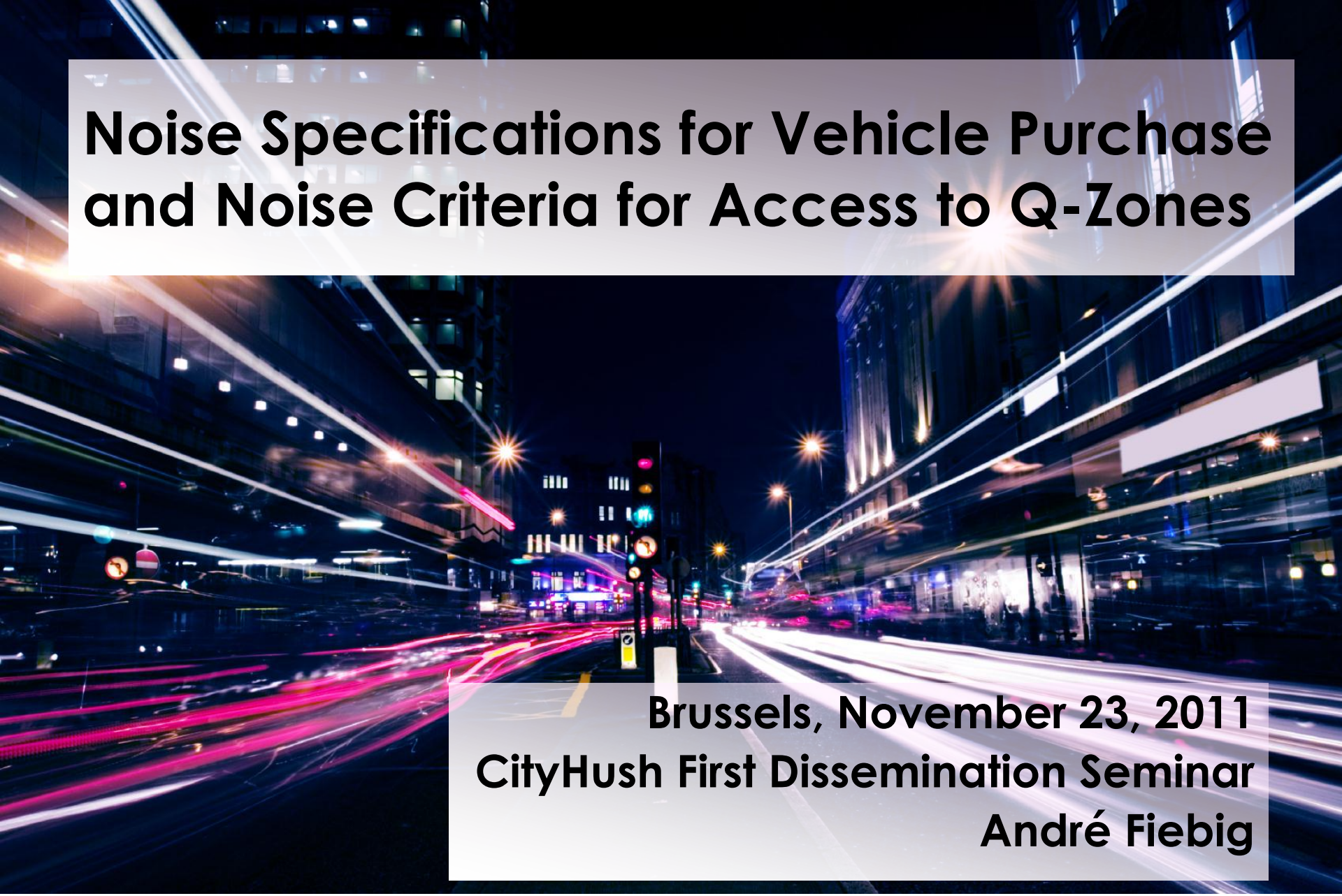
Noise Specifications for Vehicle Purchase and Noise Criteria for Access to Q-Zones



Brussels, November 23, 2011

CityHush First Dissemination Seminar

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CityHush

SEVENTH FRAMEWORK PROGRAMME

Introduction

Motivation I

- Municipalities want to purchase green vehicles because of their low noise and chemical costs
- Noise specifications are helpful for purchase decisions with respect to environmental friendliness

Introduction

Motivation II

- Suitable noise criteria for vehicles needed ensuring a most acceptable noise climate within quiet zones
- Classification allows for specific access regulation measures

Working Steps

- Studies regarding appropriate test method for type approval with focus on electric and hybrid cars
- Measurements on new hybrid and electric passenger cars
- Development of noise classifications
- Proposal on suitable noise limit for vehicles

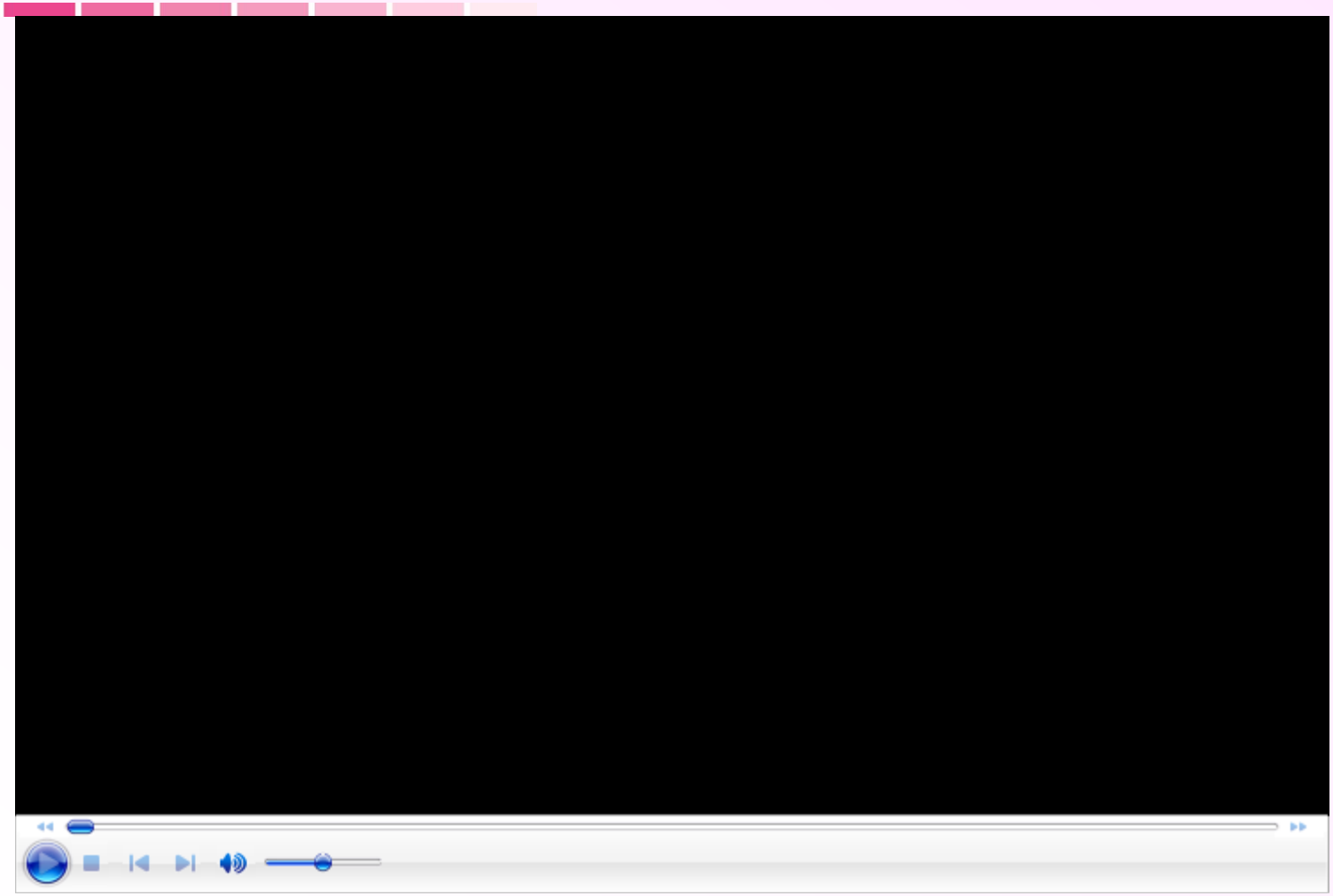
Measured hybrid and electric vehicles

- Toyota Prius (Hybrid)
- Mitsubishi iMiEV
- Fiat 500 (adapted)
- Peugeot iON
- Citreon C-Zero
- E-Scooters

How quiet are electric vehicles?

- Pass-by measurements according to ISO 362 and ISO 9645
- Pass-by measurements regarding typical urban driving conditions (starting, low constant speed)

Measurement



Measurements on a test track

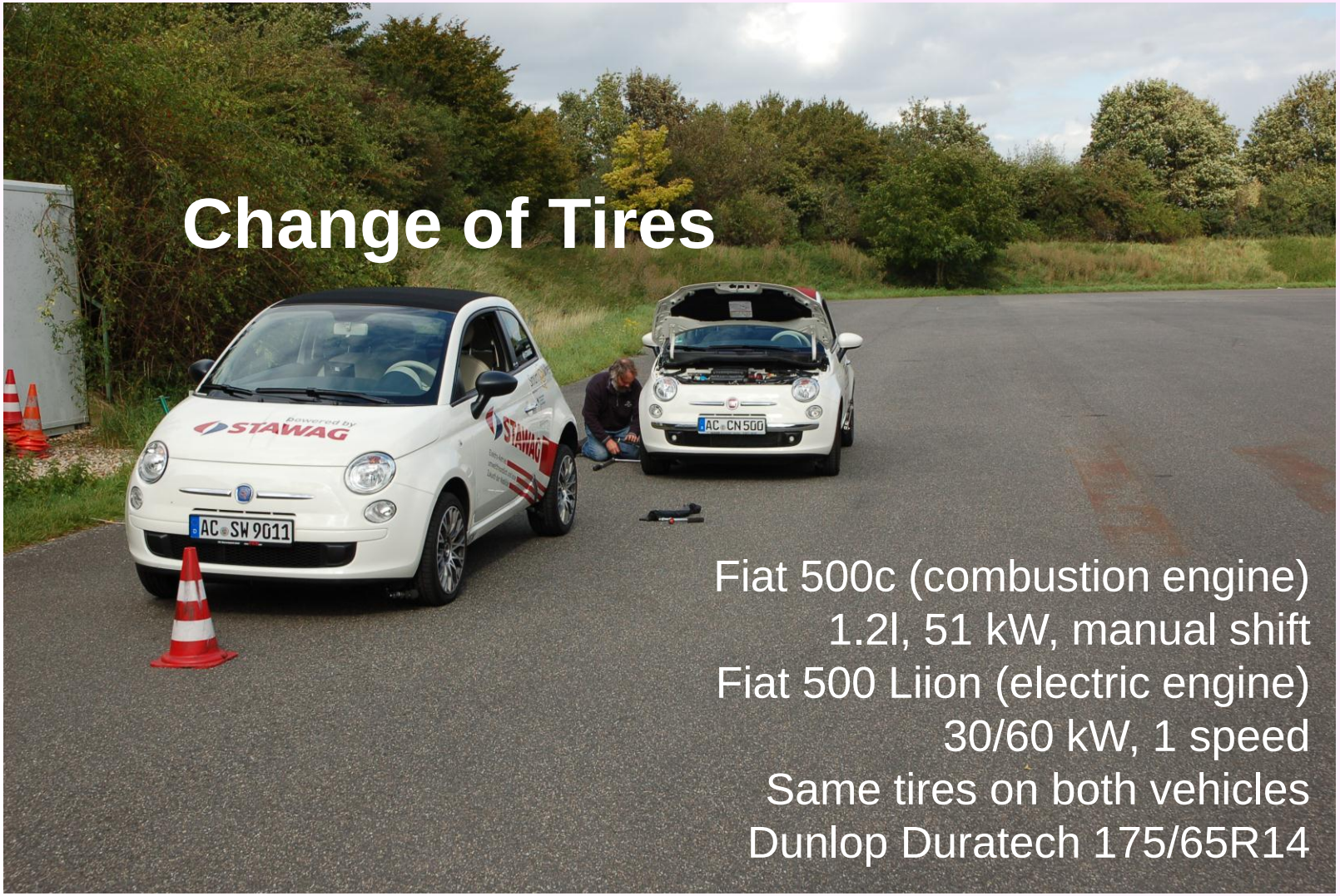
Opel Vectra

Toyota Prius

GS Suzuki 650

- Measurements of different vehicles under stable boundary conditions

Comparison of ICE and EV (Fiat 500)



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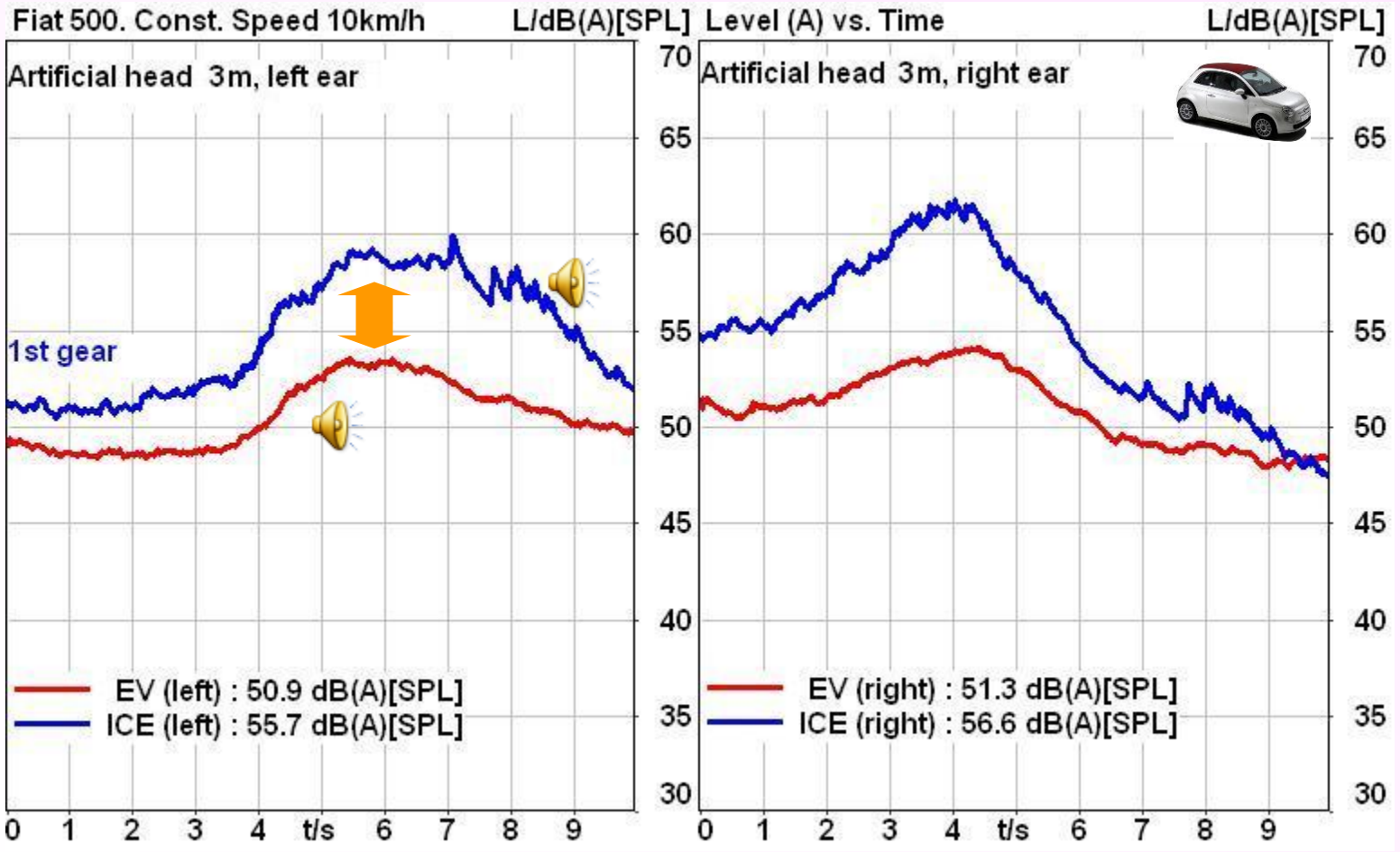

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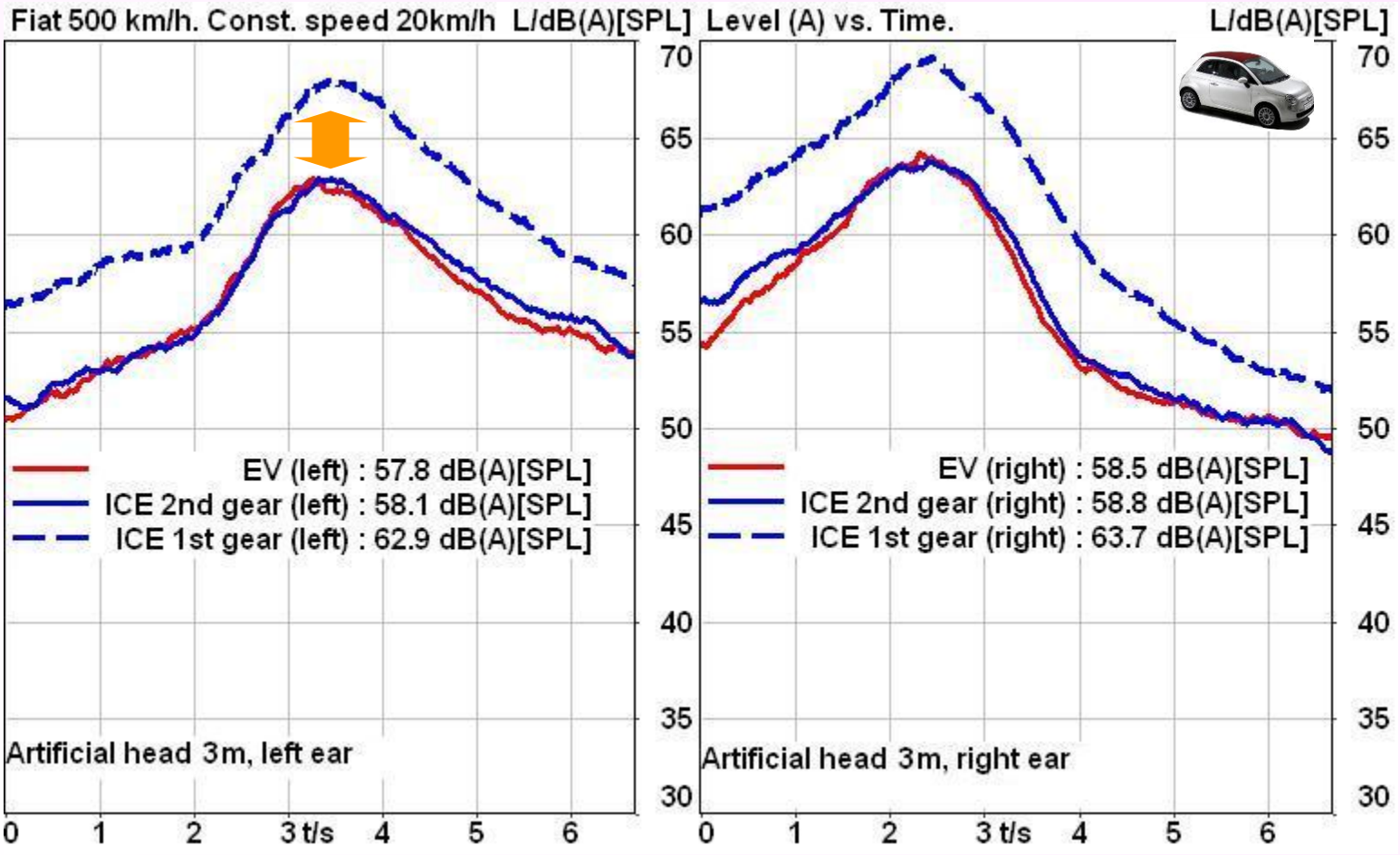

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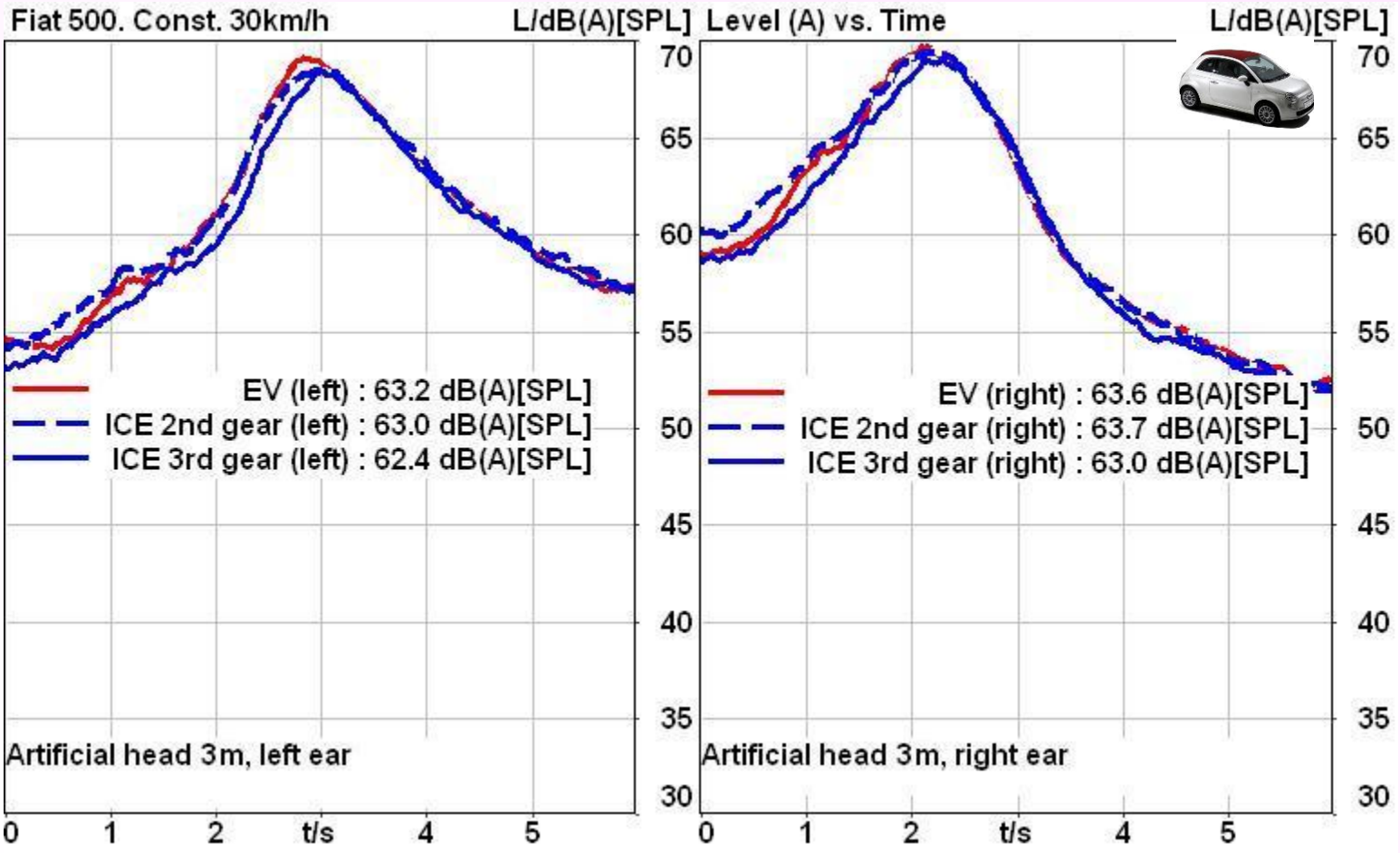
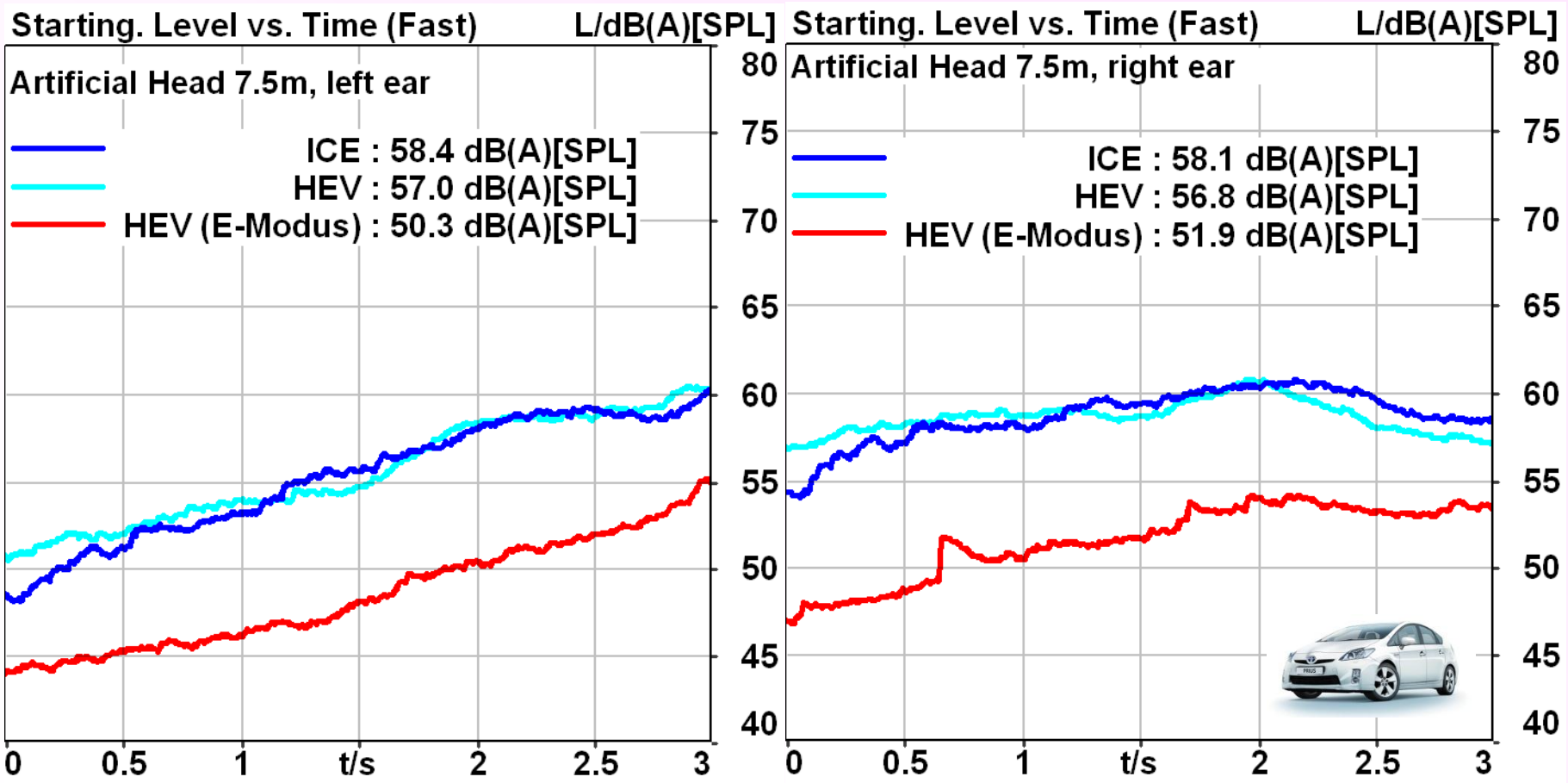


Passenger cars: Noise reduction (Prius) potential (starting, medium acc.)

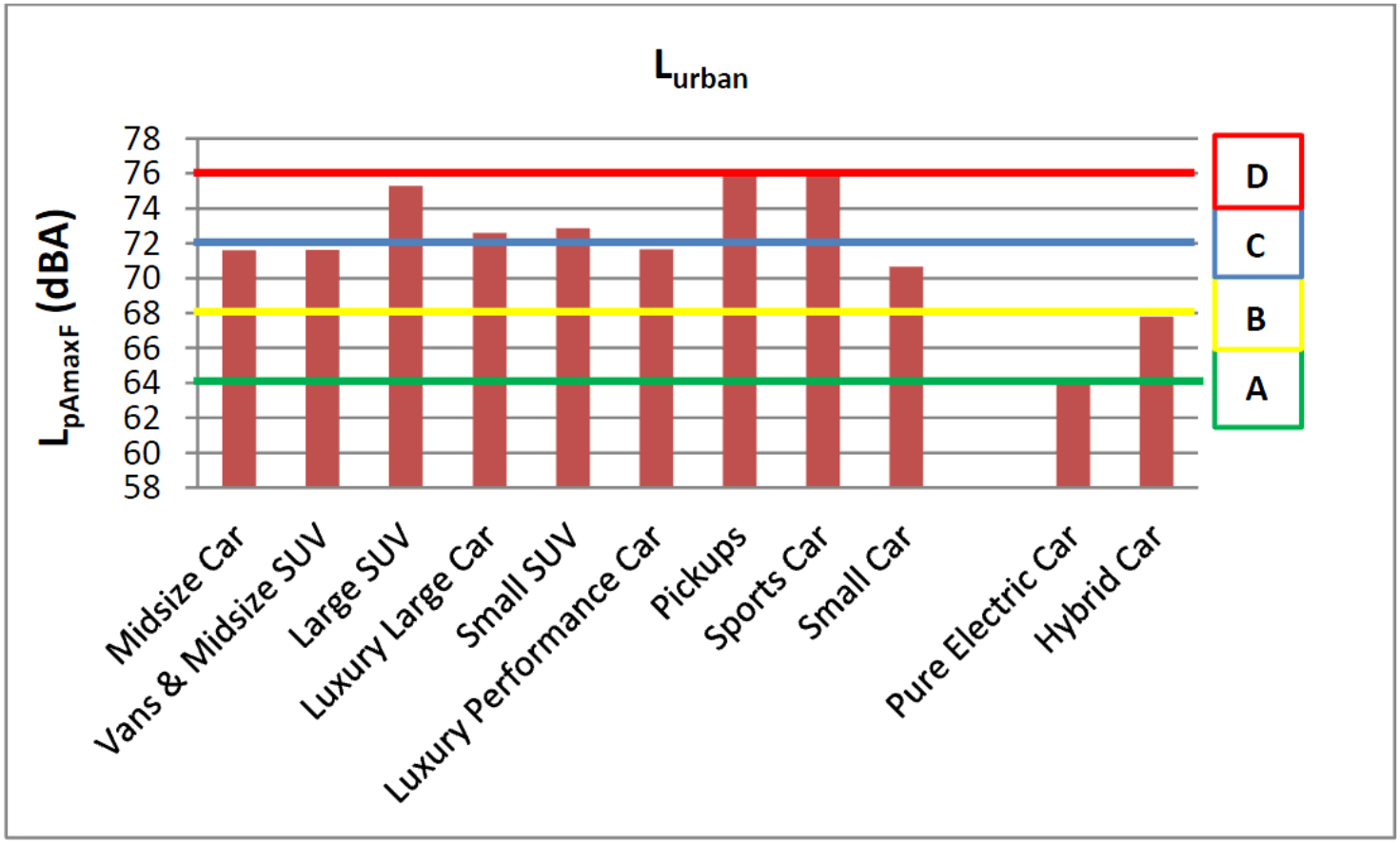


- Starting: several dB noise reduction

This means …

- Reduction potential is higher on streets with lower speed limits due to the quiet engine
- Hybrid vehicles must be operated in quiet zones only in e-mode
- Since the change of driving conditions (acceleration, braking) lead to an increase of annoyance, traffic management must force a steady traffic flow

Measured, collected data (L_{urban}) from cars including upper limits of proposed noise classes



Five different noise classes covering the range in exterior noise from passenger cars

Noise class	Noise limit ISO 362:2007 (L_{urban})	Typical passenger car types
A	<64 dBA	Pure electric cars
B	64 - 68 dBA	Hybrid cars
C	68 - 72 dBA	Normal passenger cars
D	72 - 76 dBA	Large passenger cars
E	>76 dBA	Sport cars and pickups

Current noise limit for type approval of passenger cars: L_{urban}<74dB(A)

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Final results

- Proposal of five different noise classes (A, B, C, D and E) covering the range in exterior noise from passenger cars according to ISO 362 (2007)
- Vehicle with noise class A can be considered as "environmental friendly" car with respect to noise
- The proposal is that a passenger car has to fulfill noise class A to be granted free access to a Q-zone
- This would mean a road traffic noise decrease up to 6-8 dB

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Side Note
Pedestrian Safety

Side note

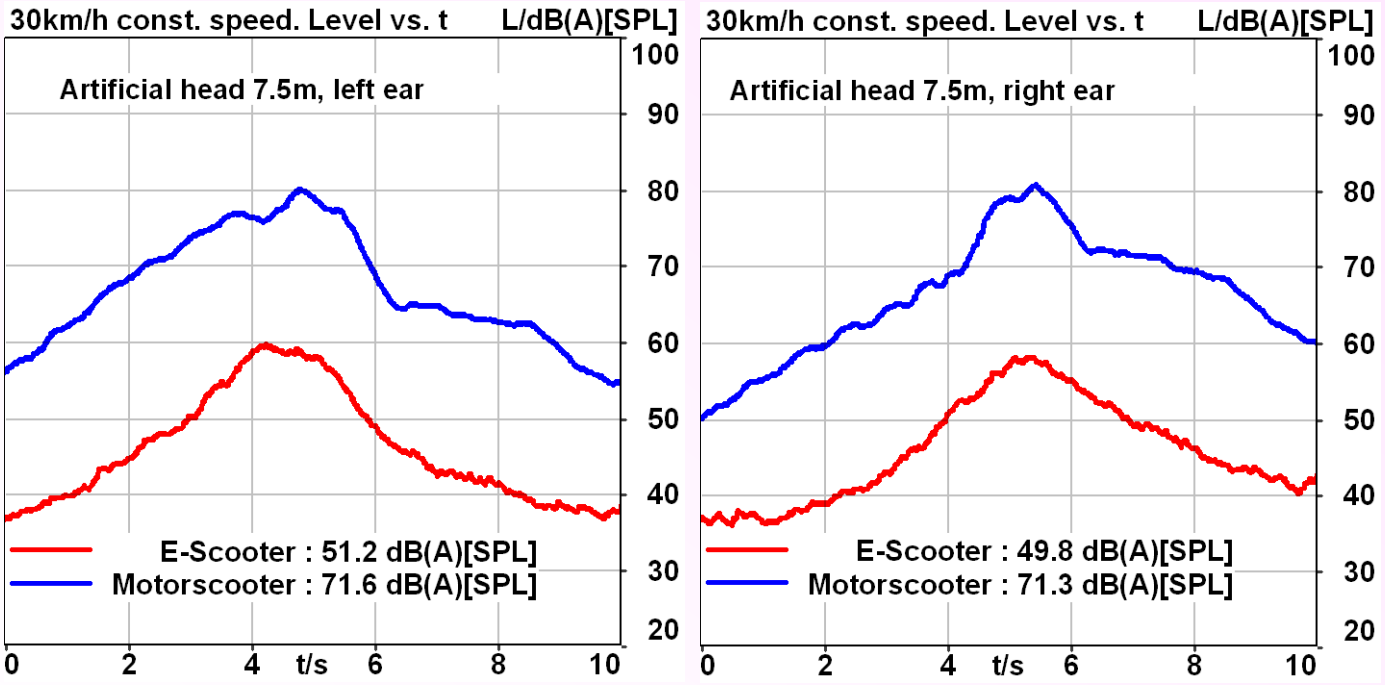
- Debate about too quiet vehicles leading to a higher incidence rate of pedestrian and bicyclist crashes
- Introduction of additional acoustical (warning) signals proposed up to the SPL of comparable ICE vehicle
- Conflict with traffic noise reduction efforts

Outlook

Outlook

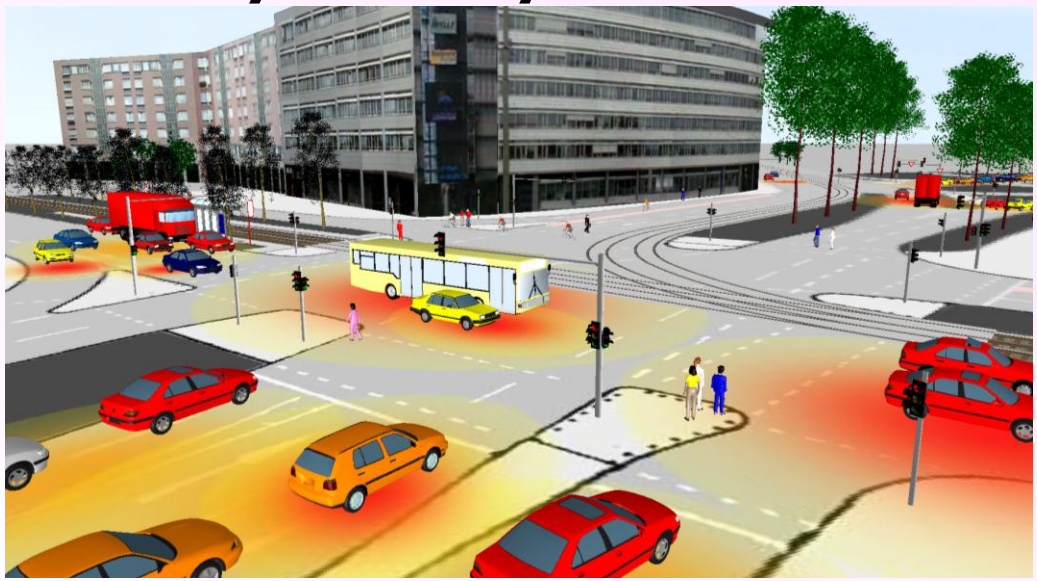
- Need for noise classes for other vehicle types
- Up-to date noise specifications on a regular basis to cover technological changes
- Consideration of driving conditions so far not included in the ISO 362 (2007) – WOT test at low(er) start speed

Noise reduction potential of Scooters



- Electrification of scooters will be highly effective

Thank you for your attention!



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