LIFE11 ENV/IT/000002
CLEAN-ROADS

Layman's Report

PROVINCIA AUTONOMA DI TRENTO

FAMAS SYSTEM

IDM SÜDTIROL ALTO ADIGE

THE CLEAN-ROADS PROJECT

CLEAN-ROADS is a project that aims to introduce, thanks to technologies, a new way to manage road safety during the winter season.

The aim is to deepen the impact related to the use of road salt on the local environment, and suggest new methodologies in order to use this resource more wisely and aware of its environmental impact.

CLEAN-ROADS tackles the environmental pollution caused by anti-icing salt used for winter road maintenance

The initiative, co-funded at about 50% by the **LIFE+ programme** of the **European Commission**, started on September 1st 2012 and has concluded on June 1st 2016.

Salt has notably positive effects for both preventive anti-icing treatments and during snowfalls, in order to prevent the formation of ice on the roads and to reduce the permanence of snow on the roads. On the other side, it has a negative impact on the environment and is a cause of the corrosion of vehicles and road infrastructures. The project started on top of these premises with the goal to support the experience of road operators with an automatic data collection and elaboration system which can support them during their daily road maintenance activities.

CLEAN-ROADS has developed a technological decision support system for the road maintenance activities with the goal to improve the current winter practices.

The **Autonomous Province of Trento** – in particular its Road Management Service, which is governed by the Department for Infrastructures, Mobility and Environment – in cooperation with its Environmental Agency and the Risks Prevention Service, and together with the South Tyrolean company **FAMAS System** and **IDM Südtirol/Alto Adige**, has introduced a new road conditions monitoring system on a test area of road **SS12, from Lavis up to the northern boundary**, with the goal to assess the potential for improving efficiency and safety of the local winter road service maintenance.

METHODOLOGY

Thanks to the installation of **road weather stations** and an **environmental monitoring site** for air and water matrixes, CLEAN-ROADS is able to provide several information such as conditions of the road, air temperature, precipitation events, traffic levels, run-off waters quality and air pollution.

Not only: the system collects all this data in real-time, elaborates it and provides **short-term forecasts** that are useful for the road operators' team. In this way, it is possible to support their decisions on an objective basis, which is representative of the current situation. All this information is made available to road operators involved in the test activities thanks to a proper **web interface** and other **automatic notifications services** that allow them to be immediately advised about the presence of critical conditions in correspondence of one of the monitored points.

This development process has been carried out with the **precious cooperation of the whole road operators' staff**, which has been involved through specific moments of discussion and training sessions.

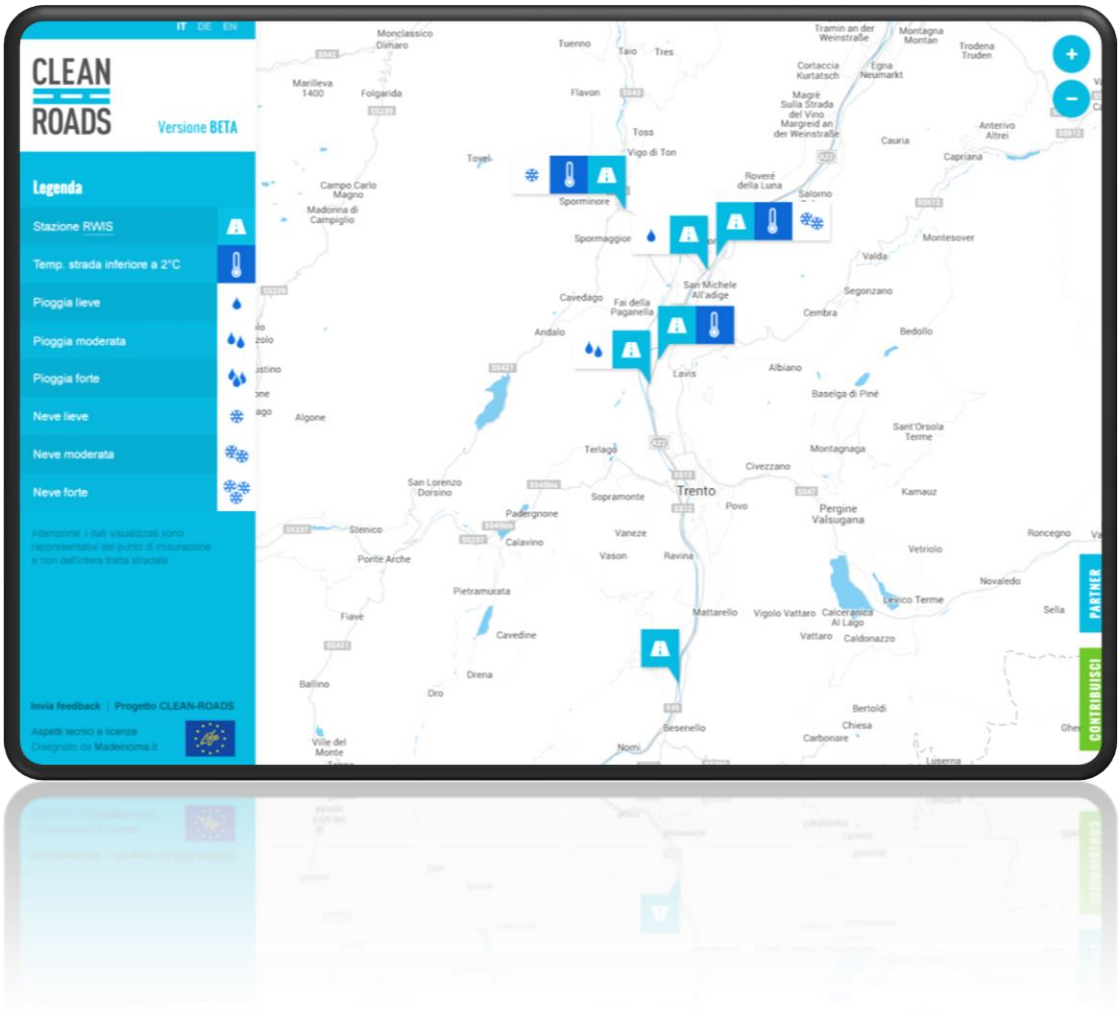
Technology can indeed very little if it is not supported by consolidated competences and acceptance of these new technological tools.

INVOLVEMENT OF TRAVELLERS

In order to improve the quality of winter road maintenance service, it is however necessary a better awareness and sense of responsibility by local drivers and travelers.

The project has started to create the conditions for an improvement in the travelling habits through the publication of the real-time information about road weather conditions in correspondence of the monitored sites in the test area. This information is available on the web portal "**Viaggiare in Trentino**" and on the web site map.clean-roads.eu which is optimized for the visualization through any Internet connected device (smartphone, tablet, PC).

Road users have been actively involved in the project even through public surveys that have involved more than 1.000 people, and other awareness-raising initiatives.



ENVIRONMENTAL IMPACT ASSESSMENT

Thanks to the air- and water quality environmental monitoring site, it was possible to appreciate in a more detailed way the impacts generated on the environment by anti-icing materials.

After being spread on the road surface, salt can be dispersed in air and/or in the aquatic systems, depending on the meteorological conditions after a road salting treatment. In absence of any precipitation event, salt is pushed in air in the form of particulate matter (PM) through the effect of wind and/or vehicular traffic. On the other side, in case of precipitation or roadside snow melting, salt is washed out and can reach the aquatic system on the surface, the aquifer layers, etc.

As far as the run-off waters' quality is concerned, the high concentrations of chlorides have been confirmed. The CLEAN-ROADS project has therefore put in evidence the necessity to reduce as much as possible the treatments which are followed by a rainy precipitation. This aspect has been already targeted in the test activities of the project and could be furthermore improved even thanks the introduction of other anti-icing products.

As far as air quality is concerned, the project has demonstrated that during the winter season the chlorine in air in part caused by the combustion of wood for domestic heating. On the other side, sodium, despite mainly related to road salting, is also produced by traffic

emissions and secondary particulates. The estimation of the contribution of road salting activities to the PM concentrations can not only be based on the measured concentrations of chlorine and sodium: an important result that could also bring to an improvement of current EU air quality policies.

ECONOMICAL BENEFITS

During three and a half pilot activities, it was possible to demonstrate that if correctly used, the decision support system implemented in CLEAN-ROADS can guarantee **resource savings in the order of 10-20%**, with optimization margins that are even much more higher if coupled with more advanced intervention procedures.

First cost / benefit analysis have moreover demonstrated that in about 10 years it could be possible to cover installation and maintenance costs of the system through the economic savings obtained thanks to a more efficient maintenance service: and all this without considering the negative externalities on the environment.

FUTURE PERSPECTIVES

The pilot activities are going to continue for at least the next three winter seasons, with the purpose to consolidate the preliminary results achieved and evaluate in a more careful way the extension of the system in other sensible areas of the road network of the Province. In this way, it could also be possible to further improve the system, and evaluate the use of new technologies that were already investigated, as for example mobile systems for the monitoring of the road conditions.