

6th Transport Research Arena April 18-21, 2016



## Different pathways for achieving cleaner urban areas: a roadmap towards the white paper goal for urban transport

Jens Schippl <sup>a,\*</sup>, Henrik Gudmundsson <sup>b</sup>, Claus Hedegaard Sørensen <sup>b</sup>, Karen Anderton <sup>c</sup>, Ralf Brand <sup>d</sup>, Merethe Dotterud Leiren <sup>e</sup>, Max Reichenbach <sup>a</sup>

<sup>a</sup>*Institute for Technology Assessment and Systems Analysis (ITAS), Karlsruhe Institute of Technology (KIT), Germany*

<sup>b</sup>*Technical University of Denmark*

<sup>c</sup>*University of Oxford, UK*

<sup>d</sup>*Rupprecht Consult, Cologne, Germany*

<sup>e</sup>*Institute of Transport Economics, Oslo, Norway*

---

### Abstract

The 2011 White Paper on Transport of the European Commission spells out a series of targets for 2030 and 2050. One of the 10 targets is explicitly related to urban transport and stipulates: “Halve the use of ‘conventionally fuelled’ cars in urban transport by 2030; phase them out in cities by 2050. Achieve essentially CO<sub>2</sub>-free city logistics in major urban centres by 2030.”

With this paper we present and discuss a roadmap that deals with the question who needs to do what by when in order to reach the White Paper goal for urban transport. The “stakeholder-driven” roadmap was developed in the FP7 project TRANSFORuM. The paper will present the key findings and the suggested action steps identified in the roadmap. The paper will also exemplify three possible urban transformation pathways towards the urban target. This approach emerged from stakeholder consultations which highlighted the need to take into account the widely differing conditions among European cities.

© 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of Road and Bridge Research Institute (IBDiM)

**Keywords:** Urban transport; roadmap; White Paper Target; transformation pathways; stakeholders

---

---

\* Corresponding author. Tel.: +49 721 60823994; fax: 0049 721 608-24806  
E-mail address: [jens.schippl@kit.edu](mailto:jens.schippl@kit.edu)

## 1. Introduction

The 2011 White Paper on Transport of the European Commission spells out a series of very concrete but also ambitious targets for 2030 and 2050. One of the 10 targets is explicitly related to urban transport and stipulates: “Halve the use of ‘conventionally fuelled’ cars in urban transport by 2030; phase them out in cities by 2050. Achieve essentially CO<sub>2</sub>-free city logistics in major urban centres by 2030” (CEC 2011a). In this paper we present and discuss elements and key findings of a roadmap dealing with the question “who needs to do what by when in order to reach the White Paper goal for urban transport?”. The ‘stakeholder-driven’ roadmap was developed in the FP7 project TRANSFORuM, running from 2013 to 2015 (see Gudmundsson et al. 2015).

Urban transport is of specific importance to quality of life and economic growth in Europe. 70% of European citizens live in urban areas. This share is expected to grow in the future (CEC 2011b). A broad range of innovative approaches and promising development towards sustainable urban transport can be observed over the last decades in many European cities (e.g. CEC 2013, EEA 2014, Gudmundsson et al. 2014, Schippl 2013, Wefering et al. 2014). However, to significantly improve the quality of the urban transport systems in Europe requires a broader transformation. The European Commission’s urban mobility package stipulates that a ‘step change’ is needed (CEC 2013). In this context, it highlights an ‘urban mobility gap’ between Europe’s few advanced cities and the majority trailing behind” (CEC 2013, p.2). The majority of inhabitants live in smaller cities not at the forefront in terms of sustainable urban transport.

It is rather obvious the 800+ cities in Europe differ heavily in various dimensions. Some are larger (above 1 million) while many more are small; some are hilly, some flat; some coastal, others embedded in networks of larger agglomerations. Some are coined as old mono-structured industrial centres struggling with recent economic conditions, others have a highly diversified and competitive economic basis. The domestic political systems across Europe differ, as does the degree of autonomy cities have. And, of course, different situations in the transport sector can be found, for example the modal split differs heavily.

Nevertheless many commonalities can also be found. The high density of urban areas usually offers good opportunities for non-car-based transport. With dense population comes diversity of interests across urban stakeholders; citizens and politicians alike. Therefore, in urban areas it is particularly important to involve a broad range of stakeholders in the development and implementation of strategies towards more sustainable urban transport – which has been embraced in the concept of sustainable urban mobility plans (SUMP). So, a roadmap for the White Paper urban goal needs to cope with the challenge of being ambitious, whilst simultaneously compiling a set of messages and actions of relevance and sensitivity to the diverse contexts of all European cities. In this paper, firstly, we present some key findings of the TRANSFORuM roadmap. Secondly, we focus on how the TRANSFORuM process and the corresponding roadmap deal with the issue of diversity.

TRANSFORuM’s approach is outlined in section 2. In section 3, we introduce the strategic building blocks that were developed with stakeholders. These building blocks formed the basis of the three ‘urban transformation pathways’ which are explained in section 4. The key findings and action steps in the roadmap are then discussed in sections 5 and 6.

## 2. The TRANSFORuM Approach

The general approach of the TRANSFORuM project was to engage key stakeholders in moderated forum activities and other consultation measures in order to consider their views about the related challenges, barriers, trends, opportunities associated with four of the ten targets formulated in White Paper. The project addressed

- Clean Urban Transport and CO<sub>2</sub>-free city logistics (Goal No 1)
- Shift of road freight to rail and waterborne transport (Goal No 3)
- Complete and maintain the European high-speed rail network (Goal No 4)
- European multimodal information, management & payment system (Goal No 8)

The participants consulted in the TRANSFORuM process were drawn from a large database of European transport stakeholders. The consortium made strong efforts to ensure a fair representation of all major types of stakeholders in

the consultations while also observing resource and time constraints of the project. In regard to the urban transport goal the strategy was to consult a wide set of stakeholders, not just those engaged directly in vehicle and fuel technologies (conventional or alternative). The White Paper itself speaks of the ‘use of conventionally fuelled vehicles’ (rather than merely their numbers) and of ‘essentially CO<sub>2</sub>-free logistics’ (rather than simply freight vehicles). This broad approach found wide support among many the stakeholders through the subsequent stages of the project, as will be explained. The following types of stakeholder representatives were involved in the urban transport roadmap process;

- City and regional administrations and associated city networks;
- Producers and suppliers of vehicles and energy technologies;
- Transport operators and mobility service providers;
- Businesses and experts involved in freight and urban logistic services;
- Citizen organisations, think tanks and other NGOs;
- National and European programmes and platforms supporting clean urban mobility.

The concrete conversations with stakeholders were conducted through workshops, direct interviews, online surveys, and the feedback function of the project website. The most important interface was the series of face-to-face workshops held in 10 different European countries. Urban transport was addressed at four of these events. For each workshop the consortium prepared background analysis and briefing documents, while subsequent minutes were circulated for approval by participants. Fragments and drafts of the roadmap were elaborated on and discussed at these events.

In each of the four events participation was limited to 10-15 urban transport stakeholder representatives. No claims can therefore be made that the participation was complete or statistically representative. Moreover the participation from conventional automotive and logistics industries was more limited than hoped. However, to some extent these limitations were compensated by eight direct interviews that were conducted with additional stakeholders, and by partly basing briefing documents on a review of strategies and roadmaps already developed by for example European Technology Platform’s (c.f. ERTRAC et al. 2010).

### **3. Building blocks and frameworks for change**

Throughout the project duration there was a broad agreement amongst the involved stakeholders that the urban goal cannot be achieved by purely substituting conventionally fuelled vehicles with non-conventional ones. Many argued that the target needs to be linked with a broader transformation of urban transport systems. At the same time, stakeholders emphasised that there is no ‘one-size fits all’ solution for the broad diversity of EU cities. A substitution pathway might work in some cities to a certain extent, whilst others need to focus on other opportunities such as modal shift or advanced logistic concepts.

It was agreed that a broader set of “strategic building blocks” need to be considered in the urban roadmap, with relevant options found mainly in three strategic areas:

- Technological substitution of conventionally-fuelled passenger cars;
- Reduced use of private passenger cars for transport in cities;
- Increased utilisation of low carbon city logistics technologies and practices.

On that basis, the schema of building blocks illustrated in Figure 1 was compiled by the project team and discussed with stakeholders. Even if it was criticized for some of its details, there was a broad agreement that it covers the main relevant elements well. These building blocks serve as the basis of the roadmap. Section 4 will highlight that they need to be combined in different ways, depending on the context in which they are implemented.

These building blocks only become effective when they are implemented. In TRANSFORuM’s stakeholder debates it was frequently highlighted that the roadmap should emphasis and concentrate on ways (governance frameworks and processes) to ensure the introduction and implementation of more transformative policies in cities. Main debates and observations offered in this regard are summarized in the following; the primary focus is on governance

frameworks and processes at the urban level, because stakeholders generally found this level to be the most important for the needed transformation:

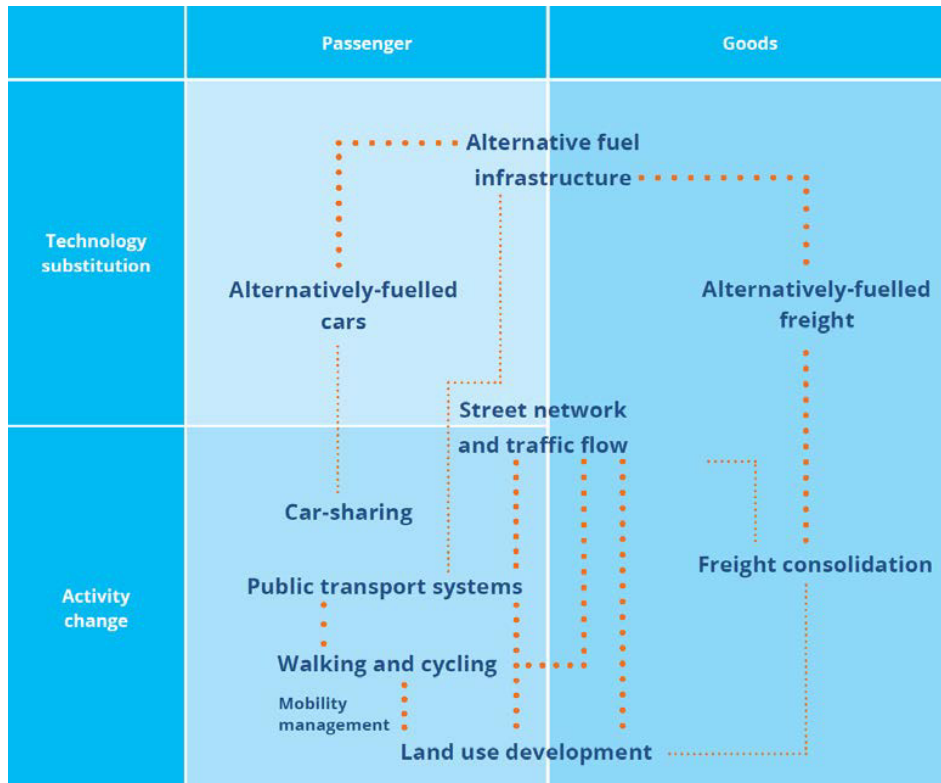


Fig. 1. Strategic areas and building blocks for urban mobility. Red lines indicate blocks that may interact.

- It was widely agreed among stakeholders that bringing local actors together and ensuring that they are pulling in the same direction is essential. Enhanced governance is about creating an enabling culture for the activation of the urban mobility building blocks discussed above. It was argued that this is especially important in the many cities where not much progress has been made so far and where a culture of change is lacking. Here the main prerequisite is to create and stabilise a political momentum for change. But even in more advanced cities, broad and stable long-term commitment backed by a broad range of different actors is also needed to carry things further. Building networks of cities was seen as a promising approach to create political momentum.
- Further, it was argued that the White Paper targets need to be connected to relevant local conditions and long-term visions in each city. This would make them more meaningful to individual cities in Europe and help create momentum for change. Even if it is unlikely that there will be full consensus on which actions to take in each city, it is most important that diverse local stakeholders become engaged in the formation of visions and the creation of solutions to urban mobility problems. This was seen as important for all aspects of the goal, but particularly for the city logistics element. All cities should adopt and incorporate SUMP according to the stakeholders, and should take inspiration from European level advice and guidance.
- Another important issue is how to generate funding for change. Even if much can be done to improve urban mobility without necessarily building costly new infrastructures; new sources of funding at different scales can allow for new solutions and ideas to be realised. In larger cities, congestion or road user charging is clearly a potential, yet controversial, source of revenue. Other sources of funding need to be developed and made available to cities, regardless of size, including PPPs; national incentives/grants for cities that adopt ambitious SUMP;

European Regional funds; and possibly even via unconventional or emerging means such as ‘crowd funding’, for new mobility innovations.

- Furthermore, new and integrative business models deserve stronger support; in urban areas, more and more people strive for flexibility by using a multimodal mixture of public transport, cycling and walking, and other mobility forms. That such models may be very important for progress towards the goal can be illuminated by the example that car-sharing schemes contribute significantly to the fleet of battery electric vehicles in some European cities through schemes such as ‘car2go’, ‘drive-now’ or ‘Autolib’. Private initiatives and resources mainly carry out these activities. The city can take the role of catalyst to yield such ‘low-hanging fruits’.

#### 4. Fictive Cities

Besides the rather general findings mentioned above, it was strongly emphasised by stakeholders that it is crucial to explicitly address the differences between EU cities. In TRANSFORuM this was done by working with what we called “fictive” cities. The approach is strongly inspired by scenario methodology. Scenarios can usually have two very basic (interrelated) functions: a scenario as a product and scenario building as a process (Volkery and Ribeiro, 2009; Schippl 2016). The fictive cities served both of these functions. In the “product-mode” they helped to illustrate how the more general findings of the stakeholders debates can be related to concrete urban contexts and, in the “process-mode”, they helped to orient, structure and focus the debates with stakeholders as well as the work of the project team when compiling the final version of the urban roadmap.

A first outline of each fictive city was drafted by the project team and then further developed by stakeholders in a workshop. On that basis, the project team compiled the three different transformation pathways described in this section. The pathways are described as brief storylines in the full roadmap document. A summary is given in this section. Each pathway – or fictive city – is described for a hypothetical urban context that in some respects resembles ones existing in Europe. Their key characteristics are summarised in Table 1. (1) “Waterberg” aims for high shares of electric vehicles; (2) “Viga” puts most of its efforts into changing modal shares; and (3) “Valanov” is more uncertain as it is just beginning to reframe its transport policy towards sustainable climate friendly mobility. As such, whereas the first two cities have already made some progress in promoting sustainable transport, Valanov is considered a ‘starter’ city, and its actions and level of ambition are reflective of this.

Table 1. Main characteristics of the three fictive cities – Waterberg, Viga and Valanov.

	<b>Waterberg</b>	<b>Viga</b>	<b>Valanov</b>
<b>Key strategy</b>	Technical substitution: “technophilic” approach	Modal sharing: Reduce use of private cars	‘Starter’ pathway: Developing enabling conditions to ‘catch-up’ with frontrunner cities
<b>Characteristics</b>	Approximately 500,000 inhabitants University, local car manufacturer, low urban density, hilly, large lake	Approximately 900,000 inhabitants University, local car manufacturers, fairly high urban density, flat; sprawling	Approximately 250, 000 inhabitants No University, regional cultural centre, ageing population, no car industry, medium density Border city; very hilly
<b>Transport system</b>	Good public transport, tramway, cycling network, EV charging points	Good public transport, metro, cycling network	Poor bus system, no cycle lanes
<b>Modal split (passenger)</b>	65% drive/10% public transport/10% cycle/ 15% walk	45% drive/20% public transport/20% cycle/ 15% walk	53% drive/25% public transport/2% cycle/ 20% walk

It is clear that in reality many more than three different types of cities exist and every city has its own unique context, but we found it manageable and useful to elaborate three indicative cases, as partly representing ‘extremes’ in conditions and approach. This allows for exploring how, despite differences, the strategic ‘building blocks’ for action, and the frameworks for change identified in the previous chapters can be applied in different ways, and in multiple combinations, to take account of this diversity, and yet reach towards the same goal. Willing stakeholders joined the exercise of exploring and animating fictive cities and found the approach useful. Through this process, it

was possible to find a quick route to debating the strategic scope towards fulfilling the goal. Paradoxically, perhaps, the fictive setting contributed to the entry of realistic deliberations about how to fulfil the goal.

#### 4.1. Technological substitution pathways in Waterberg

The city of “Waterberg” has embarked on a pathway towards an interpretation of the goal that mainly emphasises ambitious technological advances. The primary element of such an approach revolves around the idea of substituting (i.e. replacing) conventionally-fuelled vehicles with battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV). The city of Waterberg has adopted a “technophilic” approach; it trusts in the ability of science and technology to deliver long-term solutions. The report that kick-started the strategic initiative of the city had the title “From problems to opportunities.” This indicates that every challenge bears the potential to spark innovation and, in turn, to trigger economic growth. The core of Waterberg’s system of innovations is electric vehicles (EVs). Individual car ownership is considered sacrosanct in Waterberg, partly due to the long-standing presence of Clarvil in the city, a car manufacturer that provides a significant number of local jobs. Car-sharing, public transport, cycling and walking are also considered as important complimentary aspects. Emissions from cars, especially diesel cars are perceived as a serious challenge, which causes severe respiratory problems for large sections of the population. Also the historic buildings in the city centre suffer visibly from damages caused by emissions (and vibrations) of cars. The “Breathe again” promise of the leading political party is therefore often mentioned as an important factor for their success in the recent local elections. Another challenge is the high congestion levels in Waterberg.

Table 2. Milestones adopted in Waterberg.

	2010	2015	2020	2025	2030
Share of full EVs or hydrogen FCVs in new car market	1%	7%	20%	30%	60%
Funding/financing	National public fund	Local public funding scheme for private initiatives of ‘green’ concepts		Continuation	Continuation
Roll-out of charging points	One private charging point per + some public stations	Every new house/building has a charging point			
Share of transport-related public procure-ments that require ‘green’ fleets (EVs or other alternative fuels)	20% in public transport fleet, 80% local health services; 30% waste collection	30% in public transport fleet, 90% local health services and 30% waste collection	50% in public transport fleet, 100% local health services 70% waste	80% in public transport, 100% health services and 100% waste	100% in all local sectors
ICTs supporting EVs		More use of ICT for efficiency improvement in the freight sector		A multimodal transport information, management and payment system	
Share of urban freight services delivered by EFVs	5%				50%
Indirect measures	High fees and taxes on ‘conventionally-fuelled cars’	Increasing parking and toll cordon fees for ‘conventionally-fuelled cars’ in the city centre		Continuation	Continuation

Some key factors contribute significantly to create favourable conditions for electric vehicles. The regional government recently decided to aim for energy autonomy. Given the availability of hydro energy in artificial lakes between Waterberg’s hills and thanks to the vast agricultural areas in the flat hinterland, this aim is not entirely unrealistic. Because of powerful political incentives structures for EVs, the total cost of ownership of EVs is as affordable as ‘conventionally-fuelled’ cars. In addition, at local level access to parking and provision of infrastructure are important measures. As part of the “from problems to opportunities” approach, an “EV FORUM” was created. In the beginning it served as communicative platform for stakeholders in the city and also included some politicians from the national level. Meanwhile, it has a steering committee that is strongly linked with the city administration. Together with the EV FORUM Waterberg has developed and adopted a mini-roadmap with specific milestones (see Table 2). EVs are a concept that all the political parties in Waterberg can accept, the EV FORUM is a solid integrative platform. However, as bus lanes are increasingly congested due to the many EVs, some opposition has arisen. Some groups

regularly raises the issue that EVs will not solve, and may possibly even worsen, congestion levels and that the livability of the city continues to suffer from any vehicles' high demand for space, both for roads and parking. Student unions fears that cyclists who used to move relatively freely on bus lanes will soon be in danger of thousands of silent "stealth" cars. So, there are certain conflicts that remain to get solved.

#### 4.2. Modal Sharing pathways in Viga

The city of Viga has embarked on a pathway that mainly emphasizes changes in the use of vehicles. The focus is on shifting away from strong dependence on individually-owned and -operated passenger cars, vans, and trucks towards more reliance on other forms of access, transport modes, and vehicle usage patterns. The strategy involves measures for compact urban development, promotion and integration of public transport, cycling, walking, car-sharing, and ride-sharing – and measures to manage urban freight and delivery flows. Cleaner vehicles and fuels are also promoted as part of the strategy but the city is more focused on the demand, behaviour, and culture of mobility, which it aims to influence and optimise from an urban quality of life perspective.

A key measure is the access restriction zones for the whole city area based on a staged model for the concept of conventionally-fuelled, owned and operated vehicles. The most restricted area in the city centre is totally car free; the second most restricted areas only allows EVs operating in a certified car-sharing scheme; a third level area allows conventionally-fuelled cars but only shared ones; a somewhat similar zoning applies to freight with privileged access for vehicles travelling from the City Logistics Service Centre (CLSC), and/or environmental friendly vehicles. The city logistics package involves the construction of three CLSCs for different types of freight going into the city. The CLSCs offer a range of logistics services to users, operating under commercial conditions. These are the key-elements of a package of measures that were adopted in the context of the city-wide collaboration and the SUMP. Viga in 2014 has adopted a mini-roadmap with milestones towards the goal (Table 3).

Table 3. Milestones adopted in Viga.

(Baseline) 2010	2015	2020	2025	2030
<b>Private car</b>	Stabilise modal share of private cars	Modal share of private cars is below 35%	Modal share of private cars is below 30%	Modal share of private cars is below 25%
<b>Quality of public transport</b>	High quality public transport 500m away from 90% of dwellings	High quality public transport 400m away from 90% of dwellings	High quality public transport 300m away from 90% of dwellings	High quality public transport 250m away from 90% of dwellings
<b>Car-sharing</b>	Car-sharing option less than 500m away from 50% of dwellings	Car-sharing option less than 400m away from 60% of dwellings	Car-sharing option less than 300m away from 75% of dwellings	Car-sharing option less than 300m away from 90% of dwellings
<b>Cycling</b>	Cycling network increased 10% from baseline	Cycling network increased 15% from baseline	Cycling network increased 20% from baseline	Cycling network increased 25% from baseline
<b>Driving</b>	20% of inhabitants under 35 subscribe to car-sharing or have no driver's license	40% of inhabitants under 35 subscribe to car-sharing or have no driver's license	60% of inhabitants under 35 subscribe to car-sharing or have no driver's license	80% of inhabitants under 35 subscribe to car-sharing or have no driver's license
<b>Urban logistics</b>	10% of retail uses CLSC; 5% delivered by 'CO <sub>2</sub> -free' vehicle	15% of retail uses CLSC; 10% delivered by 'CO <sub>2</sub> -free' vehicle	20% of retail uses CLSC; 15% delivered by 'CO <sub>2</sub> -free' vehicle	25% of retail uses CLSC; 20% delivered by 'CO <sub>2</sub> -free' vehicle
<b>Public transport fleet</b>	60% of public transport fleet is 'CO <sub>2</sub> -free'	75% of public transport fleet is 'CO <sub>2</sub> -free'	90% of public transport fleet is 'CO <sub>2</sub> -free'	100% of public transport fleet is 'CO <sub>2</sub> -free'

Most crucial issue is to create and maintain political consensus and wide stakeholder support to such a radical goal that challenges the role of the conventionally-fuelled car in the urban economic system and everyday life of citizens, given the popularity of cars. For example, Viga struggles to achieve acceptability for the congestion charging scheme. To maintain the vision of a modal sharing approach, there first of all has to be credible and attractive alternative forms of access and mobility available or in the pipeline. A strong charismatic leader and a strong local culture (e.g. citizens

depicting themselves as ‘mobilitists’ rather than ‘car owners’) may be important elements. Also the wider (national) political and cultural framework may be important.

The sharing of cars is a promising alternative, since it does not fundamentally alter the ‘gestalt’ of the car as provider of fast, comfortable and flexible mobility. Car-sharing may to a large degree be seen as self-financing or market driven. Cities can support it by providing parking spaces and various forms of preferential treatment. City logistics is one of the measure packages where local action and agreement is particularly important. Viga has adopted a proactive approach, where the different actors (e.g. retailers, forwarders, carriers and the municipality) formed a partnership that works together to identify solutions to local conflicts and also plans ahead of major events.

Another more general aspect is the funding for investments in alternative modes and subsidies for various incentive schemes. Investments in urban transport systems influence travel behaviour and attract travellers, but require large sums beyond what the city budget can sustain. Even with some income from congestion charging, tolls and other funding sources such as national government support, there is a need for private resources.

#### 4.3. ‘Starter Pathways’ in Valanov

The city has embarked on a pathway that takes into consideration its context as a smaller and less affluent city. Following a transition to a market-based economy, Valanov has experienced significant growth in private car ownership and use over recent decades and suffers consequently from high levels of congestion, air and noise pollution and inadequate parking provision. Walking and cycling infrastructure is limited and somewhat poor where it does exist. The hills around the city deter people from active travel. Public transport systems are old and underfinanced and public perception regards transit as an outmoded and old-fashioned means of travel. Being close to an international border, the city receives significant throughput of both national and international passenger and freight traffic and measures are discussed to manage the environmental problems caused as a result of this location.

Valanov has identified the need for an overarching strategy to manage and upgrade its transport networks, with a cohesive and long-term view. A resolution to develop a comprehensive SUMP is also adopted by the city council that adheres to the established guidelines of the European Commission. The City plans for incremental changes, mainly to improve the efficiency and maintain the patronage of public transport, to improve the infrastructure for walking and cycling and to promote alternatively-fuelled private cars amongst residents and commuters alike. Also new PPPs will be required to facilitate and fund efforts to grow momentum for modal shifts and to pilot alternatively-fuelled vehicles. In order to benefit from international exchange, Valanov actively seeks involvement in various European projects to learn from and share experiences with other cities.

Table 4. Milestones adopted in Valanov.

Baseline (2015)	2020	2025	2030
Use the initial SUMP document to push-start political moment	SUMP established and 20% of SUMP measures implemented	60% of SUMP measures implemented	SUMP fully implemented
Initiate a national network of medium-sized starter cities	10 Member cities	20 Member cities	30 Member cities
Reduce car usage	45% of trips by car	40% of trips by car	35% of trips by car
Charging network for EV and e-bikes	50 points	200 points	500 points
Cycle network and promote cycling	10km new network	25km	50km
Smart Card	30% PT customers	50% PT customers	80% PT customers
CLSC funding acquired, business plan approved	Successful pilot CLSC up and running		2 <sup>nd</sup> CLSC fully operational

To develop long-term strategies and to ensure commitment several integrative processes were implemented, amongst them:

- A wider platform for collaboration, bringing together stakeholders including the private bus companies and the taxi companies to offer more integrated transport



- A freight group was established to explore the feasibility of opening a series of CLSCs on the peripheries of the city to minimise through traffic;
- A public engagement process was set up to understand public attitudes to walking, cycling and how to improve perspectives on public transport.

The City has agreed to use the following mini-roadmap with milestones as points of orientation for urban policy:

## 5. Towards a European roadmap

In spite of the differences between cities a broader set of more generic approaches that could jointly enable the urban transport goal to be fulfilled emerged through the stakeholder consultations. On that basis, the project developed a rather detailed set of actions to be taken at the local, national and European levels over the next 15 years, or, in other words a roadmap for what needs to be done by whom and when. Here we summarize the main features of the roadmap, while more details can be found in the report (Gudmundsson et al, 2015). An important proposition of the roadmap is the need to combine two types of actions, called:

- ‘Processes’, meaning framing, enabling and coordinative actions, and
- ‘Measures’, meaning direct policy, intervention or investment actions.

Both types of actions would be needed at all three political levels (European, national/regional, local), but the roadmap cannot prescribe in detail which combination of actions would be needed or feasible in each country or city.

**European level:** Action at the European level is especially relevant in order to set common technical standards, to define frameworks for common national and local actions, and to support research in urban transport problems and solutions with a view to exchanging good practices, and to monitoring performance and results. Examples of proposed *processes* to be fostered at the European level include the further promotion of sustainable urban mobility planning and the facilitation of political platforms for mutual commitment and engagement of cities, including especially starter cities such as Valanov. Examples of key *measures* to be adopted at the European level include:

- European technical standards for vehicles, alternative fuels systems, and infrastructure;
- Enhanced financial and practical support to implement sustainable mobility measures at the city level;
- Reinforcement of the Urban Mobility Observatory (UMO) into a more powerful hub for knowledge co-production; and deployment among Europea cities

**National level:** Action at the national level is especially important because urban planning frameworks general transport policies as well as taxation and charging regulations remain largely within national jurisdictions. National level policy action is needed to align country-specific legislation, fiscal regulations, and planning frameworks with transformations needed to accomplish European and local goals. Examples of proposed *processes* at the national include that member states should conduct a series of policy reviews; one concerning how national planning frameworks could be adjusted to enable cities to adopt and implement sustainable urban mobility plans and another on how the existing taxation systems could be adjusted to support the introduction of sustainable alternative fuel vehicles. Campaigns to promote awareness of alternative solutions to the use of conventionally-fuelled vehicles in cities should also be investigated. Examples of key *measures* include :

- Ambitious, effective and realistic deployment strategies for alternative fuel infrastructure;
- Revision of regulations allowing cities to charge and restrict unsustainable vehicles;
- Support for City Logistics Service Centres (CLSC) to effectively tackle urban freight-related problems.

**Local level:** Action at the local level is obviously essential to foster real change in the urban mobility. The local processes that are especially promoted include successively comprehensive SUMP, instigation of broad inclusive stakeholder processes, initiation of urban freight partnerships, and formation of jointly committed partnerships of

cities. ‘Starter’ cities should begin by adopting basic versions of each process, while cities already ‘advancing’ would build on existing results and adopt more ambitious and transformative schemes. The measures proposed in the roadmap refer to *seven generic areas* of action that all cities should exploit and combine to the degree necessary and feasible in the local context, rather than to a uniform set of specific measures. The seven areas include:

- All cities should adopt an integrated transport and land use plan, as defined in national planning frameworks;
- Public transport should be further developed in terms of infrastructure and service. Public transport vehicles should be based mostly on fossil free fuels by 2030;
- Every city should have a walking and cycling network. Also more advanced plans and strategies should be deployed towards making these truly convenient forms of mobility;
- Support car-sharing by providing for example, reserved parking, promoting it and procuring mobility services from car-sharing organisations;

## 6. Summary and Conclusions

The main message is that in TRANSFORuM there is a broad agreement that the targets are achievable, at least in principle. Most crucial changes are related to the governance of urban transport and to user behavior, in particular when it comes to modal choice. There is a huge potential in making more efficient use of the ‘building blocks’ that are already available in advanced cities (cycle lanes, car-sharing, incremental improvements to public transport, etc.).

The relevance of creating an “enabling culture” of change needs to be more acknowledged by many cities. Much can be achieved by systematically improved communication and coordination. This seems to be a necessary condition for the development of successful pathways towards the target. The fictive cities illustrate well that such pathways can develop in rather different ways taking local conditions into account. So, there is quite a lot that cities can initiate and implement by themselves.

A crucial message from the TRANSFORuM process was the European level focus on climate change and fuel independence must be aligned with concerns and benefits pertinent to the urban level such as improved accessibility, quality of life, safety, health, and prosperity. The European urban transport goal must be made more resonant with cities. Working with fictive cities can help to demonstrate how this can be achieved.

## References

- CEC, Commission of the European Communities, 2011a. Roadmap to a Single European Transport Area –Towards a Competitive and Resource Efficient Transport System, 28. 03. 2011, Commission of the European, COM(2011) 144 final.
- CEC, Commission of the European Communities, 2011b. Cities of tomorrow. Challenges, visions, ways forward, Brussels.
- CEC, Commission of the European Communities, 2013. Together towards competitive and resource-efficient urban mobility. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels.
- EEA, European Environmental Agency, 2014. Focusing on environmental pressures from long-distance transport. TERM 2014: transport indicators tracking progress towards environmental targets in Europe. European Environmental Agency, EEA Report, 7/2014.
- ETRAC; EPOSS, and SmartGrids, 2010. European Roadmap Electrification of Road Transport. Version 2.0 / November 2010. EPoSS Office c/o VDI/VDE Innovation + Technik GmbH, Berlin. [www.egvi.eu](http://www.egvi.eu)
- Gudmundsson, H., Schippl, J., Leiren, M., Brand, R., Sørensen, C. H., Anderton, K., Reichenbach, M., 2015. TRANSFORuM Roadmap Urban Transport. Cologne: Rupprecht Consult., Online: <http://www.transforum-project.eu/>
- Schippl, J. 2016. Assessing the desirability and feasibility of scenarios on eco-efficient transport: a heuristic for efficient stakeholder involvement in foresight processes. foresight, special issues of the FTA2013 seminar, forthcoming.
- Schippl, J., 2013. Sustainable urban mobility: challenges, trends & opportunities. EIONET Meeting on Transport and Environment, 24 May 2013, EEA Copenhagen
- Volkery, A. and Ribeiro, T. 2009. Scenario Planning in Public Policy: Understanding Use, Impacts and the Role of Institutional Context Factors," Technological forecasting and social change, 76, pp. 1198-1207.
- Wefering, F.; Rupprecht, S.; Bührmann, S. and Böhler-Baedeker, S., 2014. Developing and implementing a Sustainable urban mobility plan. European Platform on Sustainable Urban Mobility Plans. URL: <http://www.eltis.org/mobility-plans>