FAQ regarding the Project BrennerLEC

LIFE EU Project "Brenner Lower Emission Corridor"

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Frequently Asked Questions

The BrennerLEC project overview

Who are the project partners?

What are the main objectives of the BrennerLEC project?

Where is the project implemented?

When is the project implemented?

What environmental benefits can be achieved by reducing speed limits?

What disadvantages in terms of travel time result from respecting the current speed limits?

Is it better to reduce the speed limit of trucks or passenger cars?

How is air quality measured?

How were residents and road users informed?

Why implement dynamic management of traffic flows?

How were emergency lanes temporarily opened to the traffic?

Protecting the environment and improving public health with lower speed limits. Why?

Protecting the environment and improving public health with lower speed limits. How?

What is the purpose of intelligent road signs?

What type of participation is requested from road users?

What are the new dynamic speed limits? How are they applied?

Why does BrennerLEC experiment with dynamic speed management?

What are the determinants of the application of dynamic speed limits?

Which vehicles pollute the most? Trucks or diesel cars?

Do lower speed limits cause queues?

Why not just enforce the current speed limits?

How to guarantee speed limits are respected?

How are the road users informed of dynamic speed limits?

The BrennerLEC project overview

BrennerLEC is a contraction, short for Brenner Lower Emissions Corridor. The BrennerLEC project aims at making transiting vehicular traffic along the Brenner axis more respectful of the health of local populations and more compatible with local geographical characteristics to protect the Alpine areas traversed by the Brenner motorway.

It is an innovative project that plans to define how, where and when speed limits and other traffic management measures can be applied to obtain the greatest environmental and transport benefits with the smallest inconvenience to road users.

The three pillars of the projects are: dynamic speed limit management, dynamic lane usage and "intelligent" on-road signaling. The efficiency of these measures is evaluated in terms of their environmental, social-economic and traffic impact.

The project was approved by the European Commission on March 3rd 2016, it started in September 2016 and will conclude in April 2021. The overall budget allotted to the project was 4 million euro and is co-financed by the EU LIFE Program for a total amount of 1.9 million euros.

Who are the project partners?

The project is coordinated by Autostrada del Brennero S.p.A. (Brenner Motorway) and implemented in partnership with the environmental agencies of Bolzano and Trento, the University of Trento, CISMA (a local company) and NOI Techpark Südtirol / Alto Adige, which replaced IDM on 01.01.2019.

Each partner is of importance and contributes through specific competencies and knowledge within this field. The ambitious objectives of the BrennerLEC project are achieved through this fusion of team skills and experiences.

The description of each partner is summarized as follows:

- **Autostrada del Brennero:** the builder and operator of the A22 motorway since 1959 has ample experience in the management of a motorway in close vicinity to the Alpine environment and further experience dealing with the daily challenges of managing heavy goods and tourist traffic.
- **Environmental agencies of Trento and Bolzano:** the provincial authorities that control and manage air quality and are responsible for planning the environmental protection policies.
- **University of Trento:** an institution with scientific competence in the field of environmental engineering and specific strength in meteorology and mathematical forecasting models.
- **CISMA:** a local company specialized in environmental assessments as well as in the development and use of complex algorithms in the implementation of decision support systems.
- **NOI Techpark:** a technological innovation center that supports the local industries and has specific competences in the "smart mobility" field as well as significant experiences in the management of EU projects.

Furthermore, the project is supported externally by a series of high value technical and strategical observers, through whose constructive contribution the success of the project will be promoted. Among them are the Environmental Ministry, the Transport Ministry, the Austrian motorway operator (ASFINAG) and Environmental Agencies of the regions Lombardy, Emilia Romagna and Veneto.

What are the main objectives of the BrennerLEC project?

Trentino - South Tyrol is an Alpine region with internationally recognized high standards in terms of landscape and nature. The region comprises approximately 1 million residents and over 7 million tourists per year (source: ASTAT 2014). It possesses the road and rail infrastructure necessary to grant the free circulation of people and goods between Italy and North Europe. The environmental pollution caused by the traffic crossing the narrow Alpine valleys are of major importance, as are the health risks related to it. This difficult coexistence between environmental protection and free circulation of people and goods represents a particular challenge for the road transport sector. The emissions of atmospheric pollutants and greenhouse gases as well as the noise produced by traffic force us to act concretely and rapidly in order to guarantee, in a short period of time, a level of air quality in line with European norms and a better quality of life for the residents of the local population.

The BrennerLEC project is co-financed by the EU funds allocated for nature conservation and environmental protection. Its priority is to increase the environmental compatibility of road traffic along the Brenner corridor.

BrennerLEC aims at being a "win-win" project as it follows environmental objectives (better air quality and reduction of greenhouse gases and noise) and at the same time tries to achieve a more efficient transport system (more transport capacity and safety).

The reduction of air pollutant emissions is pursued by means of the following strategies:

- Traffic flow management during situations of heavy traffic by combining dynamic speed limit reduction and dynamic lane activation strategies;
- Dynamic management of the maximum allowed speed limits according to air quality;
- Traffic flow management near the biggest urban areas by means of "intelligent" on-road information.

Where is the project implemented?

The project is carried out experimentally on the A22 motorway stretch between Bolzano North and Rovereto South and aims at acting as prototype for the extension of management techniques to the whole Alpine motorway section. The test section is 91 km long and will host the following specific experimentations:

1. Dynamic speed reduction will be experimented on the southbound carriageway of the whole section to optimally manage traffic peaks and avoid, as far as possible, queue building and "stop&go" phenomena as well as other traffic flow disturbances.
2. Dynamic lane management will be experimented on the southbound carriageway between Trento South and Rovereto South (approx. 23 km) to understand how to optimize its use in combination with the management of the dynamic speed limit.
3. Dynamic speed reduction will be experimented along the motorway stretch between Egna and San Michele all'Adige (approx. 10 km), on both carriageways, to reduce the atmospheric pollution aiming at preventing situations where European limit values are exceeded.
4. Intelligent on-road information/signaling techniques will be experimented, near the urban areas of Bolzano, Trento and Rovereto, in collaboration with the local municipalities, to better distribute traffic flows to routes and reduce the environmental impact.

When is the project implemented?

The project started in September 2016 and will end in April 2021. The infrastructures and the devices needed to carry out the experimentations and to monitor the effects were prepared during the first three months. The first tests started in February 2017 on reduced

motorway stretches. With each month, these experimentations were conducted more frequently in order to be able to collect the necessary amount of information to successfully plan the following phases.
Starting from April 2018 tests were carried out on all experimental stretches with the objective of completely quantifying the environmental and traffic benefits and prepare everything that is needed to start the final test phase. Starting from October 2019 the plan is to implement all complete measures on all experimental sections. In this phase all methodologies and modalities of application of the dynamic measures will be fine-tuned in order to optimize the effects. The aim is to have, by the first months in 2021, an active, tested and optimized system that can be also exploited in other stretches of the Alpine corridor, in particular along the A22 motorway stretch Brenner – Verona.

What environmental benefits can be achieved by reducing speed limits?

Less pollutant emissions, less fuel consumptions, less noise, and increased road safety. The most relevant benefit in terms of air pollutant emissions can be determined by considering diesel passenger cars which characterize the highest NOx emission factors. By passing from 130 km/h to 100 km/h, a EURO 5 diesel car releases on average **30% less nitrogen oxides and 16% less CO_2**, allowing at the same time a relevant fuel saving. These data of potential reduction have been extracted from the most recent version of the COPERT calculation method.

What disadvantages in terms of travel time result from respecting the current speed limits?

In case of heavy traffic, speed reduction allows to reduce queues and therefore it tends to reduce travel time rather than increasing it.
In case of critical situations for atmospheric pollution speed limit reduction actually increases travel time. But what does it mean concretely?
Even if it is not possible to define a priori which would be ideal speed to use for dynamic speed management strategies, it is however already possible to assume a reference speed of 100 km/h. Therefore, in case of atmospheric pollution a reduction of 30 km/h on limited motorway sections (in the experimental project it is about approximately 10 km between Egna and San Michele) applied for a limited period of time will effectively determine an increase of the travel time for a large part of motorized users.
In the specific case of the BrennerLEC project, this would mean to spend about 83 seconds more for each journey (which is at least 1 hour long for most of the users). In this context, a concrete contribution for the environment costing 83 seconds from time to time can certainly be considered a collective benefit instead of a personal disadvantage.

Is it better to reduce the speed of trucks or that of passenger cars?

The maximum allowed speed limit for trucks is 80 km/h. The truck engines have been designed and optimized on this commercial speed. By reducing then the operational speed of these vehicles in normal conditions (i.e. on a flat road), does not result in any positive effects, instead there is a probable worsening of emissions.
This is not the case for cars as their optimal speed (as far as consumptions and emissions are concerned) is usually 80-90 km/h. From a logical point of view, heavy goods vehicles should then constantly travel at 80 km/h and cars at 90 km/h (primarily to grant overtaking

maneuvers). This ideal configuration cannot be reproduced in real conditions. However, trying to have constant and regular traffic flows is one of the primary objectives in order to optimize fuel consumptions, reduce emissions and increase transport capacity as well as users' safety.
Two important aspects can be then deduced from these considerations:

1. The reduction of the maximum allowed speed has effects only on vehicles that can travel at speeds higher than 80 km/h. Almost all heavy goods vehicles are therefore excluded from this measure.
2. The regularity and homogeneity of traffic flows play a crucial role as they tend to reduce acceleration and deceleration situations (which can cause a relevant increase of emissions and of the risk of accidents).

How is air quality measured?

Air quality measurements are regulated at a European level by the directive 2008/50/EC and at national level by the legislative decree 155/2010. These norms prescribe the modalities on how, where, by means of which tools and with which detailed configuration the data related to the concentration of pollutants foreseen by the norms must be collected. All these regulations grant then a remarkable homogeneity at European level and allow a comparison of the different situations. In the specific case of the regional stretch of the Brenner motorway the air quality has been measured for several years in two points, i.e. near Bressanone and Ala. Measurements are carried out by the respective Environmental Agencies. The data collected here is directly comparable with those collected in other regions and other EU countries. The data registered in our region is perfectly consistent with the surveys carried out by other authorities for environmental protection and shows extraordinarily similar values to the historical trends. Within the framework of the project, several measurements will be carried out by means of innovative systems (even if they are not recognized by law) in addition to three newly installed measurement stations along the motorway border. This will allow us to obtain all necessary additional sources of information to determine in detail the situation of the air quality next to the motorway infrastructure and in particular near the buildings located next to the traffic flow. This assessment will be supported also by the most modern model techniques to evaluate the pollutant dispersion in order to obtain a complete overview on the whole territory involved.

How are residents and road users informed?

It is particularly important to communicate with the parties directly affected by this project, namely the motorway users and the resident population. The two parties are often counterparts but sometimes the same person could find himself on both sides. The dialogue with this group of individuals is made possible through various means, but primarily through multimedia channels, and the printed media. Another group of individuals with whom it is necessary to have a dialogue is the local governmental authorities (municipalities, mountain and valley communities) and associations (economic and environmental associations). With these last groups, dialogues are organized in a way that allows for a constant exchange of ideas and requests.

Why implement dynamic management of the traffic flows?

It is common for people to have to queue and wait for more than an hour before they can continue their journey. Other times people almost experience muscle cramps due to the

repeated use of the friction and the brake pads under stop&go conditions. It is even more common for people to find themselves in an intensive traffic flow which requires a high level of attention to keep the proper safety distances from vehicles that brake or appear suddenly in front of their vehicles. As motorway users we are prone to all these situations which sometimes, unfortunately, lead to a traffic accident. They are not only unpleasant and dangerous, but also negatively impact the environment. In fact, there is nothing worse than to travel under stop&go conditions, i.e. succession of braking and accelerating, because in these conditions the emission of pollutants and the fuel consumption increases considerably. Managing these situations requires a reduction of the environmental impact as well as increasing the capacity of the motorway and the safety of the drivers: all positive aspects. BrennerLEC is using two measures to achieve this scope: the dynamic speed management on a stretch of the motorway and the dynamic use of the emergency lane. The former has priority over the latter.

Without entering in the technical details, it is obvious that with the lower speed levels the distance between the vehicles is reduced, so more vehicles fit on the same motorway; this increases the traffic capacity of the motorway. With a homogenous traffic flow (lesser difference of speed between traveling vehicles) the event of changing lanes is reduced as well as the acceleration and braking which are generating the queues. In some situations of intense traffic, reducing the speed limit increases the traffic capacity, reduces the formation of queues and increases road safety.

How are emergency lanes temporarily opened to the traffic?

To temporarily open the emergency lane to traffic requires the use of adequate road signs and the development of preventive activities for securing the stretch. It is not currently achievable in a short period of time. BrennerLEC would like to enhance the efficiency of this measure: on one hand, to harmonize the temporary opening of the lane with the dynamic speed management; on the other hand, to use of the newest traffic flow forecasting tools. It is quite intuitive to assume that an increase of traffic lanes allows the absorption of a higher volume of traffic. However, the problem arises from the decrease in traffic volume once the additional lane ends. The motorway is currently equipped only in the south bound stretch between Trento South to Rovereto South therefore this type of measure is efficient when a significant amount of people want to use the exit to Rovereto South (i.e. to go to the Garda Lake). BrennerLEC would like to experiment with this type of management first along the 25 km long test stretch before extending the lane south until the intersection with the A4 motorway or north until Bolzano South.

Protecting the environment and improving public health with lower speed limits. Why?

During the summer, when the sun is shining, and the wind guarantees a continuous exchange of air, the masses of air at the bottom of valley are mixed well and the air pollutants are diluted in an optimal way. In situations of thermal inversion (especially during the winter) this natural air exchange is very limited if not absent. At the bottom of the valley, the exhausts are concentrated and the inhaled air has a high concentration of air pollutants.

For this reason, along streets with heavy traffic flow, especially along motorways, the situation may emerge in which the nitrogen dioxide emission level is exceeded and high levels of other air pollutants, deriving from traffic, are observed. The presence of air pollutants is of particular concern and the European Union has established limits, which once exceeded indicate a potential risk for human health. Among these effects are the acute and chronic pathologies of the respiratory and cardiovascular systems as well as the related rates of premature mortality. For these reasons, lowering the maximum speed limit is a concrete and efficient way to protect the environment and human health.

Protecting the environment and improving public health with lower speed limits. How?

BrennerLEC is efficiently testing the effects on the air quality of lowering the maximum speed limits to develop an "intelligent" system that prevents the most problematic situations at an daily and annual basis. Contrary to recent years, the modern informatic devices allow us to obtain information in real time from multiple sources and elaborate meteorological and traffic forecasts in very short timeframes. The combination of these two forecasts provides us with the necessary information to predict, with enough time in advance, the occurrence of critical situations which require an intervention to help reduce the air pollutants produced by traffic. The scope is to intervene in the management of vehicular traffic flow by introducing lower speed limits before air pollutants reach high concentrations levels. This system is defined as "dynamic speed management system," which has been successfully tested in Austria although in a different manner. This new system will be tested in the 12km long experimental area with the plan to expand it to the whole alpine section of the A22 motorway (where needed) and to harmonize it with the system already present in Tyrol.

What is the purpose of intelligent road signs?

In moments of main road traffic congestion, there arises the necessity to notify motorway users in real time to allow them to make better informed decisions on the route to take. This notification often has to be coordinated between different road operators.

The objective of BrennerLEC is to allow the information systems used by A22 "to talk" to those utilized by Bolzano, Trento and Rovereto. To talk does not mean to "see" solely the information other operators provide in the message panels but to establish a dialogue between the operators. The scope is to give coherent information on how to regulate and decongest the traffic flow in the cities and give alternative routes towards the motorway to prevent potential congestion on the regional road network.

BrennerLEC provides a progressive perfecting of those systems and at the same time the monitoring of the traveling times on the motorway stretches and alternative routes (particularly SS12). The final objectives are to control the traffic flow in a way that avoids congestion in the access routes to cities, to notify users of ideal alternatives by signaling in real time the exits that prevent long queues, and to indicate the closest park&ride and public

transportation locations. The monitoring of the traveling times and the real time communications with users should discourage the tendency to leave the motorway and enter regional streets or transit residential centers along the SS12.

What type of participation is requested from road users?

One of the BrennerLEC project objectives is to enhance the responsibility of the motorway users. It attempts to develop higher awareness of drivers through topics such as road safety, level of service and traffic-induced environmental impacts. Users usually prefer being able to move on the motorway without inconveniences, regardless of environmental and traffic conditions. The use of this service has also an impact on the environment in terms of noise and emission pollutants. The mitigations are not only responsibility of the motorway operator (through methods such as using asphalt rubber pavements to absorb noise) but also of users (through speed, acceleration, driving style). It is believed that through a high driver's awareness and the adoption of precise rules situations could better for all and result in a synergetic positive results in various areas of interest, namely less fuel consumption, less pollutant emission, less noise, better road safety, and better traffic flow. At the end, part of the success of the BrennerLEC project depends on the acquired level of awareness and acceptance by the community of motorway users.

What are the new dynamic speed limits? How are they applied?

The BrennerLEC project experiments with lowering the speed limit both to reduce the queues in periods of high-volume traffic and reduce the environmental impact. If neither of these objectives are achieved, then the standard speed limits remain enforced.
To summarize, the testing stretches of the dynamic management system are two:

- the first, aims to avoid queues in a stretch of 91km in length (from Bolzano North to Rovereto South) and involves the south bound carriageway only. On this stretch, in conditions of high-volume traffic, the maximum speed limit is lowered to a speed limit determined ideal for the specific condition. High-volume traffic is usually indicated with a red or black mark and happen only during certain days of the year (an estimated 50 days a year);
- the second, aims to reduce the environmental impacts in a stretch of 12km in length (from Egna to San Michele) and involves the carriageway in both directions. On this stretch, in conditions that particularly impact the air quality, the maximum speed limit is reduced to a speed limit that not only produces the best results in terms of air quality but also minimizes the disadvantage for motorway users.

Why does BrennerLEC experiment dynamic speed management?

The Province of Bolzano proposed, to the Italian Government, a reduction in the speed limits at certain stretches of the A22, in particular Bressanone (9 km), Bolzano (7 km) and Egna (12 km). The proposal included, a reduction of the current speed limit in Bolzano and Bressanone from 110 km/h to 90 km/h and in Egna from 130 km/h to 100km/h. These types of limits should be carried out in a dynamic way (i.e. in periods with high concentrations of air pollutants) with the scope to reduce the air pollutions in residential zones along the motorway. However, the traffic laws, as currently drafted, do not allow for a reduction in the maximum speed limit for environmental reasons. These speed limits were introduced in test conditions through a specific directive of the Ministry of Transportations.

BrennerLEC is an innovative project that aims at defining how, where and when speed limits and other traffic management measures will be applied to obtain the maximum environmental and optimal traffic efficiencies with minimum disadvantages for motorway users and the local economy.
Speed reduction tests fall under a broader strategy which will be harmonized with the other objectives set by motorway operators, specifically regarding road safety.

What are the triggers for the application of dynamic speed limits?

There are two reasons that could justify the reduction of the speed limits on the motorway:
- highly congested traffic
- highly compromised air quality

Both reasons are therefore generated independently from the will of the motorway operator.
In the first case, the lowering of the speed limit allows for an improvement in the capacity of the motorway, i.e. an increase in the amount of vehicles per unit of time, enhancing at the same time road safety. With this intervention we therefore want to actively minimizes the generation of queues, improve road safety and reduce the negative impacts on the environment.
In the second case, the speed reduction helps to reduce emission pollutants and improve air quality. When it is foreseeable that the meteorological and traffic conditions could provoke excessive speeds, above the limits set by law, the intervention will serve as a prevention strategy to reduce the emission pollutants. This intervention is aimed to act actively on environmental conditions which could risk the health of the population that resides near the motorway.

Which vehicles pollute the most? Trucks or diesel cars?

Normally heavy-duty vehicles are emitting more pollutants than passenger vehicles due to their heavier weight and therefore greater fuel consumption per kilometer traveled. However, this is not the case when analyzing the emissions of nitrogen oxides (or the pollutant for which there is a greater problem with exceeding emission limits). The improvements of the exhaust treatment system of heavy-duty vehicles in the last 10 years has allowed for a drastic reduction in the emissions of particulate matter and nitrogen oxides. The same cannot be said of passenger cars. The treatment systems for diesel cars were applied much later (5 years after trucks) and most car manufacturers did not respect the standard emission limits. When operating at high speeds, diesel engines of light vehicles, in particular cars of euro class 6, generate the same or more emissions levels than heavy duty vehicles (buses, trucks, etc.).
If we take into consideration all the transiting vehicles on the A22 and the results of the tests conducted by the BrennerLEC project, we come to the following conclusions: 36% of the NOx emissions are generated by heavy-duty vehicles, 46% by light vehicles and 11% by light commercial vehicles. Buses account for 8% of the pollution and the percentage contribution of motorcycles to emissions is negligible.
From this data, it is also evident that 57% of the nitrogen oxide emissions are produced by light weight vehicles which can travel with speeds up to 130 km/h.
This indicates that intervening on light vehicles is essential to obtain concrete environmental impacts.

Do lower speed limits cause queues?

On this topic there are different opinions. In fact, the studies and theories regarding traffic flow management indicate the opposite, or that a reduction of the speed limit, if done with the right techniques, produces a reduction in traffic flow turbulence and therefore decreases potential formation of queues.
Monitoring average travel times allows us to indicate, with the use of variable information panels, the optimal driving speed, which is of particular importance in conditions of heavy traffic, in which a reduction of the average speed improves traffic flow, prevents congestions and at the same time reduces the environmental impact. To obtain these positive effects, it is necessary that all the motorway users work together.

Why not just enforce the current speed limits?

To answer this question we can reference the recent Tyrolean experience and related air quality program. The reduction of the speed limit on the A12 in the Inn Valley led to a reduction in NO_2 air concentrations by 5% along residential areas. Respecting the standard speed limits would lead to an estimated reduction of NO_2 of 1%, as per Austrian calculations. According to the traffic analyses conducted by Autostrada del Brennero, passenger cars travel at an average speed of 126 km/h within the test section.
We can deduce that both measures have an effect (even if diversified in quantitative terms) and that the measures are complementary and not contradictory to one another. It is obvious that the success of the project, provided the measures, depend significantly on the level of acceptance and respect of the dynamic speed limits by motorway users. The A22 operator and the state police work actively together to achieve these goals by organizing speed limit controls. The main objective is to obtain a wide collaboration by users and limit the application of sanctions.

How to guarantee speed limits are respected?

It is obvious that the success of the project, provided the measures, depend significantly on the level of acceptance and respect of the dynamic speed limits by motorway users. The A22 operator and the state police work actively together to achieve this goal by organizing speed limit controls. The main objective is to obtain a wide collaboration by users and limit the application of sanctions.
During execution of the project, the speed of the vehicles is continuously monitored on the test stretches (also using innovative monitoring techniques). The data collected indicates the part of the motorway where users respect the speed limits and give indications for the implementation of harsher controls.

How are the road users informed of dynamic speed limits?

Motorway users are informed with the use of information systems already employed and principally with the variable message signs. During the project the presence of the panels has been expanded to guarantee the adequate and timely information of motorway users in all the possible situations. The correct and timely information of the motorway users on the activated speed limits is an aspect that is looked upon with particularly attention and precision. Every speed limit variable sign registers the exact time at which a speed limits are altered and when limits go back to being the standard speed limit.

Glossary

LIFE Program: financial tool of the European Union that aims at supporting projects on the European territory in order to promote environmental protection, nature conservation and climate safeguard. http://ec.europa.eu/environment/life/

Win-win: English expression indicating the sole presence of winners. In a broader sense, win-win refers to situations that are advantageous to all parties involved.

Dynamic speed reduction: system that allows for temporary need-based changes in the maximum speed limit of vehicles. Motorway users are mainly informed by means of remote and real time variable message signs.

Stop&go: This English expression is used specifically in the field of transportation to describe the continuous starting and stopping of traffic flows.

Inversion (meteorology): In meteorology, an inversion is a deviation from the normal change of an atmospheric property with altitude. It almost always refers to an inversion of the thermal lapse rate. Normally, air temperature decreases with an increase in altitude. During an inversion, warmer air is held above cooler air; the normal temperature profile with altitude is inverted. This prevents the air masses closest to the ground from mixing with those present in the upper layers, thus favouring the stagnation of the substances emitted into the atmosphere and the consequent increase in the concentrations of pollutants at ground level.

Nitrogen dioxide (NO_2): Nitrogen dioxide or dioxide is a red-brown pollutant gas with a suffocating smell. It is denser than air and therefore tends to remain at ground level. Being a strong oxidant it is irritant and has a toxic effect on humans and in particular on the eyes, mucous membranes and lungs. In particular, it is responsible for specific diseases of the respiratory system (bronchitis, allergies, irritation, pulmonary edema that can lead to death). Nitrogen dioxide can be considered one of the most dangerous air pollutants also because, in conditions of strong solar radiation, it causes secondary photochemical reactions and in particular the tropospheric ozone O_3 (which in turn is a highly irritating gas with health effects similar to those of NO_2). Moreover, as it turns into nitric acid in the presence of humidity, it is one of the causes of the formation of the so-called "acid rain", which causes considerable damage to plants and, more generally, alterations in the environmental ecological balance.
At regional level, the main source of NO_2 is vehicle traffic.
The limit value for health protection is set at 40 µg/m³ as an annual average.

Dynamic lane management: Unanticipated and temporary opening of the emergency lane in order to increase the road/motorway capacity, by granting users the necessary safety measures.

European limit values: maximum levels of air pollutant concentrations acceptable in EU countries in order to protect human health.

COPERT: (Computer Programme to calculate Emissions from Road Traffic) it is an algorithm to calculate traffic emissions. It refers to the European guidelines for processing the emissions inventories (EMEP / CORINAIR Emission Inventory Guidebook) and it is therefore a reference standard at the European level.
COPERT is a model allowing to achieve emissions objectives based on:
- vehicle type (category and engine type)
- driving condition (speed, travel time, traffic type)

- fuel type (petrol, diesel, LPG)
- climatic conditions and road slopes
- load transported (for heavy goods vehicles)
- pollutant (PM_{10}, NO_x, CO, etc.)

By means of this algorithm a specific emission value (grams released for each kilometer travelled) can be associated to each pollutant. The calculation functions are not derived from theory and do not refer to vehicles' homologation data, instead they are drawn from a substantial database of measures carried out on the road with different real driving cycles.

Speed limits on the motorway: The traffic laws (Legislative Decree 285 dated April 30th, 1992) define the maximum speed limits allowed, diversified for each vehicle type:

Vehicle type	Motorway
Vehicles with MLM ≤3,5 t (i.e. cars)	130 km/h
Bus with MLM ≤8 t	130 km/h
Bus with MLM >8 t	100 km/h
HGV with MLM >3,5 und ≤12 t	100 km/h
HGV with MLM >12 t	80 km/h
Tractor trailer, independent from the MLM	80 km/h
Articulated lorry, independent from the MLM	80 km/h

Notes: MLM= Maximum Laden Mass (vehicle weight + weight of the maximum load allowed)

Light vehicles: Vehicles with a laden mass less than or equal to 3.5 tons. Normally motorcycles and passenger cars.

Heavy duty vehicles: Vehicles with a laden mass of more than 3.5 tons. Usually they are heavy good vehicles, trailer trucks, articulated lorries, buses. The mass of these vehicles can reach up to 44 tons for 5-axle vehicles.

Park&Ride:Car parking areas that facilitate users' transition from private car to public transport. These areas are usually located on the outskirts of the city and are regularly served by public transport (trains and buses).