Background to Cluster 1: public transport

Public transport is a crucial factor for achieving healthy and liveable cities and metropolitan areas. In the face of urban traffic congestion, air pollution, climate change and energy consumption, public transport is taking an increasingly prominent role as the core part of sustainable urban mobility concepts.

Solution 1.1: BRT system construction and operation

Improving the urban road network in a sustainable manner by introducing a bus rapid transit system (BRT) will provide high public transport service and increase traffic safety. BRT is best implemented on main roads of cities and metropolitan areas which need to transport large numbers of passengers. As most BRT systems use modern buses running on dedicated corridors, they are usually accompanied by gains in local air quality and reduced greenhouse gas emissions.

Solution 1.2: trolley-bus systems

A trolley-bus system is a public transport mode using electric propulsion provided by overhead wires. It offers the opportunity to use renewable energy if available and reduces fossil energy use. It is a transport system with almost zero local air pollution and little noise emissions. It supports cities in achieving their climate goals by reducing fossil fuels in public fleets. A trolley bus system is best implemented in the built up area of a city where its positive impact on local emissions can be especially advantageous.

Solution 1.3: metro systems

The construction of metro systems (MRT) offers rapid, high capacity rail-based public transport without changing the structure of road networks and built-up areas. They are almost independent from the topography of cities. Metros are said to be one of the most expensive form of mass rapid transit per kilometre (except for Maglev trains), but have the highest capacity (Wright & Fjellstrom, 2005). They are best implemented in areas with high capacity requirements and are especially appropriate in cities where typical trip distances are long. Metro systems, as with most rail systems, also successfully attract passengers from other transport modes, in particular from private cars. The main driver of metro construction is capacity. It is also perceived as fast and reliable, its electric propulsion does not add to local emissions and the shift of passengers from private cars reduces congestion and therefore emissions from cars.

Solution 1.4: fossil-fuel switch options for public transport

One way to reduce public transport carbon emissions is by utilising alternative (clean) fuels, such as Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG) and Liquefied Petroleum Gas (LPG), which also result in much lower local emissions of pollutants (especially particulate matter) than diesel.

Solution 1.5: electric and hybrid vehicles in public transport system

Electromobility has played a vital part in public transport for many years. Public transport vehicles usually follow fixed routes which makes battery propelled vehicles an attractive alternative to conventionally fuelled counterparts, as routes can be adapted to the vehicles' capabilities. Electric vehicles produce zero local emissions and less noise. Also, hybrid-electric vehicles are more flexible due to their extended range.

Solution 1.6: ITS for public transport

Intelligent Transport Systems (ITS) play an increasingly important role in public transport, both at the driver-vehicle and passenger-service interfaces. One of the most transformational aspects in recent years has been in the provision of real-time arrival and departure time information to passengers, but it is also used to provide other information (such as multimodal travel planning) to help deliver seamless journeys to travellers. Moreover, it also plays a key role in vehicle monitoring (position, service quality and maintenance diagnostics), through on-board GPS (Global Positioning), which is also used to respond to disruptive traffic situations and to provide evidence about accidents.

Solution 1.7: integrated fare systems

Integrated fare systems for public transport are one of the basic conditions required to provide convenient access to a public transport system in a city. They allow passengers to make journeys involving transfers within or between different transport modes (buses, trains, subways, ferries, etc.) with a single ticket, valid for the complete journey, ideally using smart-cards or mobile phones. In addition, public bicycles or car sharing can be included, as can electronic purse applications. Integrated ticketing encourages passengers to use public transport by simplifying the fare structures and making switches between transport modes easier, increasing the efficiency and attractiveness of the services.

Solution 1.8: integrated planning of the public transport network

The aim of integrated transport planning is to align the public transport network with the overall urban planning layout. Integrated public transport planning often is a subset of sustainable urban mobility planning. Integrating transport with urban planning provides a key opportunity to implement 'Avoid' policies as set out in the previously mentioned ASI policy framework.

Solution 1.9: financing public transport

Public transport systems require high levels of capital investments (for infrastructure and rolling stock/vehicles) and funding (subsidies) to cover operations and service delivery. Authorities and operators must ensure that public transport has sufficient investment capital to maintain a high quality service, manage capacity and affordability and to keep up with increasing demand. Generally speaking, and especially in Europe, public actors assume the responsibility for the provision of infrastructure, while operators are expected to deliver predefined service levels with revenues coming from fares and other sources. In many cases an increasingly small amount of financial support or compensation for special fares is available from the public purse. Public transport without subsidies can be achieved as long as ridership is very high, however it can mean that quality is compromised as more people are expected to be carried at peak times, while less profitable but socially-important routes are not attractive.

Solution 1.10: eco-driving for professional drivers

Eco-driving involves teaching bus, subway and light rail drivers to drive more smoothly. This increases fuel economy, reducing fuel use, costs and emissions, and increases passenger-comfort, in turn, attracting more passengers. Additionally, vehicle wear and tear is reduced, decreasing maintenance costs. The barriers are the requirements for continuous training efforts of drivers to maintain the level of eco-driving within public transport fleets, and monitoring/motivating them to continue using these skills.

Solution 1.11: bike-sharing and public bicycles

Rental bicycle systems look promising to solve the 'last mile' problem in urban transport systems and provide truly door-to-door travel connections. They also provide a means of transport for populations in high-density residential areas where residents have limited possibilities to safely park and store private bicycles.