Integration of Traffic and Environmental data for improving green policies in the city of Bolzano

Final project workshop
27/02/2015

Table of contents
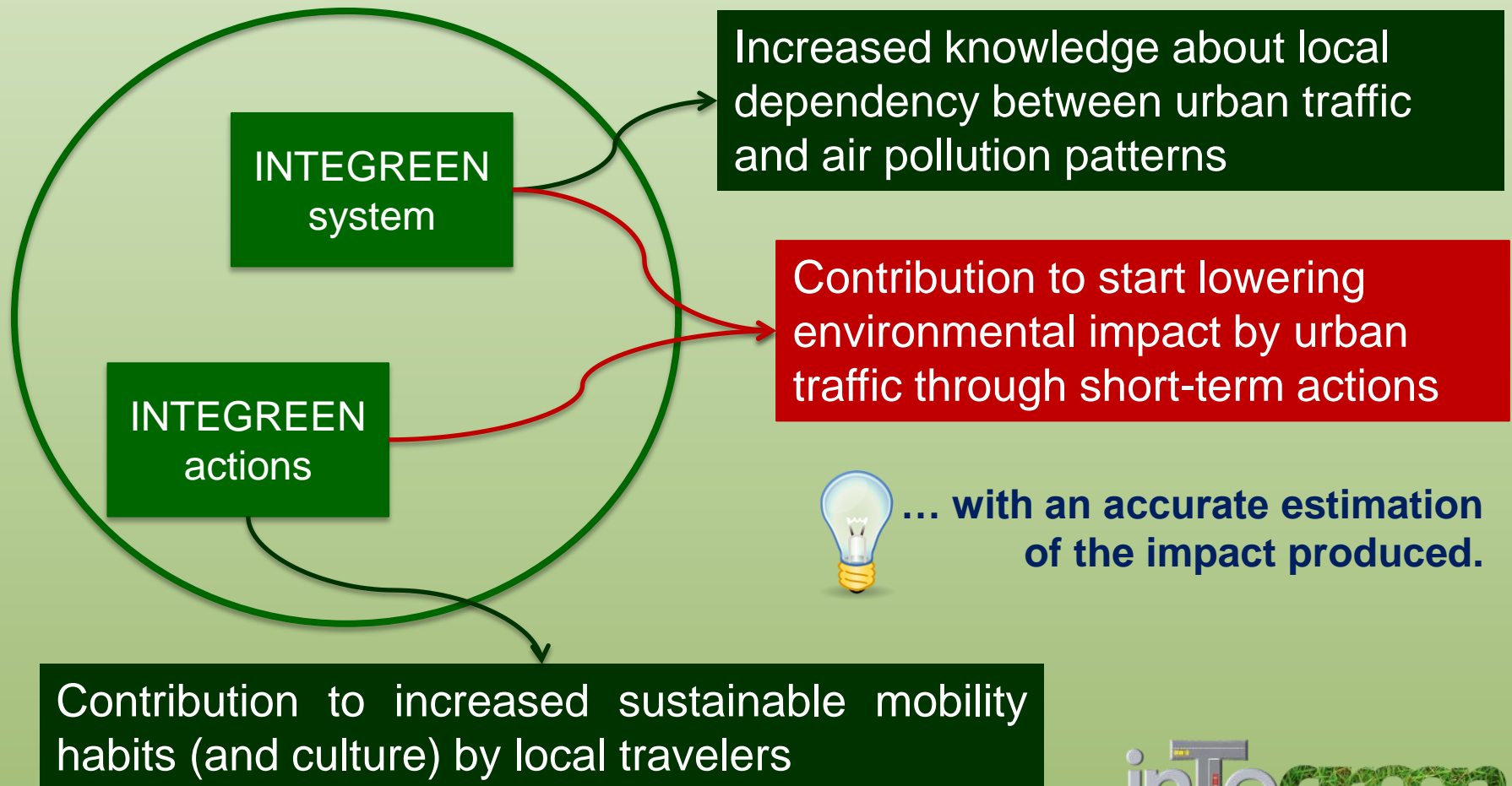
- **Results**

- **Lessons learned**

- **Exploitation and future perspectives**

INTEGREEN
system

INTEGREEN
actions

Increased knowledge about local dependency between urban traffic and air pollution patterns

Contribution to start lowering environmental impact by urban traffic through short-term actions

… with an accurate estimation of the impact produced.

Contribution to increased sustainable mobility habits (and culture) by local travelers

Result nr. 1: increased knowledge

1. **Collection and integration of a huge amount of data related to local traffic / air pollution conditions**

Data type	Availability start	Records amount [nr. records]
Parking	September 2013	> 2 million records
Air pollution / meteorological	December 2013	about 900.000 records
Mobile	February 2014	about 6 million records
Traffic detection	December 2012	> 10 million records

… without considering SASA AVM real-time data, that we don't store.

Result nr. 1: increased knowledge

2. Availability of lots of elaborated information

Elaboration type	Data sources
Average speed **Average travel times** **Nr. of congestion patterns** **Nr. of speeding records**	Traffic detections
Pollutant emissions: CO_2, NO_X, PM_{10} (and much more)	Traffic detections
Pollutants street level concentrations: mainly NO_2	Mobile
Traffic-emitted pollutants dispersion	Pollutant emissions + air pollution / meteorological

… current + historical ones (with some limitations).

3. Analyzing patterns – a case study example

Klimahouse 2015
- ✓ One of the most important local fairs
- ✓ 4 days of exhibitions, demonstrations, tours
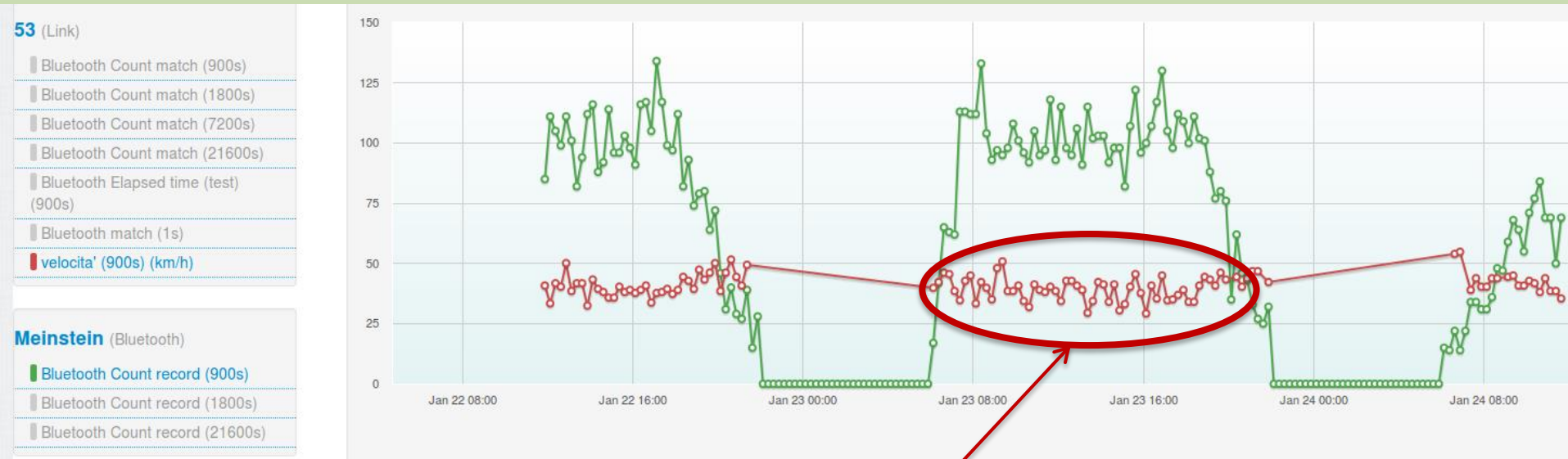- ✓ About 38k visitors + 1.000 workshop participants

Source: leonardo.tv

Exhibition area

INTEGREEN monitored routes

3. Analyzing patterns – a case study example

Reference traffic conditions
(one week before the event)

3. Analyzing patterns – a case study example

Congestion patterns (during the event)
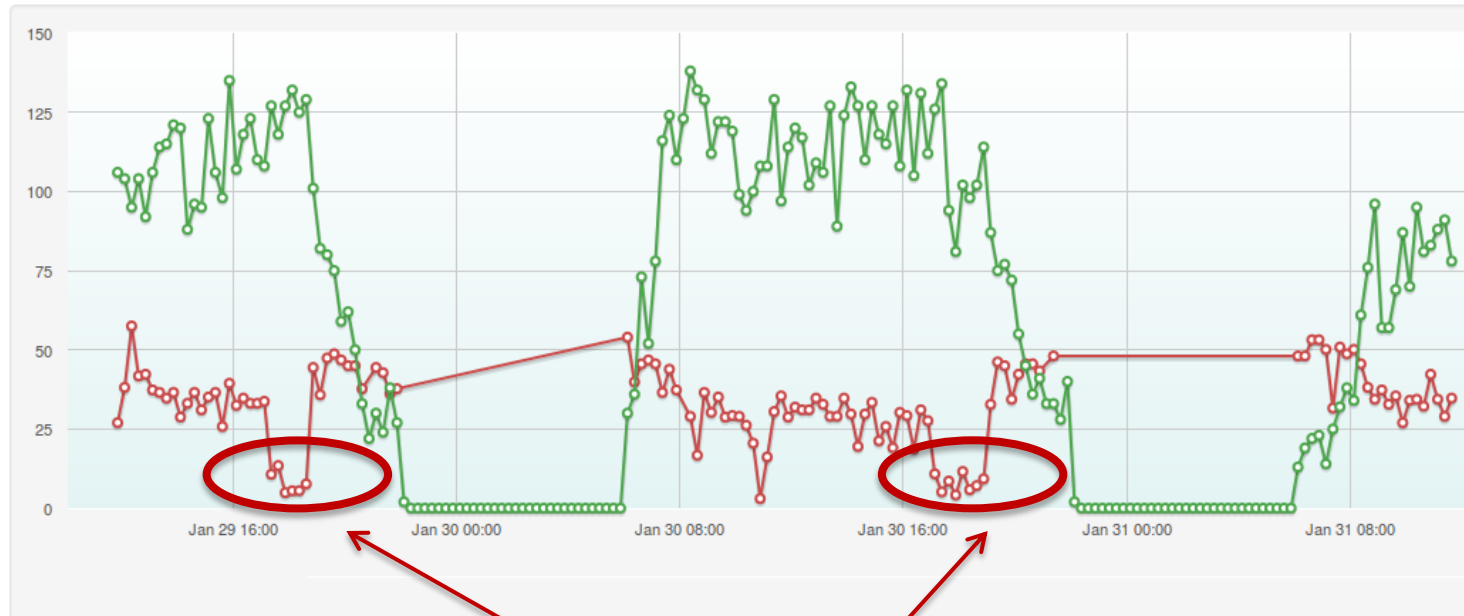
Thanks to the INTEGREEN system, one could calculate the associated increase of emissions

3.   **Analyzing patterns – a case study example**

NO₂ high concentration period mainly due to urban traffic perturbations?

The mobile system is able to identify the presence of localized hotspots

Legend

- 🟢 [0;80] [μg/m3]
- 🟡 [80;90] [μg/m3]
- 🟠 [90;100] [μg/m3]
- 🔴 [100;105] [μg/m3]
- ⚫ >= 105 [μg/m3]
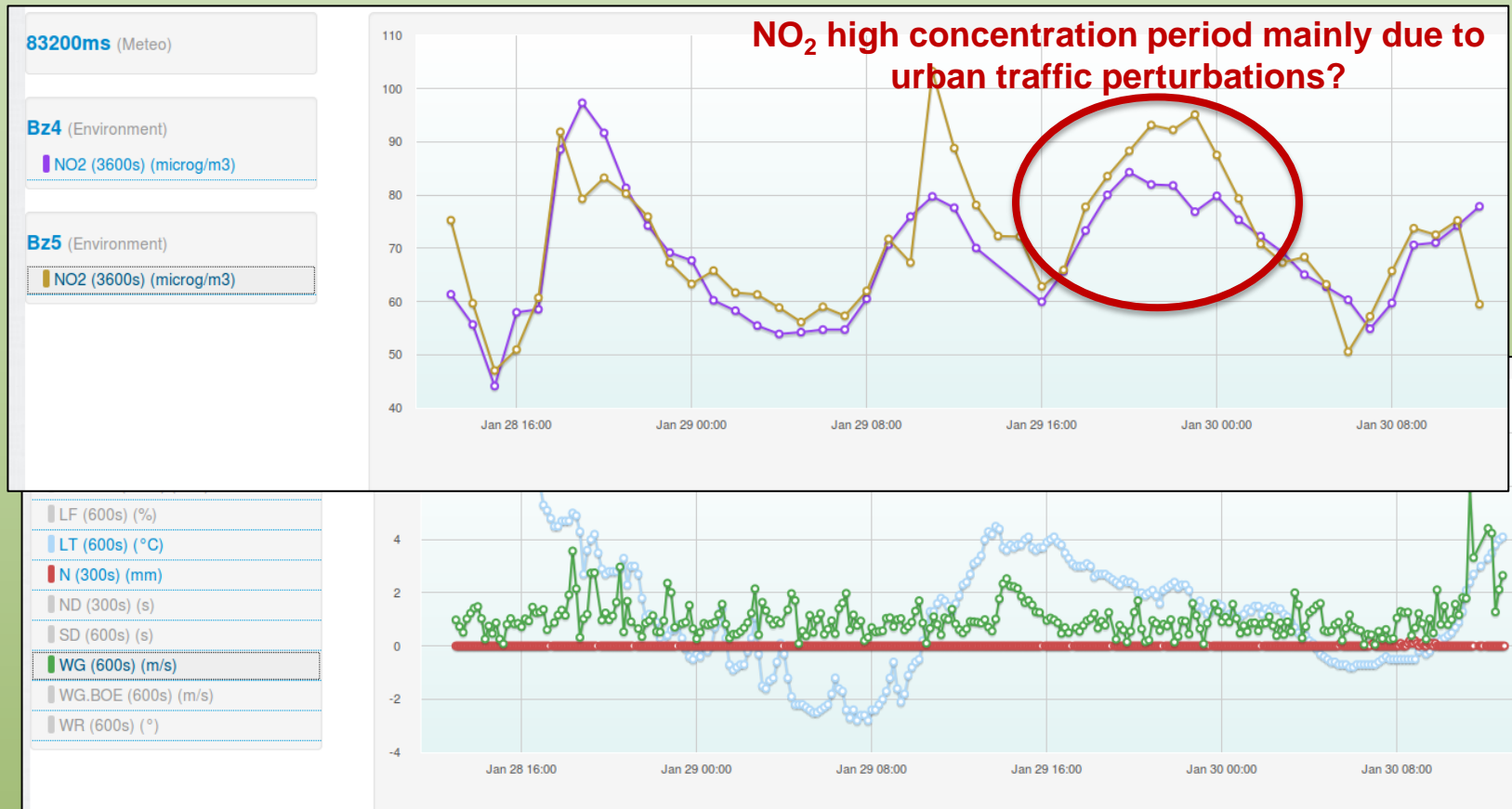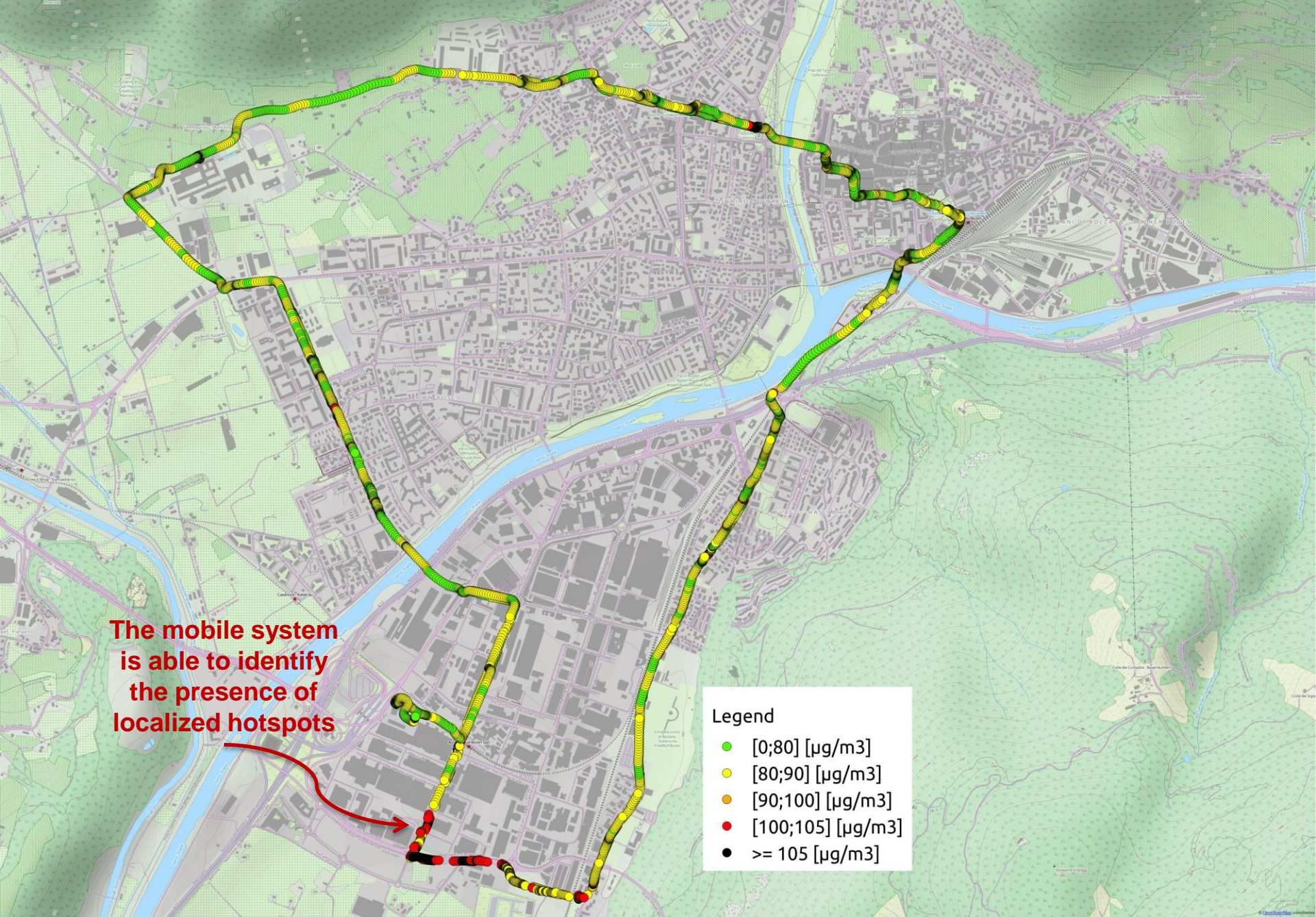
Result nr. 2: quantifying impacts

First evaluation of potential of «greening» urban traffic

In theory, given the <u>same vehicular population</u>, it is possible to reduce the environmental impact through:

- ✓ **Speed** management strategies
- ✓ **Traffic control** management strategies
- ✓ Urban **navigation** strategies
- ✓ **Mobility** management strategies (mode and time of travel)
- ✓ (**Driving** management strategies)

Result nr. 2: quantifying impacts

First evaluation of potential of «greening» urban traffic

Preliminary results suggest the following potential:

Strategy class	Low traffic conditions	Heavy traffic conditions
Speed	Medium	Medium
Traffic control	Low	Medium
Navigation	Low	Medium
Mode / Time of Travel	High	High
Driving*	Medium	Medium

*based on literature findings, not empirical verified

Result nr. 2: quantifying impacts

First evaluation of potential of «greening» urban traffic: a case study example

Speed enforcement detectors
- ✓ Very (un)popular in the last months in Bolzano
- ✓ Installation completed in the first days of December 2014

Main objective: reduce high transit speeds on the main routes of the city and increase safety of VRUs

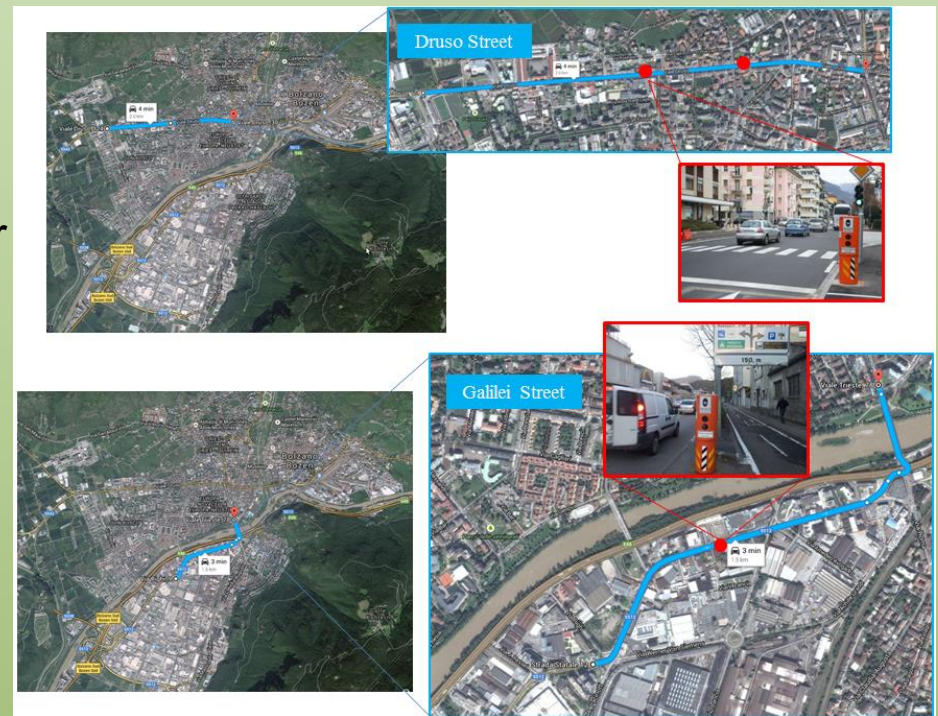**… any idea of the environmental effects? Does this measure have any effect at all?**

Result nr. 2: quantifying impacts

First evaluation of potential of «greening» urban traffic: a case study example

Comparison between the 3-months period before the installation (September / October / November 2014) and the month immediately after the installation (December 2014)

- **Druso Street** (3 detectors in series)
- **Galilei Street** (1 detector)

Result nr. 2: quantifying impacts

First evaluation of potential of «greening» urban traffic: a case study example

Indicator	Druso Street (direction city centre)	Druso Street (direction city suburb)	Galilei Street
Average Speed	+ 2%	0%	- 10%
Nr. vehicular detections	- 12%	- 16%	- 11%
Nr. congestion records	- 0.7%	- 0.5%	+ 1.8%
Nr. speeding Records	- 1.4%	- 3.5%	- 6.7%
PM_{10} emissions	- 9%	- 9%	- 3%
NO_X emissions	- 9%	- 8%	- 3%
CO_2 emissions	- 10%	- 10%	- 4%

Result nr. 2: quantifying impacts

First evaluation of potential of «greening» urban traffic: a case study example

Conclusion:
The first reaction to speed detectors by local drivers has produced a on certain streets a non-negligible environmental improvement.
The emissions' reduction is estimated in the order of **5-10%**, and it is probably higher (don't forget that in December we have Christmas market…).

But…

- Will this measure confirm its usefulness in the mid-term period?
- Are drivers really improving their behavior, or just adapting it in front of the detector?
- What about the overall emissions' balance? Are drivers avoiding the monitored routes and producing a higher impact on other stretches?

Result nr. 3: contribution to SUM promotion

The most challenging task!

Combination of:
- ✓ Large-scale events
- ✓ Targeted meetings with focus groups
- ✓ Distribution of mobility information services
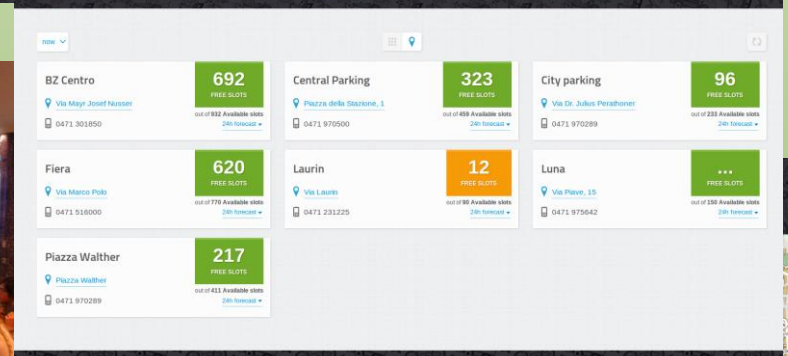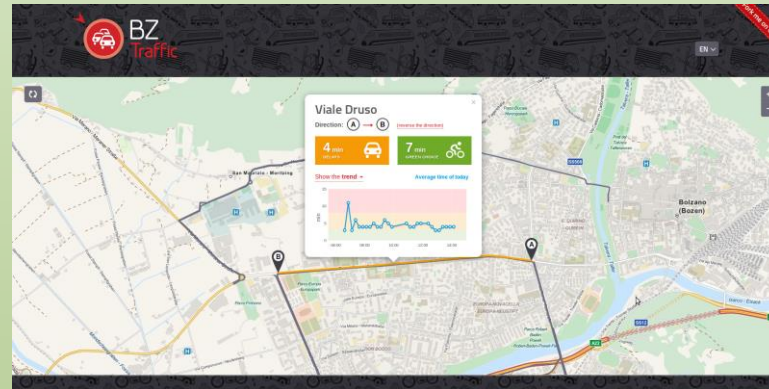
Lessons learned

- INTEGREEN and the cooperation with LIFE program has **not** been a **smooth experience**, in particular during its kick-off. But has been a **great experience**, from a technical and human point of view.

- Today it's INTEGREEN official arrival point. But only formally: today it is the **kick-off of a new phase** in the local mobility agenda. The INTEGREEN system will be fed with new data streams and continuously increase its capabilities and accuracy for operational use.

- **LIFE** is the right EU instrument for ambitious projects which put at the centre of their target the **environment**. Based on INTEGREEN experience (and tools) we can now increase our ambitions.

… in which direction?
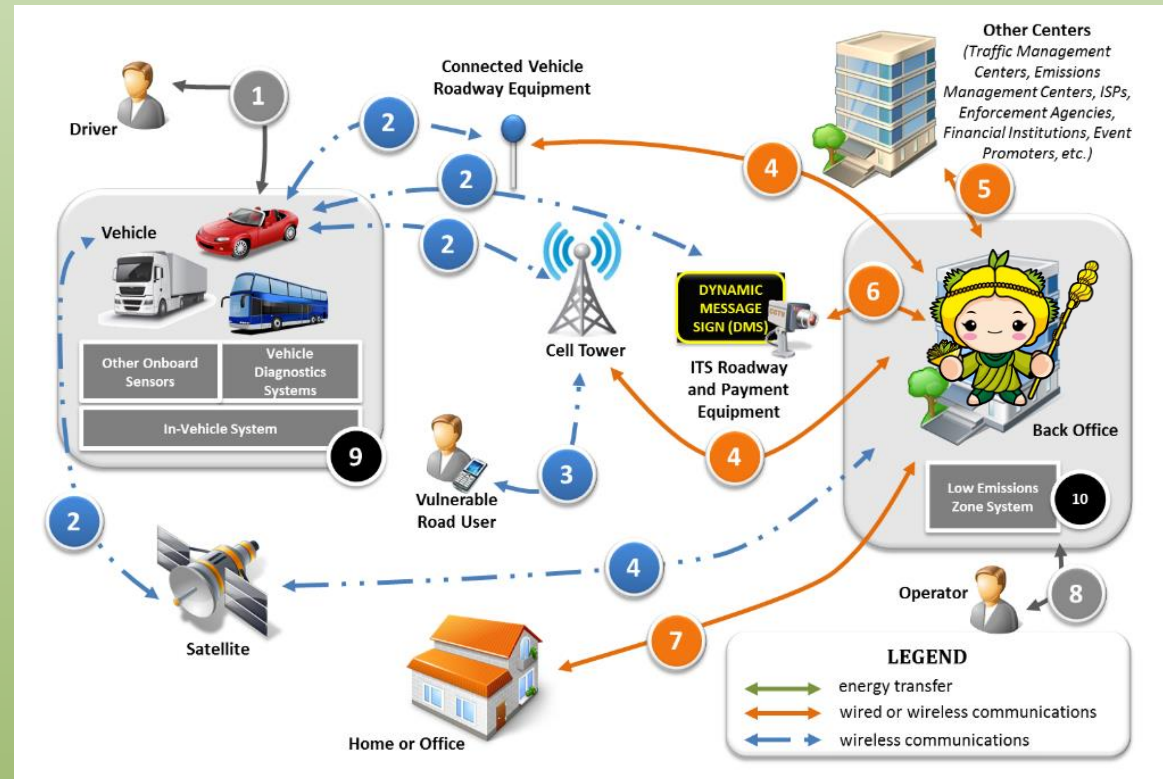
Exploitation and future perspectives

Towards fully connected scenarios

Towards next-level user engagement

Towards spatially - extended integrated approaches

Technology is the enabler. Users are the key.

Dynamic Low Emission Zones concept:
Adding rules to access and transit of (pollutant) vehicles, but only when it is really needed.

Source: its.dot.gov

Indirect outcomes

- **From stakeholders to partners**:

  - contribution to project activities;
  - availability to become partners in future project initiatives.

- **From closed to open innovation**:

  - research institutes + public administrations + innovation centers linked to market: this can drive the change;
  - small local companies can make the difference even on global markets if they learn to work in cooperation and commend their shared know-how.