



## Appraisal project

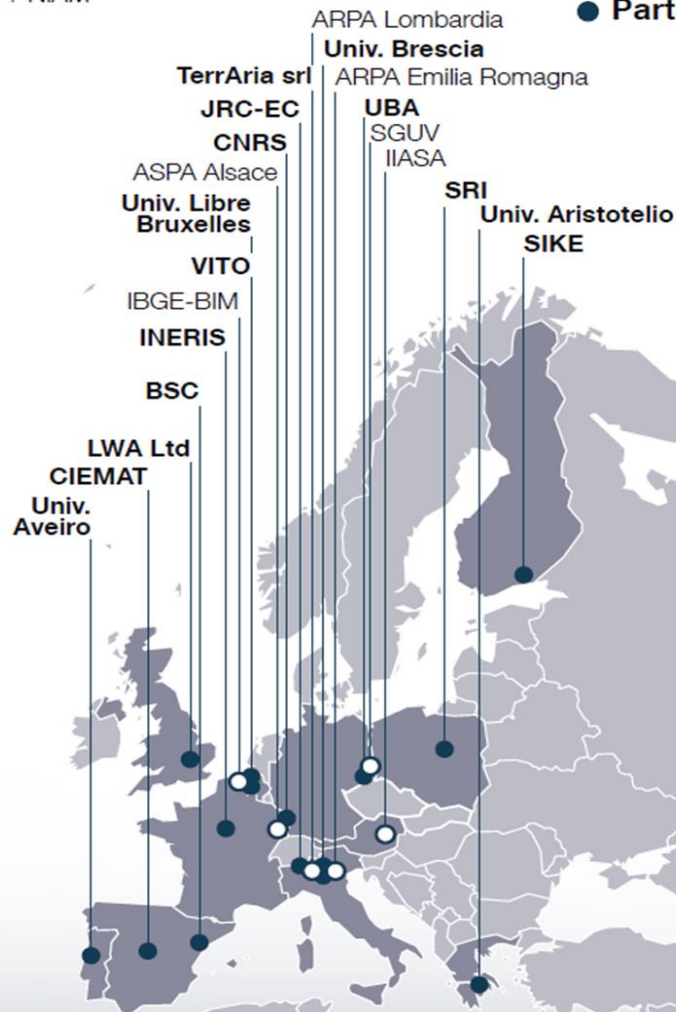
Air Pollution Policies  
for Assessment  
of Integrated Strategies  
At regional and Local scales

[www.appraisal-fp7.eu](http://www.appraisal-fp7.eu)



+ FAIRMODE  
+ NIAM

○ Stakeholders  
● Partners

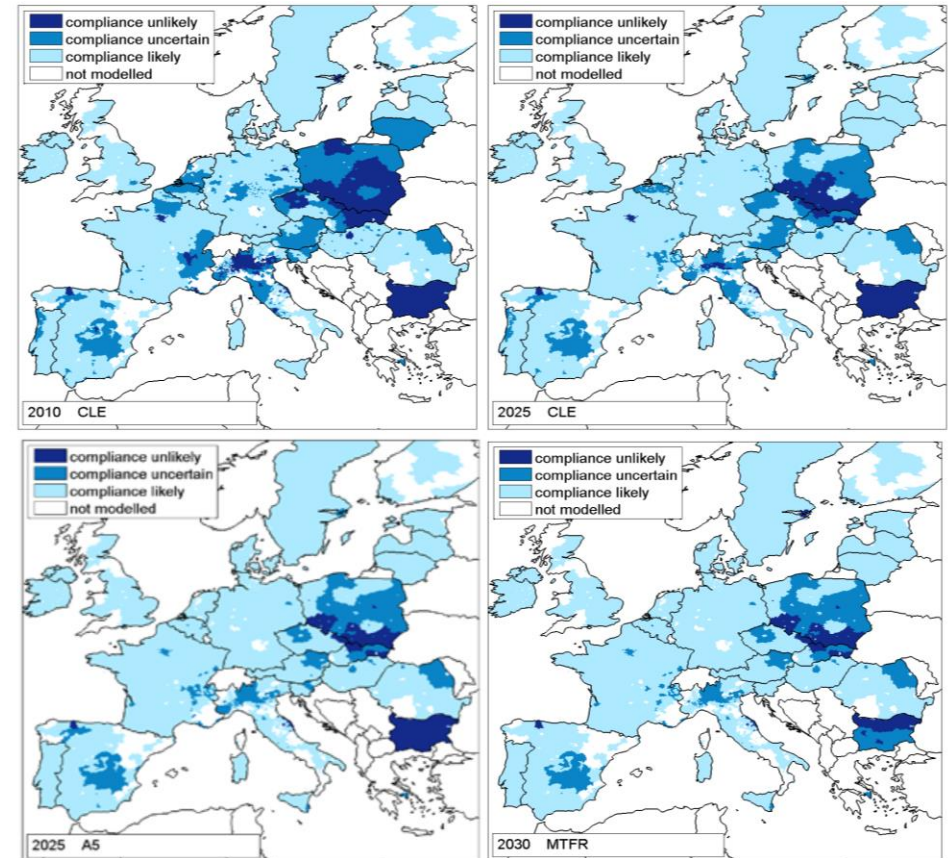
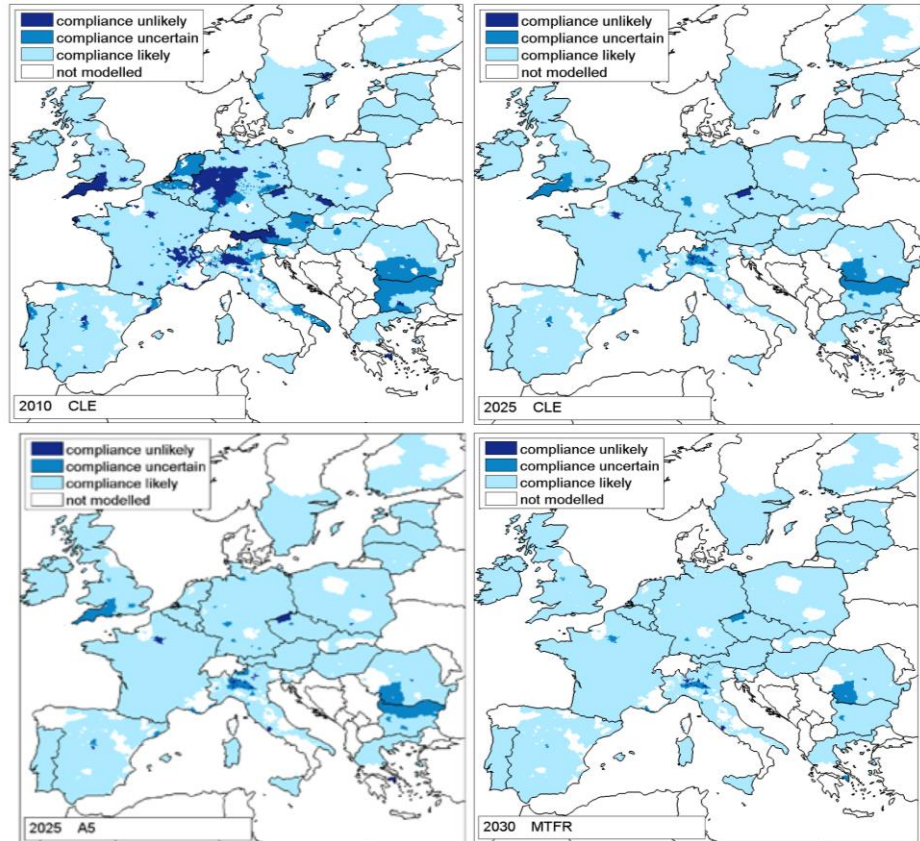


## APPRAISAL project

Integrated assessment for regional  
and local air quality policies

M. Volta – University of Brescia (IT)

# THE CHALLENGE



**NO<sub>2</sub> compliance**

**PM<sub>10</sub> compliance**



# THE CONTEXT

## **DIRECTIVE 2008/50/EC**

### *CHAPTER IV - Article 23*

Where ... the levels of pollutants in ambient air exceed any limit value or target value ... **Member States** shall **ensure** that **air quality plans** are established ... in order **to achieve the related limit values** or target values

# THE CONTEXT

## **DIRECTIVE 2008/50/EC**

### *CHAPTER IV - Article 23*

Where ... the levels of pollutants in ambient air exceed any limit value or target value ... **Member States** shall **ensure** that **air quality plans** are established ... in order **to achieve the related limit values** or target values

## **COMMISSION IMPLEMENTING DECISION 2011/850/EU**

### *CHAPTER III - Article 13, article 14*

In accordance with the procedure referred to in Article 5 of this Decision, **Member States** shall make available the **information** set out in **Parts H, I, J and K of Annex II** to this Decision on air quality plans as required by Article 23 of Directive 2008/50/EC

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# THE

## DIRECTIVE 2008/50/EC

### CHAPTER IV - Article

Where ... the levels of  
target value ... **Member**  
established ... in order

## COMMISSION IMPLEMENTING

### CHAPTER III - Article

In accordance with the procedure referred to in Article 5 of this Decision,  
**Member States** shall make available the **information** set out in **Parts H, I, J**  
**and K of Annex II** to this Decision on air quality plans as required by Article  
23 of Directive 2008/50/EC

(H) Information on air quality plans

(I) Information on source apportionment

(J) Information on the scenario for the attainment year

(K) Information on measures (type, time scale, affected  
source sector, implementation costs, emission  
reduction, expected impacts)



# THE CONTEXT

## DIRECTIVE 2008/50/EC

### CHAPTER IV - Article 23

Where ... the levels of pollutants in ambient air exceed any limit value or target value ... **Member States** shall **ensure** that **air quality plans** are established ... **the relevant limit values** or target values

## COMMISSION

### DECISION

## 2011/850/EU

In a ... referred to in Article 5 of this Decision, **Member States** shall provide the **information** set out in **Parts H, I, J and K** ... on air quality plans as required by Article 23 of Directive

Which data,  
model,  
methodologies,  
tools to design  
AQ plans?



# APPRAISAL project

## 1. **Analysis**

**What approaches are currently used to design and assess regional/local air quality plans ? What are their strengths and weaknesses?**



# APPRAISAL project

AQP database

## 1. **Analysis**

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# APPRAISAL project

AQP database

## 1. **Analysis**

**What approaches are currently used to design and assess regional/local air quality plans? What are their strengths and weaknesses?**

IAM framework:  
DPSIR

## 1. **Design**

**Which data, models, and tools are used to design Air Quality Plans? What are the future research needs to improve these approaches? (WP3)**



# APPRAISAL project

AQP database

## 1. Analysis

What approaches are currently used to design and assess regional/local air quality plans? What are their strengths and weaknesses?

IAM framework:  
DPSIR

## 1. Design

Which data, models, and methods are used to design Air Quality Plans? What are the future research needs to improve the design process? (WP3)

AQP guidance and  
taxonomy

## 1. Guidance

How to integrate data, models, and methods to define a plan?



# APPRAISAL project

AQP database

## 1. Analysis

What approaches are currently used to design and assess regional/local air quality plans? What are their strengths and weaknesses?

IAM framework:  
DPSIR

## 1. Design

Which data, models, and methods are used to design Air Quality Plans? What are the future research needs to improve the design process? (WP3)

AQP guidance and  
taxonomy

## 1. Guidance

How to integrate data, models, and methods to define a plan?

## 1. Support the review of the EU Air Policy

# 1. AQP database

- **59 samples:**
  - 34 AQ plans
  - 18 research projects

# **1. AQP database: topics**

- 1. synergies among national, regional and local approaches, including emission abatement policies;**
  - 2. AQ assessment and planning;**
  - 3. source apportionment methodologies;**
  - 4. health impact assessment approaches;**
  - 5. uncertainty and robustness, including Quality Assurance / Quality Control (QA/QC).**
-



## TOPIC 1. Synergies among national, regional and local approaches, including emission abatement policies

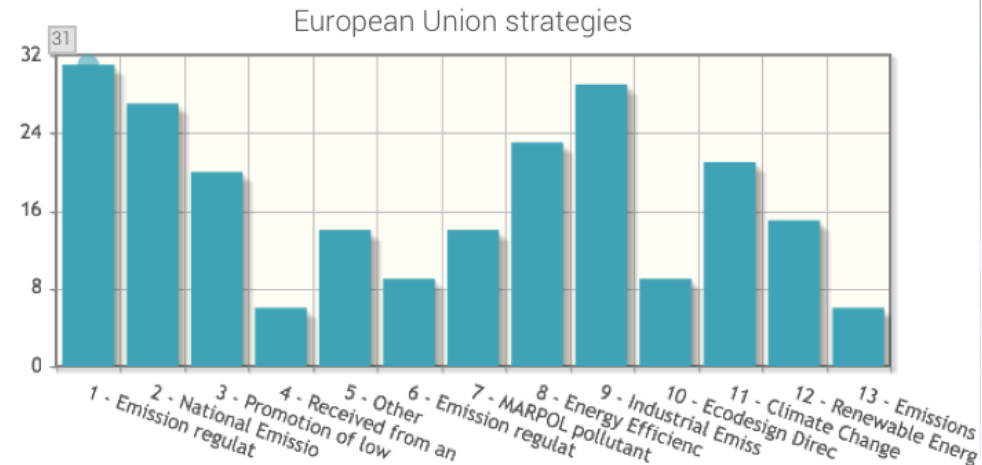
- Contribution to decision level
- What air pollution and climate strategies and legislation are taken into consideration in your activity?
- What emission sector are you addressing with your air pollution mitigation measures?
- What type of measures (technical or non-technical) did you consider?

**Selection** [-]

**Topic:** TOPIC 1: Synergies among national, regional and loc ▼

**Question:** 2.1 - European Union strategies ▼

**Filter** +



### Legend


- 1 - Emission regulation for new on-road (so-called EURO standards, e.g. Directive 98/69/EC)
- 2 - National Emission Ceilings (NEC) Directive
- 3 - Promotion of low emission vehicles (e.g. EC 443/2009)
- 4 - Received from another entity
- 5 - Other
- 6 - Emission regulation for new non-road vehicles and machinery (so-called STAGE I...IV standards, e.g. Directive 2010/26/EU)
- 7 - MARPOL pollutants emissions from ships
- 8 - Energy Efficiency Directive
- 9 - Industrial Emissions (IE) Directive
- 10 - Ecodesign Directive for local space heaters
- 11 - Climate Change programmes (ECCP)
- 12 - Renewable Energy (REN) Directive
- 13 - Emissions Trading System (ETS)


### Info


- Total answers at this question: 224
- Total number of questionnaires: 59


## TOPIC 2. AQ assessment and planning

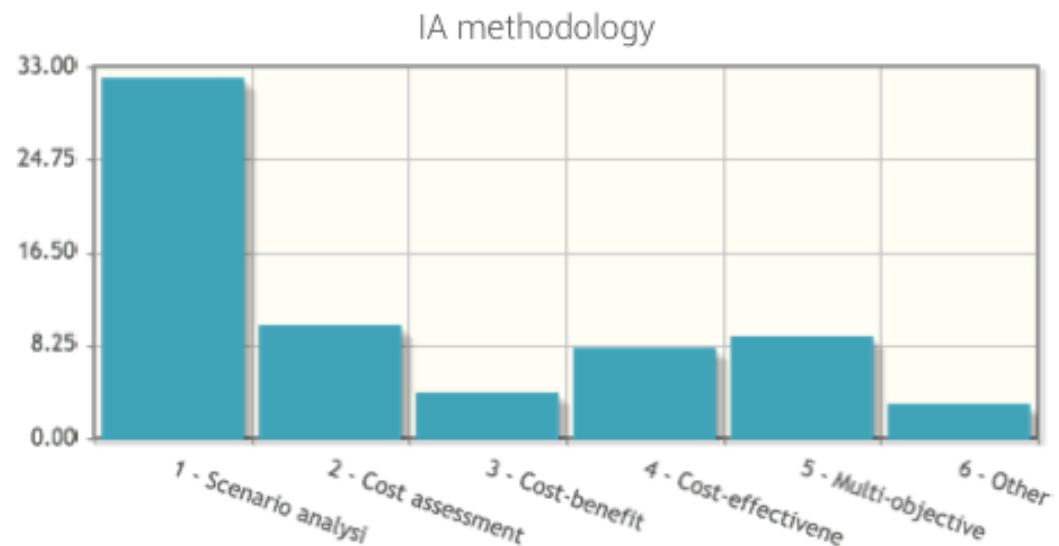
- Modelling purpose
- IA methodology
- Source-receptor relationships
- How many AQ models are you using?
- AQ Modelling tool
- Modelling setup
- AQ Modelling input data
- Combined use of model and measurements?
- Measurements
- IA indicators

**Selection** 

**Topic:** TOPIC 2: Air quality assessment and planning, includ 

**Question:** 2 - IA methodology 

**Filter** 



### Legend

- 1 - Scenario analysis
- 2 - Cost assessment
- 3 - Cost-benefit
- 4 - Cost-effectiveness
- 5 - Multi-objective approach
- 6 - Other

### Info

- Total answers at this question: 66
- Total number of questionnaires: 59

## TOPIC 2. AQ assessment and planning

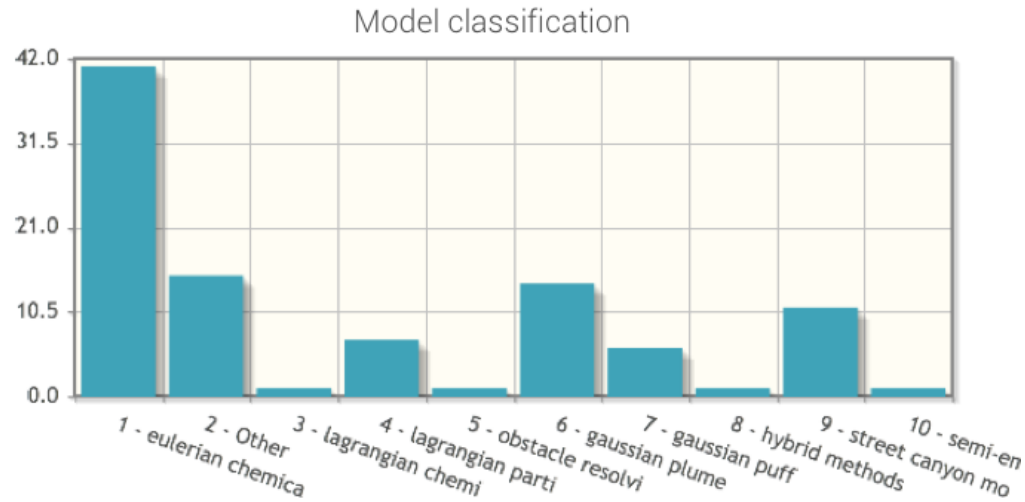
- Modelling purpose
- IA methodology
- Source-receptor relationships
- How many AQ models are you using?
- AQ Modelling tool
- Modelling setup
- AQ Modelling input data
- Combined use of model and measurements?
- Measurements
- IA indicators

**Selection** [-]

**Topic:** TOPIC 2: Air quality assessment and planning, includ ▼

**Question:** 5.3 - Model classification ▼

**Filter** +



### Legend

- 1 - eulerian chemical transport model
- 2 - Other
- 3 - lagrangian chemical model
- 4 - lagrangian particle model
- 5 - obstacle resolving fluid dynamical model
- 6 - gaussian plume
- 7 - gaussian puff
- 8 - hybrid methods
- 9 - street canyon models
- 10 - semi-empirical models

### Info

- Total answers at this question: 98
- Total number of questionnaires: 59

## TOPIC 3. Health Impact Assessment approaches

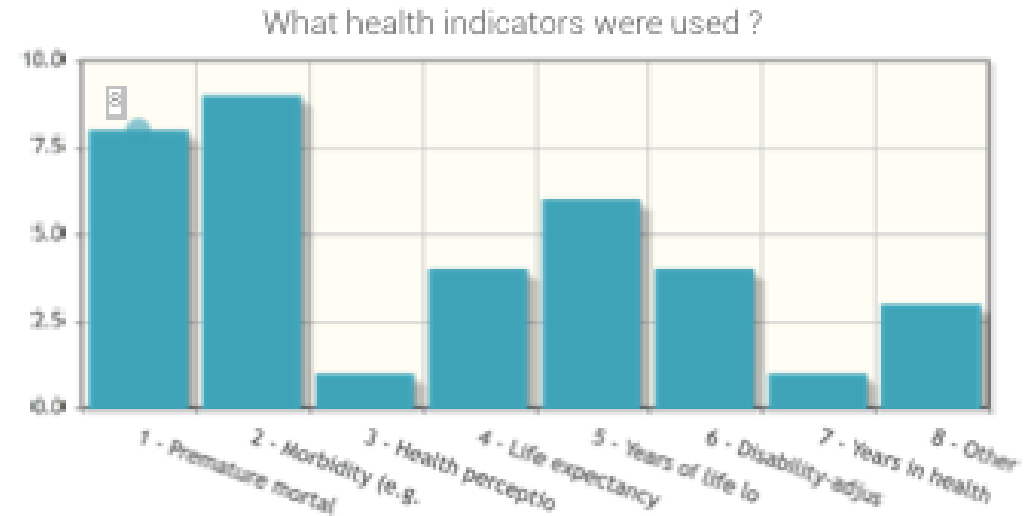
- What HIA approach did you use?
- HIA focus
- What health impact relationship did you use?
- Your health impact functions are based on what type of population data?
- What air pollutants did you consider to estimate the health effects?
- HIA features
- What health indicators were used?
- Were health effects monetized?

**Selection** ☐

**Topic:** TOPIC 3: Health Impact Assessment approaches ☐

**Question:** 7 - What health indicators were used ? ☐

**Filter** ☐



### Legend

- 1 - Premature mortality, additional mortality, death postponed, etc. (number of different terms are used in literature)
- 2 - Morbidity (e.g. pneumonia cases, cardiovascular diseases, respiratory diseases)
- 3 - Health perception (and well-being)
- 4 - Life expectancy (year/month)
- 5 - Years of life lost (YOLL)
- 6 - Disability-adjusted life-years (DALY)
- 7 - Years in health life (WHO 2012)
- 8 - Other

### Info

- Total answers at this question: 36
- Total number of questionnaires: 59

## TOPIC 4. Source apportionment

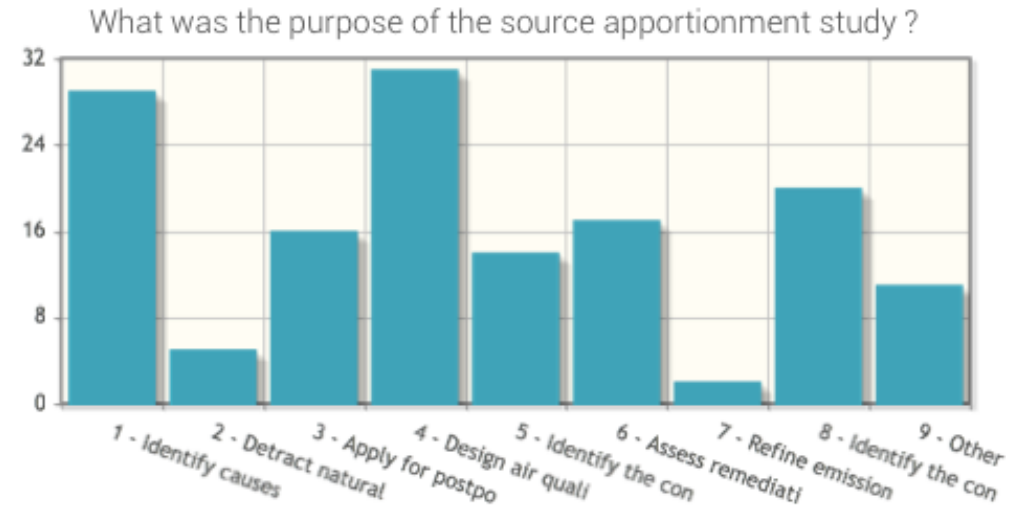
- What was the purpose of the source apportionment study?
- What was the used methodology?
- What were the pollutants considered
- Study Area
- Types of input data used (depending on type of SA methodology)
- Sampling design (only for receptor modelling methodology for SA)

**Selection**

**Topic:** TOPIC 4: Source apportionment

**Question:** 1 - What was the purpose of the source apportionme

**Filter**



### Legend

- 1 - Identify causes of exceedances
- 2 - Detract natural sources or road salting and sanding from PM (Dir. 2008/50/EC art. 21)
- 3 - Apply for postponement of attainment (Dir. 2008/50/EC art. 22)
- 4 - Design air quality plans/ action plans (Dir. 2008/50/EC arts. 23 and 24)
- 5 - Identify the contribution from different geographic areas within a country
- 6 - Assess remediation measures effectiveness
- 7 - Refine emission inventories
- 8 - Identify the contribution from other countries (transboundary pollution - Dir. 2008/50/EC art. 25)
- 9 - Other

### Info

- Total answers at this question: 145
- Total number of questionnaires: 59



## TOPIC 5. Uncertainty, robustness and validation, including QA/QC

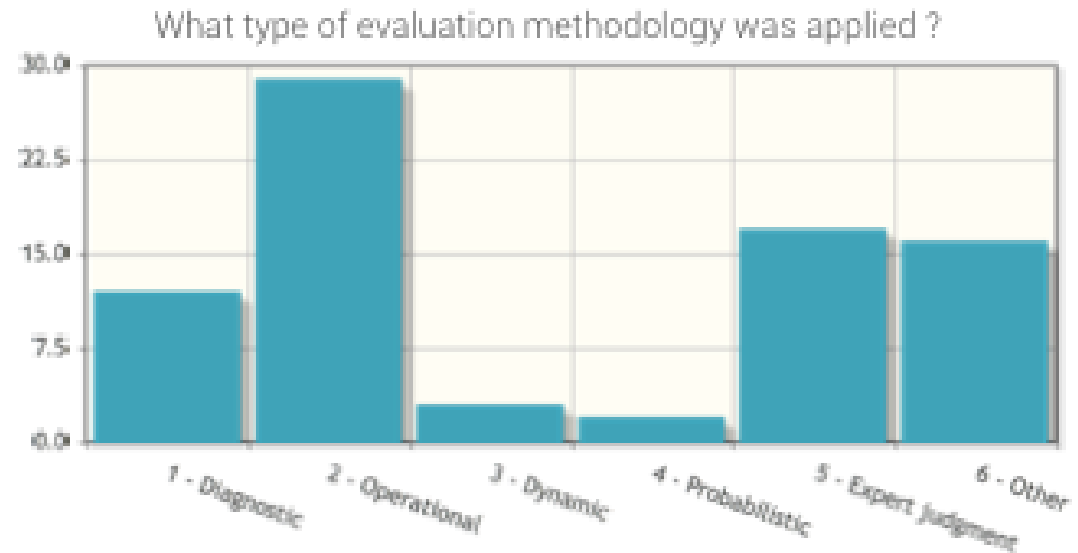
- What type of evaluation methodology was applied?
- Did you use already available software for your evaluation?
- Did you explicitly address uncertainty in the current activity or is the uncertainty evaluation based on previous works?
- What type of uncertainty quantification was applied?
- Was model uncertainty assessed in its different components?

**Selection** ☐

**Topic:** TOPIC 5: Uncertainty, robustness and validation, incl

**Question:** 1 - What type of evaluation methodology was applie

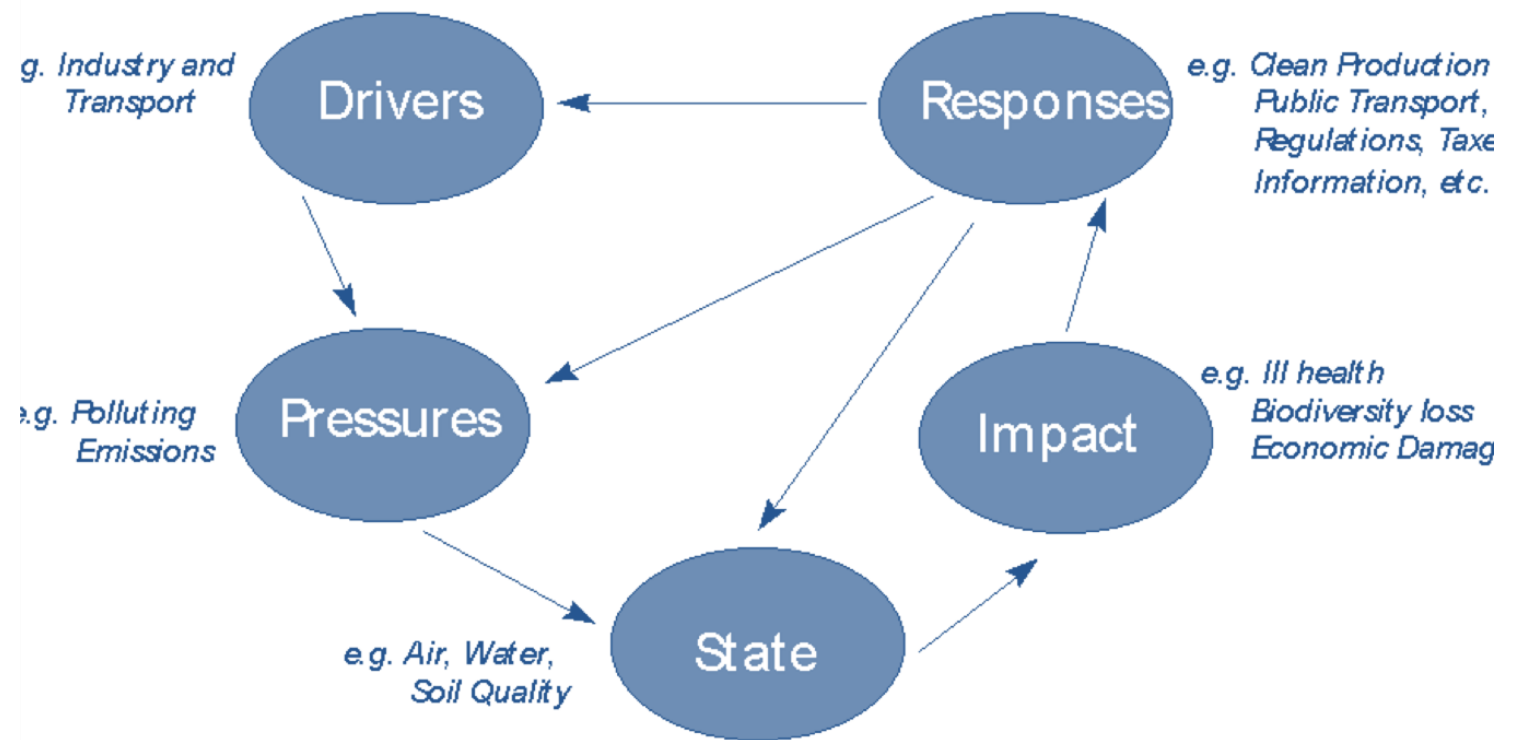
**Filter** ☐



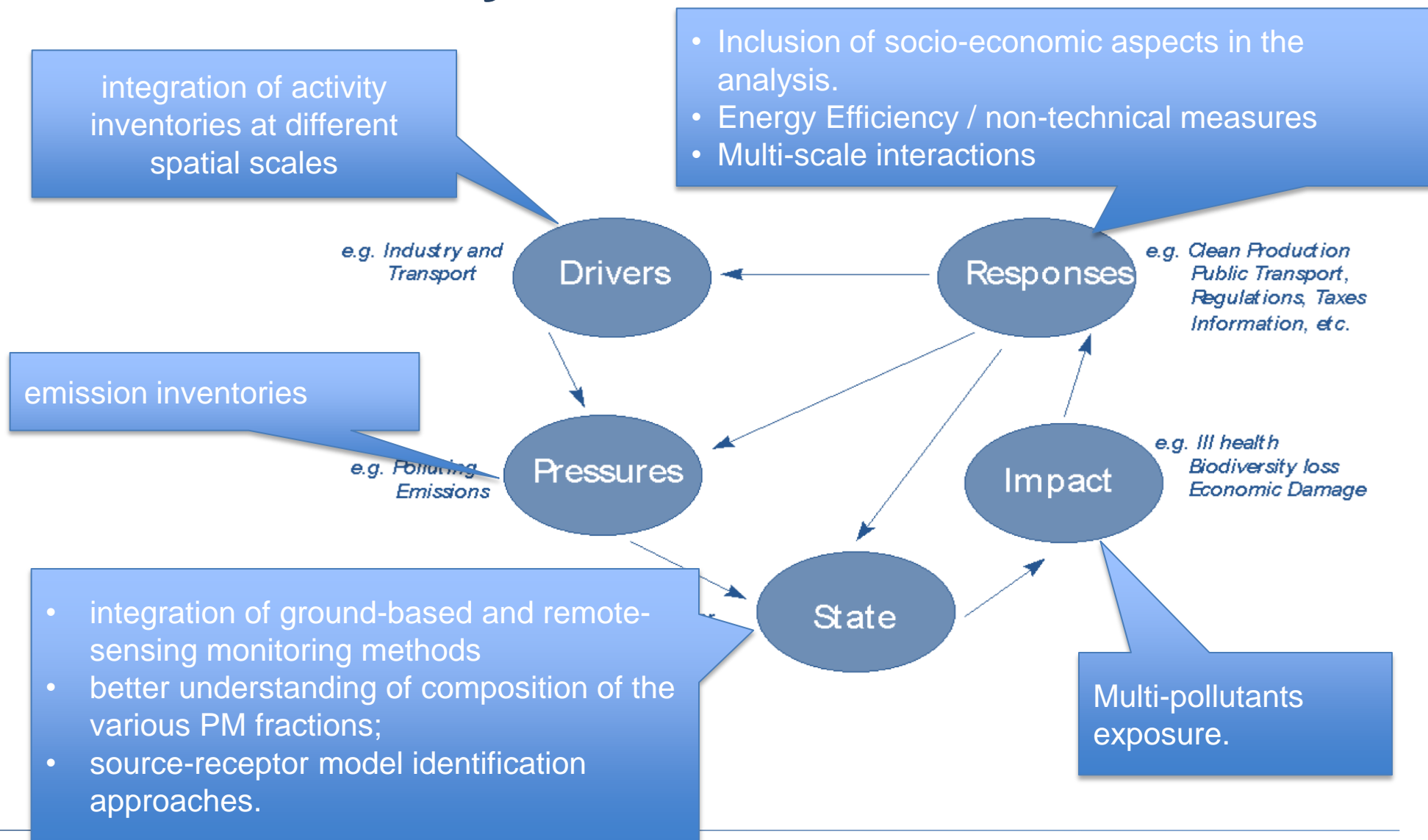
Legend
<ul style="list-style-type: none"><li>• 1 - Diagnostic</li><li>• 2 - Operational</li><li>• 3 - Dynamic</li><li>• 4 - Probabilistic</li><li>• 5 - Expert judgment</li><li>• 6 - Other</li></ul>
Info
<ul style="list-style-type: none"><li>• Total answers at this question: 79</li><li>• Total number of questionnaires: 59</li></ul>

## 2. IAM system framework design

### DPSIR



## 2. Key research areas



## 3. Guidance on IAM

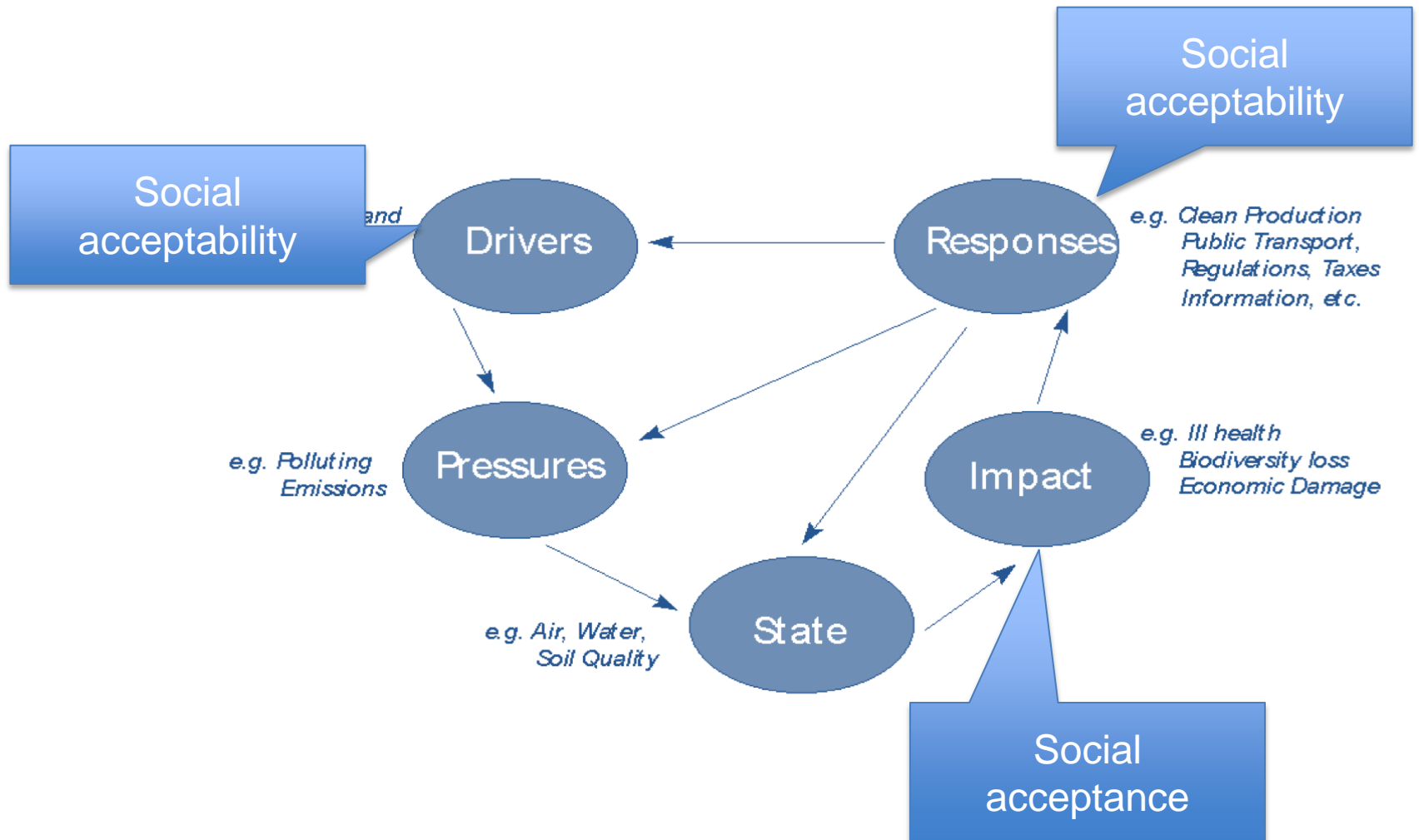
- Outcome of the review process and of the first version of the integrated assessment methodology design.
  - Provides guidance on integrated air quality and health assessment systems through a “state-of-the-art” document that can be used by all stakeholders.
  - Guidance drives the user in defining and implementing AQ plans following the DPSIR approach, block by block, defining progressive complexity levels
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## **4. Supporting the review of the EU Air Policy**

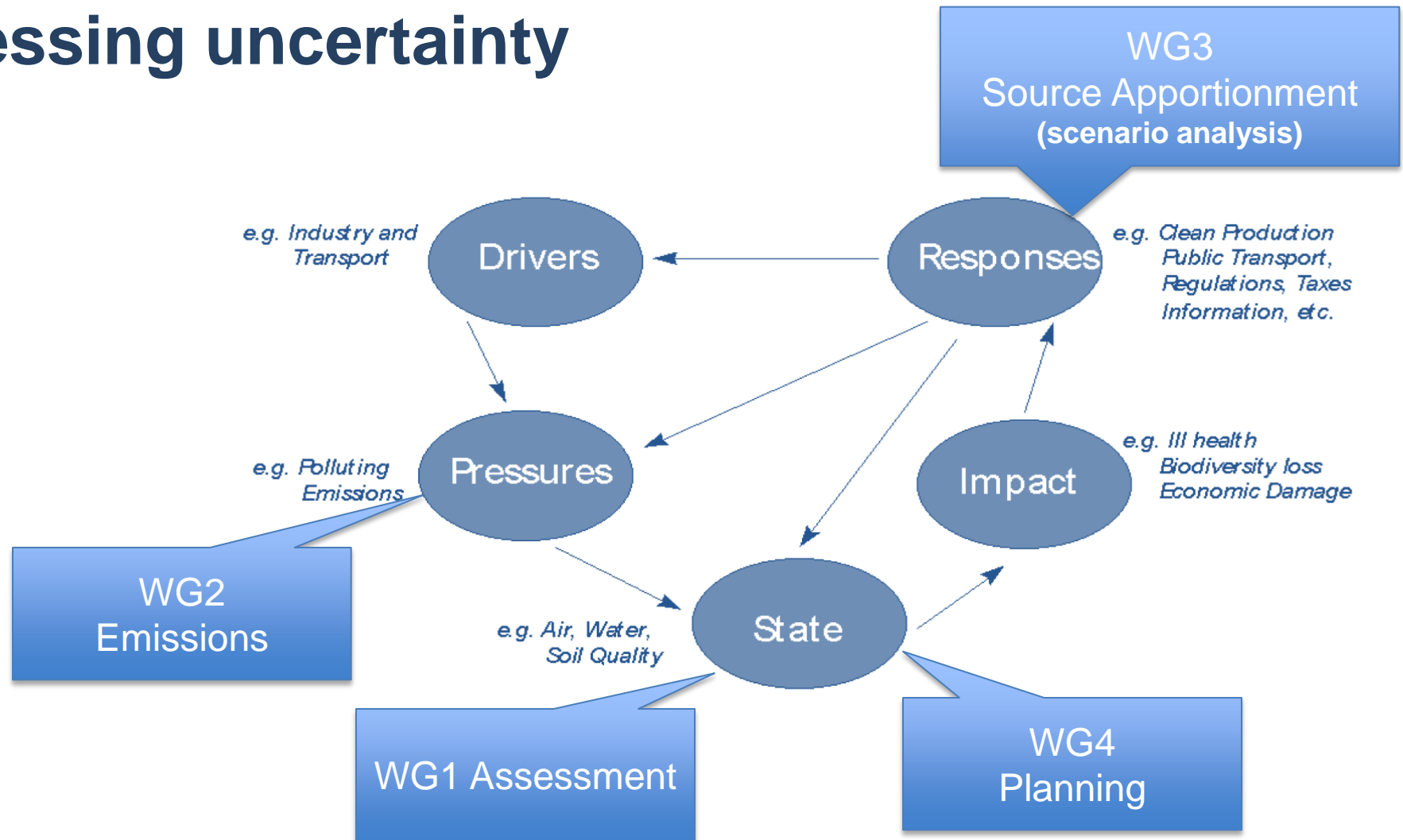
- Specify methodologies and tools to devise air quality plans
  - Provide multi-scale IAM tools to support air quality authorities in selecting efficient mitigation strategies.
  - Further promote the use of modelling tools.
  - Improve exposure estimates to assess the impacts of poor air quality on health.
  - Encourage the incorporation of uncertainty estimates in IAM to assess the robustness of the proposed solutions and the development of methods to deal and communicate uncertainty.
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# Links with SEFIRA: social issues



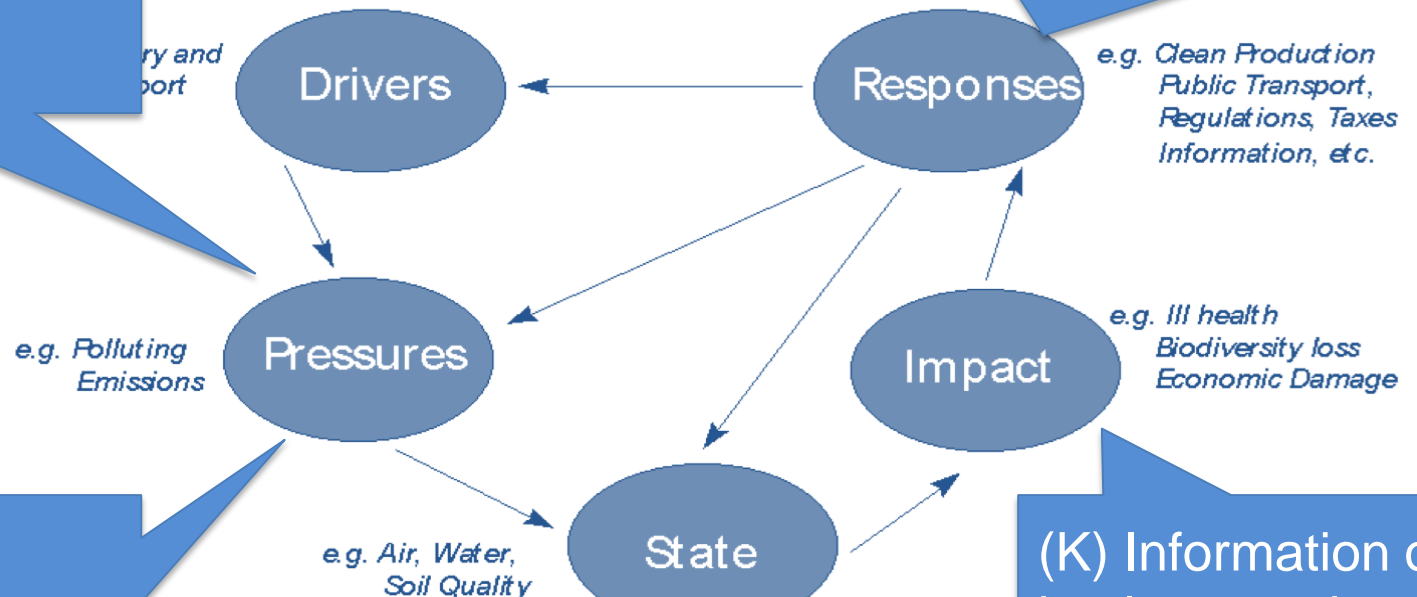
# Links with FAIRMODE: assessing uncertainty



# Links with EEA E-Reporting

(J) Information on the scenario for the attainment year

(I) Information on source apportionment  
(K) Information on measures: type, affected source sector



(K) Information on measures: emission reduction

(D) Information on the assessment methods

(K) Information on implementation costs, expected impacts

# Project outputs

- APPRAISAL database is open:  
<http://test.terraria.com/appraisal/>
  - APPRAISAL stakeholder community
  - Deliverables: [www.appraisal-fp7.eu](http://www.appraisal-fp7.eu)
  - Environmental Science and Policy Special issue (2016)
-

# Contacts

## Websites:

<http://www.appraisal-fp7.eu> (Info)

<http://test.terraria.com/appraisal/> (online questionnaire)

<http://test.terraria.com/appraisal/faces/pages/public/query.xhtml> (DB queries)

**M. Volta:** [marialuisa.volta@unibs.it](mailto:marialuisa.volta@unibs.it)

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## Appraisal project

Air Pollution Policies  
for Assessment  
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+ FAIRMODE  
+ NIAM

○ Stakeholders  
● Partners

ARPA Lombardia  
**Univ. Brescia**  
ARPA Emilia Romagna  
TerrAria srl  
JRC-EC  
CNRS  
ASPA Alsace  
Univ. Libre  
UBA  
SGUV  
IIASA  
SRI  
Univ. Aristoteli

## APPRAISAL project

LWA  
CIEMA  
Univ.  
Aveiro

# NATURE

our health, our wealth

# Green Week 2015

# satellite event



# Main achievements

1. **Review and gaps identification** in AQ and HA methodologies at regional and local scale
  2. **Designing IA systems** interconnecting national, regional, local models and strategies
  3. **Key research areas**
  4. **Guidance** on integrated air quality and health assessment systems (+ case studies)
-