

SUMP for 5 MUNICIPALITIES IN NORTH MACEDONIA

LRCP-9034-MK-CS-CQS-A.1.1.5

Technical Assistance For Development Of Sustainable Urban Mobility Plans For Five Municipalities And Providing Training On Developing And Implementation Of Sustainable Urban Mobility Plans

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TASK 1.3 – STRATEGY DEVELOPMENT: DEVELOPMENT OF SCENARIOS, COMMON VISION, INDICATORS AND TARGETS

Agenda

- Introduction
- Task 1.3 training and general information about strategy development, common vision, scenario and strategy evaluation
- Online surveying for common vision, strategies and scenario development
- Questions session
- Closure of meeting and next meeting

SUMP CYCLE PROCESS

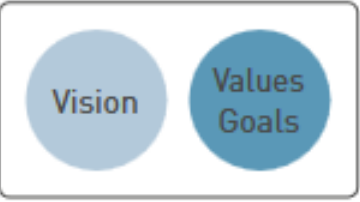


STRATEGY DEVELOPMENT

a. Diagnosis:



b. The future we want:



c. Action plan:



TASK 1.2



Milestone: Analysis of problems and opportunities concluded

04

Build and jointly assess scenarios

What are our options for the future?

05

Develop vision and strategy with stakeholders

What kind of city do we want?

06

Set targets and indicators

How will we determine success?

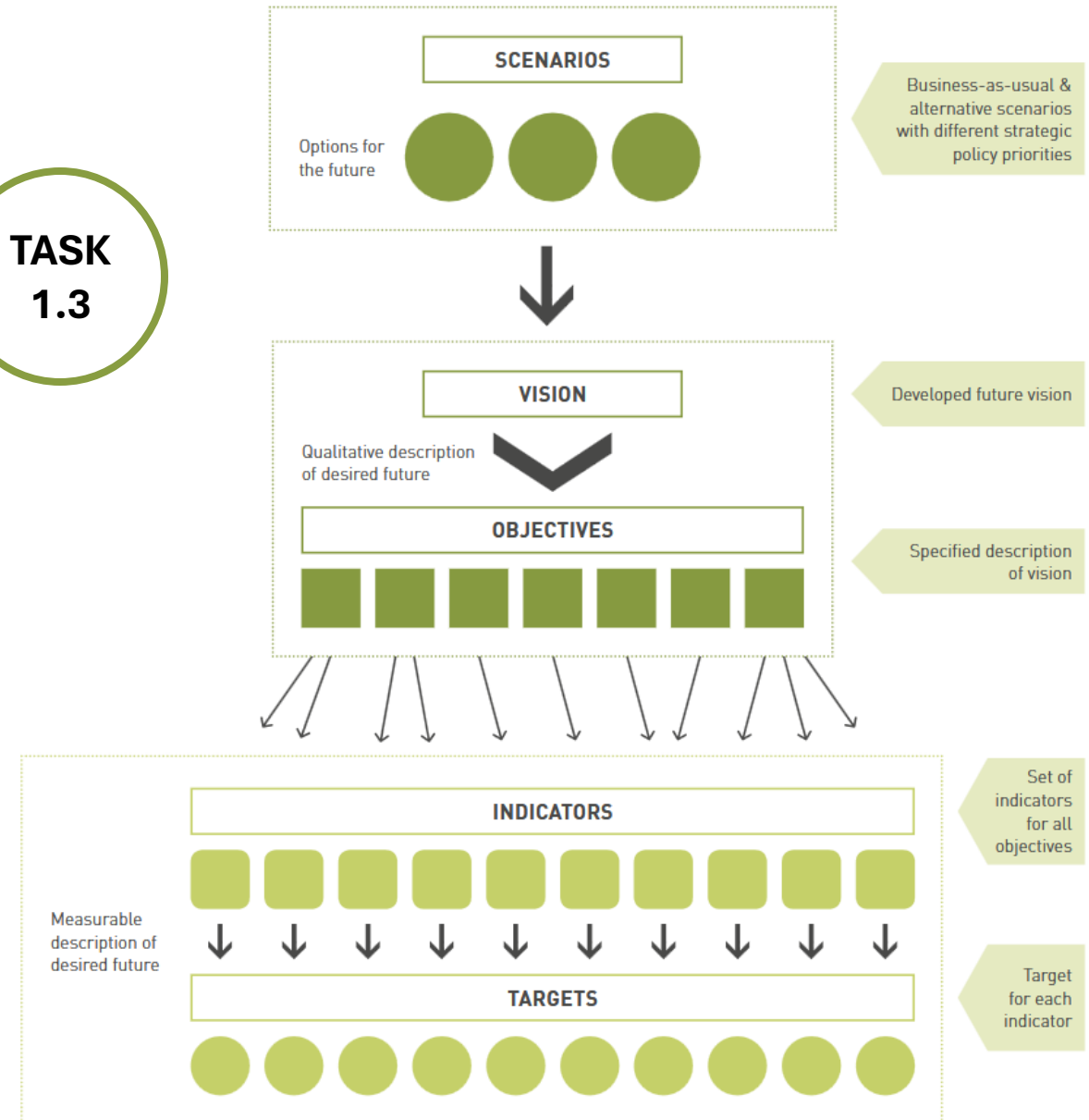
TASK 1.3



Milestone: Vision, objectives and targets agreed

- Build and jointly assess scenarios
- Develop vision and strategy with PSC & stakeholders
- Set targets and indicators

TASK 1.3



STRATEGY DEVELOPMENT APPROACH

- The strategies for the SUMP have been defined based on the analysis from the public consultation as well as considering the common vision that was developed with the help of the PSC and the external stakeholders.
- Strategy for the North Macedonian cities has been shaped by **voluntary alignment** with the following internationally recognized principles:

Principle	Application in North Macedonian Cities
Plan for the functional urban area	Consideration of flows between Prilep and its surrounding areas, reflecting real mobility patterns.
Cooperation across institutions	Engagement with national agencies and neighboring municipalities to enhance coordination.
Participation and transparency	Involvement of stakeholders and citizens in strategy development through public consultation and co-design.
Assessment of current and future performance	Use of both baseline data and future projections to inform decision-making.
Integrated development of all modes	Promotion of walking, cycling, public transport, and integration with motorized transport systems.
Long-term vision with a phased implementation	Definition of short-, medium- and long-term priorities to guide progressive improvements.
Monitoring and evaluation	Preparation of indicators and data collection mechanisms for the implementation and refinement phases.
Quality assurance	Application of internationally recognized planning standards and practices, adapted to local realities.

A model for Sustainable Urban Mobility



Analysis



Adaptation



Fast and light

- **MOMOS** is an assessment tool that offers support to analyse the impact of different policies for **sustainable mobility in urban areas** up to the year 2050.
- **MOMOS** is a flexible tool that can be adapted to **different urban contexts**. In its current version it can be applied to urban areas in the EU Member States, the United Kingdom, Norway or Switzerland.
- **MOMOS** is developed in **MS Excel**, it requires less data and can be applied within much shorter times and at lower costs in comparison with traditional simulation models.

MOMOS MODEL – HOW DOES IT WORK?



Strategic

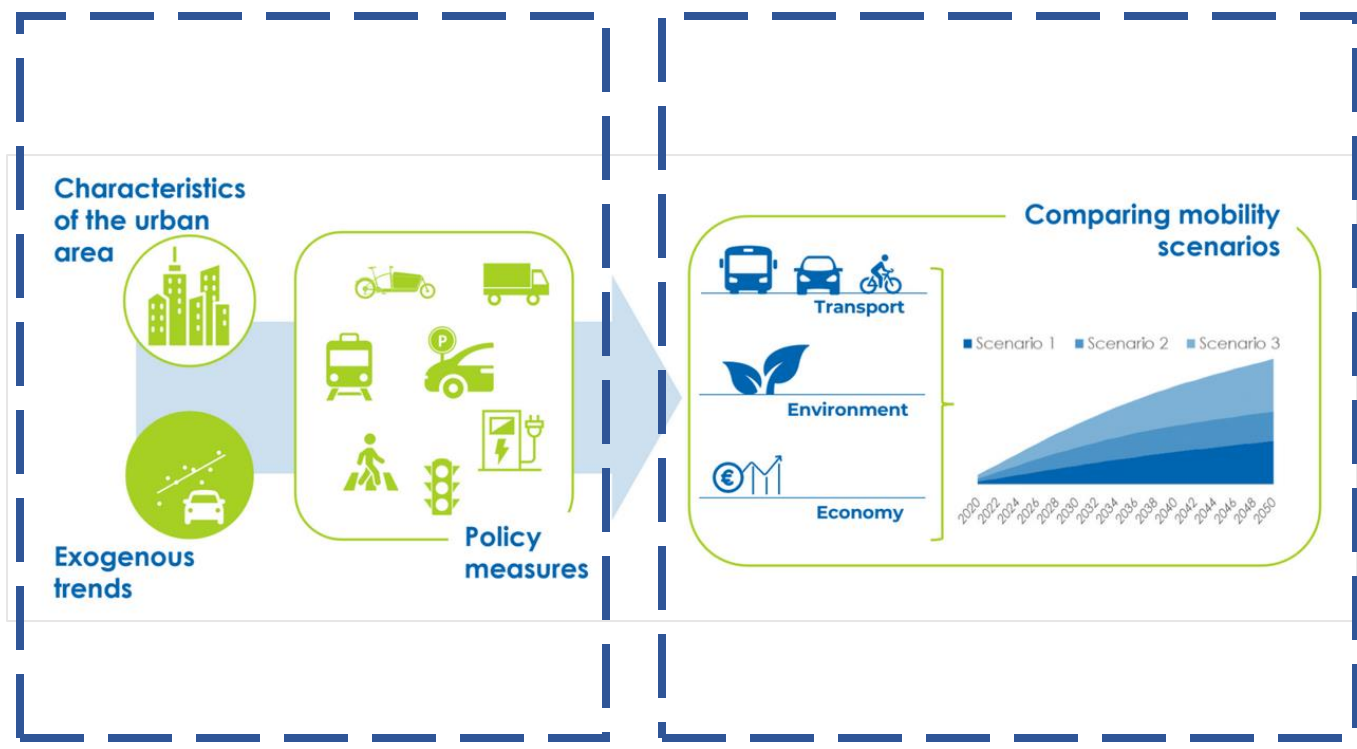
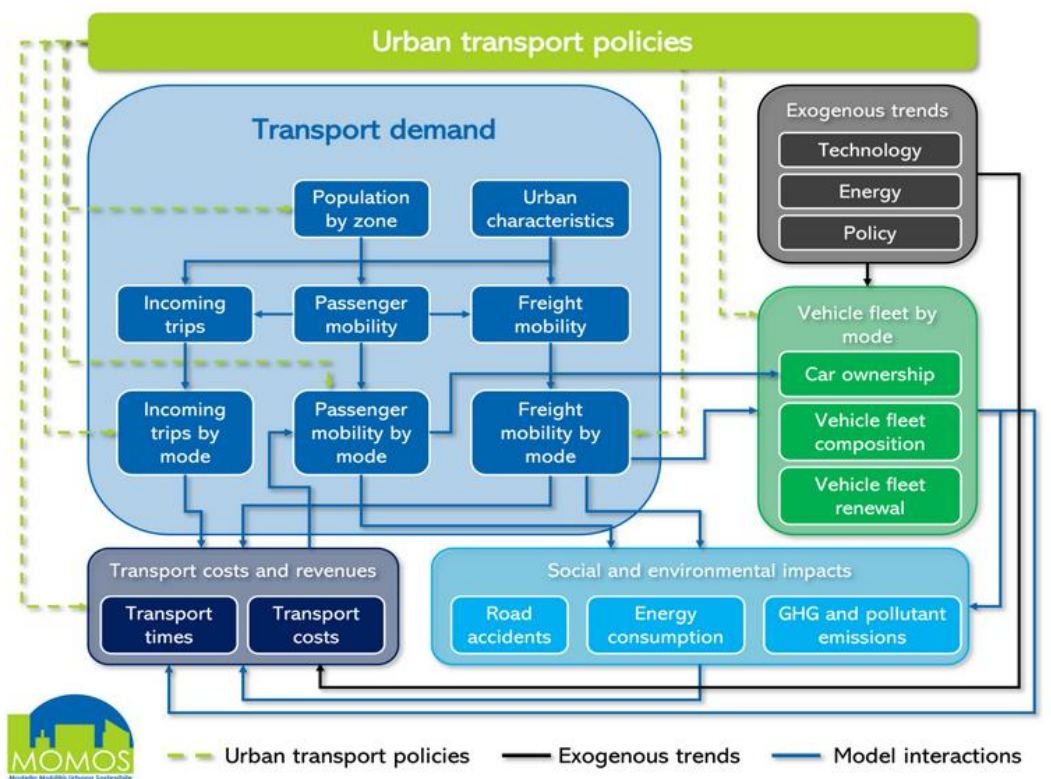
Quantitative

Theoretically sound

Adaptable to a specific context

Adaptable for limited time and resources

The calculation framework



INPUT

OUTPUT



MOMOS MODEL – INPUT PARAMETERS

- Collected during



Group	Input data
Urban characteristics	City type, population structure/distribution/growth, average income, etc.
Urban Mobility features	Motorization rate, modal split, congestion rate, traffic flows, logistic flows, private vehicles fleet composition, etc.
Public transport	Average ticket price, network length, average speed, offer, fleet composition, etc.
Park & Ride	Capacity, extension, frequency, etc. Infrastructure and Traffic
Infrastructure and traffic management	Parking price, parking stalls, bike path length, PT priority lane length, electric charging points, hydrogen charging points, etc
Car sharing	Users, vehicles, price, etc.
Bike sharing	Bicycles, price, etc.
Vehicle access regulation	Limited traffic zones, pedestrian areas, etc.
Traffic calming measures	Share of urban area with traffic calming regulation, etc
Road vehicle fleet composition	Vehicle fleet (LDV, HDV, Buses, private cars, etc)

POLICY AREAS IDENTIFIED

- 1. Walkability & Accessibility**
- 2. Access Regulation and Traffic Calming**
- 3. Road Networks**
- 4. Parking Systems**
- 5. Urban Cycling**
- 6. Public Transport**
- 7. Mobility Management**
- 8. Electric Mobility**
- 9. Urban freight transport**
- 10. Public awareness and engagement**

ASSOCIATION WITH A-S-I FRAMEWORK

The A-S-I approach classifies transport policies into three complementary pillars (see Figure 3-8, SLOCAT, 2021):

- **Avoid/Reduce:** Minimize the need for motorized transport through strategies such as transit-oriented development, teleworking, digital services, and optimized land use planning.
- **Shift/Maintain:** Encourage movement toward more sustainable modes (e.g., walking, cycling, public transport, shared mobility).
- **Improve:** Enhance the efficiency and environmental performance of transport modes through technological advancements, vehicle electrification, and operational optimization.

These pillars ensure that mobility planning is not only technically robust but also socially inclusive and environmentally sound.

A-S-I Pillar	Policy Areas in MOMOS	Examples of Measures
Avoid	Transport Avoidance	Teleworking, car-free days, online shopping behavior, land-use strategies
Shift	Shared Mobility, Public Transport, Traffic Regulation	Bike-sharing, Mobility-as-a-Service (MaaS), improved PT frequency, DRT, intermodality, access restrictions
Improve	Vehicle Fleet, Logistics, Infrastructure	EV/hydrogen infrastructure, fleet electrification, urban logistics hubs, renewable energy integration

1. Walkability & Accessibility

ID	Measures	ASI
M1.1	Develop and maintain safe pedestrian infrastructure and sidewalks	S
M1.2	Improve pedestrian crossings and ensure vehicle-free access to them	S
M1.3	Design shared streets with pedestrian priority and safety features	S
M1.4	Upgrade walking paths near schools and key public facilities	S
M1.5	Create pedestrian-only zones in central and recreational areas	A

2. Access Regulation and Traffic Calming

ID	Measures	ASI
M2.1	Implement car-free or low-emission zones in strategic urban areas	A
M2.2	Apply speed limits and traffic calming measures in pedestrian-prone zones	I
M2.3	Define regulated routes for through-traffic to limit central area congestion	A
M2.4	Implement school streets	A
M2.5	Apply tactical urbanism	S

3. Road Networks

ID	Measures	ASI
M3.1	Improve basic road maintenance and surface quality	I
M3.2	Redesign intersections for safer crossing and traffic flow	I
M3.3	Update road signage and markings to improve clarity and navigation	I
M3.4	Transform oversized urban roadways into multifunctional public spaces	A
M3.5	Introduce traffic monitoring systems for real-time congestion management	I

4. Parking Systems

ID	Measures	ASI
M4.1	Expand inclusive parking options for specific user groups	I
M4.2	Adjust parking fees to reduce long-term car use in central areas	A
M4.3	Enforce regulations against illegal parking, especially in pedestrian and cycling zones	A
M4.4	Develop park-and-ride facilities near key transit hubs	S
M4.5	Develop parking facilities at the periphery of city centres to encourage walking	S

5. Urban Cycling

ID	Measures	
M5.1	Develop a connected and safe cycling network	S
M5.2	Launch public bike-sharing systems	S
M5.3	Install secure public bike parking solutions	I
M5.4	Facilitate the transport of bicycles on public transport and trains, with attention to accessibility and space	S
M5.5	Promote the use of cargo bikes as a transport solution for families and SMEs	S

6. Public Transport

ID	Measures	ASI
M6.1	Increase the frequency of public transport services	S
M6.2	Extend route coverage to underserved neighborhoods	S
M6.3	Provide real-time information on arrival times and delays	I
M6.4	Allocate dedicated lanes for PT and upgrade the conditions of stops and stations	S
M6.5	Invest in low-emission or electric public transport vehicles	I

7. Mobility Management

ID	Measures	ASI
M7.1	Establish a local mobility coordination unit	I
M7.2	Appoint mobility managers for institutions and companies	I
M7.3	Promote flexible work and school schedules to reduce peak-hour demand	A
M7.4	Collaborate with schools to develop safe routes for students	S
M7.5	Conduct regular user surveys to evaluate and improve mobility strategies	I

8. Electric Mobility

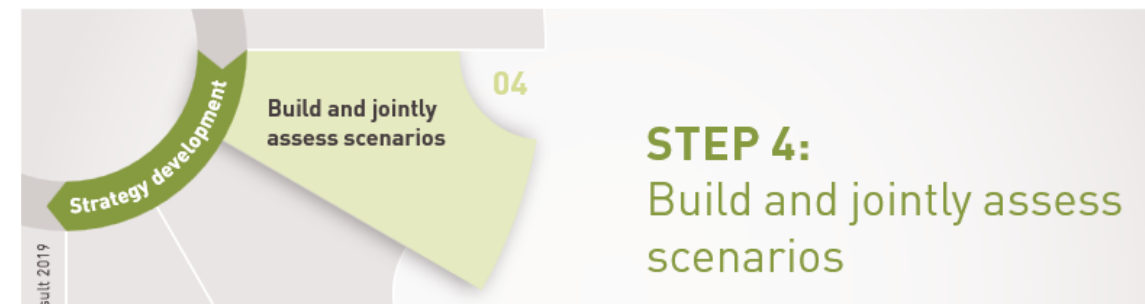
ID	Measures	ASI
M8.1	Install accessible public EV charging infrastructure	I
M8.2	Offer incentives for electric fleet conversion (e.g. taxis, buses)	I
M8.3	Realize a local e-mobility strategy including sharing schemes for EVs	I
M8.4	Launch test drives for e-cargobikes	S
M8.5	Collaborate with private actors to expand EV-related infrastructure	I

9. Urban freight transport

ID	Measures	ASI
M9.1	Schedule deliveries outside peak hours	A
M9.2	Develop urban logistics hubs or consolidation centers	S
M9.3	Support the use of cargo bikes for last-mile deliveries	S
M9.4	Digitalize freight logistics (tracking, scheduling) for efficiency	I
M9.5	Encourage adoption of low-emission delivery vehicles	I

10. Public awareness and engagement

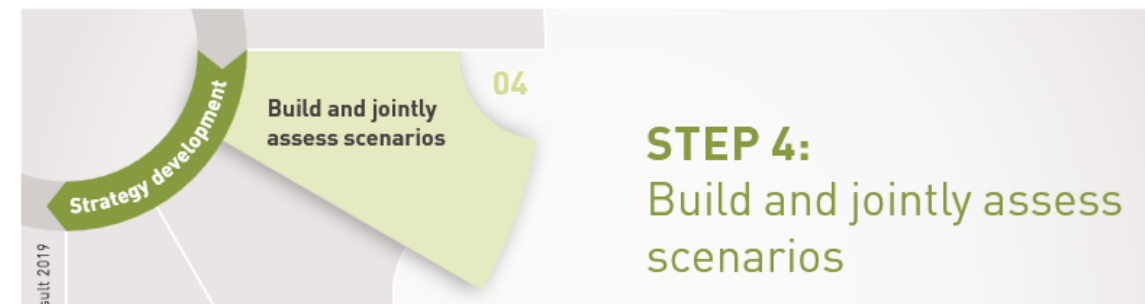
ID	Measures	ASI
M10.1	Launch safety campaigns targeting all road users	I
M10.2	Engage citizens through participatory planning processes	I
M10.3	Offer sustainable mobility education in schools and workplaces	S
M10.4	Provide incentives for sustainable travel behavior	S
M10.5	Evaluate mobility projects through inclusive feedback mechanisms	I



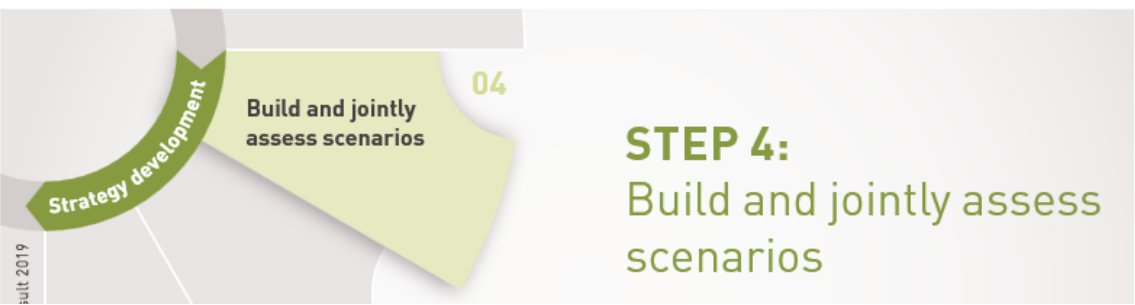
Methodology:

- **Knowledge base assessment** (Task 1.2 – *Analysis of the Current State of Mobility*), which provided a data-driven understanding of the existing mobility patterns, infrastructure, services, and bottlenecks;
- **Outcomes of the public consultation process**, including stakeholder discussions conducted during the site visit (summarized in the SWOT analysis) and responses to the online survey assessing travel behavior, perceptions, and mobility needs;
- **Strategic objectives of the SUMP**, which define the vision and desired outcomes for urban mobility in Kavadarci;
- **SUMP strategies**, which outline the thematic policy areas and strategic directions to achieve the defined objectives;
- **Temporal framework of the Plan**, which considers interventions over short (2–3 years), medium (5–6 years), and long-term (10-year) implementation periods.

Business-as-Usual (BAU) Scenario

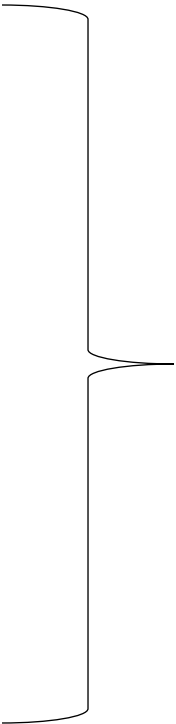


- This reference scenario projects the evolution of the city's mobility system over the next 10 years, assuming that no new sustainable mobility measures are introduced within the framework of the SUMP.
- It serves as a baseline for comparing the impacts of more proactive planning approaches.
- In the absence of SUMP-driven interventions, only already financed and ongoing projects would be implemented.



Alternative scenarios (AS1 & AS2)

- Short term (5 years)
 - ✓ Conservative scenario
 - ✓ Ambitious scenario
- Long term (10 years)
 - ✓ Conservative scenario
 - ✓ Ambitious scenario



**(AS1 – Conservative
&
AS2 - Ambitious)**

POLICY PACKAGES USED Example (AS1 & AS2)



STEP 4: Build and jointly assess scenarios

N	ID	Area	MOMOS	Measures	BAU	AS1	AS2	ASI
1	M1.5	Walkability and Accessibility	X	Create pedestrian-only zones in central and recreational areas		X	X	A
2	M2.1	Access Regulation and Traffic Calming	X	Implement car-free or low-emission zones in strategic urban areas			X	A
3	M2.2	Access Regulation and Traffic Calming	X	Apply speed limits and traffic calming measures in pedestrian-prone zones		X	X	I
4	M3.1	Road Networks		Improve basic road maintenance and surface quality		X	X	I
5	M3.2	Road Networks		Redesign intersections for safer crossing and traffic flow			X	I
6	M3.3	Road Networks		Update road signage and markings to improve clarity and navigation		X	X	I
7	M3.4	Road Networks		Transform oversized urban roadways into multifunctional public spaces		X	X	A
8	M3.5	Road Networks	X	Introduce traffic monitoring systems for real-time congestion management			X	I
9	M4.2	Parking Systems	X	Adjust parking fees to reduce long-term car use in central areas		X	X	A
10	M4.3	Parking Systems		Enforce regulations against illegal parking, especially in pedestrian and cycling zones		X	X	A
11	M4.4	Parking Systems	X	Develop park-and-ride facilities near key transit hubs		X	X	S
12	M4.5	Parking Systems		Develop parking facilities at the periphery of city centres to encourage walking		X	X	S
13	M5.1	Urban Cycling	X	Develop a connected and safe cycling network		X	X	S
14	M5.2	Urban Cycling	X	Launch public bike-sharing systems			X	S
15	M5.3	Urban Cycling		Install secure public bike parking solutions		X	X	I
16	M5.4	Urban Cycling		Facilitate the transport of bicycles on public transport and trains		X	X	S
17	M5.5	Urban Cycling		Promote the use of cargo bikes as a transport solution for families and SMEs		X	X	S
18	M6.1	Public Transport	X	Increase the frequency of public transport services		X	X	S
19	M6.2	Public Transport	X	Extend route coverage to underserved neighborhoods			X	S
20	M6.3	Public Transport		Provide real-time information on arrival times and delays		X	X	I
21	M6.4	Public Transport	X	Allocate dedicated lanes for PT and upgrade the conditions of stops and stations		X	X	S
22	M6.5	Public Transport	X	Invest in low-emission or electric public transport vehicles			X	I
23	M7.3	Mobility Management	X	Promote flexible work and school schedules to reduce peak-hour demand	X	X	X	A
24	M7.4	Mobility Management	X	Collaborate with schools to develop safe routes for students			X	S
25	M8.1	Electric Mobility	X	Install accessible public EV charging infrastructure		X	X	I
26	M8.3	Electric Mobility	X	Realize a local e-mobility strategy including sharing schemes for EVs			X	I
27	M8.4	Electric Mobility	X	Launch test drives for e-cargobikes			X	S
28	M9.1	Urban Freight Transport	X	Schedule deliveries outside peak hours			X	A
29	M9.2	Urban Freight Transport	X	Develop urban logistics hubs or consolidation centers			X	S
30	M9.3	Urban Freight Transport	X	Support the use of cargo bikes for last-mile deliveries		X	X	S
31	M10.1	Public Awareness and Engagement	X	Launch safety campaigns targeting all road users		X	X	I

POLICY PACKAGES USED Example (AS1)

ID	Area	MOMOS	Measures	ASI
M1.5	Walkability and Accessibility	X	Create pedestrian-only zones in central and recreational areas	A
M2.2	Access Regulation and Traffic Calming	X	Apply speed limits and traffic calming measures in pedestrian-prone zones	I
M3.1	Road Networks		Improve basic road maintenance and surface quality	I
M3.3	Road Networks		Update road signage and markings to improve clarity and navigation	I
M3.4	Road Networks		Transform oversized urban roadways into multifunctional public spaces	A
M4.2	Parking Systems	X	Adjust parking fees to reduce long-term car use in central areas	A
M4.3	Parking Systems		Enforce regulations against illegal parking, especially in pedestrian and cycling zones	A
M4.4	Parking Systems	X	Develop park-and-ride facilities near key transit hubs	S
M4.5	Parking Systems		Develop parking facilities at the periphery of city centres to encourage walking	S
M5.1	Urban Cycling	X	Develop a connected and safe cycling network	S
M5.3	Urban Cycling		Install secure public bike parking solutions	I
M5.4	Urban Cycling		Facilitate the transport of bicycles on public transport and trains	S
M5.5	Urban Cycling		Promote the use of cargo bikes as a transport solution for families and SMEs	S
M6.1	Public Transport	X	Increase the frequency of public transport services	S
M6.3	Public Transport		Provide real-time information on arrival times and delays	I
M6.4	Public Transport	X	Allocate dedicated lanes for PT and upgrade the conditions of stops and stations	S
M7.3	Mobility Management	X	Promote flexible work and school schedules to reduce peak-hour demand	A
M8.1	Electric Mobility	X	Install accessible public EV charging infrastructure	I
M9.3	Urban Freight Transport	X	Support the use of cargo bikes for last-mile deliveries	S
M10.1	Public Awareness and Engagement	X	Launch safety campaigns targeting all road users	I



STEP 4: Build and jointly assess scenarios

- **The first scenario includes 20 measures, 11 of which are compatible with simulation in the MOMOS platform.**

POLICY PACKAGES USED Example (AS2)



STEP 4: Build and jointly assess scenarios

ID	Area	MOMOS	Measures	ASI
M1.5	Walkability and Accessibility	X	Create pedestrian-only zones in central and recreational areas	A
M2.1	Access Regulation and Traffic Calming	X	Implement car-free or low-emission zones in strategic urban areas	A
M2.2	Access Regulation and Traffic Calming	X	Apply speed limits and traffic calming measures in pedestrian-prone zones	I
M3.1	Road Networks		Improve basic road maintenance and surface quality	I
M3.2	Road Networks		Redesign intersections for safer crossing and traffic flow	I
M3.3	Road Networks		Update road signage and markings to improve clarity and navigation	I
M3.4	Road Networks		Transform oversized urban roadways into multifunctional public spaces	A
M3.5	Road Networks	X	Introduce traffic monitoring systems for real-time congestion management	I
M4.2	Parking Systems	X	Adjust parking fees to reduce long-term car use in central areas	A
M4.3	Parking Systems		Enforce regulations against illegal parking, especially in pedestrian and cycling zones	A
M4.4	Parking Systems	X	Develop park-and-ride facilities near key transit hubs	S
M4.5	Parking Systems		Develop parking facilities at the periphery of city centres to encourage walking	S
M5.1	Urban Cycling	X	Develop a connected and safe cycling network	S
M5.2	Urban Cycling	X	Launch public bike-sharing systems	S
M5.3	Urban Cycling		Install secure public bike parking solutions	I
M5.4	Urban Cycling		Facilitate the transport of bicycles on public transport and trains	S
M5.5	Urban Cycling		Promote the use of cargo bikes as a transport solution for families and SMEs	S
M6.1	Public Transport	X	Increase the frequency of public transport services	S
M6.2	Public Transport	X	Extend route coverage to underserved neighborhoods	S
M6.3	Public Transport		Provide real-time information on arrival times and delays	I
M6.4	Public Transport	X	Allocate dedicated lanes for PT and upgrade the conditions of stops and stations	S
M6.5	Public Transport	X	Invest in low-emission or electric public transport vehicles	I
M7.3	Mobility Management	X	Promote flexible work and school schedules to reduce peak-hour demand	A
M7.4	Mobility Management	X	Collaborate with schools to develop safe routes for students	S
M8.1	Electric Mobility	X	Install accessible public EV charging infrastructure	I
M8.3	Electric Mobility	X	Realize a local e-mobility strategy including sharing schemes for EVs	I
M8.4	Electric Mobility	X	Launch test drives for e-cargobikes	S
M9.1	Urban Freight Transport	X	Schedule deliveries outside peak hours	A
M9.2	Urban Freight Transport	X	Develop urban logistics hubs or consolidation centers	S
M9.3	Urban Freight Transport	X	Support the use of cargo bikes for last-mile deliveries	S
M10.1	Public Awareness and Engagement	X	Launch safety campaigns targeting all road users	I

- The second scenario includes 31 measures, 21 of which are compatible with simulation in the MOMOS platform.

COMMON VISION AND OBJECTIVES

- We will develop a **common vision** and objectives through the mentimeter survey
- This common vision will help **fine tune our scenarios** and apply more focused measures to address the chosen objectives



INDICATORS AND TARGETS

The model will estimate:

- **Mobility indicators:** motorization rate and modal split;
- **Environmental indicators:** annual emissions of CO₂, PM₁₀, and NO_x, and total fuel consumption by mode.
- **Social indicators:** death and injuries in road accidents.



Indicator	Base Year (2027)	Target Year (2037)
Motorization rate (vehicles/1,000 inh.)		-
Modal split – walking		+
Modal split – cycling		+
Modal split – public transport		+
Modal split – car usage		-
CO ₂ emissions (tonnes/year)		-
PM ₁₀ emissions (kg/year)		-
NO _x emissions (kg/year)		-
Fuel consumption (litres/year)		-
Road fatalities		-
Road injuries		-

WHAT HAVE WE ACHIEVED TODAY?

WHAT HAVE WE ACHIEVED?

- ✓ Scenario building with the PSC
- ✓ Developed a common vision and established coherent objectives
- ✓ Agreed on strategic indicators and set well defined targets



NEXT STEPS

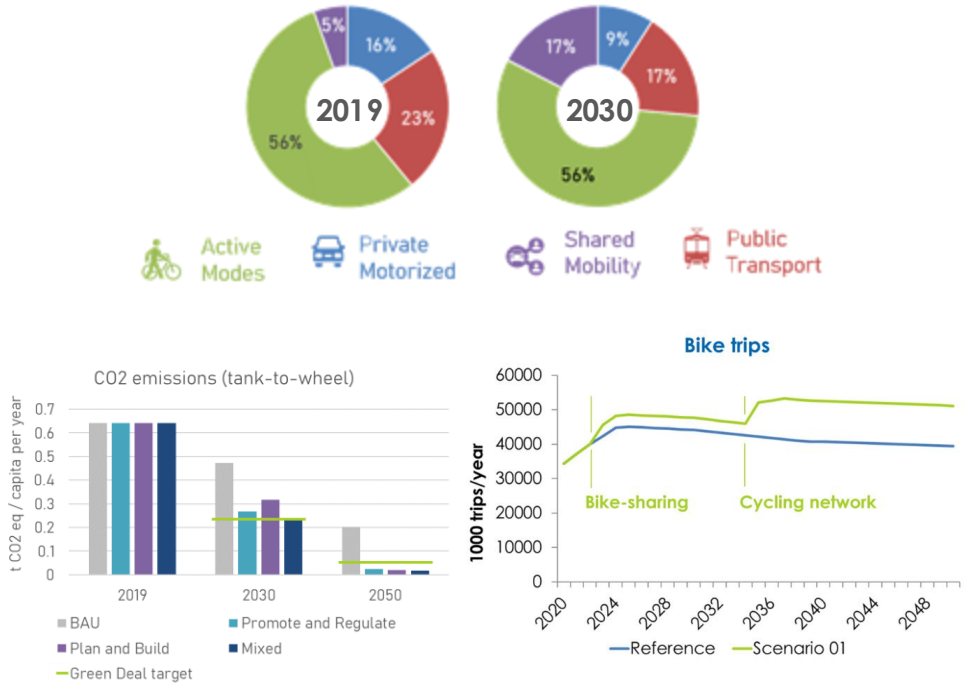
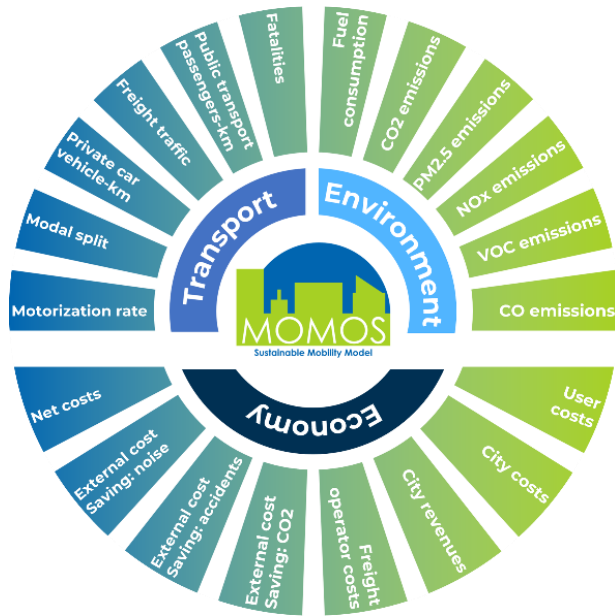
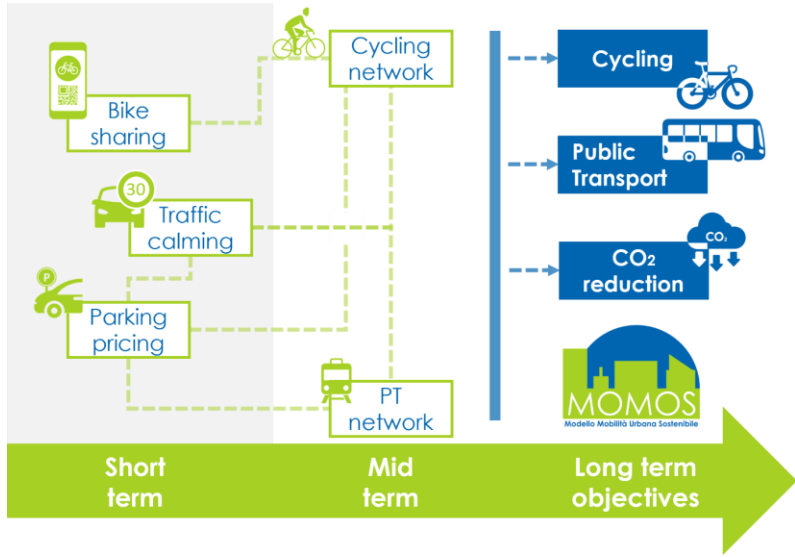
NEXT STEPS

- Public consultation with wider stakeholders
- Awaiting survey results
- Select the appropriate measures and Fine tune the scenarios
- Evaluation and comparison of scenarios (Task 1.4)
- Measure packages (Task 1.4)

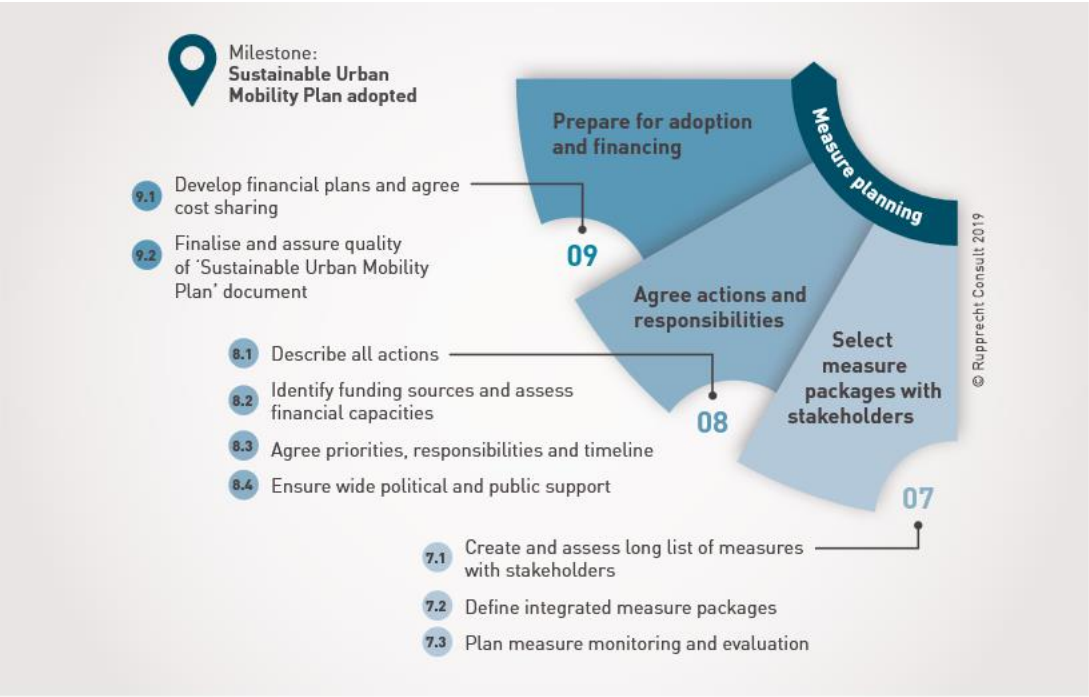


COMPARISON OF SCENARIOS (TASK 1.4)

- **Quantitative indicators** are calculated for scenarios on yearly basis. They show the impacts of the selected measures and their trend over time.
- Compare the scenarios
- Selection of the preferred scenario



MEASURE PACKAGES (TASK 1.4)



MEASURE / MEASURE PACKAGE	SUMP VISION & TARGETS			PRIORITY LEVEL (SUMMARY OF SUMP VISION)	EXPECTED OUTCOME	
	Increase of traffic safety	Increase of walking, cycling and public transport	Decrease of private car traffic		... if measure is implemented	... if measure is not implemented
Segregated Cycle Facilities	2	2	1	5 (2+2+1)	Better infrastructure for cyclists. More people using the bicycle for everyday trips.	No improvements for cyclist. In the best of scenarios that means no decrease of people using the bicycle.
Develop mobility management plan	0	2	2	4 (0+2+2)	A shift towards more use of sustainable transportation for everyday trips. Increased use of existing infrastructure for sustainable modes.	Business as usual in modal share. No increase of sustainable modes.
Improve pedestrian crossings on prioritised routes	2	2	0	4 (2+2+0)	Increased safety and security for pedestrians. More people walking for everyday trips.	Status quo in number of injuries of pedestrians. Low perceived safety can lead to less people moving by foot.
...						

Objetivo Estratégico	Modos suaves	Integração multimodal (bilhetica)	Interfaces	Corredores BUS, BRT e LRT	Sistemas de informação aos utilizadores	Sistemas de gestão de tráfego	Soluções CUI	Ativ. tipológica
1	✓✓✓	✓	✓✓	✓✓	✓	✓	✓✓✓	✓✓✓
2	✓✓	✓✓	✓✓✓	✓✓✓	✓	✓	✓✓✓	✓✓✓
3		✓✓✓	✓✓✓	✓✓✓	✓✓	✓	✓✓✓	✓✓
4	✓✓	✓✓	✓	✓✓	✓	✓	✓✓	✓✓
5	✓	✓✓	✓✓	✓✓			✓✓✓	✓✓
6		✓✓	✓✓	✓✓			✓✓✓	✓
7	✓			✓			✓	✓
8				✓		✓		✓
9		✓	✓✓	✓✓	✓✓	✓✓✓		✓
10	✓		✓	✓	✓✓	✓	✓✓	✓
11		✓✓	✓✓✓	✓	✓✓	✓	✓	✓
12	✓	✓✓✓	✓✓	✓	✓✓✓	✓✓	✓✓✓	✓✓
13		✓✓✓	✓	✓	✓✓	✓	✓✓	✓
14						✓✓✓		
15	✓✓	✓	✓	✓	✓	✓	✓	✓

For reference purposes only

THANK YOU!!!