

REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Session II: IMT and simulation of low carbon mobility solutions

Marina Almeida-Silva ^[1], Ana Marta Faria ^[1], Joana Ferreira ^[2]

[1] Instituto Superior Técnico, [2] Universidade de Aveiro



















REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Disperson module

Points to discuss:

Meteorology

- Wind components,
- Suitability of this approach to all pilot areas?
- Desired/Available spatial and temporal detail of inputs vs running time

Roads locations

D air pollutant

Long-term simulation / typical meteorological conditions

vs running time

















Freight module

Project co-financed by the European **Regional Development Fund**

REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Changes in traffic **INPUTS** demand (peak/nonpeak) **Characterization reference** Number of vehicles to situation: **Freight module** Typical operational Total value (peak/nonpeak) Vehicle type distribution -

Outputs

Definition of scenarios

- **Overall freight demand** _
- Vehicle type shift _
- Peak/non-peak changes _















maintain level of service

values (average speed, energy consumption)

Examples of application:

- Introduction of other vehicle types (Euro 6, electric vehicles,
 - cargo bikes, electric scooters)
 - Introduction of regulation regarding time of delivery (peak
 - versus non-peak demand)



REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Freight module









Freight module

Project co-financed by the European **Regional Development Fund**

REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Cilla di Trerise

Outputs Changes in traffic **INPUTS** demand (peak/non-**Characterization reference** peak) **LIMITATION:** Number of vehicle to situation: nd comaintaindevel of service -vicTypical operational Total value (peak/non-Reference level of service age speed, peak) Vehicle type distribution energy consumption) **Scenarios level of service Definition of scenarios** Examples of application er-vehicle types (Euro 6, electric vehicles Overall freight demand cargo bikes, electric scooter Vehicle type shift egulation regarding time of delivery (Peak/non-peak changes versus non-peak demand) n Ni In In Aristotie University of Thessaloniki GRAD SPLI



REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Freight module

OUTPUTS





REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Freight module

Points to discuss:

- Have pilot-areas any load/unload regulation? LOURES TREVI
- RES TREVISO SPLIT THESSALONIKI
- Which freight activities/interventions foreseen for each pilot-area?









Period of analysis

- Peak traffic: 7h30-9h30, 17h-19h30
- Off-peak: 13h-15h

Traffic flows → Freight streamlining

 15 minute counts of traffic flows in study area per type of vehicle (passenger car, taxi, bus, motorcycle, freight transport)

Noise

- Noise map available
- Sampling: determined by Loures Municipality

Exhaust Gases

- 1 probe vehicle passing 4 times per hour in the period of analysis 1 Hz data on vehicle dynamics (speed
 - 1 Hz data on vehicle dynamics (speed, acceleration, engine parameters) and emission of gases (HC, CO, CO₂, O₂, NO_x)





GRAD SPLIT

REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubripliento Activity 3.2 Sevilla - SpAIN

Sampling Duration:

- Phase 1 (prior to intervention): 1 day
- Phase 2 (during and after intervention): to be determined





Base case characterization

- Characterization of vehicle type
- Dominance of LDV
- Freight and buses with higher average age
- Vehicle ages in accordance with national average
- Vehicle age distribution allows estimating average local pollutants emissions factors



Euro standard	LDV	Taxi	Freight	Bus	
Pre-Euro	2%	0%	2%	0%	
Euro 1	2%	0%	0%	0%	
Euro 2	10%	19%	11%	20%	r
Euro 3	31%	11%	30%	40%	
Euro 4	16%	17%	25%	0%	
Euro 5	23%	19%	14%	40%	
Euro 6	16%	33%	18%	0%	
Average vehicle age	10.0	8.2	10.0	16.0	
		Aristot	ie University of	U	







Base case characterization

Project co-financed by the European Regional Development Fund

REMEDIO 2nd Meeting

					-		
	Time period	LDV	Тахі	2W	Freight	Bus	
	7h30-7h45	65%	0%	1%	14%	20%	ma
	7h45-8h	69%	4%	1%	17%	10%	
	8h-8h15	69%	2%	3%	16%	10%	
	8h15-8h30	73%	2%	2%	16%	7%	
	8h30-8h45	71%	1%	1%	18%	8%	
	8h45-9h	77%	2%	4%	9%	8%	
	9h-9h15	82%	2%	1%	11%	3%	
	9h15-9h30	69%	2%	2%	18%	8%	
	13h15-13h30	75%	4%	3%	15%	4%	
	13h30-13h45	77%	0%	1%	12%	10%	
	13h45-14h	82%	1%	2%	8%	7%	
	14h-14h15	74%	3%	1%	14%	9%	
	14h15-14h30	74%	3%	1%	19%	4%	
	14h30-14h45	71%	5%	3%	13%	8%	
	14h45-15h	71%	4%	8%	14%	3%	
	15h-15h15	75%	0%	2%	14%	9%	
	17h30-17h45	75%	1%	3%	13%	8%	
	17h45-18h	77%	3%	3%	10%	8%	
	18h-18h15	82%	2%	2%	8%	6%	
_	18h15-18h30	81%	3%	2%	8%	6%	
	18h30-18h45	83%	1%	3%	8%	6%	
	18h45-19h	83%	1%	1%	9%	5%	
	19h-19h15	78%	4%	4%	7%	7%	
1223427	19h15-19h30	83%	1%	4%	8%	5%	
Aristotie University of					of U	M A	

Thessaloniki

Cilla di Trerise

_

- Dominance of LDV
- Freight and buses with higher average age

Characterization of vehicle type

- Vehicle ages in accordance with national average
- Vehicle age distribution allows estimating average local pollutants emissions factors

Colour code: Green – higher percentage of vehicles; Red – lower percentage of vehicles















> Aristotle University of Thessaloniki

REMEDIO 2nd Meeting 18th and 19th May 2017 de Tegenievia de Covilla 25 0 20 15 Speed (km/h) 10 5 0 00:20 08:00 00:60 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 160 140 120 0 Traffic (PCU) 08 00 09 00 0 G 40 20 0 08:00 00:60 00:20 10:00 L1:00 2:00 L5:00 16:00 17:00 L8:00 19:00 13:00 20:00 14:00 Aristotle University of

Thessaloniki

Cilla di Trevise

Base case characterization

- Characterization of vehicle dynamics

• Influence of traffic in vehicle speed observed

ÉCNICO

LOURES

TÉCNICO LISBOA

• More detailed analysis on vehicle dynamics being performed



REMEDIO 2nd Meeting 18th and 19th May 2017 Escuela Técnica Superior de Ingeniería de Sevilla Camino de los Descubrimientos, s/n, Sevilla - SPAIN

Reference/present scenario for Loures

- reducing traffic by eliminating one lane while widening of sidewalks to improve people mobility and promote the commerce on the area
- create green areas
- implementation of a bikeway
- parking for bicycles
- decreasing the number of parking spaces along the area













