Geospatial Technologies for the Environment: a user experience

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IMPEL Water and Land Expert Team
WHO WE ARE

LOMBARDY REGIONAL ENVIRONMENT PROTECTION AGENCY

- 1,000 OPERATORS ON 23,844 km² AREA,
- ~ 10 MILLION INHABITANTS,
- ~ 60,000 ENTERPRISES UNDER ONE OR MORE EU ENV. LAW,
- ~ 330 BILLION € REGIONAL GDP (~ 20% ITALY GDP

IS MEMBER OF

EUROPEAN UNION NETWORK FOR THE IMPLEMENTATION AND ENFORCEMENT OF ENVIRONMENTAL LAW

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the European Union Member States, acceding and candidate countries of the EU, EEA and EFTA countries. 48 Authorities in 34 countries.
WHAT WE DO

“To contribute to protecting the environment by promoting the effective implementation and enforcement of EU environmental law.”

The core of the IMPEL activities concerns awareness raising, capacity building, peer review, exchange of information and experiences on implementation, international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation. The Association undertakes its activities primarily within a project structure.
THE BASIS OF OUR WORK
EU 7° ENVIRONMENT ACTION PROGRAMME:
Policy Priority Objectives

DECISION No 1386/2013/EU OF THE
EUROPEAN PARLIAMENT AND OF THE
COUNCIL
of 20 November 2013
on a General Union Environment Action
Programme to 2020 ‘Living well, within
the limits of our planet’
(Text with EEA relevance)
THE BASIS OF OUR WORK

EU 7° ENVIRONMENT ACTION PROGRAMME:
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the limits of our planet’
(Text with EEA relevance)

to protect, conserve and enhance the
Union’s natural capital
THE BASIS OF OUR WORK
EU 7° ENVIRONMENT ACTION PROGRAMME: Policy Priority Objectives

(Text with EEA relevance)

to safeguard the Union’s citizens from environment-related pressures and risks to health and well-being
THE BASIS OF OUR WORK
EU 7° ENVIRONMENT ACTION PROGRAMME:
Policy Priority Objectives

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(Text with EEA relevance)

to enhance the sustainability of the Union’s cities

AND MORE...
HOW WE SUPPORT THE ACHIEVEMENT OF THESE GOALS

ACTIONS IN THE FRAMEWORK OF POLICIES

• ASSURING COMPLIANCE TO ENVIRONMENTAL LAWS
  o SURVEILLANCE
  o INSPECTION
  o ......

• PROMOTING SUSTAINABLE DEVELOPMENT
HOW WE SUPPORT THE ACHIEVEMENT OF THESE GOALS

TWO EXAMPLES

POLICY – PROCESS – PRACTICES CONVERGENCE

USING GEOSPATIAL TECHNOLOGIES IN ENVIRONMENT PROTECTION
## POLICY-PROCESS-PRACTICE CONVERGENCE: TWO USE CASES

<table>
<thead>
<tr>
<th>Use case</th>
<th>Convergence</th>
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</thead>
<tbody>
<tr>
<td>Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process (ARPA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice</td>
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</tbody>
</table>
POLICY 1: ASBESTOS FREE LOMBARDY
POLICY 1: ASBESTOS FREE LOMBARDY

TASKS OF ARPA LOMBARDY IN SUPPORTING THIS POLICY *

- estimation of the regional amount of asbestos-cement roofings in order to assess the need for new landfills.
- Monitoring of Policy goals achievement
- Surveillance to aim inspections

*Legal Framework:
A Group of Laws at European, National, Regional level
- Directive 87/217/EC on the prevention and reduction of environmental pollution by asbestos.
- Lombardy Regional Law N°17/2003 on the remediation, removal and disposal of asbestos.
- Lombardy Regional Act N° 8/1526 D.g.r. 22/12/2005 setting up the Asbestos Regional Plan of Lombardy (PRAL).
POLICY 1: ASBESTOS FREE LOMBARDY

2007
hyperspectr. mapping
baseline map of cement-asbestos covers
Data Analytics
assessment of stocks

2012 2014
orthoimage mapping
change detection
updated map
Data Analytics
assessment of stocks and flows

2015
orthoimage mapping + hyperspectr mapping?
change detection
Data Analytics
assessment of stocks and flows
POLICY 1: ASBESTOS FREE LOMBARDY

ASSESSMENT OF STOCKS OF ASBESTOS

1. REMOTE SENSING TECHNOLOGY

Airborne Multispectral Infrared and Visible Imaging Spectrometer (MIVIS)

<table>
<thead>
<tr>
<th>Spettrometro</th>
<th>Bande Spettrali</th>
<th>Lunghezza d’onda (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 - 20</td>
<td>0.43 - 0.83</td>
</tr>
<tr>
<td>2</td>
<td>21 - 28</td>
<td>1.15 - 1.55</td>
</tr>
<tr>
<td>3</td>
<td>29 - 92</td>
<td>1.98 - 2.48</td>
</tr>
<tr>
<td>4</td>
<td>93 - 102</td>
<td>8.18 - 12.70</td>
</tr>
</tbody>
</table>
ASSESSMENT OF STOCKS OF ASBESTOS

2. THE TERRITORY

Statistical approach: Identification of representatives areas to be sampled

<table>
<thead>
<tr>
<th>Area</th>
<th>Km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacino settentrionale dell'Olona</td>
<td>653</td>
</tr>
<tr>
<td>Corridoio autostradale Milano-Brescia</td>
<td>1202</td>
</tr>
<tr>
<td>Valcamonica</td>
<td>144</td>
</tr>
<tr>
<td>Valtrompia</td>
<td>63</td>
</tr>
<tr>
<td>Totale</td>
<td>2062</td>
</tr>
</tbody>
</table>

A 8.6% AREA CONTAINING 29% OF REGIONAL POPULATION:

PHASE 1

2007
POLICY 1: ASBESTOS FREE LOMBARDY

ASSESSMENT OF STOCKS OF ASBESTOS

3. THE ESTIMATE
Weighted extrapolation to the whole regional area

Estimated volume of asbestos waste to be managed (2007)

2.8 M m³
POLICY 1: ASBESTOS FREE LOMBARDY

NEW ESTIMATE AND SURVEILLANCE

1. Change detection of individual asbestos roofings

- 27 %
NEW ESTIMATE AND SURVEILLANCE

2. New asbestos roofing inventory and analysis of individual Municipality trends

Support to Local Policies

PHASE 2 2014
NEW ESTIMATE AND SURVEILLANCE

3. Individual site analysis for inspection targeting in the framework of compliance assurance activities

PHASE 2
2014
POLICY 1: ASBESTOS FREE LOMBARDY

NEW ESTIMATE AND POLICY SUPPORT

4) Analysis of correlation with removal incentive policy, trends evaluation
POLICY 1: ASBESTOS FREE LOMBARDY

2015 campaign
• New stock estimate
• Extension to all urbanized regional territory (10 M sq km ca.)

NEW ISSUES FROM EO AND IN GENERAL FROM GEOSPATIAL WORLD?

Orthoimage mapping + hyperspectr mapping? Aircraft or satellite?

New change detection methodology?
POLICY 2: PROMOTING SUSTAINABLE DEVELOPMENT
SAVING LAND CONSUMPTION

EVERY DAY, IN ITALY, AN AVERAGE AREA OF 55 HECTARS (0.55 km²) IS LOST BECAUSE OF URBAN GROWTH, NEW INSTALLATIONS, INFRASTRUCTURE DEVELOPMENT.
POLICY 2: PROMOTING SUSTAINABLE DEVELOPMENT
SAVING LAND CONSUMPTION

At the same time, thousands of brown fields, shut down installations, building vacancies are left unattended, endangering the environment.
POLICY 2: PROMOTING SUSTAINABLE DEVELOPMENT
SAVING LAND CONSUMPTION

PROGETTO «SUOLI»
NOW UNDER DESIGN

GATHERING AND ANALYZING
INFORMATION TO SUPPORT INVESTORS
IN SEARCHING AND REUSING BROWN
FIELDS SUITABLE TO THEIR NEEDS
### Policy 2: Promoting Sustainable Development - Saving Land Consumption

**Progetto «Suoli»**

**An «Ecosystem» Made Up of Information Owners That Become Information Providers**

<table>
<thead>
<tr>
<th>Available Areas</th>
<th>Land Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Contaminated Sites Registry</td>
<td></td>
</tr>
<tr>
<td>• Ceased Industry Records</td>
<td></td>
</tr>
<tr>
<td>• Energy Consumption Info</td>
<td></td>
</tr>
<tr>
<td>• Earth Observation Info</td>
<td></td>
</tr>
<tr>
<td>• Abandoned Arable Land Records</td>
<td></td>
</tr>
<tr>
<td>• ………</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Investors Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Area Dimension</td>
</tr>
<tr>
<td>• Wastewaters Treatment Capacity</td>
</tr>
<tr>
<td>• Water Needs</td>
</tr>
<tr>
<td>• Environmental Impacts</td>
</tr>
<tr>
<td>• Proximity to Infrastructures</td>
</tr>
<tr>
<td>• ………</td>
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</tbody>
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**Interacting With**

**Private Public Mix**

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*Image Source: SSN - Geospatial World Forum*
POLICY 2: PROMOTING SUSTAINABLE DEVELOPMENT
SAVING LAND CONSUMPTION

THE ENVIRONMENT STATE MAPS ARE QUITE THE SAME THAT WE BUILT AS «RISK INDICATOR MAPS» TO BE USED WITH RISK ANALYSIS TOOL TO PROGRAM INSPECTIONS

IN FACT, TO DAY, INSPECTION OF INSTALLATIONS UNDER EU INDUSTRIAL EMISSION DIRECTIVE (2010/75 IED) ARE TO BE PLANNED TAKING INTO ACCOUNT ALSO THE QUALITY AND THE SENSITIVITY OF THE ENVIRONMENT IN WHICH EACH INSTALLATION IS LOCATED

GEOSPATIAL INFORMATION BECOME ESSENTIAL FOR THE FULFILLMENT OF AN EU DIRECTIVE

(THIS IS MATTER FOR DISCUSSION ABOUT LEVEL PLAYING FIELD IMPLEMENTATION ALL AROUND EUROPE)
POLICY 2: PROMOTING SUSTAINABLE DEVELOPMENT 
SAVING LAND CONSUMPTION

CRITERIA: ENVIRONMENT CONDITION
INDICATOR: WATER POLLUTION
PARAMETERS: ARPA MONITORING NETWORK RESULTS
SCORE CALC: ALGORITHM, SHARED IN EXPERT COMMUNITY

GIVING A SCORE TO TERRITORIES TO BE USED IN ENVIRONMENTAL RISK ANALYSIS TOOLS
POLICY 2: PROMOTING SUSTAINABLE DEVELOPMENT SAVING LAND CONSUMPTION

CRITERIA: SENSITIVITY – HUMAN HEALTH

INDICATOR: POPULATION IN THE NEIGHBORHOOD OF SITES UNDER INVEST.

PARAMETERS: DATA FROM REGIONAL HEALTH SERVICE, GEOREF ADDRESS

SCORE: ALGORITHM, PARAMETERS SHARED IN EXPERT COMMUNITY

GIVING A SCORE TO TERRITORIES TO BE USED IN ENVIRONMENTAL RISK ANALYSIS TOOLS

<table>
<thead>
<tr>
<th>ab/km² (value min)</th>
<th>ab/km² (value max)</th>
<th>punteggio V2</th>
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<tbody>
<tr>
<td>0</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>250</td>
<td>1</td>
</tr>
<tr>
<td>250</td>
<td>600</td>
<td>2</td>
</tr>
<tr>
<td>600</td>
<td>1200</td>
<td>3</td>
</tr>
<tr>
<td>1200</td>
<td>2000</td>
<td>4</td>
</tr>
<tr>
<td>&gt;2000</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
POLICY 2: PROMOTING SUSTAINABLE DEVELOPMENT SAVING LAND CONSUMPTION

PROGETTO «SUOLI»

AN «ECOSYSTEM» MADE UP OF INFORMATION OWNERS THAT BECOME INFORMATION PROVIDERS

INTERACTING WITH

INVESTORS NEEDS

AVAILABLE AREAS LAND CHARACTERISTICS

SHARED SERVICES PLATFORM «E015»

SUITABLE SITES

DATA ANALYTICS
Supporto Nuovi Insediamenti Produttivi

Attività Prod.: Alimentari e bevande
Tipologia Sito: Area agricola edificabile
Provincia: Tutte
Comune: Tutti
Superf. (m²): 10000 a 20000
Capacità depur. (AE): 1000

Aree di espansione PGT
Aree di espansione libere
Aree dismesse
Siti contaminati
Popolazione
Aree naturali

Cerca
VAI
MAIN CHALLENGES:

- WHICH ARE THE REALLY USEFUL INFOS?
- ALL THE NEEDED DATA EXIST AND ARE GEOLOCATED?
- HOW TO CALL UP INFORMATION OWNERS?
CONCLUSIONS

CONVERGENCE BETWEEN PUBLIC USERS AND SERVICE PROVIDERS

• All the reported experiences stems from a fruitful cooperation between Users and Private Service Providers

• This was possible because the involved Public Body (us) had a good culture in geospatial area and this enabled a good dialogue with Private Service Providers

• This is not always possible: we feel there is, in general, a gap between Public Bodies and Private Service Providers, that have to share knowledge and culture in reciprocal fields to achieve even better results
THANKS FOR YOUR ATTENTION

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