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TRANSFERABLITY OF SUSTAINABLE URBAN TRANSPORT SOLUTIONS

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Abstract

While there is a wealth of information about the need for more sustainable transport, and policies and practices to achieve this, progress in this area varies greatly between countries. There is a common assumption that political and institutional frameworks can and will implement best-practice policies provided that technical information is available (e.g. through assessments). This is considered to be overly optimistic and lacking in conceptual and empirical sophistication, in particular considering socio-economic and institutional conditions in many countries. There is a critical difference between a policy's potential and the extent to which this potential can be realised.

This paper focuses on sustainable transport policies in selected developed and developing countries and testing their transferability. This builds on the SOLUTIONS project (www.urban-mobility-solutions.eu); using the project's concept and objectives, and reports on progress made in the focus regions of Europe, Asia, Latin America and the Mediterranean.

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1. Introduction

Transport is a key enabler of economic activity and social connectedness. While providing essential services to society and economy, transport is also an important part of the economy and it is at the core of a number of major sustainability challenges, in particular climate change, air quality, safety, energy security and efficiency in the use of resources (EC, 2011). Cities across the world have a need to establish sustainable transport systems, which provide efficient and safe mobility for their citizens with the minimum of environmental impact. The implementation of innovative urban transport and mobility measures varies widely: some cities are well advanced with leading approaches towards sustainable transport, whilst others are rather less developed. At the same time, the forecasted population growth and increase in urbanisation present a significant challenge to cities in Latin America, Asia and the Mediterranean Partner Countries. The SOLUTIONS project aims at achieving more widespread implementation of innovative and sustainable urban mobility solutions. This paper introduces the project, its inherent methodology and first results - including a collection of innovative urban mobility solutions that have been successfully implemented in Europe, Asia or Latin America and have a high potential for transfer to other cities across the world. Context conditions, interests and needs of cities in the target regions are identified. Transferability analysis and approaches to assess the socio-economic impacts of a policy or measure will guide the selection and implementation of urban mobility solutions in the target cities and are introduced in the present paper. In the end a conclusion and outlook to further project activities is given.

2. Methodology

The overall objective of the SOLUTIONS project is to make a substantial contribution to the uptake of sustainable urban mobility solutions in cities across the world. It goes beyond the sole dissemination of technical information, but takes a structured approach to foster the active take up and transfer of sustainable solutions between cities in different regions of the world. Cities in Europe, Asia and Latin

America have developed a wide range of innovative sustainability mobility solutions. A set of existing solutions with a high potential for transfer to cities in Asia, Latin America and Europe is compiled based on an initial transferability assessment.

Ten cities from around the world are actively involved in the project as *leading cities* and *take-up cities*. *Leading cities* will share their expertise in the development and implementation of sustainable urban mobility solutions. They have been selected as they have practical experience in the successful implementation of urban mobility solutions. Within SOLUTIONS, they will pass on their knowledge and experience to *take-up cities*, which are the ones that are going to prepare the actual implementation of innovative and sustainable urban mobility solutions in feasibility studies. The feasibility studies explore the economic viability and public acceptability of measures and assess the success factors and barriers that may accelerate or inhibit uptake.

3. Urban mobility solutions

As the first step in the SOLUTIONS project, 58 different urban mobility solutions with high transferability potential were selected and categorised into 6 thematic clusters (briefly described, below). The clusters themselves built on relevant previous research projects on urban mobility and their transferability. The clusters provide the basis for targeted knowledge-exchange and the transfer of innovative sustainable urban mobility solutions and technologies. In the SOLUTIONS project the need for a balanced approach of urban mobility measures is being emphasised to achieve a maximum sustainability impact (Sims et al. 2014, Fulton et al. 2013). This includes measures that manage and reduce demand (avoid), foster low-carbon transport modes (shift) and achieve efficiency gains and fuel switch (improve). .

Cluster 1: public transport

Public transport – an important factor for providing access and achieving liveable cities and metropolitan areas – plays a prominent role in sustainable urban mobility concepts, which aim to reduce urban traffic congestion, air pollution, climate change and fossil-fuel consumption. The transferability of successful high-capacity mass

transit is of significant interest and importance to cities in emerging countries, particularly those suffering from increasing urban populations and limited space for transport. Table 1 presents an overview of selected solutions in the public transport cluster with some good-practice examples.

Table 1: overview of selected solutions in the public transport cluster

SOLUTIONS	Type of impact	Good practice cities/projects
BRT systems	Improve/shift	Curitiba (Brazil) and the *TransMilenio* system in Bogota (Columbia)
Trolley bus systems	Shift/improve	Zurich (Switzerland), Salzburg (Austria), Athens, Lyon (France), and Beijing and Taiyuan (China)
Metro systems	Shift/improve	London, Paris, New York, Moscow, Washington, Berlin as well as many cities in Asia, including Singapore, Beijing, Shanghai and Dalian
Alternatively fuelled public transport	Improve	CNG buses in Delhi, Berlin, Lille (France), Hong Kong, LNG buses in Guiyang and Xian (China)
Electric and hybrid public transport vehicles	Shift/improve	Electric vehicles in Shenzhen and Beijing (China) and hybrid buses in Guiyang (China), Aachen and Bremen (Germany) and London
Public transport ITS	Improve	ITS in public transport in Asia has grown in use faster than in Europe, led by Korea and Seoul's metro
Integrated fare systems	Improve	London's Oystercard, Bremen's *Mobility pass,* the Netherland's smart card, Hong Kong, Beijing, Seoul and Tokyo
Integrated public-transport network planning	Improve	London, Budapest, Stockholm, Curitiba (Brazil) and Hefei and Yinchuan (China)
Public transport financing	Improve/shift	*Transport Tax* in Paris, integrated ticketing systems in Germany, Japan and China
Eco-driving for professional drivers	Improve	European transport projects such as ACTUATE and BENEFIT, eco-driving training in Leipzig (Germany), Salzburg (Austria), Parma (Italy), Brno (Czech Republic) and China
Bike sharing and public bicycles	Shift/avoid	Paris, Brussels, London, Berlin, Hangzhou (China) and Changzhou (China)

Cluster 2: transport infrastructure

The transport infrastructure cluster summarises available information and provides recommendations for the design of safe urban streets including facilities for both public transport (such as tramways and light rail, bus lanes, passenger waiting and

boarding areas) and for soft modes (cycling and pedestrian). Table 2 provides an overview of selected solutions in the transport infrastructure cluster with some good practice examples.

Table 2: overview of selected solutions in the transport infrastructure cluster

SOLUTIONS	Type of impact	Good practice cities/projects
Dedicated bus lanes	Improve	London, Berlin, Paris, Nice, Nantes, Lille and Dublin
Intermodal interchanges	Improve	Monclova interchange in Madrid, *St Pancras International* in London, *Gare du Nord* in Paris and the *Köbánya-Kispest* in Budapest. The EU NICHES, NODES and CITYHUBS projects
Pedestrian infrastructure	Improve/ avoid	Worldwide
Non-motorised infrastructure	Improve/ avoid	The Netherlands, Germany and France
Cycling infrastructure I - innovative safe cycling infrastructure	Improve/ avoid	The UK, the Netherlands and Germany
Cycling infrastructure II – cycle highways	Improve/ avoid,	The Netherlands, Denmark, Germany, the UK and Spain
Infrastructure for car- and bike-sharing	Improve/ shift	Brussels, London, Paris and Berlin
Pedestrianisation of city-centres and streets	Improve/ avoid	European cities - market towns and numerous historical cities (in e.g. Italy)

Cluster 3: city logistics

The city logistics cluster focuses on acknowledging freight's important role in economic activity, while decreasing the environmental and social impact of delivering this freight. This implies decreasing the number of commercial vehicles (without other traffic compensating for this), decreasing delivery vehicles' noise and emissions (PM, NO_x and CO_2) and reducing traffic congestion. The solutions can be introduced by public authorities (e.g. traffic-restriction regulations, low emissions zones, transport pricing, taxes and planning, and developing infrastructure dedicated to urban freight movement) and by private companies (e.g. increasing their fleets' fuel efficiency and load factor through consolidation, or improving the efficiency of home deliveries through collective delivery/pick-up depots). Table 3 provides an

overview of selected solutions in the city logistics cluster, along with good practice examples.

Table 3: overview of selected solutions in the city logistic cluster

SOLUTIONS	Type of impact	Good practice examples
Urban delivery using cargo-cycles	Improve/ avoid	Paris and Barcelona - the SMILE pilot, Donostia/San Sebastian (Spain) - a CIVITAS ARCHIMEDES project
Low Emission Zones (LEZ)	Avoid/ improve	Europe (>250 cities/regions. A good overview can be found at www.lowemissionzones.eu)
Forums, portals, labels and training programs	Improve	Paris and Toulouse (France) - London (FORS) and Norwich (the UK)
Networks of pick-up points	Avoid	Kiala (UPS) in France and Belgium, *Packstations* in Germany
Promotion of off-peak deliveries	Improve/ avoid	NYC, several European cities (Dublin, Barcelona, Paris, many in the Netherlands – PIEK program)
Urban Consolidation Centres (UCCs), urban service centres	Avoid/ improve	Several UK cities (Bristol, London), several cities in Italy (Verona, Modena, Padua) , La Rochelle in France, *Binnenstad* service in several Dutch cities
Municipal procurement reorganisation	Avoid/ improve	*Delivery Servicing Plans* in London, projects in Gothenburg, Sweden for clean deliveries in municipal buildings, the *Green Link* in Paris
Greater use of rail and water	Shift/ avoid	Waterways in Utrecht (NL), heavy rail in Paris, France (Monoprix) and light rail in Dresden, Germany
Lorry lanes for urban freight transport	Improve	Barcelona, Berlin, Padova and other Italian cities, several UK cities
Pricing schemes, taxes and tolls	Improve	Milan, AreaC (Italy), Norwegian cordon pricing schemes, , Switzerland (*LSVA*), several other European metropolitan areas, some US large cities.

Cluster 4: Integrated planning and Sustainable Urban Mobility Plans (SUMP)

Integrated planning considers all of the transport modes used in a city, and aims to take a broader social, environment and economic perspective on the transport system. The European Sustainable Urban Mobility Plans (SUMP) concept brings that approach into a formalised structure and gives the participation from various stakeholders and the public an important role. The SUMP concept and approach are increasingly seen as useful basis for integrated planning also outside Europe. Within the SOLUTIONS project the SUMP guidelines are being adapted to the conditions in Latin America. China and North Africa have also shown interest in adopting the

guidelines. Table 4 provides an overview of selected solutions in the integrated planning and SUMP cluster, along with some good practice examples of SUMPs.

Table 4: overview of selected solutions in the integrated planning and SUMP cluster

SOLUTIONS	Type of impact	Good practice cities/ projects
Preparation of a SUMP	Avoid, shift and improve	France (Nantes, Lille), UK (Leeds), Sweden (Lund), Denmark (Aalborg), Belgium (Gent) and Germany (Aachen). Projects: CIVITAS, CH4LLENGE, BUMP, ENDURANCE; Quest, ADVANCE, ECOMOBILITYSHIFT, PILOT, BUSTRIP, TIDE and PUMAS
Vision-building for future sustainable urban mobility		West Yorkshire (UK)
Participation (Involving stakeholders and engaging citizens)		Bath (UK), Gent (Belgium), round-tables with stakeholders in Berlin, Dresden and Aachen (Germany), Barcelona's social pact and Bremen's (Germany) planning application. Projects: GUIDEMAPS, ELTIS Plus, Fiets van Troje, and CH4LLENGE
Participatory budgeting		Many Brazilian cities
SUMP audit schemes and quality management		The QUEST (www.quest-project.eu) and ADVANCE (audit schemes)
Measure/measure-package selection strategies		CH4LLENGE (www.ch4llenge.eu) and CIVITAS (www.civitas.eu)
Monitoring and evaluation of SUMP		Toulouse (FR), Dresden (DE), West Yorkshire (UK) and Gent (BE). Projects: CH4LLENGE, CIVITAS, QUEST and ENDURANCE
Modelling and visualisation tools in SUMP		Gdynia (PL) TRISTAR and Aachen (DE)
SUMP framework conditions		PDUs (Plan de Déplacements Urbains) in France and LTPs (Local Transport Plans) in the UK
Capacity building and training schemes in SUMP		DYN@MO Baltic SUMP competence centre, SUMP capacity building under ELTIS, and SUTP of GIZ in Asia
Engaging external support for SUMP development		PDUs in France, LTPs in UK, Verkehrsentwicklungspläne in Germany

Cluster 5: Network and mobility management

Network and mobility management comprises a number of technical and planning measures, to ensure seamless transport, connectivity, more flexible travel opportunities, lower environmental impact and support of multimodal mobility behaviour and lifestyles.. It is important that multiple mobility options are provided that make best use of already available resources and help make a more intelligent mobility choice that considers advantages and disadvantages of different transport modes. Table 5 provides an overview of selected solutions in the network and mobility management cluster with some good practice examples.

Table 5: overview of selected solutions in the network and mobility management cluster

SOLUTIONS	Type of impact	Good practice cites/ projects
Parking management	Avoid/ shift	The EU-funded projects MOBILIS , ELAN and CARAVEL
Access restriction	Avoid/ shift	Bergen, Oslo and Trondheim (Norway), London, Stockholm and Milan
Traffic management	Improve/ shift	Projects: MIMOSA and *EasyWay*
Multimodal journey planners	Improve/ shift	Sweden and Austria
Cooperative ITS (C-ITS)	Improve/ shift	EasyWay, Conduits and SARTRE
Car-sharing schemes	Shift	*Car2go*, *DriveNow* and *Quicar*

Cluster 6: Clean vehicles

This cluster examines clean vehicles in a broader sense, along with those readily available fuels and technologies, which offer substantial GHG emissions reduction potential, and other energy-efficiency options. The suitability of different clean vehicle technologies depends not only on local, but also on national conditions. The measures analysed in this cluster include a wide range of technologies and vehicle types in order to accommodate the variety of cities in SOLUTIONS's regions. This cluster also builds upon the findings of several European electric mobility projects and upon the *European Green Cars Initiative*. The solutions in this cluster have been selected based on their potential to address the urgent need to reduce local air

pollution, especially in Asian cities, and to limit transport-sector oil consumption. Table 6 provides an overview of selected solutions in the clean vehicles cluster along with good practice examples.

Table 6: overview of selected solutions in the clean vehicles cluster

SOLUTIONS	Type of impact	Good practice examples
Registration restrictions/number plate auctions	Shift/ improve	Vehicle quota system in Singapore, Shanghai and Beijing
Management of electric two-wheelers	Shift/ improve	Charging infrastructure in Murcia (Spain), Rome, Rotterdam and Barcelona
Fuel economy/CO_2 standards	Improve	The USA, the EU
Fuel switch in taxi fleets: EVs	Improve	Electric taxis: Shenzhen (China), Mexico City, Kanagawa Prefecture (Japan), Dublin and London. Replacement of diesel-fuelled three-wheelers with electric ones in Kathmandu (Nepal)
Fuel switch in taxi fleets: LPG/CNG	Improve	Taxis and auto rickshaws in Delhi and Ahmedabad (India)
Emissions-based vehicle taxation	Improve/ shift	Tax exemption for electric vehicles in Kanagawa Prefecture (Japan), exemption from VAT in Norway and the bonus-malus system in France
Clean vehicles in municipal fleets	Improve	Grenoble (France). Projects: CIVITAS ELAN in Zagreb (Croatia), CIVITAS TELLUS in Rotterdam, TURBLOG in Utrecht (Netherlands) and EU CIVITAS TRENDSETTER in Stockholm
Information and promotion of clean vehicles	Improve	Use of bus lanes and free parking in Norway, exemption from paying the congestion charge in London (UK). Projects: CIVITAS Trendsetter, NICHES and ECOSTARS
Infrastructure for clean vehicles	Improve	Various European cities. Subsidies for charging station construction and installation of public charging facilities in Rotterdam
Fleet renewal schemes	Improve/ shift	Subsidies for EV purchase in the UK and the Netherlands

4. SOLUTIONS take-up cities: a brief overview

The SOLUTIONS project has selected the following *take-up cities*: Belo Horizonte (Brazil), Guiyang (China), Cochin (India), Leon (Mexico) and Kocaeli (Turkey) (described, below). The cities were selected from over 70 applications based on their motivation and organisational capacity as well as on their size and population (the

project focuses on mid-sized cities). Table 7 provides an overview of the take-up cities and their areas of interest.

Table 7: the take-up cities with their clusters of interest

City	Size	Region	Clusters
Belo Horizonte, Brazil	1-5m	Latin America	Public Transport SUMP City Logistics Clean vehicles
Guiyang, China	1-5m	Asia	SUMP Clean vehicles
Cochin, India	1-5m	Asia	Public Transport SUMP
Leon, Mexico	1-5m	Latin America	Public Transport
Kocaeli, Turkey	1-5m	Mediterranean	Public Transport SUMP City logistics

Belo Horizonte, Brazil

Belo Horizonte, situated in the state of Minas Gerais in the south-eastern region of Brazil, is one of Brazil's most populous cities with around 5 million inhabitants in the metropolitan area and over 2 million in the municipality, with an average per capita income of 17,313 BRL (≈€5600) per annum. The public transportation system is insufficient and not well developed, and the city suffers from traffic congestion and air pollution due to the increasing number of private vehicle trips. Although data shows that the number of bicycle and pedestrian trips is higher, the city's infrastructure for these modes is also insufficient. Therefore, the clusters public transport, SUMP, city logistics and clean vehicles are particularly relevant here.

Guiyang, China

Guiyang, situated in the Guizhou province in Southwest China, has a population of 4.4m, with an average per capita income of 23,376 RMB (≈€2802) per annum. The city has a good public transport system, which made a total of 658m trips in 2012. In comparison, 154m trips were made with taxis. The clusters SUMP and clean vehicles are the most relevant for Guiyang.

Cochin, India

Cochin, situated on the west coast of India in the state of Kerala, is a densely populated city with a population of 2.1m (2011). Light Motor Vehicles (LMV) are the most common vehicle type (24,635 and 21,522 goods and passenger autos), followed by taxis (10,346), buses (7,005) and trucks (5,290). The majority of the passenger trips are made with inter and intra city busses, followed by 2-wheelers, cars and metro-busses. The sustainable urban mobility solutions of highest interest to Cochin are public transportation and application of SUMP.

León, Mexico

León is located in Guanajuato state of Mexico, with a population of 1.4m (2011). Although vehicle registrations are increasing in the city, led by passenger cars (265,311), freight vehicles (105,9344), 2-wheelers (26,004) and other modes (4,995) in 2012, the city also has a high number of cyclists. Total trips per day (cars, 2-wheelers, busses, rail, bicycles and walking) can reach 450,000 trips/day. Public transportation is the focus area for León.

Kocaeli, Turkey

Kocaeli province lies in Marmara region of Turkey with an urban population of 1.6m. In 2013, the number of registrations was highest for cars (64%), followed by vans (18.16%), 2-wheelers (6.70%), HGVs (6.12%), busses (2.40%) and minibusses (2.18%). In Kocaeli's road network, the total number of HGV trips reaches 100,215 daily. Regarding passenger travel, pedestrian traffic dominates, with 40%, followed by public transport (23%), private vehicles (23%) and private services (school or factory busses etc.) (13%). Kocaeli is especially interested in actives related to public transport, city logistics and SUMP .

5. Transferability analysis

A transferability analysis is a broad analysis of the considerations around taking a (successful) policy or measure from one place and implementing it in another (Macário & Marques, 2008). In this case, it refers to the transferability of policies or

measures from SOLUTIONS's *Leading cities* to the *take-up* cities. This process will be documented in the feasibility studies that each *take-up* city will produce. The transferability analysis provides an opportunity to learn from previous experience; identifying opportunities and avoiding mistakes. The success in transferring a policy depends on the interaction of the policies' and cities' characteristics. • The process of conducting a transferability analysis in itself leads to stakeholder and expert involvement that can make take-up cities more open for innovation. There is a wealth of knowledge on transferability methodologies upon which the SOLUTIONS project builds, in particular from the EU projects CIVITAS, NICHES+ and TIDE (CIVITAS, 2012; NICHES+, 2011; TIDE, 2013). The findings of two EU projects have particularly influenced the development of the SOLUTONS transferability analysis: CATALIST (which co-funded adoption activities in the CIVITAS project between 2008-2012) and TIDE (duration 2012 – 2015, building on the experience and findings of predecessor projects NICHES and NICHES+). Of the two transferability methodologies, TIDE is the most relevant to SOLUTIONS, and has been used as the basis for SOLUTIONS transferability methodology. The SOLUTIONS transferability analysis methodology, produced from a desktop study, interviews, workshop and field visits, has seven steps:

1. Formulate a mission statement, objectives and scoping
2. Clarification of the impacts of the measure
3. Identification of the need for change in scale
4. Identification of the main components and sub-components
5. Identification of the relative importance of various characteristics
6. Assessment of the characteristic in the take-up city
7. Conclusions

The final step of the transferability assessment is to draw conclusions about the potential for transferability though consideration of the factors identified and the assessment values ascribed to each. This should include discussion of all the key success factors and key barriers for transferring the innovative solution. In addition, it should include discussion of the mitigating actions that could overcome key

barriers. Based on the discussion, the concluding remarks on the chances of successful transferability should be made.

SOLUTIONS is currently performing two different transferability analyses in order to show the 'general' points which should be considered when transferring innovative measures from one city to another: (1) clean city logistics and (2) road user charging (RUC). Following is a brief summary of the former.

The example transferability analysis discussed here involves a clean city logistics measure based on the use of battery electric (BEV) transporters for their reduced pollutant and noise emissions compared to conventional trucks.

In step 1, the ways in which BEV use can be encouraged are identified, e.g. charging infrastructure provision, dedicated delivery zones, night-time delivery in inner-cities, allowing BEVs to use bus lanes, reducing any congestion charges and allowing entry into inner-city low emission zones.

The impacts of BEVs, such as on efficiency, safety, environment, accessibility, financial efficiency (affordability), economic impacts and overall impacts are analysed in step 2.

The scaling required (step 3) depends on logistics companies being able to integrate BEVs into their fleets (route-distances, size of goods, topography, economic factors etc.).

Step 4 involves identifying concerns around the measure such as political support, policy measures, fleet utilization, CSR/marketing, costs (running, capital and charging infrastructure), market analysis, range, driver's safety, charging infrastructure development and advanced ICT.

Steps 5 and 6 involve the assessment of the measure in the destination city. This is done through the categorisation of the relevant characteristics based on their importance. For example, characteristics such as existing policies such as congestion charging, low emission zones, conditions surrounding night-time delivery, driver's safety and grid integration might be of the highest importance, while incentives (bus lanes, dedicated parking), range of BEVs and strategic distribution of charging infrastructure and street layout are of medium importance, with eco-driving training and charging infrastructure are of lower importance.

Lastly, this example concludes (step 7) that private companies are the key drivers of the transfer and thus that it is essential to create incentives (e.g. subsidies and low-interest loans) for them to use BEVs. Other key drivers include increasing energy costs, increasing restrictions concerning emissions and noise in dense inner-city areas and rising customer-awareness. The key barrier for transfer is the high purchase price. Other barriers include the lower range of BEVs and drivers' safety concerns.

6. Assessing the benefits

For the SOLUTIONS take-up cities, assessing the socio-economic benefits is an important step for the implementation and the selection of urban mobility solutions. The investment of (limited) public funds should deliver the maximum economic, social and environmental benefits possible, over the short and long term and for all of a city's residents. Five assessment methods, which are considered to be applied in the selection and implementation phase are briefly presented and compared:

- Tool for the Rapid Assessment of Urban Mobility (TRAM). This tool is intended for use in cities with scarce information on mobility. It can be quickly and easily carried out in close collaboration with government officials (Sudra et al, 2013).
- Cost-Benefit Analysis (CBA). The most commonly used assessment method is often used to justify a project's or measure's implementation (or not) from an economic perspective, citing specific economic viability indicators (Jansson, 2010).
- Multi-Criterion Analysis (MCA). This is an increasingly popular method for transport project appraisal (Macharis & Ampe, 2007), which takes into account quantitative and qualitative criteria, and can, as such, include soft impacts otherwise difficult to quantify or monetise (Browne & Ryan, 2011).
- Transport Innovation Deployment for Europe (TIDE) assessment method. This method combines aspects of the CBA and MCA methods (including quantitative and non-quantified aspects of urban transport projects). If costs or benefits are known or can be easily calculated, they are included in monetary form, as per CBA. If, however, the costs are not known or cannot be easily or reliably

calculated, the measures can also be assigned as performance score by experts, as per MCA (TIDE, 2014).

• Transportation Emissions Evaluation Model for Projects (TEEMP). This relatively simple tool has been developed for use in areas where relevant data is limited. With TEEMP, municipalities can make an ex-ante estimation of the effect of a planned measure in terms of direct GHG emissions (ITDP, 2010).

An overview of the strengths and weaknesses of these assessment tools is provided in Table 8, below.

Table 8: strengths and weakness of various assessment tools

	Strengths	**Weaknesses**
TRAM	Quick and easy to perform Specifically addresses women's, children's and the poor's needs	Data extrapolation diminishes the result's reliability
CBA	Transparent and easy to communicate Highlights economic efficiency Rational behaviour assumption	Extensive data requirements Monetisation is difficult and controversial Non-monetary effects often limited to VTTS and safety Results often dominated by VTTS Requires the monetisation (willingness to pay) of qualitative effects
MCA	All impacts (quantitative & qualitative) can be evaluated Promotes public participation and compromises Applicable to soft and local-level measures	Subjective Little consistency Participation process may be elaborate
TIDE	Quick and easy to perform Addresses both qualitative and quantitative effects Applicable to a variety of measures	Limited consitency Shares subjectivity concerns with MCA
TEEMP	Quick and easy to perform Reflects direct and indirect GHG emissions Comparability	Little acknowledgement of co-benefits Limited range of measures which may be assessed

7. Conclusion and outlook

SOLUTIONS take up cities are committed to assess the opportunities for the transfer of innovative solutions to their context and identified thematic fields that are most

relevant for them to tackle their most pressing urban mobility issues. During the course of the project, a feasibility study will be developed for each take up city, which will contain packages of solutions that will be selected based on the local context conditions in a city, the measures' transferability to these conditions and the potential socio-economic benefits of the measure. The feasibility studies are an important step in preparing the implementation of innovative solutions among a wider set of cities and will be an important showcase for the transferability of innovative urban mobility measures. By providing insights of the take-up process from five cites with different socio-economic, cultural and political contexts the SOLUTIONS project aims to contribute to the wider take-up of sustainable urban mobility solutions.

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