

# Using FLOW's Multimodal Transport Analysis Techniques

in the Transport Planning  
Profession



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# Introduction to FLOW

FLOW sees a need for a paradigm shift wherein non-motorised transport (often seen from a transport policy perspective simply as a nice “extra”) is placed on an equal footing with motorised modes with regard to urban congestion. To do this, FLOW has created a link between (currently poorly-connected) walking and cycling and congestion by developing a user-friendly methodology for evaluating the ability of walking and cycling measures to reduce congestion. FLOW has developed assessment tools to allow cities to evaluate effects of walking and cycling measures on congestion.

Our aim is for such tools to be used as standard for assessing the impact of walking and cycling measures on congestion. The FLOW tools include a congestion impact assessment and traffic modelling. Current modelling software has been calibrated and customised in FLOW partner cities to analyse the relationship of cyclist and pedestrian movements to congestion. The modelling and impact assessment help to identify the congestion reducing effect of walking and cycling measures. FLOW partner cities have developed implementation scenarios and action plans for adding or up-scaling measures that are shown to reduce congestion.

FLOW targets three distinct audiences, with appropriate materials and messaging for each. Cities will learn about the value and use of new transport modelling tools; businesses will be made aware of the potential market in congestion reducing products; and services and decision makers will be provided with facts to argue for walking and cycling to be put on equal footing with other modes of transport. FLOW is meeting the challenge of “significantly reducing urban road congestion and improving the financial and environmental sustainability of urban transport” by improving the understanding of walking and cycling measures that have potential to reduce urban congestion.

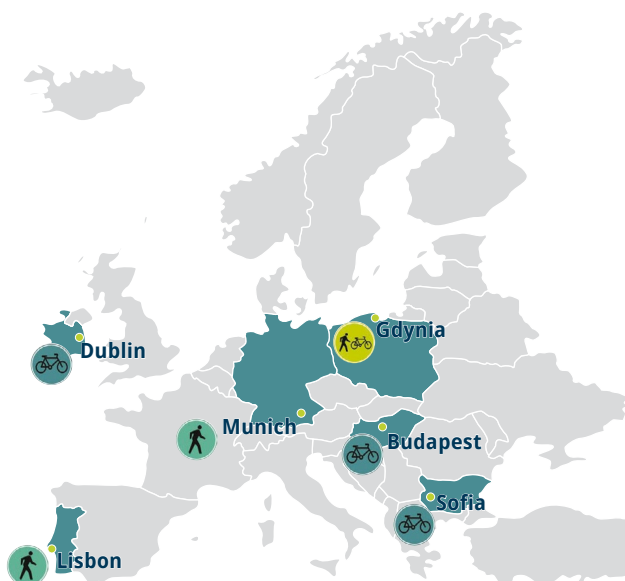


Figure 1:  
Map of FLOW  
partner cities

The communication work in the project has the objective to share FLOW outcomes and outputs to a wider group of cities and regions as well as other urban transport stakeholders across Europe through a set of communication products and networking tools.

# 01.

## FLOW for transport sector businesses

**T**his document has been written for those involved in transport businesses. These include transport planning and engineering consultants as well as producers of transport equipment and supplies (e.g., pavement systems or cycling rack builders). It can assist such businesses in communicating improved methods for analysing multimodal transport system performance (developed in the 3-year EU research project, FLOW) to decision makers, local authority staff and (other) transport consultants.

# 02.

## Introduction

**TRANSPORT  
PLANNERS**  
NEED NEW TOOLS TO ASSESS  
THE IMPACTS OF WALKING  
AND CYCLING MEASURES.

A growing number of individuals and organisations support increased walking and cycling in cities and towns. They recognise that walking and cycling help support the creation of liveable, sustainable and economically healthy communities. They see how communities that have introduced more walking and cycling thrive, and they are becoming aware that spaces designed for motor vehicle traffic are less interesting and less pleasant.

Transport planners see and acknowledge these trends; but on the other hand, they recognise that transport measures often have impacts different to and beyond those that one might expect. For example, widening a roadway may not reduce congestion, just as narrowing a roadway to add a cycling lane might not lead to more congestion (particularly if people switch to cycling as a result). Therefore, planners use transport analysis techniques and tools to analyse transport schemes and help communities choose the best measures to implement. Until now, many of these tools have been insufficient for precisely analysing the impacts of walking and cycling measures.

FLOW was a European Commission research project focused on examining the congestion-reduction benefits of walking and cycling, with the goal of improving transport analysis tools to better assess the impacts of walking and cycling on transport system performance. These tools were developed and tested by a broad range of stakeholders: NGOs for roads, cycling and walking, experts on transport modelling and engineering, as well as cities and research institutes. The tools were used in six project partner cities across Europe to evaluate and help plan key walking and cycling improvements to address congestion.

This document outlines how transport sector businesses can use the FLOW approach to help clients and administrations better ask, and answer, questions about the impacts of walking and cycling measures. Chapter 2 describes a context in which businesses can use the FLOW approach. Chapter 3 outlines challenges faced by potential clients that can be addressed using the FLOW techniques. Chapter 4 summarises the available FLOW tools. Chapter 5 outlines the FLOW project recommendations, focusing on those of interest to transport sector businesses, and Chapter 6 presents full references to the FLOW project documents and products (all available at <http://h2020-flow.eu/resources/>).



# 03.

## How transport sector businesses can use the FLOW approach

**EUROPEAN  
EXPERTISE**  
IN SUSTAINABLE TRANSPORT  
PLANNING AND ANALYSIS IS  
A MAJOR POTENTIAL EXPORT  
MARKET.

One of the key objectives of the FLOW project was to create improved transport analysis techniques and tools that could be used by transport planning consultants as part of their daily work. While these technical tools can be applied directly by transport businesses, it is also important for businesses to help build the demand for such tools. In other words, helping clients understand the need for these tools and encouraging them to request their use. Both these activities are discussed below.

The provision of transport modelling tools and consultancy is a significant business area. European expertise in sustainable transport planning and analysis is a major potential export market. The development of improved analysis techniques and tools, as undertaken in the FLOW project, helps to support and expand this market.

Given the importance of the transport planning consultancy sector to FLOW success, the project identified three specific objectives for engaging with the consultant community:

1. Promote the FLOW concept, methodology and assessment tools for take-up by the transport planning consultants;
2. Communicate FLOW results broadly to foster private sector up-take, and help generate client demand for the FLOW analysis tools; and,

3. Create a stakeholder group of industry multipliers to promote the use, and continued improvement, of better tools for analysing the impacts of walking and cycling on transport system performance.

These three objectives have been accomplished through the FLOW project's research, communications, and uptake elements. The research-developed assessment tools have, as outlined below, been publicised through a range of media, and a stakeholder group was initiated.

How can transport planning consultants use the FLOW results?

First, by using the FLOW tools when they perform transport analyses. Second, by encouraging clients to ask transport planning consultants to use the FLOW tools when they perform transport analysis (see Chapter 3). And, third, by recognising the importance of continuing improvement of techniques and tools for analysing walking and cycling measures – and becoming actively involved in supporting their development.





# 04.

## Client challenges

As private sector businesses, transport planning consultants must offer services demanded in the marketplace. But what if the client does not know what services they need or the full extent of services available? This is especially problematic in scientific fields such as transport planning, where technical complexity can be overwhelmed by popular folk wisdom or intuitive (but inaccurate) assumptions.

Cycling lanes present an excellent example. Intuitively, most people would expect narrowing a road lane to build a protected bike lane would increase congestion. Transport planners know the story is much more complex. They recognise the importance of, for example, examining how much width is really needed for motor vehicles on a given road segment, or assessing the mode change from motor vehicle to cycle when a safe cycling facility is built, and many more technical factors.

Today's communities face a range of conflicting interests. Many residents call for better walking and cycling, while others object to such changes based on how they imagine it will impact them. Transport planners find themselves in a dilemma; they are unable to answer these concerns directly since existing transport analysis techniques do not precisely assess the impacts of walking and cycling measures.

FLOW has taken a step in the development of tools (described in Chapter 4) to address this dilemma. Transport planning consultants can use them to help make better assessments and to communicate the results of these assessments to decision makers and to the public.

But how can transport planning consultants encourage clients to ask them to use these tools or consider walking and cycling measures? Following are three target audience-based approaches – for decision makers, local authorities and (other) transport consultancies – including suggested FLOW resources to facilitate the process.

## 4.1 DECISION MAKERS

### MANY DECISION MAKERS

WOULD LIKE TO DO MORE  
TO IMPROVE WALKING  
AND CYCLING IN THEIR  
COMMUNITY FOR ECONOMIC,  
SOCIAL, LIVEABILITY AND  
ENVIRONMENTAL REASONS,  
BUT THEY ARE WORRIED  
ABOUT THE TRANSPORT  
IMPACTS.

Ultimately decision makers (including elected representatives, mayors and senior administrative staff) are the most important audience for ensuring the take-up of tools and techniques that fully and accurately incorporate the effects of walking and cycling, as outlined in FLOW. If the decision maker says such tools must be used, then the tender documents requesting private sector transport planning assistance will require their use, and practitioners working in the community will begin using the tools in their day-to-day activities.

The first step in reaching decision makers is recognising that many of them would like to do more to improve walking and cycling in their community for economic, social, liveability and environmental reasons, but they are worried about the transport impacts. In other words, they want to implement more walking and cycling measures but need support from technical analyses and reports to justify it.

In almost all cases, decision-makers have little understanding of technical details (this is not a criticism; technical details are not their job). Instead they rely on the advice of staff members and outside experts. Decision makers want technical analyses and models that can add a degree of objectivity to a political decision-making process or simply provide convincing visual aids to explain the project benefits and impacts.

Many decision makers today are frustrated by the inability to clearly describe the impacts of walking and cycling measures and by the lack of data and evidence on the transport benefits for walking and cycling.

Transport planning consultants can help address this frustration by:

1. Showing decision makers and their staff how walking and cycling measures have been implemented to improve transport conditions – and bring many other benefits – to many communities. The FLOW communications tools<sup>1</sup> can support this:
  - FLOW Quick Facts for Cities: illustrates 15 walking and cycling measures that have improved overall transport system performance
  - How walking and cycling can reduce congestion: tools for cities from the FLOW project (short animated video describing the mayor's dilemma)
  - FLOW Portfolio of Measures on the Role of Walking and Cycling in Reducing Congestion. A portfolio of 20 walking and/or cycling measures that were implemented for reasons other than congestion reduction but were found to have positive impacts on overall network performance
2. Informing decision makers and their staff about the availability of improved techniques for assessing walking and cycling measures (developed by FLOW and others), and encouraging them to require the use of these improved techniques in future transport analysis studies.

<sup>1</sup> The tools are all available at <http://h2020-flow.eu/resources/>

**IT IS  
IMPORTANT**  
THAT TRANSPORT  
PLANNERS TAKE ON THE  
RESPONSIBILITY OF KEEPING  
DECISION MAKERS INFORMED  
ABOUT NEW TECHNIQUES  
AND INFORMATION ON  
TRANSPORT ANALYSIS, AND  
PARTICULARLY THE IMPACTS  
OF WALKING AND CYCLING  
MEASURES.

Given the trust decision makers place in professional advice, it is important that transport planning consultants take on the responsibility of keeping decision makers (and their staff) informed about new techniques and information on transport analysis, and particularly the impacts of walking and cycling measures.

Many communities are seeking solutions for environmental problems such as air pollution and climate change. Walking and cycling measures can help, but only if data is available and if information on the effects of all modes can be presented clearly and transparently.

## 4.2 LOCAL AUTHORITIES

Local authority staff, such as city transport planners, are another key audience for understanding and using improved techniques for analysing the transport impacts of walking and cycling measures. Indeed, the best way to reach decision makers is often through the local authority staff, since it is they who are ultimately responsible for converting political will into tangible projects and procuring the data and resources to deliver these projects.

Local authority staff have similar concerns to decision makers but, since they have technical backgrounds, they understand transport analysis techniques. In addition, their position within the local authority means they must directly respond to residents' concerns.

Like decision makers, local authority staff generally understand that more is needed to improve conditions for walking and cycling, but they struggle to justify such measures because of stakeholder worries about congestion, against which they lack strong counter-arguments. On the other hand, the technical backgrounds of local authority staff make it easy for them to understand new analysis techniques.

Local authority staff often end up using traditional (car-focussed) transport assessment methods for a variety of reasons. However, they could avoid this if they: 1) had good precedents to refer to, 2) could overcome the inertia in political cycles, 3) had access to better data, and 4) could disrupt the comfort threshold within internal teams.

Transport planning consultants can use the same approach as for decision makers to help support the local authority staff uptake of improved tools for analysing the impacts of walking and cycling measures. The only difference is that the message can be delivered in much more technical detail. For example, planners can guide local authority staff to the technical resources developed in the FLOW project, especially Walking, Cycling and Congestion: Implementer's Guide to Using the FLOW Tools for Multimodal Assessments, which describes step-by-step how to use the FLOW tools.

Similarly, transport planning consultants can direct local authority staff to the FLOW communications media listed in section 4.1 above. These can provide local authority staff with high quality non-technical arguments and resources to use in discussing walking and cycling improvements and, more practically, dispelling some of the misperceptions that stand in the way of these improvements.

## 4.3 TRANSPORT PLANNING CONSULTANTS

Many private transport planning consultants already recognise the need for analysis techniques that better consider the impacts of walking and cycling measures, but there will always be a need for sharing information on the latest techniques and research findings. This is an especially important aspect of international projects (i.e., transport consulting exported beyond Europe).

The same approach could be used to reach other transport planning consultants as for local authority staff since transport planning consultants have a strong technical background and an interest in learning about new methods. Furthermore, many of the most innovative private transport planning consultants would like to do more walking and cycling projects, recognising it as a growth market that 1) allows them to showcase their innovation, and 2) helps them attract high calibre staff by offering cutting-edge, creative work.

The key message to (other) private transport planning consultants is the importance of spreading it further (i.e., to decision makers and local authority staff) because, ultimately, consultants can only respond to the specification in the client brief. Once the brief has been issued, there is very limited potential to successfully recommend extra work (e.g., using a “non-approved” analysis technique). The new techniques must be included in the brief – and that means engaging in advance with decision makers and local authority staff to explain the benefits of new techniques.

### MANY INNOVATIVE PRIVATE TRANSPORT

PLANNING CONSULTANTS  
RECOGNISE WALKING AND  
CYCLING PROJECTS AS A  
GROWTH MARKET THAT  
ALLOWS THEM TO  
SHOWCASE THEIR  
INNOVATION AND HELPS  
THEM ATTRACT HIGH  
CALIBRE STAFF.

**As part of the FLOW project a series of workshops were held with transport planning experts with a record of innovation in modelling of walking and/or cycling strategies. Three common themes emerged from these FLOW Market Forerunner workshops:**

### **1. Lack of data on walking and cycling**

All participants in the FLOW project emphasised the need for more data on walking and cycling. The lack of data is common to many cities and manifests itself in many ways: it impacts the ability to construct multimodal transport models, to perform other quantitative analyses, and to communicate simple facts such as the growth of walking and cycling in a city's transport modal split.

The lack of data for modelling is particularly problematic because the most robust modelling is undertaken where multiple data sources are available. At a strategic level, the results of a robust travel survey, including trip stages by all modes, is essential. Several specific problems affecting walking and cycling data were identified at the FLOW Market Forerunner workshops:

- **Short trips** – Short trips are often completely neglected in transport survey data collection. Even where reliable data on short trips is collected, it is treated as intra-zonal trips in strategic transport models and therefore not assigned to the highway and public transport networks. This failure to fully consider short trips means that access to local destinations and the walkability (or cycle-ability) of local networks is simply not considered as a factor affecting people's travel behaviour.
- **Origin-Destination (OD) matrix estimation** – Even when data on walking and cycling is available, there are few standardised approaches available for creating the OD matrices needed for transport modelling. Several FLOW Market Forerunners have developed OD matrices for cycling assignment models using travel survey data, mobile data and GPS records from bicycle hire systems; they used bespoke estimation methods to develop the base and future year matrices.
- **Time periods** – Daily and seasonal peak periods for walking and cycling can differ from other modes. This can affect the choice of time periods to model. Mode-specific daily, weekly and yearly factors should be used in all forecasting.
- **Networks** – There are few sources of easily-accessible and reliable walking and cycling network data, and the preparation of networks can be resource intensive. Pedestrian networks are complex and dense. The routes taken by cyclists are also complex because they may include both vehicular and pedestrian networks. The collection of observed route choice data from large samples of pedestrians and cyclists is improving the quality of networks.

A solution to the lack of data on walking and cycling is becoming possible through technology. The availability of inexpensive sensors and GPS tracking can be used to collect this data easily and inexpensively. For example, activity tracking data is being used by many transport planners to help define pedestrian and cycling networks and measure volumes on routes.

Furthermore, several organisations have published recommendations for the collection of walking and cycling data including the Walk21 International Data Standard for Walking (see <http://www.measuring-walking.org/>) and the European Cyclists' Federation's EU Cycling Strategy (see [https://ecf.com/sites/ecf.com/files/EUCS\\_full\\_doc\\_small\\_file.pdf](https://ecf.com/sites/ecf.com/files/EUCS_full_doc_small_file.pdf))

In summary, there is a lack of data on walking and cycling, but also a clear understanding of what data is needed and emerging methods for easing its collection. What is often missing is the recognition that it is critical to collect this data. Transport planning consultants can play an important role in addressing this problem by giving information and recommendations to decision makers and local authorities on the importance of walking and cycling data.

## 2. Travel demand and behaviour of pedestrians and cyclists

The travel demand patterns and behaviours of pedestrians and cyclists differ from those of car drivers and public transport users, meaning modellers must adjust standard transport models to better account for these differences. This requires a deep understanding of the models and especially model parameters and default values.

For example, microscopic models must accurately reflect the observed behaviours of different types of pedestrians and cyclists in the way they interact with each other and with vehicular traffic. Some FLOW Market Forerunners have found it necessary to adapt default model parameters for both cyclists and pedestrians to reflect smaller gap acceptance, more risk-taking behaviour, and more complex/informal movements.

Similarly, macroscopic models must fully consider all the factors that influence the demand for travel by different modes. This is particularly difficult for cycling, which is often the fastest urban travel mode, but where a complex range of motivations (e.g. lifestyle factors, physical activity) and barriers (e.g. actual and perceived safety) have a strong influence on mode choice behaviour. In the case of walking, the traditional time and cost parameters used to estimate mode choice are more useful, but the scale of strategic models ignores these trips (see short trips above).

Transport planning consultants can play an important role in addressing these problems by staying current with the latest in transport modelling research and development, being clear with clients about the need for more detailed modelling of pedestrians and cyclists and supporting the development of improved modelling techniques.

## 3. The role of models in decision making

Transport modelling can be an extremely effective tool for assessing the impact of new land development or transport improvements on transport network performance but their effectiveness depends on how they are used.

Discussion of the relationship between politicians and transport modellers in the public often evokes a hint of cynicism. As transport modellers are acutely aware, models are often used not before, but after, a decision has been made. The modelling effort is then invested in producing an assessment of the proposed scheme to refine some of the details, to reduce uncertainty, or simply to sell it to the public.

This in itself is not fundamentally wrong. But a number of ethical conflicts can arise for consultants if, for example, modelling work is presented as making the case for one option over others when in fact no assessment of the alternatives was made. For this reason, transport planning consultancies strive to ensure that their technical documentation is transparent about what was modelled and what conclusions can and cannot be drawn (particularly important with walking and cycling, where the models are less reliable at forecasting the impact of a measure on demand).

All modelling professionals are aware of examples of behaviour that does not stand up to high standards of ethics and transparency. Transport planning consultants must address these problems by being as transparent and clear as possible. If they are not, they risk losing the confidence of the public. They should also encourage decision makers and local authorities to use transport models to help make the decisions about land development and transport improvements (as opposed to justifying them after the fact). A good practice is to perform detailed modelling during long term planning processes so that information is available before specific proposals are tabled.



# 05.

## FLOW Tools: Improved Analysis Techniques

A key objective of the FLOW work with private sector businesses is increasing the uptake and use of the transport analysis techniques developed in the project. This chapter presents a brief outline of these techniques.

The FLOW transport analysis techniques and models are designed to more accurately assess the impacts of walking and cycling measures on transport system performance. The project began by examining existing techniques and then developed the following transport analysis and modelling tools:

- five calculations of multimodal performance on transport infrastructure;
- a comprehensive impact assessment tool; and,
- improvements to transport modelling software.

Sections 5.1 to 5.3 summarise the improved transport analysis techniques developed by FLOW. For more detailed information and to download the spreadsheet-based tools, please see Walking, Cycling and Congestion: Implementer's Guide to Using the FLOW Tools for Multimodal Assessments at <http://h2020-flow.eu/resources/>.

## 5.1 MULTIMODAL TRANSPORT ANALYSIS CALCULATION METHODS

The FLOW multimodal transport analysis calculation methods were developed to improve the ability of existing analysis techniques to assess the transport benefits and impacts of walking and cycling measures.

Three key performance indicators (KPIs) are used to evaluate transport system performance: density, delay, and level of service (LOS). While these techniques are generally acceptable for evaluating the transport impacts of walking and cycling measures, they only provide mode-specific results. This makes it difficult to compare the potential impact of measures for different modes (e.g., whether it is better to add a cycle lane or a bus lane in a given situation).

To address this problem, FLOW developed a set of five multimodal transport analysis calculation methods for evaluating delay, density and level of service. These tools are based on existing techniques but add important extras:

- consideration of persons (rather than vehicles),
- a utility points-based approach to enable comparison of modes, and
- optional policy-based weighting of one mode over others.

The tools were developed for three types of infrastructure: intersections, road segments and corridors. More specifically, tools were developed to evaluate:

1. Intersection delay
2. Intersection LOS (based on delay and utility points)
3. Road segment density
4. Road segment LOS (based on density and utility points)
5. Corridor delay

Instead of directly calculating corridor LOS, FLOW recommends displaying the LOS for intersections and road segments on a map since this provides a better picture of how the corridor works than a single LOS value.

The FLOW tools represent an important first step in modifying existing methods to more accurately assess walking and cycling, but more research and development is needed to further improve these methods.

## 5.2 FLOW IMPACT ASSESSMENT TOOL

The FLOW Impact Assessment Tool was developed to ensure that transport decision making considers more than just transport system performance (e.g., congestion levels). The tool specifically considers the environmental, societal and economic benefits and impacts of a proposed transport measure – in addition to mobility benefits and impacts.

The FLOW Impact Assessment Tool is a spreadsheet-based tool that compares data before and after measure implementation. Users enter data from transport models and economic, societal and environmental projections, and the spreadsheet calculates the benefits and impacts of the proposed measure (e.g., construction of a new cycle lane). The spreadsheet uses factors based on country-specific and EU-wide default values that can be modified by users as necessary and appropriate to account for local conditions.

## 5.3 FLOW TRANSPORT MODELLING IMPROVEMENTS

Transport models are complex sets of inter-related computer programmes requiring large amounts of high-quality data, and therefore are the domain of highly specialised experts. The theoretical basis and algorithms used in many models do not fully consider walking and cycling because of the data processing limitations and the political objectives (i.e., a strong focus on motorised vehicles) that existed when models were initially developed.

Models are being constantly improved based on transport research results. The FLOW project contributed to these improvements by developing the following model refinements:

- Microscopic modelling – Enhanced modelling of conflict zones between cars and pedestrians, behaviour parameters, new mobility patterns, the interaction between bicycles and pedestrians and shared space
- Macroscopic modelling – Path-level attributes in stochastic assignment of bicycles, a modelling platform for combining two legs of a journey using different transport modes (here, shared bikes and public transport) and an enhanced representation of mobility sharing in PT assignment

These were designed to improve the ability of models to consider walking and cycling measures. Here again, the FLOW improvements represent a small but important step in an ongoing process. Many more steps are still needed.

# 06.

## FLOW

# Recommendations

The FLOW project assessed the ability of existing transport analysis techniques and models to accurately evaluate the impacts of walking and cycling measures on transport system performance. The two main research themes were: 1) improving the ability of standardised transport analysis techniques to consider walking and cycling, and 2) placing these techniques into a broader context of urban transport planning and liveability. FLOW developed recommendations in both these areas.

This chapter outlines the FLOW recommendations specifically for transport stakeholders and places them in the context of the three key audiences presented in Chapter 3 (decision makers, local authority staff, and transport planning consultants).

All of FLOW's detailed recommendations are documented in the project summary, *Walking and Cycling: A Multimodal Approach to Congestion Management*, available at <http://h2020-flow.eu/resources/>.

## 6.1 FLOW PROJECT RECOMMENDATIONS

Overall, the FLOW project recommends that transport stakeholders:

1. Fully consider walking and cycling when developing plans and policies to improve transport system performance as well as through the impact analysis and implementation processes.

2. 2.Improve existing transport analysis techniques and models to include all modes and to account for the interaction between modes
3. Improve communication about multimodal transport analysis and increase transparency in the transport planning process.
4. Improve data collection for walking and cycling to better understand the movements of these modes. Refer to the recommendations of the European Cyclists' Federation and Walk21 and the results from the FLOW data workshop (on the FLOW website).
5. Place transport system performance (including congestion) within the larger context of urban liveability, economic viability, safety and health (not above it)

Some suggested specific messages for transport businesses addressing various audiences are provided below.

## 6.2 WHEN APPROACHING DECISION MAKERS

Decision makers are the elected officials and key stakeholders who determine whether proposed transport infrastructure and services are implemented. They include mayors and deputy mayors, elected representatives, senior staff, and members of important local organisations (such as community groups, businesses and environmental organisations).

Transport businesses should encourage decision makers to:

1. Require up-to-date data on walking and cycling. Local authority staff need strong political backing to address the data issue. Decision makers must provide leadership in relation to collecting data and gathering evidence in their communities.
2. Shape the impact assessment framework by working with your staff to specify the assessment criteria for transport schemes at the beginning of projects. Ask for a balanced multimodal assessment that includes all the criteria that are important to the community (economic, social and environmental as well as transport) and about the impact of transport schemes on all modes.
3. Support the ongoing training of your staff so that they understand the multimodal perspective and the need to assess all modes equally.

## 6.3 WHEN APPROACHING LOCAL AUTHORITY STAFF

Local authority staff are the people working for the elected representatives and the community and are responsible for planning and implementing transport measures.

Transport businesses should encourage local authority staff to:

1. Ensure that the content and language of your policies and guidelines on urban traffic management reflect a multimodal perspective of urban road network performance.
2. Ensure that multimodality and modal equity are applied at all stages by: i) having in your procedures and guidelines an impact assessment framework that includes multi-modal transport benefits and significant non-transport benefits (e.g. health), ii) including in your terms of reference for procurement a requirement for services to include a multi-modal impact assessment using good practice tools and techniques and iii) reviewing project performance after implementation with a multi-modal impact assessment.
3. Within the context of your sustainable urban mobility planning, actively seek opportunities to improve network efficiency and city-wide accessibility through measures to improve conditions for safe and attractive walking and cycling.
4. Review your priorities when considering new transport schemes to avoid a disconnect between agreed-upon objectives (e.g. prioritise walking and cycling) and what is done in practice.
5. Proactively address the walking and cycling data gap by reviewing existing data collection standards and processes to ensure that you can answer basic questions about walking and cycling activity such as volumes, mode choice behaviour, safety, infrastructure location and condition, etc.
6. Have in-house understanding of how models work. Either develop in-house competency to carry out multi-modal transport modelling or acquire the skills to write planning and modelling specifications that fully consider walking and cycling and to interpret analysis findings for decision makers.
7. Educate decision makers and stakeholders to take a broader view of the transport problem. For example, reformulate questions on how to solve congestion to how to manage congestion and/or increase corridor capacity.



## 6.4 WHEN APPROACHING OTHER TRANSPORT CONSULTANTS

Transport planning and engineering consultants are companies that assist governments and private sector businesses in creating and analysing transport plans and schemes for new land development projects.

Transport businesses that are already using multimodal transport analysis techniques should encourage their fellow transport consultants, businesses, and professional organisations to:

1. Develop competencies to add multi-modal evaluation of mobility benefits for transport projects and the modelling and assessment of walking and cycling to your service offering. As European transport consultancies, also tailor and market such services to international markets.
2. Ensure that the content and language of training materials and professional standards reflect the principles of multi-modal assessment and mode-equity so that they become the norm rather than the exception in transport planning practice.
3. Work with modelling software providers to improve walking and cycling in modelling tools: both demand and mode choice modelling (macroscopic) and behavioural modelling of interactions (microscopic).
4. Educate clients (i.e. decision makers and local authority staff) about the importance of fully considering walking and cycling in transport impact analyses and inform them about improved techniques and modelling of walking and cycling.
5. Develop a voluntary charter of technical proficiency, transparency and ethics for those who offer services in transport modelling and appraisal and hold those to account who fail to uphold technical and ethical standards.

# 07.

## For more information

The FLOW project results and recommendations are described in a series of publications, brochures and research. All project resources are available at <http://h2020-flow.eu/resources/>

The following resources may be of particular interest to transport sector businesses.

### 7.1 NON-TECHNICAL RESOURCES

- **FLOW Quick Facts for Cities** (Deliverable 7.4) – illustrating 15 walking and cycling improvements that describe some – perhaps surprising – results about overall transport efficiency that have been achieved while improving conditions for walking and cycling (in Bulgarian, English, Gaelic, German, Hungarian, Polish, Portuguese and Spanish)
- **How walking and cycling can reduce congestion: tools for cities from the FLOW project** (Deliverable 5.3) – a 2-minute animated video describing the FLOW tools and their use for cities (in English)

- **FLOW Portfolio of Measures on the role of walking and cycling in reducing congestion:** (Deliverable 1.2) – A portfolio of 20 walking and/or cycling measures that were implemented for reasons other than congestion reduction but which were found to have positive impacts on overall network performance (in English and Ukrainian)
- **Walking and Cycling:** A Multimodal Approach to Congestion Management – summary and conclusion of the FLOW project and its complete set of recommendations

## 7.2 TECHNICAL REFERENCES

- **Walking, Cycling and Congestion: Implementer's Guide to Using the FLOW Tools for Multimodal Assessments** (Deliverable 3.5) – summarises results of the investigation, presents recommendations, describes how to implement FLOW-developed transport analysis tools, FLOW impact assessment tool, and transport model improvements; includes full bibliography.
- **FLOW Multimodal Analysis Methodology of Urban Road Transport Network Performance** (Deliverable 1.1) – describes FLOW multimodal transport analysis tools, their development, and recommendations; includes bibliography.
- **Analysing the impact of walking and cycling on urban road performance: a conceptual framework** (Deliverable 1.3) – documents background research results and sets forth the conceptual framework used to develop FLOW tools.
- **Multimodal Transport Analysis Calculations** – a set of 5 multimodal calculations developed to improve the ability of existing analysis techniques to assess the transport benefits and impacts of walking and cycling measures.
- **FLOW Impact Assessment Tool** (Deliverable 2.3) – an Excel spreadsheet-based tool that assists cities in assessing the (transport, socio-economic and environmental impacts of a transport measure.
- **FLOW Impact Assessment Tool – Guidelines** (Deliverable 2.4) – describes how to use the FLOW Impact Assessment Tool and background for its development.

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