning the details on different levels: long/medium/short term.

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Explanation:

When starting public transport development and network planning, it is crucial that the planning task is properly defined. The **goals and objectives** of the public transport service should be clearly stated, and the relationship between the objectives, measures and how resources may be used should be considered. Issues to be considered when deciding the goals and objectives of the public transport service include the key role that the urban bus should play within the local transport system: a prioritised system that is able to compete with private car use, or a basic supply only providing transport for those without access to a private car?

Examples of main objectives that one normally can find in urban public transport policy and planning are found within the HiTrans project (HITRANS 2005a) and can be summarised in the following list:

- **Leave public transport to the market**: focus on making the transport market function so that public transport operators can provide the service that customers are willing to pay for incl. the service providers’ profits.
- **Support social policy**: focus on giving a minimum level of accessibility and mobility to all members of society.
- **Provide efficient transport**: focus on giving people an opportunity to choose between individual car use and public transport, by making public transport a more attractive alternative.
- **Contribute to a sustainable city**: focus on replacing car traffic as the major mode of transport and stimulate non-car based and environment friendly mobility and activity in the urban area.
- **Reach the objectives efficiently**: focus on using as few resources as possible to achieve a certain level of goal satisfaction

Public transport planning spans from the detailed day-to-day operational planning (such as planning of crew, staff and fleet management) up to very long term and structural planning:

- **Long term planning (e.g. 6 – 25 years)**: In the long term, the focus is at a higher level of planning, and is associated with general transport and land use planning. General questions might be:
- Which kind of public transport system suits the planned urban development?
- Where should new housing and employment centres be built?

- **Medium term planning (e.g. 2 - 5 years):** Planning in the medium term concerns larger, strategic changes and issues, such as:
  - Density of network
  - Type of service
  - Type of mode
  - Prices and fare structure

- **Short term planning (e.g. 0 - 1 year):** In the short term – detailed – planning level the task is to ensure a daily reliable service. Issues to deal with can be:
  - How should frequencies be adjusted to changing demand?
  - What operating hours are needed on different lines and on different days of the week?

**Critical issues:**

There must be a consensus about the visions and goals among all parties involved in the local public transport planning and performance (politicians, public transport authority, city, operators etc.). It is important that all parties have an incentive to perform as well as possible (e.g. an economic incentive for the operators that is based on customer satisfaction).

**Good practice examples:**

- **Brighton & Hove (UK):** The city has a strong Sustainable Transport Strategy. This involves investment in public transport, restrictions on car use, removal of car parking and strong enforcement of car parking and bus lane restrictions, the reallocation of road space to public transport and pedestrians, and numerous “soft” measures including ticketing initiatives, travel plans and awareness-raising. Brighton & Hove is also one of the leading UK proponents of Car Clubs (shared car ownership and use) and has been designated as a 'Cycling Demonstration Town'. The vast majority of bus services in Brighton & Hove are operated commercially. Brighton & Hove has a very strong and long-standing, but informal, partnership between the city council and the bus company (Brighton & Hove Bus & Coach Company Ltd: this operates very nearly all city bus lines). This partnership includes a number of commitments from both sides.

- **Chambéry (France):** All French urban areas of over 100,000 inhabitants are required to produce an urban transport plan (PDU) setting out targets and actions. Chambéry in the French Alps (Savoie département) has a population of 59,000 and the urban area served by the local bus network has a total population of 126,000. The aim of the most recent PDU (covering the period 2003-2010) is to keep the absolute volume of car traffic in 2010 the same as that in 2003 by enabling public transport and cycling to absorb the projected increase in trips. Over the 7-year period of the PDU, the aim is therefore to double public transport mode share, increasing the share
for urban buses from 5% to 9% as well as cycle trips from 4% to 7% mode share, keep walking constant at 22% and reduce car mode share from 65% to 57%. Public transport actions include creating trunk bus lines (high quality, high frequency) linking the main trip generators and attractors, introducing a clockface timetable on main bus lines, improving tangential bus services between suburbs, improving quality and promoting use of the regional rail network and its links with urban buses. In the period 2006-2009, work has focused on providing 2.2km of bi-directional bus lanes, 6 park-and-ride sites and 2 public transport interchanges.

- **Chur (Switzerland):** Public transport has a high priority; this is fixed in the cantonal law as well as in the legislation of the city. Chur has a special local law for a human and environmentally-friendly urban transportation (‘Gesetz für einen menschen- und umweltfreundlichen Stadtverkehr - Stadt Chur’) where different objectives and standards for public transportation are described.

- **Helsingborg (Sweden):** In the Swedish city of Helsingborg the public transport authority, the city and the tendered operator have formed a partnership, in which visions and goals and clear division of roles and responsibilities have been defined and agreed. The goal is to double the number of passengers in the time period 2006 - 2014. Measures taken were: a new trunk network, infrastructure advantages for public transport, economic incentives for the operator if the drivers have a good attitude towards customers and the buses are well-presented etc. The result of the measures taken is striking: in the first half of 2006 the bus system carried over 20% more passengers than in the corresponding period for the previous year. Seven additional buses have had to be put into service in order to cope with the increased number of passengers. The foundation of the success is the cooperation between the municipality, the county transport authority (Skånetrafiken) and the operator (Arriva).

**References and background reading:**


**Related guidelines:**

2.1 Integrated public transport planning and land use planning
2.3. **Network design**

Decide your planning task based on the objectives for Public Transport in your city / town. Plan your system to be simple, attractive to users and efficient.

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**Explanation:**

The major principles of high-quality urban bus planning in small and medium-sized towns can be summarised in the slogan “**Think tram, use bus!**” While the tram’s tracks always serve as the backbone of such a network, this feature is often missing in urban public transport systems which rely exclusively on buses. The network should have simple, attractive core lines.

**User requirements** of urban bus system users may be different, e.g. shoppers aim for a direct access to the shopping area (e.g. city centre pedestrian zone) while commuters aim for fast connections to the central business district or industrial areas of the town. Since ‘collective transportation’ of persons with different requirements is a main principle of public transport, the design of the network structure has to make selective choices and to solve important dilemmas. There are few simple and general answers.

If an existing network is being improved it is often fruitful to start the network planning process with an **analysis of the strength and weaknesses** of the existing network, thus defining challenges for network improvements. In this analysis it is useful to think of the various groups of customers that might use the system for different travel destinations and purposes (see guideline 1.2 User needs and expectations). The planners should also consider the network from a practical operational point of view.

The following work structure can be used to **define the main network** that is being aimed for in the long term:

- Try to cover the origin-demand links with as few high frequency lines as possible, creating cross-city lines between corridors on each side of the city centre (trunk line network).
- Look for suitable tangential lines or corridors that work together with the radial lines to form a more complete network.
- Consider regional services as well, so as to be able to create an integrated city / regional network with smooth interchanges for users.
- Study how access to the trunk line network can be improved; through bus service improvements, the provision of high quality stops and interchanges, and priority for bus services in interchanges.
For more information on available line types see ► Background information: Common line types in urban bus networks.

Further network performance criteria to take into consideration are:

- **Distance between stops:** A longer distance between the stops makes the line faster but the accessibility lower. The distance between the stops is always determined by the respective land use in relation to the average walking distance of passengers to the stop. The distance between stops has to be adjusted with regard to travel speed and travel demand at different destinations and is usually at an average of about 400m in urban networks.

- **Walking distance:** A longer walking distance makes it possible to have longer distances between the lines, which gives the lines a wider catchment area and the possibility of having a higher frequency. But the average walking distance cannot be too long if the bus system is to be accessible. An average walking distance of less than 600 metres (400 m as the crow flies) is considered good.

- **Routing of the lines:** The lines should pass through both the central and residential areas, not around or along one side of the area. The lines should also be as short and direct as possible. Note that these two aims are often in conflict so careful planning is needed to achieve an acceptable compromise.

- **Hierarchy of Public Transport networks:** The trunk line network is usually at the top of the hierarchy. Below this there are the tangential lines and other complementary lines (e.g. connecting business parks to the city centre) where the traffic demand is not that heavy. At the last level, there can be a service network designed to cover the special needs of the elderly and disabled (widespread in some countries, e.g. Finland and Sweden), an additional network for school services (widespread in some countries, e.g. Germany, France), or demand-responsive or flexible services for outlying areas of light population density or low usage.

- **Network planning in smaller cities:** Especially for small cities the efficient use of a limited number of vehicles is a key issue in order to keep the costs of the service at an acceptable level. Hence, the length of the line (and the necessary running time) should always be in line with the circulation time of the vehicle, i.e. the vehicle should be back at the terminus within the fixed frequency interval. If this cannot be the case, the line would need to be accelerated because the operation of an additional vehicle would make the service somewhat inefficient.

- **Synergy with regional bus services:** Selected complementary lines of the urban bus network (apart from trunk lines) may be served by joint operation and co-ordinated timetables of regional buses and urban buses. This can avoid ineffective parallel services and contributes to a better use of available resources. However, there are certain prerequisites for such an approach. In addition to similar service characteristics (comparable quality standards of vehicles, low likelihood of delays), a full tariff integration between urban bus services and the regional lines is necessary. Furthermore,
the integration of local and regional services should not be in conflict, e.g. an unreasonable lengthening of travel times for regional passengers should be avoided.

The relationship between trunk line corridors and feeder lines from smaller communities will also impact the network planning. There are at least two different techniques for servicing trunk line and feeder line areas: the “Trunk-Feeder technique” and the “Convoy technique”. With the Trunk-Feeder technique, larger buses serve the principal corridors. At the end of these corridors (and/or along them) an integrated terminal station is placed to allow efficient transfer to smaller feeder buses that continue into smaller communities. The Convoy technique does not necessitate the need for transfer at terminal stations: instead a convoy of buses with different ultimate routes all ply the same main line corridor. At a certain point, each of these buses leaves the main corridor and continues onto individual routes.

Critical issues:

Serving the needs of all passengers in the same system may result in the compromise of a network that does not meet all special needs of passengers and at the same time is not attractive to the majority of potential passengers. For example, it is difficult to fulfil the different needs of disabled persons in a regular network system or to offer direct services from home to school for pupils. Consequently, options to offer special services could be considered.

Good practice examples:

- **Almere (The Netherlands):** The public transport network of Almere has a fairly dispersed grid (the average distance between the bus routes is about 800 metres, the average distance between the bus stops is 600 metres) oriented at the city centre/central station and where possible on one or two other railway stations/district centres. The lines are as much as possible cross-city (from one district via the City Centre/Central Station to another district).

- **Aalborg (Denmark):** The public transport network of Aalborg (Denmark) is quite finely-meshed and most lines are oriented at the City Centre and the Central Station. The lines are as much as possible cross-city (from one district via the City Centre and the Central Station to another district). The metro bus lines are the backbone of the system and are characterised by a high speed obtained through priority at all intersections and by high frequency. The metro bus lines cover 50% of the dwellings and 60% of the workplaces in the city.

- **Cherbourg (France):** The urban bus network in this urban area of 94,000 inhabitants on the Normandy coast was completely restructured in September 2008. The new network, strongly marketed under the name “Zéphir” is structured around two trunk bus routes called “Métronomes” with an 8 minute frequency on one and a 10 minute frequency on the other throughout the day, including Saturdays. Five additional main bus services in the second level of hierarchy have a clock-face timetable of every 15, 20 or 30 minutes dependent on the bus line. This is complemented by the “Domino” network which serves school traffic at specific times, and the “Itinéo” network which
serves less dense outlying areas (generally with scheduled services in peak hours and a demand-responsive service requiring a reservation at other times). With the new network, 90% of the population is now within 300 metres of a bus stop, and the operator aims to increase bus use by 20% in the next five years (2008 to 2013).

- **Gävle (Sweden):** The main network of Gävle consists of 3 rapid bus lines and 3 "local" lines. All lines are cross-city lines (from one district via the City Centre / Central Station to another district). The rapid bus lines are arranged in a dispersed grid pattern, while the local lines cover areas between the rapid lines and smaller districts, sometimes going along the same streets as the rapid bus lines. In addition to the main network there is a range of additional lines.

- **Lemgo (Germany):** The urban bus network in the city of Lemgo (42,000 inhabitants with approx. 32,000 within the catchment area of the urban bus system) has 3 cross-city and 2 radial lines (8 radial line sections) and provides an example of an urban bus system in a smaller city. All lines are connected at the central stop ‘Treffpunkt’ (‘meeting point’) at the same time (‘Rendezvous’ of buses) in the core of the city. 7 of the 8 line sections have a standard headway of 30 minutes corresponding with a travel time of 30 minutes (round trip). The number of necessary vehicles per branch is minimised at exactly one vehicle. The 3 cross-city lines have additional runs (every 15 minutes) during peak-hours.

- **Münster (Germany):** Münster’s bus line 22 provides an example of synergies with regional bus services. The line runs in a regular 20 minutes interval to a suburb with partly rural characteristics. The service is fully integrated into the urban bus network; however, only one bus per hour is an urban bus service – the two other runs per hour are actually regional bus services continuing to 2 different destinations in the region. The applied tariff is fully integrated and the service quality between both operators is comparable. Münster has about 270,000 inhabitants.

- **Rheine (Germany):** 10 of the 12 radial lines have a headway of 30 minutes and the circulation time between the ‘Bustreff’ central bus stop and the terminus exactly fits into this pattern: The same bus is back at ‘Bustreff’ 30 minutes later, resulting in a demand for 1 bus per radial line.

- **Sint-Niklaas (Belgium):** The bus corridor that crosses the city centre is not only served by urban buses, but by regional buses as well. This intensifies the service on the bus corridor to a high-frequency service (every 7 minutes).

**References and background reading:**


**Related guidelines:**

1.2 User needs and expectations

2.1 Integrated public transport planning and land use planning
2.2 Planning objectives
**Background information: Common line types in urban bus networks**

<table>
<thead>
<tr>
<th><strong>Cross-city line</strong></th>
<th>Line between two terminuses (e.g. suburbs or sub-centres) crossing the city centre. Very often used in urban bus planning, especially with trunk lines.</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ <strong>Advantages:</strong></td>
<td>Availability of additional direct connections without changing vehicles. No waiting time of vehicles in the city centre (which would create a loss of space by parking buses in the core of the city)</td>
</tr>
<tr>
<td>→ <strong>Limitations:</strong></td>
<td>Not always possible to create reasonable cross-city lines. Increased risk of delays.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Radial line</strong></th>
<th>Line between one terminus (e.g. a suburb or sub-centres) and the city centre. Often used in urban bus planning especially with trunk lines.</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ <strong>Advantages:</strong></td>
<td>Limited risk of delays.</td>
</tr>
<tr>
<td>→ <strong>Limitations:</strong></td>
<td>Requires changing vehicles to provide additional connections. Results in waiting time of vehicles in the city centre (and therefore losing space by parking buses in the core of the city).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Loop line</strong></th>
<th>Cross-city or radial line with a short loop at the end of the line. Often used in smaller cities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ <strong>Advantages:</strong></td>
<td>Very high coverage of the catchment area (e.g. residential area) at the end of the line.</td>
</tr>
<tr>
<td>→ <strong>Limitations:</strong></td>
<td>There is no real terminus; vehicles need to run the loop without any waiting time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ring lines</strong></th>
<th>Line departing and ending at the city centre serving a circle in both directions, often only as a one-way service. This is sometimes used to integrate low-density areas of a city into the urban network or during evening hours and for provision of night buses.</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ <strong>Advantages:</strong></td>
<td>High coverage of the catchment area of the line with a limited amount of runs.</td>
</tr>
<tr>
<td>→ <strong>Limitations:</strong></td>
<td>Network structure is not easy to understand. With a one-way service there is also a high travel time for passengers joining the vehicle at the first stops of the line.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tangential lines</strong></th>
<th>Line between two termini (e.g. a suburb or sub-centres) without crossing the city centre. This sometimes used to create fast direct connections between major sub-centres, especially in bigger cities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ <strong>Advantages:</strong></td>
<td>Fast connections between sub-centres.</td>
</tr>
<tr>
<td>→ <strong>Limitations:</strong></td>
<td>Demand level of tangential lines often remains below expectation (the city centre, a major trip destination in urban bus networks, is not served).</td>
</tr>
</tbody>
</table>

Details are shown in Figure 2-2.
Figure 2-2: Common line types in urban bus networks

- Cross-city line
- Radial line
- Loop line
- Ring line
- Tangential line
2.4. **Timetable planning**

Create a simple and regular timetable well coordinated with other public transport.

<table>
<thead>
<tr>
<th>(1) Target Stakeholders</th>
<th>(2) Planning Level</th>
<th>(3) Guideline Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision makers</td>
<td>Master plan &amp; political decision</td>
<td>Basic service</td>
</tr>
<tr>
<td>X Public authorities</td>
<td>Market analysis</td>
<td>Quality upgrade</td>
</tr>
<tr>
<td>X PT operators</td>
<td>System planning</td>
<td>Organizational improvement</td>
</tr>
<tr>
<td>X Operations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:**

**Operational route planning** is one of the three main fields of operational planning in public transport (next to vehicle allocation planning and personnel / shift planning). It includes the detailed choices of the different lines’ route, start and end, the stopping pattern, the frequency of departures and the timetable. These often need co-ordination with other lines and modes. Extra time at the end of the lines must be provided in order to adjust timings after traffic disturbances.

The timetable might vary according to the time of the day, day of the week, month and season, but here there is a trade-off between simplicity for the users, information needs, and efficiency in the use of resources (HiTrans 2006b). Simple, **regular clock-face frequency services** are, in general, much easier for the user to understand and consequently are more effective in growing passenger demand. A passenger does not usually care about the timetable if the headway of departure is shorter than ten minutes, but he / she has to adjust trip planning according to the timetable when the frequency is longer. Not having to care about the timetable is preferable for passengers; however, such a frequent supply may well not be realistic for the whole network in small and medium-sized cities due to efficiency reasons, but is limited to selected corridors with overlapping lines.

Operational route planning should be always the first step of the **overall timetable planning** procedure. After setting the interval of each line to an aspired interval (e.g. 10 minutes), the vehicles are assigned to the lines according to size and capacity (vehicle allocation planning) in relation to the actual demand level of each line. Subsequently, the personnel allocation is performed considering working time regulations and the personal wishes of drivers.

In **small cities**, with only one central transfer point, it is advantageous to use the ‘Rendezvous principle’ (of co-ordinated timings). That means that the timetables are co-ordinated in order to make all buses meet at the same time at the same place. This allows passengers to transfer between all routes. Furthermore, this approach contributes to a condensed system with a limited need for buses and personnel that matches the available resources and funds of smaller cities.

In cities that use special service **routes to meet the needs of elderly and disabled persons** the timetables of the service routes are often adjusted in order to make sure that all passengers have time to board and sit down safely before departure and time to stand up and alight while the bus is standing at the stop.
Other **performance criteria** to take into consideration when timetable planning are:

- **Frequency:** A high frequency requires a high travel demand to make it viable. The frequency must be related to the travel demand and might therefore vary during the day or during the week. When the headway is below ten minutes, studies have shown that passengers do not care about the timetable any more. If it is possible, a headway of 10 minutes or less on trunk lines is preferable. If this is not possible, then the timetable should at least be regular so that it is easily remembered by passengers.

- **Operating intervals:** The operating interval in minutes should be exactly divisible into 60 (e.g. 60/15 = 4). In that way the departures take place at the same minute every hour at a fixed interval. This is also called a “Stiff timetable”. Service intervals of 7.5, 15, or 30 minutes (exactly divisible into 60 and the result is a multiple of 2) makes it easier to adapt the timetable to the actual demand (adding runs during peak hours or taking out in the evening), but the general service pattern remains. Other operating intervals (e.g. 60/35 = 1.714) will result in timetables which customers cannot remember.

- **Operating times:** Operating times should be fixed in accordance with the load curve of local demand which varies from town to town (e.g. a city with a high share of manufacturing industry has other traffic peak-hours compared to a city with many service-oriented businesses). In many countries a service pattern ranging from 0500 – 0600 to 2200 – 2400 h on weekdays, from 0600 – 0700 to 2200 – 2400 on Saturdays and 0700 – 0800 to 2200 – 2400 on Sundays has been established.

**Critical issues:**

The interplay between the operational, short-term timetable planning and the strategic long-term planning of the network as a whole is a **crucial connection between policy and implementation.**

**Good practice examples:**

- **Jönköping (Sweden):** The city has a number of interchange points, which are primarily meant for changes to / from the City buses. The main principle is that the regional bus timetables are set with reference to the timetables of the City buses.

- **Luleå (Sweden):** In September 2003 a new star-shaped bus system was introduced. The bus system has a main central bus stop where all bus lines meet. When setting the timetable, the ambition was to have up to 8 bus lines meeting at the centre, in order to make it possible to change between bus lines.

- **Hasselt, Leuven, Sint-Niklaas (Belgium):** ‘De Lijn’, the Flemish bus operator, has the legal task of organising public transport with minimum frequencies (from 5 departures/h in cities to one every 2 hours in rural areas) within fixed operation times from 0600 to 2100 (working days) and 0800 to 2300 (weekend) respectively. If the service does not match that quality, a demand-responsive bus or even a taxi can be used instead.

- **Helsinki (Finland):** In the Finnish capital a service network is operated which includes 20 lines covering most parts of the city. The network takes into account the special
needs of the elderly and disabled, the timetables of the service routes are simple, the
buses and bus stops are accessible to elderly and disabled, and the buses stop at places
such as convenience stores and care centres.

- **Graz (Austria):** In Graz the ‘Jakominiplatz’ is the central ‘Rendezvous’ station of all
  tram lines in off-peak hours where all lines meet at the same time. The connections
  between the lines are guaranteed by the local dispatcher.

- **Schaffhausen/Neuhausen (Switzerland):** The bus network consists of 6 cross-city bus
  routes. The main train station is the most important station. Timetables are harmonised
  with the trains arriving and departing in Schaffhausen.

References and background reading:

HiTrans (2005b) Public transport – Planning the network. Best practice guide 2. Self-
published by HiTrans Consortium. ISBN 82-990111-3-2 [www.hitrans.org](http://www.hitrans.org)

Related guidelines:

4.6 Software tools for staff and fleet management
2.5. **Interchange Strategies and Intermodality**

Create attractive and high quality transfer points and interchanges.

<table>
<thead>
<tr>
<th>(1) Target Stakeholders</th>
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</tr>
<tr>
<td></td>
<td>- Operations</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:**

High quality interchanges are necessary to create the *network effect* that makes it possible to take full advantage of the simple route structure with a small number of high frequency routes. If the transfer points are not functioning well, there will be a strong demand for more low frequency direct routes. This will result in a more fragmented, complex and continuously changing network.

The strongest network effect will be achieved if well-designed interchanges are developed at all places where two or more lines cross each other, so that transfers will create a number of new travel opportunities. Many of these points will be simple road junctions, so it is important that traffic engineering and management is strongly directed to take proper care of public transport users in the detailed design of urban streets and roads. Interchanges should be part of a bus stop hierarchy approach (see guideline 2.17).
Bus stop hierarchy) and their facilities should reflect the needs of changing passengers, e.g.

- Short walking distances between stops,
- Technical devices and non-technical procedures to secure connections (bus drivers should be able to see other buses and changing passengers, there should be information displays for bus drivers to announce connections to be secured, and there should be marketing measures such as connection guarantees),
- Bus stops should be long enough if more than one bus has to stop at the same time.

The largest transfer points will be major interchanges and meeting places between the public transport system and the urban land use structure. These will be regional and local centres of activity that combine the interchange function with being major traffic generators in themselves. These points will very often have high density concentrations of work places, commercial activities and public services as well as medium to high density residences. Furthermore, such points allow the combining of the process of changing vehicles with provision of service (e.g. shopping), and by that means, turn waiting time into useful time with social or commercial benefits.

In smaller towns the urban bus network often relies on only one central transfer point serving as a ‘rendezvous’ interchange with all buses meeting at the central stop at a certain point of time and diverging after a short transfer time to their respective destinations. This feature allows a high ‘network effect’ although the headway of the lines is limited to 15 or 30 minutes. The central stop is often designed as an intermediate platform providing short cross-platform connections between waiting buses.

Urban buses are part of a supply level strategy, assigning a specific market to every public transport mode with long-distance trains and buses serving the inter-city connections, regional trains and buses connecting towns and villages to neighbouring cities, and urban buses covering the urban areas of a city. As such, smooth transfers to regional / long distance trains and regional / long-distance buses is a prerequisite, because interchanges like the ‘main station’ or the ‘regional bus station’ are the connectors between the different levels of the network. However, network integration is often challenging if the ‘main station’ or the ‘regional bus station’ is not located right at the core of the city. A number of additional measures can be taken in order to facilitate the interchange to other public transport modes. These include connecting timetables, the provision of integrated information, and integrated tickets.

In recent years a large number of intermodal facilities have been established in many medium-sized European cities to create a feasible connection between individual traffic (car, bike) and public transport. Railway, port and airport stations have been renewed, improving the intermodal links (pedestrian routes, information, accessibility etc.). Connecting public transport to other modes makes public transport more attractive to users.

Intermodal links between car, bike and bus take these basic forms:

- Park & Ride is the usual term for journeys where the car driver uses public transport for at least one stage of the journey. Park & Ride strategies can have many
specifications (e.g. only during special events like trade fairs, only on special days like peak-shopping days before Christmas, or for everyday commuter use). As far as the latter one is concerned, the Park & Ride strategy in a small or medium-sized city should preferably be integrated into the standard public transport network with parking lots in the outskirts e.g. at the terminus of an urban bus line. Park & Ride requires a significant number of parking places near the bus stop. About 60% of all cities analysed in PROCEED have a Park & Ride strategy, but - as could be expected - with a majority among medium-sized cities.

- **Kiss & Ride** is the less frequently-used expression for another common way of accessing public transport services, where the public transport passenger is set down and/or picked up by a car driver at a public transport stop. Kiss & Ride facilities are short term parking lots specially provided for this purpose (parking for longer than 15 – 30 minutes is usually prohibited on those lots). Kiss & Ride has a limited demand for parking spaces; however, it generates approximately twice as many car trips per transferring public transport passenger as Park & Ride. Kiss & Ride plays an important role in connection with long-distance services (e.g. due to baggage transport), but placing of Kiss & Ride lots at a major intermodal transfer stop in an urban bus network can be an appropriate option.

- **Bike & Ride** combines bike parking (e.g. covered racks) at a transfer stop with use of urban buses to get into the city centre. Comfortable and attractive routes for cycling to and from major bus stops and interchanges will serve to extend the catchment area for the system and make Bike & Ride combinations more attractive as an alternative to the car. Safe and easy parking of bicycles at bus stops has been seen in many cities and countries to stimulate the use of bike and bus, especially at major bus stops. Park & Ride sites could also cater to Bike & Ride customers. Facilities like secure cabinets can assist in attracting cyclists. In addition, by increasing the use of bicycle infrastructure, this also promotes bicycle use.

- **Transport of individual bikes in public transport vehicles** accompanied by the passenger is widespread especially in rail services (e.g. regional and suburban trains) but often restricted to off-peak hours due to limited available space. Consequently, the principle mainly corresponds to occasional (leisure) trips but not to daily commuting. Besides limited space in buses the benefit from intermodal integration between urban bus and bike remains low because buses are operating short urban travel distances equivalent to average biking trips.

- **City bicycles or public transport bikes** involve rented bikes for public use to promote sustainable mobility solutions for trips within the city centre. Schemes are mainly found in some major towns with some projects being free of charge, while others require a membership (often combined with key cards or automatic access systems). City bikes in major cities (e.g. Lyon, Paris, Brussels, Cologne, Berlin, Frankfurt) have complementarities with metro and suburban rail services or with parking facilities, but much less so with buses where they are generally an alternative mode.
For a detailed list of links within a public transport system (e.g. urban – regional) and between public transport and other modes see ► Background information: Intermodal links between urban buses and other modes.

**Critical issues:**

The quality and **facilities available at interchanges** needs to be appropriate to the size of demand and the number and frequency of lines serving the interchange. It is as important to avoid over-provision (of facilities which cannot be justified economically, resulting in eventual financial problems) as it is to avoid under-provision. Care should be taken to ensure that the facilities can be maintained properly over time and it is very important that economic activity, particularly retail activity, is situated at or close to the interchange or can be attracted to it. This serves to increase use of the facilities themselves and of public transport and helps to provide funds for maintenance.

In order to reach high **acceptance of a Park & Ride** scheme in connection with urban buses in a small or medium-sized town, all the necessary framework conditions have to be fulfilled (e.g. attractive frequency of the bus services, restricted access to the city centre by a paid parking concept). Special permanent bus services connecting Park & Ride parking areas with the city centre may involve additional operating costs which need to be covered. The integration of the Park & Ride scheme into the standard urban bus network helps to avoid additional financial burdens for the city and the operator.

Within the vision of intermodal connectivity care must be taken to avoid **diversions of public transport lines** where these benefit only a few multi-modal travellers (which may be a characteristic of Park & Ride customers) at the expense of the majority of travellers who are not making multi-modal journeys.

Besides developing the necessary infrastructure, considerations of a **common tariff system** for all modes (urban bus, regional bus, local rail services) should be part of the policy.

**Good practice examples:**

- **Aalborg (Denmark):** In Aalborg the local bus station has recently been moved to be integrated with the regional bus station and the train station. Here large facilities for bike parking are available.

- **Cambridge (UK):** Cambridge - a historic city with high tourist traffic and narrow city centre streets - has had great success with a Park & Ride bus system for improved city centre accessibility. There are 5 Park & Ride sites, one being situated close to major retail developments, some being also served by long-distance coach services, and some being served by buses which also connect to a major regional hospital as well as to the city centre.

- **Chambéry (France):** Two park and ride sites at the entrances to the city offer 235 free parking spaces and also secure cycle storage, and are linked with direct bus services to the city centre.
Chur (Switzerland): The bus station for regional bus services is located above the train station and can be reached directly from every platform (Figure 2-3). The yellow design elements support sign-posting because they are in the style of the yellow buses. In addition, local buses depart from just outside the train station. The timetables of buses are coordinated with those of the trains.
Cork (Ireland): Intermodality is a key element of policy. An 8-acre Park & Ride site at Black Ash (940 spaces, about 32,000 m²) received a national Public Service excellence award for innovation in local authorities. The Black Ash Park & Ride service uses dedicated double-deck buses, and has a single charge per car (5 Euros), which includes bus travel for all occupants. The site is operated by Bus Éireann under contract to Cork City Council, which was the first Irish local authority to obtain a Bus Operator licence for the Park & Ride service under the 1932 Road Traffic Act. This was done in order to allow Cork City Council to control the service and aspects such as quality. Furthermore, within 50 weeks of operation, the income exceeded operating costs for the site.

Groningen (The Netherlands): Cycling is the most important mode of transport in Groningen: 39% of all trips in Groningen are made by bicycle. There is provision and promotion of special public transport products like the Park & Ride City bus. For Park & Ride users using the Park & Ride City bus there are special 2 euro tickets on which 5 people can travel together. For frequent Park & Ride users there are special cheap season tickets for the City bus.

La Rochelle (France): This city of 80,000 people on the west coast of France has a policy of establishing free Park & Ride sites on the periphery of the central area. A major parking site located 500 metres from the city centre is linked by regular free minibuses to different parts of the central area.

Luxembourg (Grand-duchy of Luxembourg): Park & Ride plays an important role in the city of Luxembourg. The pull-effects of the city centre are high, so that parking in the city centre is expensive and Park & Ride becomes important for daily commuting. The Park & Ride car parks are placed at the city edges and are served by local bus services approximately every 7.5 minutes.
• **York (UK):** Park & Ride is a very important part of York's transport strategy, and the York Park & Ride services are thought to be the second busiest Park & Ride services in the UK: a new Park & Ride site (the 6th) is planned for the west approach to the city. York's Park & Ride bus services are commercial, but the operator, First, operates them (and the Park & Ride sites) under contract to the Local Authority, paying a license fee. Many other bus services (including other city services) also serve the Park & Ride site and First's all-day ticket is valid on all its bus services serving the Park & Ride sites. Promotion of cycling is also an essential element in York's transport strategy, and secure cycle tracks and / or lockers have been provided at all Park & Ride sites. York railway station is one of the city terminal points and is passed by several bus services (including the regional service Leeds - Whitby / Scarborough, which the rail timetable shows as part of the rail network: it is also shown on the real-time rail departure board at York railway station). The PlusBus bus add-on rail ticket is also available for York.

**References and background reading:**


**Related guidelines:**

2.1 Integrated public transport planning and land use planning

2.2 Planning objectives

2.3 Network design

2.17 Bus stop hierarchy

5.7 Co-operation with Park & Ride
**Background information: Intermodal links between urban buses and other modes**

The table below (Table 2-1) shows widely used intermodal relationship between urban buses and other modes.

<table>
<thead>
<tr>
<th>Connected mode</th>
<th>Necessary facilities</th>
<th>Relevance to urban bus planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional bus</td>
<td>Bus station / major transfer station with short transfer distances and safe pedestrian routes for transfer passengers, integrated tariff scheme</td>
<td>High (seamless journey integrating all public transport modes)</td>
</tr>
<tr>
<td>Rail services / long distance buses</td>
<td>Bus – rail station with short transfer distances and safe pedestrian routes for transfer passengers (if applicable: integrated tariff scheme)</td>
<td>High (seamless journey integrating all public transport modes)</td>
</tr>
<tr>
<td>Taxi</td>
<td>Taxi stops at selected urban bus stops (e.g. at sub-centres)</td>
<td>Low (usually only little integration between ordinary taxi services and urban buses)</td>
</tr>
<tr>
<td>Aeroplane / Ferry boat</td>
<td>Airport / Ferry port with short transfer distances and safe pedestrian routes for transfer passengers</td>
<td>High (seamless journey integrating all public transport modes)</td>
</tr>
<tr>
<td>Private car as driver (Park &amp; Ride)</td>
<td>Park &amp; Ride lots preferably in the outskirts (e.g. terminus of urban bus lines)</td>
<td>Low to medium (depending on local conditions, but especially in major cities or historic towns)</td>
</tr>
<tr>
<td>Private car as passenger (Kiss &amp; Ride)</td>
<td>Short term parking lots to set down or pick-up passengers, often connected with Park &amp; Ride facilities</td>
<td>Low (especially at rail / bus stations)</td>
</tr>
<tr>
<td>Individual bike (Bike &amp; Ride)</td>
<td>Bike shelters at selected stops (e.g. at sub-centres in the outskirts)</td>
<td>Low to medium (depending on local conditions, but especially in bigger cities with longer travel distances)</td>
</tr>
<tr>
<td>Individual bike accompanying the passenger</td>
<td>Places for bike transport in vehicles</td>
<td>Low (in conflict with short distances in urban bus networks of small and medium-sized cities)</td>
</tr>
<tr>
<td>Rented bike / City bike</td>
<td>Bike rental system with fixed spots in the city centre</td>
<td>Low (especially effective in major cities)</td>
</tr>
</tbody>
</table>
2.6. **Complementary Service coverage in non-core hours**

<table>
<thead>
<tr>
<th>(1) Target Stakeholders</th>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:**

In order to create a 'culture' where Public Transport (perhaps combined with car sharing or Car Club membership) is a valid-enough lifestyle to enable citizens to give up their car, and to deliver mobility to people without access to a car, there must be public transport services throughout the whole day and during non-core hours (such as evenings, Sundays and through the summer). From an economic point of view, however, the demand level during these times does not usually justify regular bus operation as loadings are light.

The urban public transport service during non-core hours should still aim for high-quality features such as appropriate frequency, a clear network layout and a homogenous service offering regular transfer options between the lines. It may require reduced evening services, which may involve a reduced frequency compared to day-time, no service at all on some corridors (e.g. only on trunk lines), or different route patterns in the evening.

**Night buses** with special route patterns are often provided, after the regular network operation stops in the evening hours, matching a significant demand from leisure activities in the city centre (e.g. cinemas, pubs, theatres, discos). About 59% of all cities analysed by PROCEED have a night bus service which is most often only provided on weekends (Fri-Sat and Sat-Sun).

Alternatively, the use of complementary modes (e.g. on-demand operation of buses, taxi-services) can contribute to serving low-demand mobility needs during non-core hours. The frequency should not be less than one departure per hour in order to ensure an acceptable service level. On-demand services complement the regular bus network in about 26% of all cities analysed by PROCEED. For an overview of complementary modes see ► **Background information: Common complementary modes in public transport**.

**Critical issues:**

Changing routing patterns or the line numbers during non-core hours can lead to confusion for travellers and make the public transport network hard for users to understand. So this should be avoided if possible, and certainly minimised. It is also important that return tickets or all-network tickets are valid on the (contracted) non-core-hours buses as well as the core-hour services. This is so that the passenger perceives a single network, even though it may be serviced by different operators.
A local car sharing scheme (car club) helps to promote public transport as a lifestyle choice which enables them to give up the private car, because not all trips are feasible by public transport (e.g. transport of heavy / bulky shopping goods). Marketing efforts have to be made to ‘sell’ the advantage of linking public transport with car sharing. Car clubs can be seen as complementary, but can never fully compensate for the absence of public transport.

**Good practice examples:**

- **Dieppe (France):** This Normandy port town (urban-area population of 54,000) has launched a demand-responsive minibus service called “Créabus” to complement its “Stradibus” urban network. Créabus operates in less dense outlying areas during daytime off-peak times and in the evenings. It is run using three minibuses and fares are the same as the regular bus network. A telephone reservation must be made one hour in advance and the passenger will be provided with a pick-up time at their specified bus stop within an hour of placing reservation.

- **Euskirchen (Germany):** In the early morning hours as well as during evening hours on Friday – Saturday and on Sundays (all day and evening) the network is reduced to 2 lines operating as loops. During evening hours on Monday - Thursday there is a collective taxi service operating on demand (so called ‘Anruf-Sammeltaxi’) which can be used at a slightly higher fare level than ordinary public transport fares. The ‘Anruf-Sammeltaxi’ concept is widely used in small towns in Germany in order to secure local public transport supply during times with low demand.

- **Graz (Austria):** The eight lines of the night buses (‘Grazer Nightline’) operate in the nights from Friday to Saturday and Saturday to Sunday on an hourly basis from 00:30 to 02:30 h (from the central bus station ‘Jakominiplatz’) and can be used with ordinary tickets.

- **Karlstad (Sweden):** The Swedish city of Karlstad used to have a poor range of public transport services during the summer (holiday) period. However, after it was decided to keep most of the routes operating during one summer, it was found that the travel demand during that period was much higher than expected.

- **Parma (Italy):** PRONTO BUS is an on-demand dial-up evening / night time service (from 20:00 to 01:00) with flexible routing. Users can book the service to have them picked up and taken to their chosen destination. Routes are planned with specific software, based on the booking made. This service has replaced - and eliminated - some permanent night-bus services.

- **Schaffhausen/Neuhausen (Switzerland):** The operating hours of the bus service (18 hours) enables interchange to the first train in the morning and from the last train in the evening. There are no routes without service in non-core hours, but the service frequency is lower at these times.

- **Saint-Brieuc (France):** This city in northern Brittany (112 000 inhabitants including the surrounding catchment area) created the “Taxitub” service in 1990, covering 14
outlying communes. This network consists of “virtual lines” with fixed timetables and stops: a reservation at least 45 minutes in advance is required in order to use the service.

- **Toledo (Spain):** In most Spanish cities night buses (so called "buhos") are available during the weekend for young people to return home. These urban services have a low frequency, with long intervals between each bus. In Toledo there are also special night tickets with a unique fare which can be used only in vehicles operating these special night services.

- **Tours (France):** In evening hours the bus routes are rationalised into three large loop lines (“Bleu de Nuit” network) which cover most of the urban area in order to reduce the operating resources required.

**References and background reading:**

VDV Verband Deutscher Verkehrsunternehmen (2009) Diffenzierte Bedienung im ÖPNV – Flexible Bedienungsweisen als Baustein eines marktorientierten Leistungsangebots. / Multi-level differentiated services in public transport – flexible services as approach towards a market-oriented service level. Hamburg (Germany): DVV (in German with English summary)

**Related guidelines:**

5.8 Co-operation with Car Sharing (Car Clubs)
There are different approaches to cover low public transport demand in the non-core hours apart from buses. The main principles are as follows:

**Service with fixed route and timetable, but prior registration:** On-demand operation by taxis or minibuses, standard public transport fares apply, and prior registration by phone is necessary (e.g. 30 minutes in advance). The operation is often subcontracted to local taxi operators.

**Service with fixed departures and prior registration:** The service operates in a corridor starting at fixed times and with fixed departure stops, but customers can choose the place to alight (e.g. their home door) within the service area; prior registration by phone is necessary (e.g. 30 minutes in advance). Local taxi businesses are often subcontracted to perform the service. This is known as ‘Anruf-Sammeltaxi’ in Germany and Austria.

**Route service with voluntary drivers:** Known as ‘Community bus’ (UK), ‘Buurtbus’ (The Netherlands), ‘Bürgerbus’ (Germany). This often involves use of mini buses. It is mainly used in very rural areas; and is generally not suitable for urban services in non-core hours (e.g. due to unreasonable working hours for volunteers).

**Route service operated by taxis:** These are sometimes used if there is a regular but very low demand on tangential lines or special service lines. This has a limited suitability for urban services in non-core hours where demand is fairly constant.

**Service without fixed routes or timetables:** Vehicles are dispatched according to people’s needs. Prior registration by phone is necessary (e.g. 30 minutes in advance). This has limited suitability for urban services in non-core hours: it is generally only feasible in very small towns with a low demand level.
2.7.  Intersection / traffic signal priority

Provide traffic signal priority for buses at intersections to improve regularity and maximise the running speed (and the efficiency) of bus services.

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<td>X  Operations</td>
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Explanation:

By using traffic signal priority cities can give buses priority at traffic intersections and improve schedule adherence, reliability, and speed at the same time. Journey time measurement in Swedish cities shows that up to 70-80 % of all bus journey delays within urban city centres are due to waiting time at traffic signals, if there is no priority.

Traffic light priority benefits

- The public (e.g. a faster, more frequent and more reliable bus ride with better comfort and less pollution),
- The authorities (e.g. lower costs, more passengers and more accurate data for bus schedule planning and better control with PT operators),
- The operators (e.g. more passengers, lower fuel consumption, less stress for drivers, improved operational efficiency, lower operating costs and higher revenues).

There are strong reasons for public transport priority because the reliability of the service (e.g. at interchanges) is improved. So a missed connection between less frequent lines (caused by the lack of bus priority at traffic signals) may add 30 minutes to a public transport journey for the gain of just a few minutes for a private car.

Modern prioritisation systems are intelligent: priority is only given when needed. Bus detection is fundamental to any bus priority function. Earlier designs of fixed detectors had several technical shortcomings, not least a high need for maintenance and poor accuracy at detecting all buses.

Different ways of traffic light priority comprise:

- Extensions: Where the ‘at green’ phase is extended to allow the priority vehicle through the junction.
- Recalls: Where a stage giving green to the priority vehicle is brought in early.
- Queue jumping: Where a special stage is triggered, giving priority vehicles a chance to start ahead of other traffic.
- Queue management: Where a queue of traffic is cleared to allow the priority vehicle a clear run through the junction.
• **Triggering green waves:** Where a progression through a series of junctions is triggered by the arrival of a priority vehicle. In the standard static traffic signal progression (green wave), traffic signals are set to turn green as a platoon of vehicles moves from signal to signal. In contrast, a dynamic system provides a green wave for a group of traffic signals and then the platoon is stopped. A dynamic system changes traffic signal status based on the traffic conditions, rather than remaining constant as does a static system.

It is possible to simulate traffic light priority by **software simulation tools** (e.g. the software product VISSIM distributed by PTV, Germany).

**Critical issues:**

In order to achieve a significant effect, the traffic flow needs to reach a certain point. Within smaller cities a balance needs to be struck between giving public transport priority and avoiding general traffic disruption.

Traffic light priority in isolation achieves very little. The benefits of traffic light priority for public transport are more effective when priority is implemented as part of a package of measures for a whole corridor or route.

**Good practice examples:**

- **Aalborg (Denmark):** In Aalborg the urban buses are given priority in all intersections. Over the city as a whole all bus prioritisation is integrated in around 50 intersections.

- **Brest (France):** The city recently renovated a 6.5km long major north-south axis, providing 2.45km of bus lane and traffic signal priority for buses at the 8 signalised junctions involved (before and after photos of the route can be seen at [http://www.cub-brest.fr/axenordsud/travaux_realises.htm](http://www.cub-brest.fr/axenordsud/travaux_realises.htm)).

- **Brighton & Hove (UK):** When determining the requirements for a Real-Time system the Local Authority established that the Bus Operator's first priority was traffic signal priority for late running buses, followed by automatic vehicle location for operational control, and then real-time information. This was turned into an output specification and the city council went out to tender for a large system on that basis.

- **Jönköping (Sweden):** In Jönköping there is bus priority at 13 of the traffic signals along the bus route. The bus priority signal system detects all buses that pass by, and is therefore also connected to the real-time information system at bus stops.

- **Luleå (Sweden):** In Luleå, there is bus priority at 26 of the traffic signals along the bus route. One kind of signal priority used in Luleå is the bus sluice. It helps buses to move on from the intersection ahead of the other traffic.

**References and background reading:**

Related guidelines:

2.8 Bus ways, bus lanes and bus only links
2.9 Lay-by bus stops and bus capes (bus boarders)
2.10 Urban buses and areas with traffic calming elements
2.8. **Bus ways, bus lanes and bus only links**

Provide exclusive transit lanes to improve running speed and efficiency.

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**Explanation:**

**Bus lanes** (Figure 2-4) can provide buses with a fast, reliable alternative to mixed flow traffic lanes. With a bus lane, a traffic lane within a roadway is set aside for the operation of buses. Other vehicles are restricted from using the lane. This is enforced through a physical barrier, through police enforcement or automated cameras. Buses thus face minimal congestion delay between intersections. With bus lanes, buses are not delayed in the approach to an intersection or a bus stop by a queue of other vehicles. Bus lanes and bus-only links thus reduce travel times and improve reliability. Bus lanes can be used throughout the day or solely during peak hours.

![Figure 2-4: Bus lane as part of an arterial roadway (Stockholm, Sweden)](image)

**Bus ways** (Figure 2-5) are infrastructure for the exclusive use of buses. Exclusive facilities offer significant potential for speed, reliability and safety improvements since they physically separate buses from the general stream of traffic, eliminating the potential for general traffic to encroach on the bus lanes. Because other traffic cannot interfere with buses, services can be operated safely at much higher speeds between bus stops. Bus ways may interact with other traffic at streets intersections.

By using bus ways and bus lanes, priority can be given to buses over cars, which decreases the travel time at the same time. The benefits of bus ways and bus lanes are highest if they are implemented where the congestion is the worst. This is usually the case in the city centre.
during peak hours. It is also at these places where it is the hardest to get an acceptance for implementing the measure and where space is limited.

**Figure 2-5: Segregated busways (Kesgrave, near Ipswich, UK)**

The simplest form is a painted line, but other options also exist. Bus lanes can be distinguished by painting the whole width of the lane in distinctive and readily apparent colours (Figure 2-6), e.g. Red in Utrecht and London, Green in Edinburgh. Lane marking can also be made with a ribbed texture so that the motorist hears a noise if his vehicle runs on to them. They can be made even more visible and apparent by use of a more solid texture. For example in Krakow (Poland) old tyres are cut and stretched to form a kerb to designate bus lanes. Often the lines used to separate public transport lanes are wider than normal. Lane marking and colouring rely totally on the “good behaviour” of other road users for their effectiveness. Policing and fines can help enforce conformity but will not guarantee success.

**Figure 2-6: Painted bus lane (Utrecht, The Netherlands)**
In general, lane markings should not be used where segregation is not essential but can be used where desirable and more effective measures like physical barriers are either too expensive or not feasible.

Some cities allow **taxis and bicycles to use the bus lanes**. The decision on whether such an approach is feasible depends on local conditions and on the local patterns of vehicle movements.

There are also new developments of **temporary (electronic) bus lanes**. The benefits are that they do not need additional space on the streets, but there might at the same time be a difficulty in motorists understanding and respecting the system. A temporary bus lane usually has electronic signs showing motorists when the bus lane is in use.

**Bus-only passages** are used to give buses a direct access to areas served. Bus-only passages make it possible for buses to access areas where there is no access for cars: this does increase the accessibility of buses relative to cars but it is primarily about preventing car access (while not penalising buses) rather than about assisting buses per se.

**Bus-only links** (special roads which are for buses only) are also used for the same purpose. Some bus-only links may also be for taxis.

In order to restrict other traffic besides buses from entering bus lanes, busways, bus-only passages or bus-only links, restrictions may be used. Examples of measures to use for **restricting entry in this way** include:

- **Signage**: Simple signs / standard traffic signs that restrict entry, usually supported by byelaws
- **Bus gates**: Bus-activated barriers of various designs
- **Rising bollards**: Bollards set into the roadway, which lower in order to permit the passage of vehicles that have activated an associated detection system (Figure 2-7).
• **Cattle grids / Short sections of impassable tracks**

• **Bus ramps**: Short ramps set at the “track gauge” of buses

Special passages for buses can also be used to **calm traffic in urban areas** and at the same time provide good accessibility for buses.

**Critical issues:**

By **limiting traffic to buses-only** on certain streets, the traffic flow might increase in other streets and cause serious traffic problems that also can affect other bus lines.

There is widespread **abuse of bus lanes** in many European countries and sometimes this totally destroys the value of the measure. Typical examples are:

- Short-term parking of cars on a bus lane (or even at a bus stop) while the driver is buying a newspaper,
- Traffic merging into a bus lane in advance of a road junction, so turning car drivers avoid queuing,
- Delivery of goods (the stopping of vans and lorries) on bus lanes in shopping streets.

Dedicating space on existing roadways for either bus lanes or busways may require reallocation of roadway space from general traffic lanes or parking. Given the potential community impact, changes of the roadway structure need to be planned carefully. Such reallocation can normally only be justified if bus frequency is at a high level (at least every 5 minutes), in situations where there is heavy congestion in car traffic on the remaining lane.

One solution, particularly used in the UK and Ireland, is peak-hour only bus lanes. The bus lane is operational at periods where bus frequency is high (e.g. 0700 to 0930 into the city only), in order to maintain reliability, but at other times where buses are less frequent and general traffic is lighter, the lane is available for use for all traffic.
One significant problem of passages for buses only is that some measures cease to be visible in snow and cannot be cleared by the conventional snow plough.

Another problem is that some measures might cause damage to cars and there have been legal cases (e.g. in The Netherlands) where car owners received compensation for damages when they were trying to enter priority lanes.

In cases where there are no physical barriers to other vehicles from using bus gates, widespread violation is a problem, as car drivers can easily drive through if no police controls are visible. However, drivers cannot see the entire length of bus passages combined with short bus road sections, so are dissuaded by the possibility of police controls at the other end.

**Good practice examples:**

- **Almere (The Netherlands):** In the new-build city of Almere the development of dedicated bus lanes was an integral part of the city planning. This policy is continuing for districts that will be developed in the future. In the other case study cities dedicated bus lanes have had to be developed in an existing urban environment and infrastructure. In the city of Almere a total of 91 kilometres of free bus lanes has been built.

- **Bruxelles-Brussel (Belgium):** In the city-centre a bus lane in the opposite direction of the general traffic flow was tested and was assessed as being beneficial. Because of the 'contra-flow' orientation, there is very little abuse of the lanes by motorists, which contributes to more reliable bus operation. The lanes also provide added value for emergency vehicles (ambulances etc.).

- **Gävle, Luleå (Sweden):** In Sweden "Think tram, use bus" is often used by public transport planners. Bus lanes and special bus ways are common, especially in the bigger cities. Since 2003 two new bus ways have been built in Gävle. In the municipal overall development programme for the period 2004-2006 there are goals of increasing the number of public transport trips by a certain percent. This is achieved by shortening the travel times in public transport, a result of improving the speed in streets used by buses. There are also bus lanes in the city centre of Luleå, which were introduced when changing the bus line system in 2003.

- **Oxford (UK):** The historic city of Oxford has extensive bus lanes on several long major approaches into and out of the city centre to allow buses, and particularly Park & Ride buses, easy access to the city. These bus lanes have been in operation for over 25 years.

- **Cambridge (UK):** There are many examples in Cambridge of bus only links, which was a pioneer of this approach, e.g. restricting through-traffic to the city centre at key entry points using rising bollards to prevent 'normal' traffic from entering. Local buses, taxis and bicycles are exempt from the restriction.

- **Lomma (Sweden):** A bus ramp has proved to be very effective in Lomma (near Malmö) in order to restrict other traffic besides buses from entering the bus lanes or bus
ways. It incorporates a raised beam between the treads to avoid usage by cars (cars would be damaged by the beam).

**References and background reading:**


**Related guidelines:**

2.7 Intersection / traffic signal priority

2.9 Lay-by bus stops and bus capes (bus boarders)

2.10 Urban buses and areas with traffic calming elements
2.9. **Lay-by bus stops and bus capes (bus boarders)**

Use bus capes (bus boarders) to reduce delays for buses re-entering traffic stream and improve the comfort for the passengers

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**Explanation:**

The **bus stop design** has a remarkable impact on bus operation, e.g. on the commercial speed of the service. Basically, the following designs can be distinguished (Figure 2-8):

- **A bus stop by the kerb** is the usual type of bus stop, and this makes it possible for traffic to pass the bus while it is at the bus stop. The design is simple and it is easy to fit in to any street. However, problems sometimes are that some parking spaces by the kerb have to be removed in order for the bus to access the stop, and also this kind of stop does not give buses any priority. Buses can also sometimes have problems entering the bus stop if cars have been parked too close to the bus stop. Also, each location needs special attention in terms of traffic safety (e.g. to avoid overtaking by cars where this can endanger alighting passengers).

- **Lay-by bus stops** are often provided, to enable buses to stop outwith the traffic stream, and to eliminate the obstruction of other traffic by stationary buses. However, on busy roads, particularly where traffic is moving constantly, it is often difficult for buses to then re-enter the traffic stream. Because of this there is a common tendency for drivers not to pull fully into the lay-by. This can cause inconvenience to passengers, particularly during heavy rain when kerbside gutters may be running with water. It can also cause problems for elderly and disabled passengers.

- **A bus cape** is built in order to help the bus to access the bus stop (also called ‘bus boarders’ or ‘bus bulbs’). Bus capes give priority to buses, because buses do not have to wait for a gap in car traffic when leaving the stop. With a bus cape, the bus does not have to make a sideways movement in order to access the bus stop. On a street with only one line of traffic in each direction, the traffic behind the bus normally has to stop while the bus is at the bus stop. The type of bus stop is especially advantageous on a trunk bus line and on other important parts of the bus system. Other effects are that it allows more parking spaces for cars, provides a shorter bus stop area, calms traffic, decreases the risk of illegal car parking, and provides room for bus shelters, bicycle racks, etc. Two bus capes opposite each other (1 bus wide) provide for safety, e.g. at schools. Bus capes should not be used if the traffic flow is heavy or if the stop time is long.
Critical issues:

If buses have longer stops at a bus stop and if at the same time the traffic flow is high, bus capes should not be used.

In order to avoid misuse of lay-by bus stops by delivery vans, special lay-bys for delivery vehicles should be provided.

Good practice examples:

- **Boston (UK):** The town of Boston, Lincolnshire, (population 55,000) has recently introduced a new urban bus network called "InTo Town" with three routes, and as part of that new bus capes (Figure 2-9) and bus shelters have been installed on a road in the town centre that was previously unserved by buses.
• **Münster (Germany):** The city of Münster is continuously rearranging lay-by bus stops to bus capes, with careful consideration of the general traffic situation at the respective location. The share of bus capes among all bus stops with explicitly built infrastructure is about 13% (2004: 9%). Münster was among the first cities in Germany to gain experiences with bus capes. The city has about 270,000 inhabitants.

**References and background reading:**

VDV Verband Deutscher Verkehrsunternehmen (2003) Barrierefreier ÖPNV in Deutschland / Barrier-free public transport in Germany. Düsseldorf (Germany): Alba-Fachverlag (in German and English)


Trivector (2003) "Busshållplatser i tätort – effekter på framkomlighet och säkerhet" (Bus stops in urban environment - effects of bus stop design on accessibility and safety), Sweden (in Swedish with numerous figures)

**Related guidelines:**

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### 2.10. Urban buses and areas with traffic calming elements

Carefully consider the impact of street design and traffic calming on bus operations.

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**Explanation:**

Usually traffic calming elements affect buses more than cars. Traffic calming elements can also make the ride uncomfortable for bus passengers and bus drivers. But there are several types of traffic calming element that studies have shown have an equal effect on buses and cars.

Good examples of traffic calming elements that can be used in areas where urban buses operate are:

- **The H-bump.** A speed reducing bump that looks like an ‘H’ from above (Figure 2-10). The bump makes use of the fact that buses and cars have different width between their tracks. The Public authorities in Skåne, Sweden advise that the longer ramps (for buses) make the speed reduction more comparable between buses and cars.

  *Figure 2-10: H-bump as traffic calming element (Lomma, Sweden)*

- **The road hole / cave** is like an upside-down speed bump, over which buses can travel astride, which makes them easy to pass. Cars, on the other hand, have to drive down through the hole / cave.

- **The speed pillow** is one kind of speed bump that buses can travel astride but which cars have to mount. The measure of length is important and has to be adapted to the local bus fleet.

- **Shorter narrowing of the street** helps to promote a more careful driving behaviour. As long as the lane is straight without any heavy turns, this traffic calming element does not cause buses any problems.
• **The bus cape** can serve as a traffic calming element if there is only one lane in each direction. When the buses enter the bus cape, all other traffic in the same direction has to stop and wait.

• **Bus stops situated opposite each other** (Figure 2-11) may serve as a traffic calming element because there is usually only one lane between the two bus stops that traffic in both directions has to share. The approach is only effective if car drivers accept it. If not properly communicated, or not fully accepted by the local community, it can lead to frustration and an anti-public transport sentiment.

*Figure 2-11: Bus stops situated opposite each other*

**Critical issues:**

There is a general conflict between traffic calming for private cars and urban bus planning. Where driving is on the right-hand side the general idea is to avoid “**priority to the right**” in residential areas along the bus routes because it forces the bus to potentially stop at all junctions and it is bad for travel speed and for the passengers’ comfort (similarly, where driving is on the left, “priority to the left” in residential areas is to be avoided). Other conflicts to avoid, which often occur where maximum speeds are 30 km/h, are parking along the street, speed bumps or narrowing of the road. However, there are often very creative solutions in operation to avoid any conflicts, as described above.

It is almost impossible to ensure both **high-speed public transport and traffic calming** of private cars at the same time. Various experiments with, e.g., special speed bumps designed to facilitate bus passage have not yet shown real success.
Good practice examples:

- **Graz (Austria):** Roads with bus operation, where none existed before, are often made priority roads and traffic calming elements are abandoned.

- **Landskrona (Sweden):** The right-of-way in intersections was changed with a new trolley bus route in Landskrona. Now the bus route is along the main road, where bus priorities have been introduced.

- **Rheine (Germany):** Some junctions in residential areas were reorganised to improve the urban bus service (changing priority to the right into priority in the direction of the bus route) before the improved urban bus system was launched in 1997.

References and background reading:


Trivector (2003), "Busshållplatser i tätort – effekter på framkomlighet och säkerhet" (Bus stops in urban environment - effects of bus stop design on accessibility and safety), Sweden (in Swedish with numerous figures)

Related guidelines:

-
2.11. Size and capacity of vehicles

Choose vehicles appropriate to the urban area, passenger demand and operating efficiency.

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<td>System planning</td>
<td>X Organizational improvement</td>
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<td>Operations</td>
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Explanation:

The bus manufacturing industry provides vehicles of various sizes, starting from mini-buses based on delivery vans up to three-section articulated buses with capacity characteristics similar to trams. In regional and urban transport in medium-sized and major cities the standard bus with a length of about 12 metres is predominant combined with articulated buses (18 metres) and - to a smaller extent - buses with 15 metre length.

Managers should check carefully which type of vehicle is appropriate for the service intended. Major criteria are

- Demand level in relation to the frequency intended,
- Structure of the city (road network in areas served, e.g. medieval city centres).

In many medium-sized cities with a considerable demand level, standard buses might fit best.

However, in towns and smaller sized cities (< 50,000 inhabitants) medium-sized buses with a length of about 10 metres, or midibuses, might be more appropriate, because smaller vehicles have a number of advantages:

- They are more suitable for narrow streets and / or historical centres.
- If they are of the right quality they can be regarded as a marketing element for High Quality Public Transport (HQPT) as they ‘stand out’ from standard buses.
- They may fit better to the actual level of demand.

Minibuses may also be appropriate but it is not always economical to achieve a high quality of vehicle with very small buses.

The latter principle (“It is better with smaller buses that operate more often than bigger buses that don’t operate that often”) has to be balanced with the fact that usually the driver accounts for approximately 70 to 80 % of all operating costs. Due to the ability to achieve lower costs by combining orders, resulting in easier maintenance and replacement of vehicles, there is a tendency towards standard buses (12 metres) in smaller cities.

Using too many minibuses can cause problems when demand increases. In some cases it may be appropriate to go for midibuses or even standard buses, because they can also be used on other routes.
**Special size vehicles** (e.g. double-articulated vehicles, 15m buses, buses with trailers) have special characteristics which can only be really tested in daily operation (e.g. minimum turning curves). It may be advisable to contact other cities to get information about daily operational experiences instead of “re-inventing the wheel”.

If the ticketing system makes this possible, it may be advisable to have two or more doors on the bus. The location of doors in the vehicle and the number of doors per vehicle influence both accessibility while getting on and off the bus, and the accessibility of seats. However, having more than one door may make it more difficult for the driver to control the door operation in a safe way.

**Critical issues:**

When considering the size of vehicles, the maximum capacity of a vehicle (according to technical approval or manufacturer’s declaration) should not be used for calculation purposes, because in daily use the maximum capacity is needed to manage exceptional demand peaks (e.g. during peak hours, on rainy days, or in the case of delays). In Switzerland, Anderhub et al (2008) has shown that a maximum capacity of 3 persons/m² in dedicated standing areas is accepted by users. Experience shows that about 70% of the maximum capacity can be used for calculations. If demand regularly exceeds capacity, either the frequency of the line has to be adapted or (more likely in small towns) additional services have to be established.

Furthermore, **fleet management objectives** have to be considered such as:

- The vehicle should fit most of the lines and not only just one particular line.
- Different sizes and different types of vehicles could increase maintenance expenditures.

**Good practice examples:**

- **Euskirchen (Germany):** In Euskirchen, midibuses (10 metres) are in use because these fit better to the actual level of demand. However, replacements will be of the standard bus type (12 metres) due to obtaining lower costs by combining orders.

- **Firenze (Italy):** 4 routes (A, B, C and D) operate in the old city centre using small electric-powered midibuses to avoid pollution and damage to the historic infrastructure. This example is not part of the PROCEED case study analysis.

- **Lindau (Germany):** The urban bus system in Lindau (Lake Constance, Germany) uses medium-sized buses (10 metres) in order to access the historic part of the city centre. Large parts of the city centre are assigned to pedestrian zones; however, the city bus can still enter.

**References and background reading:**

Anderhub, G., R. Dorbritz, U. Weidmann (2008) Leistungsfähigkeitsbestimmung öffentlicher Verkehrssysteme (Determination of capacity in public transport systems), IVT-Schriftenreihe 139, Institute for transport planning and systems (IVT), ETH Zurich, Zurichstudies
Related guidelines:

4.4 Strategies for efficient use of vehicles
2.12. Accessibility of vehicles

Use fully accessible vehicles with space for wheelchairs and baby carriages.

(1) Target Stakeholders
- Decision makers
- Public authorities
- PT operators

(2) Planning Level
- Master plan & political decision
- Market analysis
- System planning
- Operations

(3) Guideline Impact
- Basic service
- Quality upgrade
- Organizational improvement

Explanation:

In order to improve accessibility there has been a move towards introducing low floor buses. The floor will often slope upwards from the doorway areas and there may be internal raised areas, accessible only by steps. Many modern buses are fitted with an air system so that they can “kneel” at stops. Buses with low floors or low entrances are becoming more and more common and can now be regarded as “normal” for new urban buses. The advantages of these kinds of buses are that boarding and alighting are quicker and safer for all passengers but especially for the elderly and disabled. The majority of the buses in cities analysed by PROCEED have a low floor / low entrance (75%). It is worth mentioning that when public transport activities are tendered, a higher percentage of buses are low floor / -entrance buses.

The usual number of places reserved for wheelchairs, push chairs and children’s trolleys is 2 places per bus which has been confirmed by PROCEED’s case study analysis.

The combined infrastructure of the bus stop and the vehicle should be regarded as a co-ordinated system of platform and bus floor. Level boarding at the bus stop is a necessary requirement for enabling access by people in wheelchairs in order to benefit from low-floor vehicles. A problem could also occur where the kerb is too high compared to the bus entrance.

The distance between the platform and the vehicle step is specified e.g. in Belgium, Germany, Sweden, Switzerland and UK. This has a “spin-off” advantage in that boarding and alighting are quicker and safer for all passengers and thereby journey times are reduced. It is also of benefit for those carrying heavy luggage or travelling with young children.

The technical devices that improve accessibility to board vehicles form one prerequisite, the training of drivers to use the technical equipment on-board in a service-oriented way is another one. Tuition in ‘How to drive close to the platform with only a little gap’ and ‘How to assist disabled persons and use the ramp’ should be part of continuous driver training. Regular quality checks and maintenance of the ramp for wheelchairs should take place, as these can often malfunction.

Critical issues:

It is possible to provide “level” access from higher floor vehicles by providing high platforms. However, city planners will often object to these, partly because the ramps required to access to them can form an obstruction and partly because high platforms are a hazard to (pedestrian) traffic.
“100%” low floor involves more costly engineering and may compromise other technical features of the design unfavourably. Low-floor buses may cost more to maintain, as a result of the smaller distance between the bus and the ground. Buses with a completely low floor are usually a little more expensive than ordinary buses. It is therefore questionable if a complete low floor is that essential for meeting passengers’ needs, providing that passengers with mobility problems can enter and leave by the same low-floor areas. Some passengers appreciate the better views provided by a raised floor area.

If the vehicles are highly accessible (e.g. equipped with many places for wheelchairs and children trolleys), the number of seats per bus is usually lower.

**Good practice examples:**

- **Aalborg (Denmark), Chur (Switzerland), Helsingborg (Sweden), Klagenfurt (Austria), Rouen (France):** 100% of the bus fleet in these cities is low floor accessible, and at the same time those cities have a high number of trips per inhabitant.

- **Dundee (UK):** Travel Dundee, the main bus operator, has a 100% low-floor vehicle fleet and was the first major operator in the UK to achieve this.

- **France:** In France, a law applied in July 2005 requires studies to be done by the end of 2009, with a view to achieving full accessibility of all urban public transport by 2015.

- **Sweden:** By law, all buses have to be able to take wheelchairs on board. It is therefore common for buses operating on local lines to have a low floor or low entrance.

**References and background reading:**

VDV Verband Deutscher Verkehrsunternehmen (2003) Barrierefreier ÖPNV in Deutschland / Barrier-free public transport in Germany. Düsseldorf (Germany): Alba-Fachverlag (in German and English)


**Related guidelines:**

2.18 Accessibility of bus stop
2.13. *Intelligent service features in buses*

Provide intelligent transport system services in vehicles in order to increase the efficiency and attractiveness of Public Transport relative to the car.

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<tr>
<th>(1) Target Stakeholders</th>
<th>(2) Planning Level</th>
<th>(3) Guideline Impact</th>
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<tr>
<td>- Decision makers</td>
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<td>X Public authorities</td>
<td>- Market analysis</td>
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<tr>
<td>X PT operators</td>
<td>- System planning</td>
<td>- Organizational improvement</td>
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<tr>
<td>X Operations</td>
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</table>

Explanation:

Intelligent Transport Systems can offer a range of integrated features that benefit passengers, thereby making the public transport offering more attractive. Current examples that benefit passengers are:

- **Acoustic announcement systems and displays showing the next stop.** Electronic passenger information on the vehicle (Figure 2-12) can provide information about the next stop and the following stops. The provision of this information in buses is especially important for the elderly, disabled, tourists, and new public transport passengers, which makes an integrated acoustic and visual announcement highly desirable. People with visual disabilities often have problems with scrolling text, and therefore the 'stand still' phase must not be very short. Such announcement systems require an automatic vehicle location system (e.g. supported by GPS).

*Figure 2-12: Display showing the next stop (Helsingborg, Sweden)*

- **TV-screen with infotainment.** A TV-screen placed in the vehicle provides additional public transport information combined with city information (e.g. local events) and
entertainment (e.g. short movies). This service is often financed by advertising. However, a mixture of public transport information and other services (e.g. by splitting the screen into two areas) should be avoided. A TV screen enables the provision of additional information compared to dot-matrix screens. Sophisticated systems can display the vehicle schedule, transfer / other bus information or delays within the system via dynamic message signs in the vehicle. The system requires techniques to predict the vehicle arrival time at the station / stop, and to receive data on other vehicles along the route, and requires the ability to display this information to public transport customers riding on the vehicle.

- Many mobile electronic devices (e.g. mobile telephones) allow internet access via Wi-Fi Radio systems. A Wi-Fi service in buses may attract new passengers for public transport and provide additional benefits for the users (e.g. a check of an electronic journey planner via the internet).

- **Destination displays on the sides of vehicles.** Many urban bus systems use vehicles with destination displays on all four sides of the vehicle - even on the side without doors. It facilitates the identification of the correct bus during interchanges. Particularly in small cities using the ‘rendezvous’ technique (where all lines meet at the same time at the central bus stop to allow transfers between all lines) it is advisable that the destination of the bus (and not only the bus number) is displayed on all sides. This lowers the risk for passengers of joining the wrong vehicle where there are cross-city lines.

In addition, many service features can also provide major operational benefits

- Closed-circuit video and driver help features (see guideline 2.14 On-board safety and security measures)

- Electronic on-board passenger counting systems, with radio transmission of information to vehicle control centres (see guideline 4.3 Operation control systems)

- Smartcard readers, with a radio link to card payment ‘top-up’ systems

- Electronic fuel and engine monitoring systems

**Technological development** is growing fast, but some of the features above are not yet available at a price that would make them economical for small and medium-size cities’ public transport systems. However, because unit costs are falling, cities ought to be aware of them so that they are ready to take advantage of them at the appropriate time. In particular, cities should specify vehicle purchases where on-board electronics are fully integrated into the design so that additional features can easily be added as technology develops.

**Critical issues:**

Electronic information devices cannot replace printed information material in all cases. For example, dynamic information panels on board vehicles do not serve to replace a static network map placed in the vehicle which provides network-wide information to transferring
passengers. In addition, it is important that electronic devices operate accurately, as incorrectly displayed bus stop information can be highly confusing to passengers.

Public transport authorities and public transport operators can learn a lot from airlines, which have worked with service facilities in aeroplanes for a long time.

**Good practice examples:**

- **Coimbra (Portugal):** All buses are equipped with infotainment possibilities. Coimbra was the first city in Portugal to implement acoustic information tools in buses to provide information to passengers.

- **Donostia-San Sebastián (Spain):** In 2003 the city started to develop and implement a new project called "Intelligent Public Transport System" which includes the “Exploitation and Management System” (SAE). The set-up of an SAE system on board the buses includes the installation of informative screens on the street (40 screens are working already at stops) and the integration of the SAE system with the on-board information system.

- **Euskirchen (Germany):** All buses are equipped with destination displays including the destination of the vehicles (not only the bus number); even on the side without doors and at the rear (Figure 2-13).

*Figure 2-13: Destination display on buses in Euskirchen (Germany)*

**References and background reading:**


Information brochure about TriTrans, an integrated system on passenger information and real-time data processing

**Related guidelines:**

2.14 On-board safety and security measures

4.3 Operation control systems
2.14. On-board safety and security measures

Create a secure environment for passengers and staff on vehicles.

<table>
<thead>
<tr>
<th>(1) Target Stakeholders</th>
<th>(2) Planning Level</th>
<th>(3) Guideline Impact</th>
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<tbody>
<tr>
<td>- Decision makers</td>
<td>- Master plan &amp; political decision</td>
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<tr>
<td>X Public authorities</td>
<td>- Market analysis</td>
<td>X Quality upgrade</td>
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<tr>
<td>X PT operators</td>
<td>- System planning</td>
<td>X Organizational improvement</td>
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<tr>
<td>X Operations</td>
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</table>

Explanation:

Personal security for staff and passengers can be a less easily-managed issue. Bus drivers can be exposed to a very high risk in some areas, and buses are vulnerable to attacks on staff, other passengers and vandalism. There are different approaches to improve safety and security on-board urban buses, based on either technical or non-technical / organisational measures.

Video camera supervision decreases the number of incidents. During recent years the use of closed-circuit video (CCTV) cameras has increased, which has led to a decrease in vandalism, with passengers feeling more secure than before. Cameras can be also useful outside the buses, e.g. to observe boardings by the driver or to use camera images of accidents to verify or disprove insurance claims.

Further examples of additional equipment for traffic safety and security on-board exceeding the national standards given by legal regulations are:

- Emergency buttons for drivers (with direct messaging to the traffic control centre),
- Communication system between passengers and drivers,
- Seatbelts,
- Alcohol ignition interlocks (device to detect drunken drivers).

Furthermore, various non-technical measures should be considered to improve security on-board. Examples are:

- Reducing the handling of cash on-board buses can decrease the risks of attacks.
- Additional on-board personnel to improve security and service can be a solution in problem locations.
- A boarding strategy to improve on-board safety (e.g. boarding via the front door during evening hours)
- Also driver training to deal with incidents in a de-escalating manner should be mentioned.

Critical issues:

When specifying, installing and using video cameras inside buses care should be taken to avoid potential conflicts with laws on personal information rights.
Good practice examples:

- **Brighton & Hove (UK):** Brighton & Hove Bus Company took a decision about 5 years ago to fit CCTV cameras to 100% of its fleet. The Local Authority considers that assaults on bus driving staff are not as big an issue as they could be, very largely because the CCTV cameras installed on buses are very good, with image qualities good enough to identify people.

- **Dundee (UK):** All Travel Dundee's buses operate with sophisticated, digital on-board CCTV equipment. Dundee was the first city in Britain to have 100% CCTV coverage on its buses. In partnership with Travel Dundee, Stagecoach, Tayside Police and the Scottish Executive, Dundee City Council has CCTV operating on all local bus services in the Dundee area. Travel Dundee has a very strong ethos of providing crime-free transport for all its passengers, believing that this is an essential element in encouraging patronage growth, and hence profitability, and is part of an award-winning Safer Travel partnership with Tayside Police. There are typically 4 cameras per bus: 3 view passenger activity, while the fourth records the driver’s view of the road ahead and records the stop area. Travel Dundee also part-funds Police Liaison Officers who are dedicated to preventing on-bus crime.

- **Jönköping (Sweden):** In the City of Jönköping there are hidden alarm buttons on every bus, connected to both traffic management and the public SOS alarm centre. All buses used on evening and night services have CCTV.

References and background reading:


Related guidelines:

-
2.15. Appearance and age of vehicles

Use efficient and attractive vehicles.

<table>
<thead>
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Explanation:

**Vehicles are part of system image**

Aesthetic treatments, including paint schemes and styling options affecting the appearance, and configuration of the vehicle body, contribute to public transport system **identity**, positioning it as a quality option and providing information to potential customers as to where to access bus services. Seat pitch and available leg room are very important comfort features; and other interior amenities such as high quality interior materials, better lighting and climate control also contribute to the customer perception of comfort and service quality.

In Denmark, for example, most transport authorities have **design requirements** and quality control as regards cleanliness etc. In many cities it is also common for transport operators to follow a corporate image in their vehicles, using the same colours, logos, and brand name on their fleet.

A clear and stringent colour scheme, large and good readable text on line numbers / names or signs, and no use of reflecting materials all contribute to higher **visibility** and improved appearance of the vehicle. Additionally, such features coincide with the requirements of persons with visual impairment.

**Advertisements on buses** is a controversial subject. On the one hand, advertising generates additional revenues, but also can work against corporate or network identity. Any consideration of advertisements on vehicles should take into account the trade-off between revenues and the implications for the appearance of vehicles (see guideline 3.5)
Advertising).

**Attractive and comfortable buses**

Examples of standard comfort features in buses are:

- **Windows:** It should be possible for a sitting child and a standing adult to look out of the window. It should also be possible for people outside the bus to see inside the bus.

- **Lighting:** The lighting should make it possible for passengers to read when it is dark outside. Also, the lighting should not cause reflections in the driver’s windscreen.

- **Seats:** The seats should provide enough leg-room so that a person of ordinary height and with normal upper leg length can sit straight, and comfortably, in a forward-facing seat.

- **Air-conditioning:** If the buses are equipped with air-conditioning or a climate-control system, it helps to prevent stale air and an unpleasant climate inside the buses and helps to achieve a comfortable temperature inside the bus. This contributes to providing a more attractive public transport system. If the bus is not equipped with air-conditioning or a climate-control system, it should be possible for the windows to be opened.

- **Double-glazing of windows:** If buses are equipped with double-glazing it prevents misty or steamy windows.

Standards should be fixed to preserve vehicle appearance. Damage to and scribbling in the interior and on the bus should be repaired or removed as fast as possible in order to avoid mimics. This is partly a measure of corporate identity.

**Age of vehicles**

Newer vehicles often have the highest environmental and comfort standards, a higher reliability and are often equipped with real-time travel information and infotainment. The buses should, therefore, not be older than a certain age to meet the current user expectations regarding service and comfort. It is also desirable for the age composition of the fleet not to be too spread out in order to avoid uneven standards. The average age of the bus fleet in PROCEDURE case study cities is 8.3 years. Where tendering takes place there is the possibility of specifying requirements regarding the buses to be used (accessibility, emission, age of the buses etc.). This probably explains why the average age of the bus fleet is lower in cities where public transport is tendered rather than operated under contract to the city without any tendering procedure.

**Critical issues:**

**Aesthetic treatments** are not obtained for free; but they often represent good investments.

The effect on **fuel efficiency** of any particular climate-control system also needs to be considered. However, the comfort of passengers, particularly relative to that which they experience in competing modes, should be an important determining factor on system specification as this will affect demand for the city’s public transport.
The age-spread of vehicles (within a maximum age limit) may be advantageous since it does allow vehicle replacement to be phased and allows capital expenditure to be spread over a number of years. However, this may result in a greater variety of the fleet.

**Good practice examples:**

- **Brighton & Hove (UK):** The Managing Director of the bus operator is a member of The Ten Per Cent Club, formed of a small number of senior bus industry managers who are focussing on strategies for growth in UK bus passenger numbers. The Ten Per Cent Club has made it a particular priority to work with bus manufacturers to design bus interiors that are colourful, spacious and ‘airy’ with pleasing and attractive décor.

- **Chur (Switzerland):** Buses are regularly replaced as often as every seventh year, which makes it possible to keep them in good condition and equipped with the latest technology.

- **Euskirchen (Germany):** The logo of the company is integrated into the design of the seats (cover) of the vehicle (Figure 2-14).

  ![Figure 2-14: Seat covers with company’s corporate design in Euskirchen (Germany)](image)

- **Larissa (Greece):** In order to make the services more attractive and accessible to all citizens Larissa’s bus company decided to make a considerable investment in order to gradually renew all buses in its fleet, within a 5-year timeframe. The implementation started in 2002 and today buses have an average age of 5.5 years, they are all air-conditioned and equipped with a low floor mechanism which adapts to any kerbside height. The bus fleet consists of 48 buses, of 3 types: 12 metre buses, 18 metre (articulated) buses and 5 minibuses.

- **Reading (UK):** Reading Buses, the main operator in Reading, has a bus fleet with an average age of under 5 years, mostly double-deck vehicles.

- **York (UK):** FTR (the ‘future of travel’) vehicles, an example of bus rapid transit, used on one key route within York, are specially-designed articulated buses; stylish, comfortable, quiet, and with air-conditioning. They have spacious interiors, ergonomic
communal seating, infotainment screens, air-conditioning, anti-glare glass and bright interior lighting, and offer generally smoother journeys than conventional buses.

**References and background reading:**


**Related guidelines:**

3.5 Advertising
Advertising

5.10 Corporate design
2.16. Traction concept (e.g. gas, diesel, electric, ethanol, hybrid)

Use environmentally friendly (low pollution, low noise) vehicles.

<table>
<thead>
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<th>(3) Guideline Impact</th>
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Explanation:

Spurred on by the evolution of regulations supporting clean air, the number of choices in vehicle propulsion system is increasing. Technology is evolving to provide new propulsion systems that use clean, alternative fuels and new controls on emissions, resulting in reduced pollution and lower noise levels. At the present time many new technologies are being introduced and market conditions, such as demand and cost of production, are developing alongside. For further information see ► Background information on Common propulsion systems and European emission standards (EURO 1 to EURO 5 and EEV).

Today, bus technology developers are seeking to provide cleaner bus options. Propulsion systems and alternative fuels options now include: clean diesel, mix of bio-diesel and fossil diesel, methane in the form of compressed natural gas (CNG) or biogas, liquid petroleum gas (LPG), hybrid-electric, ethanol, electric and fuel cell.

Because of the range of various fuels and propulsion systems, it is preferable for tendering bodies (e.g. public transport authorities) to only specify particular qualities, such as emission standards, rather than force a specific technology upon an operator. The operator will need to consider a range of factors such as fuel costs, fuel availability, maintenance, reliability, refuelling times, and performance. Likewise, each operator should be able to choose manufacturers based upon their own circumstances.

Critical issues:

Note that moving existing vehicle fleets to alternative fuels, where this is possible, may necessitate some engine modification. Importantly, introduction of vehicles with alternative fuels may require depot modifications and the installation of new equipment and facilities.

Energy efficiency of the fleet should be checked if older buses are in use; in particular if a purchase of second-hand buses is envisaged. Considerably better efficiency can be a positive reason for buying new vehicles.

Higher costs of alternative traction concepts can still be regarded as a problem in many European countries.
Good practice examples:

- **Brighton & Hove (UK):** The entire bus fleet runs on bio-diesel. The company was one of the first in the industry to use low sulphur fuel as soon as it became available and is also a market leader in the fitment of specialist equipment to reduce pollution of exhaust gases from bus engines. All the operator's modern vehicles have particulate traps fitted on their exhausts.

- **Graz (Austria):** The bus-fleet in Graz runs with a high share of bio-diesel mixed with fossil diesel. Waste oil from food processing (a local recycling project using oil from restaurants and food production industry) is also used for some vehicles.

- **Reading (UK):** Since May 2008 Reading Buses has had 14 bio-ethanol double deck buses on its Premier Route 17, operating around the clock, seven days a week. Using E95 ethanol, these buses are some of the cleanest there are. Unlike E85 ethanol, which includes a 15% petrol mix, E95 ethanol comprises 95% ethanol and 5% additive to improve ignition. Particulate emissions from these ethanol buses are ten times lower than for the least polluting (Euro V) diesel bus. The bio-ethanol fuel also dramatically reduces the emissions of the global greenhouse gas CO₂ by more than 95%, earning these ethanol buses the EEV – ‘Environmentally Enhanced Vehicle’ – classification under European emissions regulations.

References and background reading:


Related guidelines:
Background information: European emission standards (EURO 1 to EURO 5 and EEV)

The European emission standard defines the limit for emissions of new vehicles in the EU. In order to give an indication, the respective limits and the respective commencement date for buses are given below (Table 2-2). In contrast to cars (g/km), emissions of buses and lorries are indicated in g/kWh. Currently, emissions of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxide (NOx), particulate matter (PM) and smoke are part of this standard.

Table 2-2: European emission standards for buses (EURO 1 to EURO 5 and EEV) (with HD Diesel Engines, g/kWh, smoke in m⁻¹)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Date</th>
<th>CO</th>
<th>HC</th>
<th>NOx</th>
<th>PM</th>
<th>Smoke</th>
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</thead>
<tbody>
<tr>
<td>Euro I</td>
<td>1992, &lt; 85 kW</td>
<td>4,5</td>
<td>1,1</td>
<td>8,0</td>
<td>0,612</td>
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<tr>
<td>Euro I</td>
<td>1992, &gt;85 kW</td>
<td>4,5</td>
<td>1,1</td>
<td>8,0</td>
<td>0,36</td>
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<tr>
<td>Euro II</td>
<td>Oct 1996</td>
<td>4,0</td>
<td>1,1</td>
<td>7,0</td>
<td>0,25</td>
<td></td>
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<tr>
<td>Euro II</td>
<td>Oct 1998</td>
<td>4,0</td>
<td>1,1</td>
<td>7,0</td>
<td>0,15</td>
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<tr>
<td>Euro III</td>
<td>Oct 2000</td>
<td>2,1</td>
<td>0,66</td>
<td>5,0</td>
<td>0,10</td>
<td>0,8</td>
</tr>
<tr>
<td>Euro IV</td>
<td>Oct 2005</td>
<td>1,5</td>
<td>0,46</td>
<td>3,5</td>
<td>0,02</td>
<td>0,5</td>
</tr>
<tr>
<td>Euro V</td>
<td>Oct 2008</td>
<td>1,5</td>
<td>0,46</td>
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<td>EEV</td>
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</table>
Background information: Common propulsion systems

**Internal Combustion Engines:** The internal combustion engine fuelled by ultra low-sulphur diesel (ULSD) or compressed natural gas (CNG), biogas with spark-ignition, or ethanol coupled with an automatic transmission, is the most common propulsion system today. Some public transport authorities are testing other fuels such as bio-diesel, diesel emulsion blends and even LNG but these are a small fraction of public transport applications. The impending EPA requirements on emissions in 2007 and 2010 for NOx and PM will require engines with Exhaust Gas Re-circulation (EGR) plus exhaust after-treatment technology.

**Trolley, Dual Mode and Thermal-Electric Drives:** Electric trolleybus drives powered by overhead catenary-delivered power are still produced today and are planned in limited quantities for operation in tunnel applications. Dual mode systems with an on-board thermal engine (usually diesel) can provide a capability to operate as a trolleybus and as an ICE (Internal Combustion Engine) vehicle off the catenary for specialised operations. Also, a thermal-electric drive, which couples an ICE to a generator, is used as a drive system in vehicles.

**Hybrid-Electric Drives:** Hybrid-electric drive systems offer improved performance and fuel economy with reduced emissions (e.g. of nitrogen oxides (NOx) and particulates (PM)). They differ from dual-mode systems in that they incorporate some type of on-board energy storage device (e.g., batteries or ultra capacitors). Though the thermal or internal combustion engines used for hybrid drives are diesel in most public transport applications, in a number of cases CNG or petrol-fuelled engines have been used. Fuel economy gains of up to 60% are being claimed in urban service. Operational tests show improved range and reliability over ICE buses. Hybrid buses have entered operation in places such as New York and Seattle. Hybrid drive buses offers numerous operational advantages over conventional diesel buses, such as smoother and quicker acceleration, more efficient braking, improved fuel economy and reduced emissions.

**Fuel Cells:** A number of operational tests of fuel cell buses are currently underway in Europe and the US. Although the price is prohibitive currently, there is great interest in future development to provide zero emissions using domestically produced hydrogen. As far as we are aware, there are no plans as yet for large-scale introduction of fuel cell buses in public transport system applications in the United States or Europe.
2.17. **Bus stop hierarchy**

Develop a hierarchy of bus stops to help guide investment planning.

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<th>(3) Guideline Impact</th>
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**Explanation:**

A hierarchy of bus stops or stop groups helps to decide where to prioritise investments and to locate the right user facilities at the right place. For example, costly infrastructure like loudspeaker systems should contribute to a benefit for passengers and are not needed at stops without transfers and a low likelihood of disturbances. At a bus stop where it is possible to change between different lines it is particularly important that the bus stop is prioritised for investment and well-equipped with user facilities. The transfer time can otherwise affect the whole journey in a negative way.

Besides basic information provision (e.g. timetable with bus departures, tariff information, sign-posting within the bus stop group) further facility elements can be part of an **equipment catalogue for bus stops of different types** (e.g. clock, loudspeaker system, shelters, heated waiting facilities, Bike & Ride, Kiss & Ride or Park & Ride facilities; see guideline 2.19 Safety, information and equipment at bus stops).

The hierarchy should preferably be based on the importance and accessibility of the bus stop location and of the bus lines serving the stops (trunk lines vs. additional lines). One way of developing a bus stop hierarchy is to consider demand and importance within the network:

- **Categorise your bus stops on e.g. three levels:**
  - Level 1: main stops / interchanges with high demand with regional importance (e.g. rail station),
  - Level 2: stops with high local importance, interchanges to other buses or other modes (e.g. local sub-centres, major stop in city centre),
  - Level 3: bus stops of only one line.

- **Set a standard of facilities** for every hierarchy level. The chosen standard should be in line with the overall customer expectations as well as with the available funds for investment.

- **Ensure fixed standards** by defining processes for maintenance and control.

By that, a bus stop hierarchy can contribute as **marketing tool** for communicating a good impression and a high visibility / clarity of the system.
**Critical issues:**

The strategy for bus stop provision should be long-term and should determine the priorities for investment over the whole public transport network.

**Good practice examples:**

- **Dundee (UK):** The 'Bringing Confidence into Public Transport' project recognised the importance of city centre bus stops as potential interchange points and delivered a very large infrastructure investment programme to install new 'super' bus stops at various key locations in the City Centre (Figure 2-15). These have stylish designs, full accessibility, significantly-enhanced customer facilities and high-quality information.

*Figure 2-15: Bus interchange in the City Centre in Dundee (UK)*

**References and background reading:**

VDV Verband Deutscher Verkehrsunternehmen (2003) Barrierefreier ÖPNV in Deutschland / Barrier-free public transport in Germany. Düsseldorf (Germany): Alba-Fachverlag (in German and English)


**Related guidelines:**

2.19 Safety, information and equipment at bus stops
### 2.18. Accessibility of bus stops

**Bus stops should be fully accessible.**

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**Explanation:**

The effectiveness and accessibility of bus stops depends not only on where they are or how they are equipped and designed but also on how easy they are to access. Bus stops should be accessible for the elderly, children's-trolleys and the disabled. Bus stops should also be easy accessible for pedestrians and, where appropriate, for cyclists and passengers arriving by car. The access to a bus stop may be defined by how many people can reach the bus stop, relative to its catchment area, and how easy the bus stop is to reach by different modes.

How close the bus stops are located affects the **average access distance for pedestrians**, while street lightning, adequate pavement widths, quality surfaces and weather protection for the pedestrian network adjacent to the bus stop all affect the quality of access (HITRANS 2005c). The walking distance to a bus stop in urban areas should not be longer than 400 metres (in a straight line) resulting in an average distance between bus stops of again 400 metres, but this can range from 100-1,000 metres depending upon local circumstances (e.g. hilly areas, peripheral settlements). The optimum distance between stops is a trade-off between two aspects:

- **Speed of the service**: The demand at key locations vs. the time penalty incurred at each stop added,

- **Coverage of the service**: The walking time ‘origin – bus’ stop vs. the subsequent travel time in the bus.

Bus stop access can be entirely focused on pedestrian access from adjacent land uses or can include ‘**regional** access’ through the provision of covered or open car and / or bicycle parks. The type of parking facility and the number of spaces should be related to the nature of the market that the bus stop serves and the adjacent physical travel time for customers arriving by car / bicycle from outside the bus stop area. Where they are well-designed and are in the right place, parking facilities can expand the reach of the public transport system. When planning a bus stop, the bicycle parking (if needed for integrating bikes and public transport) should be placed very close to the bus stop: it is important that cyclists do not have to take a circuitous route in order to park their bikes.

**Platform height** affects the ability of disabled or mobility-impaired passengers to board the vehicle. Passengers traditionally board vehicles by stepping from a low kerb up to the first step of the vehicle, then climbing additional steps. Platforms at the same height as the vehicle floor can enhance the customer’s experience and reduce dwell times if some approach to
providing no-gap, no-step boarding and alighting is adopted through the provision of drop ramps or precision vehicle-docking. Of course there are many more criteria a bus stop has to fulfil in order to be accessible. In some countries (e.g. Sweden, The Netherlands) the kerb has to be of a certain height given by national standards (e.g. Sweden > 17 cm, The Netherlands = 18 cm) but this gives an indication.

In addition to the platform height, the pavement of the platform has a high importance for vision-disabled persons. Tactile ground surface indicators with high visual contrast improve the accessibility for this user group and contribute to a better recognition of the bus stop by all passengers.

The distance between the platform and the bus floor should be as close as possible (e.g. for wheelchair users to bridge the existing gap). Features such as ‘Kassel kerbs’ (a special kerb stone format guiding the bus to the stop without damaging the tyre wall) help the driver to reduce the gap is as to make optimal use of existing infrastructure.

In order to make it possible for everyone to travel on buses, it must be possible for everyone to access the bus stops and enter the buses. The locations of bus stops are important as they need to be close to the place that they are planned to serve. The following aspects are of importance in order to achieve an accessible bus stop:

- Avoid changes of level since they cause problems for many users including anyone carrying anything or those looking after elderly people or children.
- Stairways and ramps all restrict the capacity of bus stops to cope with crowds.
- Locate stops so that in order to reach major traffic generators passengers do not need to cross the road used by the bus.
- Direct passengers towards clearly defined safe crossings rather than doing nothing to deter indiscriminate movement.
- Locate such crossings in an appropriate safe location.
- The bus driver must have adequate visibility of people approaching the stop from every direction.
- Consider appropriate sign-posting or tactile pavements for vision-disabled persons.
- Locate segregated alignment crossings so that people will tend to cross behind rather than in front of departing vehicles by the use of staggered platforms where possible.
- Provide safety measures at crossings.
- Co-ordinate pedestrian crossing signals with vehicle movements as part of the priority system.
- Provide benches for elderly and disabled

In order to reach high accessibility standards, the set-up of an investment plan for future years may help to improve the current situation in a structured way.
**Critical issues:**

There are some **further aspects** influencing the location of bus stops besides network planning issues. Road safety conditions (e.g. avoiding bus stops in curves with bad visibility of moving traffic for motorists and bus drivers) or priority measures (e.g. locating a bus stop in front of a traffic light to use the ‘red light’ for set down / boarding of passengers) have to be considered as well. This may sometimes result in compromises between different demands on locating bus stops.

Whilst social inclusiveness is a key goal of making bus stops accessible it should also be remembered that making a bus stop accessible can also **increase the attractiveness of bus stops to all users**.

As well as the features of the bus stop itself, accessibility is also determined by **how close to the kerb the bus gets**, and is able to get, to allow unrestricted level boarding.

**Good practice examples:**

- **Grenoble (France):** 80% of bus stops in Grenoble are fully accessible with raised pavements (gentle slopes) and tactile surfaces for guidance and safety. Almost all buses are low floor and fitted with wheelchair ramps.

**References and background reading:**

VDV Verband Deutscher Verkehrsunternehmen (2003) Barrierefreier ÖPNV in Deutschland / Barrier-free public transport in Germany. Düsseldorf (Germany): Alba-Fachverlag (in German and English)


**Related guidelines:**

2.12 Accessibility of vehicles
2.19. Safety, information and equipment at bus stops

Bus stops should be safe and secure and provide appropriate passenger information and equipment.

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**Explanation:**

**Safety**

A safe and secure bus stop is a key factor in order to create an attractive public transport system. To make bus stops look safe and secure, planners should consider lighting, design, and general position with high security characteristics. In order to create a bus stop with a high degree of security for passengers the following factors are important:

- Good lighting
- ‘Platform’ size and platform design
- Pavement / paving
- Uniform design / profile
- Good location and with good views from adjoining properties / walkways
- Cleaning
- Vandal-resistant materials.

‘Platform design’, which describes the length and extent of the bus stop bay, is also a major element of bus stop design. It affects how many vehicles can simultaneously serve a bus stop and how passengers must position themselves along a platform to board a given service.

**Passenger information systems**

Electronic traveller information at bus stops / stations provides real-time information (RTI) about the vehicle schedule, next bus information or delays within the system via a dynamic message sign at the bus stop / station. The approach requires techniques to predict the vehicle arrival time and the ability to display this information at the station / stop (Figure 2-16).
Real-time, correct and accessible information for the passenger at bus stops is very important especially in terms of passengers’ security. This information (e.g. of when the bus is arriving and departing) increases the passenger’s **feeling of independence and control** and also has a positive effect on the passenger’s safety and security.

Real-time displays at bus stops are also a kind of **marketing instrument**. For instance, if cars are passing, drivers realise that there would be a bus in x minutes at the bus stop near their home as a personal travel option.

Bus stops with real-time information displays are seemingly increasing, but such devices are mainly introduced at major stops (interchange stops, stops in city centre etc.). This results in a fairly low number of stops in all cities analysed by PROCEED with real-time information available at the stop (only 2% of all bus stops of PROCEED’s case study cities).

As well as at-stop signage real-time information can also be provided through **mobile phones**, either accessing a website or via SMS messages. A stop-specific code displayed on the bus stop flag indicates what can be keyed into a mobile phone to allow the user to access the real-time information for that specific stop. This approach avoids investments in on-site devices such as message signs at bus stops; however, only a limited number of users are effectively reached in this way.

Real-time information screens can be installed in **public buildings** (e.g. universities, hospitals), supermarket foyers, foyers in large apartment blocks etc., if the information is available (e.g. via the internet).

Some service facilities can be financed by **commercial establishments**. Companies specialised in street furniture and outdoor advertising (e.g. JCDecaux) offer to set-up shelters at selected locations and maintain them.

**Equipment**

A minimum standard of equipment and facilities at all stops should be:

- Good visible bus stop sign (preferably including operator or network logo),
• Stop-naming on the flag or shelter,
• Display of the numbers of the services that stop there (preferably including the destination of the services),
• Information panel including timetable, network map, the city and / or surroundings of the bus stop, contact phone numbers of the operator,
• Garbage bin.

There are different types of further service facilities that may be offered in accordance with a bus stop hierarchy:

• Shelters as weather protection
• Benches (especially for elderly passengers)
• Enhanced information displays / information kiosks
• Real-time displays
• Clock
• Loudspeaker system
• Heated waiting facilities
• Toilets at larger bus stops / stations / terminals
• Left luggage lockers
• Commercial establishments (e.g. tobacco shops, newspaper kiosks)
• Customer information centre
• Facilities to publicise or implement other programmes of public interest (e.g. display of municipal announcements, recycling facilities and air quality monitoring),
• Facilities for intermodal trip planning (e.g. bicycle racks, Park & Ride lots).

Protection from the weather is a major consideration in deciding whether a bus stop should have a shelter and then deciding on bus shelter design. The image of the ‘stop’ as a refuge from the outside world can help to attract customers. In some cities, high temperature and humidity are a concern. Passive solar design techniques can help shield the bus shelter from direct sun as well as stimulate natural ventilation flows. Open designs can be good options in warm locations, while wind shelters are preferable in colder or windy locations.

Bus stops are often regarded as ‘business cards’ of public transport because the poles and flags, including further service facilities at bus stops, such as shelters, are the only part of the public transport system within the urban public space which is permanently visible. Consequently, the design of poles and flags marking the bus stop can contribute towards an attractive appearance from a marketing point of view. In some towns, innovatively–designed or decorated poles with a noteworthy design are being used to mark the bus stop. New pole designs are being installed in many Austrian, German and Spanish cities in an effort to
modernise the public transport services. In some cases the poles include a small screen that informs passengers about the waiting times on each line.

There has to be a clear **maintenance strategy** for the bus stop and its facilities. Most problems can be identified by an operator’s own personnel (e.g. bus drivers) or customers. If a bus driver or customer detects damages (e.g. a shelter with a broken window), the procedure should be formalised regarding who is to be informed and within what timescale the damage should be fixed.

**Critical issues:**

The most important design feature of bus stop poles and flags is clearly to show passengers where the bus stop is. Some examples have been reported where the design features are striking and perform a good marketing function, but which interfere with the visibility of the bus stop by passengers, and in some cases by car drivers who do not realise that they are parking their car at a bus stop.

In some countries the design of **poles or flags** has to consider national standards or strict legal regulations (e.g. Lithuania).

It is not necessary to equip 100% of **bus stops with shelters** since some bus stops may actually have no waiting passengers (e.g. at the last stop before the terminal stop where passengers mainly alight). The implementation of a bus stop hierarchy is a good approach to equipping bus stops with adequate facilities.

The implementation of electronic real-time displays at all bus stops of a network is most often not feasible due to high investment costs and available funds. However, one can prioritise investments with regard to a bus stop hierarchy scheme (see guideline 2.17)
Bus stop hierarchy).

Delays displayed by a real-time information system serve to generate additional customer value for waiting passengers, although the system can be vulnerable. When it comes to breakdowns, detours, recalibration of lines, short runs etc., automatic systems may often display incorrect information and should provide options for manual intervention by the dispatcher to inform the waiting passengers properly. However, techniques are improving, and real-time information systems are developing, and becoming more reliable and stable.

Real-time information systems accessible on mobile phones can lead to large savings on costs of at-stop signage and telecommunications.

**Good practice examples:**

- **Almere (The Netherlands):** The city of Almere applies a consistent policy on bus stop equipment: All bus stops are equipped with shelters.

- **Beveren (Belgium):** The interchange bus stop ‘Markt’ (Figure 2-17) in the town of Beveren (approx. 45,000 inhabitants) is an architectural landmark and as such provides orientation to public transport users as well as highly integrates urban space with public transport.

  ![Figure 2-17: Bus stop as architectural landmark in Beveren (Belgium)](image)

- **Brighton & Hove (UK):** 116 bus stops within the city boundary are now equipped with real-time information displays, with further signs at stops in contiguous urban areas. The stop displays are very large and are highly visible to motorists (having a black background), thereby raising the "presence" of the bus network in the mind of "not-yet users". In addition, the same real-time information is available through the internet, which means that the Local Authority has been able to put screens in public buildings (such as the new Jubilee Library), supermarket foyers, foyers in large apartment blocks, and the railway station concourse.
• **Chur (Switzerland):** 20 out of 160 bus stops are equipped with real-time information. The most important ones are at the main station where the timetables of all interchange connections to other modes and routes are displayed.

• **Donostia-San Sebastián (Spain):** The city is implementing a new system which offers display screens next to the bus stops providing information about the waiting time and the occupation level of the buses.

• **Dundee (UK):** The city has a very large number of bus stops with real-time information displays (360 bus stops, or about 40% of the total number of bus stops in Dundee). These were installed as part of a much wider programme called 'Smartbus', incorporating significant fleet upgrades, major city centre interchange improvements, and installation of a map-based journey planner. Real-time information is also available over the internet ([http://www.dundeetravelinfo.com](http://www.dundeetravelinfo.com)) and via SMS.

• **Euskirchen (Germany):** The poles in Euskirchen are of a pillar-style integrating the official German bus stop sign (yellow ‘H’ in a circle) and the customer information (Figure 2-18). All 265 bus stops in the city of Euskirchen are equipped with high-quality information.

![Figure 2-18: Pillar-style bus stop design in Euskirchen (Germany)](image)

• **Graz (Austria):** Between 20 and 40 bus stops are equipped with real-time information posts, showing the departure time of the next vehicles and the vehicle type (low floor or otherwise). In addition, text-messages can be broadcast on the displays, and this feature is used in cases of incidents (cancellation, rerouting etc.). The data supply comes from the Integrated Transport Control System (ITCS) newly installed in 2003.

• **Helsingborg (Sweden):** 20 bus stops (out of the total number of 257 bus stops in the city) are equipped with real-time information. A computer that collects data is installed in 60 of the buses in the city. The vehicle data is connected both to the real-time information displays at the bus stops and to the traffic signals in order to give the buses priority in intersections.
• **Heraklion (Greece):** Bus stops in Heraklion city centre are designed in a kiosk-like style in order to be harmonized with the city's traditional buildings appearance.

• **Parma (Italy):** The city is implementing high technology projects, such as the Remote Sensing System, a system that enables all vehicles in circulation to be located in real-time and information to be transmitted to users by means of "intelligent boards", equipped with display units.

• **Peterborough (UK):** Since 2002, 58% of all bus shelters have been upgraded using anti-vandal, anti-graffiti materials in response to the findings of the Peterborough Transport Audit (published in 2003). This initiative was very successful and has ensured that the Council’s bus shelter infrastructure is more easily maintainable, with an improved waiting environment for bus passengers.

• **Schaffhausen/Neuhausen (Switzerland):** A proper appearance of the bus stops serves as a "business card" for public transport. Therefore, bus stops are regularly checked by bus drivers and cleaned / maintained by the municipality’s cleaning teams.

**References and background reading:**


**Related guidelines:**

2.17
Bus stop hierarchy

2.18 Accessibility of bus stops
3. GUIDELINES ON “FINANCING”

3.1. Cost benefit analysis

Apply cost benefit analysis for the provision of public transport both for decision on investments and operation.

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Explanation:

Cost Benefit Analysis (CBA) seeks to guide decision-makers to policies which lead to an economically efficient social use of capital. There may also be legal requirements for CBA in capital expenditure schemes. CBA expresses both sides of a benefit-cost ratio in financial terms. This therefore requires the “monetisation” of the quantified effects. For basic techniques see ► Background information: Cost benefit analysis.

Private car use generates negative externalities in the form of environmental degradation (including air and noise pollution), accidents and congestion. By increasing the number of people that use public transport relative to private cars we effectively reduce these costs. Hence some of the external benefits of public transport arise from a reduction in the external costs of private car use, see ► Background information: External, private and social costs.

In brief, the external benefits of public transport include (but are not restricted to) reductions in:

- Traffic congestion,
- Air pollution,
- Noise and
- Accidents.

Compared to private transport options, public transport generally provides more environmentally and socially sustainable solutions and contributes not only to pure economic benefits but also to social benefits for the community. Besides the effects generally considered in financial appraisals of public transport schemes, public transport can be argued to contribute to:

- Increased competitiveness and growth
- Enhanced personal security (actual and perceived)
- Increased physical activity, e.g. walks to the bus stop and consequently improved health
- Increased quality of life and social inclusion
• Increased accessibility to work and essential services (such as education, food and healthcare)

However, providing an accurate measure of the social benefits is not always straightforward. Instead, in order to display the total benefits of a public transport scheme, the social benefits (not only to users but to the wider society) could be presented by a verbal presentation. The benefits of public transports also provide arguments for public financial support, see ► Background information: Public financial support of public transport.

The foundation of cost benefit analysis is welfare economics which says that all effects should be considered in order to decide whether a project is socially economic efficient or not, i.e. whether the benefit outweighs the costs. For a Public Transport Authority it is essential to carry out cost benefit analyses since profit-maximising public transport systems may lead to an economically inefficient social use of capital. One example is increased frequency; a profit maximising firm will only increase frequency if the increased revenue exceeds the costs. A welfare maximising system will also include the benefit for the existing passengers, i.e. reduced travel time, in the calculations as well as the external costs of car use and the benefit of transfer from cars to public transport. For further information see ► Background information: Economic efficiency / profit maximising.

It is unclear to what extent authorities and operators conduct cost-benefit analyses. 59% of the cities analysed by PROCEED indicated that cost-benefit analyses are conducted – usually as part of plans for investment in infrastructure. However, it is questionable, if these results refer to “true” cost benefit analysis including e.g. travel time savings for existing passengers and external costs.

The main weaknesses of using cost benefit analysis are the assumptions required to value attributes like noise and accidents, the difficulty of appraising impacts on future generations, and the fact that the final value appears to determine the decision, rather than encouraging discussion. It is also possible that important effects are left out due to difficulties in giving them a monetary value. ► Background information: Public financial support of public transport

Critical issues:

Decisions and actions leading towards social economic efficiency often find resistance from contractors fearful of revenues being reduced. The contract must therefore clearly stipulate the principles and conditions for the contractor.

All comparisons dealing with public financing levels and cost coverage are subject to uncertainty because of differences in how the public financing level for public transport is calculated. This means that some cities refer to subsidies while others provide subsidies but do not call them subsidies.

Good practice examples:

• UK: Full CBA is carried out in the UK for major publicly-funded public transport investments, such as: FTR - bus rapid transit scheme in Swansea or Fastway - bus
rapid transit scheme in Crawley / Gatwick. The CBA is carried out in accordance to standard government evaluation procedures. This suite of procedures is known as TAG (Transport Analysis Guidance).

- **Sweden**: In order to apply for partial public funding of public transport investments PTAs have to carry out cost benefit analyses. The evaluation method is developed by SIKA (Swedish Institute for Transport and Communications Analysis) SIKA decides on method of calculation and the values to be used for various effects such as reduced travel time, reduced number of accidents etc. The calculation method and values applied are revised every forth year.

**References and background reading:**


**Related guidelines:**

3.6 Fare structure
3.7 Fare level
5.11 Political marketing
### Background information: External, private and social costs

Urban transport, like any other activity, generates an array of costs and benefits, both private and social. The difference between the purely private costs of an activity – those borne exclusively by the person undertaking it – and the wider costs becomes important when those generating the costs (and enjoying the benefits) are not faced with the full costs of their actions, i.e. there are external costs. The full social cost of any activity will be the sum of both the private and the external costs involved. With passenger transport the presumption in most large urban centres is that the social (internal plus external) costs exceed the social (largely private) benefits of car use.

### Background information: Cost benefit analysis

In carrying out a cost benefit analysis money is used as the comparator. Changes in amounts of travel, travel time, and external costs such as accidents and the environment are assigned monetary values, based on observations of the choices which people make.

One may also consider wider economic benefits and health effects etc. Some of these effects may be difficult to put a monetary value on, but since they do imply a benefit they ought to be regarded as well.

When assessing the benefits of Public Transport both existing consumers and new ones have to be considered. For instance, if increasing the frequency of buses, this will increase the quality for all passengers.

In the analysis, costs and benefits are each calculated, relative to ‘doing nothing’, for each future year. The net benefit is then discounted to the present day and summed over all years in the appraisal period to give, as a single indicator of performance, a net present value of the benefits. The appraisal period will normally be longer than the plan period, to allow for longer-term impacts. A scheme with a positive net benefit is worth implementing; the option with the highest net benefit is the best.

Besides decisions on investments, cost benefit analysis should also be used for decisions on operation, e.g. the level of service supplied.

### Background information: Economic efficiency / profit maximising

There is a need to distinguish between:

- Production efficiency / profit maximisation: traffic revenue - operating costs
- Market efficiency: (traffic revenue - operating costs) + user benefits
- Economic efficiency: (traffic revenue - operating costs) + user benefits – external costs

There is a contrast between the economic and market-efficient solution, which considers the user benefit of increased frequency, and the production-efficient solution, which does not.
Market efficiency, however, disregards the external costs of car use and does not give weight to costly transfer of peak hour trips from cars to public transport, which the economic-efficient solution does.

Background information: Public financial support of public transport

Based on welfare economics grounds there are arguments for public financial support of local public transport. One reason to support public transport is that road traffic gives rise to external costs such as traffic congestion, death and injury, noise, and environmental problems. If travellers can be transferred from cars to public transport, these negative effects are reduced. Thus, public financial support of local public transport may generate more benefits (for all users) than the cost of the support, and provide value for money. The use of public financing also contributes to social benefits for the community, such as the social inclusion of groups that have no direct access to a car (e.g. youth, low income groups, disabled) and contribute to equality between women and men in the transport system.

The level of public financing and fare box revenues depends on the density of the population and the market share of public transport. It is however difficult to say whether a high level of public financing is a condition for or leads to HQPT in small and medium-sized cities. There are successful cities with a fairly low level of public financing (and a corresponding rather high cost coverage from fares). This indicates, and similar to politics overall that there is no such a thing as a general optimal level of public funding of local public transport.

There are examples of cities with HQPT that have a very high level of public financing (e.g. some examples in Belgium of upwards of 80%, or as much as 100%). There are also cities where no public financing is paid to the operator at all, e.g. some in Greece and in the UK. In the cities analysed by PROCEED, the average cost coverage is 52% (cost coverage = share of fare box revenue in relation to the total incomes from fares plus public financing). This level coincides in many cases with the prevailing level in many European countries for local and regional public transport. It also coincides in many cases with the socio-economically optimal level according to cost benefit calculations (Ljungberg 2007).

Few cities in Europe apply public transport for free (‘zero tariff’): one example is Hasselt (Belgium). Another example is Kristinehamn (Sweden), although this reintroduced fares after a period. The general finding is that there can be a large increase in the number of trips – for instance in Kristinehamn trip numbers doubled). Generally, the increase in trips consists of new trips and of passengers that would otherwise have walked or biked; only about 20% are previous car users. It has been shown that a free fares policy might be an interesting option especially for smaller cities. Transaction costs are substantially reduced (no need for ticketing machines etc.). For larger cities free fares lead to higher fixed and variable costs, since additional vehicles are needed. A comprehensive study has been conducted on the consequences of free public transport in Denmark (Teknologirådet 2006).
3.2. Contracts

Authorities should carefully consider various ways to provide public transport service and types of private contracts.

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Explanation:

The type of market regime and the responsibility of the public transport authority have a strong impact on the contractual design and should be considered accordingly. The number of lines being contracted, particularly relative to the size of the public transport system, may determine whether or not it is appropriate to have a regulated procurement. There are countries where the use of contracts is limited, e.g. in the UK and Ireland. Basic features of different market regimes are explained as ► Background information: Types of market regimes.

Three main types of contracts can be distinguished in the public transport industry:

- **Management contracts**: The public transport authority pays the operator an annual remuneration including a fixed sum and a variable sum, which takes account of the quality of management. The public transport authority takes both the risk on the operating costs and the commercial risk on the commercial revenues.

- **Gross Cost Contract**: The operator is remunerated by a contribution of the public transport authority based on the costs. In case of an incentive scheme, the public transport authority can share the commercial risk with the operator. The operator takes the risk on the operating costs and the public transport authority takes the commercial risk on the commercial revenues.

- **Net Cost Contract**: The operator is remunerated with the revenues and by a complementary compensation payment fixed by the public transport authority with or without adjustment. The operator takes the risk on the operating costs and the commercial risk on the commercial revenues.

Various performance based incentive schemes may be included in the gross contracts to provoke operator interest and development. The conclusion made so far in Norway is that the difference between gross and net cost contracts is largely nominal and of lesser practical significance than was previously assumed (Bekken et al. 2006). Gross contracts do not necessarily result in a poorer market adaptation. Experiences from Norway also suggest that regimes with a mixture of tenders and negotiated contracts may have a less favourable development than regimes that choose one over the other. For principles of gross and net contracts see ► Background information: Characteristics of different types of contracts.
Experiences from Scandinavia gained in public transport over the last 20 years indicate that tendering may contribute to cost effectiveness and increased cost coverage. Local public transport is tendered by the public transport authority in 61% of all PROCEED case study cities, whereas in the remaining cases the service is operated by a public bus company owned by the municipality without tendering.

**Critical issues:**

Research in France has shown that creating a public-private partnership (PPP) via a semi-public company (a hybrid derived from a public company) turned out to be the worst organisational choice a local public transport authority could make in terms of technical efficiency (Roy 2007).

**Good practice examples:**

- **Norway:** Institute of Transport Economics in Oslo produces a series of studies analysing various contract types applied within public transport in Norway, e.g. Longva et al. (2007) and Fearnley et al (2006). By this ongoing analysis different contract types and their effects are discussed.

**References and background reading:**


Longva, F., Osland, O. and Skollerud, K.H. (2007) Competitive tendering in local bus services. Effects on rural service levels and on administrative costs. TØI rapport no 927


Related guidelines:

3.3 Tendering of services
Background information: Types of market regimes

The type of market regime and the different public transport authority responsibilities have a strong impact on the contractual design. In a franchising or “area regulation” market structure the contract for provision of public transport services can be said to represent “a balanced attitude towards the management of public services between the two extremes of a public monopoly on the one hand and total deregulation on the other hand …” In a deregulated market a contract may also exist for the provision of services which the market would not otherwise provide. The major types of market regimes are:

⇒ **Regulation - authority-initiated regime**: In a regulated market, the public transport authority sets the rule for the operators. Within the ‘givens’ of such regulation of service provision the contract should be an efficient tool for the management of public transport services. Public transport authorities, which decide to delegate the delivery of transport services, must generally use tendering procedures (according to the EU procurement framework) under certain conditions depending on the amount of the contract.

⇒ **Regulation - market initiative regime**: This is common practice in Germany, for instance, where public transport is considered to have to fulfil public service requirements and it is considered that the product design cannot be left to the market. Therefore the Public Transport Authorities focus on organisation, monitoring and regulation of the transport services. A large share of the public transport is not tendered, but is operated with a concession to run a specific service with exclusive rights for exploitation.

⇒ **Deregulation - market initiative regime**: This is currently the norm in the UK outside London and Northern Ireland: commercial operation prevails on bus routes, according to what is financially attractive for the operator, and is in general completely deregulated without a formal contract between the public transport authority and the operator. However, there may be informal quality partnerships. Also, the Transport Act 2008 made it easier for local transport authorities to introduce both Statutory Quality Partnerships (SQPs) and Statutory Quality Contracts (SQCs), where the operator has to perform to certain conditions on a corridor or in an area. There are currently no SQCs in operation in the UK. Within commercial operation, operators are completely free to operate under their own conditions the service of their choice in terms of route, schedule, and tariffs, subject to fulfilling certain notification conditions. The public transport authority decides if these services meet the social needs or whether it is necessary to add non-commercial services. In this latter case, the public transport authority will use different types of contracts to organise the non-commercial services.

The different categories of regimes vary from fully competitive open entry regimes to strict authorisation regimes. However, market fairness requires transparency, and organisational development which is both sustainable and responsive to the needs of the travel market, in order to prevent monopoly characteristics.
### Background information: Characteristics of different types of contracts

<table>
<thead>
<tr>
<th>Field</th>
<th>Management contracts</th>
<th>Gross cost contracts</th>
<th>Net cost contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remuneration</td>
<td>Authority remunerates the operator for know-how and technical assistance, usually both a fixed amount and a variable component</td>
<td>Contribution based on the kms operated, index often updated in relation to changes in costs (diesel, gas, salaries, sales price of buses, etc.).</td>
<td>Operator remunerated by keeping the ticket revenues, compensation is paid by the authority (a fixed sum)</td>
</tr>
<tr>
<td>Ticket sales</td>
<td>Revenues related to operation belong to the authority / operator</td>
<td>Operator collects revenues on behalf of the public transport authority</td>
<td>Revenues related to operation belong to the operator</td>
</tr>
<tr>
<td>Incentive schemes</td>
<td>Financial incentives can relate to productivity and quality</td>
<td>Quality or revenue incentives will encourage the operator to focus not only on the production / costs but also revenue / passenger satisfaction</td>
<td>Quality incentives frequently make use of stated minimum demands or results on customer surveys</td>
</tr>
<tr>
<td>Ancillary activities</td>
<td>Revenues are collected by the operator on behalf of the public transport authority</td>
<td>Operator retains ancillary revenues</td>
<td>Operator retains ancillary revenues</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Authority generally monitors the operator regarding policy and budget</td>
<td>Authority monitors the operator regarding service performance through qualitative and quantitative assessments</td>
<td></td>
</tr>
<tr>
<td>Definition of the services</td>
<td>Decided by the public transport authority</td>
<td>Decided by the public transport authority</td>
<td>Often shared responsibility, however with significant operator influence</td>
</tr>
<tr>
<td>Quality</td>
<td>Authority: strategic responsibility to define the level of quality Operator: managerial and operational responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tariffs and fares</td>
<td>All related issues under the responsibility of the public transport authority</td>
<td>All related issues under the responsibility of the public transport authority</td>
<td>Policy defined by authority, autonomy for the operator for commercial fares such as discounts, fare sections</td>
</tr>
<tr>
<td>Information and promotion</td>
<td>All related issues usually a shared responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel and employment conditions</td>
<td>All related issues usually a shared responsibility but may also be wholly an operator responsibility</td>
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</table>
3.3. Tendering of services

Define financial and service provisions within bus service operation contracts. There should be at least some degree of performance-based incentives. The tendering process should be transparent, and the aims, scope, eligibility of operators and contract duration should be established at the beginning.

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Explanation:

Financial and service provisions consist of a number of items, depending on the contract type, which must be defined within the contract. Regarding quality, the contract is a key document to clarify the responsibilities of each party, while enabling all parties to express their expertise in their own field of competence. The monitoring made by the Public Transport Authority is essential for a successful outcome. The consequences of not performing according to contract must be clearly stipulated within the contract, e.g. reduction of bonus and penalties.

In the contract different criteria could be mentioned, e.g. quality and age of buses, passenger satisfaction and growth of passenger numbers. In the selection process, there is then a possibility to give different scores to each criterion.

A central part of a public transport contract is the duration. The contract length should primarily reflect the investment to be made. The duration may also affect the actors in different ways. With shorter contracts (e.g. one year), the market is stimulated until the next procurement and competition is maintained; however, this comes with high transaction costs. With longer contracts (e.g. more than five years), mutual development during the contract period is stimulated and operator investments and increased technical efficiency is supported. If the public transport authority handles investments and rolling stock, the periods can be made shorter. In Europe, commonly a contract length of between 5 and 8 years has been used. At present, the general trend is towards longer contracts. The EU Regulation 1370/2007 states that the upper limit should be 10 years for bus transport.

The qualification of the contract is important. It determines the applicable EU legislation, e.g. Regulation 1370/2007, Directive 2004/17/EC (coordinating the procurement procedures) and Directive 2005/51/EC (public procurement).

The aim of the tendering process may vary. Depending on the aims and goals of the Public Transport Authority, the tendering may be oriented towards the cost side, i.e. based on price with fixed quality, or towards the output side, i.e. based on quality.
Performance-based incentives should be used. An **incentive agreement** gives the operators the possibility of developing the service within the framework of the current contract, e.g. it can let the operator keep part of the revenues from an increase in the number of trips and let passenger satisfaction influence the bonus. Thus, the operator’s motivation is strengthened, and it takes over the responsibility for planning, marketing, and information. From PROCEED’s case study analysis can be seen that 37 % of the cities with tendered service have a bonus / incentive regulation in the contract.

**Critical issues:**

The whole idea of operator tendering is slightly challenged, when considering that contract lengths between 5 and 8 years do not fit vehicle depreciation life. This issue is sometimes dealt with by letting the public transport authority be the owner of both vehicle and garage infrastructure, reducing the operator to a company with a temporary work force.

The general trend towards longer duration of contracts can imply ‘too close’ relations between operator and the public transport authority, and an unfair market situation and a tendency towards monopoly.

It is important that where performance-based incentive provisions are included in the contract they can be monitored. The European standard EN 13816:2002 provides methods for monitoring performance (see guideline 1.4 Monitoring of performance).

Regarding incentive schemes (for all regimes and contracts), it is crucial that the contract contains a mutual responsibility for both the operator and the public transport authority. The authority must commit to all the measures necessary to ensure appropriate framework conditions for public transport. If not, then the operator's ability to benefit from an incentive contract is substantially reduced.

**Good practice examples:**

- **Almere (The Netherlands):** The tendering process has been very stimulating for the market. The contract comprises severe bonus / penalty agreements, related to the targeted increase in the number of passengers.

- **Cherbourg (France):** The operator has agreed a target of increasing bus use by 20% and fare box revenue by 23% by 2013, and the public authority payment to the operator in the contract is based on achieving these targets. In the event of the targets not being met, the operator takes the financial risk by making up the shortfall in funding.

- **Gävle (Sweden):** An incentive agreement gave the operators the opportunity of developing the service within the framework of the current contract, i.e. the operator keeps part of revenues from an increase in the number of trips. Thus, the motivation from the operator's part was strengthened, taking over the responsibility for planning, marketing, and information. Another success factor has been the active way in which the parties (Public Transport Authority, X-trafik, operator Swebus and municipality
Gävle) co-operate in regular meetings and a common steering document with aims, strategies and measures.

- **Groningen (The Netherlands):** The Public Transport Authority has chosen to make a very detailed tender and contract on all aspects of the Public Transport service to be provided by the operator. This guaranteed that the Authority got the Public Transport service it wanted, being less dependent on what the bidding operators were going to offer. The main selection criteria were the fulfilment of the specifications and price. Because the Public Transport Authority determines the services to be provided in detail, they also take the revenue risks.

- **Helsingborg (Sweden):** Since 2003 Helsingborg has had a three part co-operation between the City, the operator and the Public Transport Authority. This co-operation includes an incentive contract with the operator. The incentive contract is based on customer satisfaction within various areas like punctuality, clean vehicles, reception of staff, etc. but also increased number of passengers. Within the three part co-operation a number of other measures have been taken such as investments in bus-lanes and new vehicles but also great efforts by the operator, educating and having events for the staff. The co-operation has been a success and the number of passengers has increased by 40% since 2003 when the new contract started.

- **Toledo (Spain):** Financing public transport in Toledo by the local administration is based on subsidies calculated according to the costs/km, the occupation and the fare conditions. The contract is based on a fixed income of 2,1026 € per bus km without an agreement on bonuses.

**References and background reading:**


EN 13816:2002 Public passenger transport - Service quality definition, targeting and measurement.


**Related guidelines:**

1.4 Monitoring of performance

3.2 Contracts

4.2 Monitoring the performance of operation
3.4. Innovative financing

Consider innovative financing but issues to reflect on before implementation are: independence, costs of implementation, acceptability, and feasibility.

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Explanation:

Innovative funding refers to a wide range of local taxes and charges, where some or all of the revenues are directly hypothecated to fund public transport. Examples of innovative funding methods that can be used in small and medium-sized cities:

- Advertising
- Renting/selling of premises and facilities
- Providing additional services
- Sponsored bus lines
- Employer/employee-, local motoring- and consumption taxes
- Fines and road and parking charges
- Cross-utility financing from city-owned companies
- Property-related taxes and development levies

Examples of innovative funding methods that may be most relevant in small and medium sized cities and for light rail investments are property-related taxes and development levies. For details see ► Background information: Innovative funding measures.

Providing resources to the public transport system through innovative financing measures may result in more stable fares and a maintained or improved HQPT as well as a higher level of public financing and lower level of cost coverage from the fare box.

Practically, it may not be that problematic to implement innovative funding schemes. Many rely on existing structures, which keep costs and complexity relatively low. However, certain categories are very much a ‘product’ of the local conditions and taxation systems prevailing.

Critical issues:

Acceptability by the public is often low when new charges or taxes are imposed on them, but improves when the objective (to fund public transport) is explained. Therefore, transparency is a key issue. It helps when the public understands the need for revenue, and when the existing tax structure is regarded as not too onerous.
This area requires creative thinking, but at the same time taking care not to impose heavy future financial burdens on local public transport users or local taxpayers. A situation has to be avoided where due to innovative funding measures other sources of income are neglected. PROCEED’s analysis of cities applying innovative financing measures reveals relatively low cost coverage (about 25% - 40% in contrast to the average cost coverage of all cities of 52%).

**Costs of implementing** innovative funding schemes have to be studied carefully. Consider using cost-benefit analysis to support the decision of implementation.

A disadvantage of sponsored bus services can be seen in a dependency on sponsors for maintaining parts of the public transport system. Then, the public transport authority may have less ability to influence the planning process. A change in the sponsor’s policy (e.g. due to their own financial problems) may therefore lead to sudden gaps in the financing of public transport services.

**Good practice examples:**

- **Besançon (France):** The Versement Transport (see ►*Background information: Innovative funding measures*) is used in many French towns to contribute to the financing of urban public transport. Besançon is a medium-sized to major city with about 120,000 inhabitants and has high public transport demand figures: each inhabitant makes about 198 trips per year on urban public transport.

- **Chur (Switzerland):** All bus stops have the same design and all are painted red, like the buses. There is a national advertising company called “Allgemeine Plakatgesellschaft (APG)”, which finances and maintains the bus stops in Chur. It rents out the walls for advertising.

- **Oslo, Bergen, (Norway):** These cities have an urban toll cordon. 20-100% of the revenue is dedicated to public transport investments, mainly in rail infrastructure and light rail.

- **Schaffhausen/Neuhausen (Switzerland):** The area has about 45,000 inhabitants with a high number of passenger trips per inhabitant. 75% of the parking revenues are used for public transport: 20% of the public financing is contributed in this way.

- **UK:** In some towns there are a number of free bus routes sponsored by large retailers aimed at conveying passengers between specific areas of the town and the retailer. This practice tends to occur most often when a large retail outlet is relatively new or where it faces local competition from other major retail companies.

**References and background reading:**


**Related guidelines:**

2.19 Safety, information and equipment at bus stops

3.1 Cost benefit analysis

3.5 Advertising
Background information: Innovative funding measures

**Employer / employee tax:** In Europe, employment taxes dedicated to public transport systems are in use, e.g. in France (“Versement transport”). This tax must be paid by all firms with more than nine employees, unless these are living on the premises or the firm provides its own transport for employees. The Versement Transport may (optionally) be levied by any urban authority with a population of over 10,000, but with different rates:

- 10,000 to 100,000 inhabitants: max. 0.55% of salaries
- > 100,000 inhabitants: max. 1% of salaries
- > 100,000 inhabitants with own infrastructure (e.g. busways or tram): 1.75% of salaries.

In some cases, this has led to neighbouring local authorities joining together in order to pass the population threshold allowing a higher public transport tax rate.

**Parking charges and fines:** Parking charges may be hypothecated to support public transport or as a part of a planned transport funding package. Revenues from parking charges in Milton Keynes, UK, are dedicated to supporting public transport, being part of a transport and parking strategy. Another scheme is implemented at London’s Heathrow, Stansted and Gatwick airports, where passengers contribute an average 25 pence from every parking transaction. These revenues are credited to a budget that goes towards improving public transport within and around each specific airport. Revenues from city-centre parking are also used in Amsterdam to partly fund a new tramline. Similar implementations are to be found in La Spezia, Verona and Milan in Italy. In Schaffhausen, Switzerland, three quarters of the parking revenue is used for investment in public transport.

A related source of funding to parking levies is that of parking fines. In France, additional revenues from parking fines and driving offences have been earmarked to pay for public transport infrastructure. In Athens, Greece, part of the charges imposed on private cars that violate bus lanes will be passed to the local public transport authority.

**Sponsored bus lines:** Bus routes that connect to stores and shopping malls may be sponsored by companies in the area. There may be several motivations for companies to sponsor bus lines - for instance sponsorship may be required as a prerequisite by the local authorities in order to authorise a building licence for a specific site).

**Local motoring taxes:** A local motoring tax is a tax levied on motorists by local jurisdictions for local purposes (one of them being public transport) and is collected in addition to state and federal motor fuel taxes. Public transport in Lisbon (Portugal) benefits from a levy on diesel fuel and in Germany national taxation has existed since 1967 which earmarks a tax on sold fuel for investment in urban roads and public transport.
**Consumption taxes:** Public Transport agencies often use consumption taxes to replace decreasing federal funding, to build significant capital projects, or to supplement operating revenue. These kinds of taxes are common in the United States where many counties or States have implemented these kinds of schemes after obtaining the required voter approval. There are mainly two forms of consumption taxes: the local sales tax and gambling taxes.

**Cross-utility financing:** Cross-utility financing is adopted on a localised basis, and earmarked to fund public transport. There are mainly two methods of how cross-utility financing operates in practice. The first is via a levy on utility use e.g. telephone, water and sewerage. The levy is collected by utility companies and transferred to the city, which then transfers revenues to the public transport department.

The second method is where a loss-making public transport department is cross-subsidised by a profitable utility department. In Germany, public transport systems are often municipal departments, and as such are often supported by revenues from other municipal departments, such as water, gas and electricity, that generate a revenue surplus. This effectively allows the municipality to offset any profits against the losses of the transport undertaking, meaning that these profits are not subject to corporation tax. However, in the long run the liberalisation of the EU will render such models impossible. Similar arrangements are in place in some Italian (e.g. Milan) and Austrian cities, as well as in Luxembourg.

**Road charges:** Road charges can be used to support public transport. Tolling in Norway is based on a cordon system, in which vehicles (except public transport) must pay for entry to the city centre, and the revenues are intended to fund a mixture of road and public transport investments. While the former examples were more aimed at raising revenues, there are also schemes initiated at reducing congestion, e.g. in London and Stockholm.

**Property related taxes:** The property tax is based on the concept that, by providing a public transport service, the occupants of the properties are provided with a benefit. This benefit is reflected in an increase in the real property value, which can be regarded as a comprehensive index of all the benefits generated by the development, including improved accessibility and increased business opportunities. The local or regional government may then earmark a specified amount to support public transport. Examples of earmarked property taxes outside North America are rare, but can be found, for example, in Spain (Barcelona).

**Development levies:** Development levies tend to operate within planning rules. Examples are development charges, whereby part of the cost of transport would be recovered by special charges on different land uses, usually levied at the time of new development of properties in the benefiting areas. In Europe, a development charge scheme can be found in Hamburg, Germany and Copenhagen, Denmark. A variation in the UK is that developers (of housing, retail, business or leisure sites) are sometimes required by the local authority to contribute to the funding of an adequate bus service for a certain number of years in order to obtain planning permission for the site.
3.5. Advertising

Carefully evaluate using space on buses and stops for advertising. It can be a useful source of financial support, but this space can instead be used powerfully for marketing Public Transport.

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Explanation:

Selling advertising space on buses and bus stops may be a financial source for supporting public transport. For advertisers, there are many advantages for bus-exterior advertising; including the fact that the target group can be geographically based as determined by certain bus routes. The advertising exposure may also trigger an immediate sale at a moment when no other media are present.

A bus operator or Public Transport Authority deciding whether to begin an advertising programme must weigh several factors. The potential revenue stream is certainly a major factor. A realistic appraisal of time and resources to manage the programme properly is a second. Internal resistance and obstacles to the advertising programme also need to be considered. Any legal impediments, such as local ordinances, should be explored. Maintaining the image of the public transport system should also be considered. Selling advertising space e.g. on and in the bus and at bus shelters may also work against a clear brand identity. Consideration should be taken of the type of advertising allowed. Do not advertise products and services that compete with Public Transport e.g. cars.

Public transport companies should ideally work together with local businesses to promote bus use as a means of getting to these businesses. Providing information on how to reach the business by bus may be part of the advertisement on buses itself (e.g. an indication of the relevant bus stop to alight at).

The transport authority may also have a strategy of not allowing advertising on the buses at all. Buses without advertisements may give a fresher impression. Furthermore, in smaller cities, there may be no demand for advertisement space.

The space on buses may also be used to self-promote the brand of the bus operator, giving an identity to the operator and increasing the knowledge of the brand. One may also choose to self-promote supply features of the public transport system as such, stimulating an interest in public transport (e.g. on the rear of buses: ‘This route runs every 5 minutes during the day’).

The target group is people not travelling by bus, and having little or no knowledge of where and how often the buses are leaving. Giving a special identity to buses diminishes flexibility since you cannot move one bus from one route to another. However, in the UK the advantages
of this have generally been judged to outweigh the disadvantages, in cases where it makes marketing logic to carry out specific route branding.

In the UK, on-vehicle advertising is, or has been used, in several small cities to **promote new transport networks and routes**, also providing information on frequencies. Some operators have chosen to give a special identity to the buses on a certain route with different colours.

**Critical issues:**

**Advertisement on window screens (dotted adhesive labels)** is controversial among both operators and customers because the view of passengers through windows is thereby limited. It should be checked carefully whether the proposed advertisement fits into the overall corporate design strategy or if there is a danger of destroying the established image of public transport.

**Good practice examples:**

- **Bregenz (Austria):** For corporate design reasons, the urban bus system in Bregenz has abandoned all advertising, both inside and outside the buses (Figure 3-1).

*Figure 3-1: Vehicle in corporate design without advertisement in Bregenz (Austria)*
• **Brighton & Hove (UK):** In Brighton & Hove, buses are being used in a very creative way. For example, the bus company has an established on-bus advertising campaign with real local people being advertised on the sides of buses promoting the concept, and very eye-catching adverts on the rear of buses (Figure 3-2). The Brighton & Hove bus company now has a deliberate policy of not accepting advertisements from third parties except where the bus is also advertising travel specifically to that destination (e.g. Brighton Marina). Instead it uses the space saved to raise the profile of the bus.

*Figure 3-2: On-bus advertising campaign on buses in Brighton & Hove (UK)*

• **Stagecoach (UK):** Another means of advertising is to advertise directly on competing modes. In the UK the Stagecoach bus group now advertises its weekly discounted tickets on self-service fuel pump hoses at fuel stations, so that the advert is clearly visible to the car driver holding the hose as he / she fills the car fuel tank.

• **Tallinn (Estonia):** The Tallinn public transport operator offers its buses and trams to advertisers on its web site: [http://www.tak.ee](http://www.tak.ee) (> English > Services > Renting of bus surfaces for advertising).

**References and background reading:**


Related guidelines:

2.15 Appearance and age of vehicles
2.19 Safety, information and equipment at bus stops
3.1 Cost benefit analysis
3.6. Fare structure

Consider aspects such as attractiveness, simplicity, brand loyalty (e.g. through period or multi-journey tickets) and benefits from new technology (e.g. smartcards, mobile and 'virtual' tickets). Consider fares restructuring at times of fares increases.

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Explanation:

The development of a fare structure has to be based on defined objectives within the available financial framework. Evaluation and feedback must show whether the results meet the objectives (Figure 3-3). If not, modifications have to be made.

![Figure 3-3: Development of a ticketing strategy](image)

The objectives of the fare structure can be divided into:

- **Policy objectives:** sustainable urban mobility, environment, mobility for all, reduction of car use and congestion, local economic development etc.

- **Financial / operational objectives:** maximising revenues, increasing the number of passengers, more even spread of vehicle occupancy (peak and off-peak hours), maximising revenue predictability etc.

Normally the objectives are a combination of these two.

Simplicity is the most important requirement for the fare structure, because this will attract patronage. Keep the fare structure as simple as possible. Consider both financial / operational and policy effects of the fare structure. However, the fare level is a key issue, while attracting new passengers and selling spare capacity.
Increased simplicity can also be created by fare integration, i.e. a common tariff for the local and regional public transport systems. A prerequisite for fare integration is, however, a consensus regarding the financial conditions. Further information about fare integration is given in ►Background information: Fare integration between urban bus, regional bus and rail.

Based on the ‘simplicity goal’ three major fare strategies are prevailing in urban public transport:

- **Flat unit fares**: unit price per trip, regardless of trip length and time of travel. Flat fares represent simplicity – for both regular and new customers. These are particularly attractive and easy to communicate to ‘occasional’ users (the risk of buying the wrong ticket is low). Also, a flat fare does not require advanced ticketing systems (the boarding point and destination of the passenger do not need to be checked), while it could, in addition, be combined with a very simple zonal structure or a time-component. From the suppliers’ perspective it does not maximise yields because the flat fare does not charge extra for customers with longer trip distances.

- **Zoning system fares**: Many cities use a so-called zoning system (with geographical and time criteria), in which the price of the ticket is determined by the number of zones travelled. The zoning system could be seen as a simple approximation of area- and distance-based fares. A revised time-based fare zone system could be a solution as well. Zonal fares could, however, if properly designed, be seen as a good approximation to marginal cost pricing. Zonal fares are a prerequisite for integrated tariff schemes that are covering local and regional trips by different modes in a larger area.

- **Differentiated fares**: Some cities use off-peak hour discounts or peak hour surcharges, and quality-dependent fares (e.g. for express buses). The major goal is a proper yield management and an attractive ticket offer during off-peak hours. However, differentiated fares imply some limitations in terms of simplicity: there is a lack of transparency as “different fares for the same trip” could cause confusion. Complex fare structures may require electronic ticketing such as smartcards.

**Key trends and developments** related to fare structures and payment options are as follows:

- **Simplification of fare structures**: Despite the growth of electronic fare systems, operators / authorities continue to opt for simplified structures, generally choosing not to introduce fare zones or peak / off-peak differentials, while others have been eliminating or reducing the number of zones.

- **Increase in market-based pricing strategies**: Operators / authorities are increasingly offering a range of payment options that segment the market based on frequency of use and willingness to prepay. These options typically include unlimited-ride cards as well as some form of discount option.

- **Electronic fare systems**: The introduction enables the potential for introducing more efficient and equitable dynamic fares. Smartcards particularly enable the use of
creative fare structures. The card can hold a variety of single tickets, period tickets and travel permits that are added to the card prior to travel. Smartcards are being progressively introduced; however at the moment they are primarily in larger cities in Europe (e.g. Oyster Card, London) and creative fare strategies are not yet being implemented.

- *Fare collection via mobile phones:* This approach is growing in various European countries. Especially with flat fares for local trips a simple ticketing can be established, for instance, by using SMS as proof for paid trips.

PROCEED’s case study analysis shows that local experts regard “Tariffs” (integrated and consistent tariffs, simple tariff system, etc.) as among the **most important success factors** for HQPT.

**Critical issues:**

It is crucial for the passenger to know how much he / she has to pay and for what. Systems that are too complex often fail (even if objectively in favour of the passenger).

The range of fares available also affects (and is affected by) the method by which tickets are sold (exclusively off-bus or a mixture of off-bus and on-board purchase) and whether off-bus ticketing uses mostly travel centres and local shops acting as agents, or automatic ticket machines.

**Good practice examples:**

- **Avilés (Spain):** The introduction of a “Unique Ticket” scheme (integrated tariff scheme) has been an important effort and a great improvement for the users in terms of fare and ticket coordination. With the new integrated ticket, transfers between or within public transport modes are no longer penalised.

- **Brighton & Hove (UK):** The flat fare has been a very positive feature since it was introduced in 2001: it is easy to understand and makes using the bus straightforward. Combined with a low-price all-day ticket which can be bought from the bus driver but can also be bought at a discounted price on-line or from travel centres, it contributes to the perception of the bus network as easy-to-use and good value.

- **Graz (Austria):** Graz has a differentiated fare structure and provides high discounts for multi-ride tickets (13% on a 10-trip-ticket) and season tickets (e.g. monthly ticket is cheaper with only 19 trips per month compared to single tickets).

- **Jönköping (Sweden):** Similar to some other Swedish cities, 40% discount on trips is given in off-peak hours (Mon-Thu 0900-1400 and 1800-2300, Fri 0900-1400, Sat / Sun 0400-1800).

- **Klagenfurt (Austria):** The tariff comprises a monthly pass "Umweltschutz" (environmental protection) for a reduced price, but which is not valid during peak hours in the morning (before 0830). Since 2006 electronic tickets (smartcards issued for various municipal services in Klagenfurt) with a best-price guarantee have been in use.
• **Lippstadt (Germany):** The tariff system of the greater area is based on a zonal fare system. In order to avoid different fares in the city buses, it was changed before the launch of the improved urban bus system: Today, the first fare stage ticket is valid for the whole city bus system. Previously the city was subdivided into four zones and it was necessary to buy a second fare stage ticket to go from one zone to another.

• **Luleå (Sweden):** Similar to other Swedish cities, a 40% discount on trips in off-peak hours (Mon-Fri 0900-1400, Sun all day) is provided. Luleå has managed to increase both fares and patronage by careful monitoring and follow-up studies.

**References and background reading:**


**Related guidelines:**

3.7 Fare level

5.15 Ticketing strategy
Background information: Fare integration between urban bus, regional bus and rail

Since a trip with public transport does not necessarily start and end within the network of an urban bus system or on a regional rail line, there is a strong tendency in some European countries towards common tariff schemes for all public transport modes covering a whole area. Experience shows that a remarkable increase of passengers can be triggered by fare integration (e.g. Greater Cologne area: passenger increase of 41% between 1987 and 2005). Regional fare integration is widespread in several Central and Northern European countries, having often begun in greater metropolitan areas, but today available country-wide in some cases.

However, common tariff schemes are in effect a kind of public transport monopoly which might be seen as in conflict with fully deregulated markets. Consequently, a common tariff scheme is often part of a strategy to offer only a simple and easily-understandable single “public transport user interface” to the customer (although there are a number of operators behind it). “One region, one timetable, one ticket” facilitates access to public transport and can contribute to increased ridership figures.

When considering a common tariff scheme there are several problems to solve:

- Through ticketing can often result in a gap in revenues which has to be balanced, as transfer passengers no longer have to purchase a second ticket).
- Where previously operators might have set their own fares this right no longer exists, having been transferred to a single central unit.
- Integrated fares imply a shift from slower (bus) services to faster parallel (rail) services, whereas different tariff systems in the past acted to prevent people from mode shift.
- Different existing fare levels between operators may be a challenge.

Examples of methods in use to share the revenues from a common tariff scheme are:

- **Reimbursement method:** The revenues from ticket sales of all carriers are "pooled" and subsequently shared according to the actual transport performance (e.g. performed passenger-km). The method responds to the actual demand, and can be used with different size of operators, but requires extensive surveys of actual ticket use.

- **Accounting method:** Each carrier receives shares from registered ticket sales as far as its services are concerned (sales data such as origin, destination, lines used, are registered in databases). The method responds to the actual demand, and no additional survey is needed, but a differentiated accounting is required which is often difficult to obtain at a local level.

- **External user method:** Each carrier keeps its revenues from ticket sales, but revenue for users with tickets issued by other carriers (transfer passengers) are claimed from other operators. This is a suitable method if the carriers are of similar size, and external...
user figures are low. The method responds to the actual demand, and the effort required for small-scale surveys is modest.
3.7. Fare level

Consider the effect of fares changes since fares increases are likely to reduce passenger numbers and possibly, in the long-term, revenue, unless accompanied by a fares restructuring.

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Explanation:

The fare level affects both the passengers’ and companies’ finances. A fare reduction will generally result in a small increase in the number of passengers but at a somewhat lower level of revenue. If the fare increases, the revenue will increase as well (in the short-term) but at a somewhat lower level of patronage. In the long-term there may even be a reduction of revenue if passenger numbers continue to decline.

The concept of fare elasticity is a means of calculating the price sensitivity of public transport passengers. If the fare elasticity of public transport demand is estimated to be –0.4, and all fares were to increase by 10%, a decrease of passengers by 4% can be expected. The elasticity of public transport patronage is usually in the –0.2 to –0.5 range in the short run (first year), and increases to –0.6 to –0.9 over the long run (five to ten years). It is observed that long-run elasticities could approach -1.0. Also, elasticity for interregional trips may tend to exceed -1.0. Various factors affect price sensitivities including type of user (e.g. income, car ownership) and trip, geographic conditions, and time period. The following factors are influential:

- Travel frequency: lower elasticities for public transport-dependent than for discretionary (choice) patrons
- Trip type: elasticities are about twice as high for off-peak and leisure travel
- Car in the household: large reductions are needed to attract car drivers, who are more responsive to service quality (speed, frequency, and comfort)

The communication of fare level changes is a crucial issue, since increases in fares are often subject to political discussions in the city council or by the general public (e.g. in newspapers). One approach to absorb negative side-effects is to combine fare changes with service improvements or general changes in ticket types. Some cities (with the public transport authority responsible for the fares) connect fare level changes to a price-index to determine the increase in ticket fares. This limits the risk of crucial periodic discussions on particular increases in fares.
Critical issues:

While higher fares may lead to a decrease in demand (but also to a higher revenue in a certain range), lowering the fares does not generally mean an incremental increase of new passengers. Public transport demand is sometimes inelastic and reducing the fares by means of public financing will not generally make it grow. Preferably, the profile of present and possible transport users in the area (such as pupils, students, and unemployed) should be analysed before introducing a fare modification. Also, for low income groups the fares can be crucial for their mobility.

The increase in the number of passengers resulting from fare reductions and service improvements is mainly due to a transfer of people walking, cycling, or making rideshare trips. A smaller, but important, share of the increase in the number of passengers consists of car users changing travel mode (in different surveys a figure of about 20% has been measured). The increase may also be a result of an increase in total personal mobility.

Good practice examples:

- **Euskirchen (Germany):** Due to a cut-back by national and regional governments from 2004 of adjustment payments for school transport and disabled passengers, the public transport operators were faced with a serious gap in financing the current service level. In order to avoid a downsizing of public transport service levels a fare change took place to compensate the reduced funds by an increase in farebox revenues. At the same time fuel prices went up, and regional commuting, e.g. to Cologne, was still increasing. Consequently, this fare level strategy succeeded because of passengers’ increased willingness-to-pay, and a general cut in services was averted through an increased user contribution to public transport financing.

- **Graz (Austria):** The increase of the fare level in Graz is connected to a price-index to determine the increase in ticket fares.

- **Kaunas (Lithuania):** Generally, the fare level is low. But increasing living standards increase passengers’ expectations of the quality of the services so this low fare level might lose its importance.

- **Monaco:** The flat fare on the city’s bus network was reduced from €1.50 to €1 in 2008 and patronage has increased by 15%. The reduction was largely a political decision to increase public transport use to reduce traffic congestion, and also to align the tariff structure to neighbouring Nice in France.

- **Pula (Croatia):** A favourable pricing policy (including smartcards, lowering of fares, discounts, new information system for tickets) led to an increase in passenger numbers.

References and background reading:


**Related guidelines:**

3.1 Cost benefit analysis

3.6 Fare structure
4. GUIDELINES ON “MANAGEMENT”

4.1. Management Structure

Apply a management structure that fits the local conditions and the respective national framework. Clearly assign or split the tasks and duties to either the authority level or bus operator’s level.

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Explanation:

The management structure of a public transport company often has the following general scheme:

- Management board,
- Group work council (= representation of employees),
- Central departments for:
  - Human resource management / payroll accounts and financial accounts
  - IT-related services
  - Traffic planning / timetabling
  - Marketing
  - Operations / operation control
  - Purchasing, maintaining / repair and managing of the fleet

Often, there are additional management positions with special duties such as a concession manager (e.g. The Netherlands) or quality co-ordinators (e.g. in Slovenia).

In some countries the responsibilities for public transport are split between a public authority and the operator(s). **Public transport authorities** are politically and financially responsible for local public transport, while operators provide the service (e.g. based on contractual agreements). It depends on the national legal framework or the approach of the public transport authority as to what extent tasks are on the operator’s side and which are performed by the public transport authority (e.g. tariff development, fare level changes, information provision to customers, timetabling).

In smaller cities, the urban bus network is often provided as part of a bigger operating area, or the city is operating the service itself. In both cases, the implementation of a small management unit at a local level which is in charge of operations, planning, and marketing (an urban bus manager) seems to be advantageous in order to meet local prerequisites. Additionally, the duty of the management unit is to communicate with decision-makers and
other stakeholders to ensure local identification with the urban bus service. The provision of the services (drivers and vehicles) is either provided by a major bus operator or contracted to bus companies which perform the human resources management for drivers and the fleet management.

**Critical issues:**

There might be a *contradiction between goals* of the municipality / public transport authority (maximum possible quality of service) and the operator’s goals (high efficiency of the service). The organisational framework and the contract design have to ensure that the principles of high-quality public transport services are not affected by these contrary positions.

If the organisational framework involves the interplay between a public transport authority and operator(s), a *clear split of competencies* and responsibilities is needed. The interfaces between fields of work have to be agreed on in order to avoid overlaps or even gaps in service provision.

**Good practice examples:**

- **Almere (The Netherlands):** The bus operator Connexxion which operates the urban bus network ‘MAXX’ in Almere has appointed a concession manager as a kind of product manager for each of its concession areas. The concession manager is responsible for the day-to-day operation of the service within the local concession area. Furthermore, the concession manager is the first contact person for consultation between the regional public transport authority (province) or the respective municipality and the operator. The province itself has usually appointed concession managers at the public transport authority level performing the respective tasks on the administrative side (e.g. monitoring the performance of the operators, providing policy advice, serving as the contact person for both the municipality as well as the operator).

- **Brighton & Hove (UK):** The city has a strong and long-standing (but informal) quality partnership between the local authority and the operator. This has resulted in progressive investment and performance achievements over time.

- **Elbląg (Poland):** Elbląg’s policy quite strongly favours the development of public transport. There is good co-operation and a clear split of responsibilities between the Public Transport Office of Elbląg (responsible for organisational aspects, timetable planning, monitoring issues, maintenance of bus stops) and the 4 public transport operators running the bus services.

- **Euskirchen (Germany):** Euskirchen (about 56,000 inhabitants) has a municipally-owned public transport company which is led by an urban bus manager. The company provides the management of the urban bus service in Euskirchen and bears the commercial responsibility for the supply; however, the bus service itself (vehicles, drivers) is delivered by bus operators on a contractual basis.
• **Rheine (Germany):** Behind the “urban bus Rheine” there are actually three companies: (1) The municipally-owned “Transport company Rheine” fixes the level of service and pays for uncovered costs, (2) the publicly-owned regional public transport company serves as the provider of overheads such as timetable planning and the ticketing facilities, (3) a private bus operator runs the buses (drivers, vehicles).

**References and background reading:**


**Related guidelines:**

3.2 Contracts

3.3 Tendering of services
4.2. Monitoring the performance of operation

Monitor system operating performance regularly.

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Explanation:

As part of managing the public transport operation, there should be at least regular basic monitoring of the efficiency of operation in order to optimise the use of resources.

Monitoring the performance of the organisation in general is a cyclical process. Monitoring enables an operator to compare indicators with, for instance, the outcome of the previous year. The operator is then able to plan and implement improvements to the business and since monitoring is a permanent ongoing process, the indicators need to be monitored in order to analyse the outcome of the improvements. The monitoring can be an in-house scheme as well as a public one.

In the context of a public transport operator, the process should follow a step-wise approach:

1. Definition and agreement of the factors which are critical to the success of an individual company
2. Development of appropriate performance measures, known as indicators. These indicators are then measured by individual operators
3. Collection of the values of the indicators for a first, base year
4. Setting-up of short and long term goals for each indicator, on the basis of the base year
5. Planning of measures and activities which will improve the operation and lead to a fulfilment of the short and long term goals
6. Setting-up of a monitoring scheme describing what to be monitored, who is monitoring and when to monitor

Many performance indicators can be applied. For a basic analysis, indicators should be defined within three areas:

- Product
- Efficiency (staff, vehicles and maintenance)
- Result

For examples see ► Background information: Examples of performance indicators
**Critical issues:**

Always keep in mind the need to follow the ‘quality cycle’ as well, see guideline 1.1.: Basic analysis. The elements of the quality cycle are: plan, act, evaluate (monitor and review) and improve. It is crucial to implement a solid monitoring system, well-integrated into the daily operation, to ease the reporting of figures, calculation and analysis of indicators and presentation of results.

**Good practice examples:**

- **UK:** In the UK, some of the larger bus groups (e.g. First) are involved in in-house benchmarking between different operating units within the UK. Being an in-house scheme, the potential to deliver consistent information is high despite the different ownership origins of the constituent parts of First.

- **Sweden:** In Sweden many public transport authorities present their performance indicators in their public annual report. Every diversion from the goals set or from the performance of last year is commented on in the report, thus giving an incentive to develop the public transport in a positive direction.

**References and background reading:**


**Related guidelines:**

1.1 Basic analysis
1.4 Monitoring of performance
5.1 Knowledge base about your (potential) customers
### Background information: Examples of performance indicators

Within the three areas of performance the public transport operator/authority should choose a number of indicators for monitoring the performance of the public transport system. Examples are:

- **Product**: line coverage, average speed, share of public transport-only links, share of traffic-light priority, share of low-floor vehicles, share of bus stops with shelters, average age of vehicles

- **Efficiency**:
  - **Staff**: staff per vehicle kilometre or hour, total cost of staff per vehicle kilometre or hour, cost of administrative personnel per vehicle kilometre or hour, cost of drivers per vehicle kilometre or hour
  - **Vehicles**: number of buses per vehicle kilometre or hour, trips per vehicle kilometre or hour, trips per single ride, vehicle hours or vehicle kilometres per vehicle
  - **Maintenance**: Technique staff per vehicle kilometre or hour; cost of maintenance per vehicle kilometre or hour

- **Result**: total cost per vehicle kilometre or hour, cost-coverage, community support per trip, trips per inhabitant, ticket revenues per trip, trips per vehicle kilometre and/or vehicle hour
4.3. **Operation control systems**

Develop an operation control system to manage the operation.

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**Explanation:**

A means to improve the system operation, especially for larger systems are **Computer-based operation control systems**. These refer to an automatic control system for buses that ensures data transfer between vehicles, infrastructure and the traffic control centre. They can provide real-time information for passengers and managers, traffic light priority, voice announcement in the buses, etc.

Small operations (up to around 15 vehicles) can be organized without the need for a computerized system. However, in larger operations complexity levels rise, and the need to keep the overview at a system level, react to unforeseen events and take decisions is beyond the capacity of a manual control system.

The desirability of computer-based operational control will depend on city size and circumstances. In medium-size towns, real-time scheduling and vehicle location systems should be considered. In larger towns, integration between operational control and traffic light priority should be aimed at.

The main **processes provided by computer-based operation control systems** are:

- To collect real-time data about the vehicles, in particular their location (real-time information for management),
- To transfer the real-time data to the traffic control centre,
- To transfer instructions to bus drivers e.g. about re-routing of lines (real-time scheduling),
- To transfer data to traffic lights for traffic prioritisation,
- To transfer real-time data to bus stops (real-time information for passengers); this can be done directly (bus to bus stop) or the traffic control centre transfers to bus stops some data which has already been processed (“filtered”),
- To perform ex-post analyses about the system’s performance (statistics, reliability studies, etc.).

The **objective** of a good management of operations control is to minimise the costs of operation and maintenance (see guideline 4.8 Vehicle maintenance and repair) and to make public transport more attractive (higher speed, better information, secured connections, higher reliability etc.). The question is which of the operations mentioned above is performed more efficiently by automatic procedures rather than by personnel manually.
Since the 1990s automatic vehicle location (AVL), automatic on-board counting systems and real-time scheduling has been used by operators in larger operating areas (urban conglomerates). For these (large) areas, it has been shown that they can support an effective dispatching, an improved fleet utilisation and vehicle availability, an improved movement control / monitoring and a higher customer satisfaction. The question is to what extent this also applies to smaller cities, especially in economic terms. From the cities analysed by PROCEED, 33% of the small (up to 50,000 inhabitants) and 68% of the bigger cities are equipped with some kind of vehicle monitoring system (sometimes as part of a larger operating area).

Manufacturers of computer-based operation control systems offer various system architectures with different hardware options (e.g. detectors, transmitters, information displays), communication technologies, and software (with functionalities such as calculations of predicted delays, statistical evaluations, optimisations etc.). Some manufacturers also provide bus traffic priority as an integrated option.

According to the infrastructure already in place, available financing and human resources, a city, public transport authority or operator can decide optionally for a tailor-made system. The investment can be performed in stages.

In the case of an implemented computer-based operation control system, all options should be checked to integrate traffic light prioritisation regardless of city size. For instance, when using a ‘Rendezvous’ based system in smaller cities it is very important that all buses are running on time.

**Counting system**

For operations with low demand number of passengers can be counted by hand e.g. by the driver or other personnel. Other methods that can be used are calculations based on visual estimations on the number of passengers in certain sections or by onboard surveys.

**Automatic on-board counting systems** count the passengers as they enter and alight from the vehicle. One kind of counting system is an Automated Passenger Counter (APC), which include treadle mats (which register passengers when they step on a mat) and infrared beams (which register passengers when they pass through the beam). Other systems work by observing changes in weight. Electronic ticketing schemes can also be regarded as a counting system, at least for boardings. They provide a wealth of information that can be used to improve the existing network. Other approaches use ‘Bluetooth’ technology to track the passengers’ trips from their mobile phones (anonymously).

On-board counting systems are used to reduce the costs of data collection and to improve data accuracy. There are various reasons for using on-board counting systems:

- *Operational planning*: The information gained (e.g. passengers per trip, per line, boardings per stop, passenger load per hour) helps identify the weak points in the present public transport network, paving the way for a more efficient design.
- **Strategic planning:** Where public transport is carried out by operators supported with public financing, these systems supply reliable information to the authorities, information that otherwise would be very hard to gather.

- **Share of revenues:** In integrated tariff schemes, passenger counts are often used to distribute the revenues from the common tariff among the different operators. Data from on-board counting systems can support this procedure under certain circumstances depending on the actual method used.

**Operational control:** Data can be used in real-time for vehicle operations, but this can only happen if all vehicles are equipped with an APC. Data can also be used for future planning purposes. The system requires additional sensors for counting passengers either on the vehicle or at the stop, and the ability to store or transfer the information.

From the cases analyzed by PROCEED, about 32% of the cities use automatic passenger counting.

**Critical issues:**

According to the city size (for small cities) the costs of introducing automatic vehicle location and real-time scheduling, for operational reasons only, might not be justified by the overall benefits. When considering the implementation of such a system, the benefits, maintenance and the necessary efforts for correct operation of the system should be considered.

It has to be stated that bus prioritisation does not necessarily need a central system as a nucleus. Other decentralised techniques may well fit to the actual needs of the urban bus network.

With an integrated network of different operators (e.g. urban and regional bus) the need for open access to a computer-based operation control system for different operators will grow. Where operators use different systems this may result in incompatibility issues and therefore in the investments made producing limited benefits.

To operate in real-time reliable communication links with a control centre are required so that additional buses can be dispatched easily.

Depending on the major reasons for the use of automatic on-board counting systems, it is not necessary to equip all buses with counting systems. Also, it is possible to get insight in the performance with only a few ‘counting buses’. However, this requires strict vehicle allocation planning.

Passenger counting systems are widely used and provide necessary demand data e.g. for planning purposes. However, it should be noted that such systems require accurate efforts in data management to deliver reliable data. There are various sources of error leading to incorrect measurements.

**Good practice examples:**

- **Almelo, Enschede, Hengelo (The Netherlands):** Traffic light priority and management information is gained from the SABIMOS Twente system.
• **Chur (Switzerland):** All buses can be localised by GPS signal. The real-time location of every bus can be observed via a website. The localisation is especially used for real-time information at bus stops and for announcements of the next bus stop in the buses.

• **Donostia-San Sebastián (Spain):** There is a project called "Intelligent Public Transport System" that includes the exploitation and management system. The SAE real-time scheduling system knows the current location of all buses, the number of users, recording times of departure and arrival, etc. More than 40 information screens with real-time information were placed on bus stops at the end of 2005. Toledo also implemented the SAE information system.

• **Dundee (UK):** The system used in Dundee provides recording of bus braking, and indicators for performance and speed based on GPS.

• **Graz (Austria):** A system called ITCS (Integrated Transport Control System) has been installed, which continuously communicates the position of all vehicles to the central control unit. The system provides real-time passenger information at many stops.

• **Kaunas, Klaipeda (Lithuania):** A comparison of the working regime and the timetable is performed by the PIKAS system.

• **Ljubljana (Slovenia):** The urban bus system uses the GPS based system TELARGO which provides automatic vehicle location and real-time scheduling (departure and arrival of buses) including low floor bus information.

• **Luleå, Lund, Karlstad (Sweden):** TriTrans is a module-based information system for public transportation (bus, tram, light rail, underground or commuter train). The system operates in real-time and serves all parties involved – traffic planners, dispatchers, drivers and passengers. Traffic controllers are provided with information on vehicles’ deviations from schedule. The system helps traffic controllers to plan traffic when deviations from schedule occur and enables them to communicate with drivers. Waiting passengers are given the information they need – in real-time – by means of visual display and voice announcements. The information can also be made available on the Internet. Passengers in vehicles are informed of the next stops or stations by visual display and voice announcements. Drivers experience less stress, are freed from various tasks, can communicate readily with traffic control, and have a highly advanced alarm function at their disposal.

• **Graz (Austria):** The public transport operator equipped 130 vehicles of its fleet (both trams and buses) with 'Bluetooth' receivers. The devices can anonymously trace mobile phone users with activated ‘Bluetooth’ interface in the range of the receiver (i.e. passengers on-board). Since the Bluetooth ID of each mobile phone is unique, the system provides data on origin - destination of the trips within the Graz urban network. However, the system does not cover all trips, but the share allows the analysis of Origin-Destination trip patterns within the network.
References and background reading:


**Related guidelines:**

1.3 Market analysis / Monitoring of demand

2.7 Intersection / traffic signal priority

2.19 Safety, information and equipment at bus stops

4.5 Communication with drivers
4.4. Strategies for efficient use of vehicles

Plan operations to maximise vehicle efficiency. Scheduling efficiency must not go against customer-focussed routes and timetables

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Explanation:

The goal of a good strategy for efficient use of vehicles is to **minimise empty kilometres** and to maximise the vehicle occupancy without overcrowding, taking into account the need for simplicity for passengers.

The right choice of the vehicle is usually made by experienced staff according to a certain set of criteria with regard to costs, operating regime, environmental aspects, and vehicle maintenance:

- The purchase and sale date of the vehicles is set with respect to the life-cycle costs (LCC) of the vehicle.
- New vehicles contribute to a reduced fuel consumption (new engines, energy-efficient driving).
- The vehicle capacity matches the forecast numbers of passengers in peak hours.
- The vehicle capacity and dimensions fit to most of the lines and not to one particular line only.
- Different sizes and types of vehicle may increase maintenance expenditures.
- The majority of the bus fleet should be of the same size. Buses of a different size should be assigned to lines according to specific characteristics (weight, power, length of line, passenger load).
- The vehicle size per line should be kept generally constant throughout the day even if ridership varies significantly, since frequent changes may result in ineffective operation and unreliable service.
- However, where the structure of the fleet allows different working regimes, exploiting this, e.g. by replacing articulated buses by standard-size buses or minibuses during off-peak periods (evenings, weekends), may increase passengers’ feeling of security in the vehicle and lower fuel consumption.
- The vehicle provides a reasonable standard of customer comfort and seat availability.
- The traction is environmentally friendly (e.g. engine standards of EURO 5 or higher).
• The vehicle has a high reliability. The vehicle is reliable and is available for operation when required.
• In case of a breakdown spare buses should be of an appropriate size.
• The vehicle is equipped with all required technical safety measures (e.g. emergency button).

Critical issues:
Strategies focussing exclusively on an efficient use of vehicles result in a less market-orientated service for passengers and may interfere with an attractive headway for the service or interfere with a regular interval timetable. Sometimes smaller vehicles (such as minibuses or midi buses) are used to solve this problem, but on the other hand, minibuses might not have enough capacity in peak hours.

Good practice examples:
• Ipswich (UK): Ipswich Buses Ltd uses a software suite called OmniBASE to enable it to schedule its vehicles and duties more efficiently, removing unproductive elements from driver duties as well as getting the most out of its fleet of buses, helping to reduce its running costs and vehicle requirements - effectively "tightening up" its operations. Its services operate strongly to regular clock face timetables and the company is strongly customer-focused. Ipswich Buses Ltd has a current Peak Vehicle Requirement of 60 buses with a fleet of 76 buses operating a network of 18 town routes and mixture of rural routes and school contracts.

References and background reading:


Related guidelines:
2.11 Size and capacity of vehicles
4.2 Monitoring the performance of operation
4.3 Operation control systems
4.6 Software tools for staff and fleet management
4.5. Communication with drivers

Minimise the need for manual communications between the driver and dispatcher. Integrate communications with other computer-based on-vehicle and network facilities in bigger cities. Implement hands-free communication connections for drivers.

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Explanation:

Generally, there is a need for the driver to be able to make contact with three groups involved in the process of bus operations:

- The dispatcher at the operational control centre or the urban bus manager at smaller networks (e.g. to report unforeseen occurrences such as breakdowns, disruptive passengers),
- Other bus drivers (e.g. to inform them about passengers transferring vehicles),
- Customers in the bus or at bus stops (e.g. to announce necessary route changes).

In the first instance, communication should be limited to what is really necessary, because any communication will interfere with the essential task of the bus driver, which is driving the bus safely and keeping to schedule as much as he can. The following features can be implemented:

- Automatic detection and reporting of problems (on-board vehicle diagnostic system)
- ‘Invisible’ button in case of emergency or a special emergency channel (e.g. disruptive passengers)
- Setting clear communication strategies in case of security problems (who has to be informed?) if there is no emergency button in use,
- Providing generally valid route instructions for drivers in case of slight deviations from the route (e.g. fixed alternative routes in case of traffic jams / accidents)
- Good passenger information in the bus (route plan, interchanges, points of interest, etc.)

The communication between the dispatcher and the driver is mostly one-way communication: the dispatcher provides instructions to the driver to follow. Communication with drivers is mainly made through radio data transmission, voice channels or mobile phones. The public transport company can also operate its own dedicated radio network (with mostly an analogue technique) or upgrade it to GSM. New GSM-based systems of driver communication are being introduced as part of larger systems with a number of other functions, integrating dynamic real-time information for passengers (on buses and at stops).
with improved facilities for operational management and control (information about transfer options with other modes, punctuality etc.).

**Communication with other drivers** can be made over cell phones or a radio network. Newer, more functional, GSM-based systems allow bilateral communication with colleagues in other buses. The larger operators tend to restrict driver-to-driver communication in order to avoid non-essential communication (e.g. private conversations), with communication between buses having to be done via the dispatcher.

**Communication between the driver and passengers** can be of the following types:

- Announcement by the driver to all passengers in the bus or at bus stops in cases where there are deviations from the timetable (e.g. due to a road closure),
- Enquiries by passenger (e.g. where to alight to reach a certain point of interest).

In both cases, reasonable knowledge of the language spoken in the city and region is essential. Furthermore, the driver should be reasonably informed about the public transport services in general (network structure, operating hours, fares, etc.) as well as the area served (e.g. points of interests in the city).

**Critical issues:**

Good knowledge of the local language is a precondition for being a driver in terms of internal communication (e.g. with operational control centre) or customer contacts. Consequently, there is a potentially significant barrier to appointing personnel from the international labour market in situations where there is a shortage of drivers in some countries in Europe.

The use of new electronic on-board devices (e.g. radio data transmission devices) requires special training for the driver.

The use of mobile phones while driving affects safety and driver performance. The safety risk from using a mobile phone during driving has been studied quite often; however, the results are controversial. Some studies reveal that there is a small number of fatal accidents caused by drivers using mobile phones (Pöysti 2005). Other studies conclude that hand-held mobile phones (when compared to a hands-free system) are associated with poorer driving performance (Haigney 2000).

**Good practice examples:**

- **Almere, Groningen (The Netherlands):** The operator Connexxion introduced ‘Infoxx’ – a system which incorporates a number of facilities including communication with drivers, real-time information for passengers etc. It is based on GSM.
- **Besançon (France):** In the city of Besançon, drivers are trained for internal communication as well as for external: the former is seen as a management tool.
- **Graz (Austria):** Data radio and text messages are the usual communication tools for standard communication between the dispatcher and the driver. Due to the fact
that the ITCS-system provides the dispatcher with the position of each vehicle, the need for direct communication with drivers is reduced to a minimum.

References and background reading:


Pöysti, Leena, Rajalin, Sirpa, Summala, Heikki (2005) Factors influencing the use of cellular (mobile) phone during driving and hazards while using it. Accident Analysis & Prevention, 37, p. 47-51

Related guidelines:

4.3 Operation control systems
4.6. **Software tools for staff and fleet management**

Consider using software tools for staff and fleet management. However, ensure that operational, ticketing and information software tools are fully tested before implementation.

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**Explanation:**

The goal of staff and fleet management is to **minimise empty vehicle kilometres** and to make effective work plans for drivers (known also as “rostering”). The available working time of driving personnel has several constraints through agreements of the employment contracts specific to each operator (e.g. only one shift per driver on one weekend) and by legal regulations (e.g. EU driving time regulation). Furthermore, the availability of the vehicle also has limitations (e.g. refuelling).

The optimal **assignment of drivers and vehicles** to a certain bus run is therefore a multivariate task which can be supported by software tools if a certain level of complexity (e.g. larger operating areas) is exceeded. For very small operating areas or where there are only a small number of lines the assignment is often made by experienced staff.

There are several commercial **software products for staff and fleet management** available on the market (e.g. HASTUS, Trapeze, MICROBUS, DIVA, CrewPLAN). Software tools for staff and fleet management can have different functionalities. The more simple software tools provide

- Timetable scheduling,
- Work planning for the staff
- Trip planning for the vehicles
- Graphical support to the dispatcher
- Various statistical post-processing features

The more sophisticated tools also carry out optimisations: the dispatcher must set the criteria and do the final fine-tuning.

All software tools also have some other functions integrated in a software toolbox. Examples of additional functions are:

- Export of data for operators’ accounting departments (e.g. drivers’ salaries)
- Import of real-time data (e.g. improvements to timetable planning).
Critical issues:

Especially in smaller cities it should be checked carefully which functions of a software tool for staff and fleet management are really needed, and if the commercial products available on the market really meet the needs of operation and management in the city. Smaller operators may do manual scheduling or contract out schedule production to software companies.

Furthermore, the life cycle of the software product also has to be considered. Advice and training, updates etc. should be available from the software company throughout the life of the system.

Good practice examples:

- **Epsom (UK):** The local operator in Epsom with a fleet of 50 buses uses subcontracting of duty schedules. The operator produces the timetables itself, and then sends them to a specialist scheduling software subcontractor, which provides duty schedules within days.

- **Stagecoach (UK):** The bus operator Stagecoach has a comprehensive routing system for 7,500 buses throughout the UK supplied by a specialist scheduling software company as a routing solution based on GIS and incorporating advanced planning and optimisation. The system works over wide-area networks. The contract was gained after a three month pilot scheme.

- **The Netherlands / Belgium:** The use of integrated and modular software for scheduling and operations is very common by Dutch and Belgian bus operators which usually serve larger operating areas (local and regional bus services). The software tool is also used for planning and analysis, as well as customer information purposes.

References and background reading:


Related guidelines:

4.2 Monitoring the performance of operation

4.3 Operation control systems
4.7. Staff recruitment and training

Prioritise staff communications and effective operational team management, as this is vital for staff retention, staff morale, and delivery of customer-focused service. Provide regular staff training courses for all employees.

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Explanation:

As Public transport is being increasingly developed as a service rather than a product, the human element tends to come to the fore; after all, the wellbeing of employees affects the wellbeing of customers. Staff communications and effective operational team management is especially important for bus operations.

Recruitment defines the selection process for new skilled workers (mostly drivers), and temporary employees. As there is a lack of specialist staff (especially drivers) in some countries the recruitment of capable candidates in the public transport sector is a challenge. A fundamental and essential phase for the success of a public transport provider is to recruit the right person, and the recruitment should ensure equal treatment of all applicants and take unbiased decisions. Nowadays the capability of a candidate is no longer assessed only by technical skills such as driving but principally by behavioural skills (being service-oriented, flexible, etc.)

Training policies are often expressed in financial terms but the level of investment does not always fully reflect the level of quality. All good professionals today can expect to dedicate at least part of their career to training (managers, maintenance workers, drivers, consultants, etc.). Also, the cost of training is relatively low in comparison with the total personnel costs.

Most companies have regular internal training programmes and traineeships for different kinds of staff and management jobs (drivers, service staff, etc.). Training programmes have to be organised and conducted professionally and take place in appropriate facilities. The training can be done by

- The operator (internal),
- Specialist education and training companies
- Suppliers.

Customers form their perceptions from the interactions with the front-line people in the organisation (UITP 2005). In this context, the training of bus drivers becomes important. Besides basic training of bus drivers required by law several operators provide extra training for bus drivers:

- Customer treatment and information,
• Conflict management (behaviour and influencing behaviour, mental and physical resistance, diversity of passengers and respect),
• Accessibility service for persons with disabilities.

An effective and economical method is 'train the trainer' principle, where company specialists undergo intensive training with the system supplier and then pass on their own knowledge in training courses to the company’s other employees.

It is essential that employees can contribute to developing and sustaining, constantly, a shift from an ordinary public transport provider to a mobility service provider offering high-quality transport services. Active bidirectional communication instead of bare information transmission leads to a transfer of the company’s values and objectives. Good communication structures are therefore vital in achieving improvements and raising the standard of the quality of services. Listening to the staff and considering their needs, e.g. by regular meetings with drivers, helps to discover information about problems that might need to be resolved soon.

Closely related to the field of training, the certification of staff can support the achievement of high-quality public transport standards.

Managers and drivers should be positive about the delivered service (having a ‘pro public transport attitude’). One example which serves to improve identification with their own service is a high regular usage of the service by personnel themselves, and particularly by managers. Another way to improve identification of all staff with the delivered service is to involve managers in daily operation for a couple of working days a year (e.g. driving buses 1-2 days a year themselves, selling tickets at sales office, etc.). In 72% of the cities analysed by PROCEED the bus drivers receive special training or instructions regarding customer contacts.

Common certifications of employees in public transport are described in ► Background information: Certification of personnel.

Critical issues:

To ensure lasting staff participation in a project, trust, respect and recognition of professional abilities and qualities is essential. Bearing this in mind, it is interesting to note that projects can happen within very different contexts but all generally need strong work recognition and a long-term vision to achieve their goals.

It is not always easy for the employees to adopt a customer-oriented behaviour since they are subjected to diverse stresses, including fatigue and security problems. In addition, it should not be forgotten that some disruptive passengers make it difficult for road-staff to maintain a professional attitude. It is therefore important to address at the same time the issues related to the quality of working conditions since customer satisfaction depends also on staff satisfaction (UITP 2002a). Ensuring a customer focus of drivers therefore requires permanent management of employees’ education, motivation and personal development.
Good practice examples:

- **Bregenz (Austria)**: The customer-friendly driver training consists of a brief guide to the city’s points of interest; how to help disabled people; how to operate electric ramps; first aid; safety and security aspects; and dealing with disruptive customers.

- **Brighton & Hove (UK)**: Management believes in riding the buses, seeing what goes on 'on the ground'. Senior management team members have a regular 3-hour 'walkabout' (at different times and network locations each week) to ride buses and to visit locations on the network where problems have been identified or improvements have been introduced. Some senior managers also drive buses for short periods on a regular basis, ensuring that they become familiar with problems faced by driving staff.

- **Chur (Switzerland)**: Drivers are trained in regular courses over 2-4 working days per year.

- **Donostia-San Sebastián (Spain)**: The transport operator’s staff members have the opportunity to attend special training sessions for about 8 days per year.

- **Graz (Austria)**: Drivers are trained in regular courses every 2-3 years.

- **Lausanne (Switzerland)**: The public operator in Lausanne has developed a project allowing drivers to set their own working hours. The result has been a 30 % increase in employee satisfaction and a 40 % reduction in absenteeism.

- **Ljubljana (Slovenia)**: All proposals and complaints that deal with driver behaviour are individually treated. The driver concerned is invited for a discussion, whereby the driver gives his statement. Every complainant receives a written or oral (phone) answer about the decision and action taken.

- **Schaffhausen/Neuhausen (Switzerland)**: Bus drivers can attend different seminars. Up to 8 days a year are provided for special training.

- **Sweden**: In Sweden there is a concept called "driver certificate". It has been developed by the Swedish public transport association, and is used by many public transport authorities. The certificate can be gained if the driver has successfully passed a course and a test. The course consists of different elements such as customer treatment, driving behaviour, drugs and alcohol regulations, tariffs etc. ([http://www.forarcertifiering.se](http://www.forarcertifiering.se)).

- **UK**: ROSCO (Road Operators' Safety Council, [http://www.rosco.org.uk](http://www.rosco.org.uk)) has an award scheme for the best bus drivers in the UK, mostly for accidents and conviction-free yearly driving.

References and background reading:


**Related guidelines:**

4.1 Management Structure
Certifications of employees in the public transport industry are used in the following fields:

**Certificate of Professional Competence (CPC):** From September 2008 new drivers should have a Certificate of Professional Competence (CPC) linked to the EU directive 2003/59/CE.

**Eco-driving** can be called also environmental, defensive driving, where the acceleration behaviour of driver is geared to reducing fuel consumption (The result is that fuel consumption was reduced by 2% reduction because of driver training (af Wåhlberg 2007).

**Customer-friendly driving** means training the drivers in knowledge about points of interest, dealing with disabled, disruptive customers etc.

**Health and safety certification:** National medical laws and rules define preventative or periodical medical examination for new and existing employees in the workplace. National safety certifications are set in order to prevent employee injuries and pollution of the environment.

**OHSAS 18001** is a specification for Occupational Health and Safety Management Systems and it certifies the health and safety aspects of business activities, while taking into careful consideration accident prevention, risk reduction and the well-being of employees.

**“Ergonomic law”:** The so called “Ergonomic law” of the European Commission is in preparation. It will harmonise national safety certifications concerning ergonomics.

**ISO 9241** - Ergonomic requirements for office work with visual display terminals covers a number of aspects for people working with computers

**Human rights of workers: SA 8000** (Social Accountability) is a global standard to guarantee the basic rights of workers, social responsibility and provide health and safety work condition.

**Maintenance, Cleaning, Management, Environment:** Quality certification such as the ISO 9000 family standards affects the training of staff in order to achieve higher quality service.
4.8. **Vehicle maintenance and repair**

Develop a cost effective vehicle maintenance strategy, e.g. by offering vehicle maintenance and repair services commercially to other organisations. Pay attention to the management of maintenance costs throughout the vehicle lifecycle.

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**Explanation:**

The maintenance and repair workshop is often located at a bus depot together with other operational facilities such as stores or the fuel station. The workshop has to provide maintenance for a large variety of vehicles, from several manufacturers and with a long life cycle. Workshop size and equipment is determined according to the number, size and type of rolling stock and the maintenance regime. The workshop can be separated into separate partitioned areas according to the service function (e.g. cleaning, preventative maintenance, greasing etc.).

**Workshop operation** includes:

- Vehicle checks (preventative maintenance),
- Cleaning,
- Regular maintenance / repair,
- Greasing,
- Materials and components stores,
- Registering of failures and repairs and providing other documentation (such as drivers’ service books),
- Communication with drivers and management,
- Activities for providing an environmentally-friendly bus service (e.g. cleaning with recycled water, waste management, reduced fuel and energy consumption, improvement of chemical treatment),
- Data supply and disposal (for ticket machines, on board units, counting units, …)

Some technical terms are explained under ► **Background information: Strategies for vehicle maintenance**.

The maintenance and repair of vehicles does not necessarily need to be performed by the operator itself. Where the fleet is small, **in-house maintenance** is not generally cost effective, since the required investment (staff training, spare-parts acquisition) is not justified. Another solution can be to perform only maintenance work in-house, whilst larger repairs such as engine repairs are provided by the vehicle supplier or by outsourcing. On the other hand, if
the operator owns a well-equipped workshop itself, it can offer maintenance and repair services to other public transport fleets (e.g. a regional bus operator), large road haulage firms, municipalities and coach or taxi businesses. An increasing number of manufacturers offer their vehicles through a contract which includes maintenance activities as well. There are different types of this model in action (e.g. maintenance and repair is done in the manufacturer’s workshops whereas maintenance and repair remains with the operator but the cost is refunded by the manufacturer).

**Technical staff** must be appropriately qualified in order to ensure that systems operate correctly on a long-term basis without failure. Training is mainly carried out by supplier companies and should be organised in a regular annual programme.

With larger fleets the need for **electronic data transfer to and from vehicles** (e.g. ticketing machines, passenger counts, software updates) increases. The automation of such procedures in depots saves much time and money. Options include communication via W-LAN during overnight hours when vehicles are parked in depots.

Strategies of handling individual vehicles as **individual cost sites** help to monitor and to individualise problematic vehicles in the fleet.

The adoption of a **quality management system** according to ISO 9001:2000 is a strategic decision for maintenance work. The workshop certification gives a trading advantage in competition with other workshops and - where the workshop is part of a transport company - it can also be a good beginning for the company’s overall certification scheme.

**Environmental aspects** should be integrated in the planning phase of new workshops.

**Critical issues:**

Advanced maintenance regimes require sophisticated high-technology equipment and staff training. To provide and control a qualitative maintenance service the information flow between different personnel and sections is important. An optimum workshop management and organisation is the best organisational balance between product (the vehicle being ready for operation), staff (work conditions, training, safety etc.) and stakeholders’ concerns (costs, audits etc.). This balance is different in all organisations.

**Good practice examples:**

- **Almere (The Netherlands):** The Dutch company Connexxion transformed its maintenance department into an independent company (Techno services Nederland BV). This manages and maintains the fleets of public transport companies, large road haulage firms, municipalities, and coach and taxi businesses. It has a network of 51 workshops including five repair shops, together with a central parts store which supplies all the division’s workshops with parts on a daily basis.

- **Fribourg (Switzerland):** The bus station, at street level behind the railway station, is equipped with an underground maintenance and depot level just under the bus station (Figure 4-1).
• **Piešťany (Slovakia) / Tabor (Czech Republic):** Maintenance is offered for other fleets (e.g. lorries) and positive results are reported from both cities.

• **Schaffhausen/Neuhausen (Switzerland):** Schaffhausen signed a service contract that allows it to test and to implement new products of the supplier. Furthermore, the operator broadened the services to other fleets.

**References and background reading:**

EN 13306:2001 Maintenance terminology

BS 3811:1993 Glossary of terms used in terotechnology (the economic management of assets)

**Related guidelines:**

4.1 Management Structure

4.9 Strategies for vehicle checks and cleaning

4.10 Vehicle parking area (overnight)
A maintenance strategy is a maintenance method used in order to achieve maintenance objectives (EN 13306:2001), while the policy describes the interrelationship between who is to carry out maintenance, where to carry out maintenance and the set of actions to be carried out (BS 3811:1993).

Maintenance objectives are assigned targets accepted for the maintenance activities (EN 13306:2001). These targets may include e.g. availability, cost reduction, product quality, environmental protection, safety. The main goal of a dedicated workshop is to increase the bus availability and reliability.

Over the years several models and methods for good maintenance have been developed to measure and support fleet performance:

- **Curative / Corrective maintenance**: Equipment and facilities are maintained, when a failure has already happened.
- **Predictive maintenance**: helps determine the condition of in-service equipment in order to predict when maintenance should be performed.
- **Preventative maintenance**: Equipment and facilities are maintained at regular intervals in accordance with the instructions, to prevent failures before they occur or before they develop into major defects.

Also, in recent years on-board auto-diagnostics and reliability-centred maintenance, on-line transmission, work tracking and cost control have been introduced by bigger operators in larger areas.
4.9. Strategies for vehicle checks and cleaning

Develop regular preventative maintenance and cleaning regimes, with a formal fault-logging and repair process.

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<td>X Operations</td>
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**Explanation:**

Strategies for vehicles checks can be regarded as an efficient set of procedures for **predictive-preventative maintenance**. For bus fleet maintenance two separate procedures can be defined:

- Management of breakdowns of running buses (it depends on the seriousness of the breakdown),
- Workshop operations (time of repair depends on the seriousness of the breakdown, preventative maintenance, providing reports on failures and repair protocols)

From the management point of view, it is possible to identify different methods for on-line team assistance and for workshop operation team assistance, while from an economic point of view, it is possible to evaluate and manage the possible outsourcing of maintenance (Carrese, Ottone 2005).

**Systematic vehicle checks** with clearly assigned responsibilities result in a reliable service.

Checks of the vehicle interior and exterior can be done by the driver, or by authorised personnel from the operator or the public transport authority. Passengers may also report their observations if these have not been picked up by the regular official checks. Obligated periodical checks are fixed by the predictive / preventive maintenance policy of the operator and / or bus manufacturer instructions.

Since the 1980s vehicle checks have been upgraded with computer-based maintenance **management systems**, which enable a clearer database structure, automatic decision support systems, diagnostics, etc.

The aim of a **cleaning strategy** is to provide a high-level cleanliness of the bus fleet and bus stops. In order to deliver that an operational cleaning plan should be approved. The operational cleaning plan should describe the implementation of cleaning standards, quality assurance, training, communications, equipment and material, health and safety aspects. Cleaning as a high-quality feature can be organised according to the following types of cleaning procedures:
• Integrated periodical (e.g. daily dry cleaning, weekly wash and complete disinfection, and replacement of broken parts every six months
• Segregated periodical (e.g. floors and stairs washed weekly, windows washed every 15 days)
• Extraordinary cleaning (e.g. when reported by driver).

In order to meet environmental goals, vehicle bodies (exteriors) can be washed with recycling water and detergent without chemicals, etc.

**Critical issues:**

Periodical checks can become a routine. Therefore, measures have to be undertaken to avoid deviations from high-quality standards.

Improved maintenance also means larger investments and staff training.

Damage, soiling or graffiti should be repaired or cleaned as soon as possible, because the vehicles are the ‘business cards’ of the PT operator (this is also a marketing issue).

When ordering new vehicles, the use of easy-to-clean materials should be considered. Since manufacturers often provide a large variety of configuration and equipment details, the operator should be aware of ordering possibilities regarding difficult-to-clean interior elements (e.g. carpeted floor).

**Good practice examples:**

- **Coimbra (Portugal):** Coimbra applies a policy on clean buses. Fleet renewal has taken place with an emphasis on clean and accessible vehicle technologies.

- **Dundee (UK):** Travel Dundee contracts out bus cleaning, with buses being swept out and mopped, and ledges and the driver's cabin all cleaned each night. Every 4 weeks there is a special clean, focusing particularly on seat cushions and windows. There is also a thorough annual inspection, which involves the buses being stripped, roofs cleaned etc. A cleaner is also employed by Travel Dundee to sweep some buses at major terminal points during the day. If a bus gets particularly dirty en-route the cleaner may well go out to it or the bus may be changed for another. Also the night fleet supervisor will check the cleanliness of 10% of the fleet each night.

- **Dordrecht (The Netherlands):** A fast repair of damages and / or removal of other graffiti is usually performed (if possible within 48 hours).

- **Graz (Austria):** A special group of employees is responsible for the maintenance and cleaning of the bus-stops; this group makes regular inspections.

- **Győr (Hungary):** Periodical checks and cleaning (with a requirement that the number of journeys lost because of vehicle failures should be less than 1%).

- **Monaco:** Buses are cleaned inside and washed outside every day, as part of the very high quality expectations of the network.
• **Leuven (Belgium):** A special policy on graffiti removal is applied. The removal of any racist graffiti is especially performed as a priority (normally within 24 hours).

• **Toledo (Spain):** Periodical checks and cleaning. The buses are washed and cleaned daily (exterior automatic washing, interior vacuuming, and cleaning of seats, and holders), floors and stairs washed weekly, glasses washed every 15 days, a complete disinfection and replacement of broken seats or parts every six months.

**References and background reading:**


**Related guidelines:**

3.3 Tendering of services

4.1 Management Structure
4.10. Vehicle parking area (overnight)

Plan vehicle storage facilities for efficient operations and to protect vehicles. Integrate maintenance and cleaning departments in bus depots.

(1) Target Stakeholders
- Decision makers
- Public authorities
X PT operators

(2) Planning Level
- Master plan & political decision
- Market analysis
- System planning
X Operations

(3) Guideline Impact
- Basic service
- Quality upgrade
X Organizational improvement

Explanation:

Options to park vehicles can be:

- In a bus depot where cleaning, maintenance etc. can also be provided (in smaller cities one “central” depot is the norm). The bus depot is used also for reserve (‘spare’) buses.
- On special bus parking lots.
- On turning points or on the street (at the end of the line).

There are two main criteria for overnight parking with respect to minimisation of empty vehicle kilometres; however, they are in opposition:

- Parking of vehicles at a central depot reduces empty vehicle kilometres for performing maintenance and cleaning at the workshop (e.g. overnight).
- Parking of vehicles at turning points reduces empty vehicle kilometres for the first morning and the last evening trip.

There are further criteria (e.g. security, open-air parking vs. under cover), which requires an analysis of the respective cost and benefits of each. Examples are:

- In areas with colder climate conditions pre-heating facilities at a depot that minimise the warming up time in the morning should be considered. The vehicles start in the morning with pre-heated engines (no warming up time with high engine drag) and cabins (no passenger complaints that the bus is freezing cold on the first run).
- Start and end point of the driver’s shift should be at the same place whenever possible.

Urban buses are predominantly parked in bus depots, which are also the maintenance and cleaning area, while in regional bus transport it is more often the case that the vehicles are parked on turning end points. At the depot vehicles can be parked:

- In the open air (widespread e.g. in Belgium, Greece, Slovenia),
- Under cover (widespread e.g. in the UK, Germany, Switzerland).
**Critical issues:**

When parking the vehicles at turning points, the **issue of security** (vandalism, damage, fuel theft) arises. Furthermore, if the parking area at the turning point is a part of the public road or even a street in a residential area, there may be opposition from nearby residents.

**Good practice examples:**

- **Larissa (Greece):** In Larissa (Figure 4-2) there is at the outskirts of the city a large area owned by the public transport operator where apart from overnight parking of the vehicles, facilities such as vehicle refuelling, maintenance and washing are also provided for all vehicles of the fleet.

*Figure 4-2: Vehicle refuelling, maintenance and wash area in Larissa (Greece)*

- **Switzerland:** In general the buses are parked in the bus depot overnight under cover because of the weather. Buses are generally cleaned every night and smaller maintenance actions can also been done in the early hours. Having the bus in the depot avoids acts of vandalism. The drivers usually start and end their work at the bus depot.

- **The Netherlands:** In The Netherlands the bus depots are generally located centrally in the region served (minimising depot kilometres i.e. empty ride kilometres). Besides cleaning, repair services are also carried out at the depot.

**References and background reading:**

- **Related guidelines:**
  4.4 Strategies for efficient use of vehicles
  4.8 Vehicle maintenance and repair
  4.9 Strategies for vehicle checks and cleaning
5. GUIDELINES ON “MARKETING”

5.1. Knowledge base about your (potential) customers

Develop marketing strategies based on your knowledge about the needs, expectations and perceptions of your current and future regular customers.

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Explanation:

Marketing requires a shift from supply-oriented to customer-oriented management. In-depth knowledge of the ‘customer’ is a necessity for this. It is not a fixed, isolated task, but marketing is part of a constant cycle in which there are 4 central elements as described below:

1. Analysing basic external data of trends and clients: Marketing ideally starts with a solid analysis of the situation of the market and the organisation. One of the most critical elements of the external (market) analysis is detailed information about (potential) customers. In other sectors – for example the car manufacturing industry – in-depth market research is a common feature. Suppliers in that industry use this market information in their whole PPPP (product, price, place, promotion) cycle. In public transport marketing is less common. For service marketing such as PT 3 extra Ps can be used (process, personnel, politics). See Table 5-1

Table 5-1: The 7 ‘P’s in PROCEED’s case study cities

<table>
<thead>
<tr>
<th>The 7 ‘P’s</th>
<th>Summary of PROCEED’s case study results</th>
</tr>
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<tbody>
<tr>
<td>Product:</td>
<td>Most case study cities put a high emphasis on the quality of the public transport product: safe, quick, reliable, comfortable etc. Many case study cities offer special services for specially identified target groups: facilities for disabled people, school buses, Park &amp; Ride buses, complementary services with other modes, etc.</td>
</tr>
<tr>
<td>Price:</td>
<td>All case study cities offer special discounts, and special tariffs focussing on special target groups.</td>
</tr>
<tr>
<td>Place:</td>
<td>Number and location of bus stops, main interchange points, ticket sale points, the public transport network itself. All these ‘place’ aspects are carefully planned in most case study cities, on the basis of available knowledge of the local public transport market.</td>
</tr>
<tr>
<td>Promotion:</td>
<td>All case study cities have an information strategy regarding ‘before …’, ‘during …’ and ‘after the journey’ information, advertising, etc. and accompanying material.</td>
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<tr>
<td>Process:</td>
<td>In Public Transport production and consumption of the service takes place at almost the same time. This means that much emphasis has to be placed on the process: the processes regarding ticket sales, information provision, handling of complaints, etc. have to be optimized.</td>
</tr>
</tbody>
</table>
Personnel: Personnel comprise a very important element of the PT service. Pleasant personnel with an eye for customer wishes, a driver who drives smoothly and safely, and accurate information, are all aspects which contribute to a positive image of the PT system.

Politics Although one can discuss whether ‘Politics’ should be one of the 7 Ps it is obvious that politics has a substantial impact on PT: pedestrian areas in inner cities, traffic management, planning of new business in residential areas, etc. are the result of political decisions.

2. Analysing the internal performance of the company: Regularly measuring customer satisfaction and the development of the number of passengers is important, but is only part of the information needed to know your customer and to identify their future needs and expectations. Other information needed is:

- Where do they live?
- What are their socio-economic characteristics (students, young families, elderly)?
- Where and how do they travel and for what purposes, what is their lifestyle and what are their values and attitudes?

There are many methods and sources that can be used to answer these questions and these are described in more detail in guidelines 1.1 Basic analysis, 1.2 User needs and expectations, 1.3 Market analysis / Monitoring of demand.

3. Segmentation, targeting, making choices: The ‘public transport customer’ does not exist; neither does the ‘car user’: Some car users are more likely to become frequent public transport users than are others. Given the different characteristics, needs and demands of the heterogeneous group of current and potential customers the market should be divided into segments. This enables a rational decision about the composition of the marketing mix and allows for a focussing of marketing efforts and campaigns on the most promising groups.

Many campaigns focus on price and the relative speed of public transport compared to the car (in peak hours). Of course these are important aspects, but real insight into the attitudes and values of the most promising current car users might show that other aspects such as reliability, ease and comfort (with no need to waste valuable free time waiting in a garage) are important aspects as well.

One should determine the segments based on different expected responses to changes in the marketing mix. For example, passengers in one segment might demonstrate a very strong response to a lower price whereas passengers in another segment are more sensitive to changes in quality of the buses. One can define the segments as follows:

1. Define the main segments or target groups: e.g. students, commuters, business travellers, shopping trips, recreational trips
2. 

Specify sub-segments: e.g. incoming and outgoing commuters, ‘recreational’ shopping trips to the city centre and daily shopping trips etc.

Criteria for defining the sub segments are:

- The different sub segments should have clearly distinct characteristics.
- The size and the characteristics of the segment have to be measurable.
- The size of the segments has to be large enough to justify a specific marketing approach.
- It must be possible to tailor a specific marketing strategy to the segments.

3. 

Select the most promising target groups: Because not every segment offers the same potential and because financial resources are not unlimited, the organisation should then choose those segments which offer most potential: the target groups. Before this selection can be made information about the different sub-segments has to be assembled and analysed (either using existing information, or by conducting new market research).

Possible selection criteria are favourable demand characteristics (for example off-peak travellers), needs and wants that are not being satisfied, or the opportunity to compete effectively and profitably.

Further insights are given in ► Background information: Market segmentation.

4. Implementing Strategies: The last step is dedicated to the implementation of the strategies which result from step 1 to 3, and - if necessary - these steps can be returned to as part of the circle.

Critical issues:

In most cities analysed by PROCEED marketing activities are the sole responsibility of the public transport operator. This could make sense since marketing concerns the whole P.P.P.P. cluster, not just one aspect. On the other hand, in the cases when public transport is tendered the operator is only responsible during the contract period. The public transport authority has broader and long-lasting responsibilities. In order to guarantee that both the short term financial-organisational objectives as well as the mid- and long-term policy objectives are fulfilled the main outlines of the expected marketing efforts (including market analyses), both by the operator and by the public transport authority, can be specified in the tender and the contract.

Good practice examples:

- Luzern (Switzerland): The transport operator and the municipality conduct a market study on different transport related topics, such as “options for a change in travel behaviour”, “potential for public transport” and “mobility behaviour”. This survey includes users of all transport modes. To gain an insight on customer needs
and opinions the transport operator investigates customer satisfaction every second year.

- **Stagecoach (UK):** Stagecoach is a multimodal transport group that operates buses in various UK locations. Its Customer Insight unit has stratified the market for bus travel according to socio-economic categories and pioneered the use of direct mail and telemarketing to sell bus travel in the UK, based on identifying socio-economic target groups that are judged as willing to consider switching to the bus mode. The small team of 20 people claims to have generated 4.2 million additional trips a year on Stagecoach’s buses across the parts of the UK where it operates. Importantly, it is estimated that more than half of these trips would have otherwise been made by car. With careful selection of target groups, the team has found that people are often keen to hear from their local bus company, and claims to have a one in three chance of converting a fresh contact into a bus user. By telling people about the service, where it knows that the product is already good, Stagecoach finds that it is removing the major hurdle to using the bus - the fear of being embarrassed.

- **Sweden:** All public transport authorities participate in the national barometer scheme called “Kundbarometern”. A number of inhabitants in each public transport region are asked monthly questions about the services, the information etc. As many public transport authorities have been members in the scheme for several years, it is possible to see the development throughout the years. Many public transport authorities perform customer surveys (customer satisfaction, counting etc.) in the buses / at bus stops once a year. There is also an ongoing planning of the transport system with the help of traffic survey data (daily trips) from the ticket machines (electronic cards). On some occasions the region or public transport authority performs a regional travel survey by using postal questionnaires for a selection of inhabitants.

- **Vilnius (Lithuania):** Public transport operators interview passengers about their age, origin destination points of the trip, and about their needs for the trip by public transport.

**References and background reading:**

UITP (2002a) Marketing as an investment in greater client, satisfaction and better benefits.

**Related guidelines:**

1.1 Basic analysis
1.2 User needs and expectations
5.2 Customer feedback
**Background information: Market Segmentation**

A basic strategy in marketing is to carry out a segmentation of the market. No single customer is alike, but some have related wishes and can be treated as such. Normally, when a market is segmented, each will have to be provided for by its ‘own’ service (aimed principally at that market segment but not necessarily restricted to use only by that group) and sometimes its own brand. Market segmentation is ideally related to individuals that have certain values in common.

In a segmentation of the market a company singles out target groups that can easily be defined in quantities and qualities. Data, client monitoring and strategic choices on a company level are logical counterparts of a strict segmentation of the market.

Running public transport based on a segmentation of the market is not easy. Public transport is based on a compromise: a service based on the most common denominator that is just acceptable by most customers. A common market segmentation in public transport is between commuters, elderly, shoppers, etc. This segmentation is not related to common values but to common characteristics (at that moment of the day). An elderly person can commute, do shopping. This segmentation is, above all, practical.

Looking at segmentation in public transport it is necessary to distinguish between the bus lines and the other services:

- Bus lines should be seen as a standardised service, without too much differentiation between persons, only differentiation in areas and places. Exceptions to this general practice are the special transport for elderly and disabled that is a common feature in many European cities. Some major cities have special public transport lines for regional schools that only run during school times. Bus lines that serve business areas are normally treated as standardised public transport. Dordrecht (120,000 inhabitants) is an example of a Dutch city that – some years ago – tried to base its whole public transport strategy on market segmentation. Besides regular bus lines, an express- and service network were introduced. This experiment failed: the reduction in travel time on the express network was limited, the small streets in the old residential neighbourhoods were often problematic for the service buses and the system was hard to comprehend. Probably the city was too small for this segmentation.

- Market segmentation in public transport is useful when it comes to ticket arrangements or special means of communication. The operator can co-operate with attraction centres, local business or major schools to offer them special sales arrangements, and special incentives for annual pass holders (Spain, customers clubs in Sweden).
5.2. Customer feedback

Establish a structured customer feedback management as a basic element of Customer Relations Management and service development.

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Explanation:

Customer feedback on suggestions, comments and complaints is a very important element of customer relations management. A complaining customer who feels treated in a fair way will most likely stay a regular user. The suggestions, comments and complaints also provide valuable information for the operator and the public authority about the image and performance of the public transport system. The information can help to improve customer satisfaction and provide very useful information to the operator or public transport authority so as to improve the service.

Customers should be informed about their customer rights (e.g. UITP passenger charter). The charter is not only a catalogue of customer rights, but a kind of marketing instrument outlining what the customer can expect.

In the UITP’s Passenger Charter (UITP 2006) it is stated that operators should:

4. Provide information about how customers and potential customers can contact them to make their views known.

5. Handle customer suggestions and complaints as quickly as possible, preferably with a response time within three weeks as a maximum.

6. Give reasons for acceptance or rejection of the comment or complaint.

It is important to provide information to customers on the website and other information material on the way that complaints, comments and suggestions can be submitted and the information and the details needed (e.g. date, time, line, station / bus stop, vehicle, contact phone number or address).

Usual reaction times of operators on suggestions, comments and complaints are often set to one week, although UITP’s passenger charter mentions a longer period of time. Not every customer reaction can be solved immediately, but some need further investigation which might take longer. In these cases, the customer should be informed individually about a later response and the reason for it. As the UITP passenger charter outlines, it is important to tell customers what has happened with their suggestion, comment or complaint. This signals to the user that his / her concern has been taken seriously.

Publishing the customer complaint and feedback policy through printed advertising material and the Internet is a good customer service. This handout to customers can describe:
• How and where complaints can be submitted (phone, email, post).
• The information needed when customers want to submit a complaint or suggestion, such as the date, time, line, station / bus stop, contact phone number and address.
• The topics on which complaints / suggestions can be made.
• The way (procedure) in which the complaint will be handled.
• The reaction time within which a decision / comment on the complaint will be given.
• Any option about how to appeal against the decision.
• Privacy guarantees regarding the submitted customer information.

In case of tendered services, it is useful to specify the **customer feedback policy as part of the contract** with the operator. Providing a regular report to the public transport authority and the management of the operator about the received user complaints, comments and suggestions is good not only for monitoring purposes but also for improving the service according to the customer needs.

**Critical issues:**

All public transport operators receive complaints and suggestions, either by phone, e-mail, at the Customer Service Centre or through the bus drivers. However, there has to be an *official* procedure about how the complaints and suggestions are registered and how the follow up and feedback is done. Otherwise, there is a danger of dissatisfied customers and of valuable information for improving the service getting lost.

**Good practice examples:**

- **Brighton & Hove (UK):** Response to customer complaints and inquiries is given straight away on the same day. This is part of the Bus operator’s Managing Director's "10 top tips for delivering excellent customer service" published in the UK's "Transit" industry magazine. Others include "Quickly admit when things have gone wrong. People like honesty and accept mistakes can be made", and "Use complaints and feedback to set the future business plan. It works!" (French 2007).

- **Groningen (The Netherlands):** If customers have a complaint about the service they can first contact the operator, Arriva, who will register the complaint. Within two weeks Arriva has to answer the customer about what will or has been done with the complaint. If the customer is not satisfied with the answer there is the possibility of having the complaint officially registered by the public authority 'OV bureau Groningen-Drenthe' who will contact the operator (i.e. Arriva). Arriva has to periodically submit to the OV bureau an overview of the complaints received and the way these are handled. The number of justified complaints is part of the bonus / penalty.

- **Helsingborg (Sweden):** Complaints and comments can be reported by bus drivers or by passengers on the web site, by post or by phone directly to Skånetrafiken.
Skånetrafiken uses the Boomerang customer feedback system. This is a database where feedback is recorded in a structured way. In a first step the feedback is typed into the database by employees of the public transport authority. In a second step the Boomerang-system automatically sends the feedback to the right planner / division in the public transport authority, which has to answer the customer within a certain period of time.

References and background reading:


Related guidelines:

1.1 Basic analysis

1.2 User needs and expectations

5.1 Knowledge base about your (potential) customers
5.3. Board of customers

Establish a board of customers and use their advice in planning and evaluation of performance of the system and complaints.

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**Explanation:**

A High Quality Public Transport system is one that fulfils as far as possible the (potential) **passengers’ needs and expectations**. An advisory board of customers or a customer panel can be of great assistance in creating and maintaining HQPT. Given the local knowledge and contacts in the community, they can both provide valuable input from the (potential) user’s perspective and at the same time communicate and promote the bus transport system to the (potential) user groups they represent.

The board can be asked to give **advice and comment** on all aspects of the public transport system: planning, performance of the system and evaluation of complaints and suggestions. It depends on the local circumstances which organisations or individuals should be involved.

**Possible members** of a board of customers can be seen in the following organisations / groups:

- Public Transport Passengers Organisations: In many EU countries there are clubs of public transport users. On the European level they are represented by the European Passengers Federation (EPF). Very often the national public transport passenger organisations have regional / local branches. Given their expertise in the field of public transport and their knowledge of the passenger needs they are helpful partners.
- Chambers of commerce,
- Trade unions,
- Organisations of elderly and / or handicapped persons,
- Major employers or schools,
- Organisations of car owners, like ADAC (Germany) or ANWB (The Netherlands)
- Non-organised regular users: individual passengers (e.g. season ticket holders) will provide information from their daily experience with the public transport system.
It depends on city size and the local circumstances who is invited to take part in a board of customers and which strategy to select representatives is applied. In bigger cities it can be advisable to go for non-organised individual members only to gather a representative profile of everyday users and to tone down pressure groups. The participants can be recruited by public announcement in newspapers or in vehicles. Based on their application, a segmentation based on different criteria (sex, city district, age, occupation) is made to get a representative profile of users.

**Further approaches** to maintain public relations with users as well as special interest organisations can be:

- Regular meetings between the management and organisations with special interest in urban bus services (organisations as given above, where applicable: representative of political parties),
- Introduction of a user group of one line or corridor,
- Regular workshops between management and citizens in city districts.

**Critical issues:**

A board of customers bears some risk of unbalanced discussions among representatives, because experience shows that certain user groups (e.g. rail enthusiasts, PT user associations) tend to dominate the discussion. It is reported that single persons involved in such a board tend to overestimate their role with regard to decision-making or consulting.

In order to create a positive and long lasting involvement of the board of customers, a co-ordinator of the board should be assigned, responsible for the regular meetings, information exchange etc. The co-ordinator has to communicate clearly the role of the board which is defined as an advisory body in terms of a customer perspective.

**Good practice examples:**

- **Oxford (UK):** The 'Oxford Bus Company' set-up a Stakeholder Board to create a forum for anyone with a stake in the business. Management, staff, unions, customers, local authorities and even major employers within the city are invited and encouraged to attend. This example is not part of the PROCEED case study analysis.

- **Sweden:** Many Swedish public transport authorities have a board of customers, who meets regularly to discuss important issues. In Jönköping, there is a special board dealing with security issues.

- **The Netherlands:** In The Netherlands in each public transport region (12 provinces and 7 larger city regions) there is one regional public transport platform (= board of customer organisations), giving advice (both requested and unsolicited) to the public transport authority. There are several local and regional consumer organisations involved. The obligation of installing a regional platform of consumers is regulated in the national Public Transport law.
• **Translink (UK):** The organisation, which operates nearly all public transport in Northern Ireland, has set-up nine regional, independently-chaired passenger groups which meet regularly to give feedback on bus and rail services. Each member of a group fills in a questionnaire every week about their travel experiences. The input both from the meetings as well as from the questionnaires is used to improve the services. This example is not part of the PROCEED case study analysis.

**References and background reading:**


**Related guidelines:**

1.2 User needs and expectations

5.2 Customer feedback
5.4. Travel Guarantees

Establish a travel guarantee regulation providing help or compensation to customers in the case of delays, missed connections, wrong information, or other shortcomings in order to increase the attractiveness of your service and customer satisfaction.

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Explanation:

Even in the case of High Quality Public Transport **things can go wrong**. Buses can be delayed because of traffic jams or accidents, or the service can be totally cancelled. In that case travel guarantees can assist in keeping the ‘goodwill’ of public transport customers.

In the case of **delays or cancellations** passengers should be adequately looked after and informed. If the operator fails to provide passengers with the necessary assistance, passengers should have a right to obtain compensation. In 34 % of the cities analysed by PROCEED there are such guarantees in the form of a refund of the ticket price, the corresponding taxi fare, a day ticket for free, the cost of making the trip by their own car etc. In many cities (for example in Sweden and Germany) the limit for the travel guarantee is set at 20 minutes delay or more.

**Further travel guarantees** may provide compensation in the following cases:

- Missing co-ordinated connections (only rarely found, sometimes restricted to the last run of the day),
- Damage to clothes while travelling in a vehicle,
- Wrong information provision.

The **procedure for a travel guarantee** should provide the following characteristics:

- Adequate compensation (preventing the compensation being regarded only as ‘symbolic’)
- A clear regulation (describing what is compensated and what is not)
- Easily obtainable by the customer (simple application e.g. by Internet)
- Manageable clearing costs for the operator (standardised process, low handling costs)
- Authenticity of claims to be capable of being tested (verification of incidents e.g. by performance data).

A travel guarantee has to be regarded as a **marketing tool** to stress the service orientation of the operator, with controllable financial impacts at least for urban bus systems. For that reason, the travel guarantee has to be publicised by marketing campaigns to make it well-
known to all users. All Swedish Public Transport Authorities have already voluntarily adopted a travel guarantee, ensuring passengers’ rights of compensation.

In its recent proposal for a regulation on passenger rights in bus and coach transport COM(2008)817 (Brussels, 04.12.2008), the commission proposes the following rules in the case of cancellations or long delays (longer than 2 hours). Although such heavy delays are not relevant in local public transport, the general rules can be applied accordingly. According to the proposed regulation, in the case of long delays passengers should:

7. Be offered alternative transport services under reasonable conditions or, if that is impractical, be informed of adequate alternative transport services of other transport operators;
8. Receive reimbursement of the ticket price unless they accept alternative transport services referred to in point 1.;
9. Have the right to compensation amounting to 100 % of the ticket price if the bus and / or coach undertaking fails to provide alternative services or information as referred to in point 1.

Whilst the desirability of having a legal requirement for compensation is a matter of controversy within the public transport sector, we would argue that from a marketing and customer-relations perspective there are many reasons why operators and public transport authorities should have their own well-advertised travel guarantee policies, appropriate to their particular situations.

**Critical issues:**

A travel guarantee may imply a double penalty for the operator concerning the same deficit in quality: (1) the travel guarantee in relationship to the customer itself, (2) a malus system agreed in a contract with the respective authority. Both approaches should therefore be implemented in a co-ordinated manner.

A different financial impact on different types of service should be acknowledged, especially in connection with tendered services. While high-frequency urban bus services tend to have no delays in terms of the provided travel guarantee (frequency is above the travel guarantee’s threshold), cases of compensation will occur more often in regional rail or bus services with lower frequencies (below the travel guarantee’s threshold).

**Good practice examples:**

- **Bergamo (Italy):** In the case of delays of more than 30 minutes, the operator will refund two tickets with the price of the trip. In cases of necessary use of a taxi, 5 tickets are refunded.

- **Euskirchen (Germany):** The urban bus service in Euskirchen applies a travel guarantee (‘Pünktlichkeitsgarantie’ / punctuality guarantee) compensating heavy delays: If the service is more than 20 minutes late, the operator will refund a taxi ride. The travel guarantee is applied by all public transport operators within Greater Cologne public transport association. In some other areas in Germany a refund is
provided for damage to clothes while travelling in a vehicle (refund of dry-cleaning costs).

- **Gävle (Sweden):** Refund or value card (up to the value of the corresponding taxi fare) is the way of compensating for shortcomings in (a) keeping to the timetable (time loss >20 min), (b) providing information to the customers, (c) treating the customers, (d) cleanliness and tidiness in buses. This constitutes a well-marketed travel guarantee.

- **Ljubljana (Slovenia):** In a case of bus delays of more than 15 minutes caused by the operator, the passenger can receive a ticket refund. The travel guarantee is provided in accordance with the national Slovenian road transport law. As the bus frequency of the network is relatively high (3 to 6 minutes), delays of more than 15 minutes are rare.

- **Luleå (Sweden):** The Luleå urban public transport operator LLT has a travel guarantee consisting of four promises: 1) You can trust the timetable. 2) You get all the necessary information that you need. 3) When you are delayed by at least 20 minutes you may be entitled to compensation or reimbursement, e.g. for a taxi ride. 4) Customers contacting LLT are always treated in a friendly way. The travel guarantee is not valid at times of extreme weather conditions or strikes.

**References and background reading:**


**Related guidelines:**

4.2 Monitoring the performance of operation

5.2 Customer feedback
5.5. Customer information centre

Establish well-run customer information centres that are easily-accessible and visible to all local citizens and visitors.

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**Explanation:**

Before the Internet or mobile phone, a customer information centre was the logical focal point of the services related to local public transport. Customer information centres are located at the central interchange points, places not only visited by public transport passengers, but also by many less regular public transport users. There is no reason why such visibility of local public transport should be less in modern times, though it may take different forms from previously:

- There is always a need for special services at central public transport interchange points (bus station and / or railway stations). Some travellers are not familiar with public transport or not always capable of understanding the information provided, or how to use ticketing machines.

- Not all customers of public transport are in possession of the internet or a mobile phone (as they also may not have a car).

- Other selling points (‘Tobacco shops’ or ticket machines) may not provide all services or give all information unless they are specifically charged with this role and equipped to provide it.

- Being visible in a central place is very important for public transport that takes its customers and branding seriously. The commercial value of a customer information centre in this area could not be overstated.

Regarding financial issues, operating a customer information centre can be costly. In many cases public transport related services are therefore combined with services such as tourism information, ticket office, municipal services, receiving complaints, rest area for drivers, etc.

When selecting staff for services at customer centres it should be realised that the personnel need a high-service orientation and a good knowledge of the area.

The provided information should be of added value for the users, e.g. information including all kind of transport modes, and providing information on leisure activities with bus and rail. An enhanced timetable information database including all public transport services in the area (not only urban bus, but also regional bus and rail services) can be regarded as a backbone of the information service.
Customer centre **opening hours** should also coincide with main retail hours rather than with (shorter) office hours, so that the centre is open when potential customers can visit.

Customer-information centres are focal points to offer **different information channels**. Next to personal information by personnel they should have available materials to promote the services / network, including leaflets, posters and maps; and preferably such leaflets should be available for the enquirer to select himself. In this way the different types of information complement each other under the single roof of a customer centre.

**Critical issues:**

The **responsibility** for a customer information centre (implementation and operation) can be with an authority, the operator, or a third party. Here, a clear assignment or – in the case of joint operation and financing – contractual agreements are necessary.

Customer information centres should also handle **information on other modes** (e.g. regional or long-distance trains) as in Brighton & Hove (UK) and Graz (Austria). This seems logical but in most cases is not provided. Joint actions of different operators and authorities may help to integrate services in one place.

There is usually high **financial pressure** on customer information centres since their services are often seen as too costly considering the personnel involved compared to other information and sales channels like internet or private kiosks. Combining the high-level services of customer information centre with other (more profitable) services, such as tourist information and sales locations, seems a way to overcome these pressures. In a combined outlet, however, public transport will be less visible and the customer information centre may be less useful for the general marketing of the public transport service.

**Good practice examples:**

- **Brighton & Hove (UK):** There are 'Travel Shops' at both the city centre and the Railway Station, providing comprehensive information on travel not just by bus but by rail also, together with other city information.

- **Chur (Switzerland):** All essential information about public transport services is available on the website or at the information desk at the main station. The information desk at the main station is run by BUSvuCHUR, the Rhätische Bahn and the Chur Tourist Office, and provides competent general information.

- **Euskirchen (Germany):** In many towns in Germany with an urban bus system a central "shop" was established to give personal information, to sell tickets, to provide additional services (e.g. tourist service, municipal services) and even to integrate operational issues (back office area, rest-rooms for drivers etc.). The "shop" is usually located directly at the central interchange station. In the Euskirchen urban bus shop 'treffpunkt’ (opposite the bus interchange station) customers can even buy tickets for concerts and events in the region.
• **Graz (Austria):** The ‘Mobil Zentral’ customer information centre is situated close to the main public transport square of Graz, where there are 110,000 changeovers per day and where all tram lines of Graz and 15 bus lines have their stops. Before the integration, the three service organisations were located at three different locations. The new centre provides integrated, high quality information to all and has resulted in increased use of public transport. The centre is not linked to a single public transport operator, and therefore provides information about all public transport modes in the Province of Styria.

• **Reading (UK):** The operator's Travel Centre is situated in a key location within a pedestrian-only shopping mall in the town centre.

**References and background reading:**

Mobility Centre, Municipality of Kalamaria, Thessaloniki, GREECE (2008).


**Related guidelines:**

2.19 Safety, information and equipment at bus stops

5.13 Information before and after the journey
5.6. **Measures to attract new users**

Develop measures to attract new customers through market development, market penetration, diversification and / or product development in combination with promotional activities.

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**Explanation:**

Marketing efforts are aimed at **keeping regular users and attracting new users**. In general, efforts to attract new passengers are often a combination of improvement / renewal of the public transport services (product, price, place, process, personnel) and accompanying promotion. Measures to attract new users can be categorized in four main categories:

1. Market development: Attract new users by extending or improving the existing PT services (for example new bus lines, higher frequencies, or improved interchanges)

2. Market penetration: Attract new users by promotion of the existing PT service (for example ‘try for free tickets for new citizens’, increasing the number of points of sale, or special contracts with companies)

3. Diversification: Attract new users by diversifying the PT services (for example a special hospital bus, a city circle line or a business area bus)

4. Product development: Attract new users through the introduction of new PT products or PT services (for example Park & Ride in combination with a shuttle service, one euro tickets, or family tickets).

The measures to attract new users can focus on all (potential) customers or on selected target groups (for example, employees), for which a specific marketing approach is developed.

A broad **spectrum of measures** and combined promotional activities can be taken to attract new customers:

- Contracts between businesses and the public transport company in combination with mobility management,
- Job tickets (tickets bought by employers)
- Integrated customer information packages for all citizens
- New bus line in combination with heavy promotional activities among the potential users
- New Park & Ride facilities connected through a frequent shuttle service in combination with a well-developed information strategy and promotional campaign
• Improvement of the existing public transport service (frequency, speed)
• Free trial tickets and public transport information for new inhabitants or new employees
• Free tickets for children (the public transport users of the future)
• Off-peak discount tickets
• Information material (e.g. timetable booklet, newsletter about new products) directly distributed to households
• Direct marketing among selected target groups (mail).

It is important to state that each marketing activity should always relate to ‘real measures’ enabling a potential customer to test and experience the service in order to become convinced of its value.

**Critical issues:**

Investments in new products or improvement of the service can be substantial. Therefore, the measures taken and the accompanying promotional activities should ideally be part of the overall marketing strategy and be targeted at the **pre-selected most promising market segments**.

It should be recognised that marketing measures cannot provide substantial changes in travel behaviour, if accompanying measures (e.g. local parking policy, car access restrictions to the city centre, priority / bus lanes for urban buses) are not taken to promote sustainable mobility goals. Marketing measures can contribute to ‘pull’ customers towards urban buses, but local transport policy needs to ‘push’ citizens as well.

**Good practice examples:**

- **Chur (Switzerland):** Chur (about 35,000 inhabitants) has an attractive night bus offer on weekends. With this measure the city tries to attract or keep young users who would usually switch to becoming car-users.

- **Elbląg (Poland):** The promotion of the public transport system is based on several educational campaigns addressed to children and youths and local inhabitants and special promotional activities like "a day without a car" campaign.

- **Euskirchen (Germany):** The pocket-size timetable booklet with integrated customer information is distributed annually to all households.

- **Jelgava (Latvia):** For pupils up to 8 years old public transport operators give free monthly tickets to use public transport. This does not cost anything in loss of revenue, as for children up to 8 years travelling on public transport is free anyway, but it has a number of positive benefits. Pupils become used to having a ticket for public transport; and children want to have these monthly tickets to boast about them to friends. Operators are growing a new generation of public transport passengers.
• **Schaffhausen/Neuhausen (Switzerland):** People who move to the city receive a welcome gift from the municipality including information about the bus service and a day pass for free.

**References and background reading:**


**Related guidelines:**

1.2 User needs and expectations

5.13 Information before and after the journey
Co-operation with Park & Ride

Create synergies with the private car by establishing Park & Ride sites: their design can also cater to Bike & Ride customers.

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Explanation:
Integration and co-operation with other modes can create win-win situations: Park & Ride is one example since Park & Ride passengers can be regarded as additional customers to those on the existing urban bus service network. In general there are two types of Park & Ride: near the origin mostly linked by train, and near the destination in the periphery of cities. The latter type is the most important for local public transport systems.

Park & Ride facilities in the periphery of the city are becoming quite common in many European cities. Combined with frequent public transport between the Park & Ride-parking lot and the city centre this can be very successful, especially when there is paid parking and a parking problem in the inner city.

A successful Park & Ride service has to fulfil the following characteristics: safe and secure, fast, comfortable, easy to find and to use, high frequent and reliable public transport connections (shuttle bus or regular public transport), attractive pricing and active and positive campaigning. In other words all 7 Ps (Product, Price, Place, Promotion, Process, Personnel, and Politics) aspects have to be optimal in order to be successful.

The main target groups of Park & Ride are visitors (shopping, tourists) to the city centre and daily commuters. A key aim should be to appeal to motorists who are not used to using public transport and, if possible, to attract them onto the 'normal' public transport network.

Simple pre-trip information (map, ticket prices and timetable) should be available through leaflets and the websites of the public transport operator and the municipality. Publication on city maps and on websites of tourist organisations, and other websites frequently used by visitors or commuters should be promoted as well (Figure 5-1).

Potential users should be pointed to Park & Ride facilities by signposting along the road when approaching the city borders. The motorist should be even able to use Park & Ride when he / she has discovered this option by chance without any information beforehand. Various cities use displays (real-time information or semi-dynamic) to indicate the current frequency of the bus services to potential Park & Ride users (‘Bus to city centre every 5 minutes’). Information about tickets, routes and network at the Park & Ride parking place should assist in making the trip as easy as possible.
Ticketing and buying tickets must be simple and easy. Total travel costs when using Park & Ride should preferably be less than when parking in the city centre. In general the following possibilities are provided:

- Integrated tickets (parking fee + public transport tickets in one).
- Free parking + ordinary bus fares / special Park & Ride-tickets.

Special service features at Park & Ride lots such as covered customer waiting areas, with chairs, refreshments, toilets etc., special security measures, real-time information about bus departures, all contribute to higher acceptance of the scheme.

Priority measures along corridors between Park & Ride facilities help to compensate for time-losses caused by within-system discontinuity (the waiting time during the change from car to the bus).

Similar principles as for Park & Ride can be applied to Bike & Ride services.

Promotion of the Park & Ride facility should be a joint effort of the main actors involved: the municipal authority (often several departments are involved) and the public transport operator.

Critical issues:

Park & Ride schemes are usually not a priority business in smaller cities; however, Park & Ride can be an option especially in historical cities and towns (e.g. those with medieval centres).

If Park & Ride is established, then a holistic and comfortable solution is necessary. Compromises, bad features (e.g. no integration of parking fee and ticket price, low frequency of bus services) may result in a poor usage of Park & Ride which might have serious financial impacts for the municipality (e.g. investment in parking facilities, funds being used for poorly-used shuttle services).

The frequency of buses connecting with Park & Ride places has to be comparatively high. Experience show that the usage will be low, if the bus headway is lower than every 15 minutes and if there is no parking restriction policy in the city centre (paid parking).
Good practice examples:

- **Cambridge (UK):** Cambridge - a historic city with high tourist traffic and narrow city centre streets - has had great success with a Park & Ride bus system for improved city centre accessibility. There are 5 Park & Ride sites, one being situated close to major retail developments, some being also served by long-distance coach services, and some being served by buses which also connect to a major regional hospital as well as to the city centre. This example is not part of the PROCEED case study analysis.

- **Cork (Ireland):** An 8-acre (about 32,000 m²) Park & Ride site at Black Ash with 904 spaces (Figure 5-2) is the first purpose-built Park & Ride site in Ireland. The capital cost was funded by the Department of Transport and the site is operated by Bus Éireann under contract to Cork City Council. Within 50 weeks of operation, the income exceeded operating costs for the site, and the project received a national Public Service excellence award for innovation in local authorities. The Park & Ride service uses dedicated double-deck buses, and has a single charge per car (5 Euros), which includes bus travel for all occupants. There is bus Priority on the Park & Ride corridor. The service was used by 200,000 people in the first year.

![Figure 5-2: Park & Ride shuttle buses in Cork (Ireland)](image)

- **Groningen (The Netherlands):** The city of Groningen is actively promoting Park & Ride. Currently there are four Park & Ride sites. Parking is free (although an exception is the Park & Ride site in Zaanstraat, next to the station). The Park & Ride sites are connected to the City Centre by a frequent city bus service operating on Sunday shopping days as well. A return trip on the Citybus costs € 2,00 (max. 5 persons / travel companions on one ticket). The Citybus uses free bus lanes on most of the route. Over 1.4 million people used this service in 2006.

- **Klagenfurt (Austria):** There are special shuttle buses that connect the Park & Ride facilities at the periphery with the city centre; these buses can be used for free.

- **Pisa (Italy):** The Park & Ride facilities have been recently implemented: each day 2,800 people leave the car in the Park & Ride facility and reach the city centre by shuttle bus.
References and background reading:


Related guidelines:

2.5 Interchange Strategies and Intermodality
5.8. Co-operation with Car Sharing (Car Clubs)

Create synergies with car sharing (car clubs) by offering discounts or a combined Public Transport / Car Sharing "product" which will provide a valid alternative to private car ownership.

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Explanation:

There are several possibilities for commercial revenue-generating partnerships, for example cooperation in the exploitation of a customer information centre, partnerships with large leisure centres, or shopping malls, partnerships with other public transport organisations etc. Cooperation with car sharing is one example of a possible commercial revenue-generating partnership. For additional information see ► Background information: Major principles of car sharing (car clubs).

Car sharing is a good provision for citizens who can use public transport or the bike for most of their trips, but who occasionally need a car. It can act to cause non-car owners to hold off from buying a car (and instead staying as regular public transport users), or to prevent families from buying a second car. Experiences in several countries also show that a substantial percentage of car sharing members have sold their car. Therefore (potential) car sharing customers are an interesting target group for urban bus services.

UITP (UITP 2002b) has formulated the following guideline for successful synergies between Public Transport and car sharing:

- The first guideline for a successful cooperation between public transport and car sharing would be the implementation of services of high quality from both operators.

- One essential element of the co-operation between public transport operators and car sharing providers is in the introduction of combined season tickets, making the use of both systems cheaper but mainly a lot easier.

- To ensure seamless mobility, it is fundamental that the information on the different modes of transport is centralised and well disseminated.

- Marketing is needed both to make people aware of the existence of car sharing and to draw out a positive image.

- a successful Public Transport – car sharing co-operation requires a strong political support from national, regional and local authorities

Co-operation between Public Transport and car sharing creates a win-win situation for both and can take several forms, though one of the more usual ones is the combined ticket. It may also happen that the Public Transport operator becomes a Car sharing provider as well.
One essential element of the co-operation between public transport operators and car sharing providers could be the introduction of combined season tickets, making the use of both systems cheaper but mainly a lot easier. In June 1998, Bremen introduced a combined offer with the monthly or annual pass for public transport including the electronic car-key. Some 8.5% of new card holders had given up their personal vehicles (a separation that they declared painless), while 26% had joined a car sharing scheme instead of buying a car (as originally planned). It has led to an increase in the number of car sharers using a public transport annual season ticket from 55% to 78% (UITP 2002b).

The Moses guide (MOSES 2005), mentions that "Public transport gains more customers as car sharers tend to have more informed mobility patterns and use a car less often than car owners. At the same time, car sharing can penetrate markets more quickly and strongly when combined with public transport. Various studies have also shown that car sharing clients who were previously car owners change their mobility patterns: they reduce their car mileage and use public transport much more often."

Critical issues:
The availability of car sharing operators decreases with lower city size. Therefore, options to combine car sharing with public transport are more likely in medium-sized and larger cities.

Good practice examples:
- **Chur (Switzerland):** The main car sharing provider is Mobility (http://www.mobility.ch). In the Swiss market, Mobility offers its 87,700 customers 2,250 cars at 1,150 stations in 430 locations (figures of June 2009). Mobility’s partnerships with 15 tariff associations now allow extensive cooperation with public transport systems. For the future, plans are to improve the 10-year-old ChipCard system (50,000 ChipCards in use, Chur has 35,000 inhabitants), so that more functions and information, e.g. for customers of the Car-Sharing provider Mobility, can be registered on the card.
- **Rheine (Germany):** Customers with "Die Blaue"-Ticket (Monthly pass for min. 3 months) get a reduction on the local car sharing service.

References and background reading:
DG TREN: Good Practice Case Study: Integration of car sharing / MOSES project (Mobility Services for Urban Sustainability), Bremen, Germany. Download: http://www.managenergy.net/products/R465.htm
Related guidelines:

2.5 Interchange Strategies and Intermodality

**Background information: Major principles of car sharing (car clubs)**

Car sharing (also called car clubs) is a short term car-rental scheme targeting primarily those users who do not own a car, but need access to a car for occasional trips. Some key features of car sharing are:

- The fundamental principle of car sharing is that the actual use of a car does not have to be directly linked to the ownership of a car.
- The cars are located at central points in the city (usually areas with a high car sharing demand).
- The access to the car is usually by a master key or a key card (without any personnel).
- The car usage has to be booked in advance by phone or internet in accordance with the current availability of vehicles.
- In contrast to car rental, car sharing is usually accounted on an hourly base with a monthly ‘member’ or ‘subscription’ fee and is not open to everybody. Users are either ‘members’ of a car sharing organisation (if on a neighbourhood basis) or ‘subscribers’ of a commercial provider.

In most countries with car sharing schemes, the initiative started with ‘grass root’ organisations (e.g. neighbourhood projects), but nowadays the service has developed towards a commercial service driven by professional operators. While car sharing sites and initiatives continue to expand in many countries, in others car sharing is only just being introduced. In order to reach a break-even point car sharing needs a certain demand level which is sufficient in urban areas with a higher density. In more rural areas and smaller towns this level is often not reached.
5.9. Branding policy

Develop a long-term, clear and attractive branding policy, which will make it possible for public transport to compete on all levels in the consumer market.

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Explanation:

Branding is a set of activities, which UITP (2003) describes in its Core Brief about branding as:

- Define a consistent service in line with consumer needs
- Associate the appropriate values to the service
- Communicate this consistently.

Branding stands for the long-term strategy to attach emotions, good feelings and understanding to a product. Branding adds extra value to otherwise common products. International brand names (Coca-Cola, Nike, Mercedes-Benz) sell because they can make an appeal, not because they are necessarily any better. In fact, advertisements do not tell anything about the product itself, only about emotions. In professional marketing branding is an essential next step.

There are strong reasons to sell public transport also as a brand, not as a commodity or a simple service. Values that can be added to public transport are (in line with the Maslow pyramid):

- **Basic values**: security and predictability
- **Speed**: it transports you fast from A to B
- **Easy to handle**: no hassle with tickets or information provision
- **Relaxing**: rest for the body, good chairs, etc.
- **Feel good**: travelling can be nice (atmosphere, people and surroundings).

Most regions and cities have their own public transport network that operates under its own name. The brand is strongly associated with the local context and over the years loaded with customer experiences and associations. Branding should then be a local responsibility. Some operators providing services in various municipalities should have a different image for each area which is distinct from the branding of the company itself.

**Critical issues:**

The impacts of branding as such are not that clear since branding involves action on all fields of marketing and the public transport product itself. Probably branding is only really
effective if all the aspects of the service (frequency, speed, comfortable buses, special tickets, attractive pricing, customer-oriented personnel) are of high quality.

Branding is not as common in public transport as in, for instance, the car manufacturing industry. Originally this had to do with its background as mainly a public service. Since the 1990s, when tendering was introduced in many countries, branding received more attention. But there remain some severe barriers:

10. Branding needs a consistent effort over a long period; tenders mostly have a fixed period, which may be too short for serious branding.

11. What is the brand, who owns the brand: the transport operator or the transport authority, or both? Since transport operators have contracts for limited periods, the authority seems the proper brand owner. Despite this fact transport operators are growing in market size, in medium-sized cities the brand is more and more owned by the operator. There are some good examples of branding when both are in charge (Karlstadbuss, Maxx Almere).

12. Related to the issue before, should the brand be connected to the public marketing goal (‘PT avoids congestion’) or to the commercial marketing goal (‘keeping our customers, raising our profits’)? These mission statements should come into line with each other. Branding can bring clarity. In order to avoid competition in public transport, the public authority and the operator should develop a strong partnership in accordance with their respective missions.

In the long run, branding is essential for public transport (also attracting non regular users). Tendering can also create much confusion and can weaken the brand. It works best in strong local arrangements between operator and authority in a more advanced form of tendering in which the missions of the authority and the commercial operator are taken seriously.

**Good practice examples:**

- **Almere, Zwolle (The Netherlands):** ‘Maxx’ in the Dutch towns of Almere and Zwolle shows a combined effort of the city and the operator to brand public transport as a whole new product. ‘Maxx’ stands for quality, reliability and frequent services.

- **France:** Successful promotion of urban networks under memorable brand names (instead of the name of the operator or official acronym of the network/transport authority) is common, e.g. Fil Bleu (Tours), Ondéa (Aix-les-Bains), Divia (Dijon), Ligne d’Azur (Nice), Zéphir ( Cherbourg), Ginkobus (Besançon), or in Landerneau simply Le Bus – Ar Bus (“the bus” in French and Breton). Colour coding of bus routes on maps, vehicles, bus stops, etc is a strong feature of many French urban networks.

- **Jönköping, Karlstad (Sweden):** Sweden shows some good examples of cities with a public transport that is promoted as a brand. Trunk lines have different colours and all bear the same name.
• **Elbląg (Poland):** In Elbląg the effectiveness of the public transport brand was shown as a key element in the perception of the citizens.

• **Wien (Austria):** The marketing strategy of ‘Wiener Linien’ over a period of 30 years was aimed at changing the association of public transport from a means one *could* travel with, to a means one *wishes* to travel with, to – in the end – public transport as something one *loved* to travel with. Slogan: ‘The city is yours’. This example is not part of the PROCEED case study analysis.

**References and background reading:**


**Related guidelines:**

2.15 Appearance and age of vehicles

2.19 Safety, information and equipment at bus stops

3.5
5.10. Corporate design

Create an attractive corporate design since this is an important aspect in creating a positive emotional connotation for public transport and is an important element of branding.

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Explanation:

Corporate design is a term that encompasses all of a company’s visual forms of expression. Corporate design involves all the visible elements of the public transport system which a customer can encounter before, during and after the journey: ticketing, the design of the buses (outside and inside), drivers’ clothing, bus stations and bus stops, website, timetables, logos etc. (UITP 2003). Attractive corporate design is a tool used to appeal to passengers and create a positive image; it is a basic element of branding and the corporate identity.

A Corporate Design concept has **two functions** in the case of Public Transport companies: on the one hand, it is of practical benefit to the customer; on the other hand, it helps create a positive image for Public Transport and / or the public transport company and fosters an emotional bond between customer and company.

The **aim of a corporate design concept** is to come up with an easy-to-remember image for the company by using formal styling constants (logo, colours, typefaces, styling pattern) in product design and communication. A Continuous Corporate Design concept makes it much easier for customers to find their way around a complex public transport system and generates a feeling of routine and security. At a glance, it must be clear who or what is behind certain products or data.

It is essential to reduce constant design elements to such an extent as to guarantee re-recognition capability and conciseness, but at the same time make it possible to adapt to totally different situations, target groups, media, and so on.

**Critical issues:**

Public Transport makes specific requirements of corporate design as it has an eminently heterogeneous set of customers. On the one hand, Corporate Design must satisfy the bulk of passengers, yet on the other hand allow specific groups of them to be targeted.

**Advertising on buses** (except for promoting public transport itself!) has to be examined carefully in order to avoid damage to the Corporate Design strategy.

**Good practice examples:**

- **Bregenz (Austria):** For corporate design reasons, the urban bus system in Bregenz has abandoned all advertising, both inside and outside of the buses (Figure 5-3).
Chur (Switzerland): Corporate design and the brand "dr BUS vu CHUR", which means "the bus of Chur" is mentioned as one of the success factors. Especially because of the name, the customer perceives the bus as "their" bus. (Figure 5-4).

Euskirchen (Germany): All vehicles are painted in the corporate design framework of SVE in yellow with blue elements. Advertisements are only on a limited surface on the rear of buses.

Flanders (Belgium): The Flemish public transport operator ‘De Lijn’ introduced a new corporate design scheme in 2008 covering not only basics like the logo or the colour of the buses, but integrates signposting elements of customer information: each bus line has (besides the line number) an individual colour used in table headings in the timetable booklet, on network maps, on bus stop signs, on displayed timetables at bus stops, etc. (http://www.delijn.be/images/DeLijn_in_beknopte_huisstijlgids_tcm7-1595.pdf, document in Dutch only).
• **France:** Urban bus networks generally have their own livery and corporate design independent of the operator contracted to run it. Therefore if the operator changes as a result of a new network tender concession, the brand identity of the service remains constant (unless of course a re-branding is launched as an agreed action with the public transport authority).

• **Helsingborg (Sweden):** The corporate design is a very important part of the success, together with frequency etc. In the city of Helsingborg a unified design approach is used on all buses, bus stops and information material. The buses are coloured green, as a connection to environmental friendliness. The city buses’ image is supposed to be green, on-schedule, clean and with friendly drivers. All information material uses the same design scheme (with a red banner). The aim with the PR-strategy in Helsingborg is to make the people living in Helsingborg more positive towards the city buses.

• **Jönköping (Sweden):** JLT’s vehicles follow a corporate design approach with a unified look of the vehicles, bus stops, all information material and tickets (Figure 5-5). The trunk routes (“citybussarna”) are well-known because of their low floor buses, colours and backbone task of the system.

  ![Figure 5-5: Elements of the corporate design strategy in Jönköping (Sweden)](image)

• **Kristiansand (Norway):** In November 2003, Vest-Agder Kollektivtrafikk and MyreHøie Design were granted the Award for Design Excellence for Bussmetro by the Norwegian Design Council. This is the most prestigious award for design in Norway and is intended to be an incentive for businesses to use design as a powerful means in product development and market communication. The Award for Design Excellence is a stamp of quality and a visual evidence of the fact that company and designer have developed a good product together. The metro stops are easily recognisable due to their unique design (Figure 5-6). They have been constructed with a view to accessibility for all, and earned in 2005 the Award for Design Excellence in the class “Design for All”.

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UK: Corporate design is by operator, and applies to vehicles, printed material and - outside metropolitan areas and where the local authority is not responsible for the flag - to bus stop flags too. However, there is strong corporate design by the local integrated transport authority in metropolitan areas and these include some towns / cities which are free-standing and effectively fall within the PROCEED interest: e.g. Southport (Merseytravel), Halifax (Metro), Wigan (GMPTE). Here this branding is strongly applied to stops and printed material but not to vehicles (unless the vehicles are exclusively for networks which are specially contracted by the local authority).

References and background reading:

Related guidelines:
2.15 Appearance and age of vehicles
2.19 Safety, information and equipment at bus stops
5.9 Branding policy
5.13 Information before and after the journey
5.11. **Political marketing**

Develop a political marketing strategy towards decision makers and key stakeholders since Public Transport is highly dependent on political awareness, support and decisions.

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**Explanation:**

Political marketing is one of the important Ps of public transport marketing (Product, Price, Place, Promotion, Process, Personnel and Politics). It aims at creating a good knowledge about public transport and positive view of public transport among **decision-makers** (councillors, and leading management officers) within a municipality. Effective political marketing may result in favourable conditions for operation and further development of public transport in the local discussion.

On the other hand, putting **no effort into political marketing** might result in the development of new shopping centres where public transport is ‘forgotten’, residential neighbourhoods where no fast bus routes can be created, lack of interest in investing in free bus lanes, reduction of budgets etc.

The **impacts of politics on HQPT** are manifold. First of all because (in most cities) a substantial amount of the operational deficits are publicly financed. However, there are also many other aspects in which politics can contribute to successful public transport, for example:

- Land use planning and development creating favourable circumstances for public transport (high density development along public transport corridors, bus routes, bus stops etc.).
- Traffic demand management in favour of sustainable transport modes (car free zones, parking policies, Park & Ride, mobility management).
- Infrastructure measures (bus lanes, traffic priority measures, renewal of central bus stations and bus stops) etc.

Given the many potential direct and indirect impacts it is important to **create awareness and conviction** amongst decision-makers of the importance of public transport for the harmonious development of cities and for citizens’ quality of life.

Giving a ‘recipe’ for political marketing and lobbying is not possible. There are many differences in local circumstances and the political and decision-making cultures (between cities of different size, between countries etc.). Operators and public transport authorities should **continuously communicate** with political decision-makers, business leaders and
It is important to have **up-to-date knowledge** about the relevant actors and developments:

- Which relevant local, regional and national departments and policy-makers can be identified?
- Are there relevant local / regional platforms or committees in which the public transport authority or operator should be involved?
- Which other private stakeholders or organisations (for example, real estate developers, neighbourhood committees etc.) can be identified?
- Which are the relevant local developments and policies in which the ‘voice’ of public transport should be heard also at an early stage of the process (development of new residential areas or shopping centres, local urban transport plans etc.).

One should realise that knowledge about public transport among local politicians is normally similar to the knowledge of citizens. **Providing decision-makers with adequate information** and gaining their interest in HQPT issues is an important aspect. Some options are:

- Special information meetings
- Organise site visits to their own public transport system or other good practice cities
- A company brochure
- Involve them in the Board of Customers (Guideline 5.3 Board of customers)

**Critical issues:**

Political marketing requires a **proactive attitude**, rather than just responding to developments and processes already going on. Only giving a response to a draft city or neighbourhood plan, rather than seeking to influence it at an early stage might be too late.

**Good practice examples:**

- **Sint-Niklaas (Belgium):** Due to strong local political support and interest in HQPT the following developments were achieved:
  - The creation of a north-south bus corridor through the city between the rail station and a mall on the southern fringe of the city
  - The implementation of ‘basismobiliteit’ since 2003. A totally new bus network layout has been created with the introduction of city lines
  - Tariff measures in the frame of "the third payer" politics of the Flemish Government and of Sint-Niklaas.

- **Brighton & Hove (UK):** A main policy has been to engage with the public at a very local level. The Managing Director is involved with many local organisations and is well known by the local press, local politicians and local authority staff. Civic and fund raising activities result in the company’s name appearing in the press once or
twice a week, generally with creditable reports. The company also has a good relationship with local radio in the area, and the two music-based commercial radio stations both carry local stories about buses and fares in their news bulletins.

**References and background reading:**


**Related guidelines:**

5.3 Board of customers
5.12. Product regeneration / review

Regularly review the marketing strategy of the Public Transport network and the 'product range' in line with the reviewing of services. Also consider reviewing the branding over time as consumer preferences change.

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Explanation:

Public transport is operating in a continuously changing environment; it has to deal with a limited life cycle of its products and services and with changing customer preferences and expectations. It is important to continuously monitor the development of these aspects and review and adapt the marketing strategy and the range of products and services in line with these changes. This process of continuous product reviewing and regeneration is common practice in the consumer retail sectors. As already stated in guideline 1.2 (User needs and expectations), the size and scope of significant reviews will vary depending on what changes in land-use, policies, user lifestyles, etc. have taken place. Not adapting the marketing strategies and product range may result in time in an outdated public transport product, unused market opportunities and loss of market share.

Examples of changes to be considered:

- **Changing environment:** Planned extension of parking regulation will affect the use of public transport, but also the demand for new products like Park & Ride or Bike & Ride services. An ageing population means higher requirements regarding accessibility of buses and bus stops and maybe new demand for public transport at other times and places and even new ‘ticket products’ for this group.

- **Customer preferences and expectations:** In order to meet changing preferences, new products and services have to be introduced and old ones have to be phased out or renewed in time.

- **Product life cycle:** Typically products go through the following life cycle: development > introduction > growth > maturity > decline. The life cycle of some public transport products may last for a long time while for others it may be shorter. In order to prolong the life cycle of public transport products it is essential to invest well in the development of the product and the promotion of it. Once the product is on the market it may be necessary to periodically ‘inject new life’ into it. This can be done in several ways including: product renewal and improvement, improved promotion etc.

For additional information on product regeneration and review see ► Background information: Product life cycle.
Critical issues:

Product renewal or regeneration should not conflict with a main principle of ‘branding’ which is ‘continuity’. The appearance of a brand can change, but preferably only gradually without causing confusion to the users. The same applies to its elements like numbering / naming of lines, corporate design etc.

Good practice examples:

- Brighton & Hove (UK): The company has a policy of continually re-evaluating its branding to ensure that it is fresh, relevant and eye-catching. At the same time, it takes care to ensure an easy transition from branding images that have been used in the past in order to maintain brand loyalty.

- Elblag (Poland): Market analyses concerning the assessment of the quality of services as perceived by passengers were conducted in 1995 and 2003. According to the findings, the quality of transportation services in Elblag was improved.

References and background reading:

Download: http://www.thetimes100.co.uk/downloads/nestle/nestle_4_full.pdf

Related guidelines:

1.2 User needs and expectations
1.3 Market analysis / Monitoring of demand
5.6 Measures to attract new users
Background information: Product life cycle

In business theory it is assumed that products follow a life-cycle, going through phases of development as follows:

→ The conception of an idea / product.
→ Research and development.
→ Introduction to the market.
→ Growth: A period of growth then follows as consumers become increasingly aware of the service and, if successful, it attracts more consumers.
→ Mature: Eventually, the growth will level off - this is the mature phase and is usually the result of increased competition.
→ Decline: The theory predicts that use will gradually decline as the market becomes saturated and consumer tastes change.

However, it would be wrong to assume that after the uphill struggles of the development and growth phases, life becomes easier on the level. It is a considerable challenge to the marketing professionals to prolong the profitable mature phase for as long as possible, using a range of extension strategies.

A major drawback with the product life cycle theory is that it cannot be used as a predictor. Firms may be able to identify some of the stages of development from historical sales data, but they cannot know their exact position on the cycle, nor in which direction they might be heading. In addition, some products seem to enjoy very long maturity, if not immortality, with no signs of decline.

Extending the product life span is the goal of many firms, but achieving this requires careful co-ordination of corporate and marketing objectives and strategies.

*(THE TIMES 100 1998)*
5.13. **Information before and after the journey**

Develop a comprehensive and achievable information strategy, which provides easy-to-understand, accessible and attractive information widely available via various media.

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**Explanation:**

A key element of marketing is that information about the bus service is widely available, easy to understand and attractive. Regular and non-regular customers should be able to get easy access to relevant information about the public transport system before they plan their journey and after their journey, when they have further questions, complaints or suggestions. Special attention should be paid to the special needs of travellers with visual, hearing or physical mobility impairment (e.g. to font size of timetables) and to the needs of foreign travellers. Key information should preferably also be available in selected foreign languages (e.g. English) to cover tourist and visitor needs.

A comprehensive information strategy should contain several elements (Table 5-2).

**Table 5-2: Elements of a comprehensive information strategy**

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
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<tbody>
<tr>
<td>Contents of static information</td>
<td>Provide accurate, appealing and attractive information about the following:</td>
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<tr>
<td></td>
<td>- Network: bus lines, routes, and timetables</td>
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<td></td>
<td>- Tickets: ticket types, fares, where and how to buy, refunds, special offers</td>
</tr>
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<td>- Accessibility of buses and bus stops</td>
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<td></td>
<td>- Available additional services (e.g. co-operation with car sharing)</td>
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<td></td>
<td>- Where and how to submit suggestions and complaints</td>
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<td></td>
<td>- Where and how to claim lost properties</td>
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<td>- City map of bus stop surroundings to find the way to final destination</td>
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<tr>
<td>Foreseeable changes</td>
<td>Develop an approach on how to provide information about temporary and structural changes and new bus lines to the customers (local radio, newspapers, door-to-door mailing, website, newsletter, emailing, etc.)</td>
</tr>
<tr>
<td>Target groups</td>
<td>Ensure that bus information is available to all: businesses, schools, households, tourists etc. For households, consider ‘individual’ neighbourhood information timetables, e.g. to be posted door-to-door or other targeted marketing activities</td>
</tr>
<tr>
<td>Sources of information</td>
<td>Raise the awareness of channels where public transport information is available (e.g. website, electronic journey planner, customer information centre, phone)</td>
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</table>
The pre- and post-travel information is usually made available through the following media:

- **Timetable booklets and leaflets:** Printed timetable booklets and timetable leaflets for all local bus services should be easily accessible (e.g. from tourist information offices, shops, other public buildings like libraries). They should always include a network map providing visual information about the routes and preferably the approximate frequency. Timetables should be clear and easy to understand and should take into account the needs of partially sighted users. Household leaflet drops could be undertaken when new services or major revisions affect an area. These should contain all relevant information (Table 5-2). Timetables for significant bus service changes should be available for passengers at least a few weeks prior to the changes. Timetable booklets should be available free of charge or at a very small fee.

- **Telephone:** A telephone enquiry service should be available at local call rates (or free of charge). The appropriate numbers should be promoted in printed documents, at bus stops and on the buses, and prominently displayed in local telephone directories. The enquiry service should preferably operate also before and after office hours, given the fact that bus users regularly travel outside these hours, and that a lack of available information may discourage or prevent journeys being made.

- **Internet:** the Internet is being used by (almost) all bus companies to promote their services. Navigation and details must be clear and easy to access and understand. Easily downloadable timetables, ideally with maps, should be available for potential passengers requiring timetable information in a more permanent form. In several countries door-to-door Internet journey planners are available, taking over part of the role of the local public transport company sites. On the other hand there are several local public transport sites with their own door-to-door planner as well. For further information on journey planners, see ► Background information: Electronic journey planner on the Internet.

- **Customer information centres:** see guideline 5.5 Customer information centre.

Information provision should be **free of charge** for timetables and basic information. Inhabitants could be supplied with the new timetables and news once a year (delivered directly to households, considering that not all have internet access).

**Critical issues:**

One has to remember that many persons still do not have access to the Internet. In 2007, about 43% of the European inhabitants were more or less frequent Internet users (although there are substantial differences between the European countries). Printed information and information accessible via other sources (telephone, Customer Information Centre etc.) will remain important.

Information should be **congruent**, i.e. the basic information stays the same, no matter where or by which channel it is obtained (printed / internet / phone / by the driving staff / on stops,
etc.). In practice this is not easy to realize, and with the increasing number of information channels this is not becoming easier.

If the service is tendered, the **responsibility for providing information** to customers must be clearly assigned to either the operator or the authority. Cases are reported where both provide information which leads to confusion and makes the public aware of an unstructured approach. Consequently, a clear interface between both is necessary.

**Good practice examples:**

- **Aalborg (Denmark):** Clear and simple website including a door to door journey planner [http://www.nordjyllandstrafikselskab.dk/default.aspx](http://www.nordjyllandstrafikselskab.dk/default.aspx)

- **Brighton & Hove (UK):** A widely-available glossy 'Bus Times' booklet is produced twice a year, plus a regular free on-bus 'Lifestyle' magazine. There is a clear and well-designed website ([http://www.buses.co.uk](http://www.buses.co.uk)).

- **Coimbra (Portugal):** This city has well developed marketing and information tools, e.g. website / real-time passenger information / communication (brochures, leaflets) / ticket design / vehicle design and branding ([http://www.smtuc.pt/index.php](http://www.smtuc.pt/index.php)).

- **Euskirchen, Rheine, Lippstadt (Germany):** Data for the urban bus systems are included in the respective regional electronic journey planners ([http://www.vrsinfo.de](http://www.vrsinfo.de) and [http://efa.vrr.de](http://efa.vrr.de)). Through the exchange of timetable data, the urban bus services are included in German Rail’s journey planner ([http://reiseauskunft.bahn.de](http://reiseauskunft.bahn.de)) combining local, regional and long distance services.


- **Graz (Austria):** An important element of this strategy is the GVB website ([http://www.gvb.at](http://www.gvb.at)) on which information can be found about public transport lines, timetables, tickets, special offers, abnormal conditions, etc. Furthermore, there is a mobility-information-centre in Graz, where all kinds of information regarding public transport in the whole province of Styria can be obtained (including public transport in the city of Graz). For the province of Styria an Internet-based journey planner ([http://www.busbahnbim.at](http://www.busbahnbim.at)) provides very complete door to door travel information, gives incident messages as well and has a real-time information system, currently in a prototype state. The door-to-door information includes walking and public transport. The next step (also in development stage) adds cycling and car (intermodal Park & Ride).

- **Göteborg (Sweden):** The GoTiC (Gothenburg Traffic Information Centre), a joint research centre of the city’s traffic and public transport authority and the Chalmers University of Technology, aims to develop a system specially adapted for the presentation of real-time information, produced and transmitted by their current
traffic control system (KomFram) to passengers on the public transport network’
(http://www.urbantransport-technology.com/projects/gothenburg/).

- **Lindau (Germany):** Since the timetable and network of the urban bus systems is very simple, it is put on a double-page A4 leaflet containing the timetable, the tariff, a schematic network map and the relevant contact details (http://zeus.sw-lindau.de/pdf/Fahrplan010906.pdf).

- **Tartu (Estonia):** The website is easy to use, including door-to-door travel information (http://buss.tartu.ee/bi2/bi2?language=eng).

**References and background reading:**

UITP (2001) Passenger Information Core brief. Download:

**Related guidelines:**

2.19 Safety, information and equipment at bus stops

5.5 Customer information centre

5.14 Information during the journey
Electronic journey planners find the optimal route between two stops within the public transport system. The electronic tools are today mainly provided via the Internet (with a web interface), or for call centres via an Intranet or loaded to a local computer. Electronic tools facilitate trip planning because printed booklets need then not be checked and complex connections with transfers are determined much faster than by the use of printed media.

The electronic journey planner should preferably be based on addresses in addition to bus stops only; in that way passengers have the opportunity to search for “door-to-door” trips. Further data integrated with the journey planner like “Points of interest”, footpath routing, maps of interchanges, interactive city maps showing the route network and bus stops, helps the user to find his / her way by public transport.

Electronic journey planners require a high effort on data management because data from different sources (e.g. different operators) has to be integrated into one database. Some typical mistakes like the aggregation of bus stops with the same or similar name, but physically located in different parts of the city, have to be avoided.

The benefit from electronic journey planners is high if complex trip chains combining different modes (e.g. regional bus > rail > urban bus) are involved. Consequently, the integration of timetable data of urban bus services into regional / national journey planners is recommended; however, if there is no regional / national journey planner in existence, the set-up of a stand-alone solution for only one small or medium-sized city provides a small benefit whereas printed timetables (e.g. as PDF on the web) can meet general information needs.
5.14.  **Information during the journey**

Provide clear and customer-friendly guidance for travellers during their journey from the first to the last bus stop.

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<th>(3) Guideline Impact</th>
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<td>X Operations</td>
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**Explanation:**

The public transport journey has to be simple and easy to use from door to door. Both regular and non-regular travellers must be able to find their way easily. Therefore, **accurate clear and simple information and signage** has to be available from the first to the last bus stop. Ideally vehicles, infrastructure and public-facing information have a common appearance and all the elements of the information system are integrated in terms of their message, graphic treatment and colour scheme (corporate design). For hints on information needs during the trip see ► **Background information: The trip chain and the need of information**.

**Bus stops:** The bus stop or bus station should provide highly visible and clearly understandable information about services available, including:

- Timetables clearly showing site-specific departure times with destination names
- Route number(s) of services using the same stop or station, if applicable
- Network map identifying all services using the stop or station
- Stop name (and number, if applicable)
- Contact details for public transport information
- Fare zone number where transport is located
- City map of bus stop surroundings to find the way to the final destination

Real-time information displays about the expected departure of the next bus substantially improve the service for waiting passengers. If real-time data is available, but investment into local infrastructure is pending, this useful information can be forwarded to customers by mobile phones (dialling a stop-specific number to get departure information or mobile internet access to real-time information).
Major interchange points (bus / train stations) should have:

- A recognisable network logo clearly displayed
- Clear visible way-finding signage to direct the user
- Directional information indicating where
  - Buses leave
  - Information can be obtained (for example the customer information centre)
  - Alternative transport such as taxis / bike rental / car sharing are available
- A locality map orientating the user

**Bus Exterior:** Bus number (or name) and destination have to be displayed clearly and visibly at least on the front of the bus, but preferably also on the nearside and rear of the bus.

**Bus driver’s information in the bus:** Bus drivers – belonging to the front line staff of the company – will be the first people whom customers will ask for information. Of course, they cannot know every detail, but they should have enough knowledge to be able to inform passengers on:

- Bus stops / destinations along the bus route concerned
- Connections and alternatives
- Major changes and abnormal conditions
- Tickets and tariffs
- Where they can get additional information
- Where they can submit complaints and suggestions

This should be an important element of the driver’s training.

**Static (printed) information in the bus:** If feasible, the following information should be available in the bus:

- Leaflets or small posters informing the customer about timetable-changes, new bus services, special offers etc.
- A network map.

If the network and the timetable are easy and simple, it is useful to have printed leaflets containing all the relevant information of the public transport system (network, timetables, tickets and tariffs, relevant contact addresses).
Dynamic information in the bus:

- Real-time information displays showing the next stop and destination are very often standard in new buses and provide a very useful service, especially for passengers unfamiliar with the route and the bus stop where they have to leave the bus.

- Audio announcement of the next stop, including interchange possibilities, is an extra service for all passengers, not only for persons with a visual impairment.

- Infotainment screens can be used to provide extra information about the public transport service (e.g. special offers, timetable changes, temporary route changes etc.).

Critical issues:

It is important that all the information elements during the journey are of high quality, and are reliable and consistent. Regular maintenance and noticing defects in-time, or aspects that could be improved, is important. Not only information provided by the staff (drivers), but also other sources (e.g. customer complaints, information from customer board) can be very useful.

Information of passengers about disruptions or serious delays is a crucial issue. At first, information has to be gathered and synchronised from different sources (computer-based operating system, bus driver, police, fire department etc.). Subsequent operational actions (e.g. detour of routes) require immediate information to passengers. Operators should have strategies available on how to deal with common incidents and about how customers are informed. The major principles should include:

- In the event of delays, or cancellations passenger should be informed in the best possible way as soon as this information is available.

- In-bus information can be provided by the bus driver and / or real-time displays.

- At major interchange points (if available) real-time displays will show the expected (delayed) departure times.

- It is not generally feasible, though, to directly inform waiting passengers at each single bus stop about delays. Instead, a central telephone number should be able to provide waiting passengers with the most recent available information about the delays.

Good practice examples:

- **Brest (France):** A centralised operator aid and traveller information system allows bus positions to be known every 2.5 seconds. Real-time traveller information is provided to passengers at many stops.

- **Graz (Austria):** A system called ITCS (Integrated Transport Control System) has been installed, which continuously communicates the position of all vehicles to the central control unit. Consequently, there is real-time passenger information at many stops. Furthermore, the online passenger information system provides timetables,
public transport routes, and door-to-door routing including footpaths, in close cooperation with the Transport and Tariff Association of Styria. Additionally, most stops are equipped with loudspeakers to announce information in case of incidents to waiting customers.

- **St. Moritz (Switzerland)**: The bus fleet of Engadin Bus in this tourist resort is equipped with flat-screen information displays providing information about the next bus stop, the time, driver’s name, weather conditions, etc. This example is not part of the PROCEED case study analysis.

- **The Netherlands**: Travellers have the possibility of using mobile phones to ask travel advice (06-9292) and to receive SMS information during their trip about (longer) delays caused by abnormal circumstances (accidents etc.)

References and background reading:


Related guidelines:

2.13 Intelligent service features in buses

5.10 Corporate design

5.13 Information before and after the journey
Background information: The trip chain and the need for information

- **Origin**
  - Way to stop (e.g. by foot)
  - First stop
  - Vehicle 1 (e.g. bus)
  - Transfer stop
  - Vehicle 2 (e.g. train)
  - Last stop
  - Way from stop (e.g. taxi)
  - Destination

**Identifying the best routes**
- Is there a connection?
- When can I travel?
- Where is the bus stop?
- How much do I have to pay?

**Sign-posting**
- How do I get to my bus stop?

**Departure information**
- When is my bus/train departing?
- Where can I buy my ticket?

**Route tracing**
- When and where I have to get out?

**Sign-posting**
- When and where is the connecting service departing?

**Sign-posting**
- How do I get to my final destination?

**Sign-posting**
- When and where do I have to get out?

**No need for further information**
5.15. **Ticketing strategy**

Use the ticketing strategy as a marketing tool: it should not only be based on policy, financial and operational objectives, but it always has to take into account customer perspectives and needs.

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Explanation:

The term ‘ticketing system’ as used here includes all aspects of offering different ticket types to customers as well as organising the purchase, validation and check of tickets. For financial issues such as fixing the fare level (how much is a trip?) and defining the fare structure (how is the fare calculated?) see guidelines 3.6 Fare structure and 3.7 Fare level. It has to be noted that decisions on ticketing aspects always coincide with policy / financial and operational objectives and the financial framework.

There are many different approaches to ticketing systems in Europe and there is not a ‘one solution fits all’. The ticketing system may have been developed as a result of trial and error and ad hoc decisions or as a result of a well thought-out comprehensive ticketing and fare strategy. In practice, it will usually be a combination of the two: a comprehensive strategy combined with ad hoc decisions.

When making decisions or changes on ticketing aspects, one always has to take into account the customer perspective:

- Is the ticketing and fare system logical, transparent, and easy to understand?

- Are tickets widely available (including in late evenings and Sundays when shops acting as ticket sales agents may be closed) and easy to obtain also for the non-regular public transport user?

- Which (limited) extra special ticket / fare types should be introduced given the marketing strategy and the target groups that will be attracted?

- How can tickets improve the relationship between the customer and the urban bus services (tickets as a marketing and Customer Relationship Management (CRM) tool and as part of the branding policy)?

Tickets should actually fit to all user needs, but a large variety of (potential) user profiles exist. By aggregating the most common ones, three main groups can be identified:

- **Non-regular users:** using the service from time to time, e.g. visitors to the city -> single ticket, day ticket, weekly ticket

- **Occasional users:** using the service quite often, but not everyday (e.g. shoppers) -> day ticket, multiple-trip ticket, value tickets, discount card
• Frequent users: using the service daily (e.g. commuters): monthly ticket, annual ticket, (weekly ticket)

The subscription of monthly tickets is a low-cost distribution channel for public transport tickets. It lowers the sales and handling efforts of the operator, avoids waiting time for customers at ticket offices, and the customer co-ordinates are known by the operator which is an important factor for CRM purposes.

Permanent ticket types at a low price can stimulate awareness about public transport and encourage non-users to experience public transport for themselves. Examples are:

• 1-EURO-Ticket / Short-trip ticket (ticket for a few stops only as alternative to a flat-fare city-wide single ticket),

• day ticket for 5 persons (following the capacity of a private car) excluding morning peak-hours, for leisure trips like shopping or sight-seeing.

Next to standard ticket types as mentioned above there are further approaches to provide tickets to certain groups with purchase procedures via alternative channels:

• Job ticket: The market share in the segment ‘commuter trips’ can be increased by distributing rebated tickets via employers (e.g. the employer buys annual tickets for all employees at a fixed rate). As long as no extra costs have to be incurred (for example, for new bus lines or higher frequencies), this approach will lead to more trips at only a marginal cost.

• Student ticket: A flat-rate fare to cover public transport usage is charged for all students. The solidarity principle contributes to an attractive price for each student, and sufficient revenues for the operator. The student ID card is used for ticket checks.

• Event ticket with bus trip: The public transport ticket is already included in the event tickets (e.g. concert, trade fair, exhibition), so that visitors can use public transport to / from the event location without extra out-of-pocket costs. The total price of the event ticket remains constant for all visitors regardless of them making use of the bus or not (solidarity principle).

• Park & Ride all-in-ticket: Car parking and travelling on the bus are combined in one ticket (issued at the car park).

• Shopping ticket: Shop owners often refund parking fees for shoppers. This idea can be adapted to public transport users as well. Shop owners can hand out ticket vouchers as a customer-present to attract customers.

The ticket purchase should be as easy as possible. Although sales by drivers are essential, especially in regional bus services, there are good arguments to reduce ticket sales on-board by the driver of urban buses: speed of service (avoids time-losses, accelerates boarding), road safety (driver can concentrate on driving only), security (less cash on-board). Since an abandonment of driver ticket-sales often results in occasional users making unintended rides without a ticket, a slightly higher fare for a ticket bought from drivers is generally accepted and encourages customers towards other distribution channels.
Critical issues:

The use of electronic payment systems facilitates more and flexible tariff differentiation (peak / off-peak etc.). From the customer’s point of view, on the other hand, there is a need for an easy-to-understand and simple ticketing and fare system. The use of all the possibilities of tariff differentiation offered by electronic ticketing, therefore, should preferably be limited to some easy to understand principles.

The non-regular user is an important target group for public transport. Whatever ticketing system is used, it is important to keep in mind that also the accidental / non regular user should be able to easily obtain a ticket (in the bus or at a vending machine at the bus stop) whenever he / she wants to use public transport.

Good practice examples:

- **Almere (The Netherlands):** In order to attract new passengers, some special MAXX city bus tickets are issued in addition to the tickets of the Dutch national tariff system for local and regional bus services:
  - Maxx reis: € 2.00 per ticket, valid on all MAXX lines in Almere for 1.5 hours
  - Maxx meerreizen (Multiple trip ticket): € 12.50 for ten trips
  - Maxx nacht: € 3.00 per trip on the night buses.

- **Bregenz (Austria):** All buses are equipped with ticket vending machines. Single, day, week and monthly tickets can be purchased from the ticket vending machines in the bus. Single trip tickets can also be purchased from the driver. Season tickets can be bought at the office of ‘Stadtbus Bregenz’ (Figure 5-7).

  ![Figure 5-7: Local fares for trips in Bregenz (Austria)](rows: different user groups children, youth/student, disabled/elderly, adult, families, ..., columns: ticket types per period of travel single, day, week, month, year, left: address, opening hours, phone number of the local customer centre ‘Urban bus office’)

- **Chur (Switzerland):** The BUSvuCHUR is a relatively new transport operator with a young and dynamic image. Buses and information systems are state-of-the-art. Innovations concerning ticketing and information systems are developed in conjunction with the University of Applied Science in Chur. For the future, plans are to improve the 10-year-old ChipCard system, so that more functions and information,
e.g. for customers of the car sharing provider Mobility (http://www.mobility.ch), can be registered on the card. Today, there are combinations with ski-tickets, deposit-box card systems and credit cards available. Currently, there are 50,000 ChipCards in use (Chur has 35,000 inhabitants).

- **France:** There is an increasing deployment of smart card payment systems in urban public transport, with integration with regional public transport. In the city of Limoges (Limousin region), magnetic intermodal ticketing combines the city and regional bus networks. In the Rhône-Alpes region, the "OùRA" smart card can be used as an electronic purse or a season ticket on the regional rail network and on urban buses in over 20 towns and cities in the region, including Lyon, Valence and Grenoble. In Bouches-du-Rhône (Marseille area) the TICKETREIZE smartcard can be used either for season tickets or loaded with credits for individual or multi-journeys. It is available either as a personal card (with name and photo) for season tickets, or an “anonymous” card which can be loaded with multi-journey tickets and used by several people making the same journey. Although these initiatives are generally in larger cities or at regional level, they are relevant to smaller cities insofar as they are increasingly harmonising their ticketing systems with neighbouring authorities in the region in order to facilitate intermodal trips between different networks. In some larger cities, public transport smartcards can also be used as a support for a subscription to self-service bicycle hire.

- **Jönköping (Sweden):** Special tickets for young people: school card (free for pupils, paid for by the municipality), leisure card (as an addition to the school card, € 72 for a half-year), summer card (offering discounted travel for children and youth in the summer months, € 64). The tickets have an attractive ticket design which is part of the brand (Figure 5-8).

![Figure 5-8: Ticket design as part of the brand in Jönköping (Sweden)](image)

- **Klagenfurt (Austria):** Regular users can use the electronic ticketing system with the smartcard ("Kundenkarte Klagenfurt"). The special feature of this electronic ticketing system is the “best-price-guarantee”, i.e. with electronic ticketing passengers never pay more than the price of a season-ticket. The card is multi-purpose, e.g. it also works as ticket for various leisure activities.

- **York (UK):** Multi-journey bus tickets for the main operator can be purchased from an extensive network of 47 'PayPoints' (a cash sales service available at many retailers). ‘Lower-value’ tickets can be purchased in the bus as well.
References and background reading:


Related guidelines:

3.6 Fare structure

3.7 Fare level