CityHush Presentation WP3.5

Definition of a noise & annoyance standard for motorcycles in the urban environment

presented by

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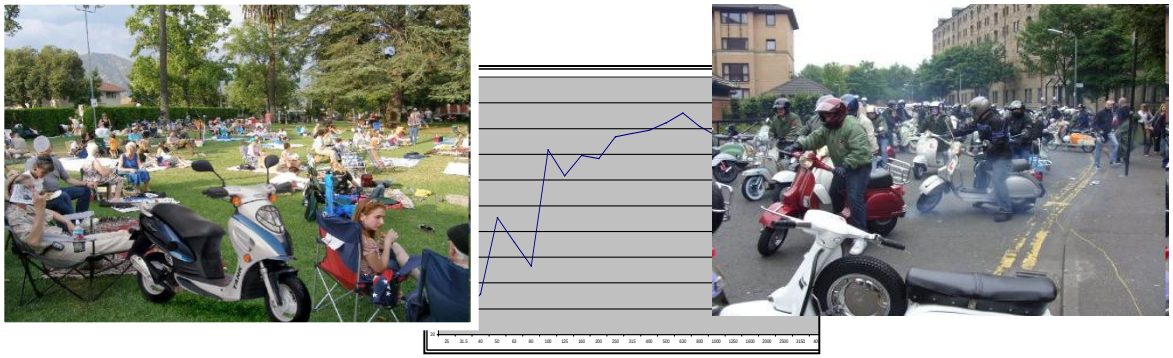
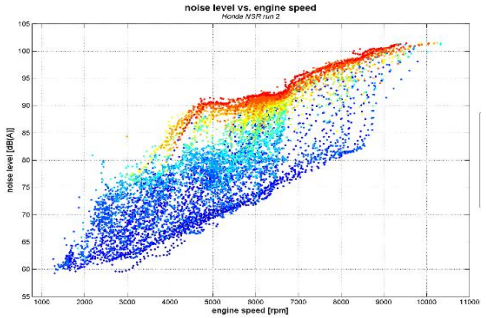
Main Questions

- Is a motorbike, a moped, a scooter, a three-wheeler, a quad, …annoying?
- What features of its noise footprint annoys?
- When (compared to the specific location)?
- Where?
- What can be done to reduce its annoyance?
- Where does it make sense to reduce it?





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To answer the questions on PTW annoyance…

-Preliminary study on existing literature

(confidential document **CH-WP35-TTE-MEMO01-210310**)

- Athens **Municipality involved**
- **4 different sites were set up**, corresponding to locations of potential **Q-zones** and **embedded parks**
- The people passing by were asked for opinion on the istantaneous sounds heard (about **200 people interviewed**)
- And specifically about general traffic and PTW
- Simoultaneously the sounds were recorded, so as to allow any kind of post processing (**Leq, Lmax, L5, Spectra, Sharpness, Loudness, etc.)**
- People were uniformely distributed between genre (m 57% - f 43%), age (13->86), site (1-2-3-4), time (06 am-19 pm) while mainly Greeks were interviewed (75%) and foreigners were fewer (25%)

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- So far the database is ready
- Analyses of the **PTW noise characteristics** were performed and a **set of acoustic evaluators** for different type of **PTW**, **cars** and **buses** is available so as to derive the acoustic signature in urban (real) environment.
- A rough impact assessment of potential scenarios to be introduced was prepared including:

Annoyance

Sleep disturbance

Social aspects

Safety

CO2 emissions

NOx emissions

Economic implications

Energy consumption

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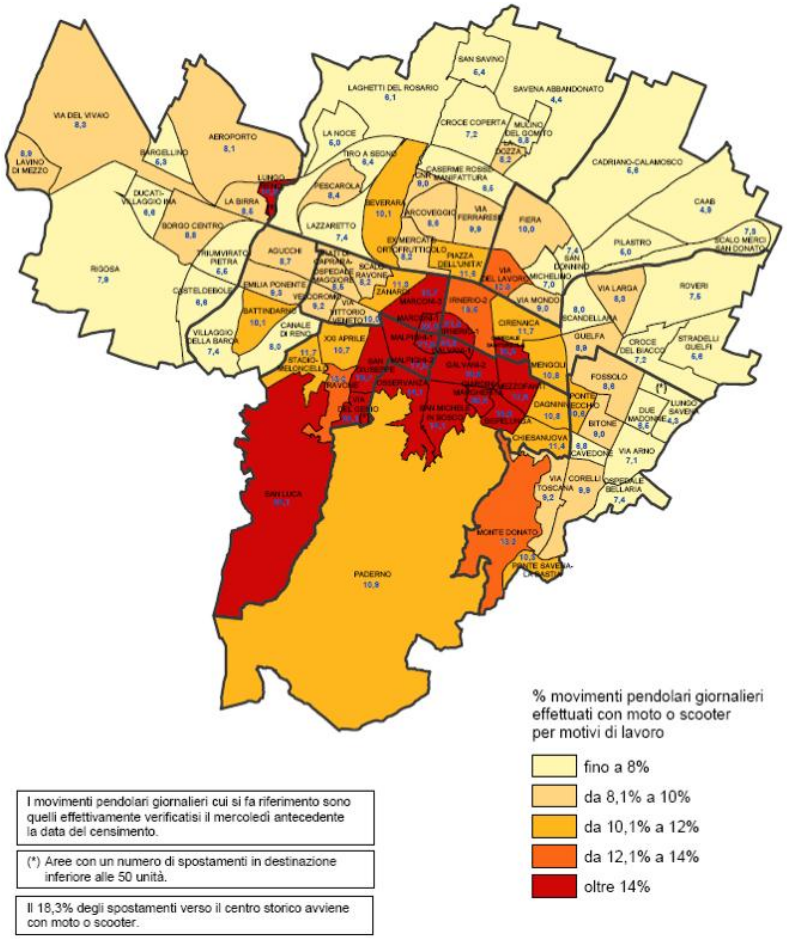
Where are ptw in use?



- In the city during everydaylife short distance movements
- In the countryside/mountains/sea for leisure

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How many PTW are there?

Site/Time	% Scooter/Mop.	% Motorbikes	% Cars	% Buses	% Oth. vehicles
Major road/Day	31	8.8	57.1	0.7	2.5
Major road/Night	10.3	4.1	82.1	0.7	2.7
Minor road/Day	20.6	7.1	68.8	0.7	2.8
Minor road/Night	22.8	12.3	63.2	1.8	0

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Assessment sites

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1) What is your **reason** for being in this area / at this site?

2) **How frequently** are you in this area, at this site?

Often	Regularly	Seldom	First time

3) **How long** have you been **/in this area /walking along this road/** at this site so far today?

<5 min.	5-15min.	15-30min.	>30 min.

4) What is your **evaluation** of the acoustic environment (the overall sound) during your present visit to this area / site?

Not at all quiet										Very quiet
0	1	2	3	4	5	6	7	8	9	10

5) What is the **quality** of the acoustic environment during your present visit?

Very bad										Excellent
0	1	2	3	4	5	6	7	8	9	10

6) **How annoying** do you consider the acoustic environment during your present visit?

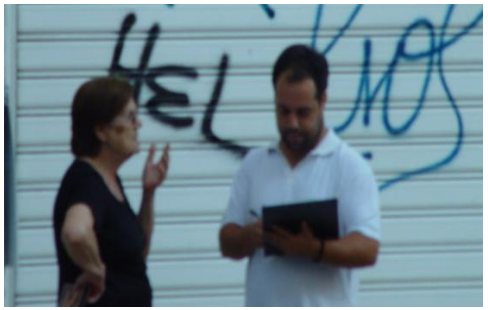
Not at all annoying										Extremely annoying
0	1	2	3	4	5	6	7	8	9	10

7) Specifically in this area / at this site, **how annoying do you consider sounds heard from the following possible sources**?

	Not at all annoying									Extremely annoying	*Not Noticed*
General road traffic	0	1	2	3	4	5	6	7	8	9	10	
Motorcycles & Scooters	0	1	2	3	4	5	6	7	8	9	10	

8) Do you consider **yourself**, generally speaking, as being **sensitive to noise** in your surroundings?

Not at all sensitive										Very sensitive
0	1	2	3	4	5	6	7	8	9	10



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Differences in annoyance

	%annoyed general traffic	%annoyed PTW only
Site 0	78	79
Site 1	89	73
Site 2	25	0
Site 3	70	70
Site 4	61	46

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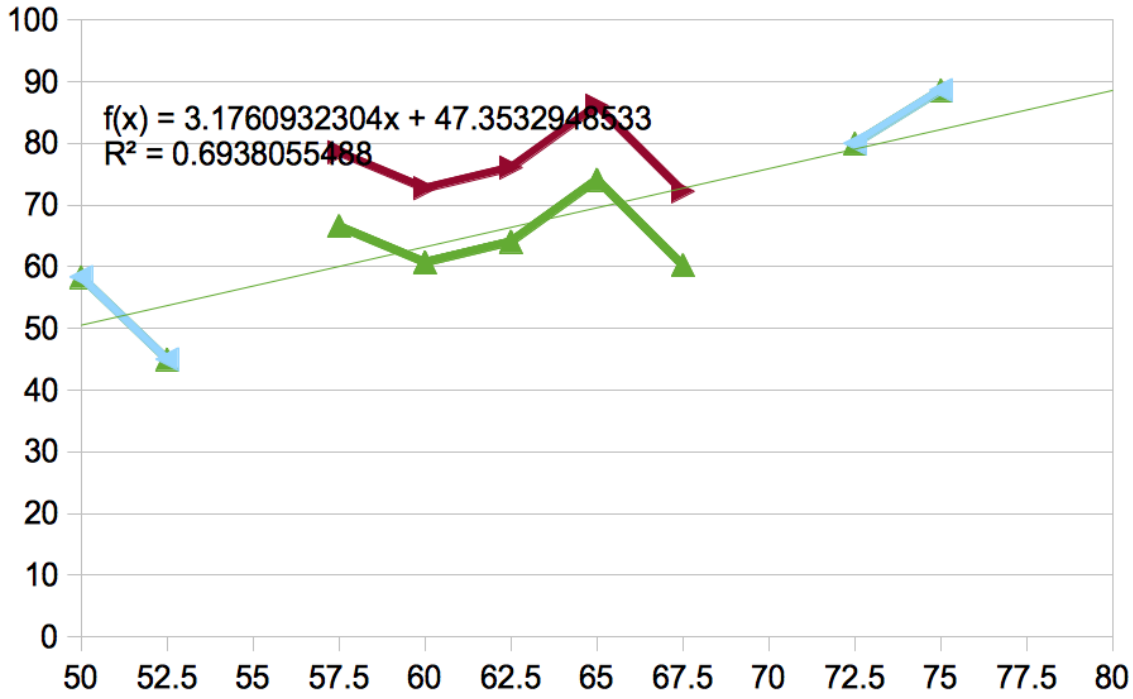
Paviotti&Vogiatzis annoyance curve



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	L(A)eq	L(A)max	L(A)5	SEL(A)	Roughness	RoughMAX	LoudMAX	
Scooter (TOT)	74,6	78,3	77,8	79,1	48,0	**71,0**	**52,6**	LinMEAN
	76,2	**80,5 (+4,5)**	**80,0 (+4,4)**	80,9 (+3,3)	104,0	214,9	134,9	LogMEAN
	64,4	70,4	69,8	71,8	29,3	31,0	29,0	MIN
	81,8	86,7	86,3	87,0	119,0	230,0	150,0	MAX
Moto (TOT)	75,2	80,5	79,7	81,0	**36,8**	**51,2**	63,9	LinMEAN
	77,1	**82,7 (+6,7)**	**81,8 (+6,2)**	82,5 (+4,9)	48,1	83,8	75,6	LogMEAN
	66,5	70,0	69,5	72,6	25,9	34,0	43,0	MIN
	82,2	87,3	86,1	87,2	58,1	94,0	84,0	MAX

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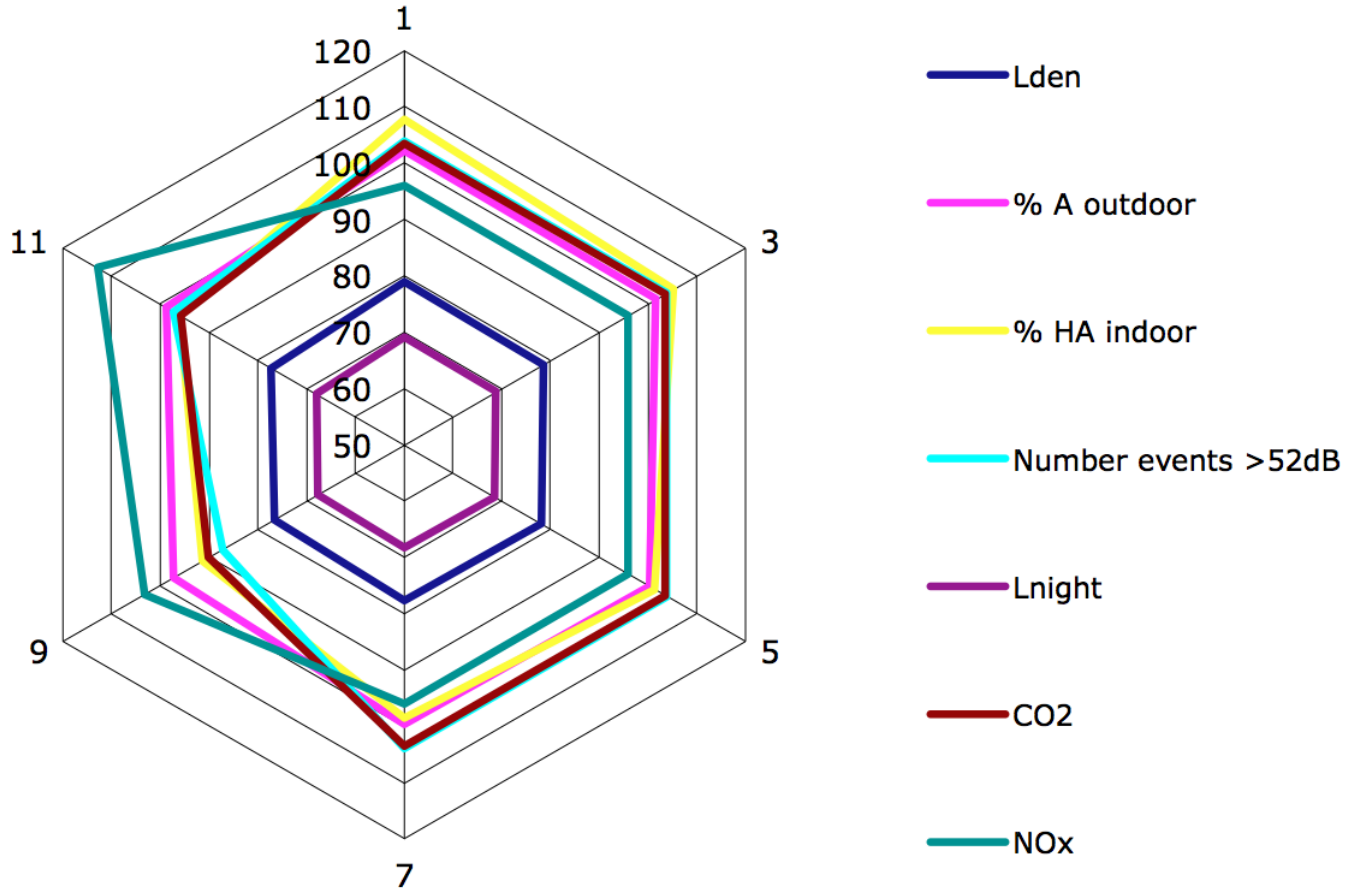
Impact assessment results



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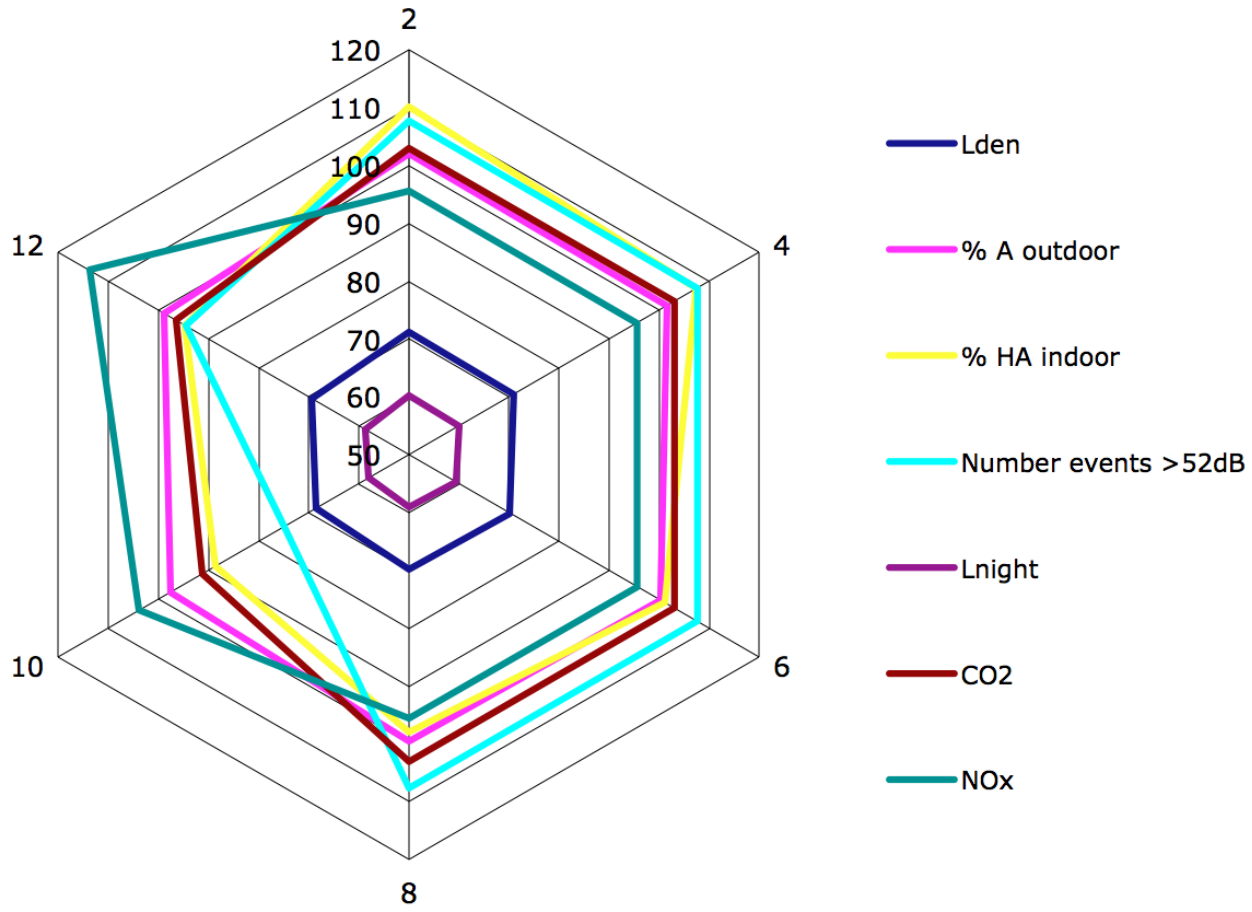

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Conclusions (annoyance)

- **First rule:** for annoyance may be that whenever the PTW are mixed into the traffic, they follow the same annoyance curve as road traffic in general, and the annoyance depends on number of events and SEL of single events only

- **Second rule: 8-15% is most likely the range of increase of percentage of annoyed people due to the specific PTW noise signature features, additionally to the annoyance already foreseen due to noise level (e.g.: SEL) only**

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Conclusions (noise, annoyance and social costs)

The best option for noise reduction is therefore the use of only electrically driven PTW, because:

- they make less noise (about 20dB less as foreseen in the target of CITYHUSH for each pass-by, and overall a reduction of approximately 2,5dB on the overall traffic noise on the road)
- they reduce annoyance, both indoor and outdoor
- they reduce the health risk during night times, because less noisy events are heard inside houses
- they reduce overall air emissions and are at “zero emissions” in urban environment
- they are at the same cost for the owner
- they are as safe as other PTW
- they allow to maintain the flexibility of movement typical of small transportation means within urban environment.

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Europe, 80 dBA

Cina, 55 dBA

Learn from more advanced countries!

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