



European  
Commission



# LIFE ACEPT-AIR

## Development of A Cost Efficient Policy Tool for reduction of Particulate Matter in AIR

LIFE09 ENV/GR/000289

Δρ. Ε. Διαπούλη (Κ. Ελευθεριάδης), ΕΚΕΦΕ "Δημόκριτος"



**LIFE ΚΑΙ ΠΟΛΕΙΣ**  
*Διημερίδα Ενημέρωσης, 10-11 Απριλίου 2019*

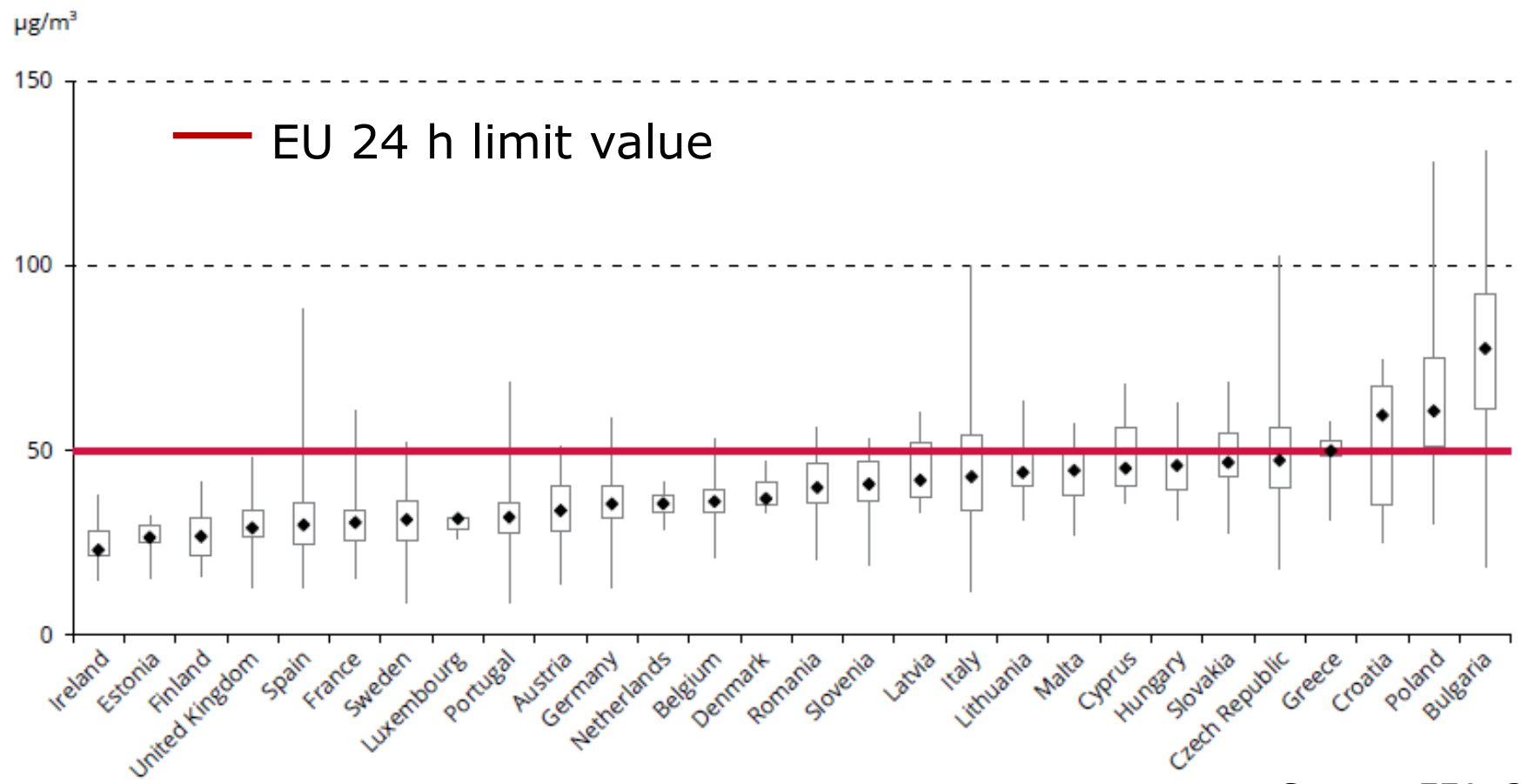


# Motivation

- ✚ PM<sub>2.5</sub> and PM<sub>10</sub> ambient concentration levels are still a major environmental problem in several urban areas in the E.U.
- ✚ New evidence of particulate matter long term impacts on human health continues to emerge.
- ✚ The Commission of E.C. was moving towards the implementation of the Thematic Strategy on Air Pollution
- National authorities will have to re-evaluate their environmental strategies as requirements of lower limit values for PM in air may arise.

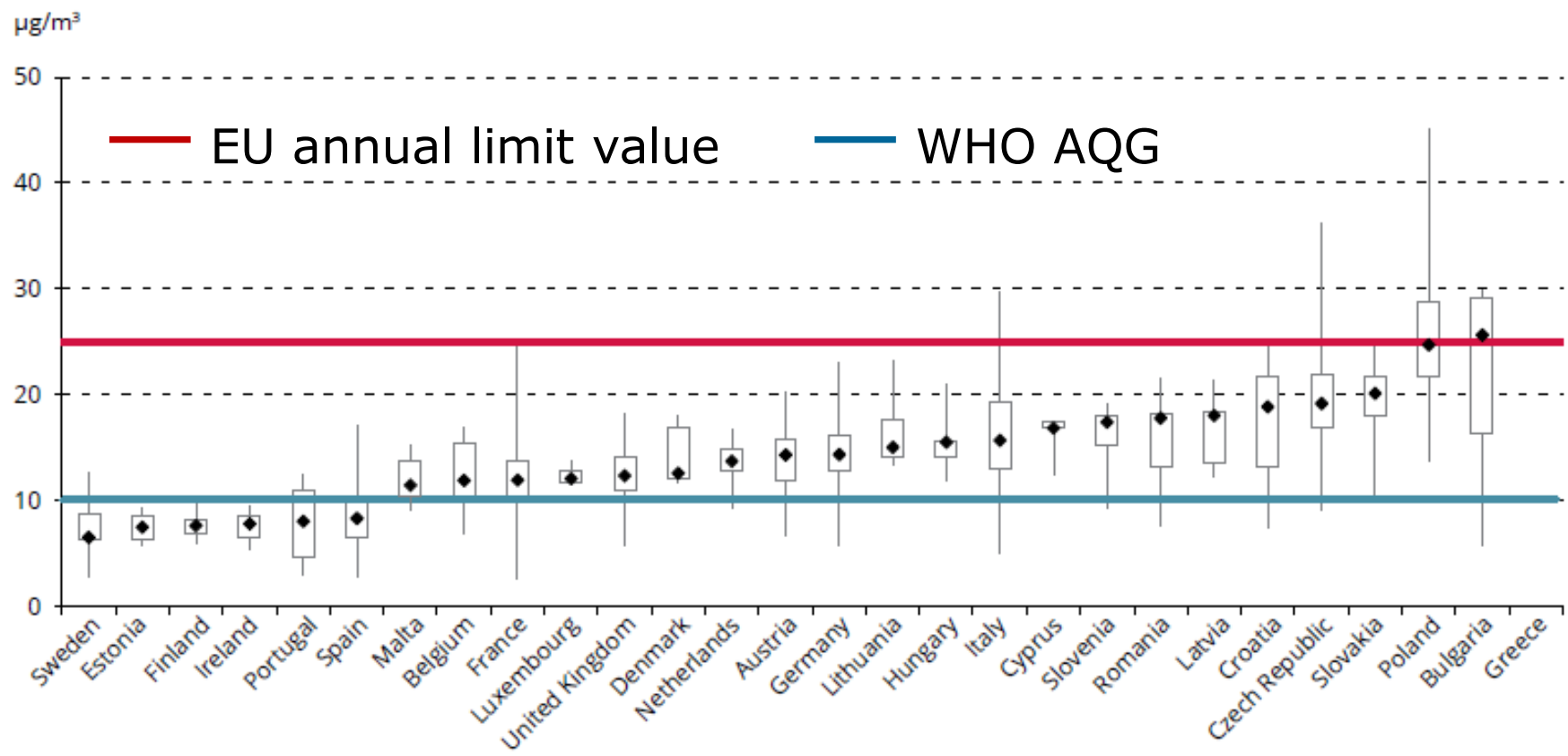


# PM<sub>10</sub> concentrations in relation to the 24h limit value in 2014 in the EU-28





# PM<sub>2.5</sub> concentrations in relation to the target value in 2014 in the EU-28





# EU urban population exposed to harmful levels of air pollutants (2012-2014)

	EU limits/target values	WHO guidelines
PM <sub>2.5</sub>	8-12 %	85-91 %
PM <sub>10</sub>	16-21 %	50-63 %
O <sub>3</sub>	8-17 %	96-98 %
NO <sub>2</sub>	7-9 %	7-9 %
BaP	20-24 %	88-91 %
SO <sub>2</sub>	<1 %	35-49 %



## Project beneficiaries:



**NCSR "Demokritos"**



**Aristotle University  
of Thessaloniki**



**University of  
Thessaly**



**Technical University  
of Crete**



**AXON Envirogroup  
Ltd.**

***Duration:***

09/2010 – 08/2014

***Areas of  
implementation:***

Athens

Thessaloniki

Volos



## ACCEPT-AIR objective was to create a Tool which

- Contains a database of PM concentrations, source apportionment studies results and emission inventories
- Creates a historical record of control measures / changes in emissions and provide results in measured concentration reductions apportioned to changes in every accounted source
- Allows the policy makers to evaluate the effects of control measures applied on specific emission sources as well as plan new ones.



Ministry of Environment, Energy & Climate Change



The Regional Unit of Magnesia and N. Sporades



Coalition of 21 Local Authorities in Athens



The Municipality of Thessaloniki



# Major activities

Measurement campaigns

Chemical characterisation

Source Apportionment

Emission inventories







# Measurement campaigns

**Warm period: 6-9/2011**  
**Cold period: 1-4/2012**

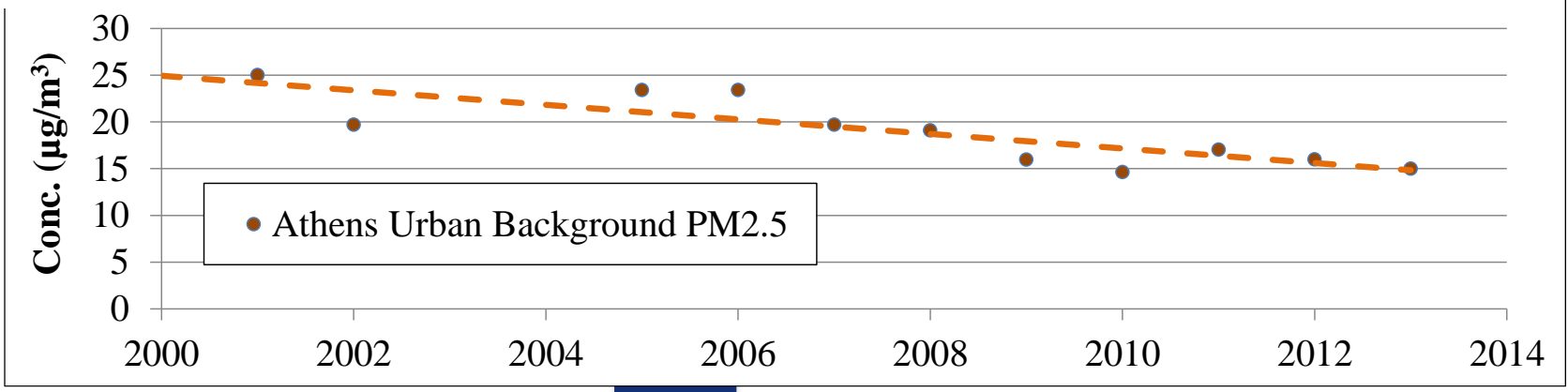
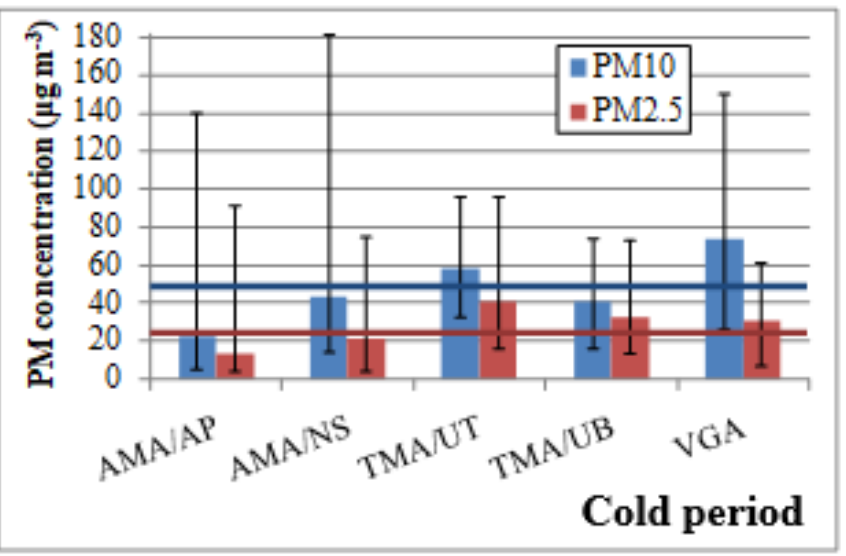
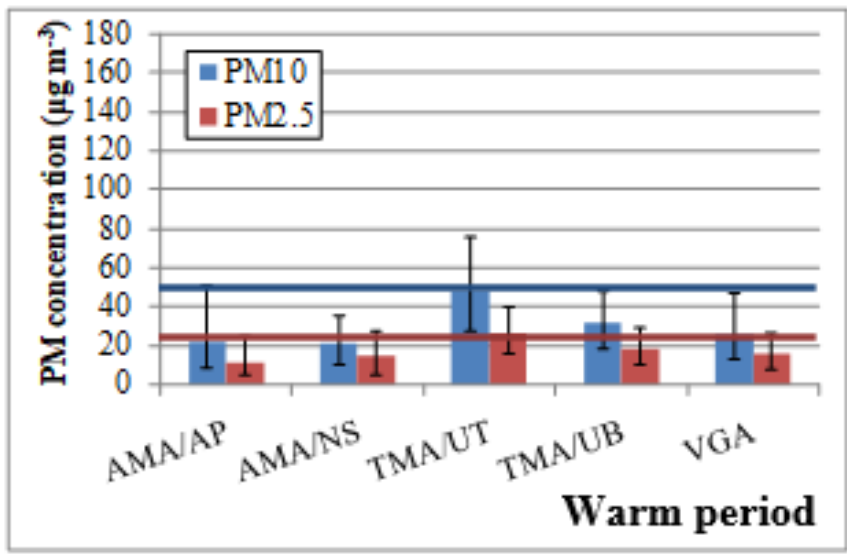


VGA



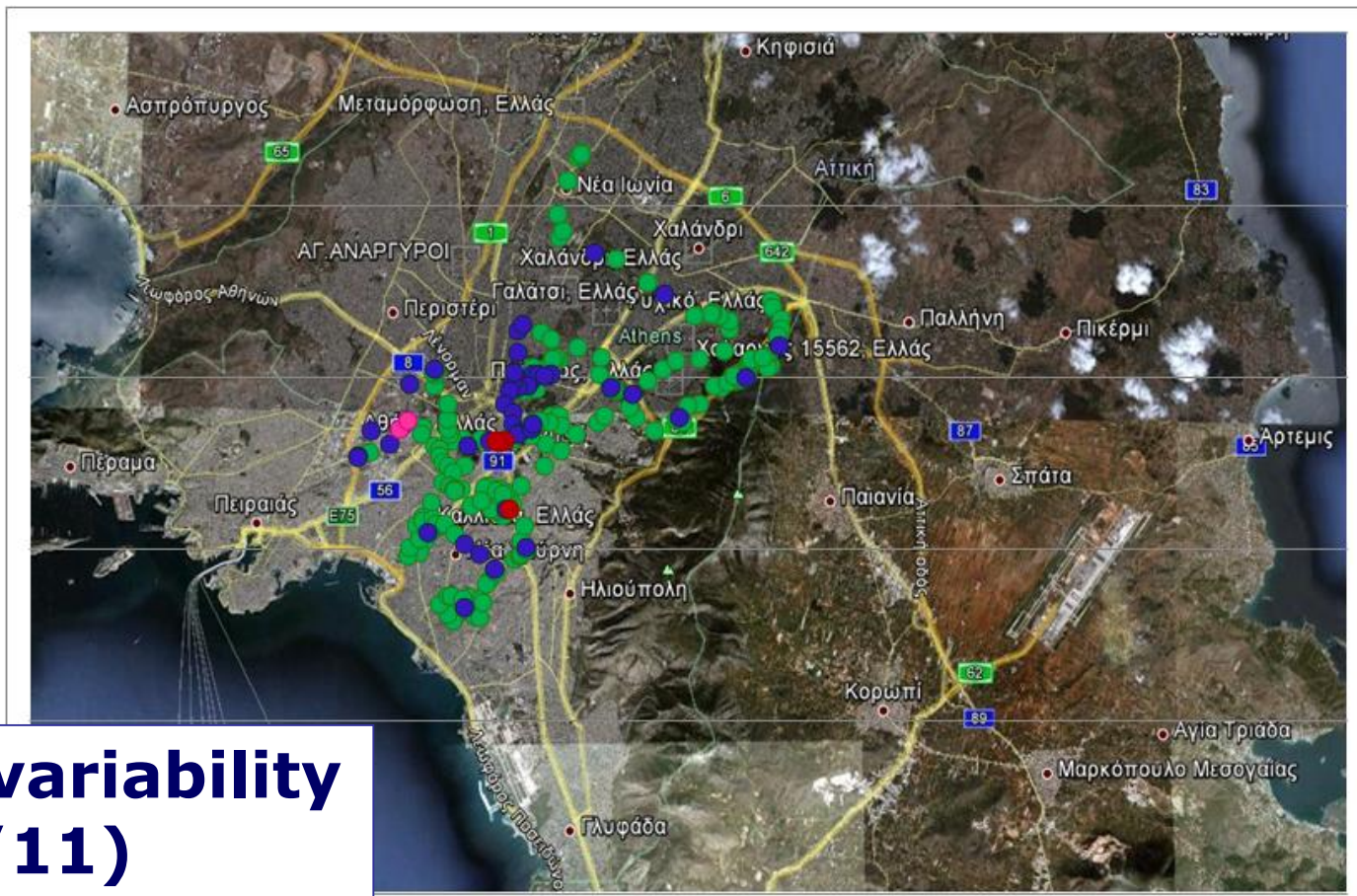


# Measurement campaigns





# Measurement campaigns



**PM<sub>10</sub> spatial variability (14/9/11)**

● 10 - 25 µg/m<sup>3</sup> ● 25 - 50 µg/m<sup>3</sup> ● 50 - 100 µg/m<sup>3</sup> ● > 100 µg/m<sup>3</sup>



Measurement campaigns

**Chemical characterisation**

Source Apportionment

Emission Inventories

ACEPT-AIR Policy Tool

## Analysis for major PM components:

OC/EC

Ions

Major and trace elements

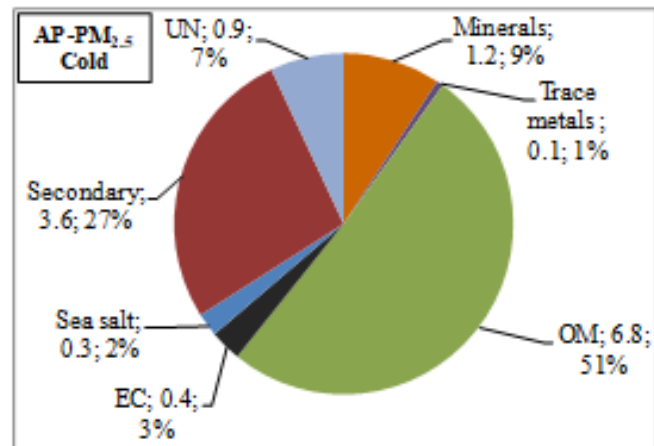
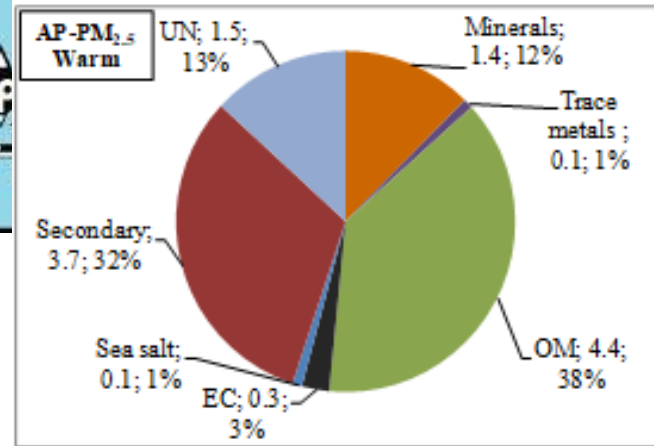
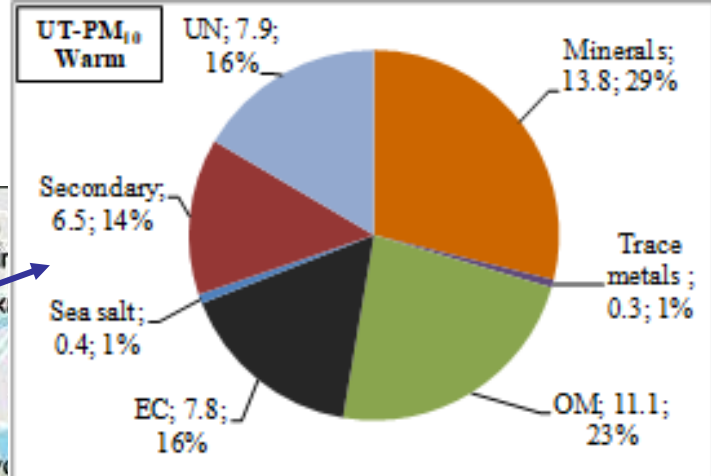
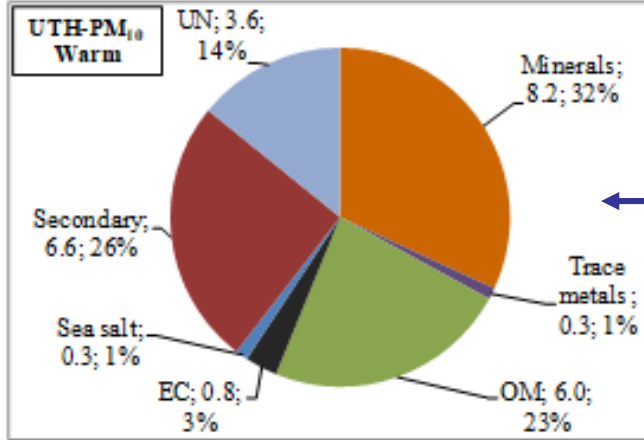




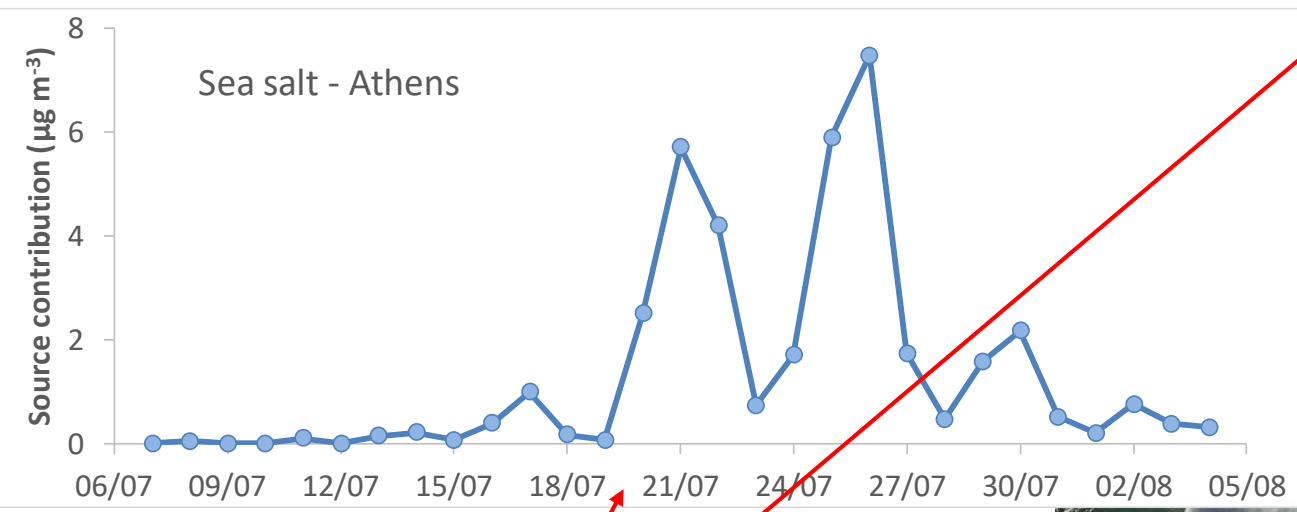
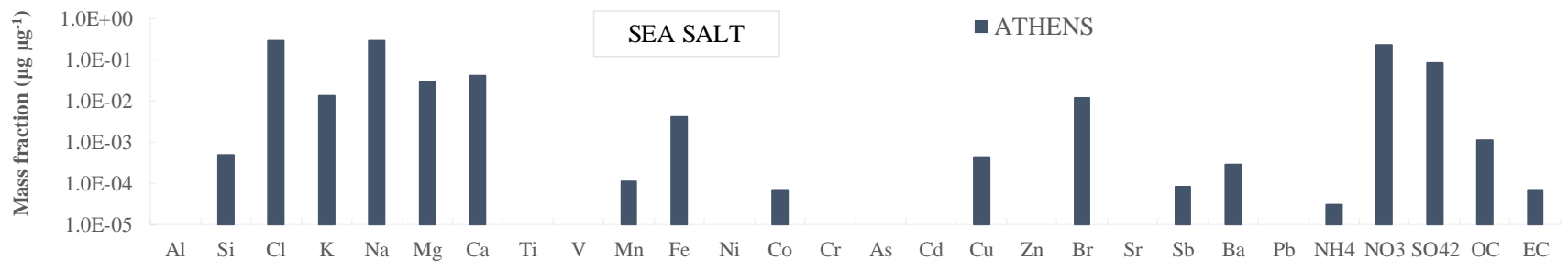
European Commission



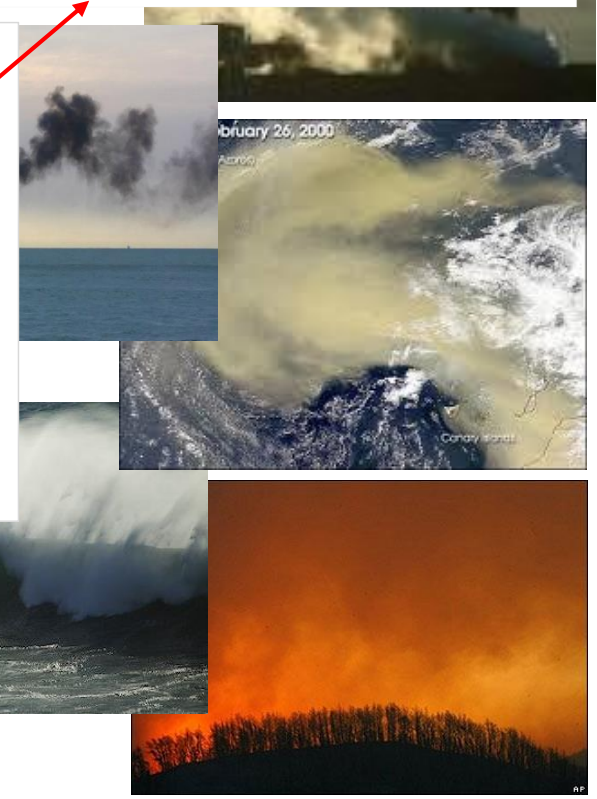
# Chemical characterisation



M  
Ch

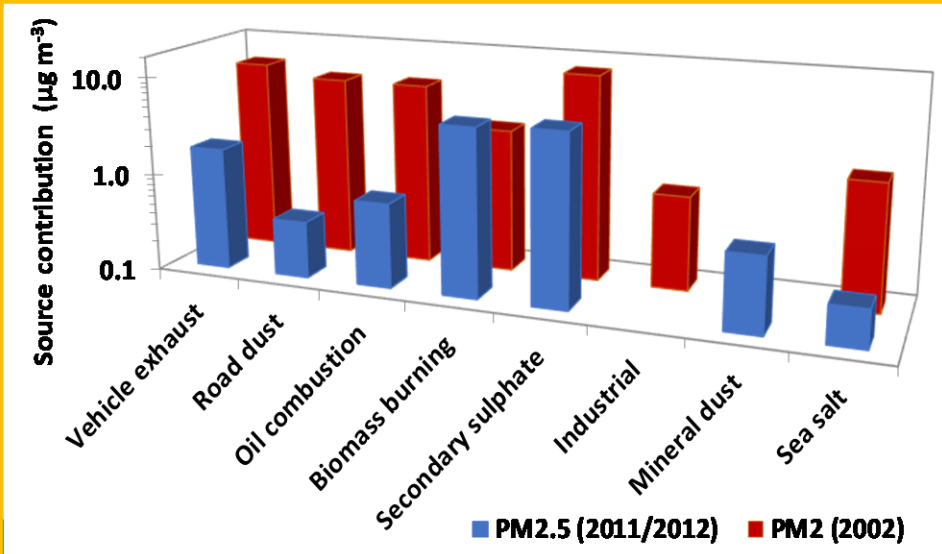
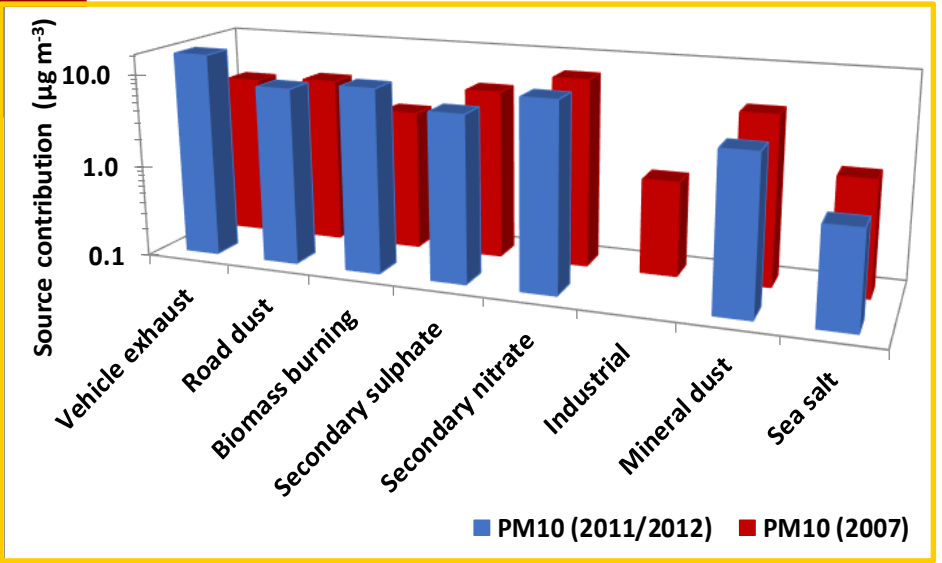


$$C_{ij} = \sum_{k=1}^p g_{ik} \cdot f_{kj} + e_{ij}$$





# Source Apportionment





Measurement campaigns

Chemical characterisation

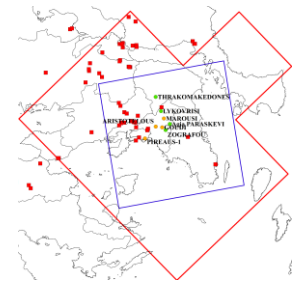
Source Apportionment

Emission Inventories

ACEPT-AIR Policy Tool

Years: 2000 - 2013

Athens Metropolitan area (AMA)



Thessaloniki Metropolitan area (TMA)



Greater Volos area (GVA)



Domain covering conurbation; used in spatial disaggregation

Area of Interest

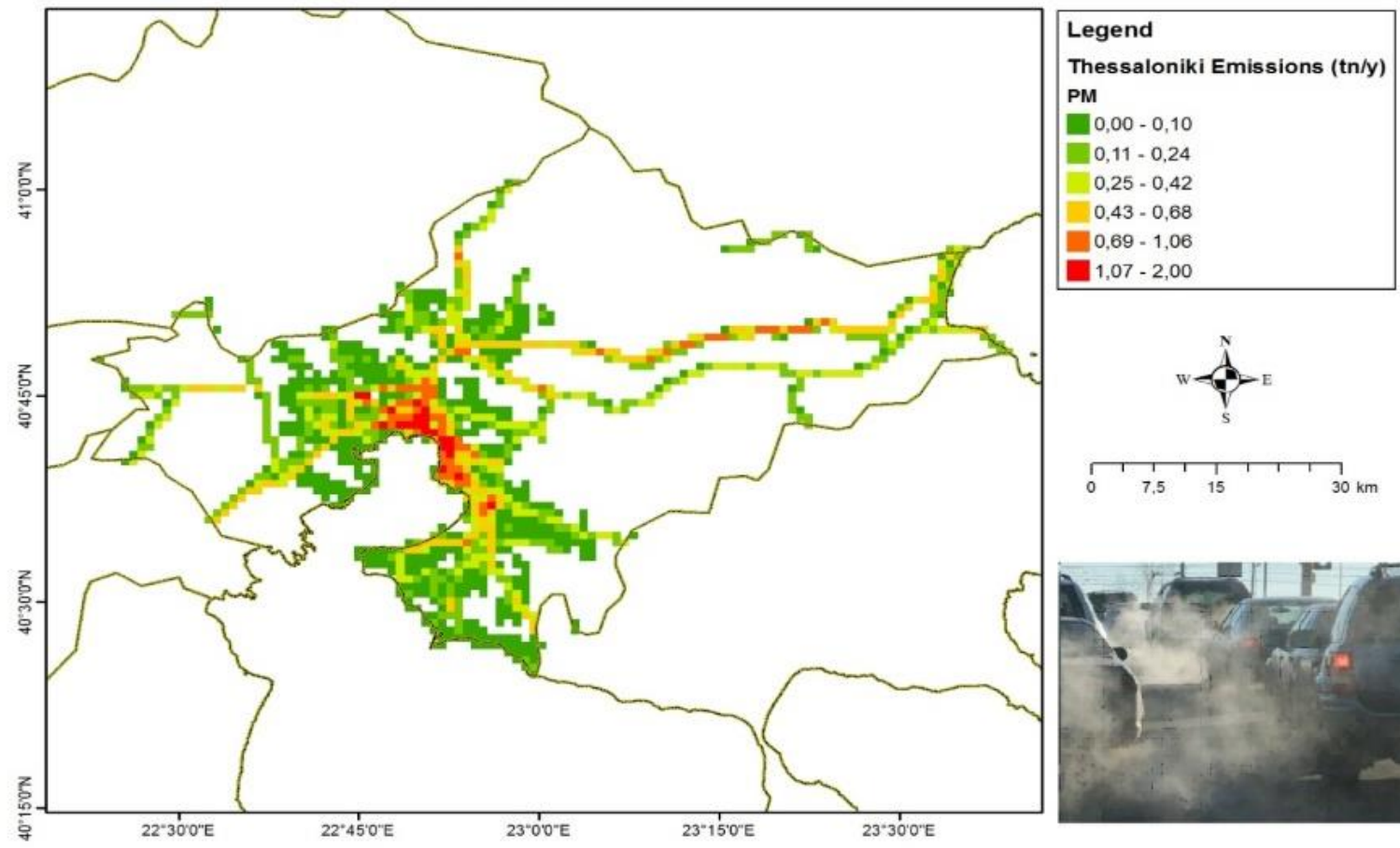
- LPS
- Traffic station
- Industrial station
- Background station





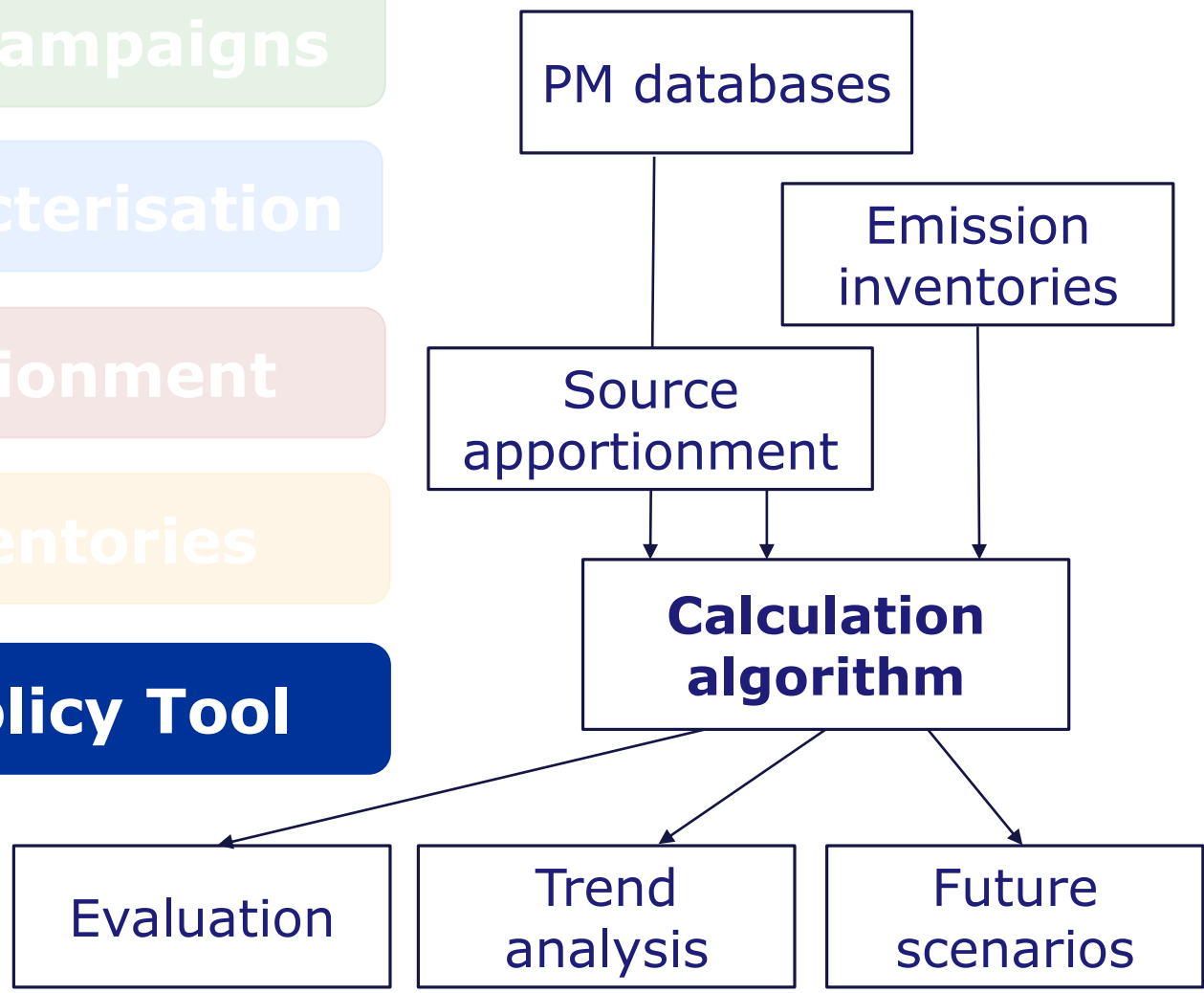
# Emission Inventories

## THESSALONIKI: ROAD TRANSPORT EMISSIONS





- Measurement campaigns
- Chemical characterisation
- Source Apportionment
- Emission Inventories
- ACEPT-AIR Policy Tool**





European Commission



# ACCEPT-AIR Policy Tool

ACCEPT-AIR

Data Presentation | Scenarios Build-up | DataBase | About | Exit

**ACCEPT-AIR Policy Tool**  
*development of A Cost Efficient Policy Tool for reduction of particulate matter in AIR*

ACCEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund

Exit

ACCEPT-AIR

Data Presentation | Scenarios Build-up | DataBase | About | Exit

- Pollutant Measurements
- Emissions**
- Source Apportionment
- Scientific Publications

- Distributions
- Time Series
- Spatial Allocation
- Daily Variation

ACCEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund

Exit



ACCEPT-AIR

### Emissions - Time series

Data Info

Region: Volos

Source: Road transport

All years

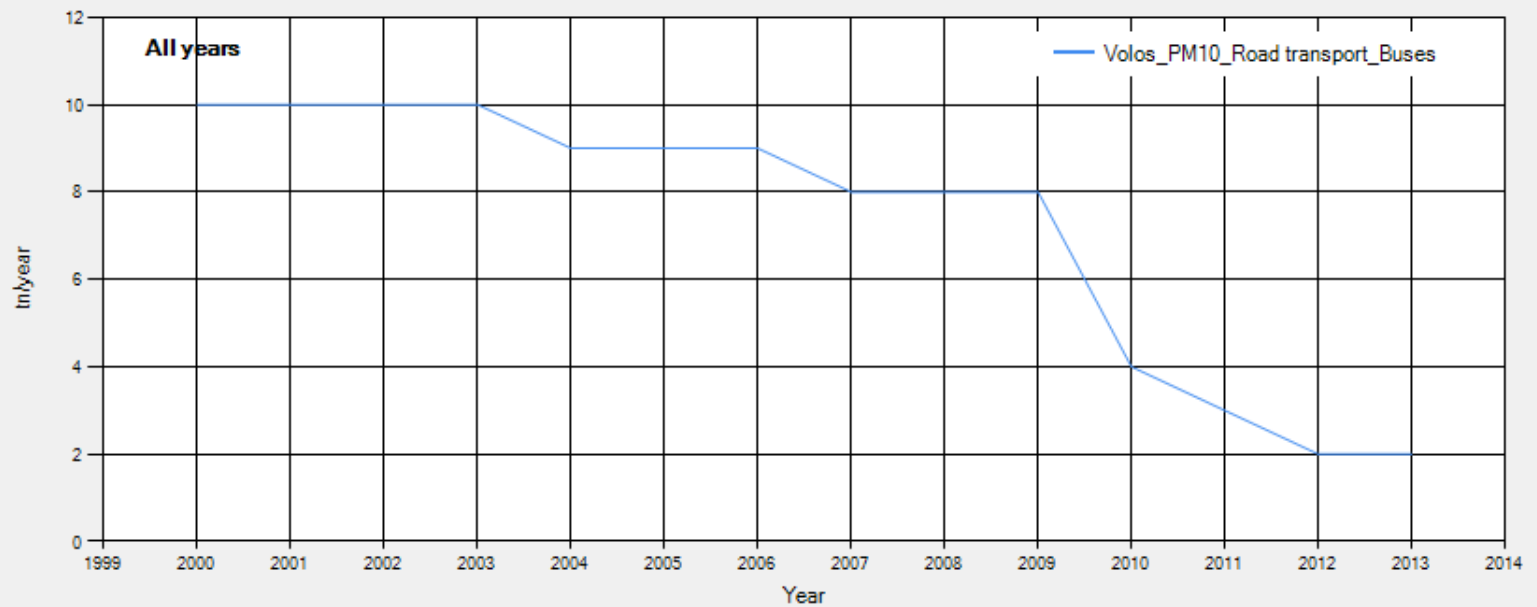
Pollutant: PM10

SubSource: Buses

Monthly variation for year:

Data recall

GraphResults



Data export

Filename: Volos\_PM10\_Road transport\_Buses.xlsx

in: C:\LIFE Progs\ACCEPT-AIR

Change folder

Save

Close




# ACCEPT-AIR Policy Tool

ACCEPT-AIR

Data Presentation **Scenarios Build-up** DataBase About Exit

**ACCEPT-AIR Policy Tool**  
*development of A Cost Efficient Policy Tool for reduction of particulate matter in AIR*



 ACCEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund 

Exit



ACCEPT-AIR

Data Presentation Scenarios Build-up **DataBase** About Exit

PM Concentration Forecast  
Emissions Future Projections

**ACCEPT-AIR**  
*development of A Cost Efficient Policy Tool for reduction of particulate matter in AIR*



 ACCEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund 

Exit



### PM Concentration Forecast

(based on emission scenarios and PM contribution of emission sources)

#### Data Info

Region:  Year:  Pollutant:

#### Scenario build-up

Annual average pollutant concentration ( $\mu\text{g}/\text{m}^3$ ):

#### % change in [ (+) for increase / (-) for decrease ] emissions from:

R11	<input type="text" value="-10"/>	ROAD DUST FROM TRAFFIC
R21	<input type="text" value="-10"/>	VEHICLE EXHAUST
R31	<input type="text" value="0"/>	RESIDENTIAL HEATING FROM FOSSIL FUEL
R32	<input type="text" value="0"/>	INDUSTRIAL COMBUSTION
R61	<input type="text" value="0"/>	BIOMASS BURNING
R71	<input type="text" value="0"/>	INDUSTRIAL PROCESSES
R91	<input type="text" value="0"/>	WASTE BURNING
R101	<input type="text" value="0"/>	PORT
R111	<input type="text" value="0"/>	-
R121	<input type="text" value="0"/>	-

$\Delta\text{C}$  from background in  $\mu\text{g}/\text{m}^3$  (see user's guide):

Area Type:

Source Apportionment Data

Year:

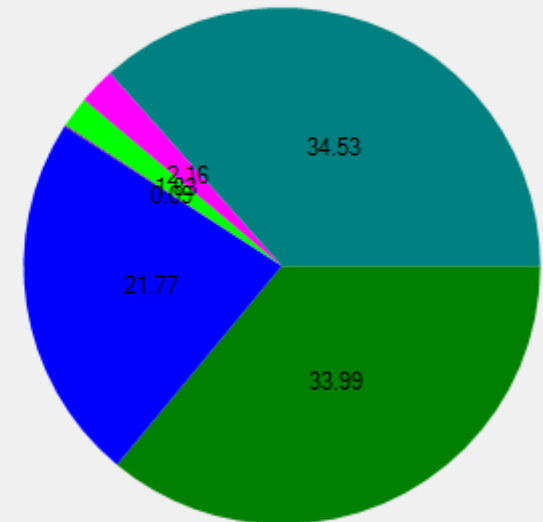


#### Results

Change in pollutant concentration ( $\mu\text{g}/\text{m}^3$ ):

New pollutant concentration ( $\mu\text{g}/\text{m}^3$ ):

#### New PM concentration distribution



- TRAFFIC
- BIOMASS BURNING
- SEA SALT
- SOIL DUST
- PORT
- SECONDARY AEROSOL

#### Data export

Filename:

in:





# ACEPT-AIR Policy Tool

ACEPT-AIR

Data Presentation   Scenarios Build-up   **DataBase**

## ACEPT-AIR Policy Tool

*development of A Cost Efficient Policy Tool for reducing particulate matter in AIR*

ACEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund

ACEPT-AIR

Data Presentation   Scenarios Build-up   **DataBase**   About   Exit

- Source Apportionment
- Emissions
- Monthly variation
- Measurements
- Back-up / Restore
- Scientific Publications
- Spatial Allocation

ACEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund

Exit

- Check Item
- Rename SA category
- Add Item
- Update Item
- Delete Item
- Show all



European Commission





# ACEPT-AIR Policy Tool

ACEPT-AIR

Data Presentation Scenarios Build-up DataBase **About** Exit

**ACEPT-AIR Policy Tool**  
*development of A Cost Efficient Policy Tool for reduction of particulate matter in AIR*



 *ACEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund* 


Exit

About

**ACEPT-AIR Policy Tool**  
 Program Ver. : 2.5  
 Date : November 2014



Project Partners

 <b>DEMOKRITOS</b> <small>NATIONAL CENTER FOR SCIENTIFIC RESEARCH</small>	<b>N.C.S.R. "Demokritos"</b>
	<b>University of Thessaly</b>
	<b>Aristotle University of Thessaloniki</b>
	<b>Axon Envirogroup Ltd.</b>
	<b>Technical University of Crete</b>

Contact Details

K. Eleftheriadis, Coordinator  
 elefther@ipta.demokritos.gr

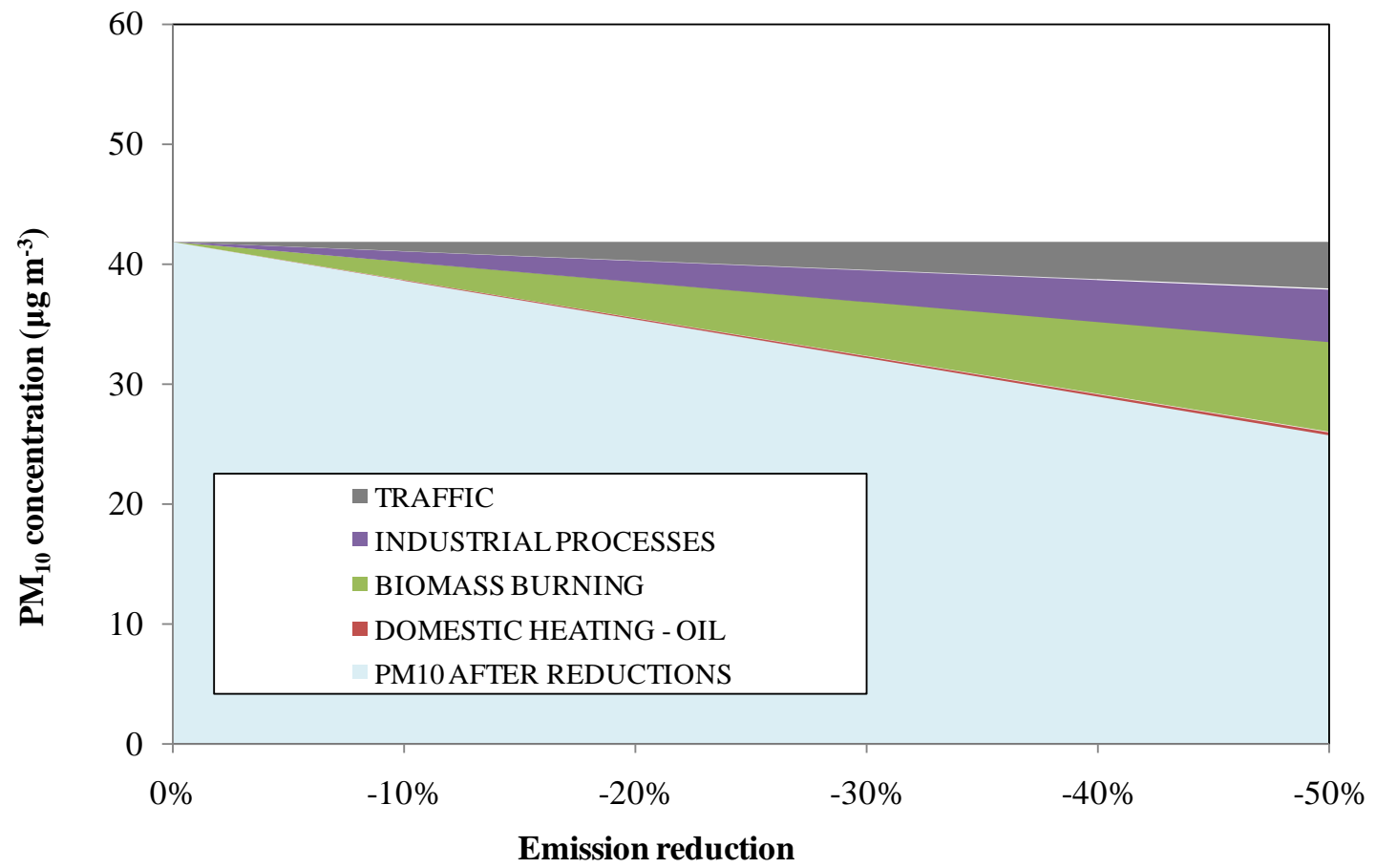
Close





# ACEPT-AIR Policy Tool

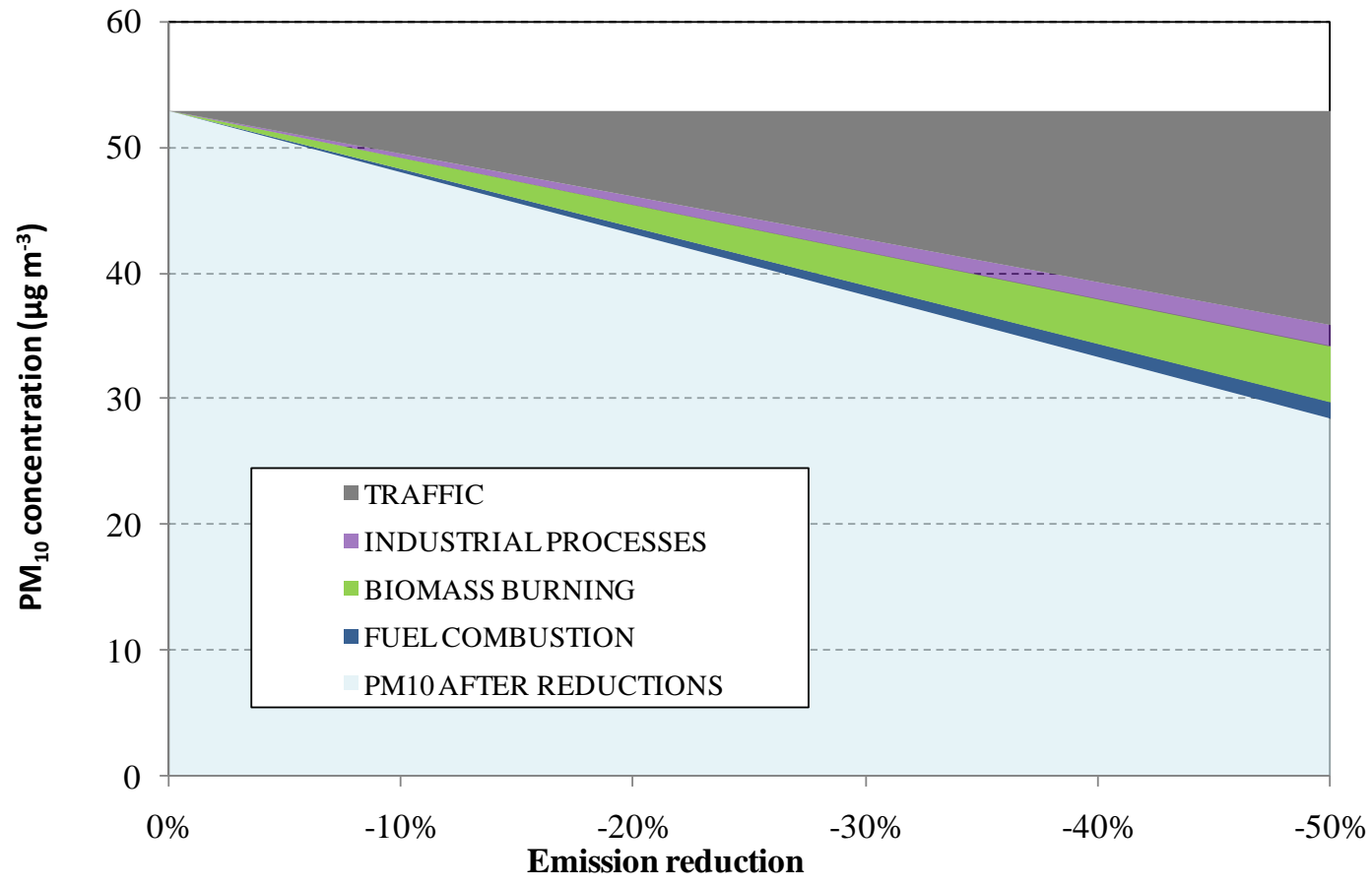
Athens – Urban background area





# ACCEPT-AIR Policy Tool

## Thessaloniki – Urban traffic area



## Transfer of knowledge to stakeholders

- ✚ Yearly informative meetings
- ✚ Close interaction during the development of the ACEPT-AIR Policy Tool
- ✚ Training on the use of the Tool
- ✚ Guidelines for the formulation of Action Plans
  - Provide a characterisation of air quality in relation to PM in Greek urban centres
  - Propose specific mitigation measures



# Stakeholders



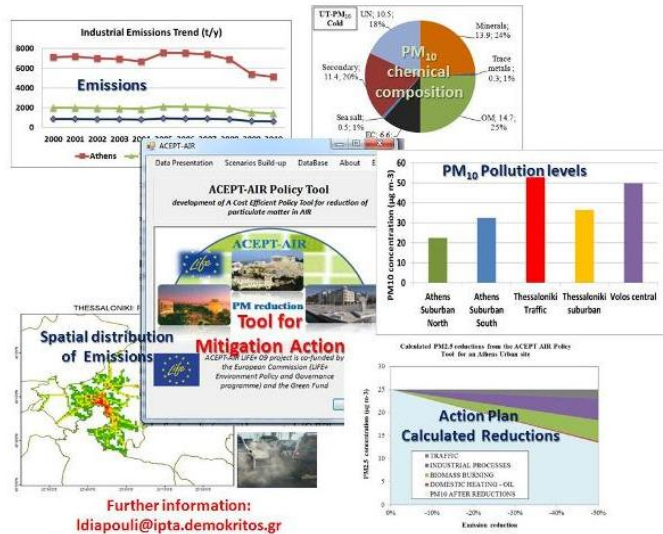
# International conference



# Secondary education teachers



# Thank you for your attention!



<http://www2.ipta.demokritos.gr/accept-air>