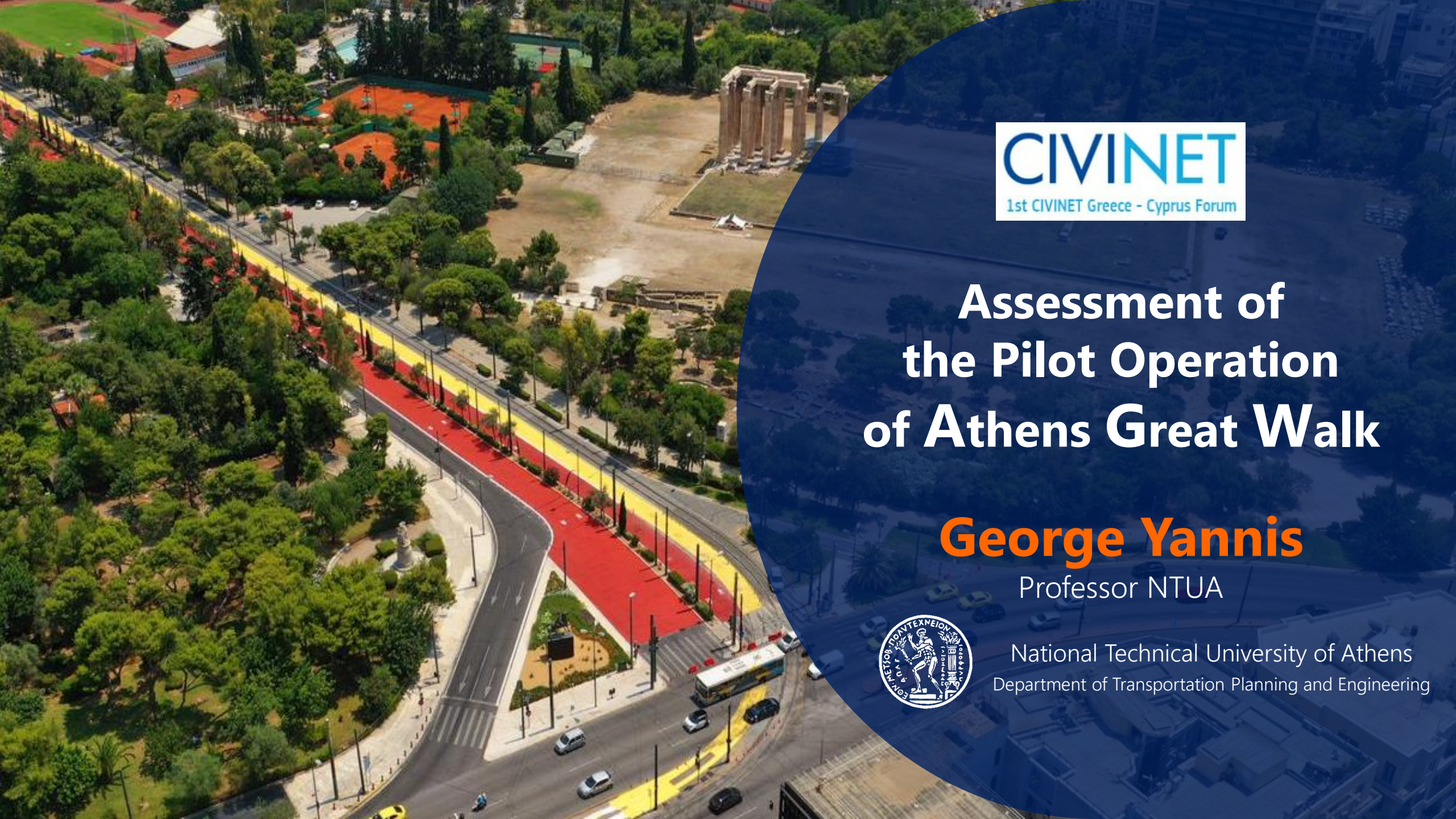

CIVINET
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Assessment of the Pilot Operation of Athens Great Walk

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Department of Transportation Planning and Engineering

Outline

1. Mobility Situation in Athens
2. Framework & Aims
3. Evaluation of the Pilot Operation
   - Traffic
   - Cycling
   - Parking
   - Walking
   - Modal Split
4. Overall Assessment

Current Mobility Situation in Athens

- Athens metropolitan area
- Vehicle Fleet
- Road infrastructure
- Traffic
- Road Safety
- Public Transport
- Parking

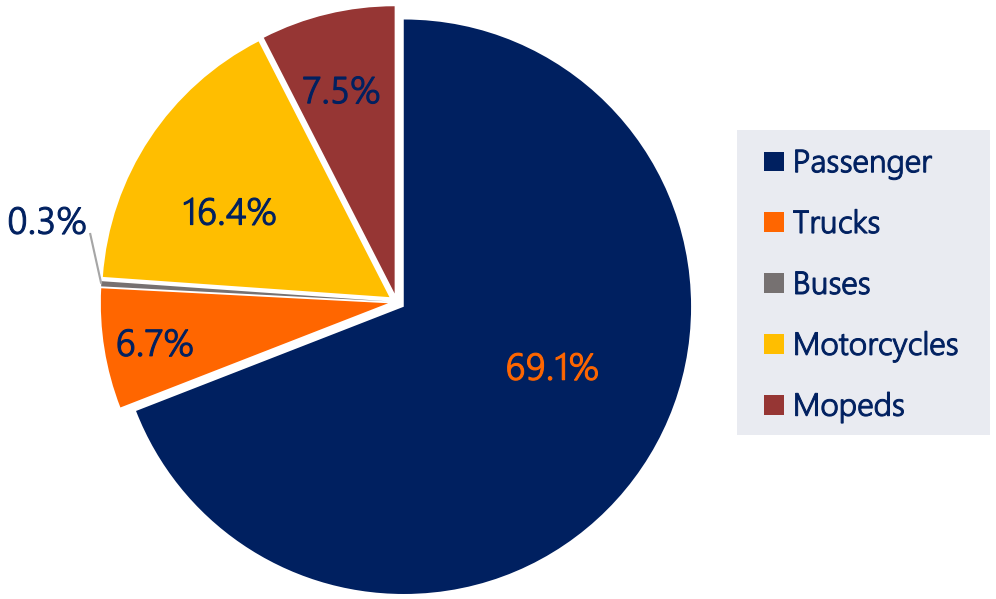
Athens metropolitan area

- Athens is the capital and largest city of Greece
- The city of Athens and surrounding municipalities constitute the metropolitan area of the Attica basin
- The city of Athens, has a population of 664,046 people and an area of 38.96 km^2
- Athens metropolitan area has a population of 3,090,508 people and an area of 412 km^2
- 52.5% of the Athenian population are women
- The average age of the population is 41.3 y.o.

Vehicle Fleet

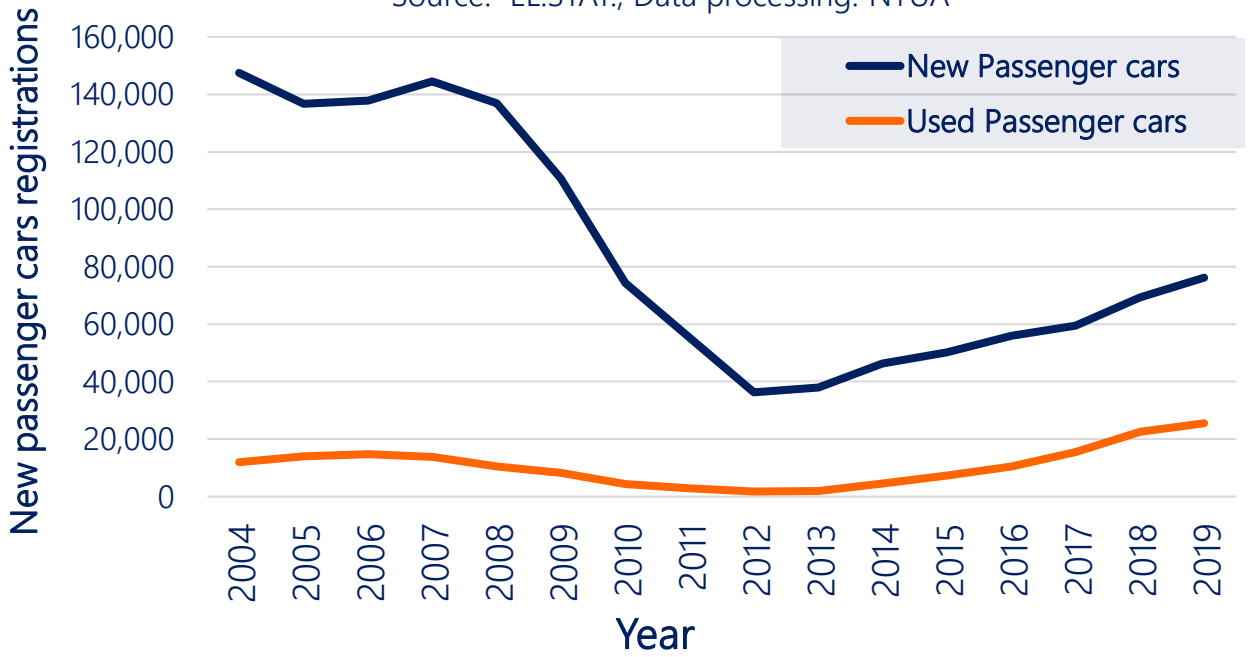
Vehicle fleet by transport mode

Source: EL.STAT., Data processing: NTUA



New passenger car registrations

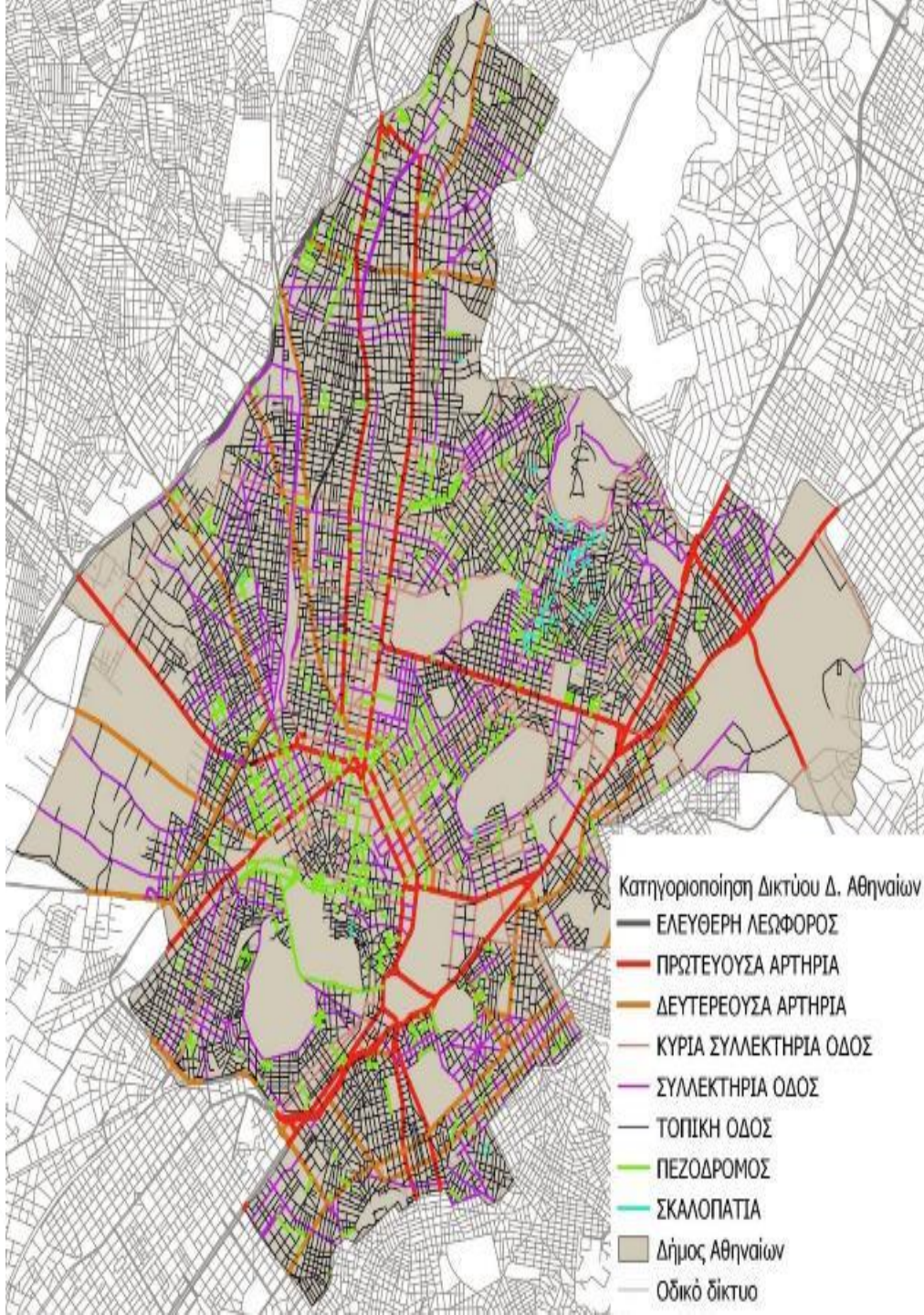
Source: EL.STAT., Data processing: NTUA



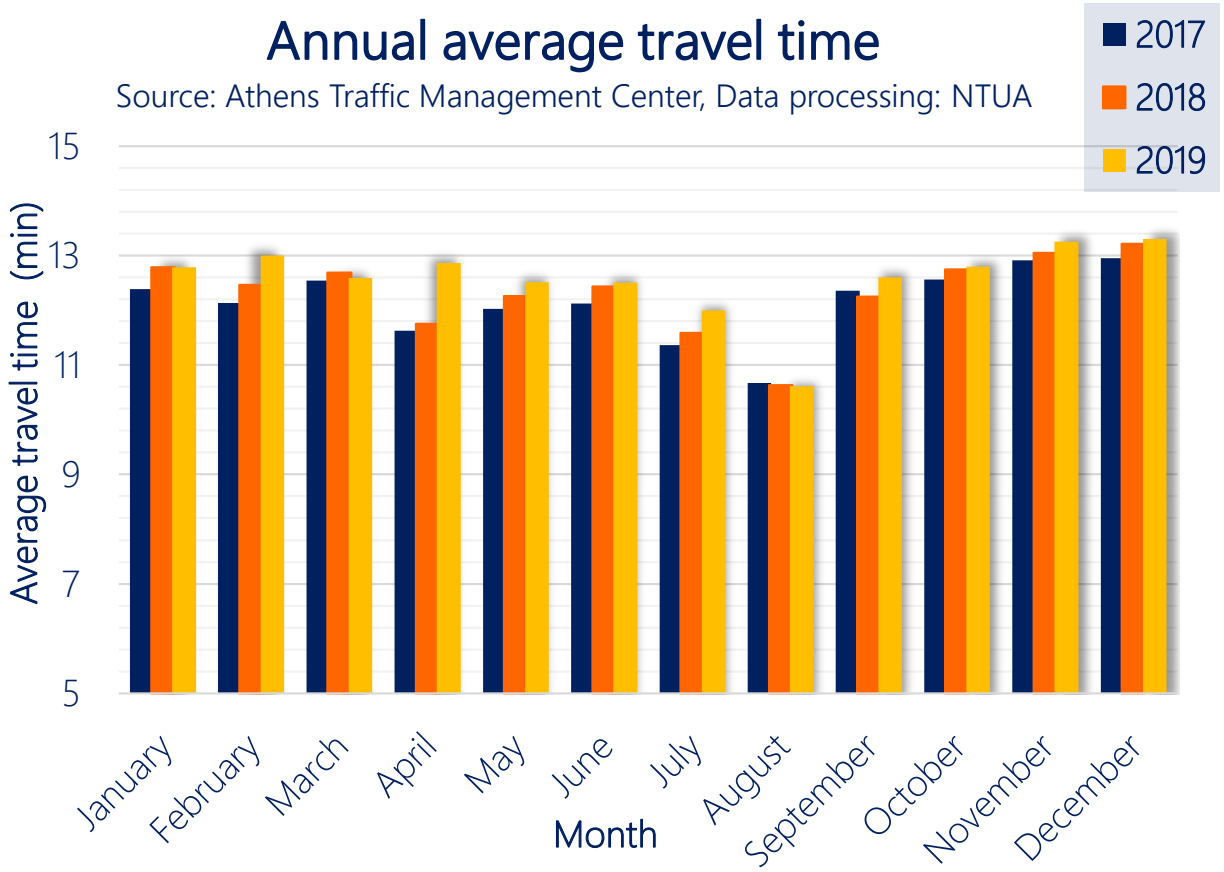
- Passenger cars constitute 69% of the total vehicle fleet, while two-wheelers constitute 24%
- Approximately 14.000 taxis are operating in Athens
- During 2009-2013, a reduction of new passenger car and motorcycle registrations is observed
- In 2019, Public Transport fleet consisted of 1.725 thermal and 291 electric buses
- In early 2019, the first micromobility services appeared in Athens

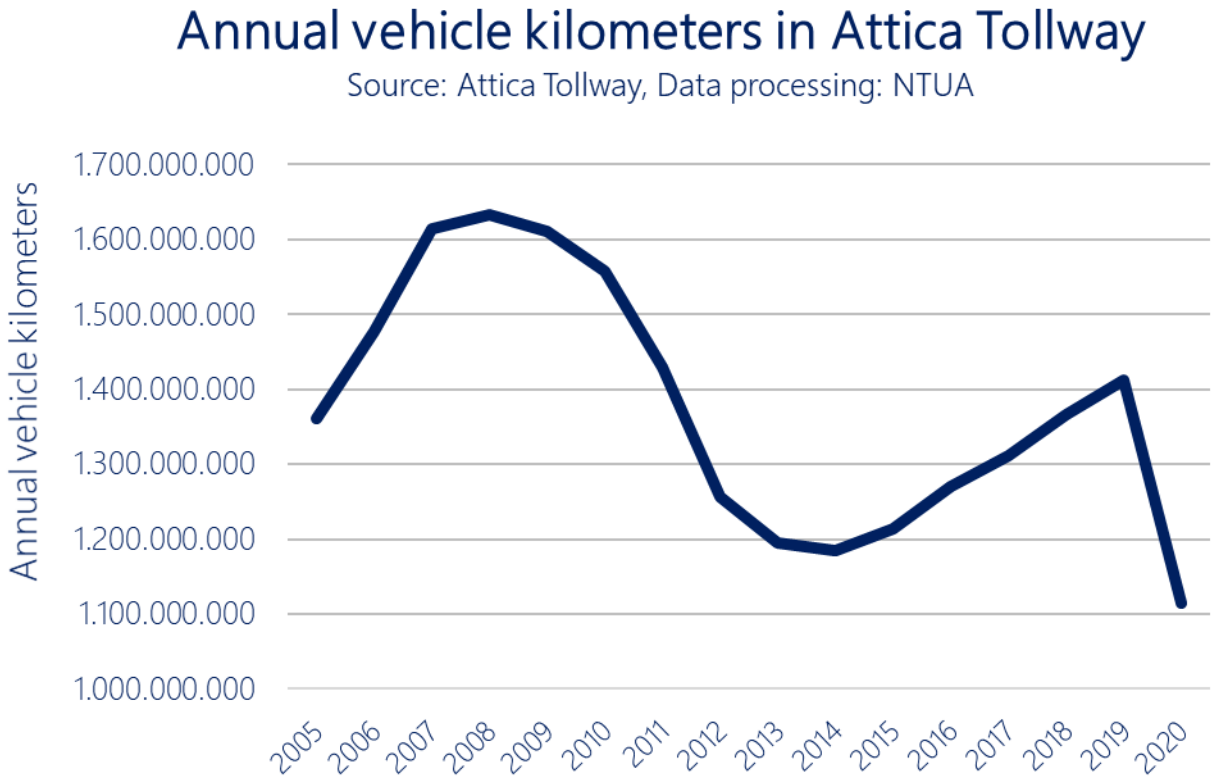
Road Infrastructure

- Total road infrastructure 868 km
- Pedestrian network 48 km
- More than 400 marked nodes



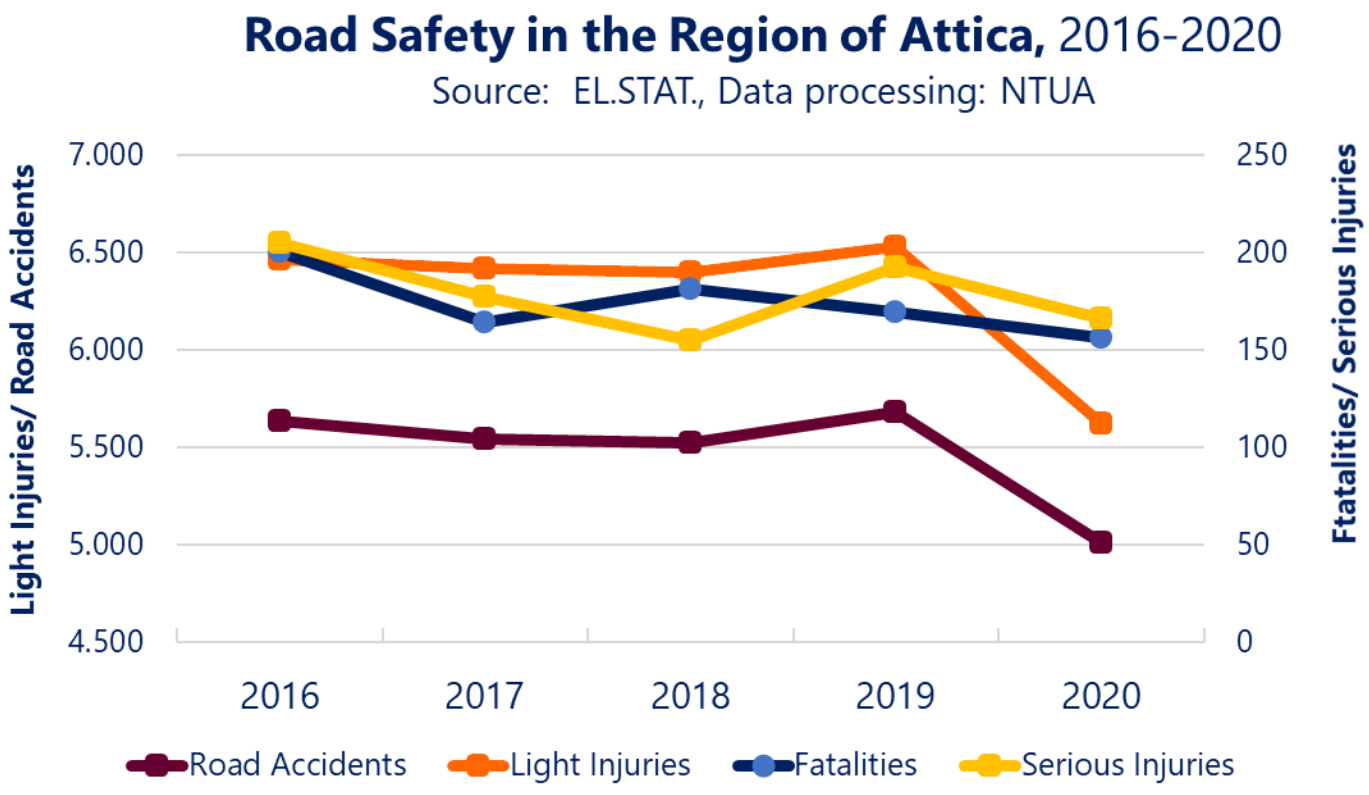
Traffic

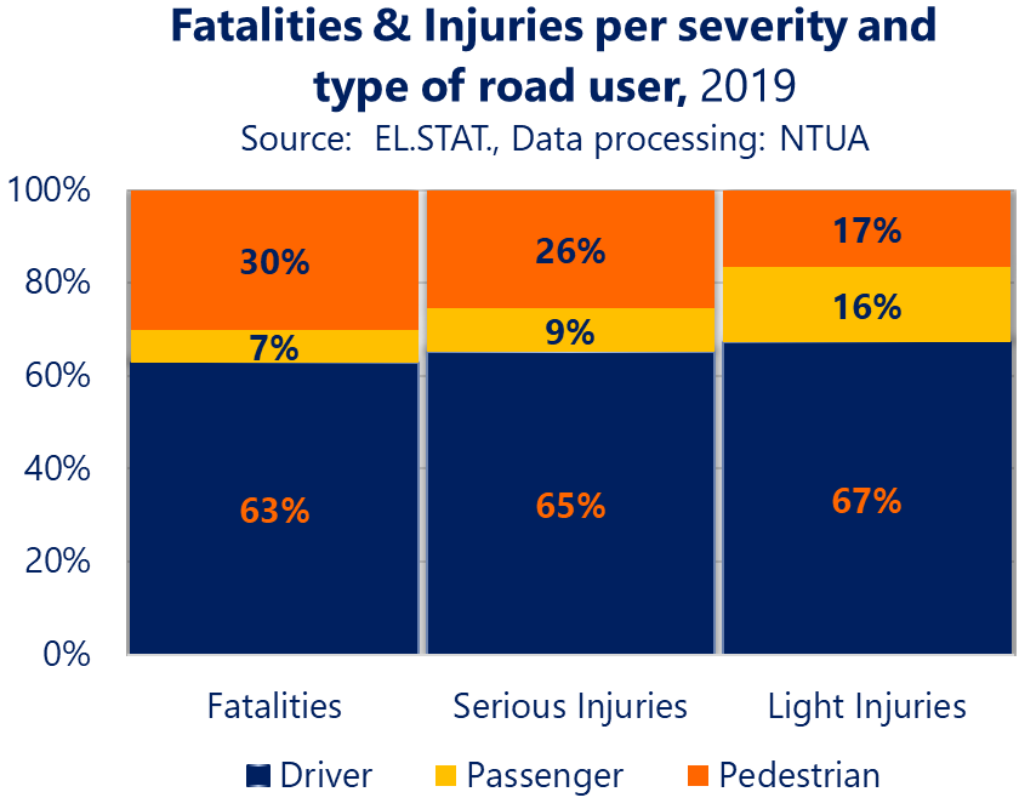




- The highest travel times are observed in November/December. The lowest are observed in August.
- An increase in average travel time was identified in 2019, compared to the last three years
- An increase in annual vehicle kilometers in Attica Tollway is observed from 2014 to 2019, followed by a remarkable decrease in 2020 due to the Covid-19 mobility restrictions

Road Safety



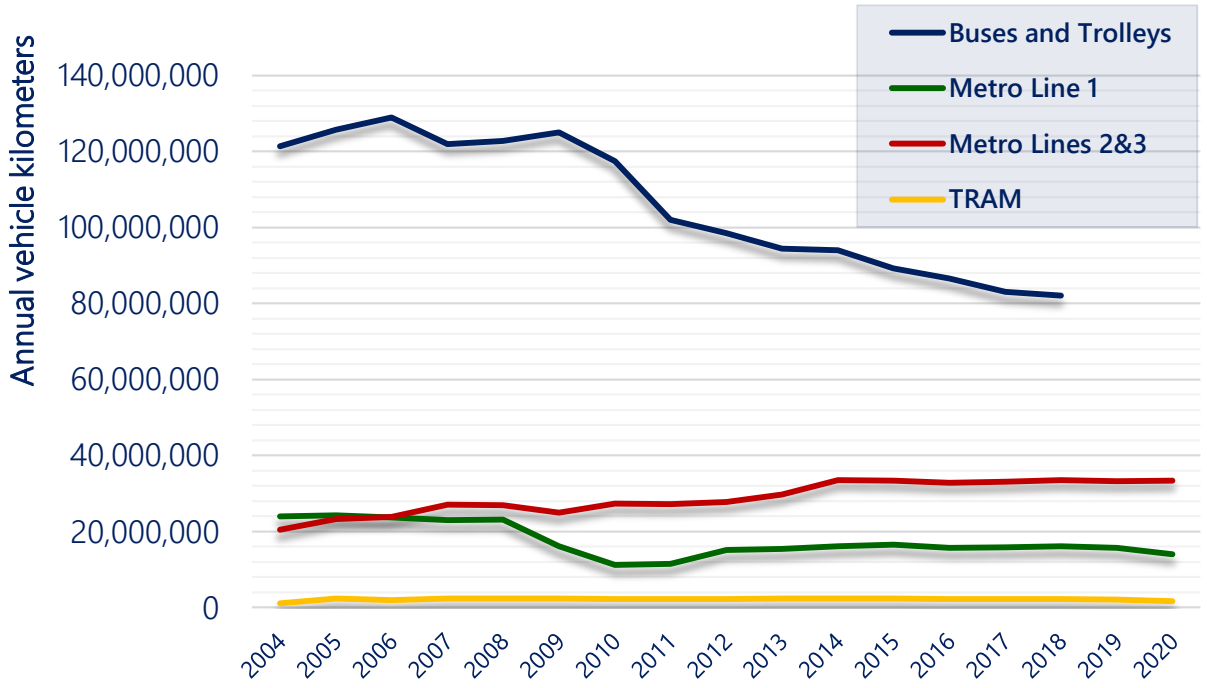


- During the last years, a decrease in road fatalities can be observed in the region of Attica
- Car drivers constitute the largest road user group among road fatalities
- Together with car passengers they account for 70% of all fatalities

Public Transport

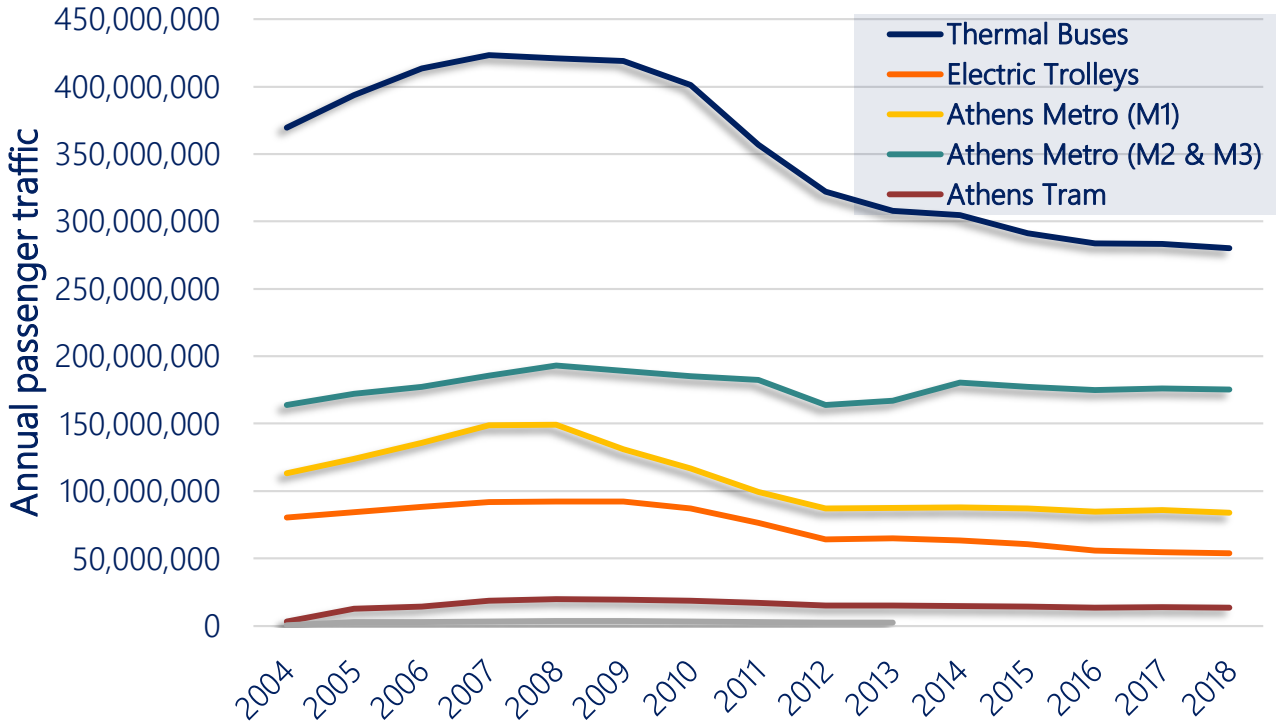
Evolution of annual vehicle kilometers of Mass Transit System

Source: OASA, Data processing: NTUA



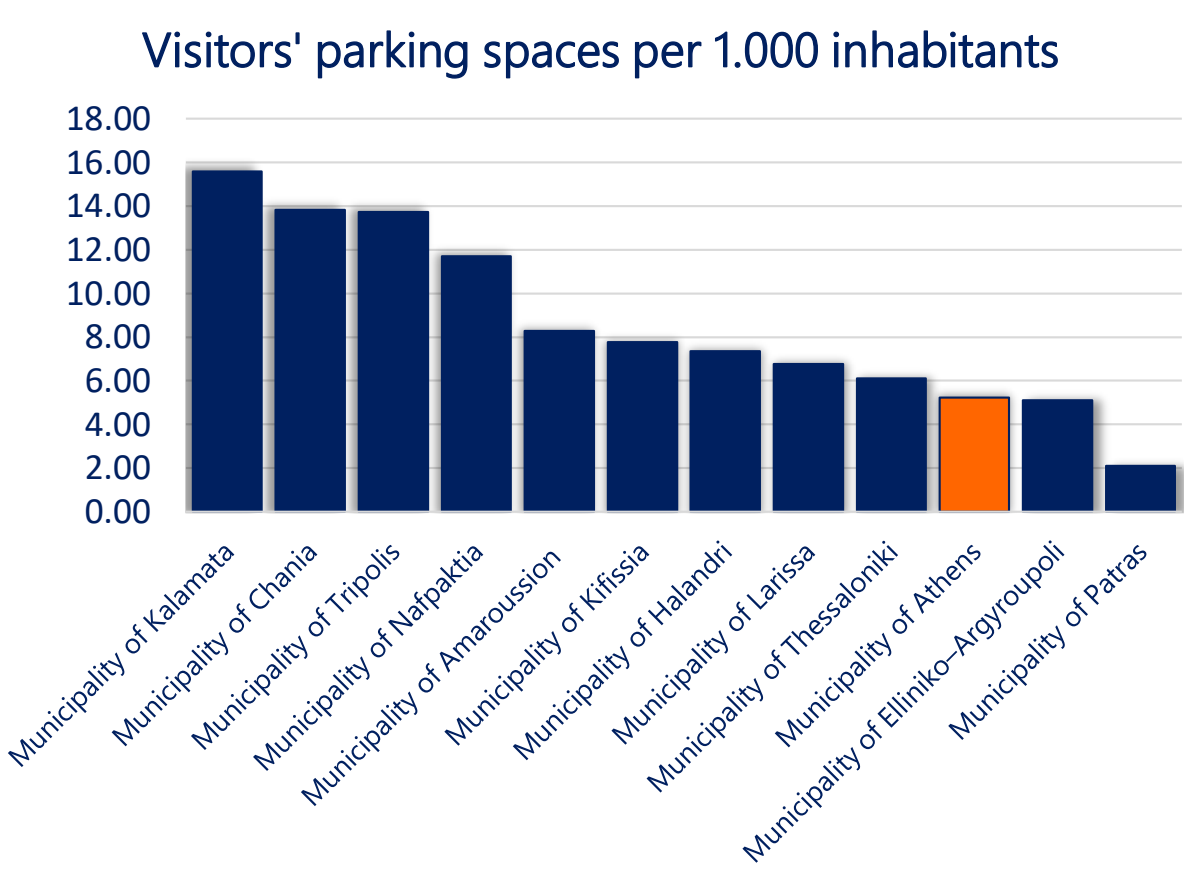
Evolution of annual passenger traffic of Mass Transit System

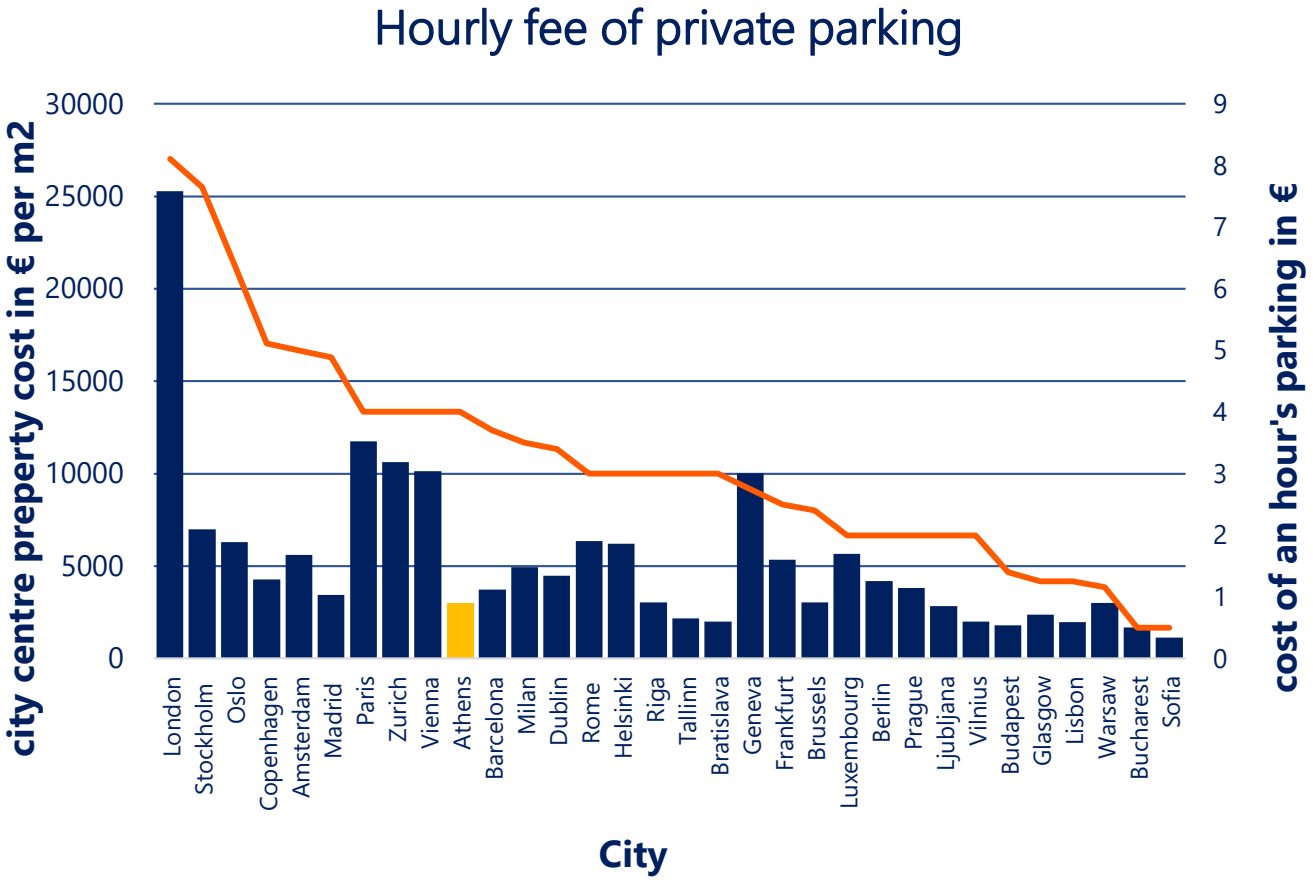
Source: OASA, Data processing: NTUA



- Reduction in the number of passengers of all Public Transport Means (-25% from 2010 to 2018)
- Reduction in the number of vehicle kilometres of all Public Transport Means (-15% from 2010 to 2018)

Parking





- Athens the 3rd lower index of visitors' parking spaces per 1.000 inhabitants compared to other Greek cities
- The average hourly parking in 32 European cities is 3 euros while in Athens it is approximately 4 euros

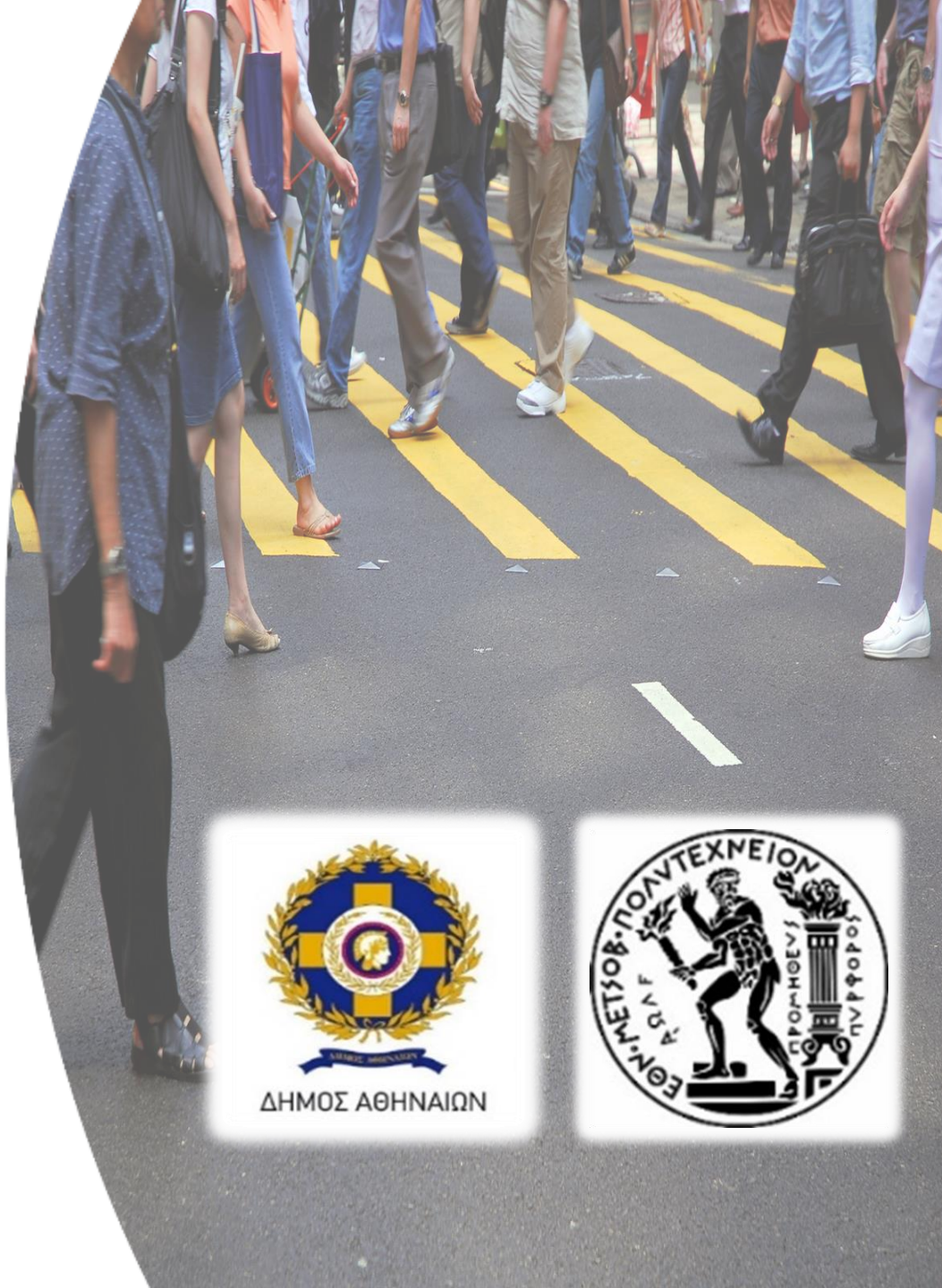
Framework & Aims
of Athens Great Walk Pilot Implementation

- The Research Project
- Athens Great Walk
- Purpose of AGW
- Mobility Interventions
- Traffic Impact Study
- NTUA traffic simulation model
- Analysis area
- Pilot Implementation
- Interventions in Operation

The Research Project

- **Partners:**
  City of Athens
  National Technical University of Athens

- **Project Duration:**
  12 months (March 2020 – February 2021)



Athens Great Walk

- Since Autumn of 2019, a series of novel traffic and parking interventions for the center of Athens were examined

- The proposed interventions are part of the new mobility policy of the City of Athens, and are harmonized both with the Athens Sustainable Urban Mobility Plan and the related trends in European cities

- The new mobility interventions formed a major urban regeneration plan called the Athens Great Walk

Purpose of Athens Great Walk

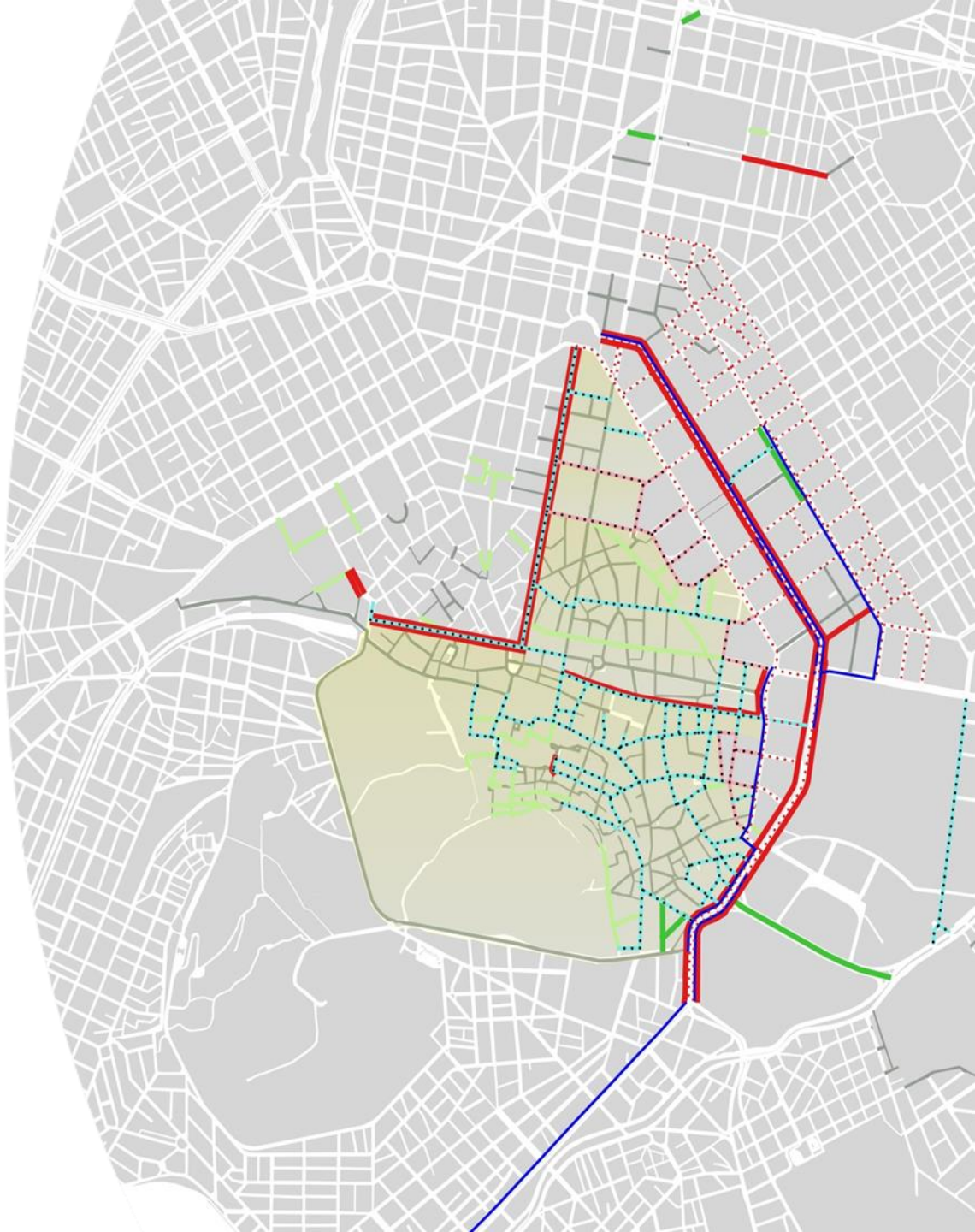
The objective of the new mobility interventions is to create a new quality in urban mobility, promote public transport and active travel modes, in order to achieve:

- Safe
- Green
- Efficient

transport for all

Mobility Interventions

- Pedestrianization of urban streets
- Increase of Sidewalks in central road axes
- Streets free of passenger cars & motorcycles
- Areas free of passenger cars and motorcycles
- Promotion of Public Transport and Cycling
- Speed Limit Reduction
- New parking arrangements



Traffic Impact Study

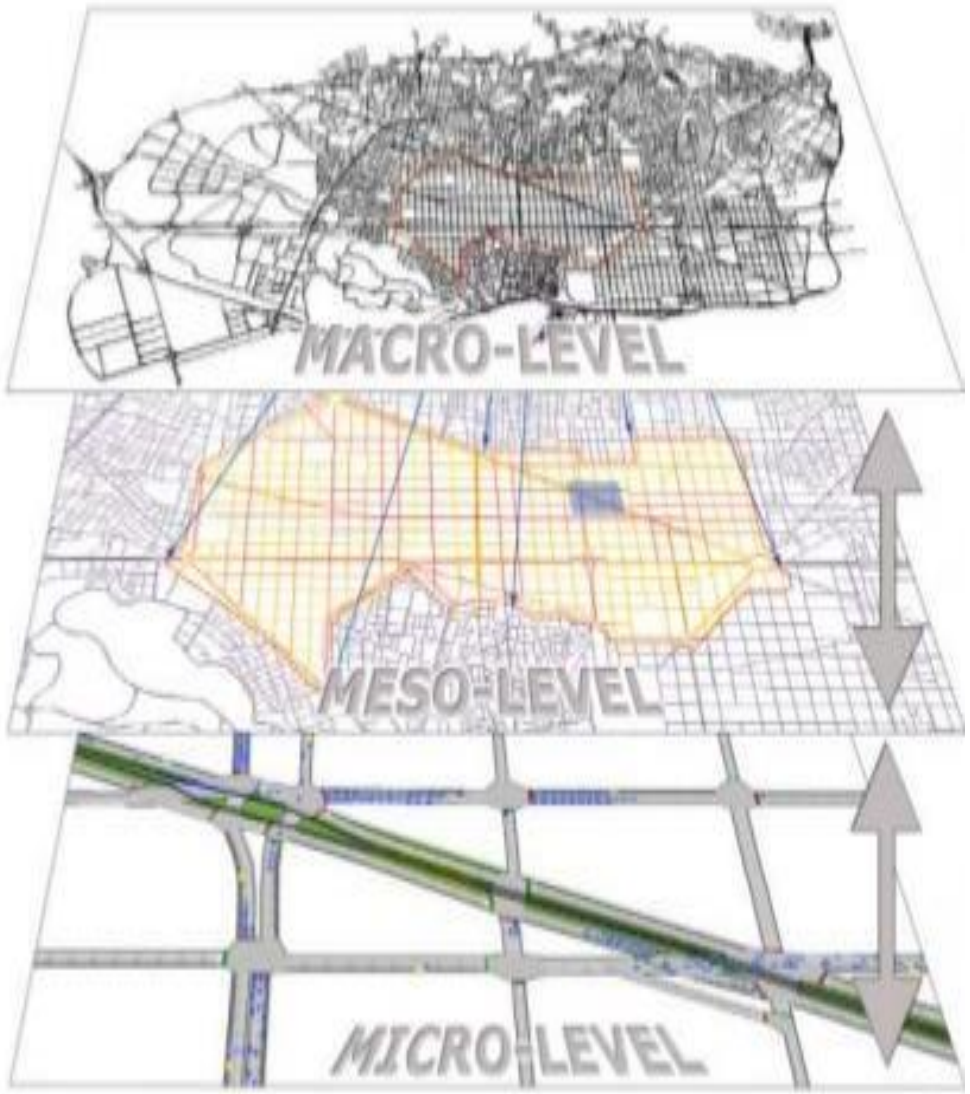
- Analysis of the current situation in the city of Athens and the Greater Athens area
- Examination of alternative traffic management schemes using the NTUA Traffic macro and micro simulation models for Athens (Aimsun)
- Calculation of Key Performance Indicators for car traffic, public transport, bicycles and pedestrians - Selection of the best scenario
- The model predictions were successfully validated during the implementation

NTUA Traffic Simulation Model

- The Integrated Traffic Simulation Model for the Athens Network of the NTUA Department of Transportation Planning and Engineering was updated and used for the needs of the study (292 zones of origin/destination)

- An analysis at road network-level (macro), axes-level (meso) and selected junctions (micro) was performed

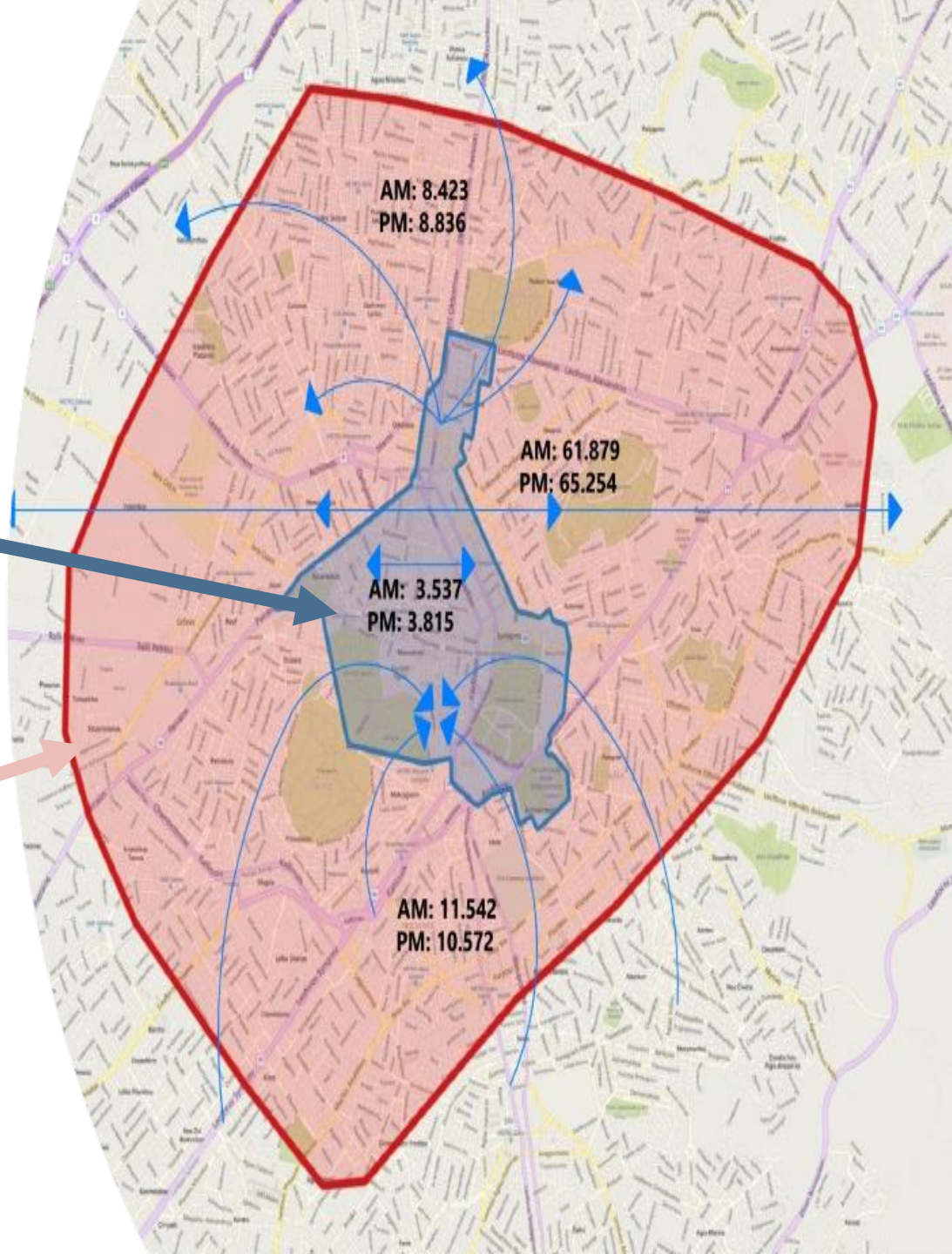
- The impact assessment was based on 6 selected Performance Indicators by comparing current situation with a series of alternative scenarios while the best scenario was selected



Analysis Area

Intervention Area

Wider Area Analysis



Pilot Implementation

- In June 2020, a pilot implementation of a subset of the new mobility interventions was decided, following the example of several cities worldwide on the occasion of the pandemic:
  - to support active travel modes,
  - to assess the mobility interventions in practice,
  - to initiate a live public consultation and dialogue based on pilot results
  - to guide travelers towards better mobility behaviour
- The subset of interventions implemented were:
  - Increase of sidewalks in streets with high pedestrian traffic
  - Exclusive lanes for pedestrians and cyclists
  - Exclusive bus lanes
  - Motorcycle, taxi and disabled parking management
- The evaluation of the pilot implementation led to useful adjustments for the final engineering

Interventions in Operation

- **Olgas Av. - Herodou Attikou**:

  from 13/6/20: Streets free of private vehicles

- **Panepistimiou** (from Vas. Sofias Av to Omonoia Sq.):

  from 14/6/20: Increase of sidewalks and decrease of traffic lanes to 3
  from 3/8/20: Add an extra traffic lane

- **Syntagma Square** (from Kar. Servias to Mitropoleos):

  from 28/6/20: Increase of sidewalks with **4 traffic lanes** and 1 traffic lane for the station of PT (from Ermou St. to Mitropoleos St.)

- **Ermou** (from Monastiraki to Asomaton Sq.):

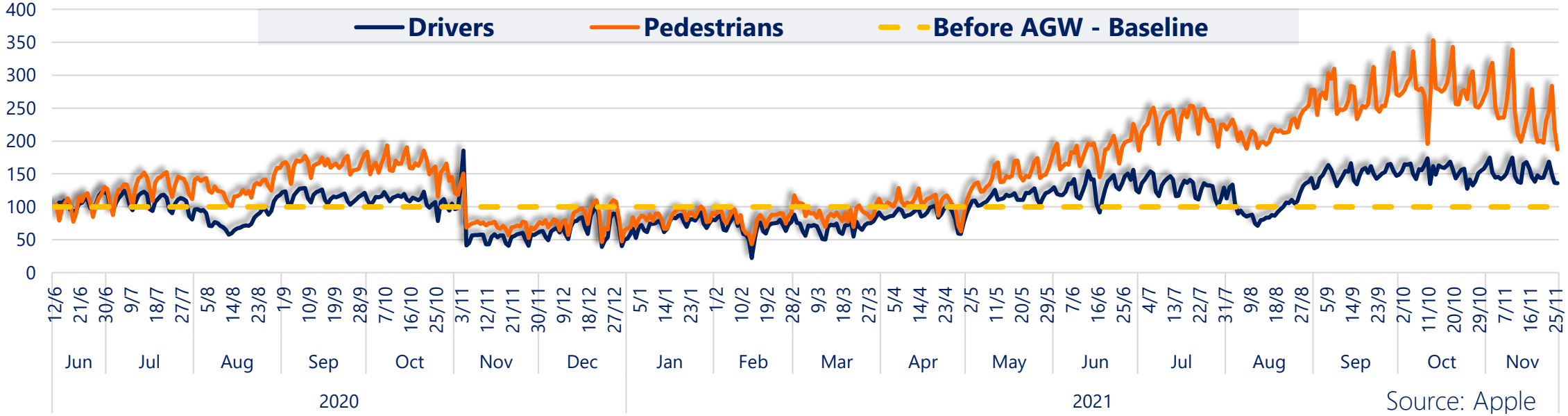
  from 17/7/20: Increase of sidewalks and parking arrangements

Pilot Evaluation

- Mobility and Traffic
- Modal Split & Traffic Volumes
- Walking
- Cycling
- Parking

Mobility Trends in Athens Greater Area

- The week before the pilot implementation of the interventions (8/6/20-12/6/20) is considered as the baseline time period
- From June 2020 until October 2020, an increase in pedestrian mobility can be observed, which can partly be attributed to the avoidance of Public Transport due to the pandemic
- Mobility of passenger cars and pedestrians from November 2020 to April 2021 is significantly reduced due to COVID-19 restrictions
- Walking from April till October 2021 increased rapidly. Driving also increased compared to 2020.



Source: Apple

Comparison of Observed & Predicted Travel Times

- The travel times observed during the first weeks of the pilot implementation confirmed the predictions of the traffic simulation model of NTUA (with the exception of the Vas. Amalias Av.)

	Model Predictions			Observations			Difference
Route	**Existing A**	**Scenario 3 traffic lanes**	**Dif.**	**Before AGW**	**1st-7th week**	**Dif.**	**Observations - Predictions**
Central Road Axes							
Panepistimiou (from Vas. Sofias to Patision)	**2.9**	**5.1**	**2.2**	**2.7**	**3.9**	**1.2**	**-1.1**
Akadimias (from Patision to Vas.Sofias)	4.9	4.9	0.0	4.9	4.4	**-0.5**	-0.5
Solonos (from Vas. Sofias to Patision)	**4.4**	**5.1**	**0.7**	**7.1**	**7.2**	**0.1**	**-0.6**
Stadiou (from Aiolou to Vas. Georgiou)	3.3	3.7	0.4	2.7	2.6	**-0.1**	-0.5
Entry Road Axes							
Vas. Sofias (from Vas. Konstantinou to Panepistimiou)	**3.4**	**3.1**	**-0.4**	**4.6**	**4.4**	**-0.2**	**0.2**
Vas. Sofias (from Kifisias to Vas. Konstantinou)	5.5	5.0	-0.5	4.3	4.1	**-0.1**	0.4
Vas. Amalias (from Ath. Diakou to Panepistimiou)	**1.9**	**2.0**	**0.1**	**3.6**	**5.2**	**1.6**	**1.5**
Patision (from Alexandras to Stadiou)	2.7	2.6	-0.1	3.0	3.2	**0.1**	0.2
Exit Road Axes							
Vas. Sofias (from Panepistimiou to Vas. Konstantinou)	**4.4**	**4.9**	**0.5**	**5.2**	**4.4**	**-0.8**	**-1.3**
Vas. Sofias (from Vas. Konstantinou to Kifisias)	4.4	4.3	-0.1	5.7	5.2	**-0.5**	-0.4
Vas Amalias (from Filellinon to Ath. Diakou)	1.6	2.2	0.6	1.3	1.4	**0.1**	-0.5
Filellinon (from Vas. Georgiou to Vas. Amalias)	1.8	3.2	1.5	1.3	1.4	**0.1**	-1.4
Ring Road Axes							
Vas. Konstantinou (from Arditou/ Ath. Diakou to Vas. Sofias)	**2.0**	**1.9**	**-0.1**	**6.7**	**7.0**	**0.2**	**0.3**
Vas. Konstantinou (from Vas. Sofias to Arditou/ Ath. Diakou)	3.8	3.9	0.0	5.6	4.8	**-0.8**	-0.9
Alexandras (from Kifisias to Patision)	**9.0**	**9.6**	**0.5**	**7.8**	**9.0**	**1.2**	**0.6**
Alexandras (from Patision to Kifisias)	7.1	7.2	0.1	9.2	9.8	**0.7**	0.6

Travel Times (short term)

Central Road Axes

- Expected traffic congestion in Panepistimiou St. that stabilized after the 2nd week
- Increase of travel time on Panepistimiou St. by 48% in the first 2 weeks
- Limited traffic variation in the other central road axes

Entry Road Axes

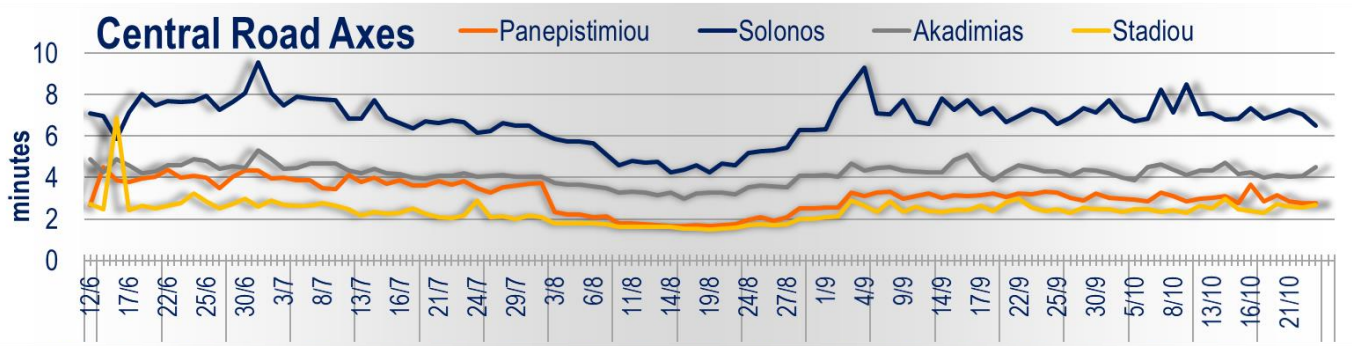
- Similar traffic conditions in the entry road axes comparing to the period before the pilot implementation
- Except from Vas. Amalias (to Panepistimiou), which presents traffic congestion especially during the first operation phase (1st-7th week)

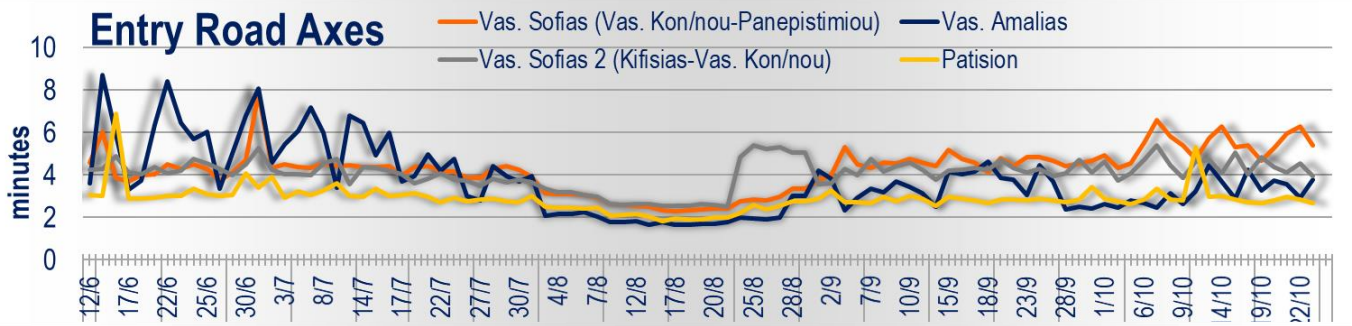
Exit Road Axes

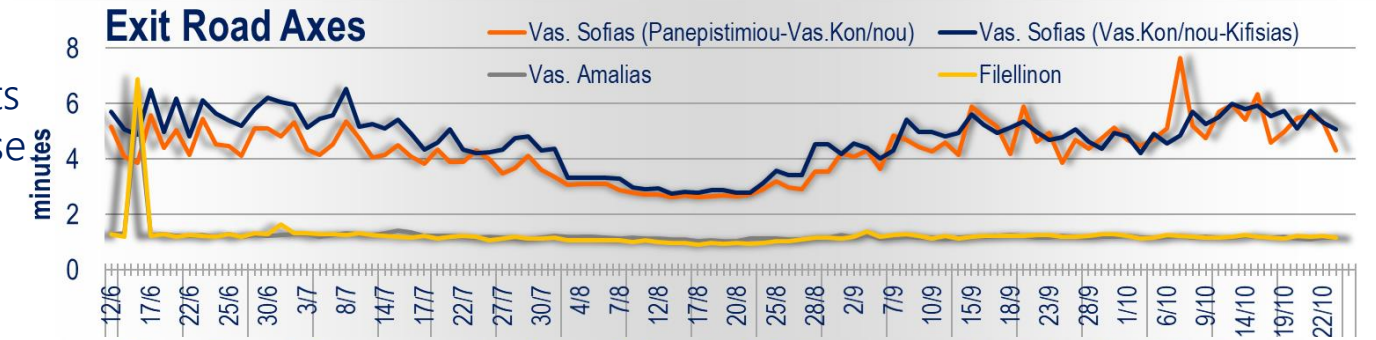
- Travel times do not change significantly after the pilot implementation of interventions

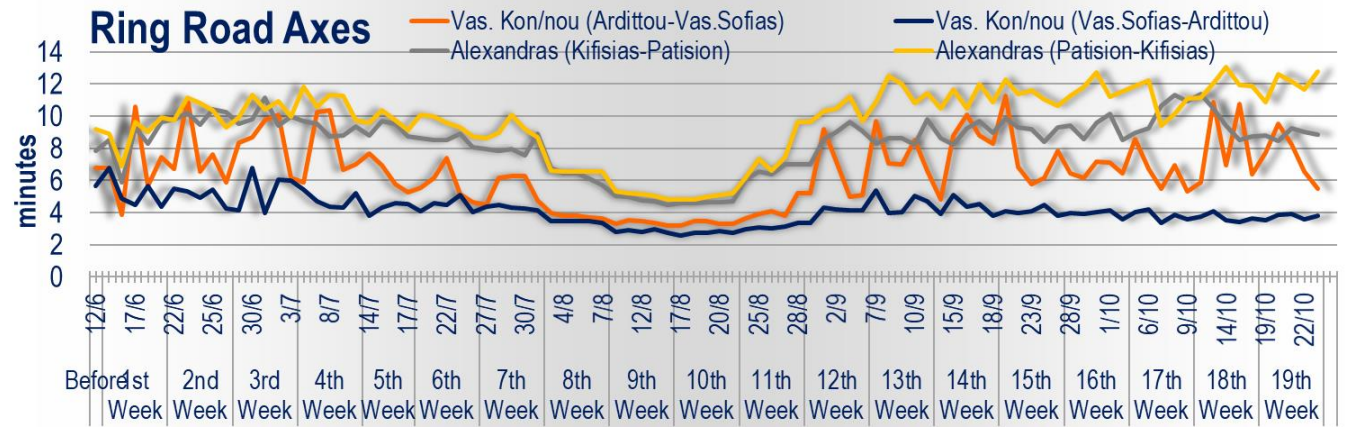
Ring Road Axes

- Traffic congestion during the morning peak hours especially on the two directions of Alexandras Av.









Travel Times (long term)

Central Road Axes

- Travel time of Panepistimiou St. consistently lower throughout 2021, compared to 2020
- Traffic conditions in Akadimias and Stadiou remain stable
- Increased travel time in Solonos during the summer, however lower compared to 2020

Entry Road Axes

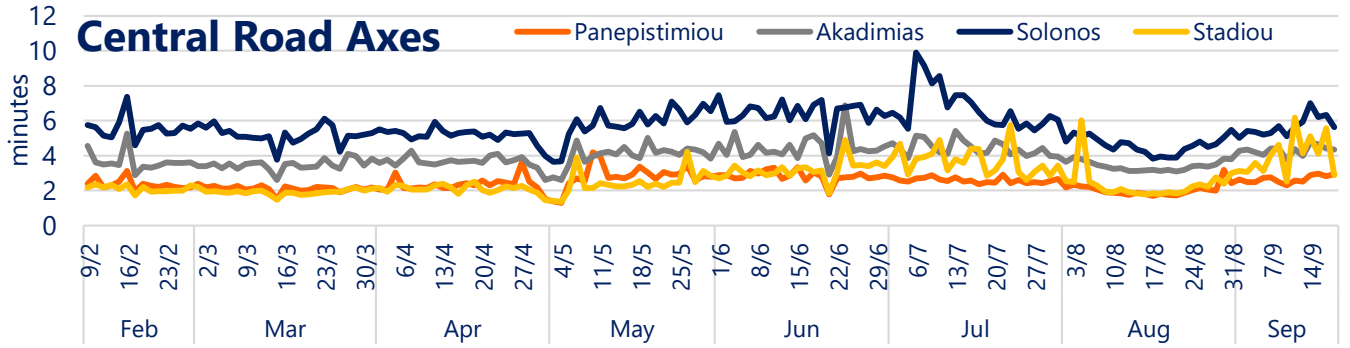
- Travel times remain low during the first half of the year due to traffic restrictions
- Significant increase during the summer in Vas. Sofias
- Travel times in entry road axes increase during autumn

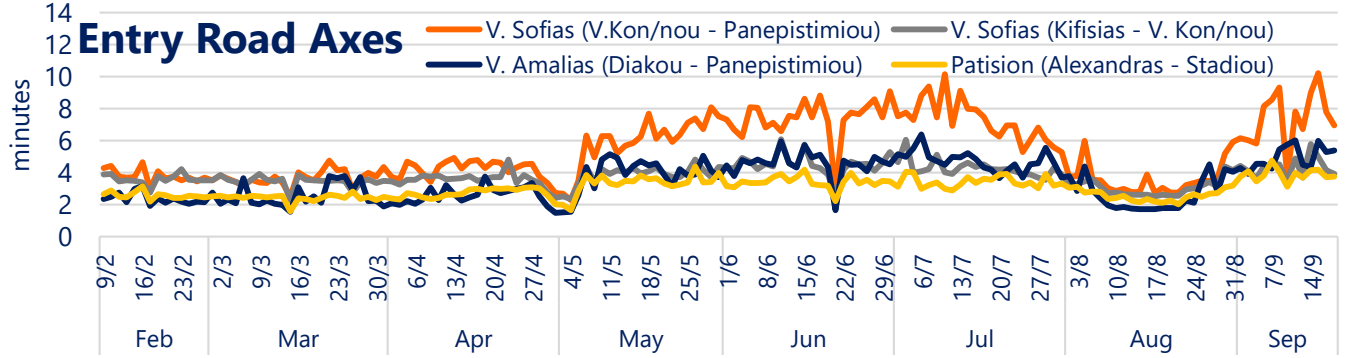
Exit Road Axes

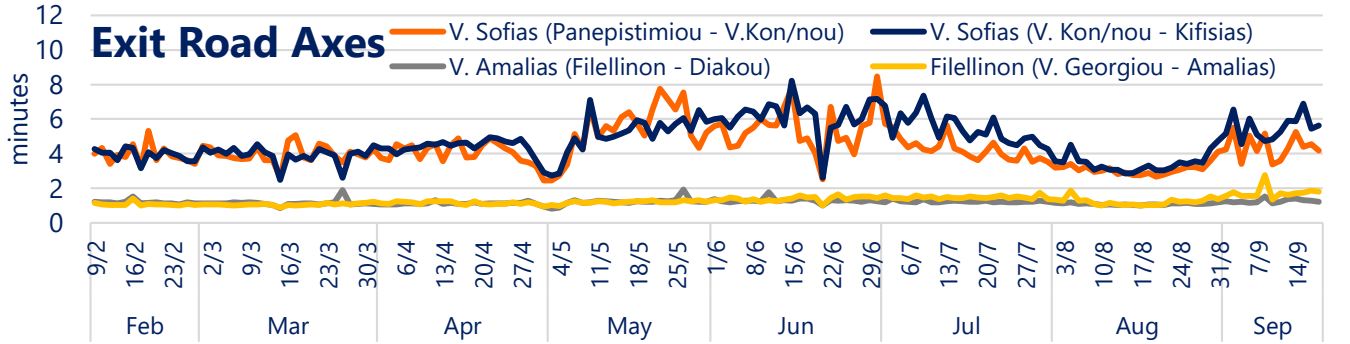
- Travel times during autumn 2021 are at similar levels compared to 2020

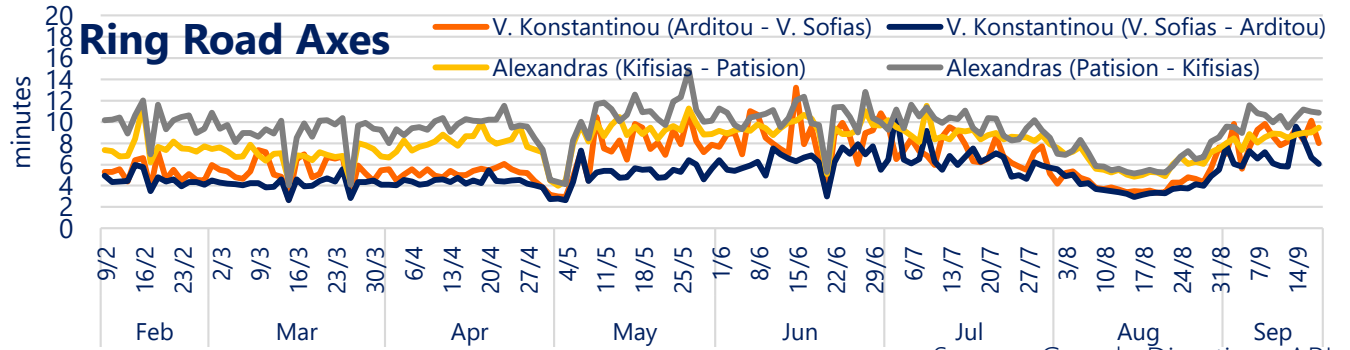
Ring Road Axes

- Comparable traffic conditions between autumn 2020 and 2021 in all ring road axes









Source: Google Directions API

Comparison of travel times per operation phase

1st Phase: 3 traffic lanes on Panepistimiou St. (07/2020)
2nd Phase: 4 traffic lanes on Panepistimiou St. (09/2020)
3rd Phase: 1 year after the pilot implementation (05/2021)

- **Central Axes:** The travel time on **Panepistimiou St.** during the 1st Phase increased by 1.1 min. while during the 2nd and the 3rd phase traffic conditions improved
- **Entry Axes:** Most of the axes show **similar traffic conditions** to the period before, with the exception of Vas. Amalias in the 1st phase and Vas. Sofias in the 3rd phase
- **Exit Axes**: The impact of the mobility interventions on most road axes is **negligible**
- **Ring Axes**: On Vas. Konstantinou Av. (to Vas. Sofias) and Alexandras Av. the travel times were increased during the 2nd phase while during the 3rd phase **traffic conditions slightly improved**

	Observations (min)				Difference (min)		
	Before AGW	1st Phase	2nd Phase	3rd Phase	Before AGW		
Route	12/6/20	13/7-17/7/20	14/9-18/9/20	May 2021	1st Phase	2nd Phase	3rd Phase
Central Road Axes							
Panepistimiou (from Vas. Sofias to Patision)	2.7	3.8	3.1	2.8	1.1	0.4	0.1
Akadimias (from Patision to Vas.Sofias)	4.9	4.2	4.5	4.0	-0.7	-0.4	-0.9
Solonos (from Vas. Sofias to Patision)	7.1	6.9	7.5	5.9	-0.2	0.4	-1.2
Stadiou (from Aiolou to Vas. Georgiou)	2.7	2.3	2.4	2.4	-0.4	-0.3	-0.3
Entry Road Axes							
Vas. Sofias (from Vas. Konstantinou to Panepistimiou)	4.6	4.2	4.6	5.9	-0.3	0.0	1.3
Vas. Sofias (from Kifisias to Vas. Konstantinou)	4.3	4.2	4.2	3.9	-0.1	-0.1	-0.4
Vas. Amalias (from Ath. Diakou to Panepistimiou)	3.6	5.3	3.9	3.9	1.7	0.3	0.3
Patision (from Alexandras to Stadiou)	3.0	3.0	2.8	3.3	0.0	-0.3	0.3
Exit Road Axes							
Vas. Sofias (from Panepistimiou to Vas. Konstantinou)	5.2	4.1	5.0	5.4	-1.1	-0.2	0.2
Vas. Sofias (from Vas. Konstantinou to Kifisias)	5.7	4.9	5.2	5.2	-0.8	-0.5	-0.5
Vas Amalias (from Filellinon to Ath. Diakou)	1.3	1.3	1.2	1.2	0.0	-0.1	-0.1
Filellinon (from Vas. Georgiou to Vas. Amalias)	1.3	1.2	1.2	1.2	-0.1	-0.1	-0.1
Ring Road Axes							
Vas. Konstantinou (from Arditou/ Ath. Diakou to Vas. Sofias)	6.7	6.2	8.1	7.4	-0.5	1.4	0.7
Vas. Konstantinou (from Vas. Sofias to Arditou/ Ath. Diakou)	5.6	4.3	4.3	5.1	-1.3	-1.3	-0.5
Alexandras (from Kifisias to Patision)	7.8	9.0	8.9	8.8	1.1	1.1	1.0
Alexandras (from Patision to Kifisias)	9.2	9.7	11.1	10.2	0.5	1.9	1.0

Source: Google Directions API

Modal Split & Traffic Volumes

Panepistimiou St.

- 19 weeks after the pilot implementation, a reduction in the hourly volume of passenger cars during the morning peak by 50% (from 2,522 to 1,259) and during the afternoon peak by 36% (from 1,710 to 1,094) was observed
- Reduction in the share of passenger cars during the morning peak by 15%
- Simultaneous increase in the use of taxi by 7% and in the use of motorcycles by 9%

Nearby Area (Stadiou, Solonos, Filelinon, Vas. Sofias, Vas. Amalias & Akadimias)

- The modal split was only slightly different from the period before the pilot implementation
- Reduction of the passenger cars share during the morning peak by 4% and during the afternoon peak by 2%
- Reduction of total hourly traffic volume by 17% in the morning peak and 24% in the afternoon peak

Ring Road Axes (Alexandras Av., Vas. Konstantinou)

- The modal split did not show a significant difference compared to the period before the AGW

		Hourly Traffic Vol.		Modal Split	
		Morning Peak Hour	Afternoon Peak Hour	Morning Peak Hour	Afternoon Peak Hour
Panepistimiou	Passenger Cars	-50.1%	-36.0%	-15.2%	-4.4%
	Taxi	2.5%	-27.2%	7.2%	1.4%
	Lorries	-78.6%	-70.0%	-0.9%	-0.7%
	Buses	-22.7%	15.8%	0.3%	1.2%
	Motorcycles	-7.0%	-24.2%	8.5%	1.9%
	Bicycles	-12.1%	60.0%	0.2%	0.4%
	Scooters	200%	280.0%	0.2%	0.3%
	Total	-33.3%	-29.6%		
Nearby Area	Passenger Cars	-23%	-28%	-4.1%	-2.3%
	Taxi	-7%	-17%	1.9%	1.7%
	Lorries	-16%	-57%	0.0%	-0.1%
	Buses	-15%	-13%	0.0%	0.2%
	Motorcycles	-10%	-23%	2.0%	0.4%
	Bicycles	-2%	-14%	0.1%	0.1%
	Scooters	-2%	143%	0.0%	0.1%
	Total	-17%	-24%		
Ring Road Axes	Passenger Cars	20%	14%	0.6%	-2.4%
	Taxi	13%	35%	-0.6%	1.7%
	Lorries	52%	116%	0.9%	2.0%
	Buses	33%	9%	0.1%	-0.0%
	Motorcycles	15%	16%	-0.9%	-1.0%
	Bicycles	-4%	-31%	-0.1%	-0.2%
	Scooters	64%	-61%	0.0%	-0.1%
	Total	18%	20%		

Walking

Panepistimiou St.

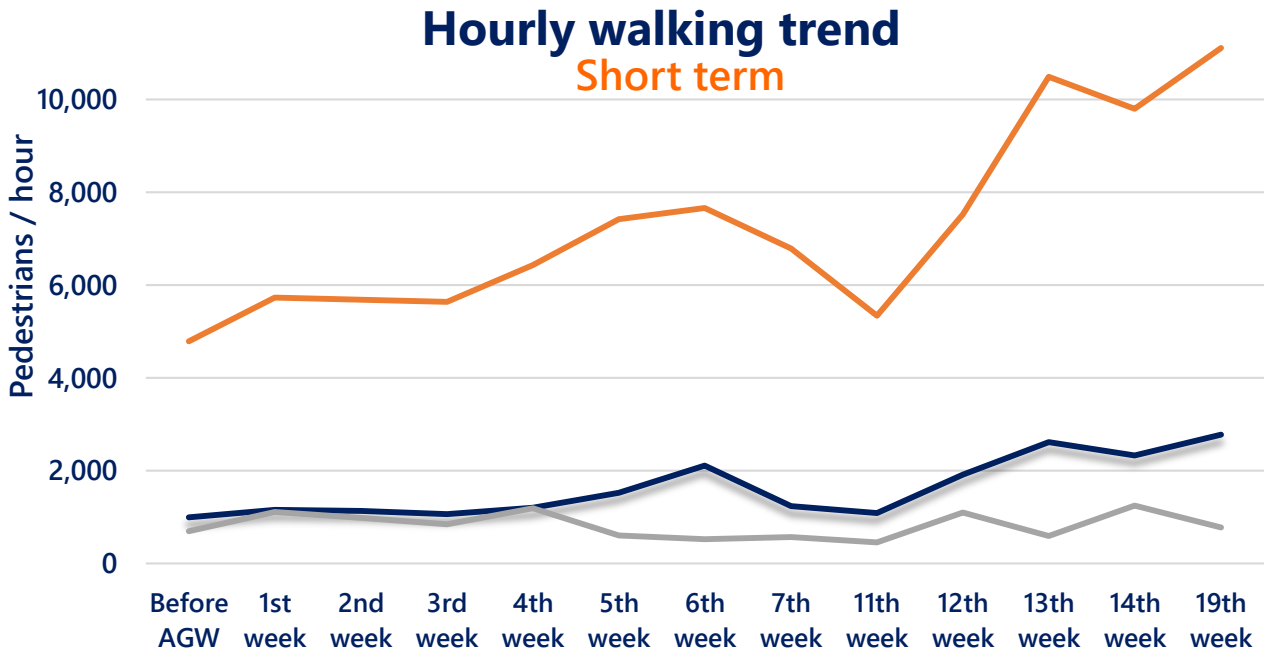
- 19 weeks into the pilot implementation a significant increase in walking compared to the week before the implementation was observed

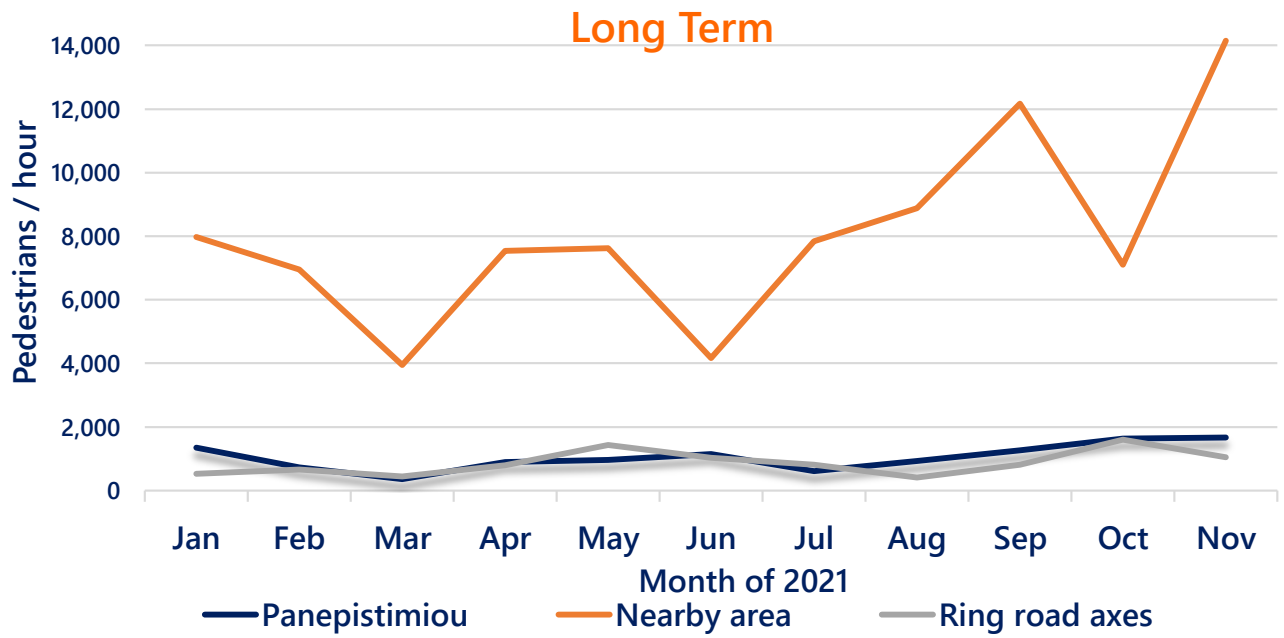
Nearby Area (Panepistimiou St., Stadiou, Solonos, Filelinon, Vas. Sofias, Vas. Amalias & Akadimias)

- After 19 weeks, a significant increase in walking (+82%) was observed. In November 2021 pedestrian traffic is further increased.
- This can partly be attributed to the widening of the sidewalks on Panepistimiou St., Syntagma Sq. and Ermou St.

Ring Road Axes (Alexandras Av., Vas. Konstantinou)

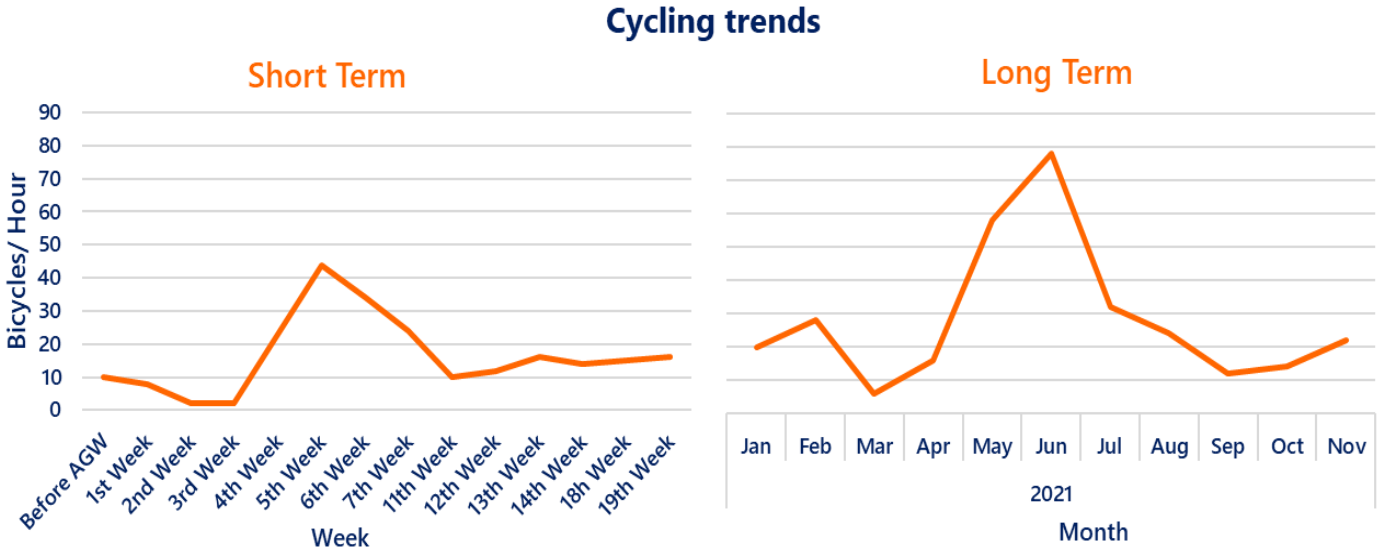
- Walking remained fairly stable during the examined period

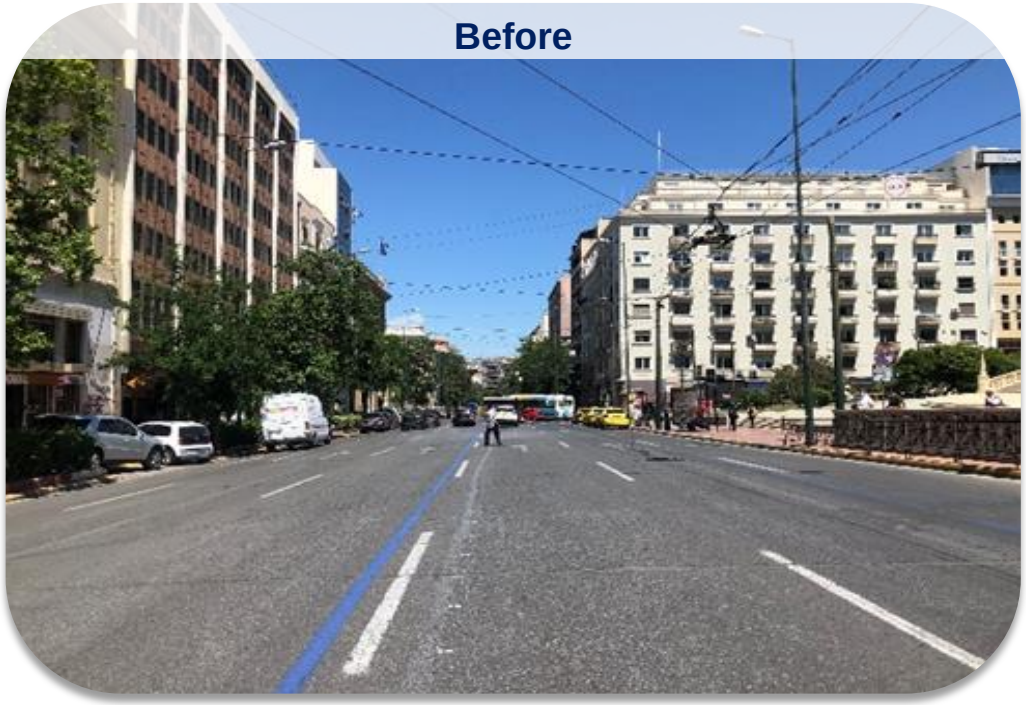


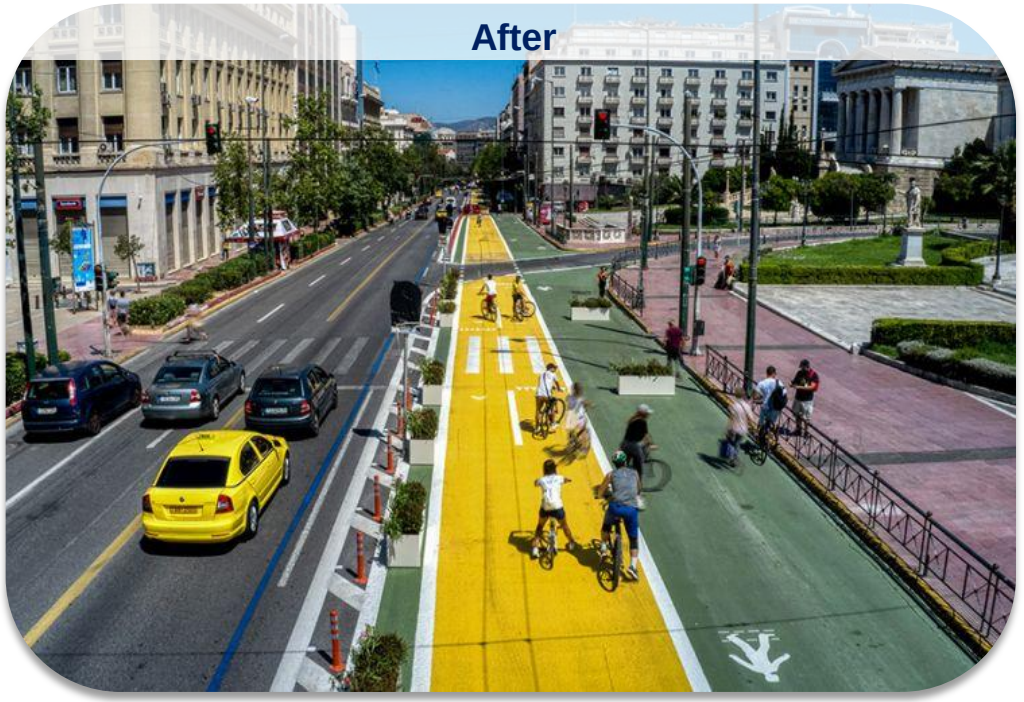


Cycling

- A two-direction lane was created for bicycles on Panepistimiou St.
- On average an increase in bicycle traffic on Panepistimiou St. was observed
- The highest bicycle volume is observed in the 5th week (mid-July)
- In 2021 bicycle traffic is increased compared to the same periods of 2020

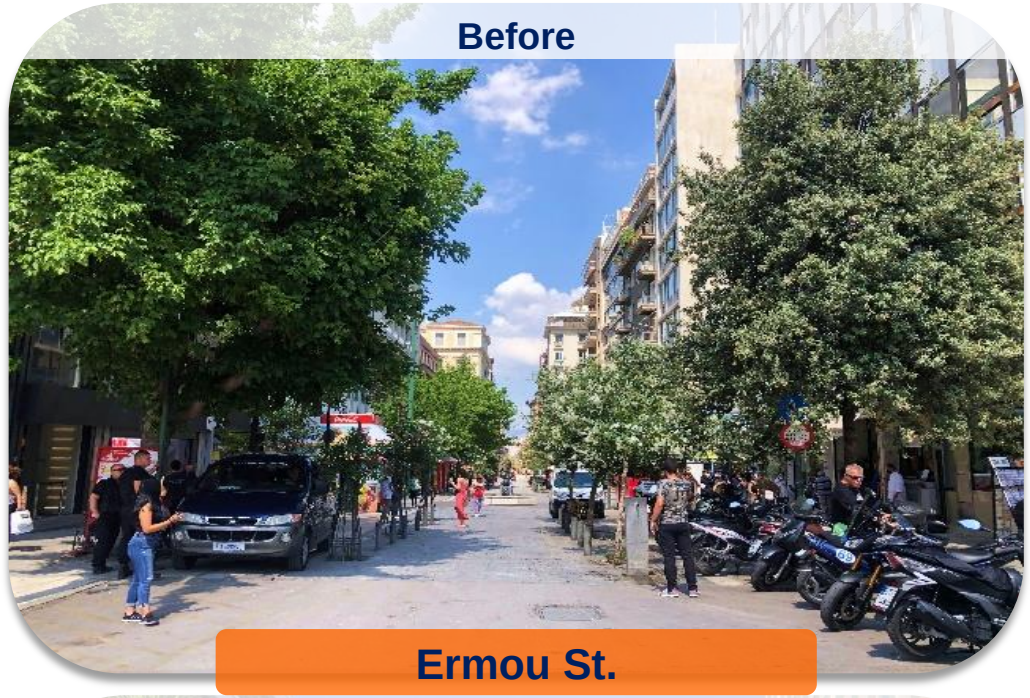


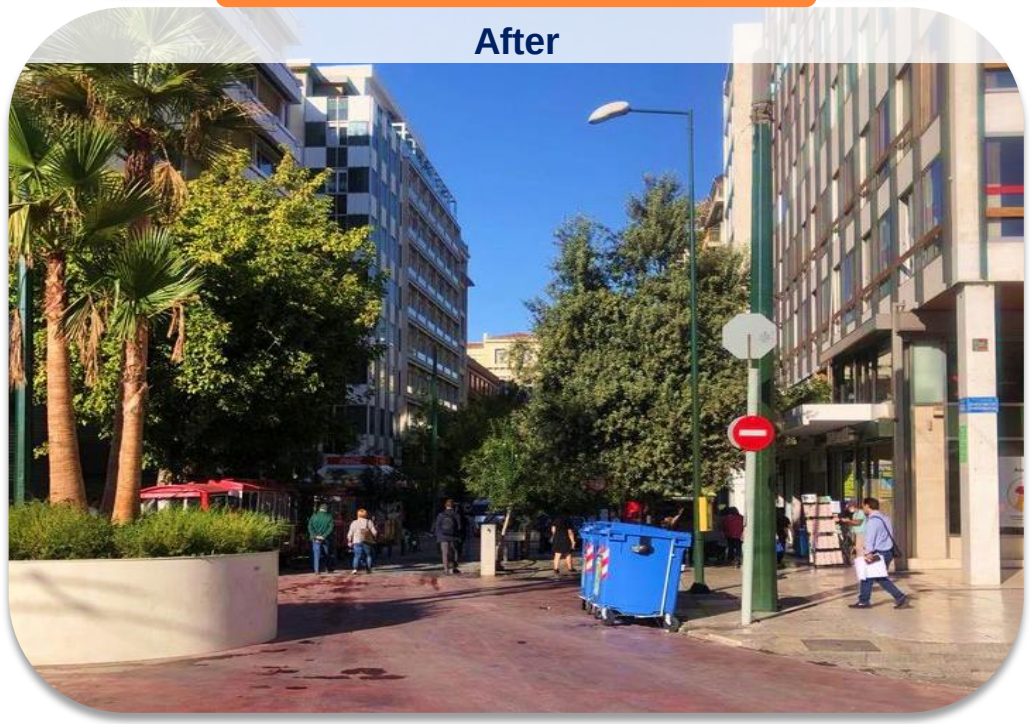




Motorcycles Parking

- To reduce the inconvenience of pedestrians from the illegal parking of motorcycles on sidewalks, 919 new motorcycle parking spaces were created. This led to:
  - Reduction of illegally parked motorcycles on the road and sidewalk, by 31% (from 1.744 to 1.205)
  - Regarding the legal parking spaces of motorcycles, there is an overall increase of 66% (from 775 to 1.289)





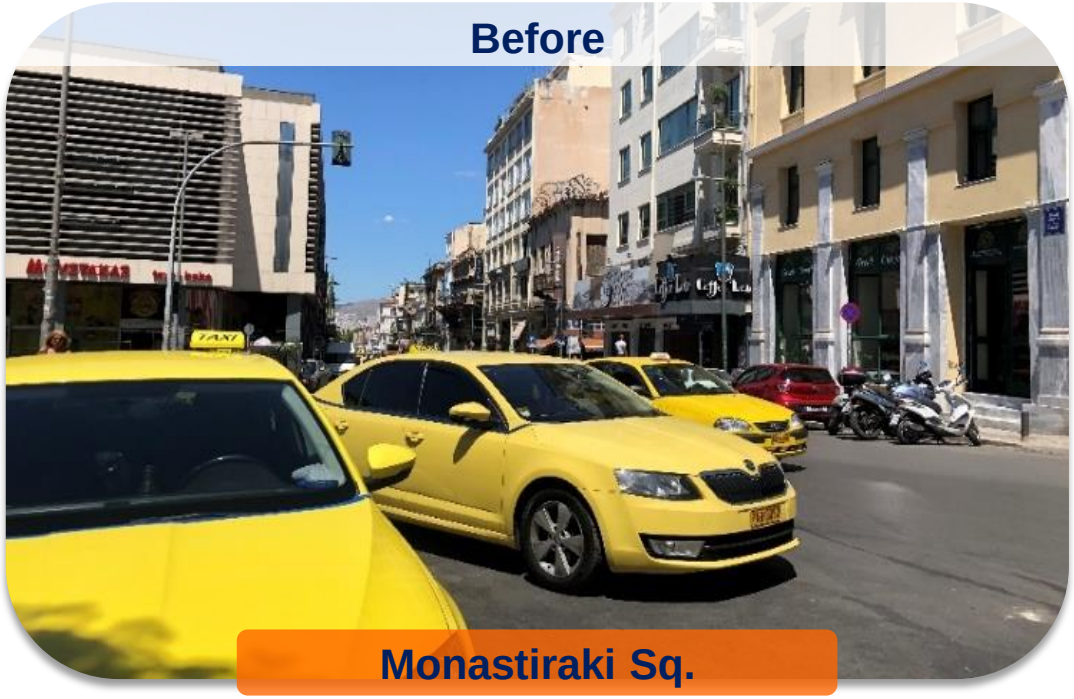
Area	Before		After		Difference (%)	
	Legal	Illegal	Legal	Illegal	Legal	Illegal
Commercial Triangle	408	1,043	889	669	+118%	-36%
Panepistimiou	63	92	96	52	+52%	-43%
Irodou Attikou	0	7	0	5	-	-29%
Psyri	250	244	250	210	0%	-14%
Plaka	54	358	54	269	0%	-25%
Total	**775**	**1,744**	**1.289**	**1.205**	**+66%**	**-31%**

Taxi Stand

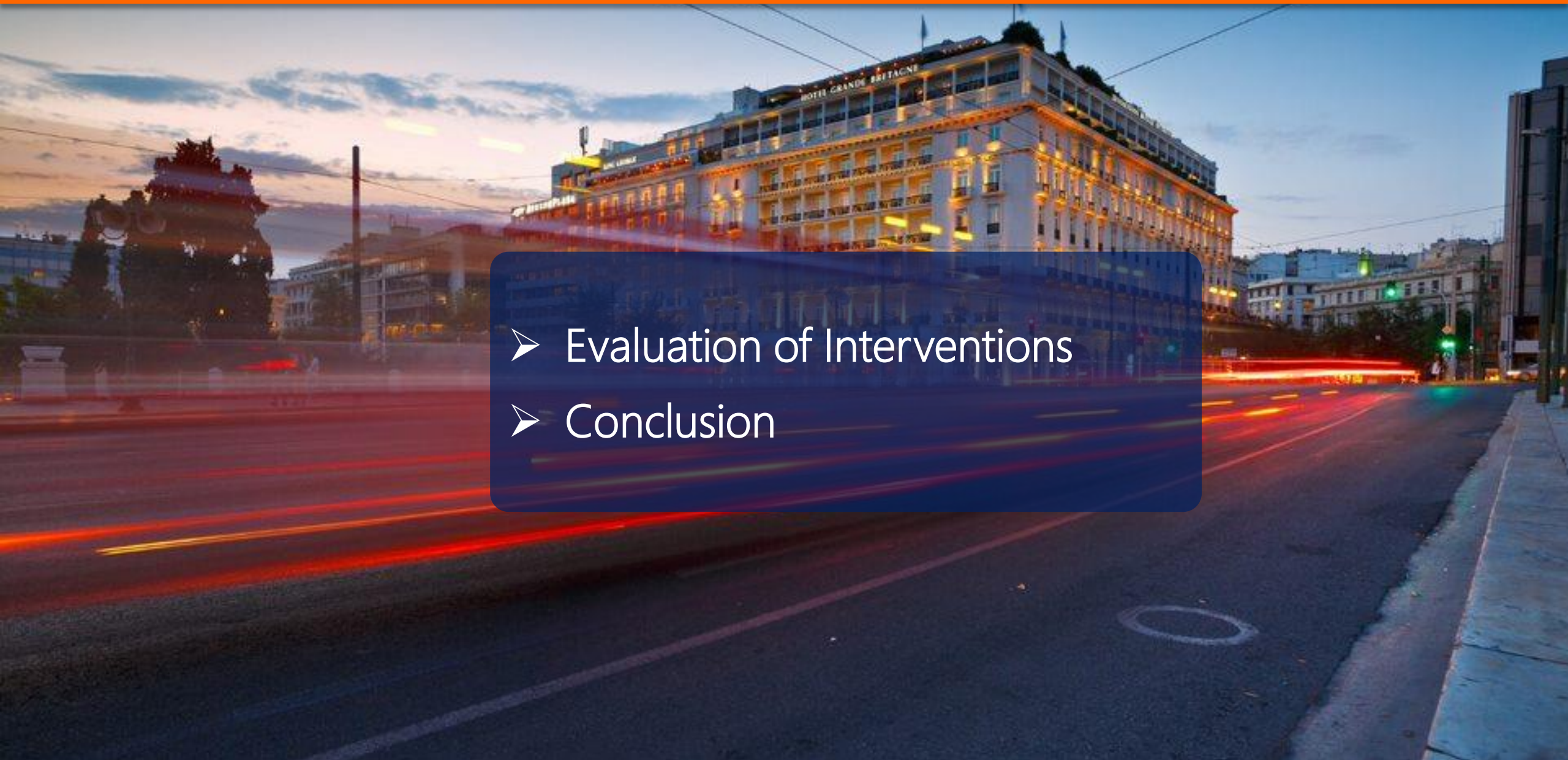
- By implementing the new mobility interventions in Athens center, taxi stands were doubled

	Before	After
Commercial Triangle		
Othonos (to Amalias Av.)	11	11
Dragatsiniou (to Stadiou)	2	2
Sofokleous (to Athinas)	0	5*
Evripidou (to Athinas)	0	5*
Omonoia (to G. Septemvriou)	3	3
Omonoia (to Stadiou)	3	3
Ag. Asomaton	0	3
Monastiraki Sq.	0	8
Total	19	40
Panepistimiou St.		
Omirou (to Panepistimiou)	0	3
Palama	4	4
Ippokratous (to Panepistimiou)	6	6
Sina (to Panepistimiou)	0	5*
Total	10	18
Grand Total	**29**	**58**

* final implementation is pending



Overall Assessment



- Evaluation of Interventions
- Conclusion

Evaluation of Interventions

Advantages

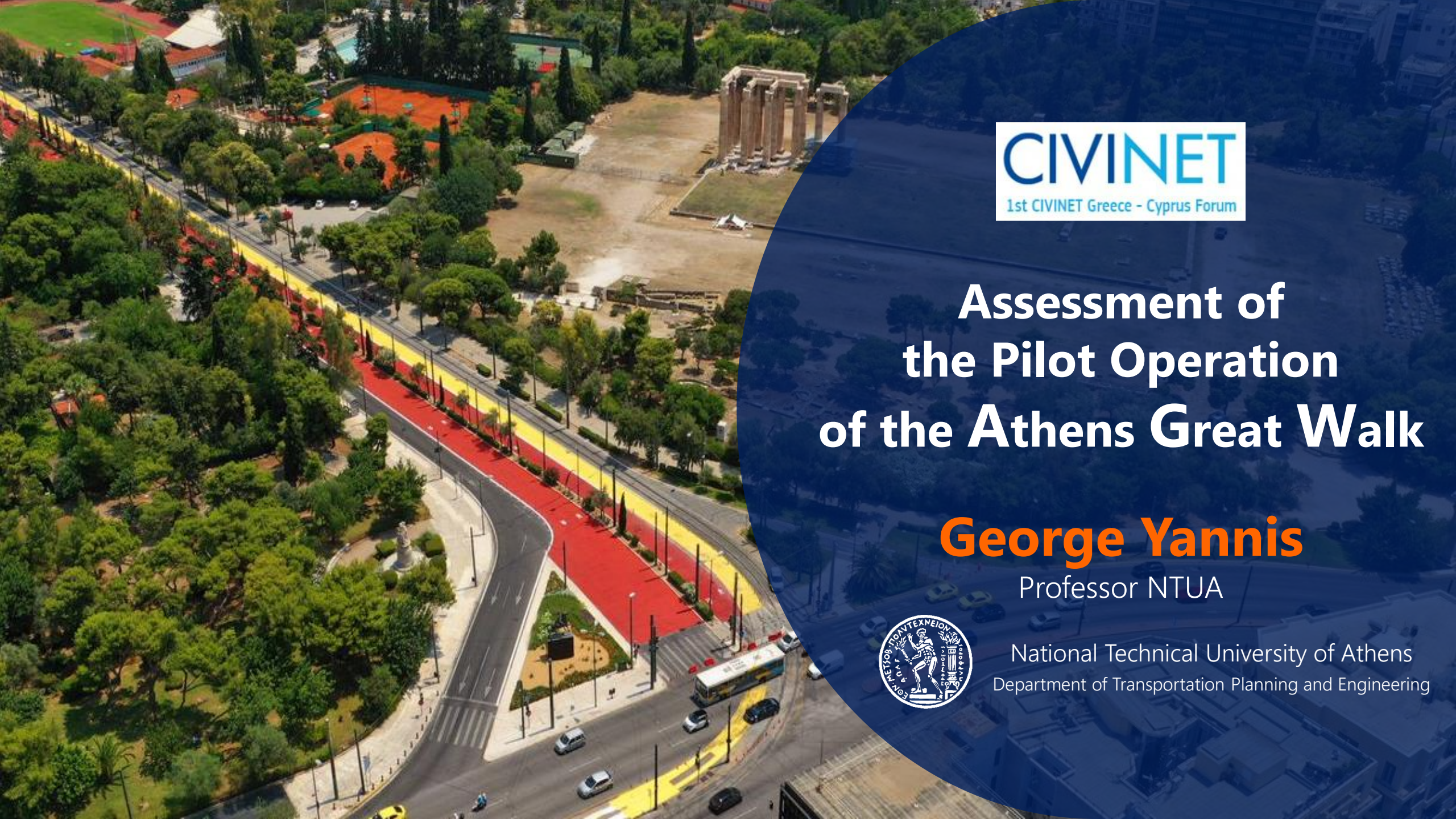
- Decrease of passenger car share on Panepistimiou St. (-15%) with a corresponding increase in taxi (+7%) and motorcycle (+9%) share
- Improved Level of Service for bus and trolley passengers, as they do not have to get on/ off between taxis and other illegally parked vehicles
- Significant increase in walking on central Axes and in the area around the center of Athens
- Pedestrians on Ermou St. have more space so they can move more comfortably and safely
- Increase in cycling in and around the city center
- Removal of illegally parked cars and taxis from bus roads, without provoking public reactions
- Better organized taxi stand by doubling the number of stand places
- Better parking service for people with disabilities by creating 17 new special parking spaces
- Reduction of car traffic speed on central roads with positive impact on safety and comfort of vulnerable road users
- Significant reduction of traffic noise and air pollution

Disadvantages

- Temporary (4 weeks) traffic congestion on a number of road axes in and around the city center such as:
  - Panepistimiou St.
  - Vas. Amalias Av.
  - Vas. Konstantinou Av.
  - Alexandras Av.
- Traffic conditions on the majority of the road axes significantly improved after 3 months, at similar levels as before the pilot implementation

Conclusion

- The goals and predictions of the new traffic and parking interventions in the context of Athens Great Walk, are fulfilled with a relatively quick adaptation of traffic to the new conditions
- For the first time, the focus on sustainable mobility policy is on people and the environment, in contrast to the unconditional priority in private car traffic
- Changes in the habits of citizens were observed by shifting to more environmentally friendly modes of transport
- These encouraging results provide an opportunity for the expansion of the new sustainable urban mobility policy in all areas of the City of Athens, aiming at the gradual implementation of an integrated network of bicycle lanes and more comfortable walking



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Assessment of the Pilot Operation of the Athens Great Walk

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