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Brennerautobahn AG

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The «green» evolution of motorway traffic

Reducing the environmental impact
of traffic through smart solutions: the
BrennerLEC project

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THE «BRENNER LOWER EMISSIONS CORRIDOR» PROJECT

Partners	A22 (coordinator) APPA - Provincia Autonoma di Bolzano APPA - Provincia Autonoma di Trento Università degli Studi di Trento CISMA IDM Südtirol / Alto Adige
Duration	01.09.2016 – 30.04.2021
Overall budget	€ 4.018.005
Eligible budget	€ 3.311.365
LIFE co-financing	€ 1.922.772 (approx. 60% of the eligible budget)

LIFE is the EU programm for **environment** and **climate** for the period 2014-2020. It's a tool of direct financing: funds are directly allocated by the **European Commission**



BACKGROUND OF THE ENVIRONMENTAL ISSUE

Air quality

Increasing pressure to improve **the air quality level**, especially next to the most anthropized areas

Climate changes

Increasing pressure to reduce **greenhouse gases emissions** produced by the transport sector



Alpine Convention: need to
**best use the existent
infrastructure** in order to
safeguard the territory



Search for a **new sustainable balance**
able to fulfil the perspectives of
strategical development of the
Brenner corridor

THE «BRENNER LOWER EMISSIONS CORRIDOR» PROJECT



Objectives

To develop a «**Low Emissions Corridor**» concept to be applied to the A22 by means of the experimental and scientific study of an **integrated set of dynamic policies** to manage traffic on the basis of a **proactive logic**

To define the **modalities to exploit the concept to the whole Alpine corridor («Alpine BLEC»)**

AlpineBLEC: Kufstein (A) - Affi (I)



THE «BRENNER LOWER EMISSIONS CORRIDOR» PROJECT



Objectives

- maximum environmental benefits,
- minimum inconvenience for users,
- optimal use of the existent infrastructure
- maximum safety level

AlpineBLEC: Kufstein (A) - Affi (I)



EXPERIMENTAL POLICIES

BLEC-ENV - Bolzano North– Rovereto South (approx. 90 km)

Policy	Dynamic management of the motorway capacity	
Measures	Speed limits reduction	<i>Days with heavy traffic flows</i>
	Hard shoulder running	<i>Highly saturated traffic conditions</i>

PHASE 1 (from March 2017 to May 2018)

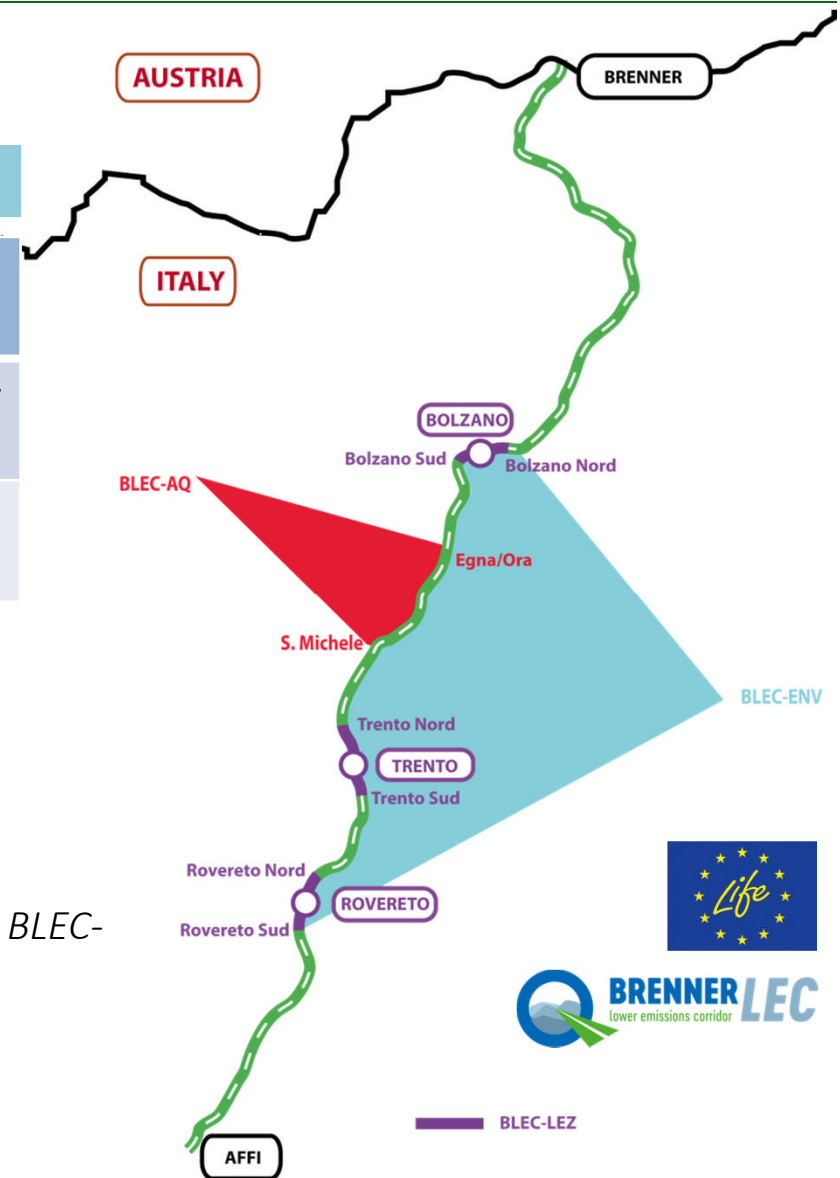
First tests with dynamic speed limits and temporary use of the emergency lane on a reduced section of the BLEC-ENV stretch

PHASE 2 (from March 2018 to December 2019)

Extended assessment of dynamic speed limits along the whole BLEC-ENV stretch

PHASE 3 (from Octobre 2019 to April 2021)

Final assessment of the combined policies



EXPERIMENTAL POLICIES

BLEC-AQ - Egna/Ora – S.Michele (approx. 20 km)

Policy	Dynamic management of speed limits for environmental purposes	
Measures	Speed limits reduction	<i>Presence of high concentrations of pollutants in the air</i>

PRE-PHASE (February 2017)

Testing users' and the system reactions (to prepare Phase 1)

PHASE 1 (from March 2017 to February 2018)

Testing the efficiency of speed reduction from 130 km/h to 100 km/h (on an NO2 average value)

PHASE 2 (from March 2018 to February 2019)

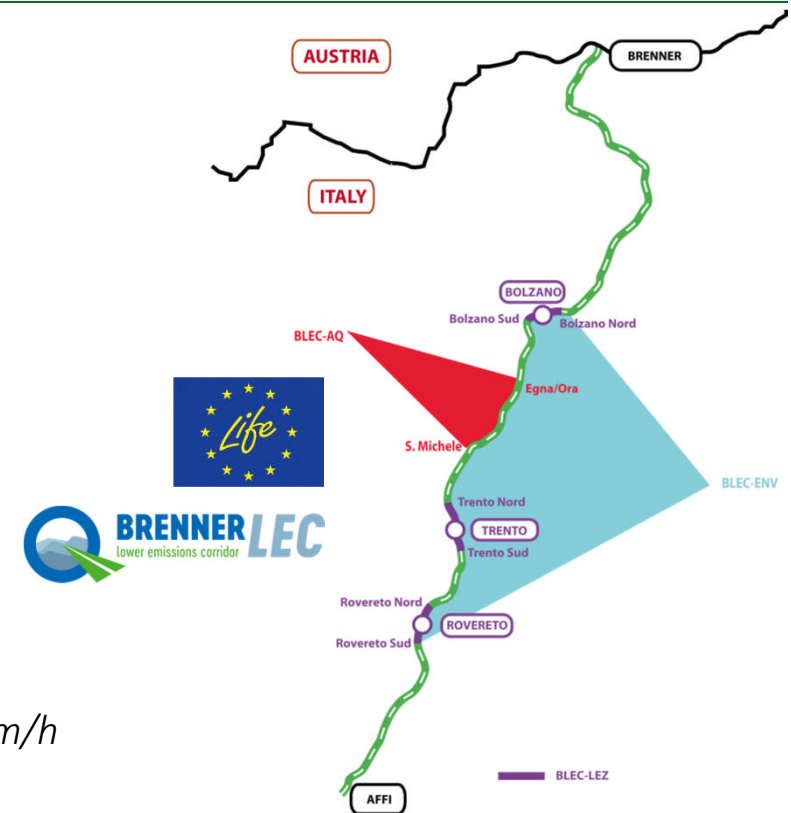
Testing the efficiency of speed reduction from 130 km/h to 110 km/h and to 90 km/h (or other combinations) and comparison

PHASE 3 (from March 2019 to September 2019)

Speed management according to the air quality conditions measured (reactive system)

PHASE 4 (from October 2019 to April 2021)

Speed management according to the air quality conditions foreseen (proactive system)



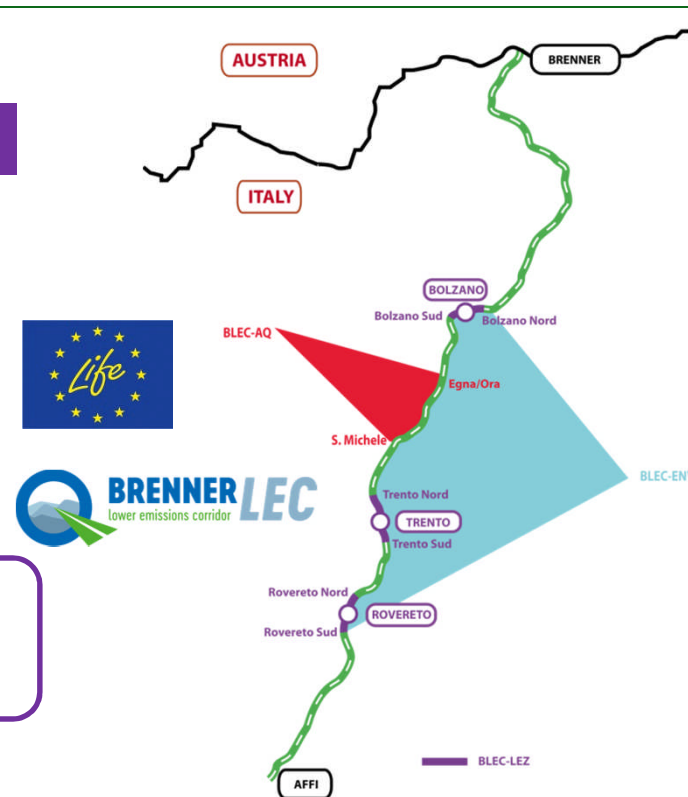
EXPERIMENTAL POLICIES

BLEC-LEZ - Urban motorway stretches: Bolzano, Trento and Rovereto

Policy	dynamic integrated traffic management (together with town authorities)	
Measures	Use of VMS with dynamic suggestions to get access to the town	<i>Traffic disturbances in urban areas</i>



Real-time analysis of **travel times** on **National Road SS12**
and monitoring of possible dangers due to extreme
motorway traffic onto the sub-urban network



PHASE 1 (from April 2017 to March 2018)

Interaction among traffic management centres with shared management of traffic flows in order to publish information about traffic-related events (via VMS)

PHASE 2 (from April 2018 to October 2019)

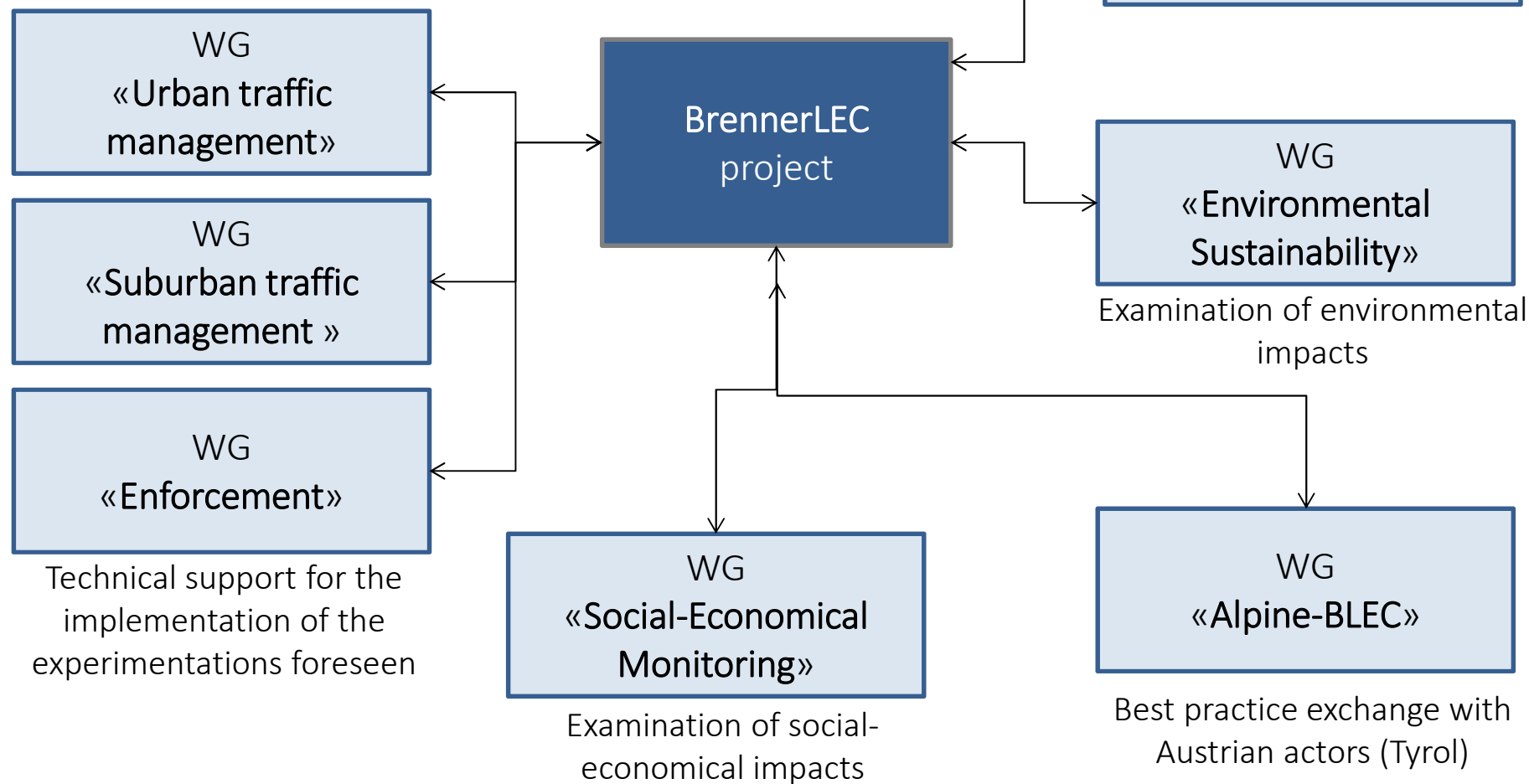
Technological integration of traffic management centres (automatic traffic data sharing in order to advise users on alternative routes)

PHASE 3 (from November 2019 to April 2021)

Creation of dynamic corridors for the most polluting vehicles needing to cross urban areas

Actions plan (supporting actions)

Stakeholders involvement



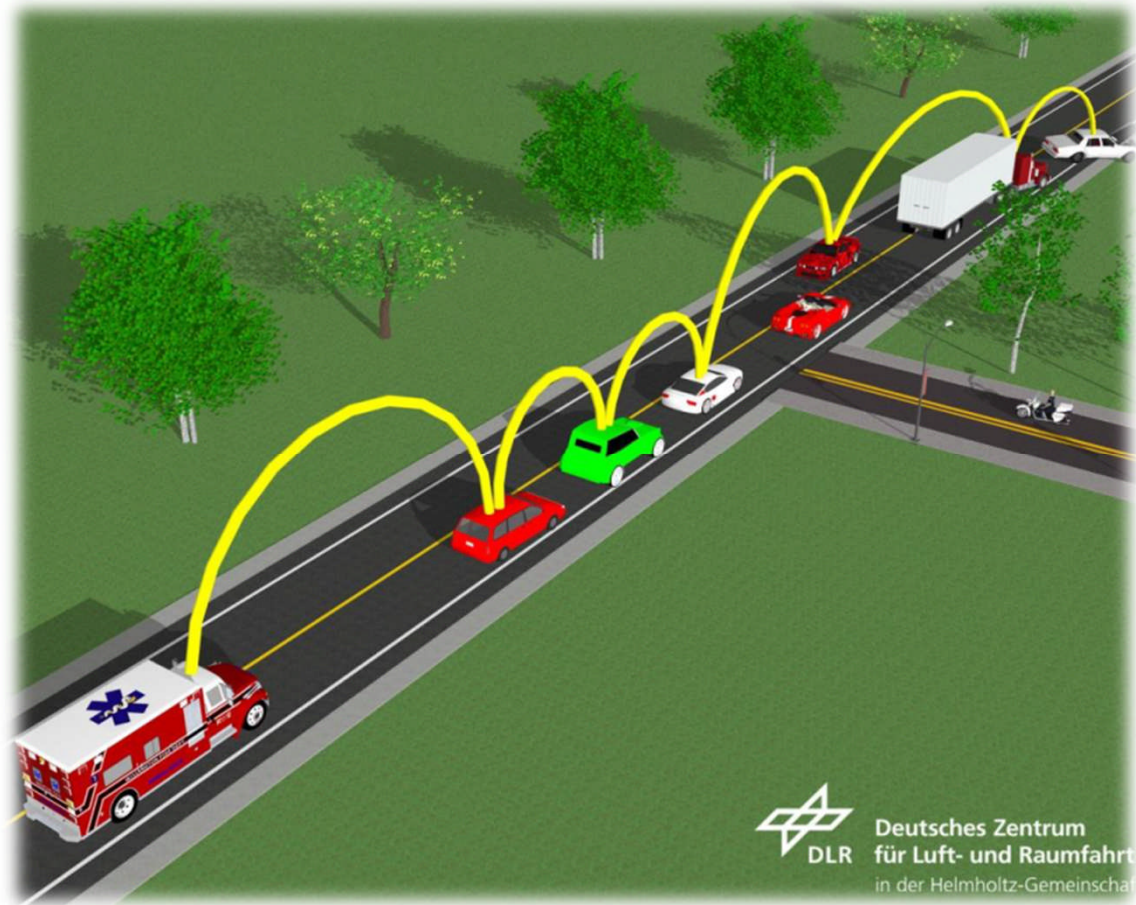
Possible synergies with C-ITS solutions to reduce the environmental impact

C-ITS

Cooperative «intelligent» transport system (ITS): system in which the «technological intelligence» is **shared** among all elements and actors of a transport system

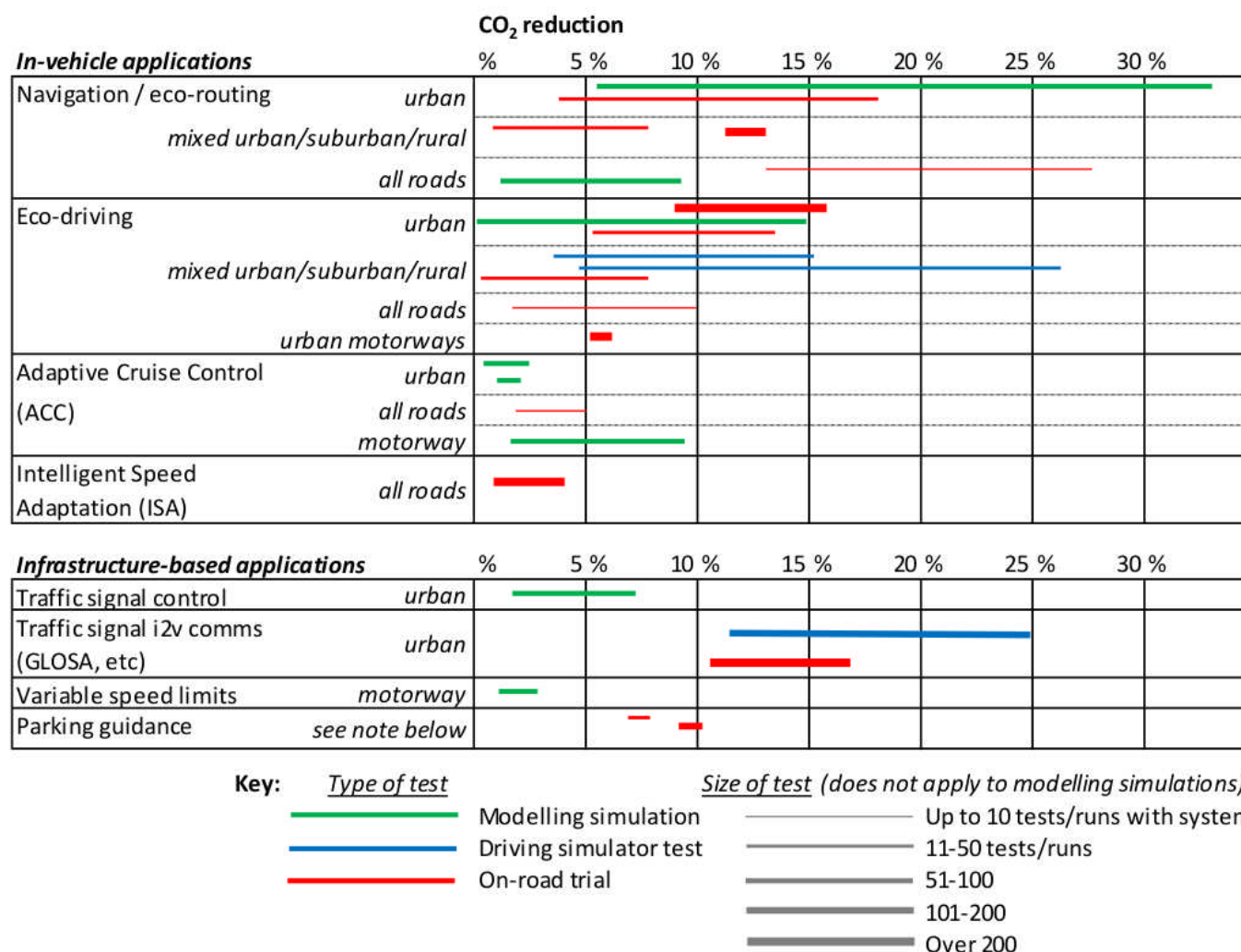
Shared cognitive intelligence: all actors are informed in real time on what is occurring around them and have a very wide «*range of view*»

Shared decision intelligence : the system objectives are shared and accepted by all road users





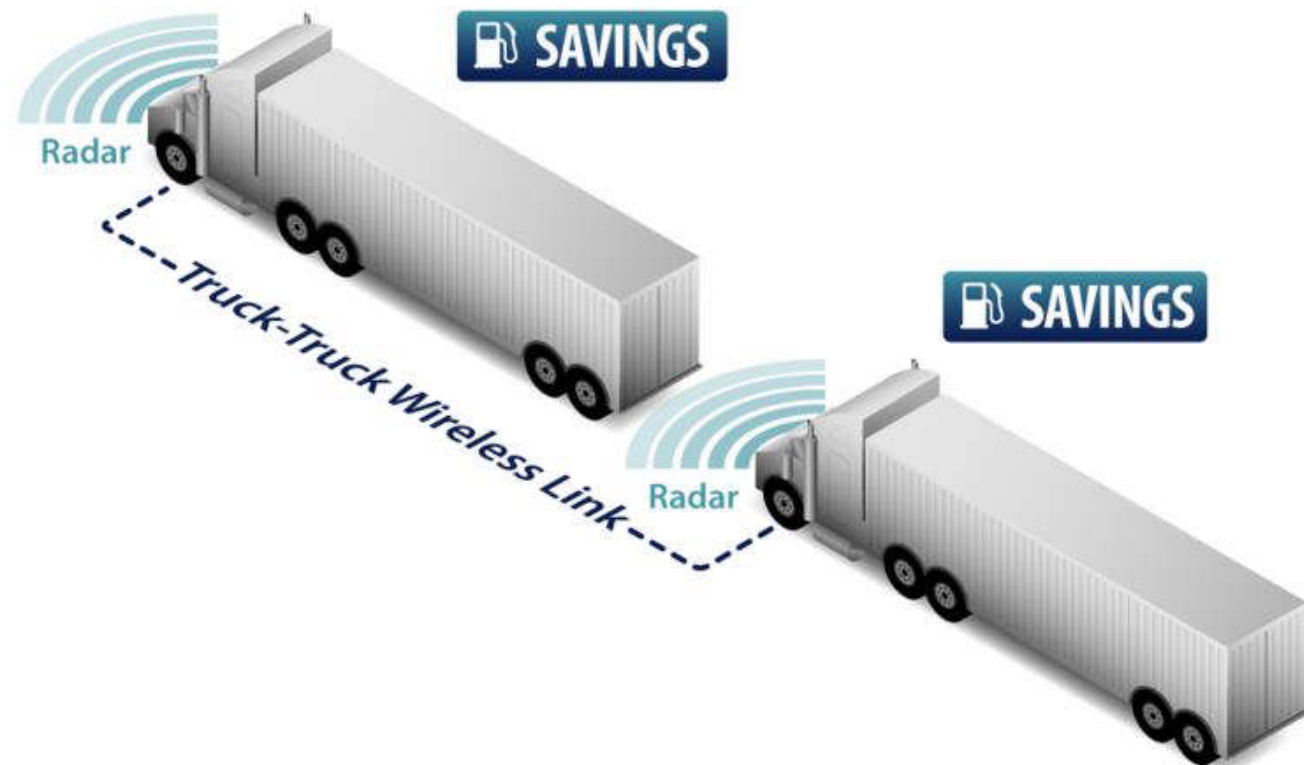
Do C-ITS generate environmental advantages?



The experimental results achieved through the VSL application only refer to dynamic traffic management scenarios applied to interurban sections with 90 km/h speed limit, aiming at maximizing the road capacity

Do C-ITS generate environmental advantages?

The maximal environmental benefits will be achieved when cooperative systems will be fully integrated with autonomous driving systems



«Truck platooning» applications: reduction up to 1-8% of CO2 emissions for the «lead» vehicle, and up to 7-16% for the «follower» vehicles

Source: ERTICO: "Study of Intelligent Transport Systems for reducing CO2 emissions for passenger cars", Sep. 2015

Future synergies with C-ITS initiatives along the A22

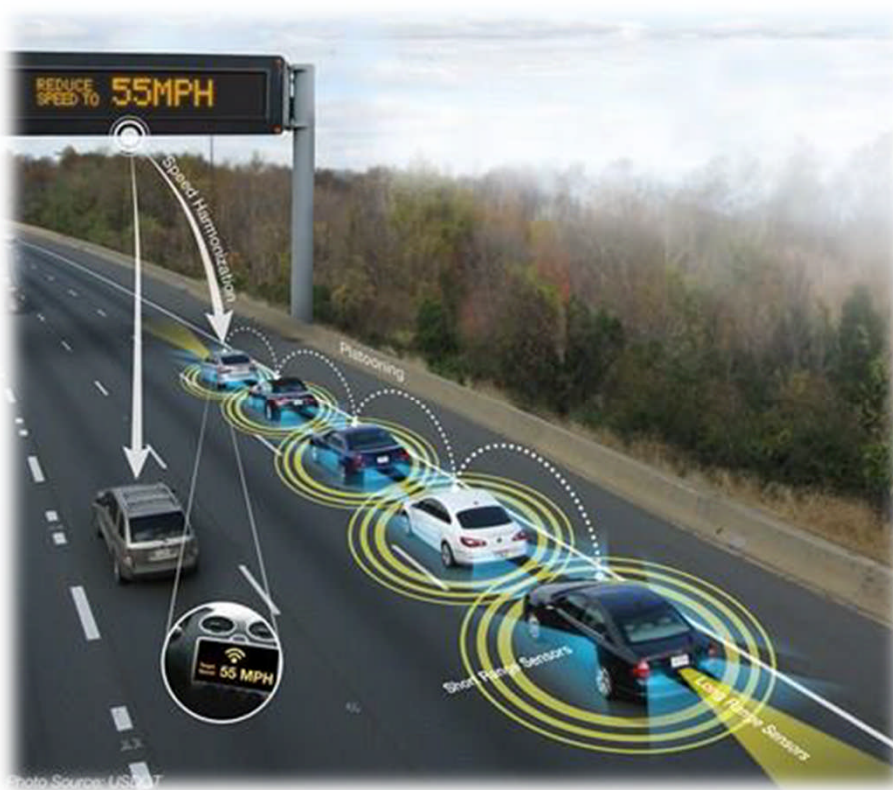
DRIVEC2X (2011-2014): tests
with cooperative vehicles

COOPERS (2006-2010): first tests
of «vehicle-infrastructure»
communication technologies (V2I)

C-ROADS ITALY (2017?): pre-
deployment of cooperative
systems in Italy, harmonized
with similar initiatives in
Europe

Among them: platooning,
highway chauffeur for cars and
set of C-ITS applications «Day
1» and «Day 1.5»

C-ITS services «Day 1»



Hazardous location notifications:

- Slow or stationary vehicle(s) & **Traffic ahead warning**
- Road works warning
- Weather conditions
- Emergency brake light
- Emergency vehicle approaching
- Other hazardous notifications

Possible synergy
with the «B3» policy

Signage applications:

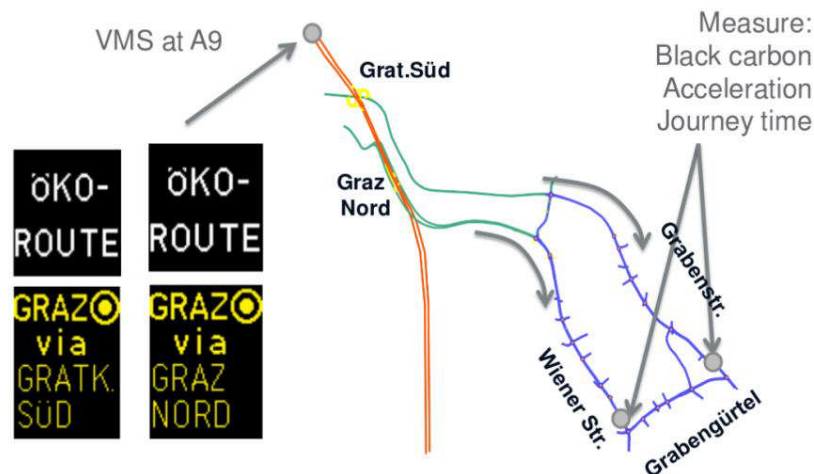
- **In-vehicle signage**
- **In-vehicle speed limits**
- Signal violation / Intersection Safety
- Traffic signal priority request by designated vehicles
- Green Light Optimal Speed Advisory (GLOSA)
- Probe vehicle data
- Shockwave Damping

Possible synergy with
the «B4» policy

C-ITS services «Day 1.5»

A further set of applications to implement right after the «Day 1» ones

Source: Martin Litzenberger (AIT): «CARBOTRAF: Preliminary results and lessons learnt from the CARBOTRAF project», secondo workshop progetto INTEGRREEN, Bolzano, 24.06.2014. Disponibile su <http://www.integreen-life.bz.it>



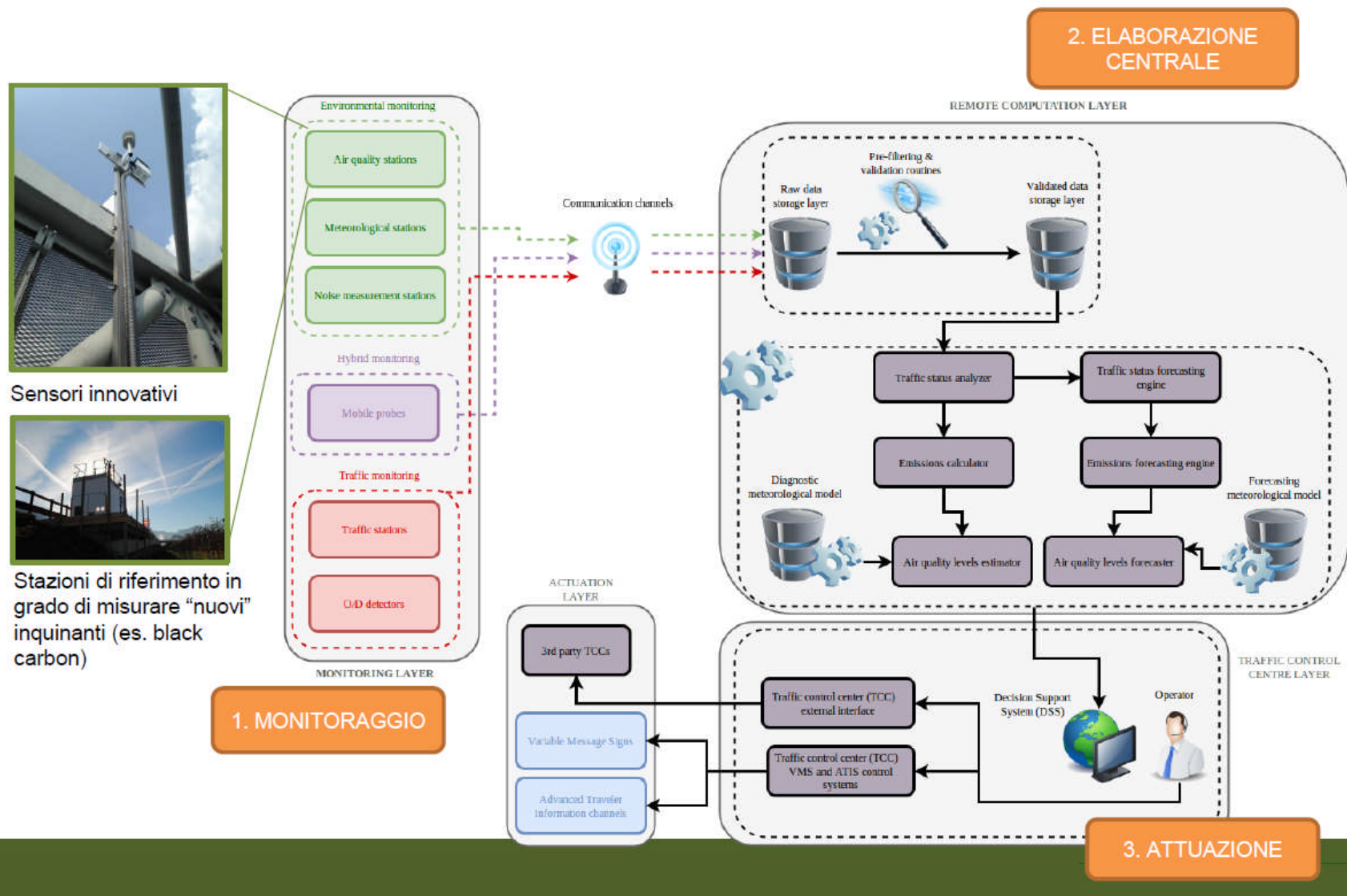
Information on fuelling & charging stations for alternative fuel vehicles

- Vulnerable Road user protection
- On street parking management & information
- Off street parking information
- Park & Ride information
- Connected & Cooperative navigation into and out of the city (1st and last mile, parking, route advice, coordinated traffic lights)
- Traffic information & Smart routing

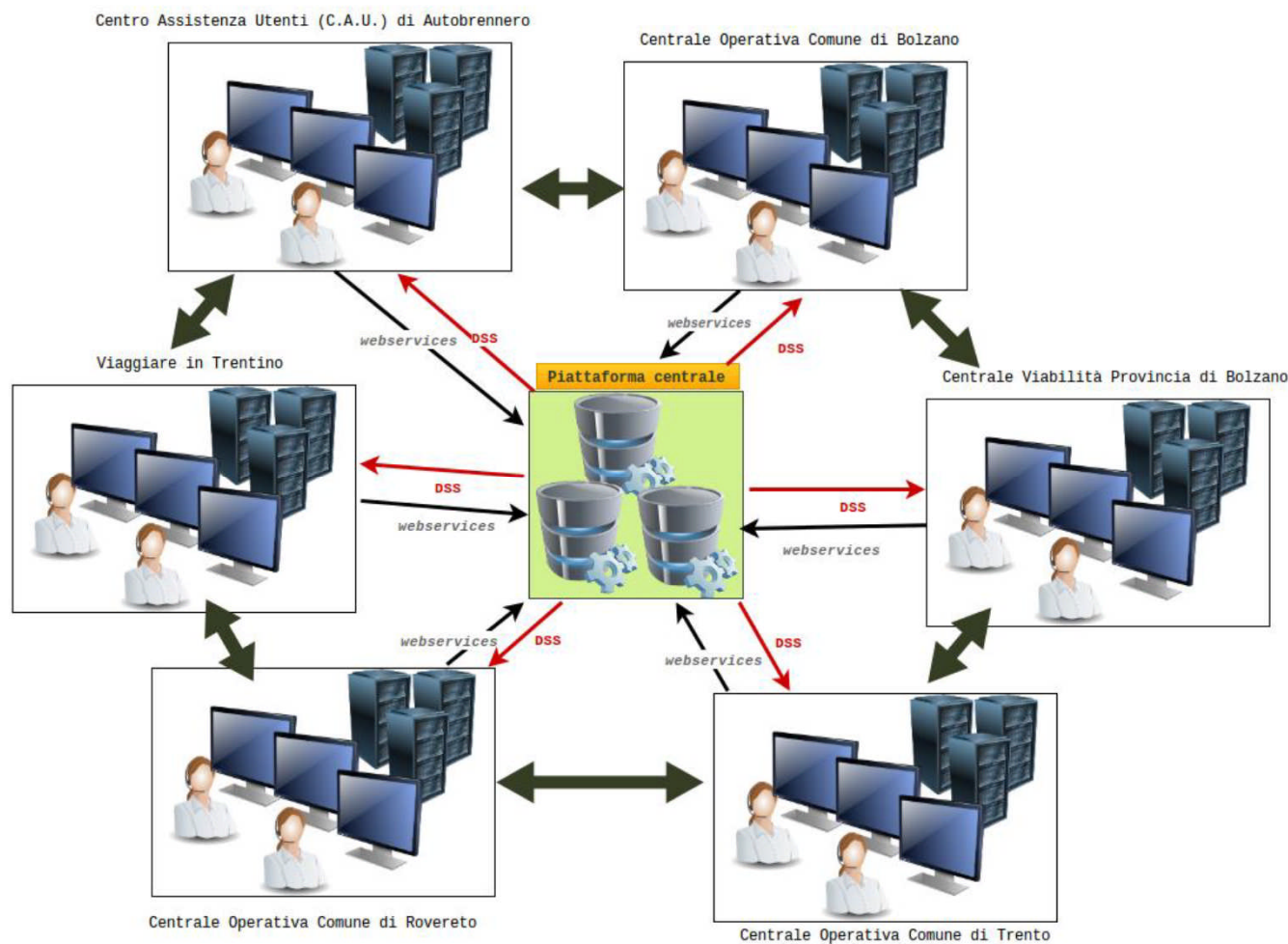
Possible synergy with the «B5» policy

Information already displayed along the motorway on traffic conditions in urban areas with possible recommendation on the «urban» exit

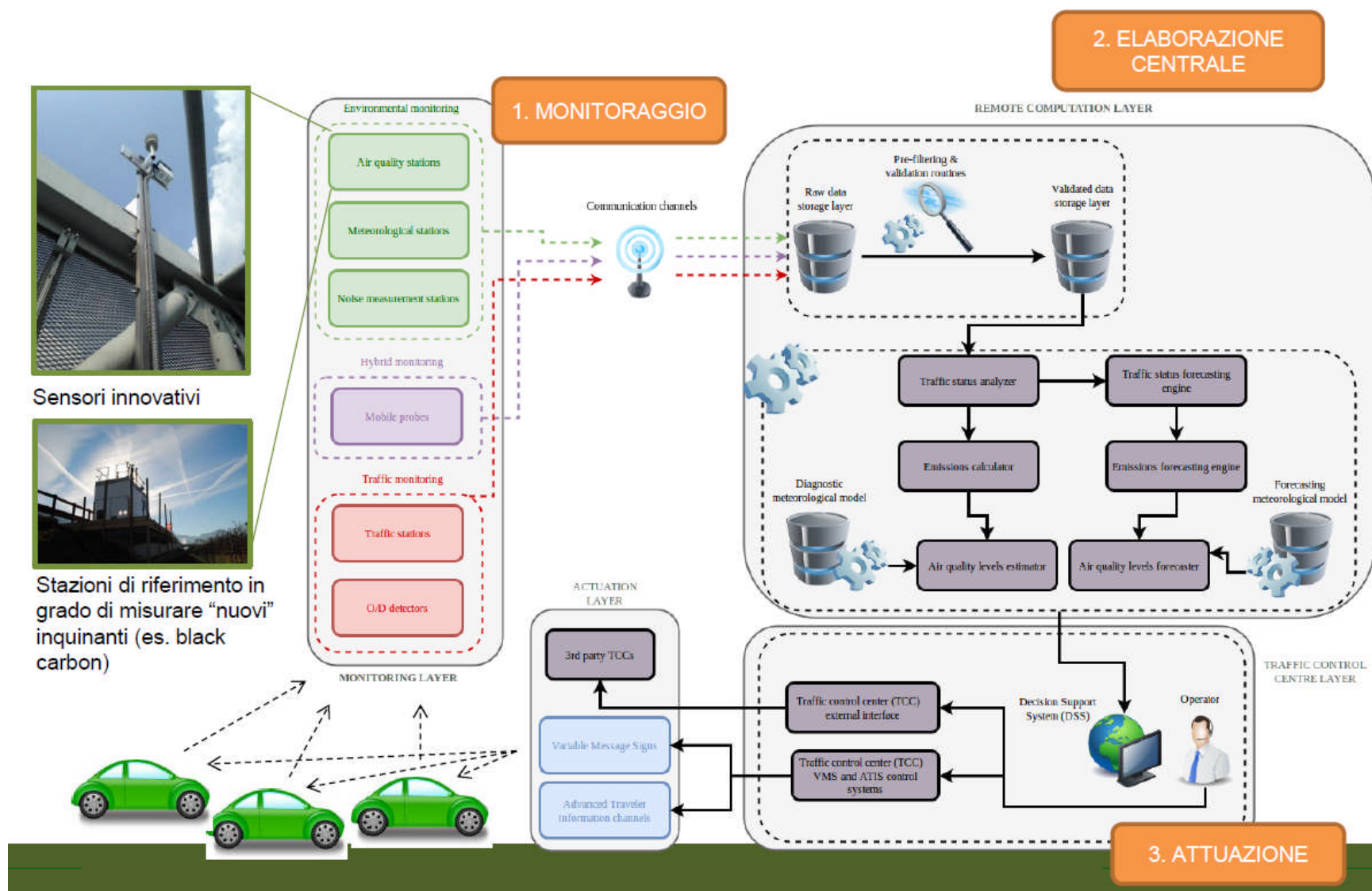
A «big data» platform as element enabling the development of these scenarios

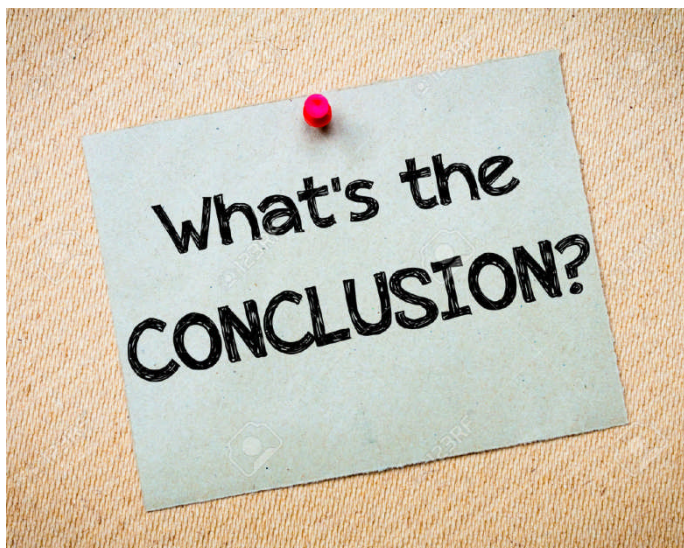


Data not only from the A22 traffic management centre



The C-ITS evolution





- ☐ «Digitalization» in the transport system (ITS / C-ITS) is able to also generate positive effects on environment
 - ☐ The A22 is getting one of the road infrastructures on which the roll-out of C-ITS systems in Italy (and in Europe) will begin
 - ☐ The application of these advanced technological scenarios referring to the experimental policies of motorway traffic management tested within the framework of the BrennerLEC project could increase the environmental effects and benefits expected
-
- ☐ The gradual introduction of automatic driving systems could solve, on the long term, the problem of the complete observance of dynamic speed limits
 - ☐ The «big data» platform developed within BrennerLEC will allow to easily implement the cooperative scenarios



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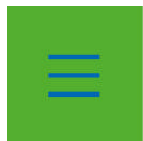

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