



Movilidad Inteligente: Desafíos y Oportunidades de investigación científica




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“Transportation Technology” Research Group - Research Lines



1. Impacts of transportation systems
2. Intelligent Transportation Systems (ITS)
3. LCA of alternative energy vectors for road vehicles
4. Active modes (cycling & walking)

Former Project:
- SMARTDECISION

On-going Projects:
- CISMOB
- @CRUISE
- Mobiwise

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energea **What are ITS?**

GSM/GPRS
 WIMAX
 WiFi

Satellite

V2I

Traffic Coordination Centre

Technology Management
 Resources Management
 Business Management

V2I

V2V

Nomadic

Sensors

Ref: ParaRede, Toronto Star, geospatialworld

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energea **Assessing the impacts of ITS - Challenges & Opportunities for R&D**

Where are the traffic congestion and emissions hotspots?

What are the most critical links in terms of traffic congestion?... Or noise?... Or crashes?...

Where we should reduce pollution?

What are the most vulnerable areas?





Increasing availability of sensor technology to record large amounts of data

- ✓Smartphone location data
- ✓GPS (probe vehicle data)
- ✓Cell phone density
- ✓Traditional traffic road monitoring network

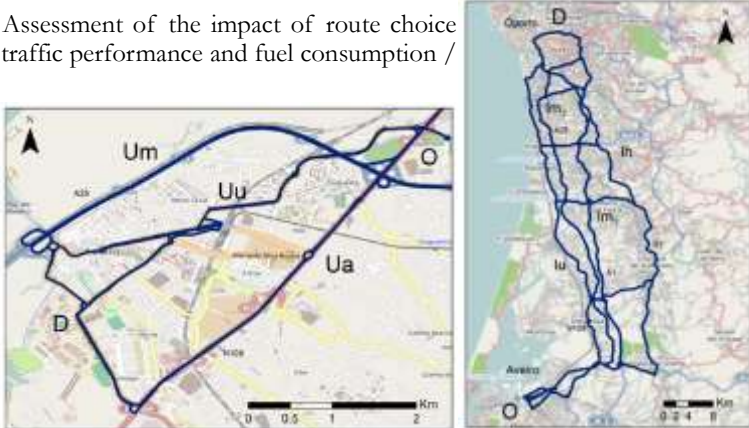
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energea **FCT Project SMARTDECISION**

SMARTDECISION: Intelligent Vehicle Routing System for Enhanced Air Quality in Urban Areas (2011-2014)

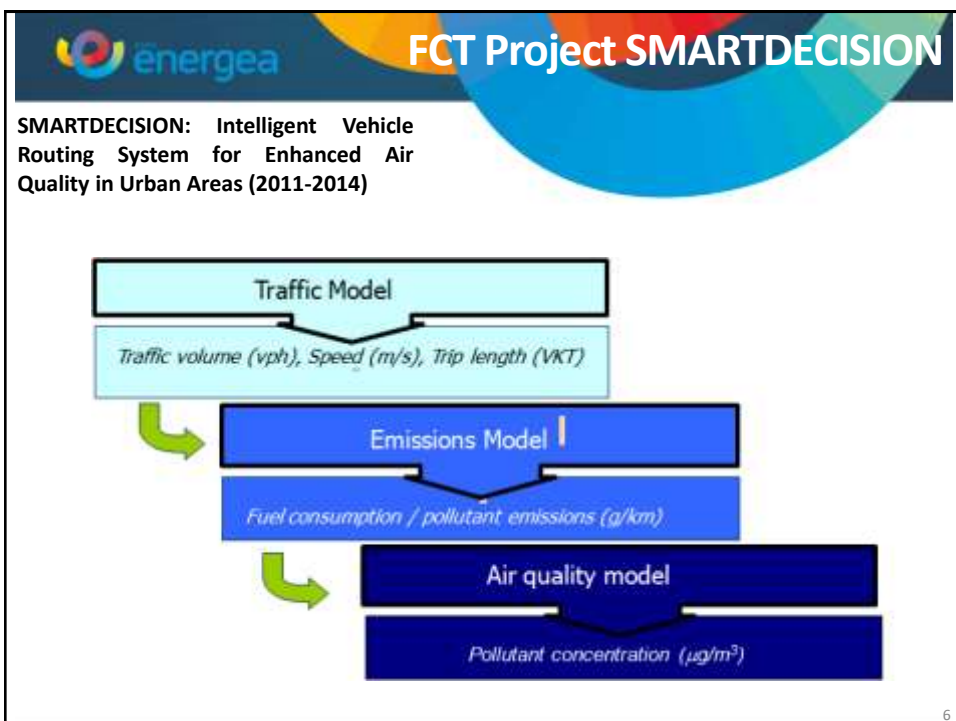
COMPETE    

Objective: Assessment of the impact of route choice and ITS on traffic performance and fuel consumption / emissions.




Ref: J.M. Bandeira, D.O. Carvalho, A.J. Khattak, N.M. Roupail, T. Fontes, P. Fernandes, S.R. Pereira & M.C. Coelho. Empirical assessment of route choice impact on emissions over different road types, traffic demands, and driving scenarios, *International Journal of Sustainable Transportation*, Volume 10, No. 3, pp. 271-283, 2016.

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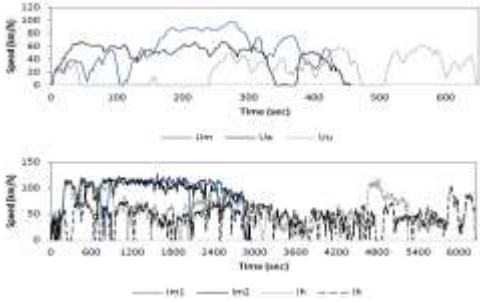


energea **FCT Project SMARTDECISION**

SMARTDECISION: Intelligent Vehicle Routing System for Enhanced Air Quality in Urban Areas (2011-2014)



Experimental measurements

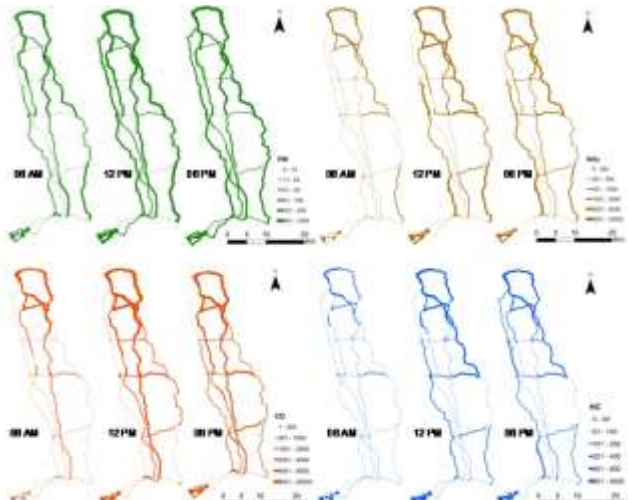


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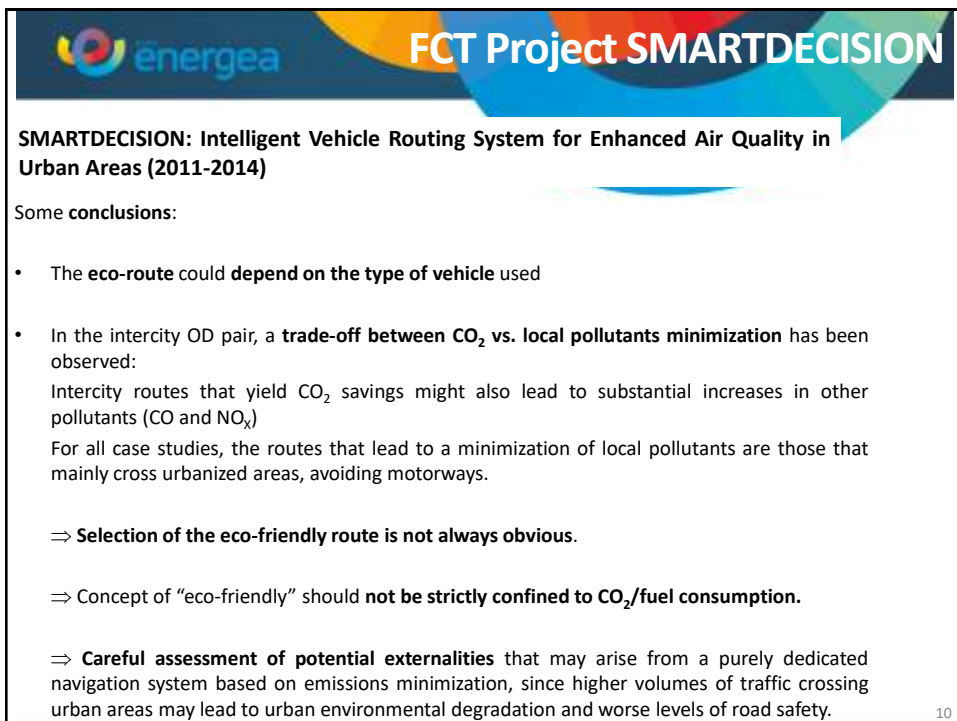
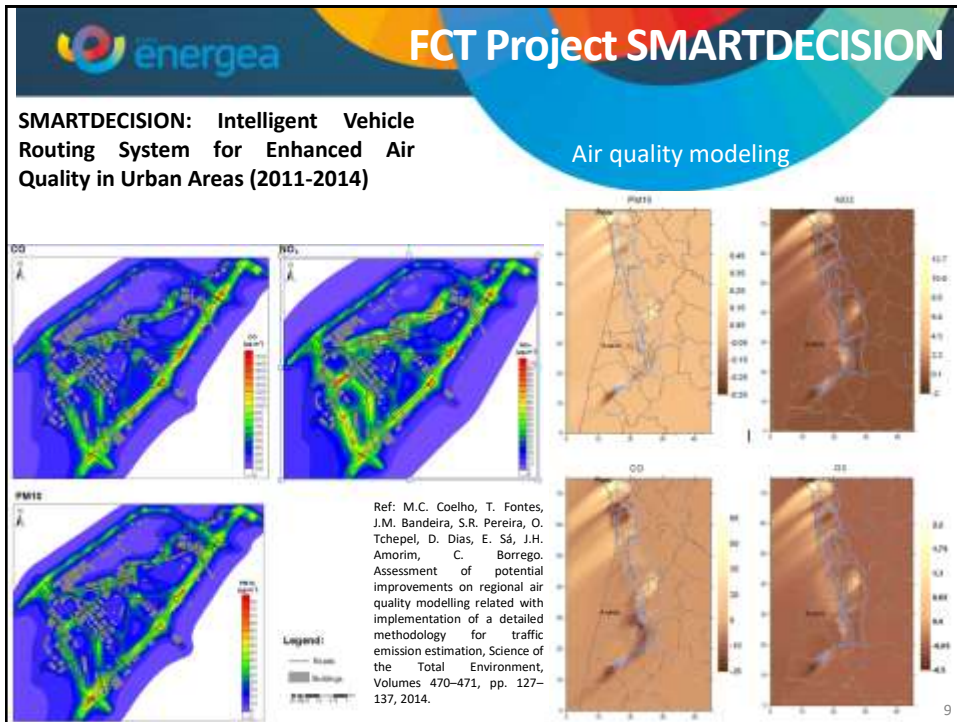
SMARTDECISION: Intelligent Vehicle Routing System for Enhanced Air Quality in Urban Areas (2011-2014)



Emissions modeling

Ref: M.C. Coelho, T. Fontes, J.M. Bandeira, S.R. Pereira, O. Tchepele, D. Dias, E. Sá, J.H. Amorim, C. Borrego. Assessment of potential improvements on regional air quality modelling related with implementation of a detailed methodology for traffic emission estimation, *Science of the Total Environment*, Volumes 470-471, pp. 127-137, 2014.

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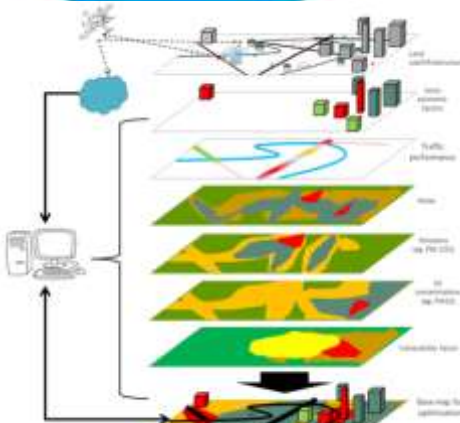


energea FCT Project @CRUISE: Advanced Impact Integration Platform for Cooperative Road Use

Goal: To integrate road traffic impacts into a single analytical framework for use in advanced traffic management systems (ATMS).

3 main pillars:

- Designing a conceptual methodology for assigning a **link-based indicator** that can evaluate **different traffic-related externalities**, adjusted to **local contexts of vulnerability**;
- Improving the interoperability between traffic-related models and new sources of traffic information;
- Optimizing the network operations by means of a decision support system.



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Consortium: TEMA, CESAM, IT, ITRE-NCSU

energea FCT Project @CRUISE: Advanced Impact Integration Platform for Cooperative Road Use

<http://project-cruise.weebly.com/>

- Task 1 • Literature review and experimental setup
- Task 2 • Experimental work - Road and environmental conditions monitoring
- Task 3 • Development, integration and validation of related-traffic models
- Task 4 • Dynamic link-based eco-indicator
- Task 5 • Data fusion and data management
- Task 6 • Network optimization and design of a decision support system
- Task 7 • Prototype / Software and applications development
- Task 8 • Dissemination and Reports

Main deliverable: Prototype of an integrated decision support system for selecting the appropriate traffic management measures.

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energea FCT Project @CRUISE: Advanced Impact Integration Platform for Cooperative Road Use




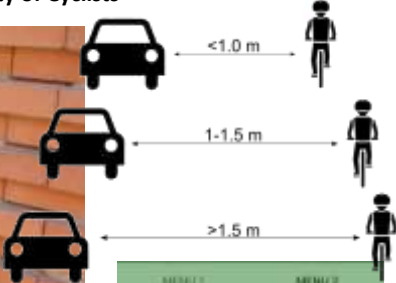
Experimental measurements




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energea FCT Project @CRUISE: Advanced Impact Integration Platform for Cooperative Road Use

On-Board Platform of Sensors for Enhancing Safety of Cyclists

MENU 1		MENU 2	
Speed	Time	Hours	
0.476	00:00:29	19:54:47	



30.48

14

José Fajardo, José Santos, Margarida C. Coelho, An On-Board Platform of Sensors for Enhancing Safety of Cyclists, ECF Scientists for Cycling Colloquium, Aveiro, november 2016

energea ITS Projects - Partnerships

CESAM
 Centro for Environmental and Marine Studies

ITRE

THE UNIVERSITY of TENNESSEE
 KNOXVILLE

UNIVERSITÀ DEGLI STUDI DI PALERMO

Technische Universität Braunschweig

Instituto de telecomunicações

TOYOTA
 Caetano Auto

UNIVERSIDADE DE COIMBRA

ÁGUEDA
 CÂMARA MUNICIPAL

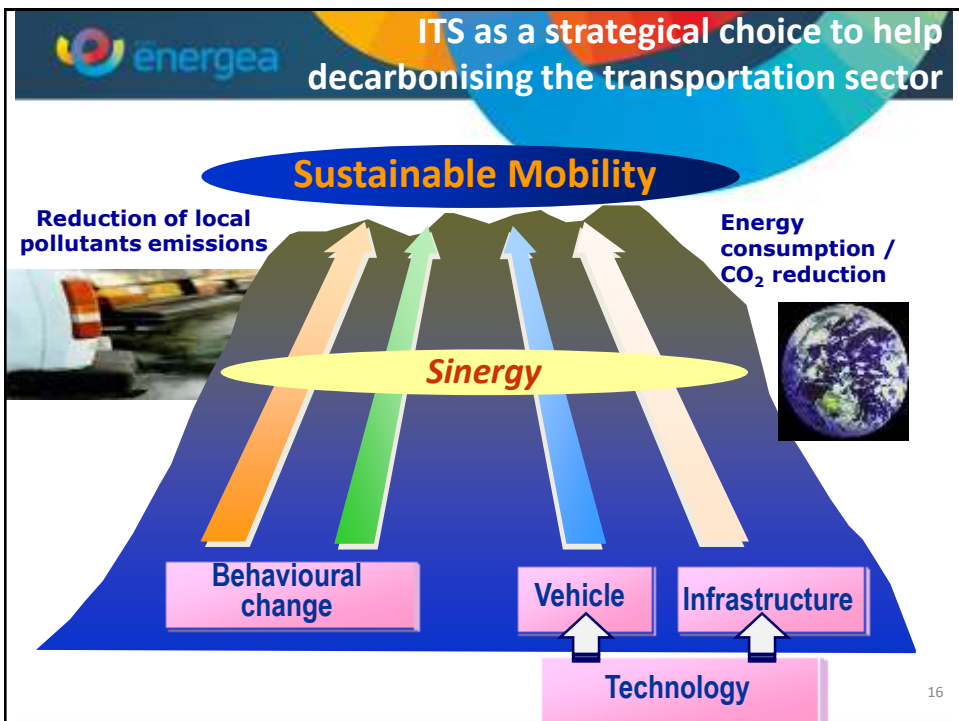
Stockholm University

Romania

AMTB

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energea Gracias!

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