National Technical University of Athens
Road Safety Observatory

Online workshop in the framework of

6TH UN GLOBAL ROAD SAFETY WEEK
17 - 23 May 2021

Streets for Life

#Love30

DECADE OF ACTION FOR ROAD SAFETY 2021 - 2030

30 KM/H

Thursday 20 May 2021

Innovation in Road Safety Research

Socio-economic impact of environmental transport charging policies

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Together with:
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The EcoCharge project

- **Title of the project:**

  Investigating the socio-economic impact of environmental transport charging policies

- **Funding:**

  Hellenic Associations of Motor Vehicle Importers Representatives

- **Duration of the project:**

  7 months (September 2020 – March 2021)

Objective and Goals

Objective

Investigating the socio-economic impact of environmental transport charging policies in Athens and Greece

Goals

- To investigate the level of acceptance of environmental transport policies in Greece
- To improve the environmental quality in the center of Athens and generally in Greece

Background

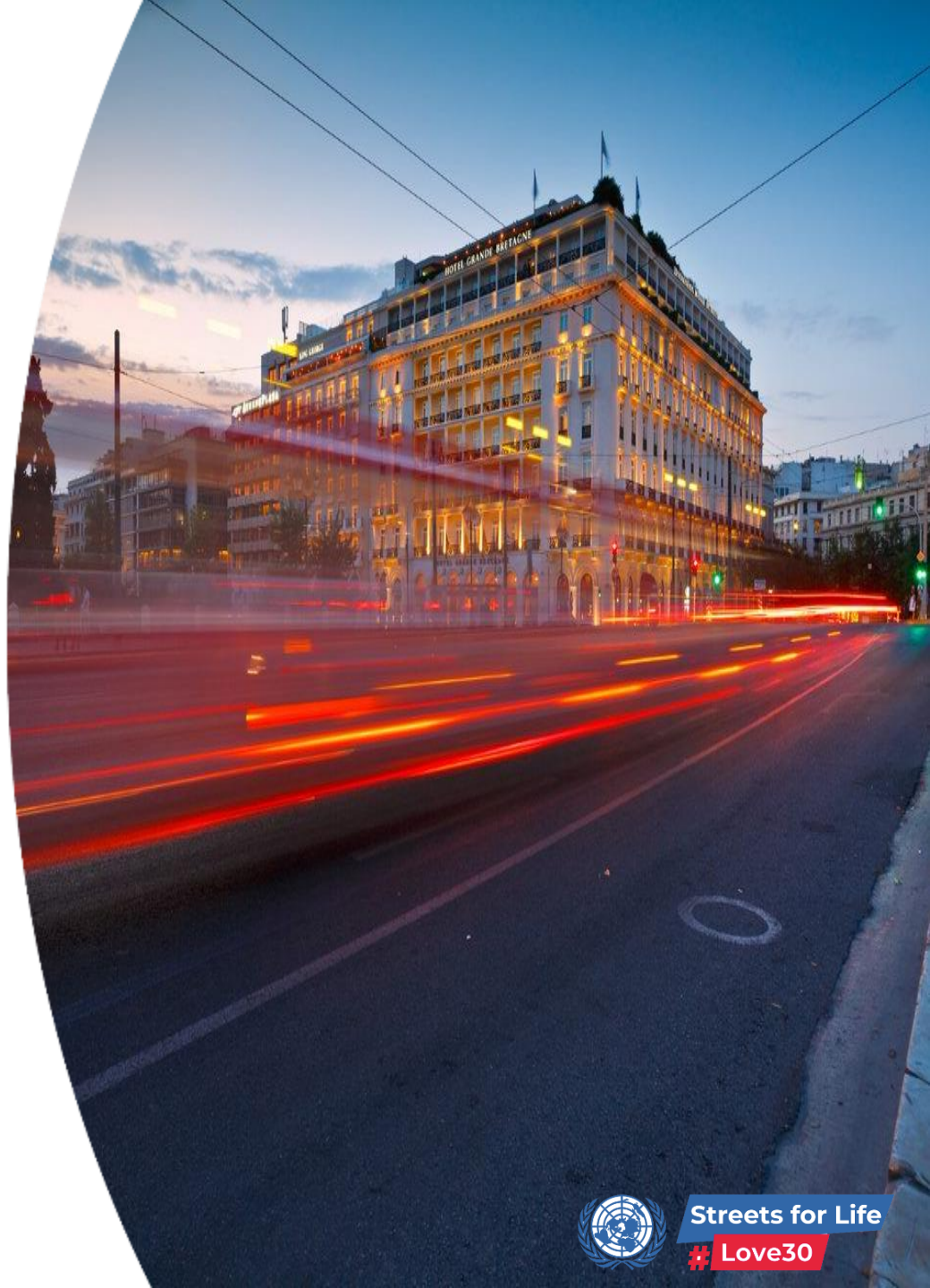
- Several transport policies aiming to reduce traffic congestion and air emissions from vehicles in city centers have been implemented in many cities worldwide and can be categorized as follows:
  - Congestion Charging (London, Stockholm, Milan, Oslo, Singapore)
  - Low Emission Zones (Athens, London, Stockholm)
  - Sticker (Paris, Barcelona)
- Results of the implementation of traffic restriction policies in urban centers include:
  - Reduction of vehicle entry in urban centers
  - Reduction of traffic congestion
  - Reduction of air pollution
  - Reduction of traffic noise
  - Increase the use of Public Transport
- In Athens, over 70% of greenhouse gases (CO_2, N_2O) are emitted due to road transport
- Also, the continuous increase of the vehicle fleet in combination with the decrease of the new registrations leads to an aging vehicle fleet

Methodology (1/2)

- The methodological framework was developed to quantify the impact of the following environmental transport policies on society, the economy, commuters and the environment:
  - Annual Card:
    Environmental charging for private cars access in the center of Athens, with a charging variable depending on the age and the environmental burden of each vehicle
  - Vehicle Withdrawal:
    Old technology vehicle withdrawal in Greece (10+ years old, based on 1st registration internationally)
- The public acceptance of additional environmental transport policies in Greece was also examined, such as environmental incentives to purchase new technology vehicles, circulation tax, parking fees and motorway tolls

Methodology (2/2)

- 2 questionnaire-based surveys were undertaken, in order to investigate the environmental transport policies under consideration
- Study areas: Athens, Thessaloniki, Volos
- The questionnaire survey consisted of 4 parts: travel characteristics of respondents, environmental awareness and sensitivity, stated preference on alternative scenarios and demographics
- Binary logistic regression models were developed for the statistical analysis of the proposed environmental transport policies level of acceptance
- The socio-economic Cost Benefit Analysis, was achieved through the Internal Rate of Return (IRR), a financial metric used to assess the attractiveness of a particular investment opportunity



Annual Card Impact

- The socio-economic impact of the annual card, is investigated and analyzed in the following sectors:
  - **Economy:** The total amount of money collected annually from the annual card fees
  - **Traffic:** The social impact of travel time saving and fuel consumption
  - **Environment:** The social cost of pollutants (CO_2 , No_x, N_2O, NH_3, $PM_{2,5}$) emitted from passenger cars in the center of Athens
  - **Road Safety:** The social cost of the fatalities, seriously and slightly injured in road accidents
- The implementation of the annual card shows a **significantly high IRR** index in all the scenarios under consideration based on the price of the card (low, medium, high)
- The sensitivity analysis shows that even in extreme price changes over a 15-years period, the IRR index remains positive, ensuring the technical **feasibility** and environmental **sustainability** of the policy
- The downward trend of the IRR index as the price of the annual card increases indicates that the low price of the annual card is the **best scenario**

Vehicle Withdrawal Impact

- The socio-economic impact of old technology vehicle withdrawal in Greece, is investigated and analyzed in the following sectors:
  - Economy: The total amount of money paid annually by the state for grants
  - Environment: The social cost of pollutants (N_2O, NH_3, $PM_{2,5}$) emitted from passenger cars in Greece
  - Road Safety: The social cost of the fatalities, seriously and slightly injured in road accidents
- The Scenario that offers the lowest grant for a vehicle withdrawal is the one with the highest IRR index
- The IRR index decreases as the withdrawal grant increases
- The sensitivity analysis shows that the higher the withdrawal rate of vehicles over a period of 15 years, the higher the IRR index and therefore the more guaranteed the investment

Environmental Transport Charging Policies Impact

The social-economic impact of the environmental transport charging policies under consideration is positive and the investments are guaranteed

Road safety benefit due to the reduction of average speed and the technologically renewed vehicle fleet

Traffic benefit mainly in the first two years of implementation of the annual card due to a reduction in vehicle kilometers within the study area (Athens Ring)

Environmental benefit as a result of the technologically renewed vehicle fleet and the reduction of traffic in the first years of implementation of the annual card policy

Future Challenges

- The environmental pollution risks on urban centers need to be addressed through concrete and targeted actions and scientifically sound decisions to turn them into opportunities for the future
- Environmental charging policies that have a positive impact on the environment and society must be integrated into a more general strategic plan adapted to the characteristics of each city
- The road safety impact on the feasibility of environmental charging transport policies is significant and should therefore be a key factor in developing the socio-economic analysis
- Urban road safety should be integrated into the urban mobility policies, equally with environment, energy and mobility concerns
- Environmental charging transport policies should be tailored to the specific mobility and safety problems and needs of each city

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