

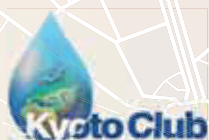


KYOTO CLUB - CNR-IIA: 2nd REPORT
IN COLLABORATION WITH OPMUS ISFORT

URBAN MOBILITY AND AIR QUALITY IN 14 CITIES AND METROPOLITAN AREAS (2017-2018)

by
ANNA DONATI, FRANCESCO PETRACCHINI,
CARLOTTA GASPARINI, LAURA TOMASSETTI

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INDEX

» Thanks	7
» Foreword by Francesco Ferrante	9
» Mobilitaria 2019 report targets	11
» 2017-2018 air quality trend in 14 big cities	12
» Urban mobility in 14 cities and metropolitan areas in 2017-2018	14
» National politics for urban mobility in 2017-2018	15
» National plan for energy and climate	
» Mobility demand features in metropolitan cities	19
» by <i>Carlo Carminucci</i> , ISFORT research manager	
» European and Italian transport sector decarbonization toward 2050	28
» by <i>Veronica Aneris</i> and <i>Carlos Calvo Ambel</i> , Transport & Environment	
» Proposals by Kyoto Club e CNR-IIA for sustainable mobility	37
» Data and analysis of 14 major cities and metropolitan areas	41
» Bari	43
» Bologna	49
» Cagliari	55
» Catania	61
» Florence	67
» Genoa	73
» Messina	79
» Milan	85
» Naples	91
» Palermo	97
» Reggio Calabria	103
» Rome	109
» Turin	115
» Venice	121
» Legend and sources	127

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FOREWORD

The working group "Sustainable mobility" of Kyoto Club and the experts of CNR-IA (National Research Council, Institute for Atmospheric Pollution) managed to outline an overall picture of air quality trends in the main 14 Italian cities and metropolitan areas intertwining it with urban mobility policies with MobilitAria, which for this second edition also makes use of the original contribution of OPMUS, ISFORT's Sustainable Urban Mobility Policies Observatory.

A difficult but fundamental challenge to detect the effective choices - from those of the municipal administrations that are intertwined with regional competences, to national "direction rooms" (too often guiltily incapable as in the case of the smog emergency in the Po Valley) - to face one of the most serious environmental problems of our time.

Indeed, the transport of goods and people, entrusted as it is to the combustion of fossil fuels, on one hand contributes significantly to climate change, and on the other is a determining factor in air pollution at local level, especially in large urban agglomerations.

And in both case, we're running out of time for answers.

IPCC scientists have written clearly that the 1.5 °C threshold of average terrestrial temperature rise should not be exceeded because the consequences on climate change could be irreversible. But governments still delay and the commitments of the Paris agreements (which were insufficient) are still unheeded.

Yet technological innovation would help us move rapidly towards decarbonisation, in transport too, and supporting the transition / revolution that began in the production of energy with the shift from fossils to renewables, the protagonists of green economy. And instead the same National Energy and Climate Plan, the draft of which was recently presented by our Government, is dramatically inadequate and does not contain sufficiently stringent transport objectives.

The delay is perhaps even more serious for local pollution, given that it is the cause of premature deaths: in Europe 3.9 million people live in areas where the limits of the main air pollutants are exceeded and about 95% live in Northern Italy (source: EU Environment Agency). Our country is in second place in Europe for deaths from PM2.5 (60.600) and the first for deaths from nitrogen dioxide (20.500). How much of this pollution is due to transport and how much to the heating of our homes or industrial activities is the subject of research, but only a Trump-like negationist could shamelessly argue that the contribution of private traffic, especially in urban areas, is not decisive. And Italy continues to be referred to the Court of Justice for air pollution, recently for nitrogen dioxide, and last year for PM10.

In the following pages you will find data that confirm that the slight improvement in air quality is not sufficient to guarantee compliance with regulatory limits for all cities. Much more should be done, in an innovative and bold way, and also more quickly, for sustainable mobility, reducing greenhouse gases and air pollution. However, it is important to record the positive news: from February 2019 Area B in Milan was launched, the widened area where the most polluting vehicles will be progressively excluded, which is an authentic innovation that confirms the Lombard capital as an advanced point among the realities Italian.

Finally, the meaning of the MobilitAria Report is mostly about the concrete proposals that we make downstream of the research and which range from the request to increase the number of monitoring stations to the urgency of approving a new Highway Code, which has as its objective the goal of "zeroing deaths in the street "; from the promotion of cycling mobility to the increase of the ZTL areas and pedestrian areas; from the enhancement of public transport to the facilitations for sharing mobility; from the growth of electric vehicles to the increase in Railway Services with multimodal integration.

Francesco Ferrante
Vicepresidente Kyoto Club

Enjoy the reading.

MOBILITARIA 2019

REPORT TARGETS

MobilitAria 2019 is the second report produced by the Kyoto Club Sustainable Mobility work group and by the experts of CNR-IIA (National Research Council, Institute for Atmospheric Pollution) with an unprecedented collaboration with OPMUS, ISFORT's Sustainable Urban Mobility Policies Observatory.

The report outlines an overall picture of air quality trends and urban mobility policies in the 14 most important cities and metropolitan areas in 2017 and 2018: Bari, Bologna, Cagliari, Catania, Florence, Genoa, Messina, Milan, Naples, Palermo, Reggio Calabria, Rome, Turin, Venice.

The study analyzes the data and trends of pollutant concentrations and the exceedances of limitation standards; a general picture of the Air Quality Improvement Plans of the Italian Regions is linked to these data. The analysis continues with an assessment of local urban and national policies in the field of mobility in the years 2017 and 2018. A critical look is dedicated to the portion about transport of the National Energy and Climate Plan, the recently presented proposal by the Italian Government, whose public consultation is already started with the aim to arrive at the end of 2019 to the final version.

But the real novelty contained in the 2019 report is the collaboration with OPMUS, the Sustainable Urban Mobility Policy Observatory of ISFORT, which has developed and commented on a survey on mobility in the 14 metropolitan areas and reconstructed the trends in 2016/2017 compared to the 2012/2013 data. Unpublished data frame the complex issue of mobility in the 14 metropolitan areas.

Two specific contributions follow: one by T&E which explores the European strategy for the decarbonization of transports to 2030 and 2050, with the objectives of reducing greenhouse gases and becoming fossil free, an immense and necessary challenge that the cities must lead. This is followed by a contribution by TRT Trasporti e Territorio, which carried out a simulation on electric mobility and its effects in four major metropolitan cities to 2030, on the basis of the MOMOS model.

The second part of the report is rich in data on urban mobility in every major city and shows trends in the years considered (2017 data compared to 2016), with the inclusion of new data and mobility trends in metropolitan areas (2016/2017 data compared to 2012/2013 data). The data are accompanied by a punctual recognition of mobility measures and the concrete, realized actions by the 14 municipal administrations in the 2017-2018 period, with some inclusions about the first two months of 2019. Among the elements considered there is also the state of implementation of the PUMS both at the metropolitan level and in each individual city: the state of this important mobility planning tool is exactly reconstructed, and it integrates the PGU; by October 2019 all metropolitan cities will have to approve a PUMS. The second part explores the air quality data of the municipal area of metropolitan cities. The data for the two-year period are shown, together with the trend of the 2016-2018 period and the state of the air quality of individual air quality stations for the year 2018.

Obviously, the Report is completed by a set of proposals for sustainable mobility, road safety and transport decarbonization, elaborated by the Kyoto Club and CNR-IIA.

We remind that, in the first edition of 2018, the study had taken into consideration air pollution and the mobility policies of the 14 major Italian cities in the decade 2006-2016 in the same way.

The reasons behind the MobilitAria Report arise from the observation that in Italy there is no institutional place where the data on urban mobility are kept in integrated way, so that they could be correlated with the effects monitored on air quality, the trend of the mobility and modal split, citizens' behavior, greenhouse gas emissions, investments, innovations and ongoing experiments.

Kyoto Club and CNR-IIA therefore reiterate that an observatory is sorely needed, a space where it is possible to compare and reason collegially about obtained results, exchanging experiences, failures and good practices found in some cities, with an eye to the future.

2017-2018 AIR QUALITY TREND

IN 14 BIG CITIES

This report evaluated and analyzed the state of air quality in the years 2017 and 2018 in 14 major Italian cities. As for the previous report, particulates (PM₁₀ and PM_{2.5}) and nitrogen dioxide (NO₂) have been considered as pollutants. In detail, the study analyzes the concentrations recorded in the two years, the exceeding of the hourly (NO₂) and daily (PM₁₀) limit values and evaluates the growth rate of concentrations recorded in 2018 compared to 2016.

Concentration limits set by law for these pollutants follow:

- » NO₂: hourly average concentration must not exceed 200 µg\m³ more than 18 times in a year; yearly average concentration must not exceed 40 µg\m³.
- » PM₁₀: daily average concentration must not exceed 50 µg\m³ more than 35 times in a year; yearly average concentration must not exceed 40 µg\m³.
- » PM_{2.5}: yearly average concentration must not exceed 25 µg\m³.

For this study, air quality monitoring stations were classified in one of two classes:

- » **Traffic stations:** monitoring stations located where air pollution is mainly caused by traffic emissions from nearby streets with medium-high traffic.
- » **Urban background stations:** monitoring stations located where the cause of air pollution cannot be identified in a single source (factories, traffic, heating), but where each upwind source contributes.

From the data collected in the considered time period a **generalized improvement of air quality** can be highlighted, even if this is not yet enough for each city to fall within regulatory limits.

A reduction in average concentration was identified for **nitrogen dioxide** (NO₂). The biggest reductions were found in Messina (-23%), Cagliari (-21%), Rome (-12%), Turin (-12%) and Bologna (-11%). Catania and Reggio Calabria seem to be moving countertrend as there was an increase in this parameter. In 2018 concentrations above the law limits were measured in Milan (45 µg\m³), Rome (43 µg\m³) and Turin (43 µg\m³).

As for the hourly NO₂ limit, in 2018 no particular problem was identified, with no cities going above.

Each studied city was below the law limits for average **PM₁₀** concentration. The situation is still critical, instead, for the daily PM₁₀ concentration limit in some cities: Turin, Milan, Venice, Cagliari and Naples, in particular, showed values above the limit, and Turin is the city where the situation is worse (89 days above the limit).

Considering **PM_{2.5}**, no city has shown concentration above the law limit, but Turin, Milan and Venice are very close to the 25 µg\m³ limits.

Although there has been an improvement in air quality in some cities, this is not enough to reduce concentrations and exceedances below the limits set by the legislation. For this reason, Italy was referred by the European Commission to the Court of Justice on 17 May 2018 for failure to comply with the limit values established for air quality, and in particular for failing to implement measures deemed appropriate for reducing exceedances of the legal limits for particulate matter (PM₁₀). In fact, the standardization plan presented was not positively evaluated by the Commission.

The European Commission has justified this decision by considering PM₁₀ concentrations in the air, exceeding the limits for more than 10 years, a systematic and continuous violation of the European air quality directive. Furthermore, the Commission maintains that air quality plans, adopted following the exceeding of the PM₁₀ concentration limit values, do not allow either to achieve said limit values, or to limit their exceedance to the shortest possible period. Still referring to the plans, the Commission believes that many of these still don't provide all the information requested in the relevant European legislation.

Among the areas affected by this measure, Emilia-Romagna, Lombardy, Veneto and Piedmont signed a new programmatic agreement for the Po Valley basin on June 9, 2017, which for the first time defines large-scale actions in order to guarantee cleaner air and reduce exceedances below regulatory limits. This agreement appears to be an important tool for the resolution of non-regional pollution phenomena.

From the analysis conducted of the different Regional air quality plans, a heterogeneous situation emerges in the methods adopted for the preparation of the same and for the control of the effects generated.

For this reason it is necessary to establish uniform guidelines for the preparation and updating of the Plans; these will have to contain stringent targets for the reduction of greenhouse gases (-33% by 2030), sustainable mobility target (on foot, by bicycle, collective transport, sharing mobility), increasing targets for vehicle electrification, emissions reduction for air quality. In our opinion, therefore, stringent obligations are required for the Regions, even if they will have to be differentiated on the basis of the state of affairs and progressive while getting close to 2030.

Furthermore, in order to tackle the problem of air pollution in general, it is necessary to define a National Strategy to complement the Energy and Climate Plan with objectives, environmentally relevant and consistent with international commitments to reduce emissions. In order to meet the reduction targets, it will also be necessary to promote a review of the planning and of the intervention tools to reach air quality recovery obligations. To this end, it is hoped that as soon as possible the establishment of a permanent coordination between the Ministries, the Regions, ISPRA and National Research Bodies to define objectives, strategies, costs and methods of control.

In addition to the objectives of reducing air pollution in cities, Italy must also intervene with structural measures to decarbonize the whole transport sector, in order to achieve the objectives, set by the European Union. In particular, Italy, based on the provisions of the Effort Sharing Regulation, has a binding reduction target by 2030 of 33% compared to the 2005 values for all sectors of the economy not included in the ETS¹ system. Assuming an equitable distribution of the 33% target among all the related sectors, road transport will have to cut its emissions by 23.8 million tons in the next decade and 76.8 million in the immediately following two decades.

It is therefore clear that at national level urgent and decisive policies must be implemented to reduce the demand for transport, shift to cleaner transportation modes and increase the efficiency of the system. The available policies to generate this type of impact on the transport system can be of a fiscal (such as those related to fuel taxes, or congestion charges in urban areas) or non-fiscal nature (reduction in the number of parking lots, increased pedestrian areas, local speed limits introduction) and the stop to the sale of internal combustion cars, with increasing annual quotas. In this sense it is necessary to introduce a zero-emission target for all vehicles sold by 2030 at the latest.

¹ Non-ETS sectors: transport, agriculture, residential, waste.

URBAN MOBILITY IN 14 CITIES AND METROPOLITAN AREAS IN 2017-2018

Urban mobility in the two-year period has seen the consolidation of trends and actions but without any leap forward, even if a considerable acceleration would be necessary, with respect to the situation of congestion, accidents, greenhouse gas emissions and pollution.

Limited traffic areas are stable: the Palermo LTZ is getting enhanced with telematic gates, and Florence has introduced a summer LTZ with extended hours. From February 2019 Area B started in Milan, a wider area where the most polluting vehicles will be progressively excluded: it represents an authentic innovation, which confirms the Lombard capital as a vanguard among Italian realities. In Turin the new all day ZTL was presented by the City Council, with access toll and parking area modelled after Milan Area C: confrontations, protests and controversy lighted up, but the mayor announced that she will go ahead.

From October 2018 to March 2019, the first provision to block traffic in the Po valley for old and polluting vehicles was implemented, but the poor controls affected the result.

The use of public transport grows slightly, even significantly in some cities (Bologna, Cagliari, Turin, Florence), but where there is the financial crisis of the transport company the use of public transport keeps dropping, as it happens in Naples, Rome and Catania. New tramways were built in Florence and Palermo, which are the two busiest cities in favor of the tram, with new projects and network extensions. Other projects are coming, like in Bologna, a candidate for MIT for the financing of the first tramway line. The construction of the undergrounds in Milan, Rome, Naples and Catania continues, while Turin has presented the project for Line 2. New projects also in Cagliari, which is applying to build a BRT line, while Genoa focuses on 4 new public transport lines (BRT or Tram yet to decide).

Pedestrian areas and cycle paths are rather stable. Bari has decided to experiment for 4 months with "paying" those who ride a bike as a form of incentive, an initiative unique among big cities. Purchase incentives for bikes and electric motorcycles in Catania and Genoa, where it is no coincidence that motorbikes are widely used.

Sharing Mobility grows in Milan, Turin, Florence, Rome, Palermo and Cagliari, and it lands in Bologna for the first time. For the other cities, there are difficulties and in some cases the service has been suspended, as is the case for car sharing in Bari. Electric mobility unfortunately has insignificant numbers even if the agreements between the cities and the operators for the installation of columns keep going forward.

The growth in the cities and metropolitan areas of the motorization index of cars and motorcycles should be recorded as a negative figure, which in the previous ten years had decreased significantly. Turin the worst case with a +5.4%.

This phenomenon can be put in better perspective with the OPMUS IFORT survey for the 14 metropolitan areas contained in this report, which shows the leap forward for walking and cycling in 2017/2018 compared to 2012/2013 data. So, the car is used less for short distance journeys in the cities - and this is a very positive figure - but the car continues to remain the main vehicle for journeys in the metropolitan area.

By October 2019 these cities will have to approve the Urban Plan for Sustainable Mobility, according to the Guidelines of the MIT Decree of 4 August 2017. The European-derived PUMS are an obligation for all Italian cities over 100,000 inhabitants, either as a single entity or as an aggregate. To date the Municipality of Milan has approved the PUMS, while Turin has an old 2011 PUMS, Bologna and Genoa have adopted one on a metropolitan scale and the participation process is underway, and Bari, Reggio Calabria and Rome have adopted it at the municipal level. Cagliari is preparing the PUMS, while Naples and Messina have only adopted Guidelines. The Metropolitan Cities of Venice, Florence, Cagliari and Milan are carrying out preparatory activities for the preparation of the PUMS on a metropolitan scale. This is a great opportunity for cities and metropolitan areas to start planning and act on a wider scale about sustainable mobility.

NATIONAL POLITICS FOR URBAN MOBILITY IN 2017-2018

Urban mobility has always had little space on the Italian political agenda, dominated by investments for large strategic works, with little attention to useful works, transport services and network maintenance.

But in recent years the urban mobility strategy has received new impetus from the Government and Parliament, which have allocated funding for new vehicles, for the completion of the metropolitan networks of Milan, Naples, Rome, Catania, Genoa and Turin and for the extension of some tramways. On December 22, 2017, the CIPE resolved the allocation of investments for rapid mass transport and then converted into a DM amounting to € 1.3 billion. The new government has completed these commitments with the go-ahead of the Unified Conference in August 2018 and issued the relevant Ministerial Decrees for allocating spending towards the main metropolitan cities. However, there still is not a real growth plan for the tram networks and the trolleybus, which offers solutions to the mobility of Italian medium cities.

The Ministry for the Environment in September 2017 gave the green light to 37 local projects presented by the cities, for home schooling and home work for cities over 100,000 inhabitants, either as a single entity or as an aggregate. These were the resources, amounting to 35 mln / euro, decided in 2016 with the "Collegato Ambientale".

With the Decree of December 2016, the Directive for the construction of an Infrastructure for Alternative Fuels was implemented. In June 2017, under the impetus of the Ministry for the Environment, the four regions of the Po Basin - Piedmont, Lombardy, Veneto and Emilia Romagna - signed an anti-smog pact which provides for coordinated measures to limit circulation in the winter period.

With the 2017 Budget Law, an overall 3.7 billion plans were financed until 2033 for new buses. While this is certainly good news, it is not enough to rejuvenate the circulating bus fleet, with 50,000 buses averaging 11.4 years of age (in Europe the average is 7 years). In 2017, the allocation for Local Public Transport was stabilized, releasing it from the excise duty. The 2018 Maneuver reinstated the tax exemption of the TPL subscriptions and establishing the Transport Voucher.

The new Government has confirmed these investments for the renewal of the bus fleet and presented in December 2018 the National Strategic Plan for Sustainable Mobility, referring to the "renewal of the road fleet and the improvement of air quality", which must be approved with a specific decree of the President of the Council. In December 2018, the Plan was given the go-ahead by the Unified Conference and includes investments for new electric, methane and hydrogen buses. These indications for the purchase of the new electric buses stimulated a reaction in ASSTRA: a study with CDP was presented in February 2019, which shows that, due to the higher price of electric vehicles, it will be possible to buy only half of the buses, with the result that in 2033 the fleet will have an average age of 17.5 years. Hence the request for additional resources equal to 10.2 billion from 2019 to 2033, equivalent to 729 million / year, in order to combine the lowering of the age of the vehicles with the electric power supply system. It may be objected that if this road towards the electric bus is really taken up, the unit price will be lowered as demand rises. But certainly, the problem posed by ASSTRA is real and their request must be heard by the Government.

Ferrovie dello Stato's 2017-2026 Business Plan, which included regional transport as a priority, funded the purchase of 450 new regional trains, whose bids have been completed and new trains are gradually arriving. With the arrival of the new Government, in June 2018, a new CEO of FS was appointed, and he was tasked with updating the current Business Plan, with priority objectives linked to the growth of commuter transport and freight transport. The new business plan will be launched in early 2019.

Similarly, the Italian Railways Network's 2017-2021 Rail Investment Program Agreement, amounting to € 13.2 billion, is being finalized: it received the go-ahead from the competent parliamentary commissions in October 2018, some changes and adjustments were requested and at the end of this process the approval decree will be defined.

The bike seems to have finally acquired dignity in legislative choices: Government and Parliament have allocated 550 million euros in the last three-year period (2015-2018) for the creation of national cycle routes and the growth of bicycle in cities. In December 2017 the significant framework law for cycling was approved, which will be implemented in the coming years (Law 2 of 2018). The new Government also continued, in agreement with the Regions, along this road. In July 2018, the Minister of Infrastructure and Transport confirmed in the Unified Conference with the Regions the total allocation of 361.78 million euros for the birth of the National system of tourist cycleways and then adopted the draft decree, in accordance with the Regions, for the criteria for allocating resources.

The General Plan of the Cycling Mobility has not been prepared yet, although according to the Law 2/2018, it had to be presented by August 2018. Unfortunately, nothing can be done for the new Highway Code, which the Chamber had approved back in October 2014 but that the Senate did not approve in the old legislature. It remains an essential tool for the management of mobility, to protect weaker road users and to facilitate innovations such as sharing mobility. Since December 2018, the Transportation Commission started a series of hearings for the revision of the Highway Code: what will emerge from the parliamentary debate is to be seen yet. Recently the Government has adopted a Delegated Law to reform the Highway Code.

A SELECT OF MEASURES FROM THE 2019 RESOLUTION

The 2019 maneuver has decided a cut of 52 million for the Local Public transport, to which the fact that another 300 million are linked to the June 2019 verification on the trend of the GDP and the public accounts must be added: in case of a negative result they will be cut and this certainly is not good news for public transport, although it must be said that the Minister of Transport has stated several times that he is working to avoid cutting.

A real novelty included in the 2019 budget maneuver is the provision with incentives to purchase electric cars or CO₂ emissions of less than 70 grams of CO₂/km and, on the contrary, a tax proportional to the greenhouse gases produced on the most polluting cars. This is a measure that should have started on March 1, 2019 but whose implementation decrees are just now coming.

As regards the bonus, a contribution of between 1,500 and 6,000 euros is planned on a trial basis for the years 2019, 2020 and 2021 for the registration of a car with low carbon dioxide emissions: from zero to 70 grams of CO₂ per km on average, therefore actually only for fully electric or hybrid vehicles. As for the malus, the rule provides for a tax parameterized to the amount of CO₂ emitted by new cars exceeding 160 g/km and divided into four bands. Together with these useful measures, it was decided that electric and hybrid cars will always have the possibility to move in the Limited Traffic Zones (pedestrian areas are also mentioned, but the law is controversial). Kyoto Club does not share this approach and believes that any negative incentive measures should be linked to the policies of different cities and have a temporary character and, together with other associations, asked for its cancellation.

A useful provision, also included in the 2019 maneuver, provides for a new tax deduction of 50% on the expenses incurred from March 1, 2019 to December 31, 2021 for the purchase and installation of recharging infrastructure for plug-in electric cars that need a power outlet.

In February 2019 the call for bids for the PRIMUS Program of the Ministry of the Environment was launched, which encourages and co-finances sustainable urban mobility choices and alternatives to the use of private cars.

The Program has a budget of 15 million euros for the co-financing of projects presented by municipalities over 50,000 inhabitants, to be employed for the following actions: construction of new cycle paths for home-school and home-work routes, development of sharing mobility, development of mobility management activities at the offices of public administrations, schools and universities.

THE ITALIAN PLAN FOR ENERGY AND CLIMATE

The National Energy and Climate Plan (PNEC) presented by the government at the end of 2018 in Brussels and now in consultation at Italian level, does not contain stringent and innovative objectives for the transport part.

It confirms the already decided objectives of -33% by 2030 for CO₂ emissions, but nothing is said about the objectives to 2050, where the decarbonization strategy of the European Union expects zero emissions. In concrete terms this means that we must reduce CO₂ from the current 100 million tons per year to 76.8 million tons per year by 2033 and, in the following 20 years, we must arrive at zero emissions in transport. This is a very complex challenge for Europe and Italy, which is not in the least discussed in the PNEC.

Many other objectives planned for 2030 are rather bland, if we consider that the consumption of petroleum products is still expected at 31% of the total (mostly for transport) and there is a lot of space given for gas and biogas, confirming that the PNEC is not aiming to a significant growth of renewable energy electric mobility.

The measures to achieve the target of -33% by 2030 are actually actions already considered and evaluated in norms and funding, or even already being implemented without the need of further measures, forecasts and innovations. Targets for sustainable mobility for passengers (on foot, by bicycle, public transport, sharing mobility, electric vehicles) and specific targets for goods (maritime transport, rail transport, urban logistics, clean vehicles) are completely missing, as are actions and targets within the context of the European strategy Avoid, Shift, Improve, for example to avoid traffic, for modal rebalancing and to support clean vehicles.

Furthermore, there are no indications on how to eliminate the SAD - the Environmentally Harmful Subsidies - or transfer them to subsidies and favorable incentives for the environment, even for the transport sector, of which the aid provided for road haulage is a component.

After the decision by France and the United Kingdom to set a deadline for the sale of petrol or diesel cars, a similar signal from our country in the PNEC was expected, something like the new Swedish government did: as soon as it took office, it set 2030 as the end of conventional cars.

In the Italian Energy and Climate Plan, however, there is no trace of the phase-out and modest goals are indicated for 2030 for electric mobility, with 6 million cars of which only 1.6 million purely electric. The objective should be a European target for stopping the sale of internal combustion cars, with increasing annual quotas and a zero emissions target for all vehicles sold at the latest in 2030.

There is no mention in the PNEC of autonomous driving, an explosive solution that will begin to spread in the next decade both in freight transport and in the conventional transport of people, with important implications even for European companies. The Commission has well understood that, having published a report on the strategies necessary to make Europe a leading area of transport with driverless vehicles.

And going from hyper-technological solutions to the simple and efficient bicycle, it is disheartening that there is not a goal on the mobility quota on two wheels, nor on the kilometers of bike paths to reach by 2030.

Finally, regarding the Public Transport part, while confirming the need for its growth and modernization, the PNEC contains rather vague objectives, without stringent targets in terms of use and modernization of the fleet, without specific quotas of electric vehicles to be introduced in the fleet and to be included immediately in the current Investment Plan 2019-2033.

It is only to be hoped that the consultation process under way for 2019 will be able to modify the PNEC proposal, with really stringent objectives, targets and actions to respect the Paris Agreements and enhance decarbonization in transport.

MOBILITY DEMAND FEATURES IN METROPOLITAN CITIES

by
Carlo Carminucci, Isfort research manager

The present contribution on the characteristics of the demand for mobility in metropolitan cities has been developed within the **Observatory on Sustainable Urban Mobility Policies** (OPMUS). The territorial data analyzed were extracted from the annual Audimob survey of Isfort on the Italian mobility styles and behaviors¹. The indicators taken into consideration describe both the dimensional-quantitative profile (mobility rate, time dedicated to mobility, length of travel), and the main characteristics of the mobility demand (motivation for movements, choice of means of transport), also looking for the recent trends. For this purpose, two periods are compared: the two-year period 2012-2013 and the two-year period 2016-2017².

Quantitative dimension of demand

With respect to volumes, the first indicator to be evaluated is the **mobility rate**, is the average percentage of citizens moving during the day (weekday). Table 1 shows that the mobility rate is growing significantly between 2012-2013 and 2016-2017 in all areas without exception, with a positive average variation of over 10 percentage points (the same as the national average).

The highest values in the 2016-2017 period, higher or on the 90% threshold, are recorded in the metropolitan areas of Northern Italy (Bologna, Venice, Turin and Milan), while in the South the index is normally closer to 80%, with negative peaks in the Sicilian provinces, except for the extraordinarily high figure of Cagliari (92.3%). Looking at the changes compared to the 2012-2013 period, the most dynamic realities are distributed more from North to South: in the order the metropolitan areas of Catania, Turin, Venice, Milan and Bari mark the most significant progress of the index.

A second quantitative measure of demand volumes is represented by the **time spent on movements** (Table 2). In the daily average, the metropolitan citizens who move (mobile population) commit less than an hour (53 minutes) of their time for mobility needs, a value perfectly aligned, against expectations, with the national average. This value is decreasing, rather markedly, compared to the 62 minutes recorded in the 2012-2013 period. The per capita time dedicated to mobility varies considerably between metropolitan cities: the highest point is measured, predictably, in the Roman area with 65 minutes (here the critical aspects of the intense urban traffic are added together with the marked commuting toward the Capital that develops through relations that are normally quite long), followed by the areas of Venice (58 minutes), Turin and Genoa (both 57 minutes).

On the contrary, it is mainly in the South that the time taken up by journeys and daily trips is less: for example, Naples with 46 minutes (commuting relations here are relatively short), and Bari, Cagliari and Catania with 49 minutes. Compared to 2012-2013 the reduction in mobility times was particularly strong in the metropolitan areas of Palermo, Rome and Reggio Calabria.

1 The Audimob survey is based on over 12,000 direct annual interviews (70% with CATI telephone system and 30% with CAWI telephone system) on a sample of the Italian population aged 14-80, distributed by region and stratified by gender and age. The survey detects in a detailed and systematic way all the movements made by the interviewee on the day before the interview (weekdays only), with the exception of journeys on foot which took less than 5 minutes to complete.

2 Biannual averages were chosen to reduce indicator variability due to sampling error.

MOBILITY RATE

Table 1 Percentage of interviewees that had at least one journey during a weekday

(*) Simple average

	2012 – 2013 Average	2016 – 2017 Average
Turin	74,0	90,2
Milan	76,1	89,6
Genoa	80,2	84,7
Venice	77,2	91,8
Bologna	82,1	92,5
Florence	79,0	85,6
Rome	79,1	89,6
Naples	75,6	86,6
Bari	70,9	83,6
Cagliari	78,7	92,3
Reggio Calabria	74,5	83,7
Messina	74,1	81,2
Palermo	75,4	82,2
Catania	64,8	83,7
Metropolitan Cities average (**)	75,8	87,0
Italian average	75,3	86,0

MOBILITY TIME

Table 2 Time per person spent on mobility during a weekday (in minutes)(*)

(*) Average over mobile population

(**) Simple average

	2012 – 2013 Average	2016 – 2017 Average
Turin	63	57
Milan	68	56
Genoa	68	57
Venice	62	58
Bologna	53	50
Florence	62	52
Rome	80	65
Naples	48	46
Bari	53	49
Cagliari	73	49
Reggio Calabria	64	52
Messina	61	52
Palermo	70	52
Catania	49	49
Metropolitan Cities average (**)	62	53
Italian average	60	53

The other classic parameter related to the demand for mobility concerns the distances traveled. In the analysis proposed here the indicator of the **average length of journeys** is used (Table 3). In all metropolitan cities the figure stands at 10.5 km for the 2016-2017 period, slightly less than the national average (11.1 km). Unlike what was highlighted for the time taken, the length of the journeys does not seem to be determinant in characterizing metropolitan mobility models. However, the index tends to grow both where there is a greater use of means of transport for the short haul (on foot, by bike, motorcycle), and where the extra-urban component of the demand is more influent, such as in Reggio Calabria (12.5 km on average for each trip) and Venice (12.2). Areas with inhomogeneous territorial features are below the average, because of high urban density such as in Genoa (9.4 km), or because of more distributed and / or multipolar urbanization levels (the Bari area with 8.9 km, caused by the high impact of pedestrian mobility as will be seen below, and the areas of Bologna, Florence and Catania). Compared to the values recorded in the 2012-2013 period, all areas, with the exceptions of Venice and Naples, show a decrease in the average length of trips, a decrease that was stronger in the southern provinces (Cagliari, Reggio Calabria and Palermo above all). In general, from the combined observation of the quantitative data of demand elaborated here (mobility rate, time dedicated to movements, distances covered), a substantial alignment of the dynamics of the metropolitan cities to the national average can be noted, including the tendency of the last years to move toward a more distributed and "participatory" mobility model, that is with higher mobility rates compared to a smaller number of journeys, of shorter distances traveled and of less daily time spent by citizens to move.

TRIP LENGTH

Table 3 Trip Length (in kilometers)

(*) Simple average

	2012 – 2013 Average	2016 – 2017 Average
Turin	12,7	10,1
Milan	12,4	10,4
Genoa	11,7	9,4
Venice	9,8	12,2
Bologna	11,1	9,4
Florence	11,4	9,8
Rome	14,4	11,0
Naples	8,8	10,7
Bari	11,0	8,9
Cagliari	18,6	10,6
Reggio Calabria	18,6	12,5
Messina	13,3	10,5
Palermo	16,0	11,2
Catania	12,5	9,8
Metropolitan Cities average (*)	13,0	10,5
Italian average	13,4	11,1

To complete this first block of indicators, the **average speed of the movements** was calculated. In all metropolitan cities, the average speed was 28km/h in the 2016-2017 period, a threshold slightly below the national average (30km/h). It should be emphasized that compared to 2012-2013 the average speed has decreased by 5 km/h, due to the increase in walking and cycling (see below). Looking at the individual metropolitan areas the highest values are found, basically, in the territories with less "urban intensity" such as the area of Reggio Calabria (35 km/h) and, to a lesser extent, the areas of Cagliari, Venice and Palermo are added. Conversely, the average speed is decidedly lower in the dense areas of Genoa (22 km/h) and Rome (24 km/h).

In comparison with 2012-2013 the average speed decreases everywhere except in Venice, with a more pronounced gap in the southern regions, especially Cagliari and Catania, as well as Bologna in the north.

Motivation of trips and modal split

Turning now to the mobility components, two main aspects are examined in this part: the motivations and the choices of the means of transport. Regarding the **motivations of mobility**, the distribution of movements in the metropolitan cities average is practically overlapping with the overall national average and highlights in the 2016-2017 period a balanced weight between the three groups of "work and study" (mobility more characterized by systematicity and length), of "family management" (tendentially fragmented and short-range mobility) and of "free time" (occasional mobility) (Table 4). Compared to the 2012-2013 period, there has been a robust increase in leisure time motivations (from 28.9% to 33.8%) with an equal weight reduction of the other two components. Among metropolitan cities, the northern ones show on average a higher incidence of work and study as motivations for moving (40.3% in Milan, 37.3% in Bologna); Rome is also approaching the 40% threshold. On the other hand, this percentage is less or near 30% in Messina and Reggio Calabria. The mobility component linked to family management is the majority in Reggio Calabria (it is the highest value, equal to 37.5%), Florence and Palermo. Finally, leisure time is over 35% in Messina (the highest value, 42.5%), Cagliari and Venice.

MOTIVATION OF TRIP

Table 4 Modal of trip (percentage)

(*) Simple average

	2012 – 2013 Average			2016 – 2017 Average		
	Work/Study	Family run	Free time	Work/Study	Family run	Free time
Turin	39,5	29,8	30,7	35,2	34,6	30,2
Milan	43,3	32,0	24,7	40,3	31,1	28,6
Genoa	43,0	35,3	21,7	34,3	34,0	31,7
Venice	39,5	29,8	30,7	34,4	30,1	35,5
Bologna	42,7	33,4	23,9	37,3	29,2	33,5
Florence	37,4	38,6	24,0	31,9	34,2	33,9
Rome	42,9	31,0	26,1	39,1	28,8	32,1
Naples	38,2	33,0	28,8	34,8	30,7	34,5
Bari	33,5	37,0	29,5	33,6	32,3	34,1
Cagliari	33,3	32,2	34,5	31,1	31,8	37,1
Reggio Calabria	31,8	40,5	27,7	30,1	37,5	32,4
Messina	25,3	39,5	35,2	26,5	31,0	42,5
Palermo	31,1	37,7	31,2	32,4	34,5	33,1
Catania	30,2	33,5	36,3	34,7	31,5	33,8
Metropolitan Cities average(*)	36,6	34,5	28,9	34,0	32,2	33,8
Italian average	38,4	34,2	27,4	34,1	32,5	33,4

The last aspect investigated, but the most relevant for sector policies, concerns the use of the various means of transport. As can be seen immediately from Table 5, the breakdown of the modal shares is the indicator that most discriminates the mobility behavior of citizens between different metropolitan areas.

In the comparison between the average 2016-2017 data of all the metropolitan cities and the national average, some modal split differences emerge, although less accentuated than might have been expected. Particularly in metropolitan cities:

- » the use of motorbikes is decidedly high (average modal share of 9.1%, an almost triple share compared to the national one), at the expense of car use (53% against 59.7%);
- » in active mobility, trips on foot are a little more significant, while bike trips are a little less represented;
- » the modal share of public transport is substantially in line with the national average (12.6%). Since the weight of collective mobility is much higher than the average in the capital cities, it is evident that in the rest of the metropolitan territories the use of public transport is more limited.

Compared to the 2012-2013 period, the same dynamic of strong growth in the weight of active mobility observed at the national level is recorded in the metropolitan cities: foot journeys increase the share by more than 5 percentage points, while the bike doubles or more its share while maintaining a still small segment of the market (2.7%). Above all, the car is losing ground, while maintaining a largely majority position (53% of journeys in 2016-2017 compared to 58.2% in the 2012-2013 period). But it should be emphasized that public transport also moves back, albeit marginally (modal share from 13.7% to 12.6%), unlike what happened at national level (from 11.6% to 12.4%).

Modal split profiles for metropolitan cities are, as already said, quite diverse:

- » pedestrian mobility has the highest weight in the province of Bari (as much as one trip in three in 2016-2017), followed by Genoa and Naples, while the lowest values are recorded in the area of the Strait (Messina and Reggio Calabria), and in Catania and Rome; therefore there does not seem to be any particular correlation with the size of the city, nor with its geographical location;
- » cyclist mobility, on the other hand, is more widespread (shares over 5%) in almost all Northern metropolitan areas, with the exception of Genoa, and Florence, while in the South -, the percentages are around 1-1.5%, with the positive exception of Bari and part of Palermo. (This, however, is a significant increase compared to 2012-2013);
- » motorbikes are widely used in specific situations such as in Genoa (12% peak), Florence, Rome and Naples, while in several other situations the modal share is less than 2% (in Milan and Cagliari even less than 1%);
- » car use is high especially in the metropolitan areas of the South, in particular Reggio Calabria, Messina and Catania (shares above or close to 70%), while in the Center-North the percentages never reach 60%, with the lowest values recorded in Genoa (41.3%) and Milan (50.8%);
- » finally, collective mobility has a much greater presence in the metropolitan cities of the North (in Milan it is just over 20%, followed by Genoa and Turin) and in Rome (19.1%); in the southern areas, with the exception of Cagliari, the modal split of public transport stops below the 10% threshold (negative records in Messina and Reggio Calabria). However, it should be noted that compared to 2012-2013 public transport gained significant market shares in different southern provinces (Cagliari, Palermo, especially Catania, where the share has more than doubled).

MODAL SPLIT

Table 5 Distribution for means of transport used (percentage)

(*) Simple average

	2012 – 2013 Average					2016 – 2017 Average				
	Foot	Bike	Motorbike	Car	Public transport	Foot	Bike	Motorbike	Car	Public transport
Turin	16,1	3,7	0,6	63,6	16,0	20,8	5,2	1,5	56,2	16,3
Milan	17,9	3,0	3,2	53,8	22,1	20,6	6,8	0,9	50,8	20,9
Genoa	17,7	0,0	10,8	48,6	22,9	26,8	1,0	12,0	41,3	18,9
Venice	27,4		1,1	53,1	18,4	31,2		1,5	52,1	15,2
Bologna	13,0	3,7	5,9	64,8	12,6	23,0	5,2	3,0	57,6	11,2
Florence	15,8	2,5	10,6	55,8	15,3	22,8	5,5	8,9	52,0	10,8
Rome	13,5	0,2	4,6	58,6	23,1	18,8	1,0	5,7	55,4	19,1
Naples	21,2	0,5	5,8	58,0	14,5	26,2	0,6	4,9	55,1	13,2
Bari	25,4	0,9	0,5	61,4	11,8	32,8	3,5	1,5	54,4	7,8
Cagliari	18,1	0,1	0,2	70,1	11,5	21,7	1,5	0,7	63,0	13,1
Reggio Calabria	8,3	0,1	4,5	81,0	6,1	15,4	1,1	2,2	73,8	7,5
Messina	15,3	0,1	77,1		7,5	14,4	1,6	77,4		6,6
Palermo	19,8	1,2	2,6	69,9	6,5	23,9	2,6	2,9	62,8	7,8
Catania	14,1	0,8	5,3	75,9	3,9	17,9	1,7	4,1	68,0	8,3
Metropolitan Cities average (*)	17,4	1,2	9,5	58,2	13,7	22,6	2,7	9,1	53,0	12,6
Italian average	14,4	2,7	3,1	68,2	11,6	20,6	3,8	3,5	59,7	12,4

Sustainable mobility rate

In conclusion, it is now possible to summarize the data on modal splits in a simple indicator called **"sustainable mobility rate"** constructed by adding the percentage weights of low-impact carriers (feet, bikes and public transport) (Table 6). It is a good measure of results, even if not exhaustive, with respect to the ability of the territories to put in place policies of disincentives for the use of private vehicles and to promote alternative, less polluting, safer and less congesting modes of transport.

The rate of sustainable mobility is less than 40%, both in the average of the metropolitan cities, and in the national one, confirming the continuing domination of private vehicles in the mobility choices of Italians. However, between 2012-2013 and 2016-2017, the index grew by almost 8 points nationally and by around 5.5 points in metropolitan areas. In metropolitan territories, means of transport alternative to cars are used a little more than in the rest of the country, but this positive gap is being reduced and the indexes are now almost aligned. In recent years, therefore, the thrust of sustainable mobility policies in metropolitan cities does not seem to have been so robust (or so effective) compared to what happened in single large cities or in other territorial areas of the country.

SUSTAINABLE MOBILITY INDEX

(*) Simple average

Tabella 6 Sum of the modal share of pedestrian, bike and public transport trips.

	2016-2017 Average		2012-2013 Average		Index variation
	Index	Ranking	Index	Ranking	
Milan	48,3	1	43,0	2	5,3
Genoa	46,7	2	40,6	3	6,1
Venice	46,4	3	45,8	1	0,6
Bari	44,1	4	38,1	4	6,0
Turin	42,3	5	35,8	7	6,5
Naples	40,0	6	36,2	6	3,8
Bologna	39,4	7	29,3	10	10,1
Florence	39,1	8	33,6	8	5,5
Rome	38,9	9	36,8	5	2,1
Cagliari	36,3	10	29,7	9	6,6
Palermo	34,3	11	27,5	11	6,8
Catania	27,9	12	18,8	13	9,1
Reggio Calabria	24,0	13	14,5	14	9,5
Messina	22,6	14	22,9	12	-0,3
Metropolitan Cities average (*)	37,9		32,3		5,5
Italian average	36,8		28,7		8,1

In **GREEN** metropolitan cities who improved their rank

In **RED** metropolitan cities who lost in rank

In **GREY** metropolitan cities who remained stable

In the ranking of single metropolitan cities, the gap between North and South is very marked, with some significant exceptions. In the 2016-2017 period, Milan's area is first in the ranking with a sustainable mobility rate close to 48.3%, gaining a position compared to the 2012-2013 comparison period.

Not far behind are the areas of Genoa and Venice, which, however, loses the record won in 2012-2013. The first area of the South, Bari, is still above the 40% threshold (thanks to the powerful contribution of pedestrian mobility as we have seen previously), and Turin and Naples are right behind. In the last positions of the ranking are positioned Reggio Calabria and the three metropolitan cities of Sicily. Messina in particular shows an index of 22.6%, even lower than half of Milan's, and it is the only province that has registered a decrease, albeit slight (-0.3%), in the rate of sustainable mobility.

Finally, looking at the changes in the index, the area that experienced the greatest dynamism was that of Bologna (10 growth points between 2012-2013 and 2016-2017), which consequently earned three ranks, while the most static, apart from the aforementioned negative performance of Messina, were Venice, Rome and Naples.

Conclusions

In conclusion, here some evaluations that can be drawn from the frameworks of the analysis conducted will be summarized. In general, two points emerge with some clarity:

- » on the one hand, there are significant differences between individual metropolitan areas in mobility models, in particular in relation to some critical indicators (modal split, length and average speed of travel);
- » on the other hand, there is a certain overall homogeneity of the average data (simple averages) of the metropolitan cities with respect to the national average values.

The first point is not surprising. Styles, propensities, choices of citizens with respect to mobility and the means of transport used depend on a multiplicity of subjective factors (habits, cultural orientations, preferences) and objective factors (territorial distribution of settlements, levels of accessibility of destinations, availability of networks and transport services) with respect to which territorial mobility models take shape and differentiate³.

In this framework, focusing attention on the use of means of transport, the survey returns a cross-section of metropolitan cities characterized by interesting signs of progression towards more sustainable balances, but with a still insufficient and paradoxically inferior capacity to push, which in practice means putting in the field adequate policies to combat the use of cars, to that recordable in other territories of the country.

At the same time, it must be said that the historical performance gaps in the sector between North and South remain wide, both in the use of public transport and in cycling mobility. The metropolitan cities of the North pursue the virtuous trajectory of the integration of local sustainable mobility policies by reaping the fruits of a work set up over the years that is for example taking the Milanese metropolitan area now close to the symbolic and emblematic finish line of 50% of journeys made with alternative modes of transport to the private vehicle owned. The same is true, at different speeds, for Bologna, Turin and Genoa while some dubious result is recorded in the Venetian area, which nevertheless maintains absolute top values in the sustainable mobility index.

In the Center-South, with the exception of Florence, the picture is instead more problematic: Rome and Naples show a weak dynamism even though they can boast significant numbers in the use of public transport (especially Rome) and in pedestrian mobility (especially Naples), also because of the obvious effect of high urbanization levels. In the other southern provinces positive performances are undoubtedly being noted, for example in Bari (in active mobility) and in Cagliari (in public transport); even in Palermo, Catania and Reggio Calabria the rate of sustainable mobility is growing, but it has very low starting levels.

To reduce the persistent performance gap with the North, the southern metropolitan areas need to strengthen the planning levels and, consequently, to put in place more courageous and continuous actions in favor of sustainable transport, not so much to reverse a trend that in the later period seems positively started (as for all the national territory), but to tangibly accelerate the processes of change underway.

3 For example, if we consider two structural indicators of demographic distribution that have a strong impact on urban-metropolitan transport, that is the population density and the weight of the common capital over the population of the metropolitan area, the gaps between the areas are very significant. Compared to the population density, which in the average of the areas considered is more than double compared to the national average (470 ab / sq km versus 200 inhab / sq km) the indexes vary from the maximum point of the Metropolitan City of Naples (2630 inhab / sq km, value 13 times higher than the national average) than the minimum in Reggio Calabria (172 in / kmq); as for the population absorbed by the provincial capital, the percentages that are clearly higher are those of the Metropolitan Cities of Genoa (68.7%) and Rome (66%), while the population is maximally distributed in the cases of Bari (25.7% weight of the provincial capital) and Catania (28.1%). Now it is clear that where these indicators are higher (in the case of Rome, Milan, Genoa, Naples, Palermo) the urbanization effect is increasing and therefore, all other conditions being equal, there is a tendency for greater travel fragmentation, increasing traffic congestion, preferential accessibility by public transport (obviously with an adequate service offer) and non-motorized vehicles (shorter average journeys).

The second general point of synthesis referred to above, namely the homogeneity of the average demand data for mobility between metropolitan areas and the rest of the country and instead the distance of behavioral profiles of those living in the other cities, appears instead less obvious. This means, at least hypothetically, that with respect to the characteristics of mobility there is no specificity tied to metropolitan areas on the demand side (and presumably also on the supply side), and that it is instead easily found only in metropolitan cities.

To give substance to the administrative recognition and "justify" measures and resources to which they potentially (and increasingly) are recipients, the metropolitan cities must therefore build a new profile and a new model of mobility decisively re-oriented towards more sustainable assets.

WHAT IS THE OPMUS OBSERVATORY

The Isfort National Observatory on Sustainable Urban Mobility Policies (OPMUS) was established in 2005 at the instigation of the National Communications Foundation with the aim of increasing knowledge and developing technical tools to support the planning, implementation and evaluation of urban policies for mobility sustainability. Over the years, OPMUS has promoted various research areas, such as the construction of policy evaluation indicators, the development of guidelines for mobility plans and the analysis of national and international concrete cases in terms of benchmarks, in addition to enliven the scientific confrontation within the sector through workshops and seminars.

In this new phase OPMUS intends to reinforce the focus on the issues of contrasting and adaptation to climate change, of the reduction of energy dependence on oil, and of alternative transport models. The approach chosen to examine these processes is of a "socio-technical" type. In the modern science of sustainability this means looking for complex and deep ways to analyze changes, taking into account three main factors: market configurations, technological pressures coming from economic actors (managers of assets and service operators), and the role of public action in interacting with both the other parameters mentioned, with the aim of guiding the vanguards of innovation and experimentation present in urban society.

Among the new subjects being researched, OPMUS will also deal with the phenomena related to "digitalization", investigating the impact on mobility caused by profound changes in the lifestyles of urban populations, such as the new areas of demand concerning active mobility and proximity, the developments of corporate and school welfare, the emerging forms of *loisir* and urban tourism, the services of sharing mobility from which branch out concepts ("mobility as a service") and proposals in the perspective of sustainability and reduction of the appeal of car ownership. These are all aspects on which the protagonist of cities and metropolitan areas seems to grow, engaged in a network activity that emphasizes their role as a "test bed" for innovation, widely recognized by international organizations, but whose efforts are still looking for guidelines for implementation, support and systems of coordination or multilevel governance largely to be defined and strengthened.

EUROPEAN AND ITALIAN TRANSPORT SECTOR DECARBONIZATION TOWARD 2050

by

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The special report of the IPCC¹ published last October 2018 on the need to keep the average increase of earth's temperature within 1.5°C leaves no room for uncertainties: we must aim for "zero net emissions" by 2050 at the latest. This means decarbonizing all sectors of the economy where zero emissions are "technically" possible. The transport sector is one of these.

The transition to zero-emission transport over a period of 20-30 years involves a radical overhaul, capable of reversing an emissive trend that has persisted for over a century. The European energy dependence on fossil fuel imports is still 89% of the total consumed energy; of this, about two thirds are absorbed by the transport sector. Transport is therefore a cornerstone of the general decarbonization process of the economy. However, while for the energy sector there is a clear commitment to decarbonize by 2050, for transport Europe officially still takes a reduction of only 60%, a value established by the White Book of Transport in 2011, and that will have to be reviewed in the framework of the new European Commission document, "Clean Energy for All".

In our recent report "How to decarbonize European transport by 2050", we try to answer the big questions: is it possible to decarbonize the transport sector? And, which is the optimal path to achieve this goal?

The aforementioned report, summarizing several decarbonization roadmaps² previously developed for the main modal sectors (cars, trucks, maritime and aviation), shows that achieving the 2050 emission-free transport target is possible, but not obvious. This desirable and necessary goal requires timelines, political will and investment certainty. The key concept is to start now.

While member states are working towards the elaboration of the National Energy and Climate Plan, the national level declination of the measures necessary to reach the 2030 target set by the Paris agreement must be carried out keeping in mind the final 2050 objective.

¹ Summary for Policymakers, IPCC, 2018.

² Roadmap to decarbonizing European cars, T&E, 2017.
Roadmap to climate-friendly land freight and buses in Europe, T&E, 2017.
Roadmap to decarbonizing European aviation, T&E, 2018.
Roadmap to decarbonizing European shipping, T&E, 2018.

CO₂ emissions in transport sector

It is now known that the transport sector is the biggest European climate problem. In Europe, the combined emissions of cars, vans, trucks, ships and airplanes represent the largest, and growing, source of emissions: 27% of total emissions in 2016 with absolute values higher than those of 1990. The Italian transport sector, with 28% of emissions, stands at the European average.

Road transport is responsible for around three-quarters of total emissions. Within this category, cars and light commercial vehicles (vans) are the main source. Although all sectors are important, it is clear that the decarbonization of the vehicle fleet is a priority, given the weight of its relative emissions and the low quality of life that plagues our cities; luckily, it is also the modal sector for which zero-emission technology is mature and available. Light commercial vehicles, while also having a very important weight, represent a category generally neglected by transport policies. This increases the interest in resorting to this type of transport for goods and explains, in part, the reason for the increase of emissions. The heavy transport sector, trucks and buses, absorbs about one fifth of the total, and a quarter if considering only land transport, and its emissions are expected to continue increasing.

Aviation sector emissions have doubled³ globally since 1990, and could even triple⁴ by 2050 if action is not taken promptly. Finally, the maritime sector is responsible on a global scale for about 1Gt of CO₂ eq. emissions every year, and it is among the main emissive sectors of the economy. European emissions account for one fifth of the global maritime sector, with around 200Mt / year.

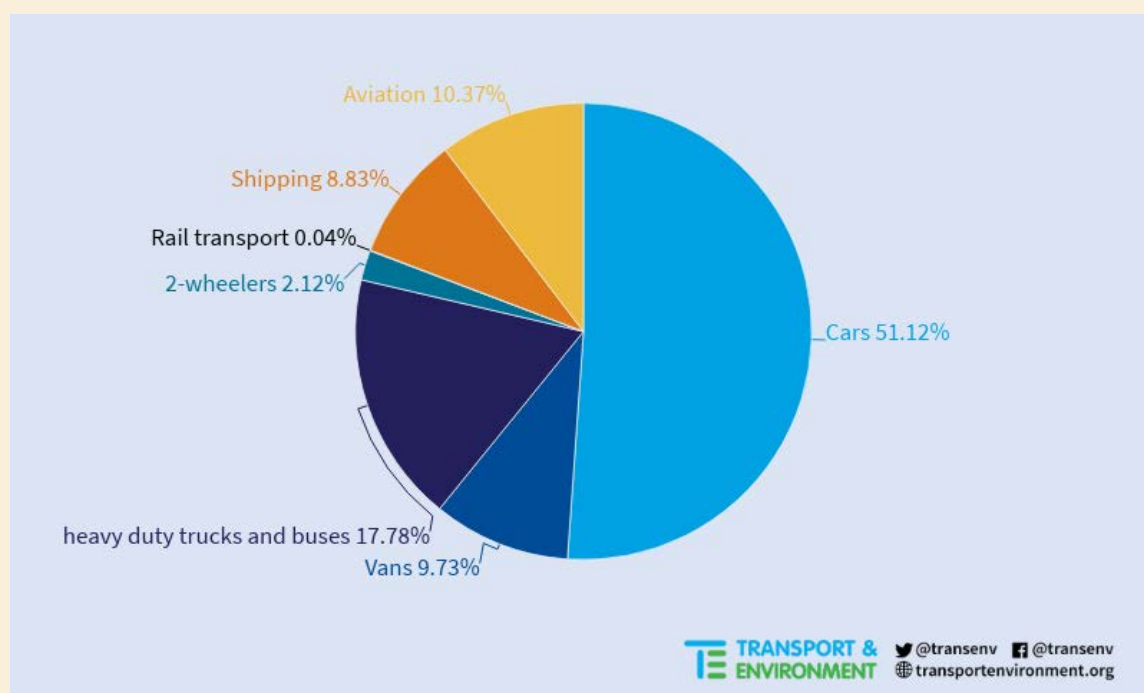


Figure 1: European transport emission by modal sector trend in 2016.
Source: UNFCCC, national GHG emission inventories

3 Member states report to UNFCCC.

4 Analysis: aviation could consume a quarter of the carbon budget for 1.5° C by 2050, Carbon Brief, 2016.

Decarbonizations paths

In addressing the issue of decarbonizing the transport sector, a holistic approach is needed, considering the fact that all sectors of the economy must be decarbonized and that a choice made for one sector may have repercussions in others. An essential parameter to take into account is the additional amount of zero-emission energy that will be required.

The reduction of transport demand and the modal shift towards more efficient displacement systems constitute a fundamental pre-requisite of each route aiming to minimize the resources needed and at the same time generate a substantial improvement in terms of urban well-being, as in air quality, urban spaces, and a drastic reduction in congestion. The main measures of the Avoid and Shift pillars of sustainable mobility are well known and already in place in many of Europe's major urban centers. However, to bring emissions from the transport sector to zero, these measures are not enough. Important technological transformations will be necessary in order to reach a system in which all modes, from car to plane, will travel with zero-emission energy.

To date, numerous analyzes agree that the only form of energy with zero-emission scalable on the entire demand for transport is electricity, which can be deployed directly (battery-powered, electric highways) or in the form of a carrier energy (hydrogen and electric fuels). The simultaneous decarbonization of the energy sector is the sine qua non of decarbonization of transport and other sectors of the economy.

Considerable investments will be needed in the renewable energy sector and in the electricity transmission grid sector. The optimal decarbonization path can be seen as the one that allows the reduction of the necessary additional electricity to a minimum. The analysis of various routes, developed for several modal sectors and summarized in the aforementioned document, was structured starting from the priority evaluation of the possible reduction in the demand for freight and passenger transport; subsequently, the additional renewable electricity necessary to feed the demand residual in three possible paths of technological improvement was calculated: electrification by direct charging, by hydrogen (in liquid or ammonia form) and feeding through electro-fuels (power-to-liquid and power-to-gas).

The potential of advanced liquid biofuels has been completely allocated to the aviation sector, in order to minimize the use of excessively expensive electro-fuels (for which it is estimated a cost of € 2100 / ton in 2050). Plug-in hybrid and hybrid technologies are not considered in the analysis, as they are transition technologies unable to achieve full decarbonization. Likewise, biomethane was not considered, whose limited additional availability (estimated at European level equal to 6% of energy demand in transport⁵) and the lack of scalability do not justify the necessary investments.

Land transport

For private mobility, a reduction in emissions is estimated at 28% in 2050 (40-50% compared to 2015) in respect to the baseline scenario, which can be obtained through the enhancement of public transport and new mobility services, together with policies aimed at discouraging the use and private ownership of the car (fuel tax reform and vehicle taxes, increase in motorway tolls and its variation on the vehicle's environmental performance, speed limits).

For heavy goods transport, a reduction in emissions of 36% is assumed compared to the base scenario in 2050 thanks to a combination of efficiency gains deriving from the new emission standards, modal shift from road to rail and improvement of logistics. For the railway sector, goods and passengers are assumed to double by 2050.

With regard to the residual transport demand to be decarbonized, some methods such as scooters, motorcycles, cars, vans and city buses have been already outlined; electrification by direct battery charging is an example.

⁵ Natural gas-powered vehicles and ships the facts. Transport & Environment, 2018.

Urban buses, in particular, are the first mode of transport in which electrification is already having a significant impact. In 2017, over 90,000 electric buses were sold in China only, and some manufacturers claim that as early as 2025 cities will only purchase electric buses⁶. Urban buses⁷ already offer a lower total cost (Total Cost of Ownership - TCO) than diesel buses considering external costs (health and environmental) and the urban bus fleet is expected to be the first mode of transport to be 100% electric. Trains have already undertaken a clear path of. For the remaining share that still travels in diesel, fuel cell electrification or hydrogen is assumed.

As for long distance buses and trucks, the road to 100% renewable energy is more uncertain. To reach 100% of ZEV in road freight transport by 2050, there are three main ways: the first is represented by hydrogen trucks produced with renewable electricity, the second by electrified motorways and the third by battery-powered electric trucks, whose production and sales in Europe seem to be imminent according to the announcement of several manufacturers such as Volvo Siemens and Mercedes. Tesla will market its Tesla Seeds this year.

Table 1 shows the sales quotas of zero-emission vehicles for road transport used in the model. For railways, the percentages are intended not as sales but as a share of activity (pkm or tkm) that passes to zero emissions (by electrification of the line or by hydrogen with fuel cells). Although the expected annual sales targets may seem overly ambitious, in reality as we shall see later, they are barely sufficient to bring the emissions of the land transport fleet to zero.

Zero Emission Vehicles Sales	2025	2030	2035	2050
Scooters and motorbikes	50%	100%	100%	100%
Cars	15%	40%	100%	100%
Vans	20%	50%	100%	100%
Urban buses	50%		100%	100%
Long distance buses	10%	25%	50%	100%
Heavy commercial vehicles (<16t)	10%	30%	80%	100%
Heavy commercial vehicles (>16t)	5%	30%	80%	100%
Trains (passengers and freight)	70%	80%	90%	100%

Table 1: Zero emission vehicles sales hypothesis per sector⁸.

Source: T&E (2019) How to decarbonizes European transport by 2050

Naval and aviation sectors

For the aviation and the naval sector, here we are limited to a few references. For airplanes, the most difficult mode of transport to lead to zero emissions, following an increase in the energy efficiency of the carriers and the reduction in transport demand we assume a contribution from advanced liquid biofuels of 11% of the residual demand, while the rest will have to be entrusted to the electric fuels⁹ (power-to-liquid).

To decarbonize maritime transport, the most probable zero-emission technological options for the various segments of European shipping are ships with direct electric propulsion, fueled with hydrogen or ammonia obtained from renewable sources, depending on the distances traveled

⁶ MAN's \$583,000 Electric Urban Bus to Test Cities' Spending Plans. Bloomberg, 2017.

⁷ Electric buses arrive on time. Transport & Environment, 2018.

⁸ For trains the value is about active trains and not sales.

⁹ Synthetic fuels that will be obtained by combining hydrogen produced using additional renewable electricity and carbon from CO2 extracted with direct air capture technology.

The best path

The following table shows zero emission electricity figures for the various modes of transport in TWh and, in brackets, the percentage value with respect to total European electricity generation in 2015, depending on whether the decarbonization technology is direct charge, hydrogen, ammonia or electric fuels.

The values in the table already take into account the reduction in the demand mentioned in previous paragraphs and the contribution of advanced fuels for the aviation sector.

Transport type	Electrical vehicles energy (TWh)	Hydrogen/ Ammonia (TWh)	Synthetic fuels (diesel, oil, natural gas and kerosene) (TWh)	Best path (TWh)
Land transport	1395 (43.1%)	3479 (107.6%)	5799 (179.3%)	1395 (43.1%)
Naval	350 (11%)	1032-1192 (32-37%)	1718 (53%)	798 (25%)*
Aviation	N/A	N/A	912 (28.2%)	912 (28.2%)

Table 2: Clean energy needed to decarbonize transport.

Source: How to decarbonize European transport by 2050 T&E (2019) *note¹⁰

According to the above analysis, the optimal decarbonization recipe, which minimizes the amount of extra clean electricity needed to feed the various fleets, appears to consist of the following ingredients:

- » Direct electrification of all land transport;
- » For maritime transport: direct electrification for short and medium distance (Roll on / Roll Off) and Hydrogen / Ammonia for long distancesdistance;
- » Aviation: sustainable advanced liquid biofuels and electric fuels.

European transport carbon budget

The carbon budget is the maximum amount of anthropogenic greenhouse gas emissions that we can issue from today to 2050 to remain below the thresholds for raising the average planetary temperature by 1.5 ° C or 2 ° C. The recent IPCC report updated the carbon budget value on the + 1.5 ° C scenario. At the end of 2018 the carbon budget was 383 Gt CO₂ for 1.5 ° C and 1033 Gt CO₂ for the 2 ° C scenario.

As emphasized by various research institutes, the allocation of the carbon budget between countries can follow different rules of application. Here the simplest methodology is used, and also the most generous for Europe, which allocates the carbon budget on the basis of the current share of emissions of individual countries ("grandfathering approach"). Taking 2016 as baseline, Europe would have a carbon budget of 34.9 Gt CO₂eq for the 1.5 ° C scenario and 94.3 Gt CO₂eq. for the 2 ° C scenario. The European transport sector therefore has a carbon budget of 8.9 Gt CO₂ for the 1.5 ° C scenario and 22.8 Gt CO₂eq for the 2 ° C scenario.

The following table shows the carbon budgets for modal sectors, with the exception of the maritime sector¹¹, and the quantity of cumulated emissions by 2050 that would correspond to the

¹⁰ Result of a mix of technologies that combines electrification for short or medium distance stretches and hydrogen technology for navigation on the high seas.

¹¹ It was not possible to model the cumulative greenhouse gas emissions but only the final energy demand by 2050 due to the lack of a suitable model for the sector. For this reason, the maritime sector has not been included in 4 the carbon budget.

optimal decarbonization path analyzed. As can be seen, although the decarbonization roadmap analyzed may appear extremely ambitious, in reality and just sufficient to stay below the threshold of the 2 ° C scenario, while the 1.5 ° C limit is largely exceeded. This means that the spread of zero-emission vehicles must take place much earlier than this analysis takes into account and underlines the vital importance of short-term measures to reduce transport demand.

	EU emissions quotas in 2016	Carbon budget since 2018 (Mt CO ₂ eq.; 66% chance)		Cumulative emissions 2018-2050 (Mt CO ₂ eq)
		1.5°C	2°C	
Motorbikes	0.23%	89	227	439
Cars	11.9%	4564	11628	9225
Vans	2.32%	891	2269	1721
Freight and buses	5.16%	1979	5041	4976
Trains	0.14%	55	139	112
Aviation	3.64%	1395	3553	3861
Total	23.39%	8972	22857	20310

Table 3: Assignment of the carbon budget based on the "grandfathering" approach compared to the cumulative GHG emissions by modal sector. Source: T&E (2019) How to decarbonize European transport by 2050

2030-2050 objectives for Italy and contribution to European measures

The decarbonization process outlined in the previous paragraphs shows the extent of the challenge that member states are facing to reach the goal of 2050 and at the same time highlights the need to act promptly. For this reason, it is of primary importance to bear in mind that the climate target set for 2030 is intermediate and functional to the final goal. The actions taken to comply with this target must be such as to place the European countries on the right path for decommissioning from now on. On the contrary, short-term, insufficiently scalable choices could seriously jeopardize the final achievement of the Paris goal. Italy, based on the provisions of the Effort Sharing Regulation, has a binding reduction target of 2030 of 33% compared to the 2005 values for all sectors of the economy not included in the ETS system¹².

Figure 2 shows the modal split of the CO₂ emissions of the Italian transport sector and the corresponding emission trends, indexed to 1990. The share of emissions from the private car sector for Italy is higher than the European average, amounting to 51% of the total, to which the 10% deriving from the vans must be added. Although the emission trend for the light vehicle fleet shows a slight decoupling between activities and emissions, in general the Italian land transport sector still seems to suffer from the after-effects of the 2008-2009 economic and financial crisis, and the reason for the decreasing trend is to be sought above all in a decrease in activity.

In the report Emission reduction strategies of the Italian transport sector¹³ developed in the context of the European Climate Initiative (EUKI) and recently published, we evaluated the amount of CO₂ emissions in the transport sector that Italy will have to cut to respect the ESR 2030 target, following the application of the new European measures envisaged for land transport by 2030 and the cut required for an Italian zero-emission transport sector by 2050. In a business as usual scenario, road transport emissions by 2030 will amount to around 100 million tons of CO₂. Assuming an equitable distribution of the 33% target among all the related sectors, road transport will have to cut its emissions by 23.8 million tons in the next decade and 76.8 million in the immediately following two decades.

¹² Non-ETS sectors: transport, agriculture, residential, waste.

¹³ Emission Reduction Strategies for the transport sector in Italy, Euki Initiative, Transport & Environment, 2019.

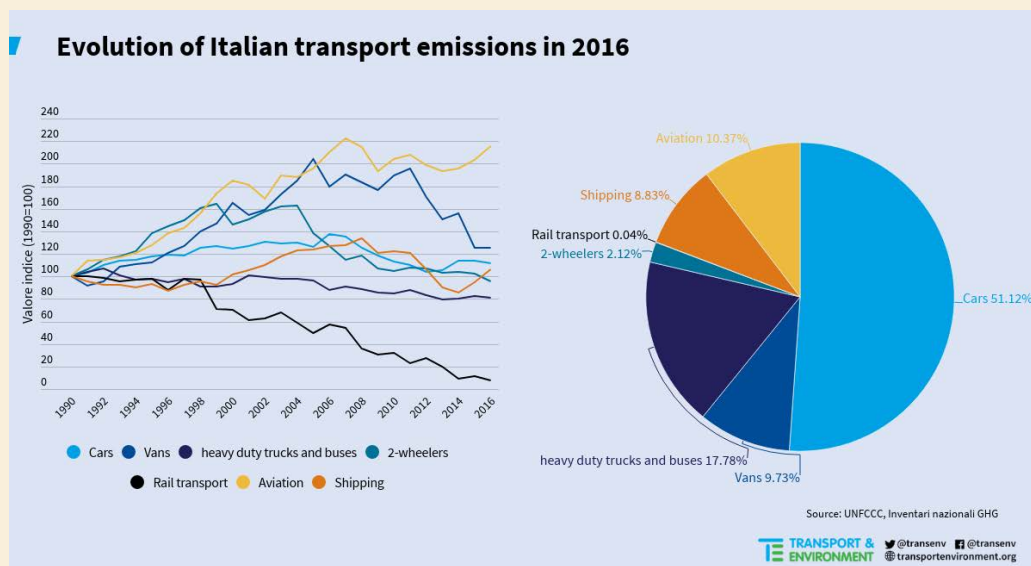


Figure 2: Italian transport emissions and modal sector trend in 2016.
Source: UNFCCC, national GHG emission inventories

The European agenda for transport policies was particularly intense in 2018 and early 2019. The new year begins with a series of news regarding European regulations and directives: new CO₂ standards for cars and vans in 2025/2030, the first European standards of efficiency for heavy transport, a new renewable energy directive (REDII) that introduces a focus on advanced fuels that include advanced biofuels, renewable electricity, hydrogen and electric fuels or fuels derived from secondary raw materials (such as plastics, exhausted gas from industrial process etc.). Finally, the recent revision of the directive on clean vehicles introduces a minimum purchase quota for heavy-duty vehicles with zero emissions for public administrations. A summary of transport policies approved at EU level is proposed in Table 4.

Regulation/ Directive	Target for 2025/2030	Recipient
Standard CO ₂ per car	-15% / -37,5%	Builders
Standard CO ₂ per vans	-15% / -31%	Builders
Standard CO ₂ per heavy vehicles	15% / 30%	Builders
REDII	14% RES in transport at 2030 in Transporting 2030 (of which 7% mandatory for advanced biofuels and renewable electricity and up to 7% optional from conventional biofuels)	Member State on Fuel Provisioner
Clean vehicles directive	45% to 65% of clean HVDs, of which at least 22.5% to 32.5% with zero emissions	PA

Table 4: EU 2030 minimum requirements for GHG emission reductions in transport. Source: T&E

While this set of measures may appear to be a good starting point, actually in Italy most of the effort required to comply with the binding 2030 objective will have to be carried out at national level. Even accounting for a certain approximation, the contribution of European measures (figure 3) to 2030 is equal to a cut of 8.2 tons of CO₂ in the Italian transport sector, about a third of the total reduction required.

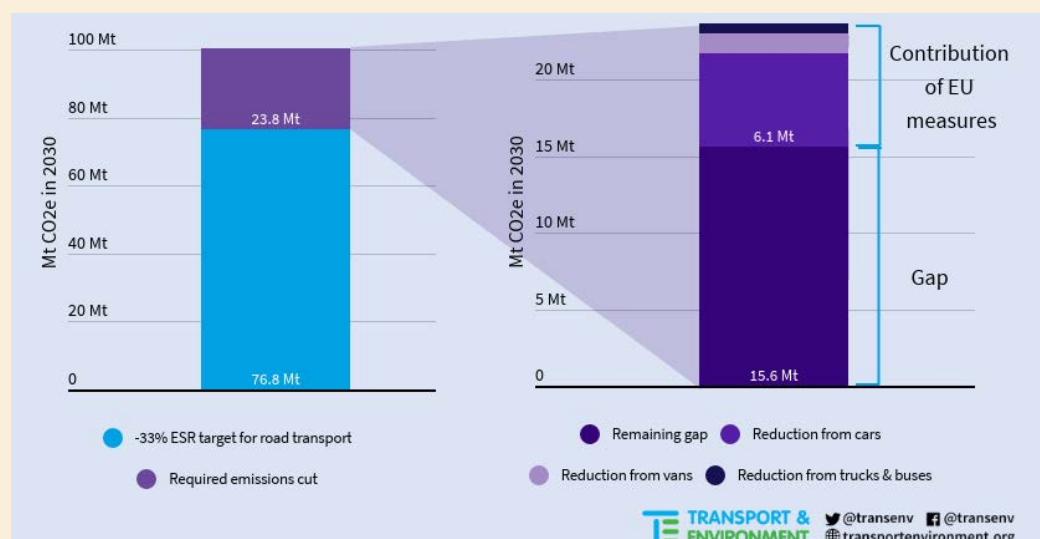


Figure 3: 2030 projection of GHG emission by Italian transport and reduction target established by ESR (LEFT). contribution of new European standards for cars, vans and heavy weight vehicles by 2030. Sources: Emission Reduction Strategies for the transport sector in Italy (Euki Initiative) T&E (2019)

It is clear that at a national level urgent and decisive policies must be implemented to reduce the demand for transport, shift to a cleaner mode and increase the efficiency of the system. The aforementioned EUKI report shows how it is possible for Italy to cut the 15.6 million tons of CO₂ remaining to close the gap needed to meet the 33% target by 2030, through a suitable policy combination capable of generating avoid and shift impacts. The policies available to generate this type of impact on the transport system are many and their field of application varies from the national level to the local level; a detailed description is proposed in the full report cited above. They may be of a fiscal nature (such as those relating to fuel taxes, the extension of road tolls for heavy vehicles to freeways or congestion charges in urban areas) or non-fiscal ones (reduction in the number of parking lots, pedestrian areas, introduction of local speed limits). In general it is possible to affirm that the combination of disincentive policies of the use of the private vehicle (increase of the cost and decrease of the comfort) together with the offer of valid alternatives will have the effect of encouraging the transition from the use of the private car with single occupant towards the use of public transport and active forms of travel.

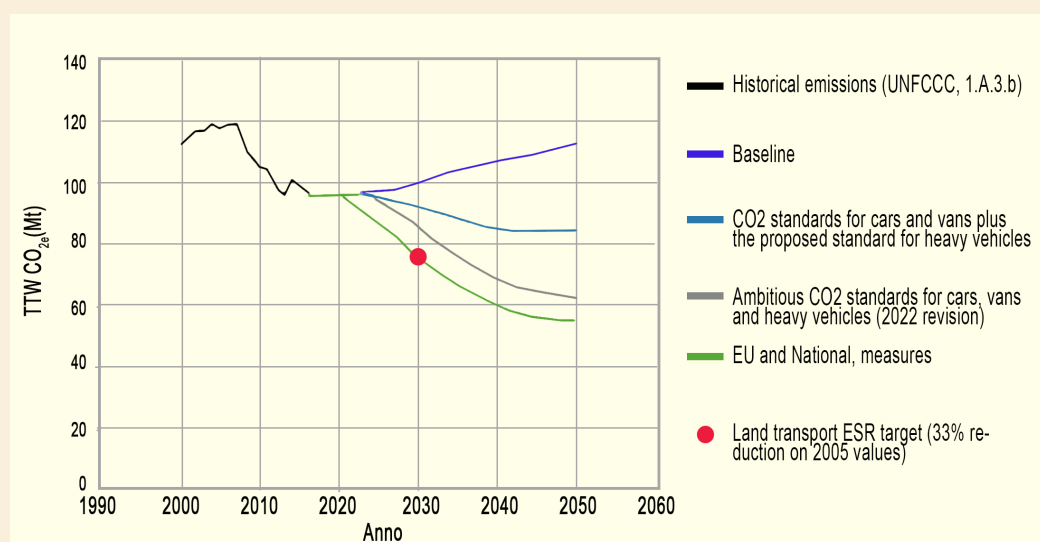


Figure 4: Long term trends for Italian tank-to-wheel emissions compared to reduction target of 33% from 2005 values. Sources: Emission Reduction Strategies for the transport sector in Italy, Euki Initiative, T&E (2019)

Finally, a long-term look is needed. From 2030 to 2050, 76.8 million tons of CO₂ remain to be cut. In other words, an annual reduction rate of more than twice that required in the 2020-2030 period is required. To bring Italian transport emissions to zero, the considerations on decarbonization paths described in the previous paragraphs apply. More ambitious CO₂ standards for cars, vans and heavy vehicles could not only contribute to a greater extent to the 2030 national target, but above all would allow the Italian and European transport sector to get on the right path for decarbonization. In this context, the revisions of the regulation for CO₂ standards of cars and vans and heavy vehicles, scheduled for 2022, offer an unmissable opportunity to correct the inadequacy of the measures approved to date.

It is necessary to align the CO₂ standards to a trajectory conforming to the Paris objective, that is a cut of 50-60% by 2030 and to stimulate the industry to quickly put zero-emission solutions on the market, to be increased over time. In this sense it is necessary, for example, to introduce a zero-emission target for all vehicles sold by 2035 at the latest.

Conclusions

The path shown in the previous pages is not the only possible solution. Different combinations and different policies could achieve the same final result. A series of considerations of general validity can however be drawn: to act preventively on the reduction of the demand for transport and on the modal shift towards more efficient means and an essential pre-requisite.

Actions must be undertaken simultaneously on the local, regional, national and European scale. Together with the reduction of transport demand and the maximization of system efficiency, the transition towards zero-emission solutions must be supported and accelerated, with a view to minimizing the additional clean energy needed, favoring highly efficient technological solutions. Finally, this transition must be started now: the industry needs guaranteed investment in order to be able to move toward the objectives and the available carbon budget does not admit further delays.

Some of the actions needed to solve the problem will require a considerable amount of public funds, and others will initially be unpopular and not easy to implement, or will go in a completely opposite direction to the historically consolidated interests. The challenge is undoubtedly of great importance, in particular for Italy, lagging behind other member states, in facing the problems of its transport. System and which could be brought to fall, once again, by the temptation of making short term choices.

The 2030 National Energy and Climate Plan, together with the long-term national strategy requested by the European Commission for January 2020, offers a considerable opportunity in this regard: even if, to date, the first draft of the plan sent to Brussels does not seem to grasp the extent of the transformation required, there are a few months ahead to adjust the pitch and set the rudder on the 2050 target.

An awareness of what is at stake, coherence, farsightedness and a pinch of courage will be essential ingredients for the political decision-maker to implement a Plan that is up to the challenge, or perhaps we should say to the mission, that the current historical moment requires to face.

PROPOSALS TO IMPROVE MOBILITY, AIR QUALITY AND URBAN SPACE IN ITALIAN CITIES

TOOLS FOR STRATEGIC INTERVENTIONS

1) Organize a systematic collection at the MIT of Italian cities of mobility measures in urban areas on networks, offered services, regulatory tools, technologies, innovations, demand for mobility as well as data on air quality, noise, congestion, road safety, fuel consumption, CO₂ emissions, settlement changes, intertwining correlations and results. PGU, PUM and PUMS must be part of this survey.

2) The number of control units in the Metropolitan Cities must be expanded to have a better understanding of air quality phenomena. The parameters to be investigated must be expanded as well. Correlation between epidemiological investigations and health effects must be studied. Relationship between pollutant emissions from other sectors and effects on urban pollution, energy consumption and CO₂ emissions in transport must be investigated. Understanding of large area phenomena and correlation with weather conditions must be elaborated on. **The objective is to strengthen the collection, analysis and research on air quality, related phenomena and health effects.**

3) Approval of a New Highway Code with innovative tools for governing and managing urban mobility, rules and incentives for sharing mobility, with the goal of zero deaths on the roads. The Energy and Climate Strategy for the Development of Electricity and Renewable Energy and Action Plan for Respect of the Paris Agreements COP 21 must be approved as well. **The objective is to adopt rules and plans to decarbonise transport, and for the management of mobility, road safety and the quality of urban space.**

4) All Metropolitan Cities, single municipalities or aggregates over 100,000 inhabitants must approve the PUMS within two years, as defined in the MIT Decree of 4 August 2017. This could be an excellent opportunity to achieve environmental, social and economic goals in urban mobility, with the participation and sharing of citizens. **The objective is the approval of the Urban Plans of Sustainable Mobility within the established times.**

5) Regional plans for quality and air remediation. There is a need for the issue of homogeneous Guidelines for the preparation and updating of the Plans. They will have to contain stringent targets for the reduction of greenhouse gases (-33% by 2030), sustainable mobility targets (on foot, by bicycle, collective transport, sharing mobility), increasing targets for vehicle electrification, reduction of emissions for the air quality. We need stringent obligations for the regions, even if differentiated on the basis of the state of affairs and progressive with respect to 2030.

6) The General Plan for Transport and Logistics is a strategic tool that must also contain the objectives related to urban mobility, with sustainability and modal split targets to be achieved progressively and constantly monitored. The choices regarding services, investments, incentives and rules must be consistent and provide real support for strategic choices. **The objective is to update the General Transport and Logistics Plan, as set out in the Procurement Law 50/2016 Code.**

ACTIONS AND MEASURES TO IMPLEMENT

- 7) Encourage the growth of cycling mobility, of Limited Traffic Areas and of Pedestrian Areas** and encourage the increase of lanes and spaces dedicated to cycling, parking for bicycles and velostations at LPT stops and stations, bicycle workshops and bicycle storage. Enforce the control of vehicles parking. Invest on interventions for traffic moderation and road safety, multi-function green infrastructure (active mobility, green water management) and for urban redevelopment. The new Law for cycling mobility No. 2/2018, which envisages the adoption of the Biciplan, must be implemented. **The goal by 2025 is to increase cycling for daily journeys to 10% and pedestrian mobility in Italy to 25%.**
- 8) Enhancement and innovation for Collective Transport services.** New vehicles and vehicles for the service need to be purchased, with 800 million additional resources / year for electric buses, compared to the already financed investment plan, to reach full electric at 2033. An increase of resources for Service Contracts is required, and technological innovation for on-call, multimodal services should be encouraged. One target should be more lanes reserved for LPT and investments for trolley buses and BRT, as well as an increased efficiency of companies and reorganization of services in metropolitan cities in an integrated way, especially in low density areas. **Complete investments for metropolitan networks and new tram networks in medium-sized cities could surely help with reaching the goal of 20% collective transport by 2025 in Italy.**
- 9) For the increase in wide area Railway Services in the Metropolitan Cities,** multimodal integration in urban nodes, new stops and stations of the SFM are needed, together with the modernization of the means and strengthening of the regional railway networks and completion of investments in urban railway junctions. Also important is multimodal integration with buses, exchange parking lots, bicycles, shared vehicles, and integrated tariffs for services and card for mobility. **The goal is to increase the number of users using regional and metropolitan rail transport by 20% by 2025.**
- 10) In order to further the preparation of sustainable low impact,** efficient urban logistics services for goods, in agreement with the operators, one step is the reorganization of distribution systems, transit points, multi-product delivery services, bookable rest areas, following with the promotion of third parties and low-impact vehicles, with reward systems on the rules for access to the LTZ (schedules, tariffs). Another way worth following is giving support for the development of Pedal Logistics, with dedicated stands and stalls, and investigating possible service innovations for the delivery and collection of products purchased online. **The objective is the implementation of the Urban Sustainable Logistics Plan within the PUMS.**
- 11) Regarding the growth of sharing mobility,** such as car sharing, bike sharing, carpooling, scooter sharing, neighborhood sharing, electric mobility, van sharing, a strategy must be developed that facilitates the use of the shared vehicle (insurance, car tax, parking stalls) and its integration with the collective transport, reducing the number of owned vehicles and privileging the use of electric vehicles. We need a reform in this direction of the Highway Code that recognizes and facilitates sharing mobility. **The goal is to reach 2025 with a motorization index of 50 cars per 100 inhabitants in Italy.**
- 12) In order to reduce emission, the promotion of electric vehicles,** for private cars, shared vehicles, collective transport, motor vehicles are needed, and the same is true for pedal assisted bicycles and the installation of charging stations by energy operators. **The objective is a European target for stopping the sale of internal combustion cars, with increasing annual quotas. In this sense it is necessary to introduce a zero-emission target for all vehicles sold by 2030 at the latest.**
- 13) The current opportunities determined by ITS and ICT are really extensive for innovative services,** info mobility, online payments, reservations, real-time vehicle sharing, parking control, authorizations, access, tourist flow management, smart roads. The future of the self-driving vehicle looks promising. Each segment of mobility will be permeated by the digital revolution, by connectivity and its operational applications. **The objective is to promote research, experiments and technological innovations for autonomous driving shared vehicles, for collective transport and for intelligent transport systems.**



DATA AND ANALYSIS OF 14 MAJOR CITIES AND METROPOLITAN AREAS

The following pages analyze the 14 major Italian cities and metropolitan areas, with an overall picture of air quality and urban mobility trends from 2017 to 2018. The cities analyzed are: Bari, Bologna, Cagliari, Catania, Florence, Genoa, Messina, Milan, Naples, Palermo, Reggio Calabria, Rome, Turin, Venice.

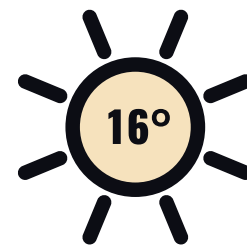
Also included are survey data on the characteristics of the mobility demand of the 14 metropolitan areas developed by OPMUS ISFORT.

In the following pages for each city are indicated:

- » The fundamental data of the city such as size, population, density, average income, urban green areas, climatic conditions.
- » The fundamental data on urban mobility 2017-2018 and the trends recorded on the various parameters.
- » The survey data on the characteristics of the mobility demand
- » A comment on the state of urban mobility, current trends and the relevant mobility actions implemented by the Municipal Administrations.
- » The available data on air quality recorded by the 2017-2018 monitoring stations.
- » A comment for each city on the state of air quality and the trend over the decade.
- » The graphical representation of the data on mobility and air quality to make the status of the situation, trends over the years and the comparison between cities immediately understandable.
- »

BARI

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED

PUM
IN PROGRESS

PUMS
ADOPTED

In the years considered by this report, the city of Bari has essentially stabilized the **offering and the use of public transport**.

The motorization index in the city for cars and motor-cycles **is growing**. The same is true in the metropolitan area, as indeed in all Italian metropolitan areas.

Bike paths are increasingly common, but the network is still sparse; **pedestrian areas have increased significantly**, including a pedestrian walkway connecting to the Santo Spirito station. The walkway is 100 meters long, connecting the station underpass with the access road near the railway crossing.

At the beginning of 2019 works started for pedestrianization, as well as tactile paths for the blind for Piazza Redentore, as decided by a Council Resolution in December 2018. These public works include new paving for the 5.000 m² pedestrian area, trees, play areas for children, and paths for people with visual impairments. The executive project was approved to meet the needs of residents, the requests of the Salesians and the requirements of the Superintendent.

First ever promotion of cycling: the Municipality of Bari adopted a resolution in January 2019 and issued a call to ensure a contribution of 20 cents per km for those who use a bicycle to go to work. An experimental project for a period of four months was launched thanks to a €545.000 financing by the Ministry of the Environment, which makes mobility vouchers available to urban cyclists. The figures are halved for those who use an electric bike. Either way, the mileage reimbursements are capped at €1 per day and €100 in four months. Another provision for bicycle mobility in the Municipality of Bari is the financing obtained by the Apulia Region to build a **bike station** near the railway station located close to the Policlinico.

Sharing mobility in Bari is in having difficulties. Car sharing has not taken off; it was suspended in 2018 due to poor results. While bike sharing was also suspended, it should return to Bari during the spring in 2019 with 200 smart bikes spread between 34 stations. This is the executive project of the new bike sharing service of the Municipality of Bari as delivered in October 2018 by Sitael, the company that was awarded the contract.

In 2017 and 2018 the trial run of the Seaside Walking Path continued on Sundays during the summer. **A waterfront redevelopment project was announced, focused on bicycle and pedestrian use, among other initiatives.** The city's Old Town Water-front initiative continues to move forward; the design is in the drafting phase, with opinion gathering to follow. Works should begin in 2019, which will completely redesign the appearance and usability of the historic seafront. The City Council also approved in January 2019 a preliminary project for the renovation of the San Cataldo Promenade with a €2,855 million budget.

THE PUMS OF THE CITY OF BARI

In July 2017 the City Council approved the PUMS for the city of Bari, a strategy document that provides for the integration of programs and projects relating to sustainable mobility, whether already approved, in the approval process, or in the late stages of planning. The document aims to provide the city with a unified and integrated vision of policies and actions to promote sustainable mobility, which are in turn connected to the metropolitan transport system.

There are no activities for the Strategic Environmental Assessment and the submission of observations to be sent to the City Council.

The plan is divided into 8 objectives: BiciPlan, Metropolitan Transport and Intermodality, Public Transport Reorganization Plan, Smart Mobility, City Logistics, Shared Mobility, Mobility Management, Traffic and Parking Reorganization Plan.

MUNICIPAL AREA

RESIDENTS
324.198

DENSITY
2.762 pl/km²

EXTENSION
117 km²

PEDESTRIAN AREA

0,5 M²/RESIDENTS

GROWTH RATE
2016/2017 **+19%**

BIKE PATHS

25 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **+38%**

LTZ EXTENSION

0,3 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS FOR VEHICLES

1.423

GROWTH RATE
2016/2017 **+3%**

ENTRANCES /DAY

GROWTH RATE
2016/2017 **---%**

DEMAND FOR PUBLIC TRANSPORT

68

PASSENGER/PEOPLE

+0,7% GROWTH RATE 2016/2017



11 MLN

KM TRAVELLED IN 2017

+4% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES- KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

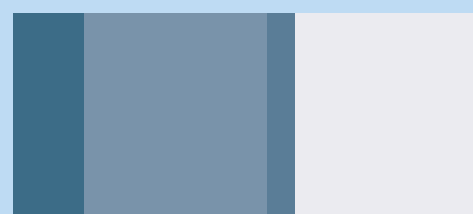
AUTOBUS	3.047	-11%
TRAM	---	---
FILOBUS	---	---
METRO	---	---
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

5 INCIDENT /1000 PL
+4% GROWTH RATE
2016/2017

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **0%** **0,5**

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 15% BIKE 6%
MOTORCYCLE 39% VEHICLES 40%

INTERCHANGE CAR PARK

60 N. CAR PARK EVERY
1000 OF CARS

--- GROWTH RATE
2016/2017

PAID PARKING ON THE STREET

24 N. CAR PARK EVERY
1000 OF CARS

--- GROWTH RATE
2016/2017

CAR SHARING

30 **0%**

FLEET OF CARS 2016/2017

1,8 **+30%**

USERS/1000 PL 2016/2017

BIKE SHARING

--- ---

FLEET OF BIKE 2016/2017

--- ---

USERS/1000 PL 2016/2017

TAXI LICENCES

N. TAXI/1000 PL IN 2016

--- GROWTH RATE
2016/2017

RENTAL WITH DRIVER LICENCES

N. RWT/1000 PL IN 2016

--- GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
1.260.142

DENSITY
326 pl/km²

EXTENSION
3.862 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17.

The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

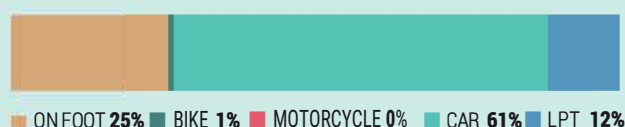
PUMS

NOT AVAILABLE SUSTAINABLE URBAN
MOBILITY PLANS

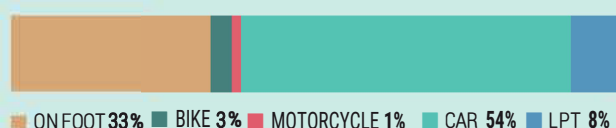
MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



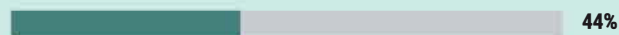
SUSTAINABLE MOBILITY RATES

Percentage on the total of the trips on foot, by bike and by public transport

2012/2013



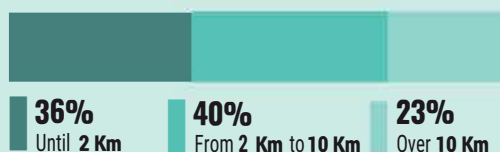
2016/2018



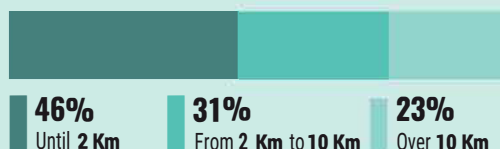
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



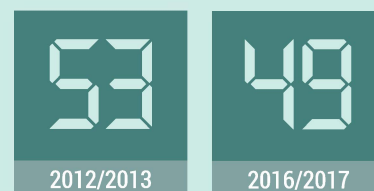
MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



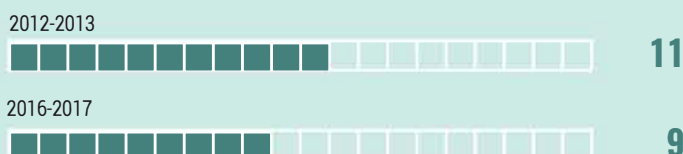
TIME SPENT FOR TRIPS

on a typical weekday
(in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)

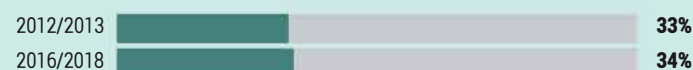


AVERAGE VELOCITY OF TRIPS

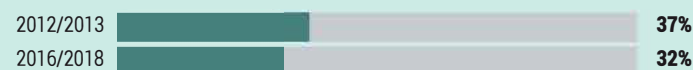


MOTIVACION OF TRIPS

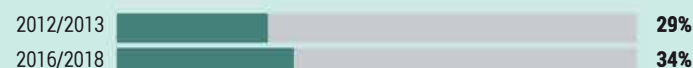
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

MOTORIZATION RATE

+2%
GROWTH RATE 2016/2017

551

MOTOR VEHICLES
EVERY 1000 RESIDENS

553

+2%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

103

MOTORCICLES
EVERY 1000 RESIDENS

74

+1%
GROWTH RATE 2016/2017

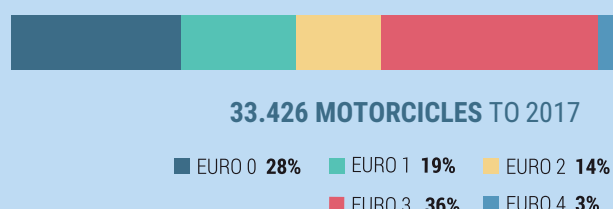
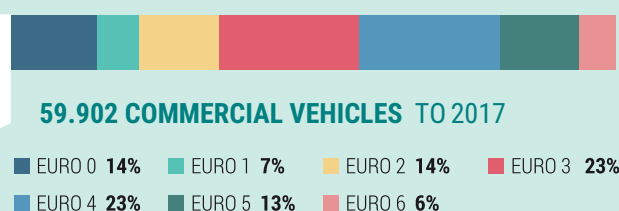
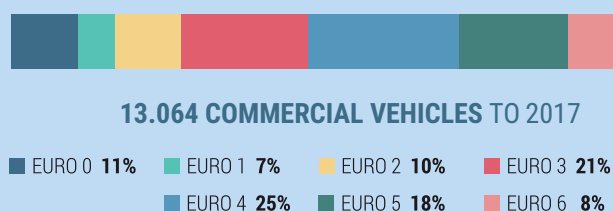
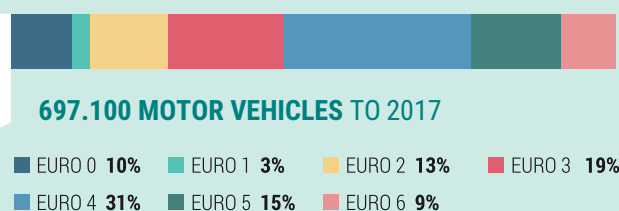
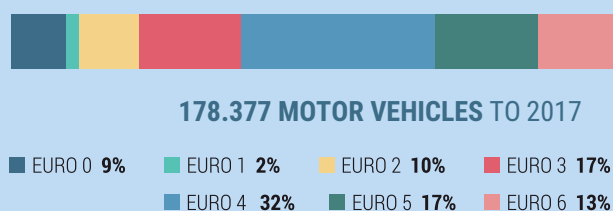
MOTOR
VEHICLES
CARS/KM2 ON 2017

1.521





ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

180

MOTOR
VEHICLES
CARS/KM2 ON 2017



TYPE OF SUPPLY

				
---	80.372	PETROL	282.022	2.231
---	79.737	DIESEL	347.691	54.978
---	12.022	LGP	40.230	500
---	5.818	METHANE	25.846	2.102
---	540	HYBRID	1.287 *	90 *
---	23	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

BARI



The monitoring stations in the city of Bari are the same five used in previous years: Carbonara, CUS, Kennedy, Caldarola and Cavour. Of these, the first three are referred to as background stations, while the other two are for traffic.

The general town situation shows slight increases in average particulate concentrations, respectively 4% for PM_{10} and 7% for $PM_{2.5}$, while there is a decrease for NO_2 equal to 10%.

The two annuities under examination register an annual cumulated rainfall of 502 mm in 2017 and 611 mm in 2018. As for rainy days, weather stations recorded 100 for 2018, while in 2017 there were 103 rainy days.

The average **concentration** of NO_2 continues to remain well below the legal limits, and compared to 2016 there is a decrease from 29 to $26\mu g/m^3$.

In 2018 the number of **exceedances** of NO_2 hourly limits is unchanged, still staying at zero this year.

Similarly, the average **concentration** of both particulate fractions remains almost unchanged compared to 2016 and 2017, and still firmly below the legal limit: the average concentration of **PM_{10}** is both in 2017 and 2018 equal to $25\mu g/m^3$. Regarding the number of daily **exceedances** of PM_{10} , there is a reduction from 20 in 2017 to 9 in 2018.

The **$PM_{2.5}$ concentration** recorded a slight increase in 2017, settling at an average value of $16\mu g/m^3$.

Considering the **traffic stations**, there are still modest increases for particulate matter; in fact, both have seen an increase of 13% for NO_2 , although the concentration for all station is below the limit of $40\mu g/m^3$. As for the **background stations**, there is a 24% for NO_2 , which in the last two years was equal to $36\mu g/m^3$.

Going into detail of the individual stations in 2018, there were no criticalities despite the fact that there was an increase in concentrations compared to 2016.

The situation in Bari seems to vary little in the year 2018, at least for the average concentrations of the pollutants examined, therefore the city manages to keep air quality parameters below the permitted limits.



MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

28 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2017

MAX EXCEEDANCES STATION IN 2017

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-10%	+13%	-24%

CONCENTRATION
AVERAGE 2018

26 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2018

EXCEEDANCES MAX STATION IN 2018

CONCENTRATION
AVERAGE 2017

25 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

20 IN 2017

MAX EXCEEDANCES STATION IN 2017

CALDAROLA

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
+4%	+8%	0%

CONCENTRATION
AVERAGE 2018

25 µg/m³

EXCEEDANCES
DAILY LIMIT VALUE

9 IN 2018

EXCEEDANCES MAX STATION IN 2018

CARBONARA

CONCENTRATION
AVERAGE 2017

15 µg/m³

PM_{2,5}

TREND CONCENTRATION
2016/2018

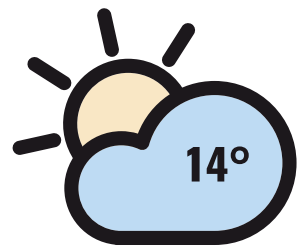
AVERAGE	TRAFFIC	URBAN
+7%	+7%	---

CONCENTRATION
AVERAGE 2018

16 µg/m³

BOLOGNA

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED

PUM
www.pum.it

PUMS
WIDE AREA
ADOPTED

During these two years, Bologna has distinguished itself with the launch and success of car and bike sharing services, as well as with the decision to build a tram network and with the adoption of the PUMS on a metropolitan scale.

Public transport use has grown (+17%), while pedestrian areas and the network of cycle paths have increased only slightly. However, **the motorization index of cars and motorcycles is growing** both in the city and at the metropolitan level, a phenomenon that is present in all Italian realities.

In June 2018, **Mobike, the free-floating bike sharing service**, was launched with 1,000 bicycles, after winning the a six-year contract with the city. Bikes are located in 200 locations, called Mobike Hubs. The city's previous **public Bike Sharing** was also updated, with a pilot project beginning in June 2018 that has introduced a thousand smart bikes with on-board computers, distributed over about 90 stations.

At the end of September 2018, the **car sharing service Enjoy** was launched in the city. This service covers a total area of 15 square kilometers with one hundred Fiat 500s. At the end of October 2018, **Corrente** made its debut as the first free-flow, publicly-owned, all-electric car sharing service in Italy. With 120 cars already, it is expected to soon reach 240.

In April 2018, **two agreements were signed by the City with Enel** for the expansion of the electric vehicle charging network, which will reach over 50 charging points.

On the 7th of March 2018, a project was presented for the new tram system, as provided for by PUMS, which includes four lines: a red line (from Borgo Panigale to CAAB Agrarian Faculty), a yellow line (from Casteldebole to Rastignano), a green line (from Due Madonne to Corticella), and a blue line (from Casalecchio to San Lazzaro).

In December 2018, the request for financing of the first line - the red line, with a length of 16.5 km and 30 stops - was made to the Government.

This line's estimated costs amounted to €510 million, and as of now the city is waiting for the outcome of the financing request. A temporary business grouping of Systra, Sotecni, Architecna, Studio Mattioli, Aegis, Cooperativa Archeologia was commissioned for the project following a European bidding process. The process of informing and involving citizens in the project was launched in March 2019.

THE PUMS OF THE METROPOLITAN CITY OF BOLOGNA

Bologna drew up a PUMS in 2016 for the Metropolitan Area, instead of at a municipal level, with guidelines approved at that time. After the call for proposals on the subject to be elaborated by the PUMS, the Forum for Sustainable Mobility was launched, with citizen participation. The phase of gathering information on the current mobility situation has already finished, and proposals and scenarios for the future have been put forward.

After the go-ahead by the Metropolitan City Council and the Municipality of Bologna, **on 27 November 2018, the metropolitan mayor adopted the Urban Plan for Sustainable Mobility (PUMS)**. A citizen participation process was important to the final approval as well. This is the first Italian PUMS approved at the metropolitan level, and envisions a metropolitan area where, in 2030, sustainable mobility (walking, bicycles, public transport) will reach 60% (70% in Bologna), a complete reversal of the current proportions.

The objective of the Plan (which consists of 360 pages of reports, 260 of situation snapshot, and 20 addenda), is to reach a 40% reduction in emissions of greenhouse gases from traffic by 2030: this means that 440,000 trips by car (out of a total of 2,7 million trips that take place every day in the metropolitan area) will have to be carried out on sustainable modes, in particular public transport (+19%) and bicycles (+14%).

In order to reach the emissions reduction objectives, the PUMS calls for a decisive strengthening of Metropolitan Public Transport, a metropolitan biplan with 700 km of new bike paths, an increase in pedestrian traffic, a "30 City" with a maximum speed of 30 km/h in the urban network, and the use of vehicles with low environmental impact.

This very ambitious metropolitan PUMS underwent an **observation phase, ending on March 11th and comprising around 150 comments**, which the Administration must now evaluate before continuing the approval process.

<http://pumsbologna.it/>

MUNICIPAL AREA

RESIDENTS
388.367

DENSITY
2.757 pl/km²

EXTENSION
141 km²

PEDESTRIAN AREA

0,3 M²/RESIDENTS

GROWTH RATE
2016/2017 **3%**

BIKE PATHS

171 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **1%**

LIZ EXTENSION

2,27 M² OF LIZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLE TO ACCESS
FOR VEHICLES

254.623

GROWTH RATE
2016/2017 **3%**

ENTRANCES/DAY

38.070

GROWTH RATE
2016/2017 **23%**

DEMAND FOR PUBLIC TRANSPORT

398

PASSENGER/PEOPLE

+ 18% GROWTH RATE 2016/2017



50 MLN

KM TRAVELLED IN 2017

0% GROWTH RATE

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	3.559	-1%
TRAM	---	---
FILOBUS	219	+54%
METRO	---	---
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY

INCIDENT RATE IN 2016

5 INCIDENTI/1000 PL
+2% GROWTH RATE
2016/2017

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **0%** **0,8**

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 16% BIKE 14%
MOTORCYCLE 39% VEHICLES 28%

INTERCHANGE CAR PARK

6 N. CAR PARK EVERY
1000 OF CARS

--- GROWTH RATE
2016/2017

PAID PARKING ON THE STREET

167 N. CAR PARK EVERY
1000 OF CARS

-2% GROWTH RATE
2016/2017

CAR SHARING

FLEET OF CARS 2016/2017

USER/1000 PL 2016/2017

BIKE SHARING

211 -2%

FLEET OF BIKE 2016/2017

17 +7%

USER/1000 PL 2016/2017

TAXI LICENCES

1,82

N. TAXI/1000 PL IN 2016

+10% GROWTH RATE
2016/2017

RENTAL WITH DRIVER LICENCES

0,58

N. RWT/1000 PL IN 2016

-2% GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
1.009.210

DENSITY
273 pl/km²

EXTENSION
3.702 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17.

The investigation is based on a sample of about italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

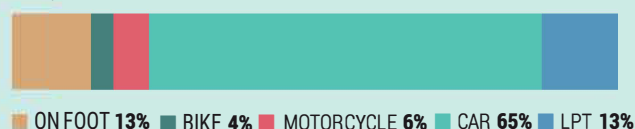
PUMS

AVAILABLE IN 2017, ADOPTED IN SEPTEMBER BY METROPOLITAN AREA

MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



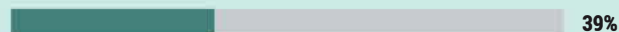
SUSTAINABLE MOBILITY RATE

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013



2016/2018



THE VARIATION OF WEIGHT PERCENTAGE

10,1

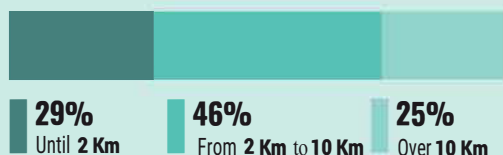
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



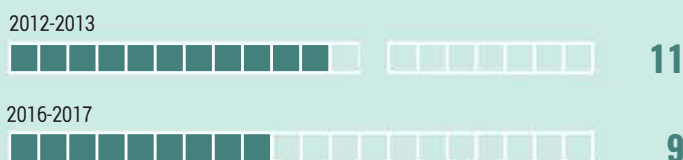
TIME SPENT FOR TRIPS

on a typical weekday (in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)



AVERAGE VELOCITY OF TRIPS

34

Km/h
2012/2013



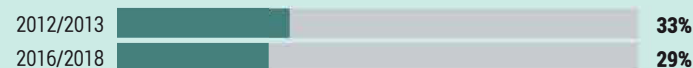
26

Km/h
2016/2017

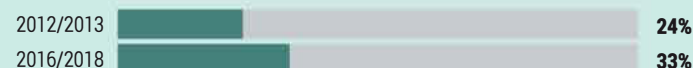
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

MOTORIZATION RATE

+3%
GROWTH RATE 2016/2017

531

MOTOR VEHICLES
EVERY 1000 RESIDENS

604

+2%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

144

MOTORCICLES
EVERY 1000 RESIDENS

123

+1%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

1.465

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

165

MOTOR VEHICLES
CARS/KM2 ON 2017



206.256 MOTOR VEHICLES TO 2017

■ EURO 0 **6%** ■ EURO 1 **2%** ■ EURO 2 **7%** ■ EURO 3 **11%**
■ EURO 4 **31%** ■ EURO 5 **23%** ■ EURO 6 **20%**



609.981 MOTOR VEHICLES TO 2017

■ EURO 0 **6%** ■ EURO 1 **2%** ■ EURO 2 **8%** ■ EURO 3 **12%**
■ EURO 4 **31%** ■ EURO 5 **23%** ■ EURO 6 **18%**



19.888 COMMERCIAL VEHICLES TO 2017

■ EURO 0 **9%** ■ EURO 1 **5%** ■ EURO 2 **11%** ■ EURO 3 **19%**
■ EURO 4 **23%** ■ EURO 5 **21%** ■ EURO 6 **12%**



68.213 COMMERCIAL VEHICLES TO 2017

■ EURO 0 **11%** ■ EURO 1 **6%** ■ EURO 2 **13%** ■ EURO 3 **21%**
■ EURO 4 **22%** ■ EURO 5 **18%** ■ EURO 6 **9%**



56.050 MOTORCICLES TO 2017

■ EURO 0 **22%** ■ EURO 1 **14%** ■ EURO 2 **14%**
■ EURO 3 **44%** ■ EURO 4 **6%**



124.021 MOTORCICLES TO 2017

■ EURO 0 **27%** ■ EURO 1 **16%** ■ EURO 2 **14%**

TYPE OF SUPPLY



---	96.831	PETROL	257.405	3.232
---	69.700	DIESEL	226.336	58.904
---	22.034	LGP	65.908	1.636
---	13.461	METHANE	51.278	4.313
---	4.273	HYBRID	8.726 *	127 *
---	75	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

BOLOGNA



The monitoring stations in the city of Bologna are the same as those used in previous years: Giardini Margherita, Chiarini and Porta San Felice. Of these, the first 2 are referred to as background stations, while the third as traffic.

The general town situation shows, from 2016 to 2018, a decrease in the annual average relative to NO_2 concentrations equal to -11%, no substantial change for PM_{10} and, instead, an increase of $\text{PM}_{2.5}$, equal to +18%.

The two annuities under examination register annual cumulated rainfall of 575 mm in 2017 and 748 mm in 2018. As for rainy days, weather stations recorded 81 for 2018, while in 2017 there were only 55 rainy days.

As for the previous years, the average annual **concentration of NO_2** continues to be below the legal limits and down compared to 2016, reaching around $32\mu\text{g}/\text{m}^3$. In 2017 and 2018, the number of **exceedances** of NO_2 hourly limits continues to be at optimal conditions, still registering zero exceedances during the year, similar to previous years and confirming the constant improvement relative to this pollutant.

The **concentration of PM_{10}** does not change in 2018 compared to 2016, despite the fact that in 2017 there was a higher concentration, equal to $27\mu\text{g}/\text{m}^3$. Regarding the number of daily **exceedances** of PM_{10} , the situation has instead surprisingly improved for the year 2018, recording just 18 exceedances, lower than the allowed limit of 35. This situation is in contrast with what occurred in 2017, when the number of exceedances stood at 43. The latter value, higher than the limit, may have been influenced by the low rainfall that characterized 2017, settling in the city of Bologna at 22% less than in the 2006-2016 period.

Preferring instead to **$\text{PM}_{2.5}$** , the situation remains more or less constant since 2008, reaching around $20\mu\text{g}/\text{m}^3$.

Analyzing the **traffic station** situation, there is a very high $\text{PM}_{2.5}$ increase of 37% compared to 2016, with the result of exceeding the annual concentration limit. Regarding instead the **background stations**, there is a reduction in NO_2 (-18%), while for PM_{10} there were no changes compared to 2016 for both traffic and background stations.

Bologna is a city that has managed to tackle well the problems related to NO_2 , but has not yet succeeded in preparing sufficiently incisive measures for particulate matter. These pollutants actually remain on acceptable average values, but the number of daily exceedances of PM_{10} is still a problem to be faced, perhaps linked to the climatic and meteorological consequences of the location of the city in the Po Valley. The analysis of subsequent years will make it possible to more effectively assess whether the number of exceedances is actually getting lower, as shown by the year 2016 and 2018, which were not influenced by rainfall conditions.



NO ₂ ANNUAL AVERAGE	23
HOURLY EXCEEDANCES	0
PM ₁₀ ANNUAL AVERAGE	24
DAILY EXCEEDANCES	14

Chiarini

Porta san felice

NO ₂ ANNUAL AVERAGE	49
HOURLY EXCEEDANCES	0
PM ₁₀ ANNUAL AVERAGE	26
DAILY EXCEEDANCES	18
PM _{2,5} ANNUAL AVERAGE	26

Giardini Margherita

NO ₂ ANNUAL AVERAGE	22
HOURLY EXCEEDANCES	0
PM ₁₀ ANNUAL AVERAGE	22
DAILY EXCEEDANCES	10
PM _{2,5} ANNUAL AVERAGE	15

0 1 km

MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

33 µg /m³

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2017

MAX EXCEEDANCES STATION IN 2017

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-11%	-6%	-18%

CONCENTRATION
AVERAGE 2018

32 µg /m³

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2017

EXCEEDANCES MAX STATION IN 2018

CONCENTRATION
AVERAGE 2017

27 µg /m³

EXCEEDANCES
HOURLY LIMIT VALUE

43 IN 2017

MAX EXCEEDANCES STATION IN 2017

PORTA SAN FELICE

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
0%	0%	0%

CONCENTRATION
AVERAGE 2018

24 µg /m³

EXCEEDANCES
DAILY LIMIT VALUE

9 IN 2018

EXCEEDANCES MAX STATION IN 2018

PORTA SAN FELICE

CONCENTRATION
AVERAGE 2017

19 µg /m³

PM_{2,5}

TREND CONCENTRATION
2016/2018

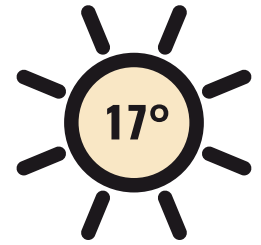
AVERAGE	TRAFFIC	URBAN
+18%	+37%	-6%

CONCENTRATION
AVERAGE 2018

20 µg /m³

CAGLIARI

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED

PUM
APPROVED

PUMS
IN PROGRESS

During these two years, the city of Cagliari has kept its commitment to sustainable mobility, with a **slight increase in Limited Traffic Zones and Pedestrian Areas, while cycle paths did not grow.**

Regarding public transport, in spite of a stationary offer, **the number of users has increased by 9%.** The services are being reorganized, improving the accessibility of the Historic Center and creating new lines. Among the projects the Municipality is working on together with the Region, one is to bring the terminus of the surface subway to the Railway Station, a fundamental step for an infrastructure that will improve the mobility of the whole area.

The acquisition by the Region of the space inside the Railways Station at the end of 2018, will allow arriving by train in Cagliari and using the metro without leaving the station once works are completed.

On December 28, 2018, **the Metropolitan Mayor approved the proposal for a BRT line between Cagliari and Quartu S. Elena** and sent the request for funding for rapid mass transport to the Ministry of Infrastructure and Transport. This is a Bus Rapid Transit line, a trolleybus network with new 18 meters long trolleybuses costing 8.1 million euros. This is a project consistent with the strategic integration of metropolitan mobility.

Noteworthy is the commitment for the promotion of bicycle mobility by the municipal administration. In October 2017, the CaBuBi Bike Sharing service was reactivated, an acronym for "Cagliari by bus and bike". This service, managed by the operator of the car sharing service, involves the Transport Company for modal integration.

Car sharing is also growing, and from February 2019 it will be able to count on thirty new vehicles available in free-flow mode. An app encompassing all the shared mobility in the city was also reinvented.

In August 2018, as part of the PON Metro, the City Council approved the final project for the completion of connections between existing cycle lanes in the city.

This will allow the creation of a coherent cycle network between different areas of the city and it will also become an important part of the metropolitan city cycle network. The resolution in fact follows the approval of three of the five corridors financed with PON Metro resources. The final project drawing the cycle path between Cagliari and Quartu is coming up, while the design of the Cagliari-Elmas corridor is in the competition phase.

As another measure to support the bicycle, at the beginning of 2019 the administration granted a total of 30,000 euros for the purchase of bicycles.

THE PUMS OF THE CITY OF CAGLIARI

In July 2017, the City Council approved the resolution for the start of the PUMS drafting procedure: it set up a group within the administration and chose external professionals for drafting the plan. The PUMS will be subject to the Strategic Environmental Assessment.

Throughout 2018, the preparation of the Urban Sustainable Mobility Plan was intense. In May 2018, an investigation campaign was launched which involved, throughout the month of June, both citizens and those visiting Cagliari for work, study, leisure and tourism. The PUMS aims to identify the best solutions for mobility, focusing on sustainability and modal integration, in particular taking into consideration public transport, cycling, walking, car sharing, bike sharing and private vehicles.

On December 28, 2018, the PUMS took another step forward with a resolution by the **City Council, which takes note of the cognitive framework** and the general report on urban mobility in Cagliari which came from the PUMS working group.

THE PUMS OF THE METROPOLITAN CITY OF CAGLIARI

The metropolitan city has initiated the procedure for drafting the PUMS with the **Resolution of April 2018 (45/2018) which approves the Guidelines for the preparation of the PUMS** and prepares a mandate for its preparation.

With the same decree, the economic framework to be allocated to the tender for the assignment of the preparation of the PUMS was defined, and the notice for the expression of interest was published in November 2018.

MUNICIPAL AREA

RESIDENTS
154.083

DENSITY
1.812 pl/km²

EXTENSION
85 km²

PEDESTRIAN AREA

0,6 M²/RESIDENTS

GROWTH RATE
2016/2017 **---**

BIKE PATHS

26 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **0%**

LTZ EXTENSION

0,88 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **5%**

ENABLED TO ACCESS FOR VEHICLES

17.446

GROWTH RATE
2016/2017 **---**

ENTRANCES /DAY

GROWTH RATE
2016/2017 **---**

DEMAND FOR PUBLIC TRANSPORT

253

PASSENGER/PEOPLE

+9% GROWTH RATE 2016/2017



12 MLN

KM TRAVELLED IN 2017

-2% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	6.254	+2%
TRAM	434	0%
FILOBUS	723	+5%
METRO	---	---
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

ACCIDENT DISTRIBUTION 2017

INCIDENT/1000 PL
GROWTH RATE
2016/2017 **---**

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **---**

PEDESTRIAN ---% BIKE ---%
MOTORCYCLE ---% VEICOLI ---%

INTERCHANGE CAR PARK

16 N. CAR PARK EVERY
1000 OF CARS

GROWTH RATE
2016/2017 **---**

PAID PARKING ON THE STREET

39 N. CAR PARK EVERY
1000 OF CARS

GROWTH RATE
2016/2017 **---**

CAR SHARING

52 +148%

FLEET OF CARS 2016/2017

8 +237%

USERS/1000 PL 2016/2017

BIKE SHARING

FLEET OF BIKE 2016/2017

USERS/1000 PL 2016/2017

TAXI LICENCES

0,68

N. TAXI/1000 PL IN 2016

GROWTH RATE
2016/2017 **-1%**

RENTAL WITH DRIVER LICENCES

0,42

N. RWT/1000 PL IN 2016
GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
560.373

DENSITY
449 pl/km²

EXTENSION
1.248 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

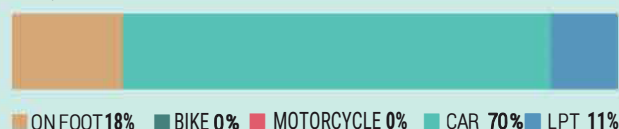
SUMP

AVAILABLE WITH RESOLUTION FOR
METROPOLITAN CITY ON APRIL 2018

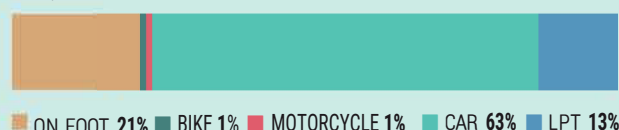
MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



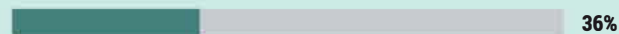
SUSTAINABLE MOBILITY RATE

Percentage on the total of the trips on foot, by bike and by public transport

2012/2013



2016/2018



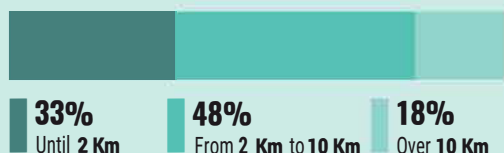
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



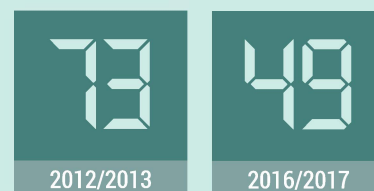
MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



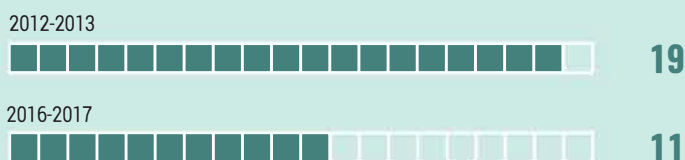
TIME SPENT FOR TRIPS

on a typical weekday (in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)

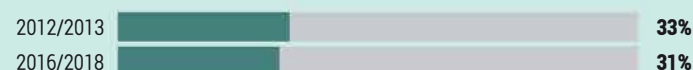


AVERAGE VELOCITY OF TRIPS

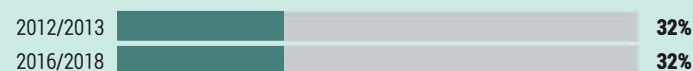


MOTIVACION OF TRIPS

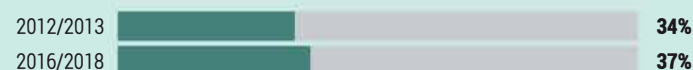
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

MOTORIZATION RATE

+1%
GROWTH RATE 2016/2017

653

MOTOR VEHICLES
EVERY 1000 RESIDENS

484

-21%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

98

MOTORCICLES
EVERY 1000 RESIDENS

51

-33%
GROWTH RATE 2016/2017

MOTOR
VEHICLES
CARS/KM2 ON 2017

1.183

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

218

MOTOR
VEHICLES
CARS/KM2 ON 2017



100.441 MOTOR VEHICLES TO 2017

271.686 MOTOR VEHICLES TO 2017

EURO 0 10% EURO 1 3% EURO 2 10% EURO 3 16%
EURO 4 32% EURO 5 17% EURO 6 12%

EURO 0 8% EURO 1 2% EURO 2 10% EURO 3 18%
EURO 4 34% EURO 5 17% EURO 6 11%



10.834 COMMERCIAL VEHICLES TO 2017

28.828 COMMERCIAL VEHICLES TO 2017

EURO 0 16% EURO 1 8% EURO 2 14% EURO 3 24%
EURO 4 22% EURO 5 11% EURO 6 5%

EURO 0 17% EURO 1 8% EURO 2 15% EURO 3 24%
EURO 4 22% EURO 5 10% EURO 6 4%







15.129 MOTORCICLES TO 2017

36.717 MOTORCICLES TO 2017

EURO 0 26% EURO 1 21% EURO 2 17%
EURO 3 33% EURO 4 3%

EURO 0 26% EURO 1 22% EURO 2 18%
EURO 3 31% EURO 4 3%

TYPE OF SUPPLY

				
---	59.848	PETROL	147.458	1.761
---	37.874	DIESEL	115.962	26.761
---	2.390	LGP	7.287	265
---	30	METHANE	93	9
---	417	HYBRID	873 *	29 *
---	35	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

CAGLIARI



The polluting stations in the city of Cagliari are the same as in 2016: 3 stations, 2 for urban traffic (Donoratico and Crespellani), and one for urban (Tuvixeddu).

Considering the period under examination (2016-2018) there is a reduction in the concentrations of all three pollutants. Compared to 2016, we observe a reduction in the average values for the city of 21% for NO_2 , a decrease of 7% for PM_{10} and 36% for $\text{PM}_{2.5}$.

With reference to rainfall in 2018, 464 mm of rain were detected, while in 2017 the control units measured values well below 300 mm.

Considering the average **concentration of NO_2** , in the period in question a reduction is observed, bringing the value to $19 \mu\text{g}/\text{m}^3$ in 2018, therefore below the regulatory limit. Concerning the **exceedances** of the daily limit there are no critical points in this regard.

Regarding the average **concentration of PM_{10}** , it remains rather constant in the two years considered and still below the regulatory limit. The daily **exceedances** of PM_{10} show a net reduction, from 118 in 2017, to 49 in 2018, but still above the 35 daily exceedances admissible by the legislation in force.

As for $\text{PM}_{2.5}$, the concentration displayed a significant decrease compared to 2016: in 2018, only $9 \mu\text{g}/\text{m}^3$ were detected.

Analyzing the stations by type, in the 2016-2018 period there was a 27% decrease in the average NO_2 concentration in **traffic stations**, a 10% reduction for PM_{10} and 42% for $\text{PM}_{2.5}$.

Regarding **background stations**, NO_2 concentration shows an increase of 8% compared to 2016, PM_{10} concentration displays a decrease of 6%, while $\text{PM}_{2.5}$ remains unchanged.

In **2018** the Crespellani traffic station is the only criticality, registering a number of exceedances (49) greater than the permitted limit.

In the two years examined, there is an improvement for the city of Cagliari concerning the average of the concentrations of NO_2 and $\text{PM}_{2.5}$, while the criticalities remain regarding the number of daily exceedances of PM_{10} .



NO₂ ANNUAL AVERAGE	30
HOURLY EXCEEDANCES	1
PM₁₀ ANNUAL AVERAGE	36
DAILY EXCEEDANCES	49
PM_{2,5} ANNUAL AVERAGE	11

Crespellani

NO₂ ANNUAL AVERAGE	15
HOURLY EXCEEDANCES	0
PM₁₀ ANNUAL AVERAGE	20
DAILY EXCEEDANCES	2

Donoratico

NO₂ ANNUAL AVERAGE	14
HOURLY EXCEEDANCES	0
PM₁₀ ANNUAL AVERAGE	17
DAILY EXCEEDANCES	3
PM_{2,5} ANNUAL AVERAGE	8

Tuvixeddu

0 1 km

MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

24 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

5 IN 2017

MAX EXCEEDANCES STATION IN 2017

CREPELLANI

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-21% -27% +8%

CONCENTRATION
AVERAGE 2018

19 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

1 IN 2018

EXCEEDANCES MAX STATION IN 2018

CREPELLANI

CONCENTRATION
AVERAGE 2017

25 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

118 IN 2017

MAX EXCEEDANCES STATION IN 2017

CREPELLANI

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-7% -10% -6%

CONCENTRATION
AVERAGE 2018

25 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
DAILY LIMIT VALUE

49 IN 2018

EXCEEDANCES MAX STATION IN 2018

CREPELLANI

CONCENTRATION
AVERAGE 2017

12 $\mu\text{g}/\text{m}^3$

PM_{2,5}

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

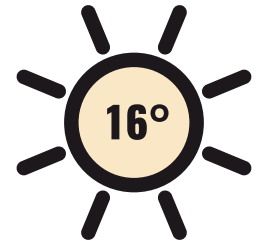
-36% -42% 0%

CONCENTRATION
AVERAGE 2018

9 $\mu\text{g}/\text{m}^3$

CATANIA

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED 2013

PUM
WIDE AREA
DEVELOPED

PUMS
STARTED

The city of Catania continues to have a strong imbalance towards car use. To make matters worse, public transport in 2017 continued reducing the offer of buses so that users, already in decreasing number, have suffered. The motorization index for cars and motorcycles is also growing.

A positive note comes from the **new underground network**, inaugurated in 2016 and expanded in March 2017 with the arrival in Nemisa, bringing the network in operation to 7 km, with a good user success. This is also demonstrated by the results recorded during the first half of 2018 compared to the same period of 2017, in terms of users transported by the Catania Metro: **the metropolitan service users were 3,028,078, with an increase of 130%.**

A substantial number of PON Metro projects decided in 2017 in the city of Catania are dedicated to mobility, with the aim of increasing sustainable mobility.

Among these are the **42 new methane buses** for the public transport service arrived in November 2018, now available to the Metropolitan Transport Company for service to users.

Other projects include the **Single Mobility Central** (cost 2.4 million) to be implemented for the traffic lights management and control system, the air quality monitoring system in urban areas and the LTZ control system.

Another measure envisaged is the **improvement of the BRT1 line**, about 12.7 km long, opened to the public in April 2013, of which a third is in a protected location. The PON Metro intends to intervene to improve intersections, expand the protected site, install a new traffic light system with priority controlled by the transponders on the buses.

The construction and strengthening of automation, control and charging systems for **electric vehicles in car parks** is also planned for an investment of 600,000 euros.

Still within the PON Metro, there is also the aim to **complete and functionalize the city's cycle network** with 3.2 million in investments. The project pushes towards the construction of the urban cycle network, with priority to the completion of the coastal cycle path, the completion of the central cycle network and new lanes dedicated to cycling.

At the beginning of 2018 the **incentives for the purchase of two-wheeled electric vehicles** returned. These incentives are promoted by the Municipality of Catania and co-financed by the Ministry of the Environment and are non-repayable loans consisting of 250 euros for the purchase of pedal assisted electric bicycles and 500 euros for the purchase of electric mopeds.

Significant construction sites are underway for the modernization of the Catania railway link, with doubling, new stations and the underground route of the Messina-Syracuse railway in the section crossing the city. In July 2017 the first Ognina-Catania Centrale section of 2.6 km was opened. **On December 20, 2018, the new Catania Picanello stop was opened** in the district of the same name. This urban rail network must be integrated with the underground line and with the local Circumetnea railway, to become a timed urban service serving the sustainable mobility of the metropolitan city.

In February 2019 RFI and the municipal administration of Catania announced that **in 2020 the Catania airport will have a railway station**, which is now under construction.

THE PUMS OF THE CITY OF CATANIA

According to what is learned from the press on May 4, 2018, the Municipal Council, with an act of political direction, has entrusted the scientific coordination and the editing of the PUMS of the city of Catania to the Department of Civil Engineering and Architecture of the University of Catania.

The University is also in charge of coordinating and monitoring the participatory planning process as well as of technical and scientific assistance, both essential elements for drafting the PUMS. This entrusting was made in the context of the Complementary Action and Cohesion Program "Città Metropolitane 2014-2020".

At the moment no other actions have been announced for the elaboration and participation of the Catania PUMS.

MUNICIPAL AREA

RESIDENTS
311.620

DENSITY
1.704 pl/km²

EXTENSION
183 km²

PEDESTRIAN AREA

0,17 M²/RESIDENTS

GROWTH RATE
2016/2017 **-10%**

BIKE PATHS

12 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **3%**

LTZ EXTENSION

0,3 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS FOR VEHICLES

981

GROWTH RATE
2016/2017 **59%**

ENTRANCES /DAY

GROWTH RATE
2016/2017 **---%**

DEMAND FOR PUBLIC TRANSPORT

41

PASSENGER/PEOPLE

-10% GROWTH RATE 2016/2017



8 MLN

KM TRAVELLED IN 2017

-24% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	1.743	-18%
TRAM	---	---
FILOBUS	---	---
METRO	180	+2%
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

4

INCIDENT/1000 PL
GROWTH RATE
2016/2017 **0%**

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **-18%**

1,4

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 14% BIKE 4%
MOTORCYCLE 50% VEHICLES 32%

INTERCHANGE CAR PARK

18 N. CAR PARK EVERY
1000 OF CARS

GROWTH RATE
2016/2017 **0%**

PAID PARKING ON THE STRETT

37 N. CAR PARK EVERY
1000 OF CARS

GROWTH RATE
2016/2017 **+16%**

CAR SHARING

FLEET OF CARS
2016/2017

USERS/1000 PL
2016/2017

BIKE SHARING

FLEET OF BIKE
2016/2017

USERS/1000 PL
2016/2017

TAXI LICENCES

0,6

N. TAXI/1000 PL IN 2016
GROWTH RATE
2016/2017 **0%**

RENTAL WITH DRIVER LICENCES

0,05

N. RWT/1000 PL IN 2016
GROWTH RATE
2016/2017 **0%**

METROPOLITAN AREA

RESIDENTS
1.113.303

DENSITY
311 pl/km²

EXTENSION
3.574 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17.

The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

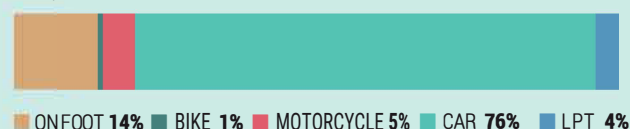
PUMS

NOT AVAILABLE SUSTAINABLE URBAN
MOBILITY PLANS (SUMP)

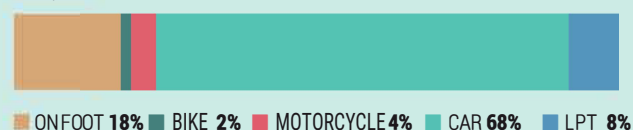
MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



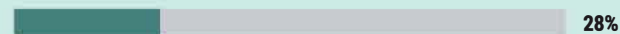
SUSTAINABLE MOBILITY RATE

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013



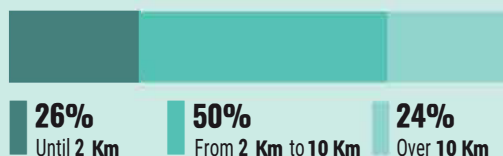
2016/2018



RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



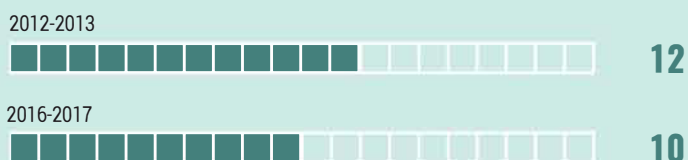
TIME SPENT FOR TRIPS

on a typical weekday
(in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)

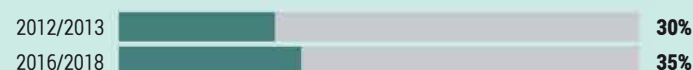


AVERAGE VELOCITY OF TRIPS

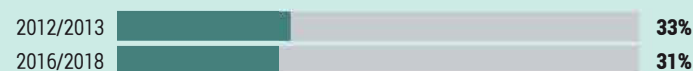


MOTIVACION OF TRIPS

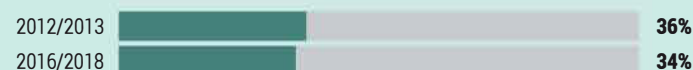
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

MOTORIZATION RATE

+2%
GROWTH RATE 2016/2017

702

MOTOR VEHICLES
EVERY 1000 RESIDENS

710

+2%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

205

MOTOR VEHICLES
EVERY 1000 RESIDENS

148

+1%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

1.197

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

221

MOTOR VEHICLES
CARS/KM2 ON 2017



218.434 MOTOR VEHICLES TO 2017

790.878 MOTOR VEHICLES TO 2017



17.949 COMMERCIAL VEHICLES TO 2017





75.195 COMMERCIAL VEHICLES TO 2017



64.041 MOTORCICLES TO 2017

165.257 MOTORCICLES TO 2017

TYPE OF SUPPLY

				
---	130.077	PETROL	414.478	4.366
---	78.493	DIESEL	336.765	69.369
---	8.324	LGP	31.139	597
---	1.650	METHANE	7.670	686
---	311	HYBRID	794 *	175 *
---	35	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

CATANIA



The city of Catania has three air quality monitoring stations. For the purposes of the study Vittorio Veneto and Parco Gioeni stations were considered respectively traffic stations and background stations, while the third, the Moro station, does not have representative data for 2017 and 2018.

Both the considered stations measure NO_2 and PM_{10} , while the data related to the concentration of $\text{PM}_{2.5}$ are not present in either station.

The city of Catania recorded a number of rainy days in 2017 equal to 49, while in 2018 the cumulative rainfall recorded was greater (763 mm), as well as the number of rainy days compared to the reference period, reaching 72 days rainy. In the 2006-2016 period the average cumulative precipitation was 529 mm.

Considering the trend of the average concentration of the two pollutants in the 2016-2018 period, there is a 15% increase in NO_2 and a substantial break-even of PM_{10} (+5%).

Examining the **concentrations of NO_2** in the year 2018 the concentration was equal to $38 \mu\text{g}/\text{m}^3$, an increase compared to 2016; however, the value is still below the regulatory limit. The trend of annual NO_2 **exceedances** does not show changes in the two years under analysis.

Average annual **PM_{10} concentrations** stays between $22 \mu\text{g}/\text{m}^3$ and $23 \mu\text{g}/\text{m}^3$, therefore lower than the limits. The PM_{10} daily exceedance trend shows a higher number of **exceedances** for 2017 than for 2016, but none was recorded in 2018.

Going into detail of monitoring stations, in the case of annual NO_2 concentrations it is observed that the Vittorio Veneto **traffic station** is characterized by concentrations above the regulatory limit with an increase of 20% in 2018 compared to 2016. The analysis of PM_{10} concentration has shown that for the traffic station there is an increase in the average annual concentration (+13%), which nevertheless remains still below the regulatory limit.

Contrary to the traffic station, the **background station** shows no significant changes for NO_2 in the two years under examination, while for PM_{10} there is a slight decrease in concentration in 2018 compared to 2016 (-10%).

In conclusion, for the city of Catania it can be said that in the years under examination there is a slight deterioration in air quality parameters, especially in reference to the concentration of NO_2 .



NO₂ ANNUAL AVERAGE 17
HOURLY EXCEEDANCES 0
PM₁₀ ANNUAL AVERAGE 19
DAYLY EXCEEDANCES 0

Piazza Gioeni

Via Vittorio Veneto

NO₂ ANNUAL AVERAGE 59
HOURLY EXCEEDANCES 0
PM₁₀ ANNUAL AVERAGE 27
DAYLY EXCEEDANCES 0

0 1 km

MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

33 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2017

MAX EXCEEDANCES STATION IN 2017

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

+15% **+20%** **+6%**

CONCENTRATION
AVERAGE 2018

38 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2018

MAX EXCEEDANCES STATION IN 2017

CONCENTRATION
AVERAGE 2017

23 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

9 IN 2017

MAX EXCEEDANCES STATION IN 2017

VITTORIO VENETO, PARCO GIOENI

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

+5% **+13%** **-10%**

CONCENTRATION
AVERAGE 2018

23 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
DAILY LIMIT VALUE

0 IN 2018

MAX EXCEEDANCES STATION IN 2017

CONCENTRATION
AVERAGE 2017

--- $\mu\text{g}/\text{m}^3$

PM_{2,5}

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

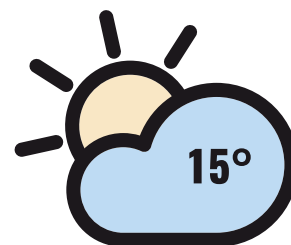
---% ---% ---%

CONCENTRATION
AVERAGE 2018

--- $\mu\text{g}/\text{m}^3$

FLORENCE

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED

PUM

PUMS
WIDE AREA
ADOPTED

In recent years the Municipality of Florence has continued to build the tram network, introduced a more temporally extended summer LTZ, and launched a free-floating bike sharing scheme. The supply of public transport is stable, with a 4% increase of users. **The rate of motorization of both cars and motorcycles continues to grow**, even more significantly with a + 3.6% at metropolitan level.

In the summer of 2017 with the announcement of the Municipality, the free flow bike sharing of the MoBike operator was launched with 2000 bicycles available to the citizens. After a year, about 10 thousand rentals a day were estimated.

Also, in the summer of 2017, the summer nighttime LTZ was introduced, going from Thursday evening to Sunday, extending the limited traffic zone times, to avoid the onslaught of traffic and the wild stop in the heart of the city. The provision was in effect from May to September and initially caused considerable protests, but then proved to be a success. This was a courageous provision that worked and was then reintroduced in the summer of 2018 with similar methods and times.

From the 1st of January 2019, the **LTZ ban on petrol-powered vehicles up to Euro 1 and diesel engines up to Euro 2** was triggered: an order has been implemented for the 2016-2019 municipal air quality action plan.

In February 2019, **car sharing for freight delivery** arrived in Florence, with the Nissan e-Van Sharing project, available 24 hours a day, 7 days a week, with the rental of a 100% electric commercial vehicle.

The Florentine tramway system continues to grow. It is worth noting that in 2010 the first T1 Tramway Line from Florence to Scandicci came into operation, with a length of 7.4 km and with 14 stops, and it was a great user success. The new Interchange Parking of Villa Costanza, inaugurated in July 2017, is connected to this tramway line, close to the motorway and ring-road system in Scandicci, for 500 cars and 25 coach seats.

In these years, important works and construction sites continued for the construction of the second and third tramway line, which in July 2018 saw the opening of the new Line 3.4 km long and with 10 stops, going to the Careggi hospital. In this way, a single T1 Leonardo line was set up which from Scandicci leads to Careggi, passing by the Santa Maria Novella Station and the city center.

The inauguration of line 2 took place on 11 February 2019 in the presence of the President of the Republic Sergio Mattarella. This second tram line starts from Piazza dell'Unità and goes north to Peretola airport. It consists of 5.5 km of route with 13 stops, takes 22 minutes per direction and the trams were scheduled to depart every 4 minutes. Following the success of the T1 line with 19 million passengers / year, an increase in passengers is expected on this T2 line of about 18 million / year. Management company GEST estimated a figure that equates to 150,000 day passengers on the tram system.

With the arrival of the new tram line, **the ATAF network on buses was also completely reorganized**, with adduction networks and 2 new lines.

Even so, the network must keep on expanding: the extension of the tram network to the southeast (Line 3.2), from the Fortress on the avenues through Piazza Libertà, with two branches, one towards Rovezzano (7 km) and one towards Bagno in Ripoli (8 km), is being designed.

THE METROPOLITAN CITY OF FLORENCE STARTS ITS PUMS

On December 19, 2018, the Florentine Metropolitan Council approved the Resolution for the start of the preparation of the PUMS and the related VAS, committing to a close coordination with the municipality of Florence for sustainable mobility planning.

The PUMS participation process was started in March 2019 with five "Metropolitan Walks", which on foot, by train, by bus and by tram, want to go to the places of the vast Florentine area to take cues and suggestions from citizens, involving local communities.

<http://www.cittametropolitana.fi.it/pums/>

MUNICIPAL AREA

RESIDENTS
382.258

DENSITY
3.733 pl/km²

EXTENSION
102 km²

PEDESTRIAN AREA

1,05 M²/RESIDENTS

GROWTH RATE
2016/2017 **0%**

BIKE PATHS

92 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **0%**

LTZ EXTENSION

5,04 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS
FOR VEHICLES

420.502

GROWTH RATE
2016/2017 **---**%

ENTRANCES /DAY

71.412

GROWTH RATE
2016/2017 **-13%**

DEMAND FOR PUBLIC TRANSPORT

246

PASSENGER/PEOPLE

+5% GROWTH RATE 2016/2017



20 MLN

KM TRAVELLED IN 2017

0% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	4.882	-1%
TRAM	652	-1%
FILOBUS	---	---
METRO	---	---
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

7

INCIDENT/1000 PL

- 1% GROWTH RATE
2016/2017

DEAD/100 INCIDENT

GROWTH RATE
2016/2017 **- 33%**

0,4

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 18% BIKE 12%
MOTORCYCLE 67% VEHICLES 3%

INTERCHANGE CAR PARK

12 N. CAR PARK EVERY
1000 OF CARS

0% GROWTH RATE
2016/2017

PAID PARKING ON THE STRETT

154 N. CAR PARK EVERY
1000 OF CARS

0% GROWTH RATE
2016/2017

CAR SHARING

550 **+33%**

FLEET OF CARS 2016/2017

15 **+110%**

USERS/1000 PL 2016/2017

BIKE SHARING

2.000 **---**

FLEET OF BIKE 2016/2017

1.923 **---**

USERS/1000 PL 2016/2017

TAXI LICENCES

2,04

N. TAXI/1000 PL IN 2016
GROWTH RATE
2016/2017 **+8%**

RENTAL WITH DRIVER LICENCES

0,27

N. RWT/1000 PL IN 2016
GROWTH RATE
2016/2017 **0%**

METROPOLITAN AREA

RESIDENTS
1.014.423

DENSITY
289 pl/km²

EXTENSION
3.514 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

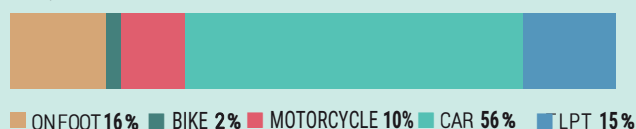
PUMS

AVAILABLE WITH RESOLUTION FOR
METROPOLITAN CITY ON DECEMBER 2018

MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



SUSTAINABLE MOBILITY RATE

Percentage on the total of the trips on foot, by bike and by public transport

2012/2013



2016/2018



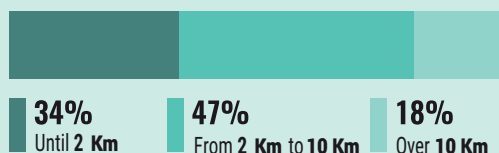
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



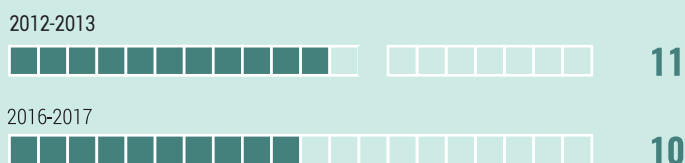
TIME SPENT FOR TRIPS

on a typical weekday
(in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)



AVERAGE VELOCITY OF TRIPS

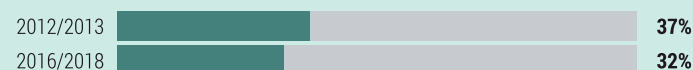
31
Km/h
2012/2013



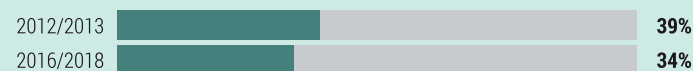
28
Km/h
2016/2017

MOTIVATION OF TRIPS

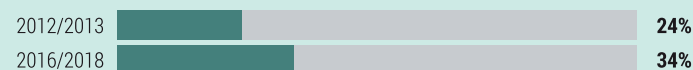
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

MOTORIZATION RATE

+0,5%
GROWTH RATE 2016/2017

516

MOTOR VEHICLES
EVERY 1000 RESIDENS

721

+4%
GROWTH RATE 2016/2017

+2%
GROWTH RATE 2016/2017

193

MOTOR VEHICLES
EVERY 1000 RESIDENS

153

+1%
GROWTH RATE 2016/2017

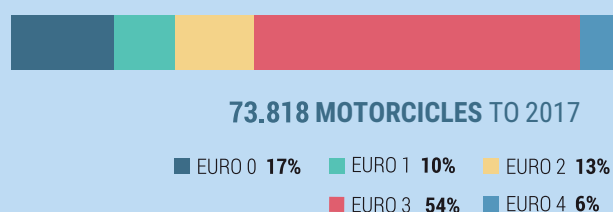
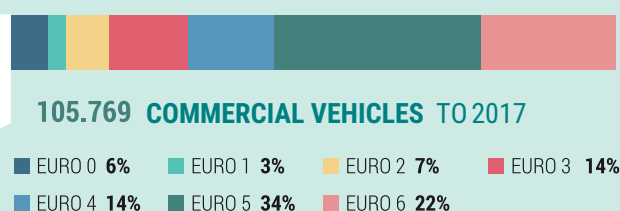
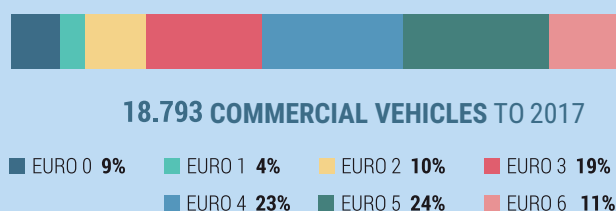
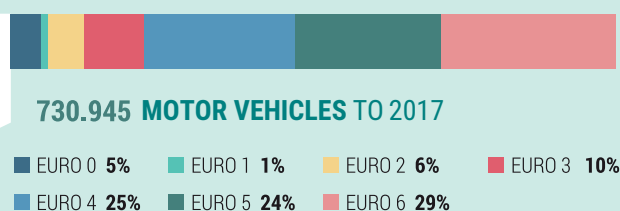
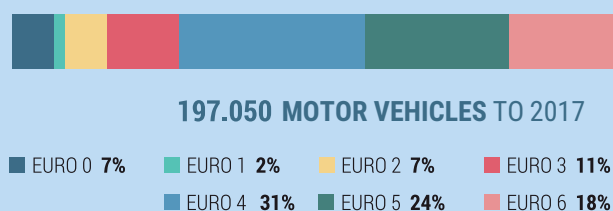
MOTOR VEHICLES
CARS/KM2 ON 2017

1.927





ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

208

MOTOR VEHICLES
CARS/KM2 ON 2017



TYPE OF SUPPLY

				
---	107.871	PETROL	308.656	4.643
---	71.516	DIESEL	357.747	94.363
---	11.471	LGP	38.445	2.097
---	4.815	METHANE	20.513	4.221
---	1.495	HYBRID	5.542 *	440 *
---	144	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY FLORENCE



The monitoring stations in the city of Florence are the same as in 2016: 4 stations, 2 urban traffic (Gramsci and Mosse), and 2 urban background (Bassi e Boboli).

Compared to 2016, there is a reduction of -9% for NO_2 , an increase of 5% for PM_{10} and a reduction of -7% for $\text{PM}_{2.5}$.

Regarding the rainfall conditions of the city of Florence, a reduction is observed for both years in question compared to the 2006-2016 period; there is a reduction of about 260 mm in 2017 and 57 mm in 2018. Rainy days are 68 in 2017 and 98 in 2018.

With reference to the average **concentration of NO_2** , in the period in question we can observe a reduction that pushed the concentration of this pollutant below the regulatory limit of $40 \mu\text{g}/\text{m}^3$ in the year 2018 for the first time since 2006. Concerning the **exceedances** of the hourly NO_2 limit there are no critical points.

As far as the average **concentration of PM_{10}** is concerned, it remains rather constant in the two years considered and below the regulatory limit. The daily **exceedances** of PM_{10} show a reduction, from 24 in 2017, to 20 in 2018, below the annual ceiling of 35 daily exceedances.

Regarding $\text{PM}_{2.5}$, the situation improves with a slight drop (-7%) in concentration compared to 2016, and it now stands at $14 \mu\text{g}/\text{m}^3$, therefore well below the regulatory limit.

Analyzing the data collected by the individual monitoring stations, it is observed that in the **traffic stations** concentrations higher than the regulatory limit for NO_2 (Gramsci $60 \mu\text{g}/\text{m}^3$) are found in 2018. Moreover, in the two years under examination, there was a slight increase in the average concentration of PM_{10} , which reached $27 \mu\text{g}/\text{m}^3$, while for $\text{PM}_{2.5}$ the concentration is reduced by 6%.

Regarding the **background stations**, there are no particular criticalities, on the contrary there is a decrease in the concentration of the three pollutants.

In the two years examined, therefore, there is an improvement concerning the average NO_2 concentrations and the number of PM_{10} exceedances in the last year of analysis, therefore it is fundamental to evaluate the trend by monitoring concentrations over the next few years.



NO₂ ANNUAL AVERAGE **39**
HOURLY EXCEEDANCES **0**
PM₁₀ ANNUAL AVERAGE **24**
DAILY EXCEEDANCES **12**

Mosse

NO₂ ANNUAL AVERAGE **20**
HOURLY EXCEEDANCES **0**
PM₁₀ ANNUAL AVERAGE **19**
DAILY EXCEEDANCES **2**
PM_{2,5} ANNUAL AVERAGE **12**

Viale Ugo Bassi

PM₁₀ ANNUAL AVERAGE **18**
DAILY EXCEEDANCES **3**

Boboli

NO₂ ANNUAL AVERAGE **60**
HOURLY EXCEEDANCES **0**
PM₁₀ ANNUAL AVERAGE **30**
DAILY EXCEEDANCES **20**
PM_{2,5} ANNUAL AVERAGE **16**

Gramsci

0 1 km

MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

43 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

1 IN 2017

MAX EXCEEDANCES STATION IN 2017
GRAMSCI

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-7% **-6%** **-13%**

CONCENTRATION
AVERAGE 2018

40 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2018

MAX EXCEEDANCES STATION IN 2018

CONCENTRATION
AVERAGE 2017

22 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

24 IN 2017

MAX EXCEEDANCES STATION IN 2017
GRAMSCI

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

+5% **+4%** **0%**

CONCENTRATION
AVERAGE 2018

23 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
DAILY LIMIT VALUE

20 IN 2018

MAX EXCEEDANCES STATION IN 2017
GRAMSCI

CONCENTRATION
AVERAGE 2017

15 $\mu\text{g}/\text{m}^3$

PM_{2,5}

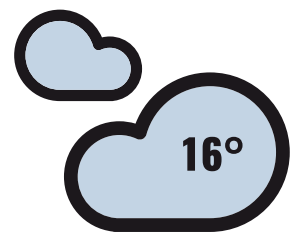
TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-7% **-6%** **-8%**

CONCENTRATION
AVERAGE 2018

14 $\mu\text{g}/\text{m}^3$



URBAN MOBILITY

TOOLS
USED

PGTU
APPROVED

PUM

PUMS
WIDE AREA
ADOPTED

The city of Genoa in these two years has not introduced particular innovations in the management of mobility. The tragedy of the collapse of Ponte Morandi, which took place on August 14, 2018, which, in addition to its load of dead and displaced people, has upset and undermined metropolitan movements, requiring a lot of energy to overcome it.

According to the available data, **the offer of TPL continues to decrease while the use by the citizens is instead slightly increased. The number of cars and motorcycles is still growing**, even on a metropolitan scale, as indeed happened in all Italian cities.

At the end of December 2018, the Municipality of Genoa presented a **dossier to MIT with a request of € 650 million to finance the construction of 4 new public transport lines**, with trolleybuses or trams in protected areas, and a monorail that will connect the lower part of Sestri to Erzelli.

This choice was also formalized in a municipal resolution, focusing on the connection between Erzelli and the airport with monorail and trolleybus or tramway lines in protected areas, without relying on a single system, but rather on a combination of multiple transport modes, with the strengthening of the Brignole pole as an interchange node.

In these months a **heated debate is taking place between the choice of trams or trolleybuses for the future of the city**: The Administration continues to declare that it has not yet chosen, while the AMT company has made it known that the orientation would be to reintroduce the trolleybus.

A quite recent Resolution, from March 2019, discusses the guidelines for the **collaboration agreement with Eco-Consegne srl, for the delivery of goods** by electric vehicles in the historic center.

THE PUMS OF THE METROPOLITAN CITY OF GENOA

The path towards the approval of the PUMS of the Metropolitan City of Genoa passed a milestone in March 2018 with the metropolitan Mayor approving the Guidelines for the drafting of the PUMS.

The PUMS Scheme was then elaborated taking into consideration the results of the participation path carried out in the April - May 2018 period, collected through the Participation Tables involving the Municipalities, the Experts, the Citizens and with further participation instruments.

The macro-objectives to be achieved within the validity time of the PUMS (10 years), consistent with the PUMS 2017 Decree of MIT, respond to the four general areas of interest: Effectiveness and efficiency of the mobility system, Energy and environmental sustainability, Safety of road mobility, Socio-economic sustainability.

On 20 June 2018, the PUMS scheme and the related preliminary environmental report were approved by the Metropolitan Mayor, which enabled the preliminary phase of Strategic Environmental Assessment to begin.

The PUMS scheme has set up the "Strategic framework" centered on the mobility system of the Genoese capital, integrating with mobility in the vast metropolitan area and taking into account the results of the participation path.

The Plan intervenes on the mobility strategy of the entire metropolitan territory and is articulated on 6 fundamental axes:

1. Strengthening public transport and improving service quality;
2. Integrating transport systems and giving consistency to the parking system by focusing on modal interchange;
3. Improving private circulation, adapting the network, developing new sharing, mobility management, info mobility and electric mobility systems;
4. "Soft mobility";
5. A new logistics of urban goods;
6. Spreading the culture of safety of mobility and sustainable mobility.

In September 2018 the phase of observations and assessments was concluded, in view of the adoption and approval of the PUMS, which is forecast to be announced by mid-2019.

<https://pums.cittametropolitana.genova.it/>

MUNICIPAL AREA

RESIDENTS
583.601

DENSITY
2.429 pl/km²

EXTENSION
240 km²

PEDESTRIAN AREA

0,07 M²/RESIDENTS

GROWTH RATE
2016/2017 **9%**

BIKE PATHS

11 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **20%**

LTZ EXTENSION

0,22 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS
FOR VEHICLES

16.242

GROWTH RATE
2016/2017 **-12%**

ENTRANCES /DAY

3.914

GROWTH RATE
2016/2017 **-4%**

DEMAND FOR PUBLIC TRANSPORT

233

PASSENGER/PEOPLE

+2% GROWTH RATE 2016/2017



27 MLN

KM TRAVELLED IN 2017

-10% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	4.127	-0,8%
TRAM	---	---
FILOBUS	199	+184%
METRO	377	+70%
FUNICULAR	33	+21%
BY WATER	14	-4%

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

7

INCIDENT/1000 PL
+1% GROWTH RATE
2016/2017

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **+67%** **0,5**

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 15% BIKE 2%
MOTORCYCLE 68% VEHICLES 15%

INTERCHANGE CAR PARK

1,5 N. CAR PARK EVERY
1000 OF CARS
+49% GROWTH RATE
2016/2017

PAID PARKING ON THE STRETT

78 N. CAR PARK EVERY
1000 OF CARS
-1% GROWTH RATE
2016/2017

CAR SHARING

--- ---
FLEET OF CARS 2016/2017
--- ---
USERS/1000 PL 2016/2017

TAXI LICENCES

1,49
N. TAXI/1000 PL IN 2016
+1% GROWTH RATE
2016/2017

BIKE SHARING

68 -3%
FLEET OF BIKE 2016/2017
0,06 +50%
USERS/1000 PL 2016/2017

RENTAL WITH DRIVER LICENCES

0,33
N. RWT/1000 PL IN 2016
+3% GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
850.071

DENSITY
463,6 pl/km²

EXTENSION
1.834 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

PUMS

ADOPTED THE SCHEME OF PUMS BY THE METROPOLITAN MAYOR ON JUNE 2018

MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



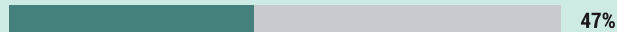
SUSTAINABLE MOBILITY RATES

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013



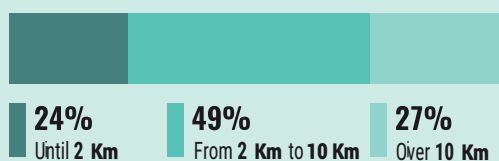
2016/2018



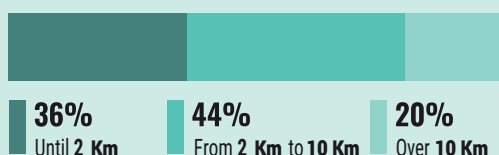
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



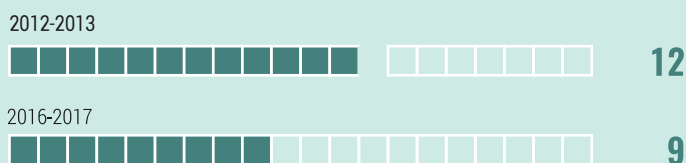
TIME SPENT FOR TRIPS

on a typical weekday (in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)



AVERAGE VELOCITY OF TRIPS

26

Km/h
2012/2013



22

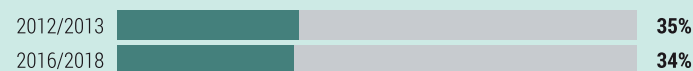
Km/h
2016/2017

MOTIVACION OF TRIPS

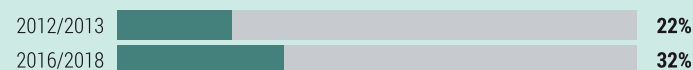
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

MOTORIZATION RATE

+0,4%
GROWTH RATE 2016/2017

466

MOTOR VEHICLES
EVERY 1000 RESIDENS

496

+1%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

240

MOTOR VEHICLES
EVERY 1000 RESIDENS

248

+2%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

1.131

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

230

MOTOR VEHICLES
CARS/KM2 ON 2017



271.877 MOTOR VEHICLES TO 2017

421.368 MOTOR VEHICLES TO 2017

■ EURO 0 **8%** ■ EURO 1 **2%** ■ EURO 2 **8%** ■ EURO 3 **13%**
■ EURO 4 **32%** ■ EURO 5 **22%** ■ EURO 6 **15%**

■ EURO 0 **8%** ■ EURO 1 **2%** ■ EURO 2 **9%** ■ EURO 3 **13%**
■ EURO 4 **32%** ■ EURO 5 **22%** ■ EURO 6 **14%**



23.646 COMMERCIAL VEHICLES TO 2017

41.114 COMMERCIAL VEHICLES TO 2017

■ EURO 0 **11%** ■ EURO 1 **7%** ■ EURO 2 **14%** ■ EURO 3 **20%**
■ EURO 4 **24%** ■ EURO 5 **17%** ■ EURO 6 **8%**

■ EURO 0 **12%** ■ EURO 1 **7%** ■ EURO 2 **14%** ■ EURO 3 **20%**
■ EURO 4 **24%** ■ EURO 5 **16%** ■ EURO 6 **7%**



140.346 MOTORCICLES TO 2017

210.744 MOTORCICLES TO 2017

■ EURO 0 **19%** ■ EURO 1 **12%** ■ EURO 2 **14%**
■ EURO 3 **49%** ■ EURO 4 **6%**

■ EURO 0 **21%** ■ EURO 1 **12%** ■ EURO 2 **14%**
■ EURO 3 **48%** ■ EURO 4 **5%**

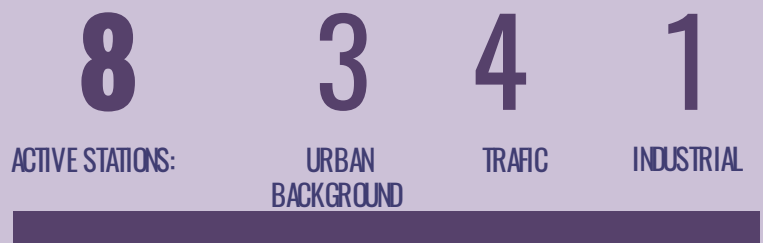
TYPE OF SUPPLY

	Municipal Area	Fuel Type	Metropolitan Area	Commercial Vehicles
	---	PETROL	236.410	5.979
	155.178	DIESEL	167.242	33.645
	7.466	LGP	12.045	1.028
	2.501	METHANE	3.693	401
	1.443	HYBRID	1.965 *	59 *
	33	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY GENOA



The city of Genoa has 8 air quality monitoring stations, including 4 traffic stations, 3 background stations and an industrial one. In particular, the traffic stations are Corso Buenos Aires, Corso Europa, Via Buoizzi, Via Pastorino; the background stations are Corso Firenze, Parco Acquasola and Quarto while the industrial monitoring station is Multedo.

Examining the average concentrations over the period 2016-2018, two different situations are observed with regard to NO_2 , $\text{PM}_{2.5}$ and PM_{10} : for the first two pollutants the situation is mostly unchanged, while for PM_{10} , instead, there is a 38% increase in the average concentration.

The city of Genoa in 2017 registered an annual cumulative precipitation value of 515 mm, about half of the average for the 2006-2016 period, while the 2018 annuity is in line with the average of the decade. Regarding the number of rain days, the 2017 annuity shows only 47 days of rain compared to 73 registered in 2018.

With regards to the average **NO_2 concentration**, it should be noted that although there has not been a significant reduction in the period in question, for 2017 and 2018 the value recorded is equal to the regulatory limit. Regarding the NO_2 hourly **exceedances**, there are no significant changes, as in 2018 there is only one value exceeding the hourly limit value.

As for previous years, the average **concentration of PM_{10}** is below the regulatory limit ($24 \mu\text{g}/\text{m}^3$ in 2017 and $22 \mu\text{g}/\text{m}^3$ in 2018). Exceedances in 2017 show an increase compared to 2016, reaching 43 **exceedances**, while in 2018 there were only 14 exceedances.

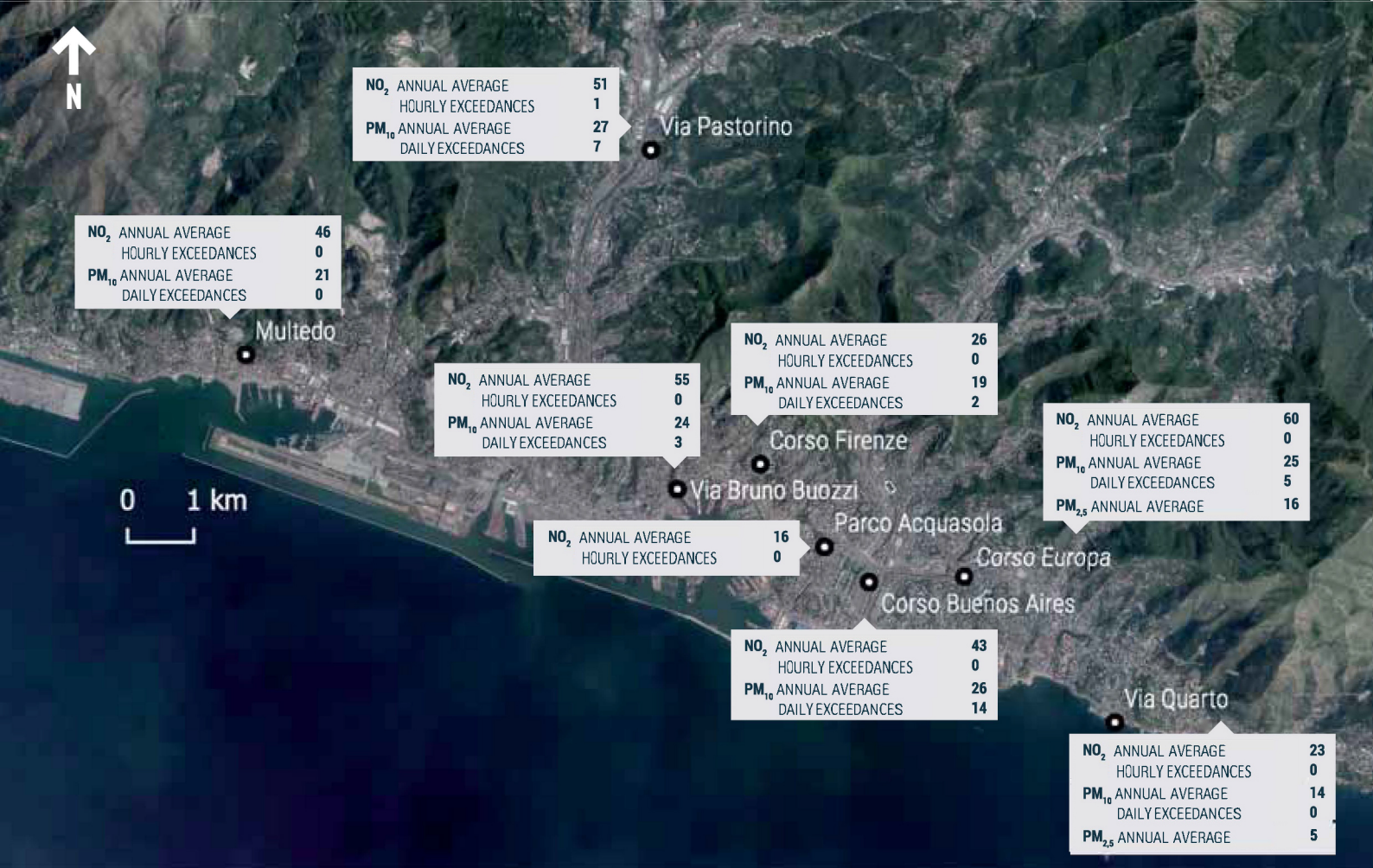
Regarding **$\text{PM}_{2.5}$** there are no particular variations in average **concentration**, and they are still below the regulatory limit.

Going into detail of monitoring stations, we note that, although the average concentration of NO_2 in the city and at **background stations** is below the regulatory limit, the average for traffic stations is higher, equal to $52 \mu\text{g}/\text{m}^3$.

Both the average concentration of traffic the **background stations** for PM_{10} and $\text{PM}_{2.5}$ are lower than the limit.

Analyzing the data of individual **stations** for **2018** shows that 5 stations out of 8 record an average concentration of NO_2 higher than the regulatory limit, in contrast with what happens instead for the other two pollutants for which there are no values higher than the limit.

In conclusion, the quality of the air of the city of Genoa remains almost unchanged with some exceptions: the average concentration of NO_2 for traffic stations is still above the limits, and the concentration of PM_{10} is growing but still below $40 \mu\text{g}/\text{m}^3$.



MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017
40 µg / m³

EXCEEDANCES
HOURLY LIMIT VALUE
0 IN 2017

MAX EXCEEDANCES STATION IN 2017

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-2%	0%	0%

CONCENTRATION
AVERAGE 2018
40 µg / m³

EXCEEDANCES
HOURLY LIMIT VALUE
1 IN 2018

MAX EXCEEDANCES STATION IN 2018
PASTORINO

CONCENTRATION
AVERAGE 2017
24 µg / m³

EXCEEDANCES
HOURLY LIMIT VALUE
43 IN 2017

MAX EXCEEDANCES STATION IN 2017
CORSO EUROPA

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
+38%	-13	+6%

CONCENTRATION
AVERAGE 2018
22 µg / m³

EXCEEDANCES
DAILY LIMIT VALUE
14 IN 2018

MAX EXCEEDANCES STATION IN 2018
CORSO BUENOS AIRES

CONCENTRATION
AVERAGE 2017
14 µg / m³

PM_{2,5}

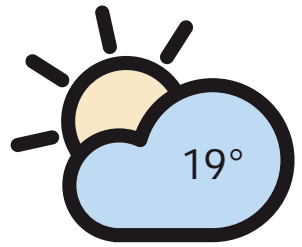
TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
0%	-24%	-50%

CONCENTRATION
AVERAGE 2018
10 µg / m³

MESSINA

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
BEING UPDATED

PUM
APPROVED 2007

PUMS
GUIDANCE APPROVED
APRIL 2018

In the two years considered by this report, the city of Messina continued its efforts to **enhance the offer of local public transport**. In 2018 a contract was signed for a pilot project consisting of 13 new electric buses and the installation of charging stations, which should start operating on a dedicated line.

On the other hand, the limited traffic zones aren't growing, the pedestrian areas are falling, and the cycle paths are still just a few kilometres long. The motorization index of cars and motorcycles in the city and in the metropolitan area is also growing here.

The substitution of the Mayor and City Council following the 2018 elections brought the focus of the discussion in the second half of 2018 on the announcement by the new Administration about wanting to **stop the Messina tram**. The motivation given was linked to the inefficiency of the service and its high management costs. The discussion was very lively and many experts highlighted the utility of the tram, also in terms of costs and efficiency, despite the need for adjustments and extraordinary maintenance interventions.

The result was a rethinking and a dialogue initiated by the Mayor with the MIT on the future of the Messina tram network. This was perhaps also due to the presentation of the cognitive data of the new PGTU, drawn up by the company TPS, from which it can be deduced that the use of the tram is the one preferred by citizens of Messina who use public transport, despite an absolutely poor "commercial speed".

In March 2019 the Mayor announced (on his Facebook page) **the favourable opinion of the Ministry of Infrastructure and Transport for the redevelopment project of the Messina tramway**. The preliminary project for the redevelopment of the tramway, costing around 100 million euros, provides for the liberation of the port curtain from the tramway, the elimination of the current protection barriers, the restoration of the underground utilities, the extension of the route to the Annunziata to serve the university citadel, and the redevelopment of the current carriages also by increasing their number.

It seems therefore that hopefully the city is going towards a redevelopment of the current network and not its cancellation. In January 2019, a notice was issued for the expression of interest for the **design of the Laguna Capo Peloro cycle and pedestrian path**.

PGTU UPDATING

In 2016, a notice was issued for the updating of the 1998 PGTU, followed by the assignment to a company for its editing. The first phase of the plan, that is the reconstruction of the cognitive framework of the current conditions of the urban mobility of Messina, and whose results were presented in February 2018, has now ended.

In March 2019 the participation path started, with the active involvement of bodies, institutions, associations, citizens, which will accompany the drafting and approval of the PGTU of Messina.

The first phase of participation, addressed to all citizens, provides for the online compilation of two questionnaires, one to identify the transport methods of those who live and "use" the city for different purposes (study, work, tourism, trade ...) and the other aiming to construct a list of priorities for the objectives of the PGTU, with specific focus on cycling. This listening phase ended on 7 April 2019.

THE PUMS OF THE CITY OF MESSINA

In 2017 the Guidelines for the "Strategic Planning for Urban Mobility, aimed at updating the Urban Mobility Plan", in line with European policies and practices, were adopted by the City Council.

The Municipal Council of Messina **approved in April 2018 the final Document of the Guidelines of the Urban Plan of Sustainable Mobility**. Thus, the first phase that will lead to the drafting of the definitive PUMS has been concluded, with the investigation of the current state of mobility in Messina. The second phase aimed at drawing a vision of the future of the mobility of the city, with a path of communication and participation.

<https://www.pumsmessina.it/>

At the moment the **new Town Council has not indicated how to continue the route for the PUMS of the city**.

MUNICIPAL AREA

RESIDENTS

236.962

DENSITY

1.108 pl/km²

EXTENSION

214 km²

PEDESTRIAN AREA

0,25 M²/RESIDENTS
GROWTH RATE 2016/2017 **0%**

BIKE PATHS

7,2 TOTAL KILOMETERS
GROWTH RATE 2016/2017 **0%**

LTZ EXTENSION

0,47 M² OF LTZ OVER 100 M² OF CITY
GROWTH RATE 2016/2017 **0%**

ENABLED TO ACCESS VEHICLES

GROWTH RATE 2016/2017 ---%

ENTRANCES/DAY

GROWTH RATE 2016/2017 ---%

DEMAND FOR PUBLIC TRANSPORT

109
PASSENGER/PEOPLE

+1% GROWTH RATE 2016/2017



4 MLN
KM TRAVELLED IN 2017

+47% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

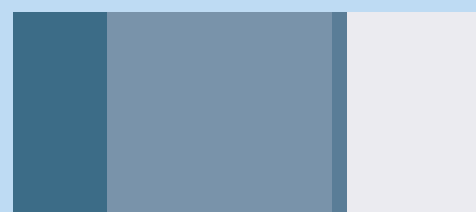
AUTOBUS	1.151	+16%
TRAM	266	+11%
FILOBUS	---	---
METRO	---	---
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

3 INCIDENT/1000 PL
+9% GROWTH RATE 2016/2017

DEAD/100 INCIDENT
GROWTH RATE 2016/2017 -59% **0,7**

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 20% BIKE 3%
MOTORCYCLE 48% VEHICLES 29%

INTERCHANGE CAR PARK

7 N. CAR PARK EVERY 1000 OF CARS

---% GROWTH RATE 2016/2017

PAID PARKING ON THE STREET

31 N. CAR PARK EVERY 1000 OF CARS

---% GROWTH RATE 2016/2017

CAR SHARING

--- FLEET OF CARS 2016/2017

--- USERS/1000 PL 2016/2017

BIKE SHARING

--- FLEET OF BIKE 2016/2017

--- USERS/1000 PL 2016/2017

TAXI LICENCES

--- N. TAXI/1000 PL IN 2016
--- GROWTH RATE 2016/2017

RENTAL WITH DRIVER LICENCE

--- N. RWT/1000 PL IN 2016
--- GROWTH RATE 2016/2017

METROPOLITAN AREA

RESIDENTS
636.653

DENSITY
196 pl/km²

EXTENSION
3.247 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

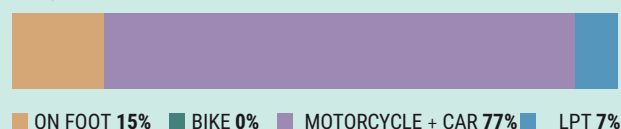
PUMS

NOT AVAILABLE SUSTAINABLE URBAN
MOBILITY PLANS

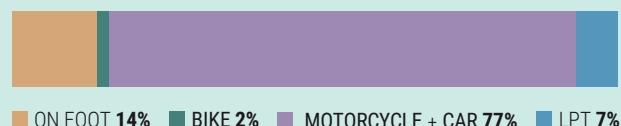
MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



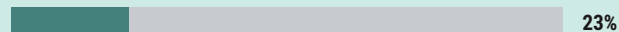
SUSTAINABLE MOBILITY RATES

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013

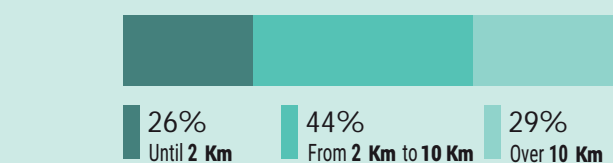


2016/2018

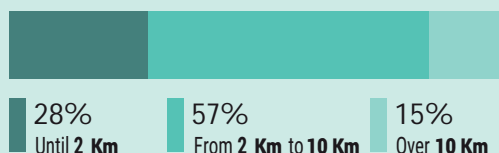


RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

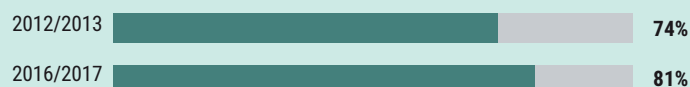


2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



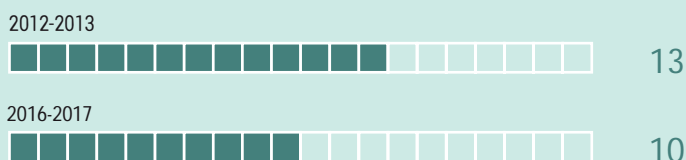
TIME SPENT FOR TRIPS

on a typical weekday
(in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)

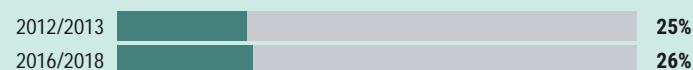


AVERAGE VELOCITY OF TRIPS

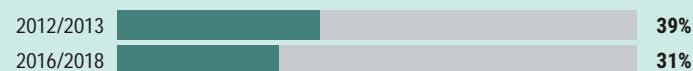


MOTIVACION OF TRIPS

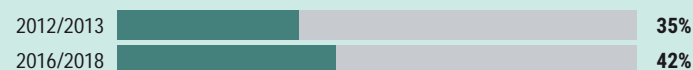
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

+1%
GROWTH RATE 2016/2017

610

MOTOR VEHICLES
EVERY 1000 RESIDENS

646

+2%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

169

MOTOR VEHICLES
EVERY 1000 RESIDENS

144

+2%
GROWTH RATE 2016/2017

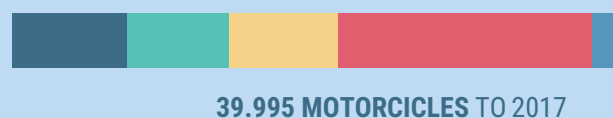
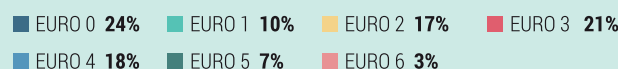
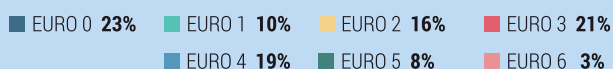
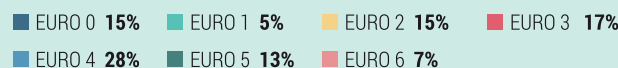
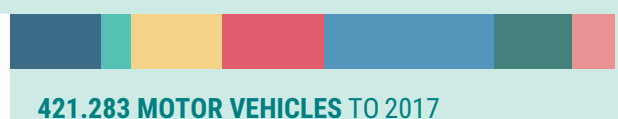
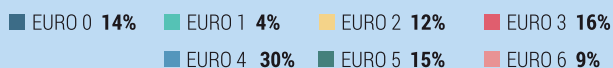
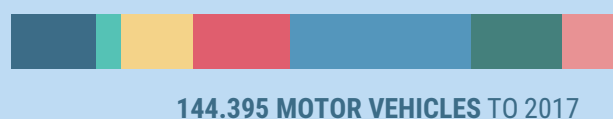
MOTOR
VEHICLES
CARS/KM2 ON 2017

676





ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

127

MOTOR
VEHICLES
CARS/KM2 ON 2017



TYPE OF SUPPLY

				
---	84.900	PETROL	226.100	3.283
---	54.730	DIESEL	170.394	34.321
---	4.195	LGP	12.958	361
---	456	METHANE	1.406	188
---	233	HYBRID	399 *	24 *
---	15	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

MESSINA



The city of Messina in the last two years had 2 survey stations monitoring the parameters considered in the study: Bocchetta and Villa Dante. Caronte station, working until 2016, no longer records PM_{10} values. The Bocchetta station measures both NO_2 and PM_{10} , while the Villa Dante station measures only the concentrations of NO_2 . None of the detection stations, as in 2016, records data on $PM_{2.5}$ concentrations.

The city of Messina, like most of the 14 cities focus of this study, in 2017 shows a very clear reduction in the annual cumulative precipitation, totaling 670 mm, while for 2018 1172 mm of annual rainfall were recorded, in line with the 2006-2015 average.

In the period analyzed a reduction in the concentrations of both pollutants is observed: -23% for NO_2 and -30% for PM_{10} .

As regards the average **concentration of NO_2** , there is a reduction compared to 2016 decreasing to a value of $30 \mu g/m^3$. In reference to the number of **exceedances** of daily limits for NO_2 , these are still at zero.

With reference to the **concentration of PM_{10}** , there is a considerable reduction in 2017 and 2018, respectively $23 \mu g/m^3$ and $21 \mu g/m^3$. Unlike NO_2 , the **exceedances** for PM_{10} are lower than in 2016, but it should be pointed out that the Caronte station, which had the highest number of exceedances over the limit in 2016, does not monitor PM_{10} since 2017; therefore, the registered exceedances refer to the Villa Dante station.

Messina has a **traffic station** and a **background station**, both of which do not have values exceeding the regulatory limits for both years considered.

In conclusion, overall the active stations do not detect particular criticalities in these two years of monitoring. However, without the Caronte station it is no longer possible to check the air quality trend in an area where this value was found to be very high in 2016.



Boccetta, San Francesco

NO₂ ANNUAL AVERAGE **30**
HOURLY EXCEEDANCES **0**
PM₁₀ ANNUAL AVERAGE **23**
DAILY EXCEEDANCES **9**

0

1 km

PM₁₀ ANNUAL AVERAGE **23**
DAILY EXCEEDANCES **12**

Villa Dante

MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

31 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

2 IN 2017

MAX EXCEEDANCES STATION IN 2017

BOCCETTA

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-23% -23% ---%

CONCENTRATION
AVERAGE 2018

30 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2018

MAX EXCEEDANCES STATION IN 2017

CONCENTRATION
AVERAGE 2017

21 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

7 IN 2017

MAX EXCEEDANCES STATION IN 2017

VILLA DANTE

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-30% -30% ---%

CONCENTRATION
AVERAGE 2018

23 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
DAILY LIMIT VALUE

12 IN 2018

MAX EXCEEDANCES STATION IN 2017

TIBURTINA

CONCENTRATION
AVERAGE 2017

--- $\mu\text{g}/\text{m}^3$

PM_{2,5}

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

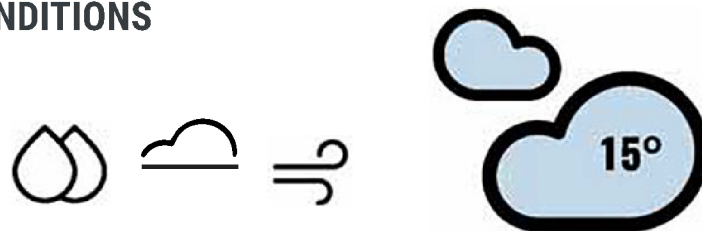
---% ---% ---%

CONCENTRATION
AVERAGE 2018

--- $\mu\text{g}/\text{m}^3$

MILAN

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS
USED

PGTU
APPROVED

PUM

PUMS
APPROVED 2018

In November 2018, the Milan City Council definitively approved the PUMS. It was a long process launched in 2015, developed by AMAT and the Municipality's Mobility Department, drawn up through an open discussion with the city, local authorities, associations, operators, and the appointed Scientific Committee. The PUMS provides for the strengthening of public transport, the management of the demand for mobility of people and goods, the enhancement of urban space as a common good, the sharing of resources. These are the key words of the PUMS for the next decade, confirming the desire for change and innovation in the field of mobility that the city of Milan has undertaken for years.

The Municipal Administration and the ATM transport company have decided that **by 2030 the entire public transport fleet of Milan will be electric**, with 1,200 new buses that will replace the diesel ones. This will be a 2 billion euros investments by ATM, which will largely be founded by its own resources and, for a small part, by government funds dedicated to sustainable mobility.

Car and bike sharing continue their development and use in Milan. From April 2018 the **Bitride** fleet has expanded to 350 bikes for the new and experimental electric bike sharing free-floating project. The new **Enjoy Cargo Van Sharing** service was also launched, consisting of a fleet of 20 Doblò Cargo, for urban freight transport.

Very interesting is the trial in May 2018 of **"TrentaMi: Zona 30 gente contenta"** promoted by Fiab and the Municipality of Milan. For four days, a portion of a neighborhood in Milan was the scene of experimentation for an area where the speed limit was set to 30 km/h. The experiment was met by excellent citizen participation and by success of critics and the public.

The real novelty of Milan was the debut on February 25th 2019 of **Area B, the largest Low Emission LTZ in Europe**, which will surround Area C. Overall Area B will cover approximately 72% of the municipal area, including about 1.4 million of people, equal to 97.6% of residents.

Specifically, the provision provides for the prohibition of the circulation of the most polluting diesel vehicles - **Euro 0, 1, 2 and 3 diesel**, Euro 0 petrol-powered vehicles, dual-fuel LPG-diesel and methane-diesel Euro 0, 1, 2, and bulky vehicles over 12 meters in length - from Monday to Friday and from 7.30 to 19.30.

From 1 October 2019 the traffic ban will also be extended to Euro 4 diesels; the introduction of other rules will gradually follow, up to 2030, when the circulation ban will be extended to all diesel vehicles. 15 cameras were already installed while another 98 cameras will be active by the end of 2019.

To help citizens, the municipality has provided for exceptions that will allow them to get used to the new rules more easily: in the first year of implementation, everyone will have 50 days of free circulation within the LTZ, while during the second year only residents will have 25 days, and all the other citizens only 5 days. Incentives are also provided for the replacement of the most polluting vehicles, for residents, artisans and traders.

AVAILABLE THE PUMS OF THE CITY OF MILANO

The Metropolitan City of Milan has started the drafting of the PUMS on a metropolitan scale. On January 30, 2019, the Metropolitan Council approved the "PUMS Formation Procedure and the approval of the Guidelines for Guidance", which will be a supplementary document of the PUMS of the city of Milan.

The main elements that will characterize the metropolitan PUMS are the territorial integration, the analysis and programming of the networks and mobility services, the material integration, in particular for cycling mobility and for charging infrastructures for vehicles at reduced emissions. There are four macro-objectives indicated in the Guidelines: effectiveness and efficiency of the mobility system, energy and environmental sustainability, road safety and socio-economic sustainability.

MUNICIPAL AREA

RESIDENTS
1.366.180

DENSITY
7.520 pl/km²

EXTENSION
182 km²

PEDESTRIAN AREA

0,46 M²/RESIDENTS
GROWTH RATE
2016/2017 **2%**

BIKE PATHS

218 TOTAL
KILOMETERS
GROWTH RATE
2016/2017 **1%**

LTZ EXTENSION

0,05 M² OF LTZ OVER
100 M² OF CITY
GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS FOR VEHICLES

53.878
GROWTH RATE
2016/2017 **-6%**

ENTRANCES /DAY

539,7
GROWTH RATE
2016/2017 **+2%**

DEMAND FOR PUBLIC TRANSPORT

540
PASSENGER/PEOPLE

+2% GROWTH RATE 2016/2017



155 MLN
KM TRAVELLED IN 2017

---% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

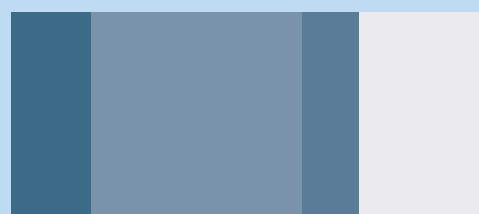
AUTOBUS	2.835	-1%
TRAM	2.041	-7%
FILOBUS	384	-2%
METRO	10.077	-7%
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

6 INCIDENT/1000 PL
GROWTH RATE
2016/2017 **-4%**

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **0%** **0,6**

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 17% BIKE 12%
MOTORCYCLE 45% VEHICLES 26%

INTERCHANGE CAR PARK

22 N. CAR PARK EVERY
1000 OF CARS
GROWTH RATE
2016/2017 **-1%**

PAID PARKING ON THE STREET

126 N. CAR PARK EVERY
1000 OF CARS
GROWTH RATE
2016/2017 **0%**

CAR SHARING

3.100 +2%
FLEET OF CARS 2016/2017
300 +28%
USERS/1000 PL 2016/2017

BIKE SHARING

4.800 +3%
FLEET OF BIKE 2016/2017
42 +4%
USERS/1000 PL 2016/2017

TAXI LICENCES

3,55
N. TAXI/1000 PL IN 2016
GROWTH RATE
2016/2017 **-1%**

RENTAL WITH DRIVER LICENCES

0,16
N. RWT/1000 PL IN 2016
GROWTH RATE
2016/2017 **0%**

METROPOLITAN AREA

RESIDENTS
3.218.201

DENSITY
2.043 pl/km²

EXTENSION
1.575 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

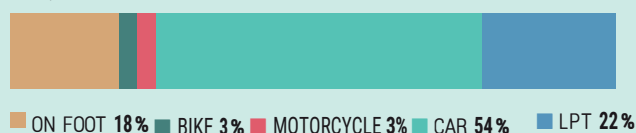
PUMS

IN JANUARY THE METROPOLITAN CITY ADOPTED GUIDELINES FOR START PUMS

MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



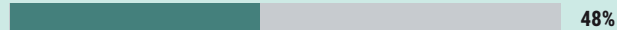
SUSTAINABLE MOBILITY RATES

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013

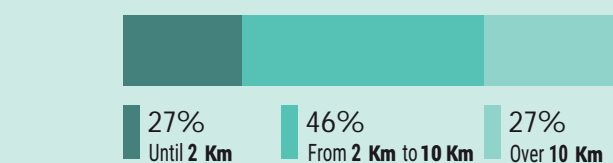


2016/2018



RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



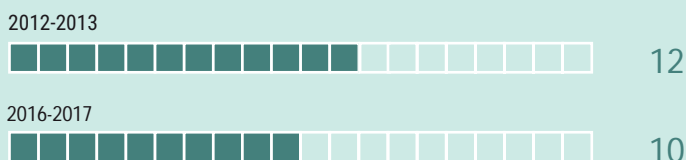
TIME SPENT FOR TRIPS

on a typical weekday (in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)



AVERAGE VELOCITY OF TRIPS

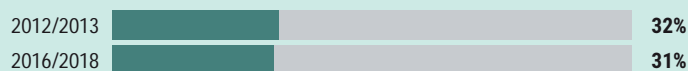


MOTIVACION OF TRIPS

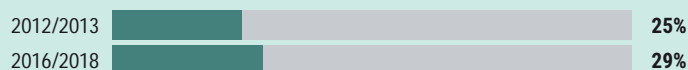
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

+0,5%
GROWTH RATE 2016/2017

513

MOTOR VEHICLES
EVERY 1000 RESIDENS

561

+1%
GROWTH RATE 2016/2017

+0,5%
GROWTH RATE 2016/2017

121

MOTOR VEHICLES
EVERY 1000 RESIDENS

106

+1%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

3.857

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

1.147

MOTOR VEHICLES
CARS/KM2 ON 2017



699.653 MOTOR VEHICLES TO 2017

1.807.123 MOTOR VEHICLES TO 2017

EURO 0 11% EURO 1 2% EURO 2 8% EURO 3 11%
EURO 4 28% EURO 5 22% EURO 6 18%

EURO 0 8% EURO 1 2% EURO 2 7% EURO 3 12%
EURO 4 31% EURO 5 23% EURO 6 17%



64.580 COMMERCIAL VEHICLES TO 2017

159.603 COMMERCIAL VEHICLES TO 2017

EURO 0 10% EURO 1 5% EURO 2 10% EURO 3 17%
EURO 4 24% EURO 5 24% EURO 6 10%

EURO 0 9% EURO 1 5% EURO 2 10% EURO 3 19%
EURO 4 25% EURO 5 22% EURO 6 10%



165.649 MOTORCYCLES TO 2017

341.717 MOTORCYCLES TO 2017

EURO 0 24% EURO 1 13% EURO 2 13%
EURO 3 45% EURO 4 45%

EURO 0 25% EURO 1 14% EURO 2 14%
EURO 3 42% EURO 4 5%

TYPE OF SUPPLY

	Municipal Area	Metropolitan Area
PETROL	403.645	1.020.959
DIESEL	246.593	648.859
LGP	32.937	98.890
METHANE	5.591	15.478
HYBRID	11.204	22.703 *
ELECTRIC	626	366 *

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY MILAN



The pollution monitoring stations in the city of Milan are the same eight used in previous years: Abbiategrasso, Città Studi, Parco Lambro, Liguria, Marche, Senato, Verziere and Zavattari. Out of these, the first 3 are referred to as background stations, while the remaining 5 are for traffic. In 2018, the Parco Lambro station is no longer active.

From 2016 to 2018, the general town situation shows a slight improvement for NO_2 (-8% reduction) and for PM_{10} (-8% reduction), while there is a more marked reduction in $\text{PM}_{2.5}$ concentrations, equal to -15%.

For annual cumulated rainfall, the two annuities under examination register 564 mm in 2017 and 737 mm in 2018. With regard to rainy days, 88 days can be observed for 2018, and 65 for 2017.

As for the previous years, despite the noted reduction, the average **concentration of NO_2** continues to be above the legal limits, reaching $45\mu\text{g}/\text{m}^3$. In 2018 the situation of **exceedances of limits for NO_2** has undergone a drastic improvement, as there were no exceedances in the measurement stations.

Compared to past years, monitoring stations have reported **concentrations** below the limits in the various stations equal to $33\mu\text{g}/\text{m}^3$ and $23\mu\text{g}/\text{m}^3$ respectively for **PM_{10}** and **$\text{PM}_{2.5}$** .

Regarding the number of **daily exceedances of PM_{10}** , the situation remains worrying (79 days of exceedance), in fact a value similar to that of 2016 is being reported. The value is in any case lower than the 98 days of exceedances registered in 2017 in the Senato station; it should be noted that the year 2017 registered less rainfall than 2018 (737 mm of rain and 88 days in which rainfall was recorded, against 564 mm and 65 days of rain in 2017). Therefore, this improvement could be influenced by this increase of rain.

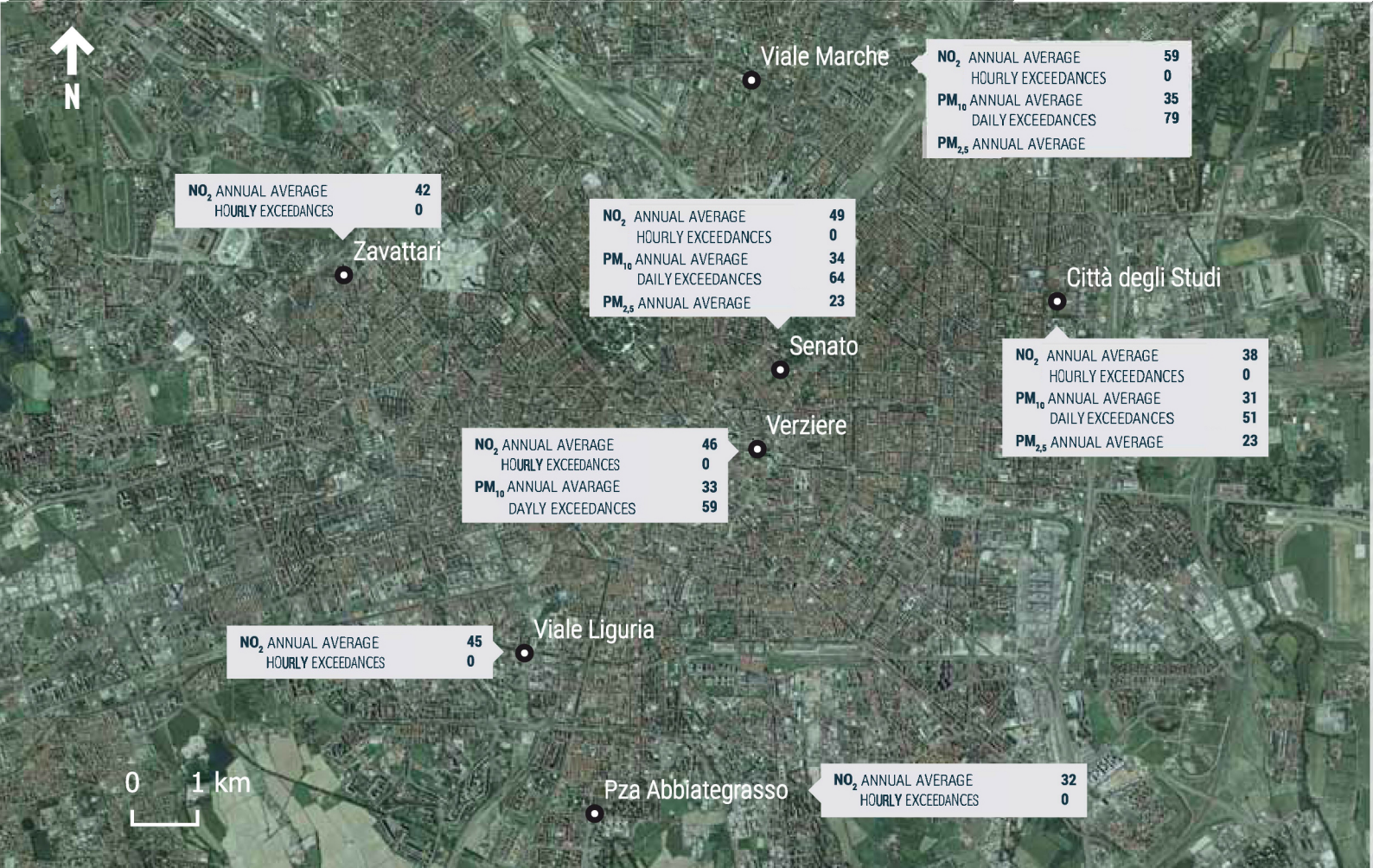
With regard to **$\text{PM}_{2.5}$** concentrations, there was a reduction of about 15% in concentrations compared to those in 2016, with values lower than the regulatory limit in all stations.

Referring to the details of the **single stations**, concerning the NO_2 , in 2018 higher, above the limit concentrations are found in the Marche, Senato, Verziere and Zavattari stations, respectively, 59, 49, 46 and $42\mu\text{g}/\text{m}^3$. As indicated above, no station reports exceeding the NO_2 hourly limit.

Regarding PM_{10} in 2018, even if all stations report concentration values lower than the annual limit, the number of daily exceedances in the Marche, Senato and Verziere stations indicate values above the limit (respectively 79, 64 and 59); the Città Studi background station also indicates value of 51 days, above the limit.

With reference to $\text{PM}_{2.5}$, no stations went above the annual limit in 2018.

Although the particular location of the city of Milan makes it more complicated to achieve satisfactory results within the legal limits for the air pollutants examined, 2018 sees compliance with the annual concentration limits for PM_{10} and $\text{PM}_{2.5}$, also thanks to greater rainfall compared to 2017; the situation regarding the NO_2 annual limit and the PM_{10} daily threshold is still problematic.



MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

49 µg /m³

EXCEEDANCES
HOURLY LIMIT VALUE

11 IN 2017

MAX EXCEEDANCES STATION IN 2017

MARCHE, LIGURIA

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-8% -17% -8%

CONCENTRATION
AVERAGE 2018

45 µg /m³

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2018

MAX EXCEEDANCES STATION IN 2018

CONCENTRATION
AVERAGE 2017

40 µg /m³

EXCEEDANCES
HOURLY LIMIT VALUE

98 IN 2017

MAX EXCEEDANCES STATION IN 2017

SENATO

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-8% -3% -18%

CONCENTRATION
AVERAGE 2018

33 µg /m³

EXCEEDANCES
DAILY LIMIT VALUE

79 IN 2018

MAX EXCEEDANCES STATION IN 2018

MARCHE

CONCENTRATION
AVERAGE 2017

28 µg /m³

PM_{2,5}

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

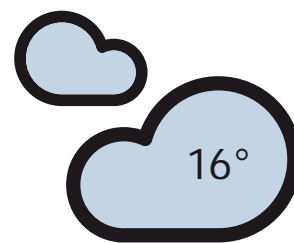
-15% -8% -18%

CONCENTRATION
AVERAGE 2018

23 µg /m³

NAPLES

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS
USED

PGTU
UPDATED

PUM

PUMS
GUIDANCE APPROVED
2016

In the years considered by this report, **public transport in Naples has continued to reduce its offer**, in particular buses, trams and trolleybuses have decreased. On the other hand, the service of the metro line grew, but was unable to compensate for the decline in the other modes. At the end of December 2018, the go-ahead of the Bankruptcy Court arrived at the arrangement with creditors of ANM, the transport company in great financial difficulty.

The rate of motorization of cars has grown in the city and, to a considerable extent, also that of motorcycles grew (+3.6%). A similar trend occurred in the metropolitan city of Naples, as indeed happened in all Italian metropolitan cities.

Cycle paths are not growing and a slight increase is registered for pedestrian areas, with two measures in the ancient heart of Via dei Tribunali and some alleys near San Domenico Maggiore, transformed from LTZ into Pedestrian Areas.

In October 2018, the Municipality of Naples issued the notice for the identification of subjects interested in the trial of free-flow Bike Sharing, based on the guidelines decided by the Executive. According to what was established by the Municipality of Naples, it will have to be active 24 hours on the whole territory, the bicycle fleet will be able to reach 6 thousand units at full capacity, they will have a free distribution on the territory and the duration of the service will have to be of three years. The outcome to date of this notice is not known.

Construction sites keep going for the construction of the magnificent metro line 1 and line 6. In 2019 two new stations of line 6 should open: San Pasquale and Arco Mirelli. On line 1, work is being carried out to complete the interchange between the two lines to 2020 and, regarding the Municipio station already opened in 2015, the arrangement of Piazza Municipio and the exit to the harbour side in 2021. The works of the Duomo Station have also been restarted, which required a complete revision of the project due to the important archaeological findings. The construction sites of the Garibaldi Station to Capodichino line continue. In 2020 the arrival of new trains is expected,

and this will allow a net improvement in the service.

Important news is coming for the pedestrian seafront and its redevelopment as a meeting place, for walking, free time, to enjoy natural beauty and sporting events. The pedestrian seafront was established in 2012.

In January 2019 the process of the tender for the executive design of the "cycle-pedestrian redevelopment of the Naples seafront, part of Piazza Vittoria and the Molosiglio" was concluded, with the awarding of the total value of 13,200,000 euros to the winning project. Cycle lane, parking spaces, paving, adjustment of spaces for catering activities, lighting, security lane: these are the essential elements of the redevelopment of the pedestrian promenade.

PUMS GUIDELINES

In May 2016 the Municipal Council of Naples approved the guidelines, the "director level" of the municipal Sustainable Mobility Plan (PUMS), which defines the "vision" of the new mobility model that the Municipality intends to pursue in the coming years to make the way of moving in the city less and less "car-centric", simpler, closer to the needs of citizens and compatible with the environment. The Administration is currently working on the preparation of the PUMS.

The cornerstone of the new PUMS mobility system will be the strengthening of the collective transport with new networks and new vehicles. Pedestrian and bicycle mobility, shared mobility and low environmental impact vehicles such as electric and hybrid will be encouraged.

In order to favour the integration between the various modes of transport, the mobility system will have to be equipped with an "intelligence" made of telematic technologies for traffic management. These same technologies will allow regulating the distribution of goods in the city.

MUNICIPAL AREA

RESIDENTS
970.185

DENSITY
8.151 pl/km²

EXTENSION
119 km²

PEDESTRIAN AREA

M²/RESIDENTS

GROWTH RATE
2016/2017 ---

BIKE PATHS

20 TOTAL
KILOMETERS
GROWTH RATE
2016/2017 0%

LTZ EXTENSION

1,18 M² OF LTZ OVER
100 M² OF CITY
GROWTH RATE
2016/2017 0%

ENABLED TO ACCESS
FOR VEHICLES

11.000
GROWTH RATE
2016/2017 ---%

ENTRANCES /DAY

30.000
GROWTH RATE
2016/2017 ---%

DEMAND FOR PUBLIC TRANSPORT

120

PASSENGER/PEOPLE

-2,5% TGROWTH RATE 2016/2017



19 MLN

KM TRAVELLED IN 2017

-10% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	991	-6%
TRAM	38	-62%
FILOBUS	27	-21%
METRO	1226	+7%
FUNICULAR	55	-23%
BY WATER	---	

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

2 INCIDENT/1000 PL
0% GROWTH RATE
2016/2017

DEAD/100 INCIDENT
GROWTH RATE -15%
2016/2017 1,1

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 19% BIKE 1%
MOTORCYCLE 65% VEHICLES 15%

INTERCHANGE CAR PARK

8 N. CAR PARK EVERY
1000 OF CARS
GROWTH RATE
2016/2017 ---%

PAID PARKING ON THE STREET

38 N. CAR PARK EVERY
1000 OF CARS
GROWTH RATE
2016/2017 ---%

CAR SHARING

11 0%
FLEET OF CARS 2016/2017
0,0008 +167%
USERS/1000 PL 2016/2017

TAXI LICENCES

0,2
N. TAXI/1000 PL IN 2016
GROWTH RATE
2016/2017 ---%

BIKE SHARING

--- ---
FLEET OF BIKE 2016/2017
--- ---
USERS/1000 PL 2016/2017

RENTAL WITH DRIVER LICENCES

0,2
N. RWT/1000 PL IN 2016
GROWTH RATE
2016/2017 ---%

METROPOLITAN AREA

RESIDENTS
3.107.006

DENSITY
2.653 pl/km²

EXTENSION
1.171 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

PUMS

NOT AVAILABLE SUSTAINABLE URBAN MOBILITY PLANS

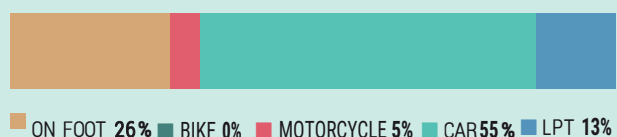
MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



SUSTAINABLE MOBILITY RATES

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013

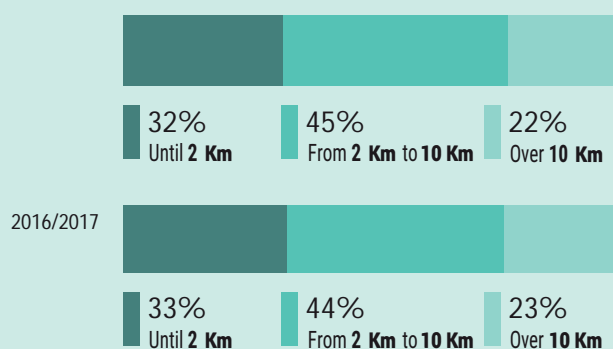


2016/2018



RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



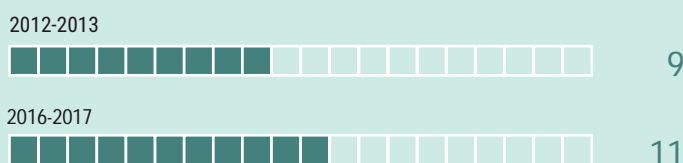
TIME SPENT FOR TRIPS

on a typical weekday (in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)



AVERAGE VELOCITY OF TRIPS

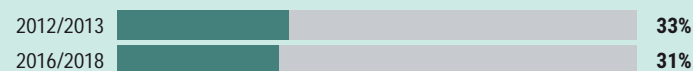


MOTIVACION OF TRIPS

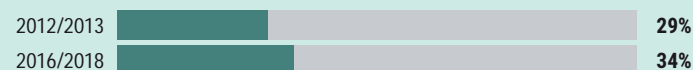
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

+1%
GROWTH RATE 2016/2017

557

MOTOR VEHICLES
EVERY 1000 RESIDENS

569

+2%
GROWTH RATE 2016/2017

+4%
GROWTH RATE 2016/2017

140

MOTOR VEHICLES
EVERY 1000 RESIDENS

108

+3%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

4.540

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

1.510

MOTOR VEHICLES
CARS/KM2 ON 2017



539.109 MOTOR VEHICLES TO 2017

■ EURO 0 28% ■ EURO 1 5% ■ EURO 2 13% ■ EURO 3 13%
■ EURO 4 25% ■ EURO 5 10% ■ EURO 6 6%



37.198 COMMERCIAL VEHICLES TO 2017

■ EURO 0 24% ■ EURO 1 11% ■ EURO 2 14% ■ EURO 3 17%
■ EURO 4 17% ■ EURO 5 12% ■ EURO 6 5%



135.958 MOTORCYCLES TO 2017

■ EURO 0 23% ■ EURO 1 16% ■ EURO 2 20%
■ EURO 3 37% ■ EURO 4 4%

1.768.050 MOTOR VEHICLES TO 2017

■ EURO 0 22% ■ EURO 1 5% ■ EURO 2 13% ■ EURO 3 15%
■ EURO 4 27% ■ EURO 5 12% ■ EURO 6 6%





132.226 COMMERCIAL VEHICLES TO 2017

■ EURO 0 21% ■ EURO 1 10% ■ EURO 2 15% ■ EURO 3 19%
■ EURO 4 18% ■ EURO 5 11% ■ EURO 6 6%

334.349 MOTORCYCLES TO 2017

■ EURO 0 25% ■ EURO 1 16% ■ EURO 2 19%
■ EURO 3 36% ■ EURO 4 4%

TYPE OF SUPPLY

				
---	321.361	PETROL	928.098	13.264
---	164.569	DIESEL	653.145	114.560
---	45.928	LGP	148.758	1.986
---	7.721	METHANE	36.229	2.242
---	724	HYBRID	1.677 *	169 *
---	24	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

NAPLES



The monitoring stations in the city of Naples are the same as those used in previous years: Osservatorio, Santobono, Museo, Ente Ferroviario, Pellegrini, ITIS Argine. Of these, only the first is indicated as a background station, while the others are traffic stations.

The general town situation shows an almost unchanged situation in the time span considered with regard to the average concentration of NO_2 (-2%) and PM_{10} , while variations in average concentrations were recorded for $\text{PM}_{2.5}$ (-11%).

The two annuities under examination register annual cumulated rainfall of 791 mm in 2017 and 1104 mm in 2018. With regards to rainy days, it rained for a total of 101 days in 2018, and 60 in 2017.

As for the previous years, in 2018 the average **concentration of NO_2** continues to be above the legal limits, reaching $42\mu\text{g}/\text{m}^3$, while in 2017 this was even greater, with a value of $44\mu\text{g}/\text{m}^3$. Regarding NO_2 hourly limits exceedances, 4 daily **exceedances** were detected during the year 2017 and 2 in 2018, well below the legal limits.

The average **concentration of PM_{10}** instead remains firmly below the legal limit for 2017 and 2018: the concentration is equal to $30\mu\text{g}/\text{m}^3$, without any significant changes compared to 2016.

Regarding the number of **daily exceedances** of the PM_{10} , these continue to be above the permitted limit, despite a reduction of 34%. The absolute value of 40 exceedances in the Ente Ferrovie station is still above the limit of acceptability established by the legislation, but it must be considered within a decreasing series begun in 2016.

Entering the merits instead of **$\text{PM}_{2.5}$** , the average concentration of this fraction of particulate has undergone a considerable reduction since 2016, thus reaching a value of $16\mu\text{g}/\text{m}^3$, well below the average permitted value.

Carrying out an analysis by type of station, it clearly emerges that in reference to the **traffic stations** the concentrations of NO_2 are still well above the limit of $40\mu\text{g}/\text{m}^3$, while a reduction of particulate matter is observed respectively of 9% for PM_{10} and 15% for $\text{PM}_{2.5}$.

For **background stations**, instead, there is a reduction of the concentrations of NO_2 and $\text{PM}_{2.5}$ respectively of 15% and 21% and a considerable increase of 23% for PM_{10} .

The annual average of NO_2 in **2018** exceeds the limits in all **stations** except for the Osservatorio and Santobono stations, while for PM_{10} the Ferrovie station reports more than 35 exceedances.

In conclusion, the difficulties encountered for the city of Naples on air pollution remain more or less unchanged compared to previous years; a situation of constant exceeding of the average concentration allowed for NO_2 can be highlighted, while the opposite is true for particulate matter, where annual average concentrations are below the limits, but there are still numerous daily exceedances of PM_{10} .



MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017
44 µg / m³

EXCEEDANCES
HOURLY LIMIT VALUE
4 IN 2017

MAX EXCEEDANCES STATION IN 2017
ENTE FERROVIE

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-2%	-2%	-15%

CONCENTRATION
AVERAGE 2018
42 µg / m³

EXCEEDANCES
HOURLY LIMIT VALUE
2 IN 2018

MAX EXCEEDANCES STATION IN 2018
MUSEO

CONCENTRATION
AVERAGE 2017
22 µg / m³

EXCEEDANCES
HOURLY LIMIT VALUE
48 IN 2017

MAX EXCEEDANCES STATION IN 2017
ENTE FERROVIE

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-3%	-9%	+23%

CONCENTRATION
AVERAGE 2018
30 µg / m³

EXCEEDANCES
DAILY LIMIT VALUE
40 IN 2018

MAX EXCEEDANCES STATION IN 2018
ENTE FERROVIE

CONCENTRATION
AVERAGE 2017
18 µg / m³

PM_{2.5}

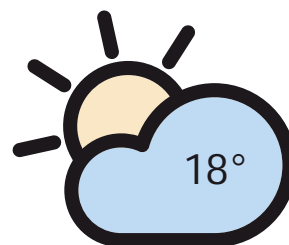
TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-11%	-15%	-21%

CONCENTRATION
AVERAGE 2018
16 µg / m³

PALERMO

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED 2013

PUM

PUMS
ANNOUNCED THE START
SEPTEMBER 2018

The municipality of Palermo in recent years has made progress towards sustainability, with the construction of four tram lines, the establishment of new pedestrian areas and of the LTZ in the historic city center. Started in 2016, **the LTZ of the central area of Palermo is now covered by telematic control gates** installed during summer 2017, thus making the provision effective and stable.

In August 2018, the process of pedestrianization and regulation of the **areas bordering the historic markets "Capo", "via Sant'Agostino" and "via Bandiera"**, where circulation will be more restrictive than in the central ZTL, is off.

However, the index of motorization of cars and motorcycles is growing, both in the city of Palermo and in the metropolitan area.

The launch of the tram service coincided with a reorganization and reduction of the bus offer. Important investments are underway to modernize the fleet, with **the supply of 89 new buses** designed to reinforce the fleet of public transport vehicles circulating in Palermo.

Significant **enhancement of car sharing** with increased fleet and doubling of users. **Leap forward also for the Bike Sharing** that reached 400 bicycles spread in 17 bike parks, with a +56% of users.

The call for tenders for the assignment of the design service for the "South area cycle route from Via Archirafi to the Portitazza della Bandita including intelligent works" was published in August 2018. The project is part of the PON Metro.

The doubling of the tracks between the stations of Palermo Centrale and Palazzo Reale Orleans **has been active since December 2018**, adding another important piece toward the completion to railway passer, now ready at 95%.

Since October 2018 RFI **has reactivated the connection between the Palermo Central station and the "Falcone e Borsellino" airport**, with a total investment for the construction of the new line of about 1.1 billion euros.

In May 2018, **the winner of the international competition for the new tramway network in Palermo was announced**. The competition provides for the extension of the current lines between the central station and Piazza De Gasperi, from the Calatafimi junction to via Lodato and from Notarbatolo to Giachery. These developments are already financed with funds from the Pact for Palermo.

This competition also provides for the construction of new tram networks to Bonagia, Zen and Mondello, but with funds to be found at a later stage, possibly via national resources of MIT. The main features of the project are the technical characteristics of the new lines which will have no barriers, no piling and magnetic induction catenary.

In December 2018, the feasibility study for 7 lines was delivered to the Municipality. For the first 3 central and priority lines financed by the Pact for Palermo, final planning is underway and should be delivered in mid-2019.

THE QUESTIONNAIRE TO START THE PUMS IN PALERMO

The Municipality of Palermo has declared that it is preparing its Urban Sustainable Mobility Plan. On the occasion of the European Week on Sustainable Mobility 2018, a questionnaire on mobility aimed at all citizens residing in the city and in the provincial territory was published on the institutional website of the Municipality of Palermo, which aims to provide useful information on mobility and will be useful support for the definition of the Knowledge Framework of the Sustainable Mobility Plan of the city.

These very simple questions try not only to photograph the state of the mobility of the city but also to understand which solutions could encourage the change of habits, facilitating the use of public transport and / or less polluting vehicles.

The questionnaire is available at the following link: <https://mobilitasostenibile.comune.palermo.it/questionario-pums.php>

MUNICIPAL AREA

RESIDENTS

673.735

DENSITY

4.195 pl/km²

EXTENSION

160 km²

PEDESTRIAN AREA

0,52 M²/RESIDENTS
GROWTH RATE
2016/2017 **4%**

BIKE PATHS

48 TOTAL
KILOMETERS
GROWTH RATE
2016/2017 **1%**

LTZ EXTENSION

1,92 M² OF LTZ OVER
100 M² OF CITY
GROWTH RATE
2016/2017 **1%**

ENABLED TO ACCESS
VEHICLES

218.993

GROWTH RATE
2016/2017 **---**%

ENTRANCES /DAY

46.956

GROWTH RATE
2016/2017 **---**%

DEMAND FOR PUBLIC TRANSPORT

113

PASSENGER/PEOPLE

0% GROWTH RATE 2016/2017



14 MLN

KM TRAVELLED IN 2017

0% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	1.685	-17%
TRAM	409	---
FILOBUS	---	---
METRO	---	---
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

3 INCIDENT/1000 PL
GROWTH RATE
2016/2017 **-3%**

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **+9%**

1,2

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 16% BIKE 6%
MOTORCYCLE 54% VEHICLES 24%

INTERCHANGE CAR PARK

7 N. CAR PARK EVERY
1000 OF CARS
GROWTH RATE
2016/2017 **-1%**

PAID PARKING ON THE STREET

44 N. CAR PARK EVERY
1000 OF CARS
GROWTH RATE
2016/2017 **-10%**

CAR SHARING

159 **+54%**
FLEET OF CARS 2016/2017

9 **+100%**
USERS/1000 PL 2016/2017

BIKE SHARING

400 **+135%**
FLEET OF BIKE 2016/2017

0,003 **+56%**
USERS/1000 PL 2016/2017

TAXI LICENCES

0,47
N. TAXI/1000 PL IN 2016
GROWTH RATE
2016/2017 **0%**

RENTAL WITH DRIVER LICENCES

0,25
N. RWT/1000 PL IN 2016
GROWTH RATE
2016/2017 **0%**

METROPOLITAN AREA

RESIDENTS
1.268.217

DENSITY
253 pl/km²

EXTENSION
5.009 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

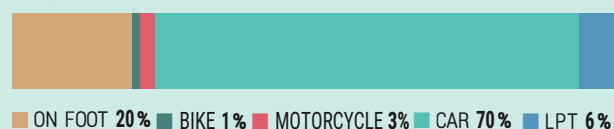
PUMS

NOT AVAILABLE SUSTAINABLE URBAN
MOBILITY PLANS

MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



SUSTAINABLE MOBILITY RATES

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013

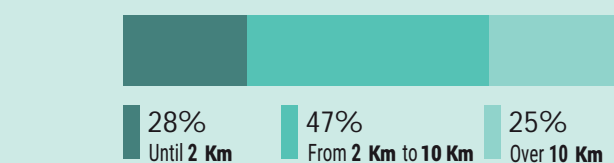


2016/2018

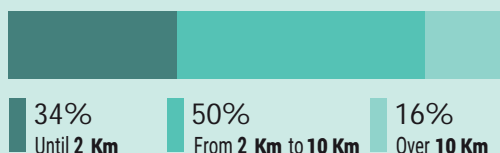


RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



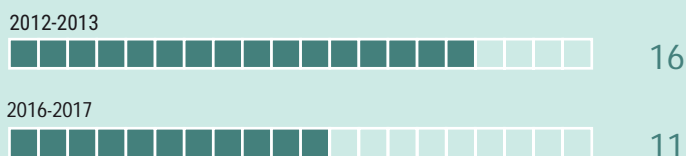
TIME SPENT FOR TRIPS

on a typical weekday
(in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)

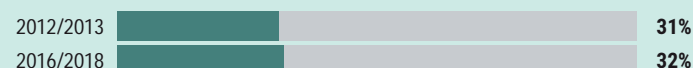


AVERAGE VELOCITY OF TRIPS



MOTIVACION OF TRIPS

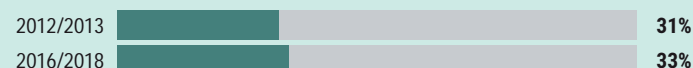
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

+1%
GROWTH RATE 2016/2017

577

MOTOR VEHICLES
EVERY 1000 RESIDENS

589

+2%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

182

MOTOR VEHICLES
EVERY 1000 RESIDENS

142

+1%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

2.422

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

149

MOTOR VEHICLES
CARS/KM2 ON 2017



388.624 MOTOR VEHICLES TO 2017

746.672 MOTOR VEHICLES TO 2017

EURO 0 13% EURO 1 4% EURO 2 12% EURO 3 16%
EURO 4 31% EURO 5 15% EURO 6 9%

EURO 0 13% EURO 1 4% EURO 2 14% EURO 3 17%
EURO 4 30% EURO 5 14% EURO 6 8%



26.289 COMMERCIAL VEHICLES TO 2017

60.672 COMMERCIAL VEHICLES TO 2017

EURO 0 19% EURO 1 12% EURO 2 15% EURO 3 21%
EURO 4 20% EURO 5 9% EURO 6 4%

EURO 0 19% EURO 1 11% EURO 2 17% EURO 3 22%
EURO 4 20% EURO 5 8% EURO 6 3%







122.692 MOTORCYCLES TO 2017

179.965 MOTORCYCLES TO 2017

EURO 0 18% EURO 1 20% EURO 2 20%
EURO 3 39% EURO 4 3%

EURO 0 21% EURO 1 20% EURO 2 19%
EURO 3 37% EURO 4 3%

TYPE OF SUPPLY

	Municipal Area	Fuel Type	Metropolitan Area
	---	PETROL	
	228.826		402.239
	---	DIESEL	
	134.115		53.193
---	22.372	LGP	35.692
---	2.598	METHANE	3.946
---	969	HYBRID	1.373 *
---	78	ELECTRIC	36 *

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

PALERMO



The monitoring stations in the city of Palermo are the same as those used in earlier years: Boccadifalco, Belgio, Castelnuovo, Di Biasi, Indipendenza, Giulio Cesare, Corso d'Italia and CEP. Of these, the first is classified as a background station, while the remaining 7 as traffic stations. Also, in the years 2017 and 2018 in the city of Palermo no measurements were carried out relating to PM_{2.5}.

With reference to precipitation in 2018, 92 rainy days were recorded in which a total of 1000 mm of rain rained, while in 2017 weather stations measured 555 mm of rain that fell in 61 days total.

The general situation of the city shows, from 2016 to 2018, a general improvement in the annual averages relating to concentrations of NO₂ and PM₁₀, equal to a reduction of 5% and 7% respectively.

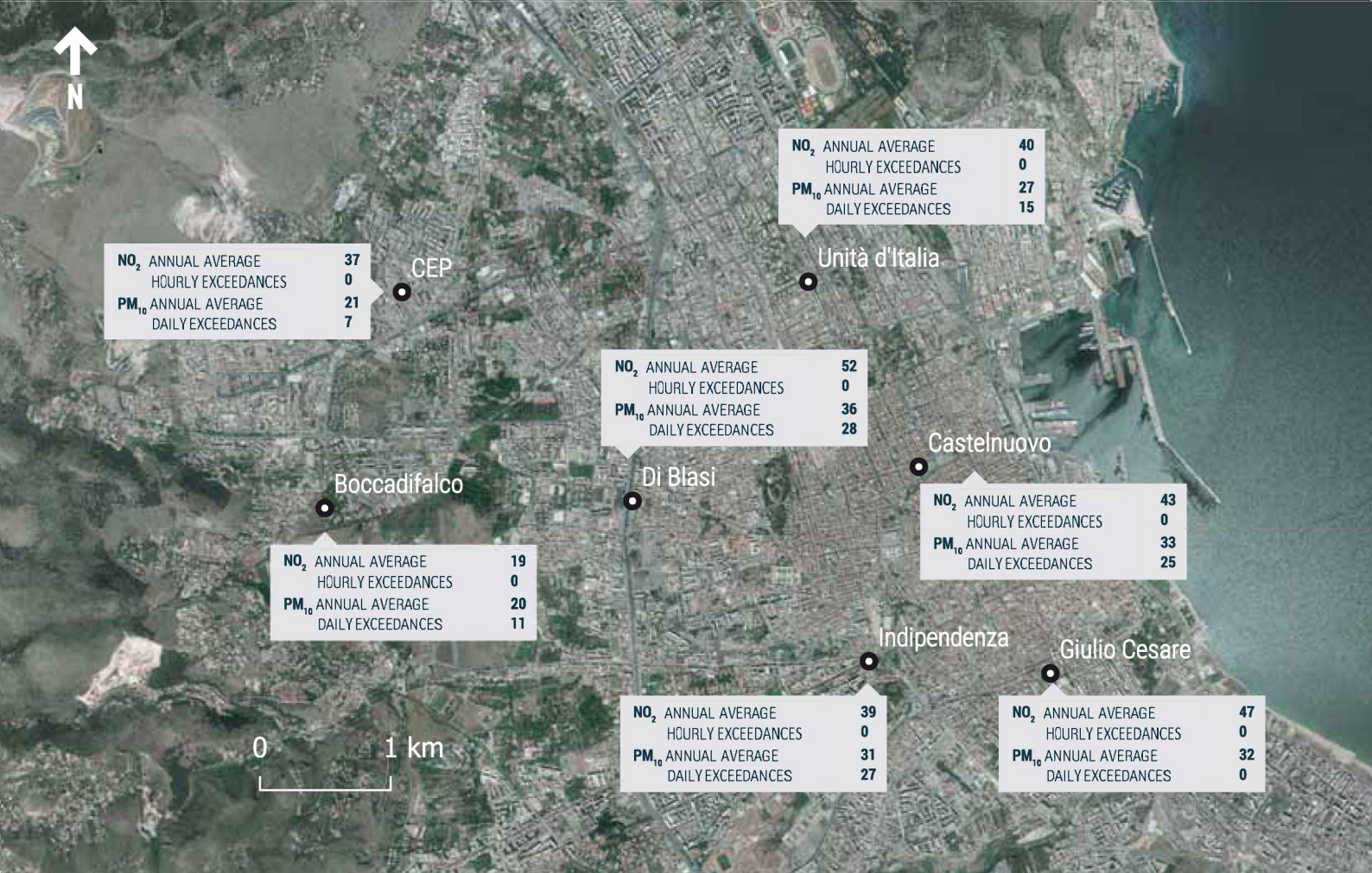
During 2018, in the city the average annual **concentration of NO₂**, although lower than in 2016, remained just below the legal limits, around 39µg/m³ (marking an increase compared to the values recorded in 2017).

In 2018 the number of **exceedances** of NO₂ hourly limits continues to be at optimal conditions, not registering any hourly exceedance during the whole year, similar to previous years.

The **concentration of PM₁₀** was lower than measured in 2016 and slightly higher than in 2017 (respectively 28 versus 26µg/m³).

Regarding the number of daily **exceedances** of PM₁₀, the situation in 2018 has improved compared to 2016: there are in fact 28 maximum exceedances at the Di Blasi station, still below the permissible limit of 35 annual exceedances. As for the average, we observe an increase in values compared to 2017 also for the exceedances, despite more rainfall in 2018 compared to 2017.

We can confirm that Palermo has overall maintained an air quality situation in line with the national legislation in force, respecting all the limits for NO₂ and PM₁₀.



MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

36 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2017

MAX EXCEEDANCES STATION IN 2017

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-5% -7% -27%

CONCENTRATION
AVERAGE 2018

39 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2018

MAX EXCEEDANCES STATION IN 2018

CONCENTRATION
AVERAGE 2017

26 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

17 IN 2017

MAX EXCEEDANCES STATION IN 2017

GIULIO CESARE

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-7% -6% +18%

CONCENTRATION
AVERAGE 2018

28 µg/m³

EXCEEDANCES
DAILY LIMIT VALUE

28 IN 2018

MAX EXCEEDANCES STATION IN 2018

DI BLASI

CONCENTRATION
AVERAGE 2017

--- µg/m³

PM_{2,5}

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

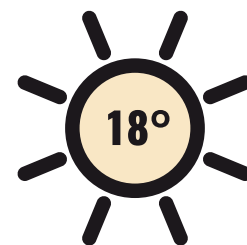
---% ---% ---%

CONCENTRATION
AVERAGE 2018

--- µg/m³

REGGIO CALABRIA

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
ELABORATED 2013

PUM

PUMS
ADOPTED 2017
IN THE MUNICIPAL COUNCIL

In these two years the city of Reggio Calabria has worked to overcome the crisis of **the ATAM public transport company with the Recovery Plan launched since 2015**: the reduction in supply and users must therefore be considered in this context. The administration aims to reverse the route starting from 2019 and several service innovations have already been adopted: tickets that can be purchased by smartphone, a dedicated APP, and 24 new buses. In 2019 another 51 new buses and 13 new municipal school buses for student mobility should arrive.

The pedestrian areas are not growing and the cycle path is still only a few kilometres long. **The index of motorization of cars and motorcycles is growing**, increasing both in the city and in the metropolitan area, as in other Italian realities.

In November 2017, the President of the Calabria Region signed the memorandum of understanding with the Mayor of the Municipality of Reggio Calabria, **for the realization of a "sustainable mobility system"** and of all strategic works connected, including the project for the new surface metropolitan train with a regional investment of 100 million euros through the funds of the Action and Cohesion Plan.

There is something new on the bike sharing front: the administration has announced that Reggio Calabria will soon be provided with a new municipal bike sharing service thanks to the "Reggio in bici" project, implemented as part of the national experimental program of sustainable mobility between home and school or work, financed by the Ministry of Environment and Protection of the Territory and the Sea.

The project **"Reggio in bici"** is also training, education, mobility management for the growth of soft and active mobility. The 10 new Bicincittà bike sharing stations, the most widespread bike sharing service in Italy, are currently under construction.

The **formation of school mobility managers** also started with the "Reggio in bici" project, towards a new model of sustainable mobility, with two days dedicated to the training of mobility managers in schools.

The objective is the centrality of the figure of the school mobility manager to create a real change in schools towards virtuous behaviour and sustainable mobility choices.

The Reggio in Bici project has a dedicated website <http://www.reggioinbici.it/>

In March 2019 the Agreement for the integrated area mobility of the Strait was signed in Palermo, between the Regions of Calabria and Sicily and the Metropolitan Cities of Reggio Calabria and Messina. The agreement on mobility in the integrated area of the Strait concerns Local Public Transport services, sustainable mobility and the integration of services according to proximity criteria for citizens.

THE PUMS OF THE CITY OF REGGIO CALABRIA

The Urban Sustainable Mobility Plan was adopted on 16 October 2017 by the City Council, with the adoption of the preliminary proposal and the preliminary environmental report. Now it will have to be subjected to VAS and to the process of public participation, to then arrive at the final approval.

The PUMS has as its priority the realization of a modern collective transport system capable of filling the biggest limit of the city: the absence of an option of sustainable and inclusive mobility, guaranteeing the right to mobility throughout the metropolitan area.

The objectives of the PUMS are several: first of all, to create a transport line through the railway track that follows the coast, in order to effectively connect the Rosarno-Melito Porto Salvo section, using the existing and new stations.

Within the urban perimeter, a C-ring is created that connects the main attractors of urban mobility: the university, the court, the Cedir, the hospital, the port. This way, a quick and fast connection between the coastal railway line and urban mobility will be created.

A new parking plan is also planned. These parking lots will have to be located close to the surface metropolitan train stops, because another goal of the PUMS is to "empty" city traffic from too many private vehicles.

www.pumsreggiocalabria.it

MUNICIPAL AREA

RESIDENTS
182.551

DENSITY
764 pl/km²

EXTENSION
239 km²

PEDESTRIAN AREA

0,01 M²/RESIDENTS

GROWTH RATE
2016/2017 **0%**

BIKE PATHS

5,8 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **16%**

LTZ EXTENSION

0,13 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS
FOR VEHICLES

39

GROWTH RATE
2016/2017 **-59%**

ENTRANCES /DAY

GROWTH RATE
2015/2017 **---**%

DEMAND FOR PUBLIC TRANSPORT

38

PASSENGER/PEOPLE

-0,3% GROWTH RATE 2016/2017



4 MLN

KM TRAVELLED IN 2017

-12% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	1.669	+0,2%
TRAM	---	---
FILOBUS	---	---
METRO	---	---
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

ACCIDENT DISTRIBUTION 2017

--- INCIDENT/1000 PL
--- GROWTH RATE
2016/2017

--- DEAD/100 INCIDENT
--- GROWTH RATE
2016/2017

PEDESTRIAN --- BIKE ---
MOTORCYCLE --- VEHICLES ---

INTERCHANGE CAR PARK

5 N. CAR PARK EVERY
1000 OF CARS

-2% GROWTH RATE
2016/2017

PAID PARKING ON THE STREET

29 N. CAR PARK EVERY
1000 OF CARS

0% GROWTH RATE
2016/2017

CAR SHARING

--- FLEET OF CARS 2016/2017

--- USERS/1000 PL 2016/2017

BIKE SHARING

--- FLEET OF BIKE 2016/2017

--- USERS/1000 PL 2016/2017

LICENSE TAXI

--- N. TAXI/1000 PL IN 2016
--- GROWTH RATE
2016/2017

RENTAL WITH DRIVER LICENCES

--- N. RWT/1000 PL IN 2016
--- GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
553.861

DENSITY
174 pl/km²

EXTENSION
3.183 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

PUMS

NOT AVAILABLE SUSTAINABLE URBAN
MOBILITY PLANS

MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



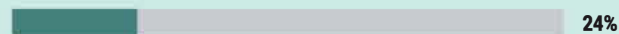
SUSTAINABLE MOBILITY RATES

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013

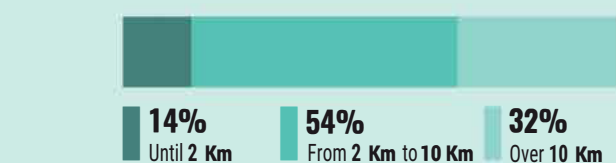


2016/2018

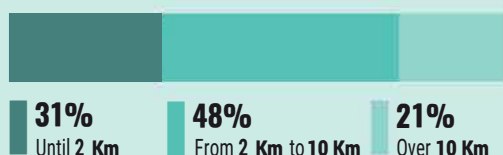


RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



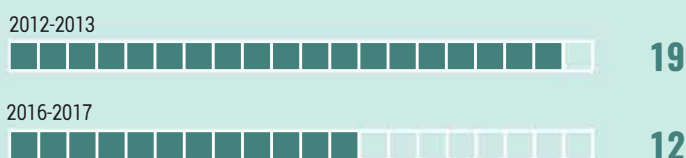
TIME SPENT FOR TRIPS

on a typical weekday
(in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)



AVERAGE VELOCITY OF TRIPS

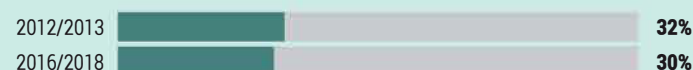
42
Km/h
2012/2013



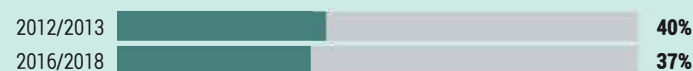
35
Km/h
2016/2017

MOTIVACION OF TRIPS

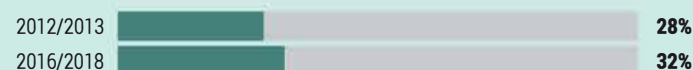
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

+1%
GROWTH RATE 2016/2017

619

MOTOR VEHICLES
EVERY 1000 RESIDENS

637

+2%
GROWTH RATE 2016/2017

+0,4%
GROWTH RATE 2016/2017

112

MOTOR VEHICLES
EVERY 1000 RESIDENS

79

+1%
GROWTH RATE 2016/2017

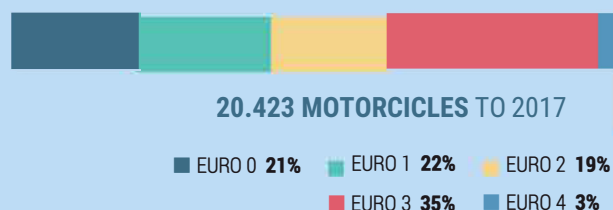
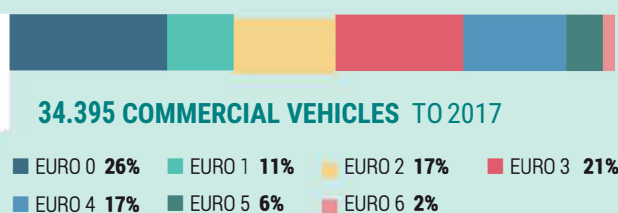
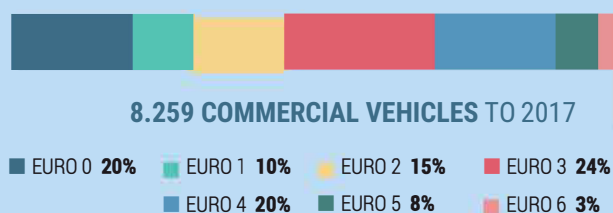
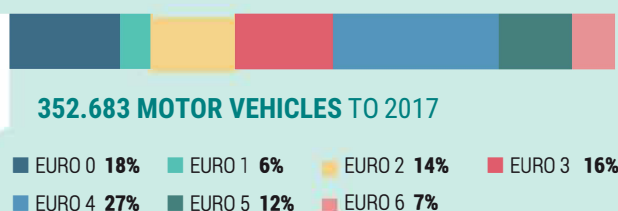
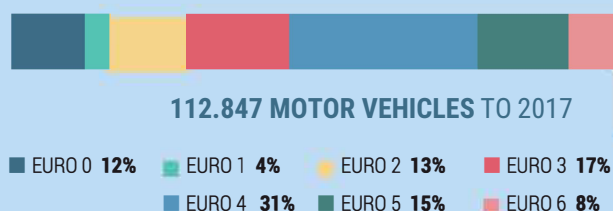
MOTOR
VEHICLES
CARS/KM2 ON 2017

473

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

111

MOTOR
VEHICLES
CARS/KM2 ON 2017



TYPE OF SUPPLY

---	59.430	PETROL	175.149	2.109
---	49.635	DIESEL	165.116	31.878
---	3.265	LGP	10.387	231
---	363	METHANE	1.453	143
---	256	HYBRID	561 *	32 *
---	5	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

REGGIO

CALABRIA



The city of Reggio Calabria has 2 stations for the detection and monitoring of air quality, a traffic station and a background station, respectively Castello and Villa Comunale.

The data currently provided by Arpa Calabria refer only to the year 2017, so the data relating to this year and the 2016-2017 trend are presented here.

The rainfall of the city of Reggio Calabria has suffered a drop of about 10% in the year 2017 (574 mm of rain and only 52 days of rain) compared to the period 2006-2016; in 2018 there was an increase in cumulative rainfall of +47% compared to the period considered (941 mm of rain and 63 rainy days).

The average concentrations of the city in the 2016-2017 time interval increased by 19% for NO₂, while, on the contrary, it decreased by 10% for PM₁₀. Concentration values remain constant for PM_{2.5}.

As for **NO₂ concentrations**, a slight increase is observed in 2017 (19 µg/m³) compared to 2016 (16 µg/m³). In contrast, the **concentration of PM₁₀** dropped from 21 µg/m³ in 2016 to 19 µg/m³ in 2017 no changes are observed for the **concentration of PM_{2.5}**.

For all three pollutants there are no values above the regulatory limit both in terms of concentrations and in terms of annual exceedances for NO₂ and PM₁₀.

Carrying out a more detailed analysis relating to the individual types of stations, in the **traffic station** the concentrations of NO₂ increased while still staying below the regulatory limit. As for PM₁₀, the values remained almost unchanged. In the **background station** there are no significant differences compared to 2016.

In conclusion, for the 2016-2017 period, the city of Reggio Calabria does not show any particular deviations from past trends; the only exception is a slight increase in the concentration of NO₂, in particular for the traffic station.



0 1 km

NO₂ ANNUAL AVERAGE	23
HOURLY EXCEEDANCES	0
PM₁₀ ANNUAL AVERAGE	19
DAILY EXCEEDANCES	6
PM_{2.5} ANNUAL AVERAGE	10

NO₂ ANNUAL AVERAGE	16
HOURLY EXCEEDANCES	0
PM₁₀ ANNUAL AVERAGE	20
DAILY EXCEEDANCES	4

Piazza Castello

Villa Comunale

MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

19 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

0 IN 2017

MAX EXCEEDANCES STATION IN 2017

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

+19% +45% +5%

CONCENTRATION
AVERAGE 2018

--- $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

--- IN 2018

MAX EXCEEDANCES STATION IN 2018

CONCENTRATION
AVERAGE 2017

19 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

6 IN 2017

MAX EXCEEDANCES STATION IN 2017

VILLA COMUNALE

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-10% -5% -5%

CONCENTRATION
AVERAGE 2018

--- $\mu\text{g}/\text{m}^3$

EXCEEDANCES
DAILY LIMIT VALUE

--- IN 2018

MAX EXCEEDANCES STATION IN 2018

CONCENTRATION
AVERAGE 2017

10 $\mu\text{g}/\text{m}^3$

PM_{2.5}

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

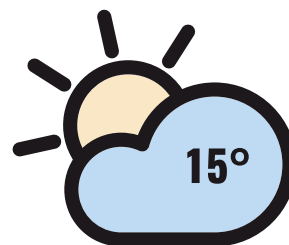
0% ---% 0%

CONCENTRATION
AVERAGE 2018

--- $\mu\text{g}/\text{m}^3$

ROME

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS
USED

PGTU
APPROVED

PUM

PUMS
PLAN DOCUMENT
ADOPTED 2019

In Rome **the service of the underground network has increased while the offer of buses and trolleybuses continues to decrease**. In fact, in 2015 the Montecompatri Lodi Line C section was inaugurated while **the section to San Giovanni was inaugurated on 12 May 2018**, thus integrating with line A. Work is currently underway on the Metro C Line to the Colosseum. The future of the C line from the Colosseum to the northern area of the city is still open, although recent statements by the Mayor would suggest the choice will be positive.

With the resolution of June 9, 2017, the City Council decided on infrastructural interventions to upgrade the metros, to establish new tram lines, new trolleybus lines and preferential corridors for collective transport. A network that will not influence the preparation of the PUMS.

Among these networks, **the tram project on the Termini-Giardinetti line (the former Rome-Pantano line), with the extension to Tor Vergata** and the supply of 50 trams, was sent at the end of 2018 with a request for funding from the Ministry Infrastructure. This is a national tender whose outcome will be known by August 2019. The Administration also continues to indicate cable cars among future projects.

From 1 January 2019, the new Regulation for tourist buses came into force, with a crackdown on circulation and parking through toll increases and access limits, aiming to reduce the impact of coaches on the historic center. Proposed and approved by the Council, it has raised many protests and even appeals, but the administration has gone ahead to protect the urban space and the quality of the air.

Regarding cycling, cycle ways on Via Nomentana and Via Tuscolana are currently underway. Another important project is the GRAB, the Grande Raccordo Anulare of the Bicycle, which is part of the major national cycle routes financed by MIT, currently being designed.

On the other hand, **Bike Sharing** has disappeared and even the brief experimentation of a free-floating service has not given a positive result.

Vice versa, in 2017 **Electric Scooter Sharing** started, and this is getting a good use success.

Car sharing also continues to grow both as a fleet of vehicles and as users.

The resolution approved by the City Council in November 2018 for the study of the **access toll in the central area of Rome**, inspired by the London congestion charge and Area C in Milan, is very innovative - and much discussed. The resolution mandates the Council and the administration offices, within two years, to prepare the adoption of a vehicle toll system that discourages high-emission cars within the VAM LTZ. Before the entry into force of the provision, it will also be necessary to evaluate the achievement of adequate levels of public transport service. Therefore, while a starting point has been established, the proposal and the implementation are delegated to future acts.

In January 2019, the creditors' meeting expressed a favourable opinion on the **preventative arrangement of ATAC, the large public transport company in economic difficulty**. Now the final decision will be up to the bankruptcy court.

THE PUMS OF THE METROPOLITAN CITY OF ROME

In May 2018 the Guidelines for the PUMS were approved by the City Council. The administration wants to put citizens at the center of the process: in 2017/2018 a public listening phase was carried out, which produced over 4,000 proposals, now being evaluated.

In 2019 the Plan Document was presented (cognitive framework and objectives) together with the Plan Proposal containing the actions and scenarios of the PUMS, on which the VAS and the consultation of the Municipalities will be carried out. The Plan Document for the start of the discussion was approved by the Rome Capital Council. <https://www.pumsroma.it/>.

The Metropolitan City of Rome in 2019, on the impulse of a motion approved by the Council, started preparatory activities for the drafting of the PUMS on a metropolitan scale.

MUNICIPAL AREA

RESIDENTS
2.873.494

DENSITY
2.232 pl/km²

EXTENSION
1.287 km²

PEDESTRIAN AREA

0,17 M²/RESIDENTS

GROWTH RATE
2016/2017 **0%**

BIKE PATHS

230 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **-4%**

LTZ EXTENSION

1,32 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS
FOR VEHICLES

248.158

GROWTH RATE
2016/2017 **1%**

ENTRANCES /DAY

73.530

GROWTH RATE
2016/2017 **-18%**

DEMAND FOR PUBLIC TRANSPORT

438

PASSENGER/PEOPLE

0% GROWTH RATE 2016/2017



144 MLN

KM PERCORSI NEL 2017

-4% TAGROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

AUTOBUS	3.952	-2%
TRAM	299	-1%
FILOBUS	30	-3%
METRO	3.304	+35%
FUNICULAR	---	---
BY WATER	---	---

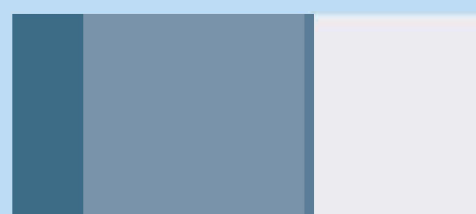
ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

4 INCIDENT/1000 PL
-2% GROWTH RATE
2016/2017

DEAD/100 INCIDENT
GROWTH RATE
2016/2017 **-9%**

1

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 15% BIKE 2%
MOTORCYCLE 47% VEHICLES 36%

INTERCHANGE CAR PARK

7 N. CAR PARK EVERY
1000 OF CARS

0% GROWTH RATE
2016/2017

PAID PARKING ON THE STREET

43 N. CAR PARK EVERY
1000 OF CARS

0% GROWTH RATE
2016/2017

CAR SHARING

2.100 **18%**

FLEET OF CARS 2016/2017

87 **27%**

USERS/1000 PL 2016/2017

BIKE SHARING

--- 2016/2017

--- 2016/2017

LICENZE TAXI

2,67

N. TAXI/1000 PL IN 2016

-1% GROWTH RATE
2016/2017

RENTAL WITH DRIVER LICENCES

0,33

N. RWT/1000 PL IN 2016

-3% GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
4.353.738

DENSITY
812 pl/km²

EXTENSION
5.363 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17.

The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

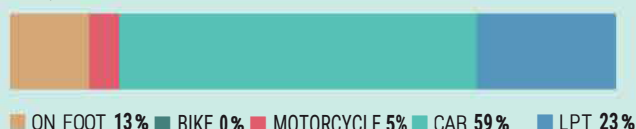
PUMS

ACTIVITIES NEEDED FOR THE DEVELOPMENT OF THE PUMS WERE STARTED

MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



SUSTAINABLE MOBILITY RATES

THE VARIATION OF WEIGHT PERCENTAGE

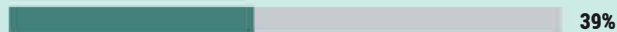
2,1

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013



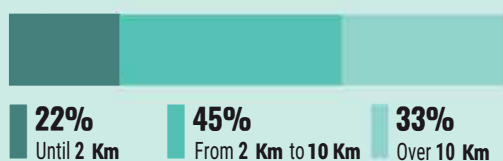
2016/2018



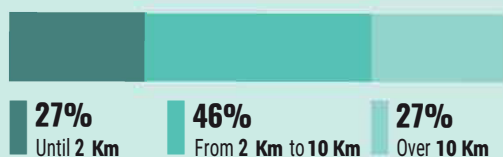
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



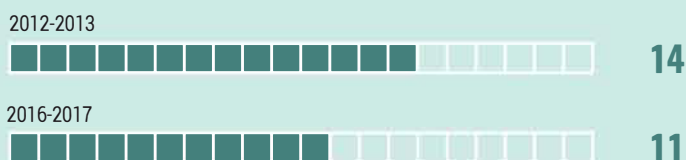
TIME SPENT FOR TRIPS

on a typical weekday (in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)



AVERAGE VELOCITY OF TRIPS

29

Km/h
2012/2013



24

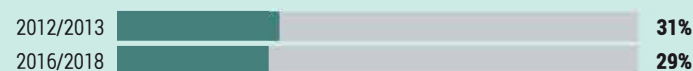
Km/h
2016/2017

MOTIVACION OF TRIPS

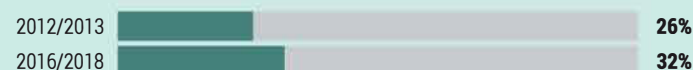
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

+0,3%
GROWTH RATE 2016/2017

614

MOTOR VEHICLES
EVERY 1000 RESIDENS

620

+0,3%
GROWTH RATE 2016/2017

-1,2%
GROWTH RATE 2016/2017

137

MOTOR VEHICLES
EVERY 1000 RESIDENS

119

-0,6%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

1.373

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

504

MOTOR VEHICLES
CARS/KM2 ON 2017



1.762.278 MOTOR VEHICLES TO 2017



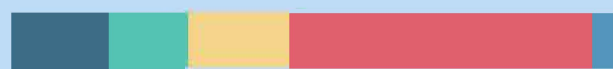
2.701.023 MOTOR VEHICLES TO 2017



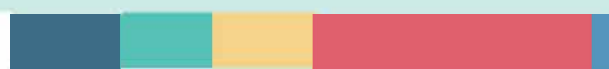
129.133 COMMERCIAL VEHICLES TO 2017



209.336 COMMERCIAL VEHICLES TO 2017







392.638 MOTORCYCLES TO 2017



519.047 MOTORCYCLES TO 2017

TYPE OF SUPPLY

				
---	948.765	PETROL	1.375.854	15.004
---	667.752	DIESEL	1.100.951	186.616
---	115.538	LGP	180.697	3.205
---	13.118	METHANE	19.939	4.075
---	18.198	HYBRID	23.119 *	394 *
---	798	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY

ROME



The pollution monitoring stations in the city of Rome are the same as those employed in previous years: Arenula, Preneste, Cinecittà, Villa Ada, Bufalotta, Cipro, Francia, Magna Grecia, Fermi and Tiburtina. Out of these, the first 6 are classified as background stations, while the remaining 4 are traffic stations.

The general town situation, from 2016 to 2018, shows reductions in annual averages for all three pollutants examined, equal to -12% for NO₂, -4% for PM₁₀ and -12% for PM_{2.5}.

As for annual cumulated rainfall, the two annuities in question show 451mm in 2017 and 1016mm in 2018. With regard to rainy days, 101 days can be observed for 2018, while in 2017, although it has rained quantitatively less than the average (2011-2016), the number of rainy days are in line with it.

Similarly to the previous years, only the average **concentration of NO₂** can raise concerns, reaching around 43µg/m³ in 2018, and therefore well above the legal limit of 40µg/m³. In 2018 the number of **exceedances** of the limits for NO₂ decreased compared to 2017, going from 14 to 1 in the Fermi station, much lower than the 18 set as the limit for the year.

Regarding the average annual **concentration of PM₁₀**, there are no significant changes from 2016 to 2018, in particular from 28µg/m³ recorded in 2016, it is still at 27µg/m³ in 2018, but in any case, values are below the regulatory limit.

As regards the number of daily **PM₁₀ exceedances**, on the other hand, there is a decrease compared to 2016; it goes, in fact, from 41 exceedances detected in 2016 in the Tiburtina station to the 22 in 2018, in the same monitoring station.

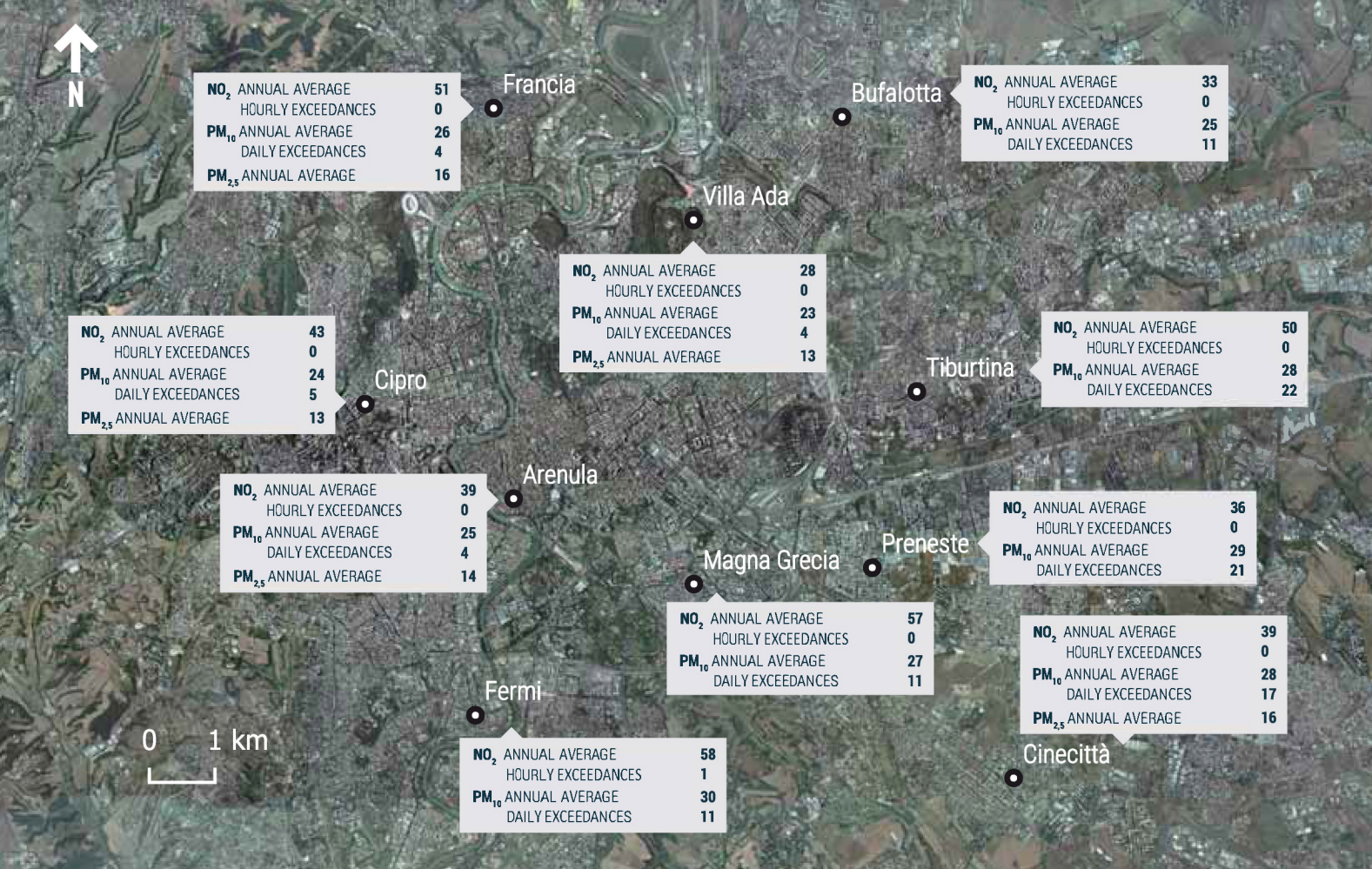
Considering **PM_{2.5}**, in the two years under examination there are no significant changes, as the average **concentration** in the stations of the cities goes from 17µg/m³ to 15µg/m³ with a decrease of -12%.

Examining the data of each station, it is observed that all the **traffic stations** indicate values higher than the annual limit of NO₂. Among **background stations**, values below the limit are observed except for the Cipro station, while Arenula and Cinecittà have reported values close to 40µg/m³.

Regarding PM₁₀, as mentioned in **2018 all stations** showed values lower than 40µg/m³; the highest value is recorded in the Fermi station, followed by Preneste (background), Tiburtina and Magna Grecia (respectively, 30µg/m³, 29µg/m³, 28µg/m³, 27µg/m³).

Regarding PM_{2.5}, the annual concentrations detected in the traffic stations are similar to background stations, respectively 16µg/m³ and 14µg/m³.

In conclusion, 2018 was a favorable year which allowed for the reduction of the average concentrations of PM₁₀ and PM_{2.5}, and of the daily exceedances of PM₁₀, now below the limit. However, this success seems to be correlated to the favorable meteorological conditions in the year 2018, rather than interventions in the city mobility sector. The analysis of the following annuities will allow a more incisive evaluation on whether the number of exceedances is in actual reduction. However, the exceedances of the annual concentration limit of NO₂ remains unchanged.



MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

49 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

14 IN 2017

MAX EXCEEDANCES STATION IN 2017

TIBURTINA

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-12% -8% -14%

CONCENTRATION
AVERAGE 2018

43 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

1 IN 2018

MAX EXCEEDANCES STATION IN 2018

FERMI

CONCENTRATION
AVERAGE 2017

27 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

26

MAX EXCEEDANCES STATION IN 2017

TIBURTINA, PRENESTE

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-4% -7% -4%

CONCENTRATION
AVERAGE 2018

27 µg/m³

EXCEEDANCES
DAILY LIMIT VALUE

22 IN 2018

MAX EXCEEDANCES STATION IN 2018

TIBURTINA

CONCENTRATION
AVERAGE 2017

16 µg/m³

PM_{2.5}

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

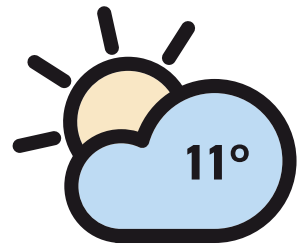
-12% -6% -18%

CONCENTRATION
AVERAGE 2018

15 µg/m³

TURIN

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED

PUM

PUMS
APPROVED 2011

In Turin, **users of public transport grow (+12%)** and pedestrian areas and cycle paths also grow slightly. But **the index of motorization of cars is also growing (+5%), the highest figure recorded among the big cities.** Cars and motorcycles are also growing at the metropolitan level.

The work of the Municipality of Turin for the construction of **Line 2 of the Metro** continues with the approval, in November 2018, of the final route of the second underground public transport line. The new route will wind along an itinerary of 26.5 km and 33 stops. The preliminary project of line 2 was delivered to MIT in December 2018 and funding should be decided by September 2019, for an estimated total cost of three billion euros. There will then be a tender to assign funding for the construction, and works could start in 2021.

To promote electric mobility, on 28 September the City of Turin published a notice to identify operators that could present their manifestation of interest in the **installation of the charging stations** – with a maximum of 200 stations each. The notice will remain open for 12 months. Private citizens and commercial operators may request to have an electric charging station under their own home or in front of the shop or office they own, to be requested on the basis of a questionnaire by the Municipality.

The new **Enjoy Cargo Van Sharing** service also arrived in 2018, consisting of a fleet of 20 Doblò Cargo, for urban freight transport.

The Municipality of Turin is continuing its commitment to expand the cycle paths with new mixed routes on 30 km/h roads, and with the installation of 1200 bicycle arches.

In September 2018, the MOBIKE free floating service arrived in Turin with 3000 bicycles scattered throughout the city.

On 26 February 2019 the Municipal Council of Turin approved the resolution "Torino open center, institution of the new Central ZTL. Guidelines on new access methods".

With this decision the old LTZ, which was functional only three hours a day, will be suppressed, and for 12 hours a day the entrance to the city center will be paid by tying access and stop: this includes the new, just approved plan that regulates the entrance to the center of the city. According to the project, entry to the old limited-traffic area will be free, but for 12 hours a day - from 7.30 am to 7.30 pm - the entrance provides for the payment of a sum that includes paid parking inside of the center for a period of at least two hours.

The intervention - the resolution says - was adopted to address an environmental urgency and to deal with the infringement procedures that the European Union launched against Italy, with particular reference to the air quality situation in the city of Turin. The objective is to reduce the traffic crossing the center, and its application should start in January 2020. According to the available data, the area of the Central ZTL is one of the most important attraction poles of mobility, which attracts over **260,000 movements per day**, of which 39% takes place by private car.

The prices for access will be established according to the criterion of "the more you pollute the more you pay": free toll for electric or hybrid vehicles, 3 euros for petrol vehicles and 5 euros for diesel vehicles.

This is a decidedly positive innovation from the Appendino administration, which aims to capitalize on the experience of Milan's Area C. On the other hand, merchants immediately and negatively protested, as they evidently did not take advantage of the Milan experience. The comparison continues and the Mayor declared that the project will go ahead.

All the material is published on the website:
www.muoversiatorino.it/torinocentroaperto

In February 2019 it was announced that the City of Turin and the Metropolitan City will sign a **memorandum of understanding for the preparation of the PUMS** and that they will involve the Polytechnic, the University of Turin and other research institutions in a technical-scientific committee.

MUNICIPAL AREA

RESIDENTS
886.837

DENSITY
6.822 pl/km²

EXTENSION
130 km²

PEDESTRIAN AREA

0,52 M²/RESIDENTS

GROWTH RATE
2016/2017 **2%**

BIKE PATHS

200 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **1,5%**

LTZ EXTENSION

2,06 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS
FOR VEHICLES

61.142

GROWTH RATE
2016/2017 **-13%**

ENTRANCES /DAY

11.430

GROWTH RATE
2016/2017 **-4%**

DEMAND FOR PUBLIC TRANSPORT

318

PASSENGER/PEOPLE

+12% GROWTH RATE 2016/2017



67 MLN

KM PERCORSI NEL 2017

+1,5% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

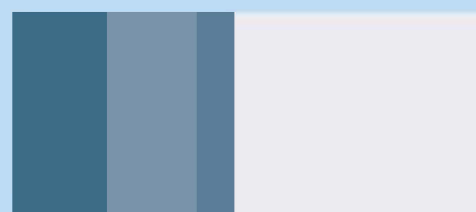
AUTOBUS	4.551	+19%
TRAM	1.223	0%
FILOBUS	---	---
METRO	992	0%
FUNICULAR	---	---
BY WATER	---	---

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

3 INCIDENT/1000 PL
+3% GROWTH RATE
2016/2017

DEAD/100 INCIDENT
GROWTH RATE **+44%** **1,3**
2016/2017

ACCIDENT DISTRIBUTION 2017



PEDESTRIAN 20% BIKE 8%
MOTORCYCLE 19% VEHICLES 53%

INTERCHANGE CAR PARK

30 N. CAR PARK EVERY
1000 OF CARS

GROWTH RATE
2016/2017

PAID PARKING ON THE STREET

81 N. CAR PARK EVERY
1000 OF CARS

-3% GROWTH RATE
2016/2017

CAR SHARING

750 **-18%**

FLEET OF CARS 2016/2017

96 **+95%**

USERS/1000 PL 2016/2017

LICENZE TAXI

1,7

N. TAXI/1000 PL IN 2016

0% GROWTH RATE
2016/2017

BIKE SHARING

1200 **+14%**

FLEET OF BIKE 2016/2017

23 **+3%**

USERS/1000 PL 2016/2017

RENTAL WITH DRIVER LICENCES

0,2

N. RWT/1000 PL IN 2016

-2% GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
2.277.857

DENSITY
333,5 pl/ km²

EXTENSION
6.830 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17.

The investigation is based on a sample of about italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

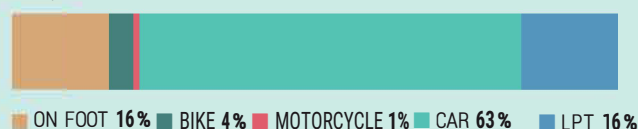
PUMS

AGREEMENT ANNOUNCED BETWEEN
MUNICIPALITY AND METROPOLITAN AREA
TO START THE PUMS

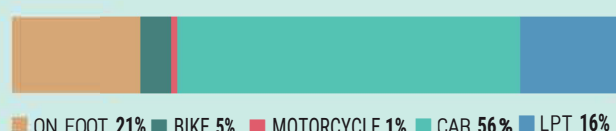
MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



SUSTAINABLE MOBILITY RATES

THE VARIATION OF
WEIGHT PERCENTAGE

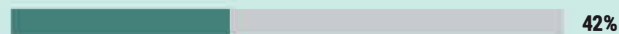
6,5

Percentage on the total of the trails on foot, by bike and by public transport

2012/2013



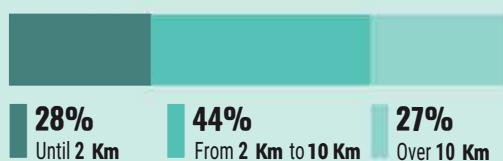
2016/2018



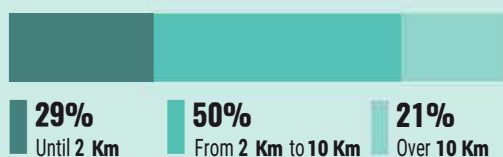
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013

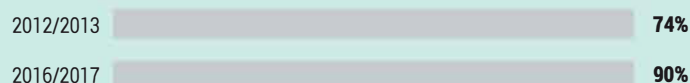


2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday



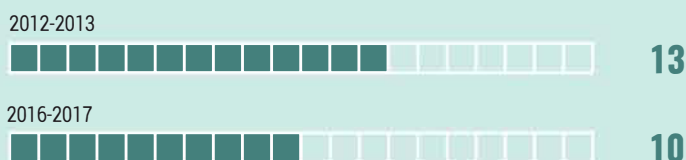
TIME SPENT FOR TRIPS

on a typical weekday
(in minutes)



AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)

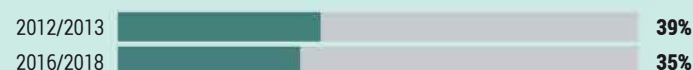


AVERAGE VELOCITY OF TRIPS

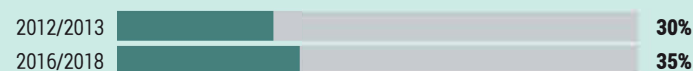


MOTIVACION OF TRIPS

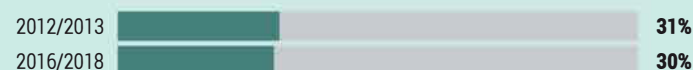
WORK/STUDY



FAMILY-RUN



FREE TIME



MUNICIPAL AREA

METROPOLITAN AREA

+5%
GROWTH RATE 2016/2017

674

MOTOR VEHICLES
EVERY 1000 RESIDENS

661

+3%
GROWTH RATE 2016/2017

+1%
GROWTH RATE 2016/2017

82

MOTOR VEHICLES
EVERY 1000 RESIDENS

96

+1%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

4.596

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

220

MOTOR VEHICLES
CARS/KM2 ON 2017



597.550 MOTOR VEHICLES TO 2017



1.505.637 MOTOR VEHICLES TO 2017



52.482 COMMERCIAL VEHICLES TO 2017



157.146 COMMERCIAL VEHICLES TO 2017







72.706 MOTORCICLES TO 2017



218.300 MOTORCICLES TO 2017

TYPE OF SUPPLY

				
---	295.918	PETROL	729.067	8.449
---	235.927	DIESEL	598.693	142.059
---	52.116	LGP	147.118	2.903
---	9.626	METHANE	23.061	3.507
---	3.746	HYBRID	7.633 *	223 *
---	197	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY TURIN



The monitoring stations in the city of Turin are Lingotto, Rubino, Consolata, Grassi and Rebaudengo. Of these, the first 2 are referred to as background stations, while the remaining 3 are traffic.

For the two years examined, the city of Turin shows very different values of the annual cumulated precipitation which stands at 492 mm in 2017 and 1097 mm in 2018, with 56 and 100 days of rain respectively.

The general town situation, from 2016 to 2018, shows on average an improvement in air quality pollution indicators; in the period under consideration, however, there are higher values in 2017 compared to 2018; this is correlated to the meteorological and climatic situation, which was more favorable in 2018 compared to 2017.

Analyzing the average **concentration of NO₂** in 2018, it decreased by 12% compared to 2016, reaching the value of 43µg/m³, in any case above the annual limits; regarding the number of **exceedances** of the hourly value, there is a net reduction, settling at 1 exceedance recorded in the Rebaudengo station.

Regarding **PM₁₀** in 2018 the annual **concentration** is on average within the limits, while the number of **exceedances** of the daily limit is much higher than allowed (in 2018, 89 days). For PM_{2.5}, in 2018 there was a decrease in concentration, which stood around 23µg/m³, therefore lower than the regulatory limit.

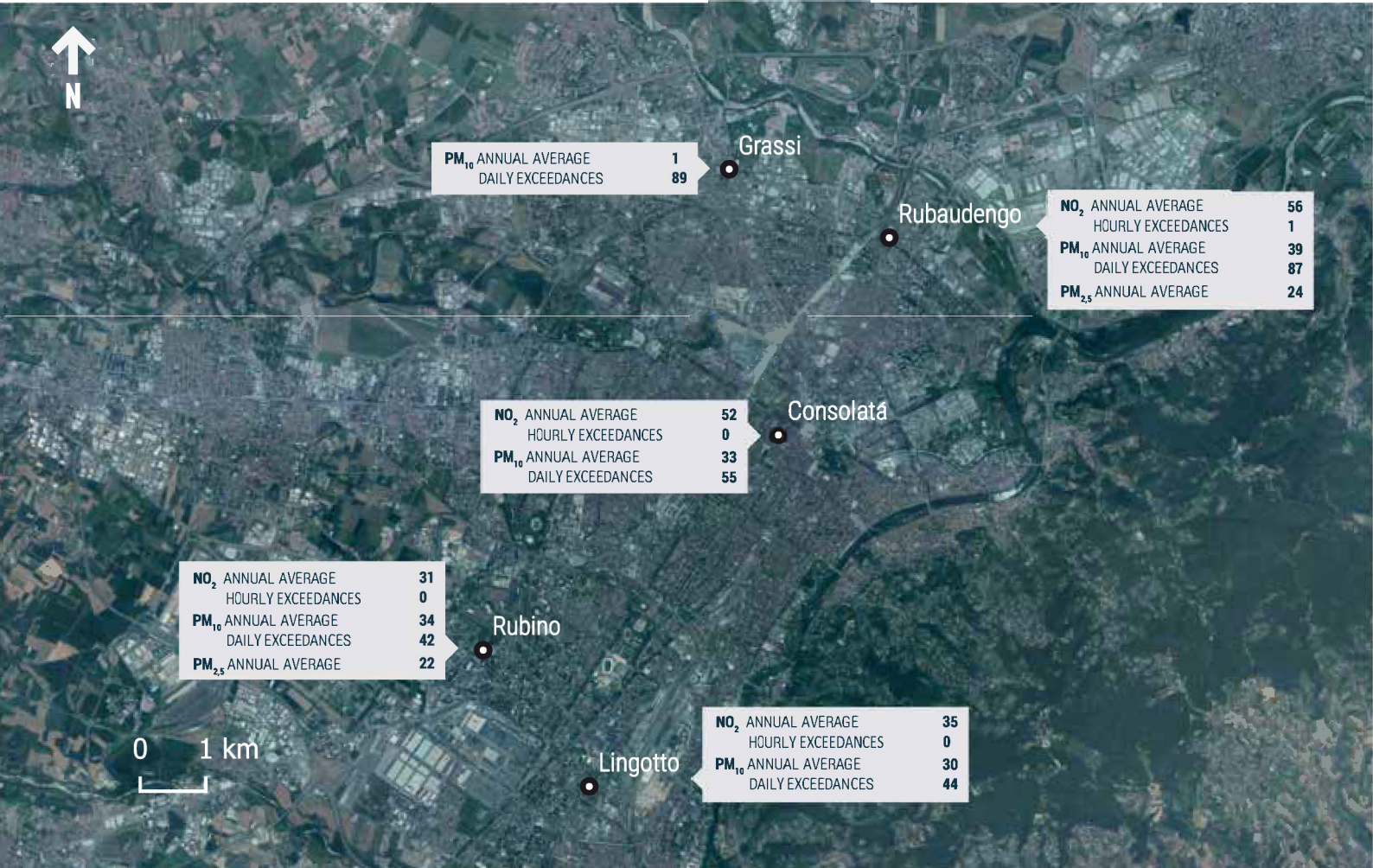
As for the **concentration of PM_{2.5}**, we are recording a net reduction of 23% which brings the average below the regulatory limit of 25µg/m³ for the first time since 2006.

Examining the details of the **stations**, it should be noted that for both **traffic and background** the year 2017 was particularly critical for all three pollutants, recording values above the limit, with the exception of the average pollutants NO₂ and PM₁₀ detected in background stations.

Considering the year **2018**, all **stations** report a number of PM₁₀ exceedances far greater than the 35 allowed, even if the annual concentrations detected are below the limit. NO₂ is critical in terms of concentrations at the Consolata and Rebaudengo stations.

Turin remains among the most polluted cities in Italy and Europe, due to the geoclimatic conditions that characterize it; in particular, the conformation of the territory, with the Po Valley that turns into the slopes of the Alps, leads to disadvantageous ventilation conditions and cold temperatures in winter, aggravated by low rainfall for 2017.

These adverse conditions must act as stimulus for the administration to adopt even more incisive measures to combat pollutant emissions in the city, for example offering citizens alternative, increasingly convenient transport systems to the private vehicle.



MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

54 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

26 IN 2017

MAX EXCEEDANCES STATION IN 2017
REBAUDENGO

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-12%	-10%	-12%

CONCENTRATION
AVERAGE 2018

43 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

1 IN 2018

MAX EXCEEDANCES STATION IN 2018
REBAUDENGO

CONCENTRATION
AVERAGE 2017

43 µg/m³

EXCEEDANCES
HOURLY LIMIT VALUE

119 IN 2017

MAX EXCEEDANCES STATION IN 2017
REBAUDENGO

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE	TRAFFIC	URBAN
-3%	-5%	0%

CONCENTRATION
AVERAGE 2018

35 µg/m³

EXCEEDANCES
DAILY LIMIT VALUE

89 IN 2018

MAX EXCEEDANCES STATION IN 2018
GRASSI

CONCENTRATION
AVERAGE 2017

27 µg/m³

PM_{2,5}

TREND CONCENTRATION
2016/2018

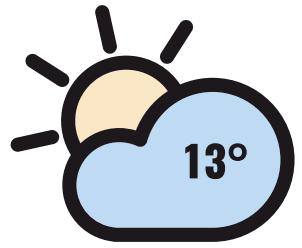
AVERAGE	TRAFFIC	URBAN
-23%	---	-27%

CONCENTRATION
AVERAGE 2018

23 µg/m³

VENICE

WEATHER CONDITIONS



URBAN MOBILITY

TOOLS USED

PGTU
APPROVED IN 2002

PUM
APPROVED IN 2010

PUMS
WIDE AREA
IN PROCESSING

In the last two years there have been no significant changes in the management of terrestrial mobility in Venice: LTZs, cycle paths and pedestrian areas have not increased in Mestre.

The use of the tram network, which now got up to speed, is being consolidated with **considerable user success and the growth in the service offer**.

As in almost all Italian cities, the rate of motorization in the city grew by 0.8%, while in the metropolitan area it grew by 1.3% in 2017.

From June 2018 in Venice Mestre a **new hybrid car sharing service** was launched: it is called **YUKŌ with Toyota** and has 50 vehicles at its start. There is also a vehicle set up for transporting the disabled and people with reduced mobility.

An authentic novelty came from the decision of the City Council in February 2019 to establish a contribution to access the city for each type of user and the **establishment of a "limited traffic zone for motor vehicles entering Venice Historic Center"**. A measure born to decongest and regulate tourist influxes in Venice, a city unique in the world for its beauty, but which risks being suffocated by the same mass tourism that it attracts every day from all parts of the world. This decision will help manage tourist flows and, by reinvesting its revenues, it will also help in making city cleaning, waste disposal and transport more effective.

The regulation states that there will be a charge for access to the ancient city "with private motorized vehicles, in order to preserve the historical and environmental heritage of the lagoon". The resolution also mandates the municipal council "to approve the access rates" and to adopt, together with the competent municipal offices, "the acts aimed at creating an electronic system for the payment of tariffs and an electronic control of access to the restricted traffic area of the historic center of Venice".

As of now, there are two approved proposals: the first concerns the application of the Access Fee, considering exclusions and exemptions; the second deals with the limited traffic area to be set up starting from the head of the Ponte della Libertà, so as to also include the arrivals on private vehicles. The municipal administration has declared that it does not want to incentivize the arrival on a private vehicle at the expense of public transport and to be inspired by the Milan Area C model for the toll system.

The resolution provides for a cost of 6 euros for admission to Venice on ordinary days, 8 for those with red stamps and 10 for black stamps. The ticket must not be paid by residents of the Municipality, by workers who enter the historic center or the smaller islands, by students, and also by commuters. The residents of the Metropolitan City of Venice and the Veneto Region, the holders of the VeneziaUnica Charter for navigation, the severely disabled and the patients of health facilities are also exempt.

Meanwhile, until the end of 2019, the transitional provision will maintain the contribution within the limit of 3 euros, while the operational measures of the collection system are still to be established.

THE PUMS OF THE METROPOLITAN CITY OF VENICE

There are no activities of the Municipality of Venice for the PUMS, while the Metropolitan City has started some preliminary activities. In fact, in July 2018 the Metropolitan City carried out a preliminary market consultation for the preparation of the future tender procedure for the drafting of the Sustainable Mobility Urban Plan (PUMS), concerning the gathering of data about the movements of users by analyzing position data with respect to telephone cells in the area.

Recently, in February 2019 the tender for the acquisition, via electronic market, of the drafting service of the Urban Sustainable Mobility Plan (PUMS) of the Metropolitan City of Venice was announced. The deadline is set for March 18, which must be followed by the completion of the tender and the assignment for the preparation of the PUMS.

MUNICIPAL AREA

RESIDENTS
261.321

DENSITY
628 pl/km²

EXTENSION
416 km²

PEDESTRIAN AREA

5,02 M²/RESIDENTS

GROWTH RATE
2016/2017 **0%**

BIKE PATHS

117 TOTAL
KILOMETERS

GROWTH RATE
2016/2017 **0%**

LTZ EXTENSION

0,56 M² OF LTZ OVER
100 M² OF CITY

GROWTH RATE
2016/2017 **0%**

ENABLED TO ACCESS
FOR VEHICLES

GROWTH RATE
2016/2017 **---**%

ENTRANCES /DAY

GROWTH RATE
2016/2017 **---**%

DEMAND FOR PUBLIC TRANSPORT

821

PASSENGER/PEOPLE

-1% GROWTH RATE 2016/2017



25 MLN

KM TRAVELLED IN 2017

-8% GROWTH RATE 2016/2017

OFFERING OF PUBLIC TRANSPORT

PLACES-KM/PEOPLE IN 2016 AND % CHANGE (2016 TO 2015)

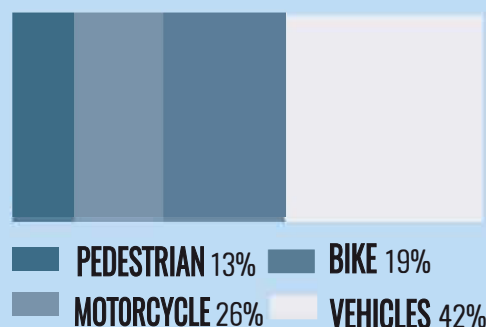
AUTOBUS	5.002	-1%
TRAM	1.388	+60%
FILOBUS	---	---
METRO	---	---
FUNICULAR	48	-12%
BY WATER	4.839	-2%

ACCIDENT AND MORTALITY INCIDENT RATE IN 2016

2 INCIDENT/1000 PL
-4% GROWTH RATE
2016/2017

DEAD/100 INCIDENT
GROWTH RATE **+20%** **1,2**
2016/2017

ACCIDENT DISTRIBUTION 2017



INTERCHANGE CAR PARK

28 N. CAR PARK EVERY
1000 OF CARS
+11% GROWTH RATE
2016/2017

PAID PARKING ON THE STREET

66 N. CAR PARK EVERY
1000 OF CARS
0% GROWTH RATE
2016/2017

CAR SHARING

--- FLEET OF CARS 2016/2017
--- USERS/1000 PL 2016/2017

LICENZE TAXI

1,4 N. TAXI/1000 PL IN 2016
0% GROWTH RATE
2016/2017

BIKE SHARING

80 +14%
FLEET OF BIKE 2016/2017
1,5 +36%
USERS/1000 PL 2016/2017

RENTAL WITH DRIVER LICENCES

1 N. RWT/1000 PL IN 2016
0% GROWTH RATE
2016/2017

METROPOLITAN AREA

RESIDENTS
854.275

DENSITY
346 pl/km²

EXTENSION
2.467 km²

THE DATE OF AUDIMOB ISFORT

The dates on the characteristics mobility demand in a 14 metropolitan areas, have been grossed up on Isfort's "Audimob", with a particular focus in the years 2012/13 and 2016/17. The investigation is based on a sample of about Italian people over a range of 14 to 80 years and notes all trips done in a weekdays, but excluding the getting around on foot less than 5 minutes.

TOOLS USED

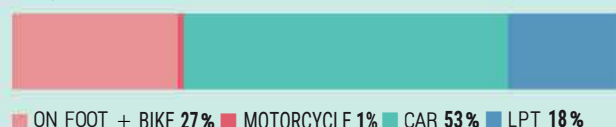
PUMS

CALL FOR TENDERS LAUNCHED TO DEVELOP THE PUMS IN FEBRUARY 2019

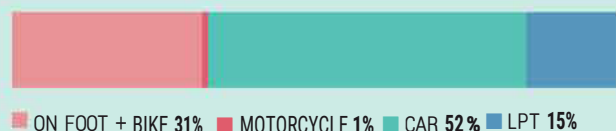
MODAL SPLIT

Distributional trip for the means of transport used (val. %)

2012/2013



2016/2017



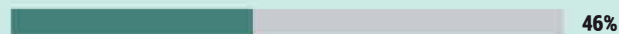
SUSTAINABLE MOBILITY RATES

Percentage on the total of the trips on foot, by bike and by public transport

2012/2013



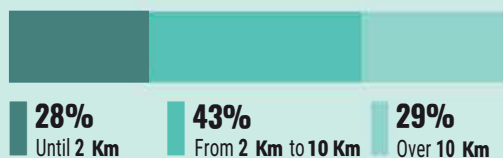
2016/2018



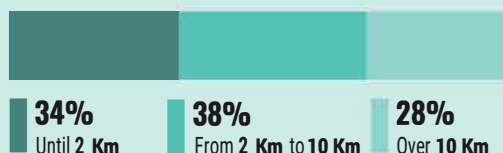
RADIUS OF DISPLACEMENTS

Distribution on the trips for wavelength bands (val. %)

2012/2013



2016/2017



MOBILITY RATES

percentage of the respondents who have made at least one displacement on a typical weekday

2012/2013



2016/2017



TIME SPENT FOR TRIPS

on a typical weekday (in minutes)

62

2012/2013

58

2016/2017

AVERAGE DISTANCE OF TRIPS

on a typical weekday (in km)

2012-2013



2016-2017



AVERAGE VELOCITY OF TRIPS

28

Km/h

2012/2013



30

Km/h

2016/2017

MOTIVACION OF TRIPS

WORK/STUDY

2012/2013



2016/2018



FAMILY-RUN

2012/2013

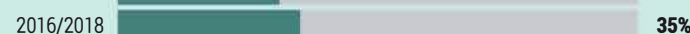


2016/2018

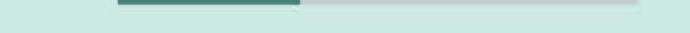


FREE TIME

2012/2013



2016/2018



MUNICIPAL AREA

METROPOLITAN AREA

+0,8%
GROWTH RATE 2016/2017

427

MOTOR VEHICLES
EVERY 1000 RESIDENS

545

+1,5%
GROWTH RATE 2016/2017

-0,6%
GROWTH RATE 2016/2017

67

MOTOR VEHICLES
EVERY 1000 RESIDENS

83

+0,9%
GROWTH RATE 2016/2017

MOTOR VEHICLES
CARS/KM2 ON 2017

269

ENVIRONMENTAL VEHICLES CLASS
DISTRIBUTION ON 2017

189

MOTOR VEHICLES
CARS/KM2 ON 2017



111.615 MOTOR VEHICLES TO 2017

465.904 MOTOR VEHICLES TO 2017



9.482 COMMERCIAL VEHICLES TO 2017

44.357 COMMERCIAL VEHICLES TO 2017



17.402 MOTORCYCLES TO 2017

70.570 MOTORCYCLES TO 2017

TYPE OF SUPPLY

Commercial Vehicle	Motor Vehicle	Fuel Type	Motor Vehicle	Commercial Vehicle
---	54.887	PETROL	214.716	1.631
---	44.155	DIESEL	198.316	41.216
---	9.928	LGP	40.197	604
---	1.910	METHANE	9.948	866
---	797	HYBRID	2.712 *	39 *
---	29	ELECTRIC		

NUMBER OF MOTOR VEHICLES AND COMMERCIAL VEHICLES ON 2017

* AGGREGATE RESULT: HYBRID + ELECTRIC VEHICLES

AIR QUALITY VENICE



For the years 2017 and 2018, Venice and Mestre have 4 air quality monitoring stations inside the urban agglomeration: of the 4 stations considered, 2 are characterized as urban traffic stations (Becciarra and Tagliamento) and 2 as background stations (Sacca Fisola and Parco Bissuola). Furthermore, in 2018, the Rio Novo traffic station, active from 1 September 2017, was added.

In the time period considered (2016-2018), it emerges a slight reduction in concentrations for the three pollutants detected. In detail, compared to 2016, there is a reduction of 8% for NO_2 , 9% for PM_{10} and -4% for $\text{PM}_{2.5}$.

The city of Venice shows similar average annual precipitation values for the two years surveyed: 664 mm in 2017 and 680 mm in 2018 with 68 and 77 rainy days respectively, slightly lower than the average for the 2006-2016 period.

With regards to NO_2 , the average **concentration** in 2017 is slightly higher than in 2018, but in both cases lower than the regulatory limit of $40\mu\text{m}/\text{m}^3$. The concentrations of the last three years show very similar values for 2016 and 2018 with a reduction of 8%. With regard to the **exceedances** of NO_2 , a slight increase is observed in the last two years analyzed, equal to 8 exceedances in 2017 and 4 in 2018.

The average annual **concentration of PM_{10}** is decreasing slightly in the last year, therefore, as recorded in 2016, the average values of the city are below the limit set by law. With regard to the number of daily **exceedances** of PM_{10} per year, they still are above the legal limit with a slightly declining 2016-2018 trend. Similarly, for the average concentration of PM_{10} , the exceedances are greater for 2017, when 94 were recorded compared to 63 in 2018.

With regard to $\text{PM}_{2.5}$, in the last year the average **concentration** was reduced, thus falling below the regulatory limit.

Going into detail of the individual stations, it is observed that in **traffic stations** the concentrations are substantially unchanged for NO_2 , although always above the regulatory limit, while they are slightly down for PM_{10} despite the addition of a new traffic station in 2018. The average values of the **background stations** for NO_2 and for PM_{10} are lower than the legal limit value, in particular for NO_2 there is a substantial reduction equal to -25%, while PM_{10} concentrations are unchanged. The station that monitors $\text{PM}_{2.5}$ is background and shows values slightly below the limit.

In detail in the year **2018 all stations** show values lower than the regulatory limit for NO_2 , with the exception of the recently introduced station: Rio Nuovo. Otherwise, more than 35 exceedances of PM_{10} were reached by all stations except for the Rio Novo station. Regarding $\text{PM}_{2.5}$, no station has concentrations higher than the limit.

In conclusion for the city of Venice-Mestre it is possible to note an improvement, albeit slight, of the air quality, which however is not enough to reduce the concentration recorded in the NO_2 traffic stations below the legal limit. Similarly, the exceedances of PM_{10} are still far greater than the 35 allowed.



NO₂ ANNUAL AVERAGE 35
HOURLY EXCEEDANCES 0
PM₁₀ ANNUAL AVERAGE 34
DAILY EXCEEDANCES 63

Tagliamento

NO₂ ANNUAL AVERAGE 27
HOURLY EXCEEDANCES 0
PM₁₀ ANNUAL AVERAGE 30
DAILY EXCEEDANCES 41
PM_{2,5} ANNUAL AVERAGE 24

Becciarà

NO₂ ANNUAL AVERAGE 36
HOURLY EXCEEDANCES 1
PM₁₀ ANNUAL AVERAGE 33
DAILY EXCEEDANCES 61

NO₂ ANNUAL AVERAGE 51
HOURLY EXCEEDANCES 4
PM₁₀ ANNUAL AVERAGE 30
DAILY EXCEEDANCES 31

Rio Novo

Sacca Fisola

NO₂ ANNUAL AVERAGE 28
HOURLY EXCEEDANCES 0
PM₁₀ ANNUAL AVERAGE 33
DAILY EXCEEDANCES 39

0 1 km

MAP BASE ORTHOPHOTO2012 - NATIONAL GEO-PORTAL

MEASURING STATION AND MEASURED VALUES IN 2018

CONCENTRATION
AVERAGE 2017

39 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

8 IN 2017

MAX EXCEEDANCES STATION IN 2017

BECCARIA

NO₂

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-8% 0% -25%

CONCENTRATION
AVERAGE 2018

35 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

4 IN 2018

MAX EXCEEDANCES STATION IN 2018

RIO NOVO

CONCENTRATION
AVERAGE 2017

37 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
HOURLY LIMIT VALUE

94 IN 2017

MAX EXCEEDANCES STATION IN 2017

TAGLIAMENTO

PM₁₀

TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-9% -14% -6%

CONCENTRATION
AVERAGE 2018

32 $\mu\text{g}/\text{m}^3$

EXCEEDANCES
DAILY LIMIT VALUE

63 IN 2018

MAX EXCEEDANCES STATION IN 2018

TAGLIAMENTO

CONCENTRATION
AVERAGE 2017

27 $\mu\text{g}/\text{m}^3$

PM_{2,5}

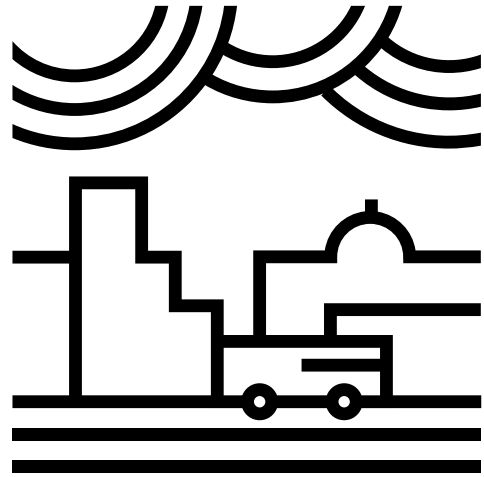
TREND CONCENTRATION
2016/2018

AVERAGE TRAFFIC URBAN

-4% ---% -4%

CONCENTRATION
AVERAGE 2018

24 $\mu\text{g}/\text{m}^3$



LEGEND AND SOURCES

GENERAL DATA

RAIN



FOG



WIND



SOURCES

WEATHER DATA: Servizio Meteorologico Aeronautica Militare - Atlante Climatico d'Italia (1971-2000) ♦

INHABITANTS PER MUNICIPAL AREA AND METROPOLITAN AREA: Istat

TOTAL MUNICIPAL AREA AND METROPOLITAN AREA SIZE: Istat

URBAN MOBILITY

TOOLS USED

ACTIVE
STATUS AND YEAR

INACTIVE

MUNICIPAL AREA

LTZ SIZE

Bari: Municipal of Bari
Bologna: Municipal of Bologna
Catania: Municipal of Catania
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: Municipal of Messina
Milan: Agenzia Mobilità Ambiente e Territorio
Naples: Municipal of Naples
Palermo: Amat Palermo S.p.A.
Reggio Calabria: Municipal of Reggio Calabria
Rome: Rome mobility services
Turin: 5T s.r.l.
Venice: Municipal of Venice

PEDESTRIAN AREA

Bari: Municipal of Bari
Bologna: Municipal of Bologna
Catania: Municipal of Catania
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: Municipal of Messina
Milan: Agenzia Mobilità Ambiente e Territorio
Naples: date not available
Palermo: Amat Palermo S.p.A.
Reggio Calabria: Municipal of Reggio Calabria
Rome: Rome mobility services
Turin: Municipal of Turin
Venice: Municipal of Venice

BIKE LANES

Bari: Municipal of Bari
Bologna: Municipal of Bologna
Catania: Municipal of Catania
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: Municipal of Messina
Milan: Agenzia Mobilità Ambiente e Territorio
Naples: Municipal of Naples
Palermo: Amat Palermo S.p.A.
Reggio Calabria: Municipal of Reggio Calabria
Rome: Rome mobility services
Turin: Municipal of Turin
Venice: Municipal of Venice

TAXI AND RWT LICENSES

Bari: date not available
Bologna: Municipal of Bologna
Catania: Municipal of Catania
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: date not available
Milan: Agenzia Mobilità Ambiente e Territorio (AMAT)
Naples: Municipal of Naples
Palermo: Amat Palermo S.p.A.
Reggio Calabria: date not available
Rome: Rome mobility services
Turin: Municipal of Turin
Venice: Municipal of Venice

PUBLIC TRANSPORT

KILOMETRES TRAVELLED AND TREND

SOURCES: Asstra

DEMAND PUBLIC TRANSPORT (km travelled)

SOURCES: Asstra

PUBLIC TRANSPORT OFFER (places-km/people)

SOURCES: Istat *riferiti al 2016

CAR SHARING

SOURCES: Bari: GirAci, end of service in march 2018

Bologna: date not available, services not present

Catania: present Enjoy - Eni fuel S.p.A., date not available

Cagliari: Municipal of Cagliari

Florence: Aniasa*

Genoa: date not available, services not present

Messina: date not available

Milan: Aniasa*

Naples: Amicar GESCO Sociale

Palermo: Amat Palermo S.p.A.

Reggio Calabria: date not available

Rome: Aniasa*

Turin: Aniasa*

Venice: date not available, service started in 2018

* data representing services car sharing di Enjoy, Car2Go, Drivenow, Blue Turin and Share'n go, where present

ACCIDENT

INCIDENTS, MORTALITY, ACCIDENTS PER PEDESTRIAN, BIKE AND MOTORBIKE

SOURCES: ACI Automobile Club d'Italia

BIKE SHARING

SOURCES: Bari: date not available, services not present

Bologna: Municipal of Bologna

Catania: date not available, services not present

Cagliari: date not available, services not present

Florence: Municipal of Florence

Geova: Municipal of Geova

Messina: date not available, services not present

Milano: Agenzia Mobilità Ambiente e Territorio (AMAT)

Naples: date not available, services not present

Palermo: Amat Palermo S.p.A.

Reggio Calabria: date not available, services not present

Rome: date not available, services not present

Turin: Comune di Turin

Venice: AVM S.p.A.

LIMITED TRAFFIC ZONES

ENABLED TO ACCESS FOR VEHICLES

MUNICIPAL AREA:

Bari: Municipal of Bari
Bologna: Municipal of Bologna
Catania: Municipal of Catania
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: date not available
Milan: date not available
Naples: Municipal of Naples
Palermo: A.mat Palermo S.p.A..
Reggio Calabria: Municipal of Reggio Calabria
Rome: Rome mobility services
Turin: 5T s.r.l.
Venice: date not available

N. ENTRANCES/DAY MUNICIPAL AREA:

Bari: date not available
Bologna: Municipal of Bologna
Catania: date not available
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: date not available
Milan: Agenzia Mobilità Ambiente e Territorio (AMAT), data referred to C Area
Naples: Municipal of Naples
Palermo: A.mat Palermo S.p.A..
Reggio Calabria: date not available
Rome: Rome mobility services
Turin: 5T s.r.l.
Venice: date not available

INTERCHANGE PARKING MUNICIPAL AREA:

Bari: Municipal of Bari
Bologna: Municipal of Bologna
Catania: Municipal of Catania
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: Municipal of Messina
Milan: Agenzia Mobilità Ambiente e Territorio (AMAT)
Naples: Municipal of Naples
Palermo: A.mat Palermo S.p.A..
Reggio Calabria: Municipal of Reggio Calabria
Rome: Rome mobility services
Turin: Municipal of Turin
Venice: Municipal of Venice

PAID PARKING ON THE STREET MUNICIPAL AREA:

Bari: Municipal of Bari
Bologna: Municipal of Bologna
Catania: Municipal of Catania
Cagliari: Municipal of Cagliari
Florence: Municipal of Florence
Geova: Municipal of Geova
Messina: Municipal of Messina
Milan: Agenzia Mobilità Ambiente e Territorio (A.M.A.T)
Naples: Municipal of Naples
Palermo: A.mat Palermo S.p.A..
Reggio Calabria: Municipal of Reggio Calabria
Rome: Rome mobility services
Turin: Municipal of Turin
Venice: Municipal of Venice

MOTORIZATION RATE PER MUNICIPAL AND METROPOLITAN AREA

NUMBER OF MOTOR AND COMMERCIAL VEHICLES

SOURCES: ACI - Automobile Club d'Italia Area professionale statistica

TYPE OF SUPPLY OF MOTOR AND COMMERCIAL VEHICLES

SOURCES: ACI - Automobile Club d'Italia Area professionale statistica

AIR QUALITY

Bari: Arpa Puglia
Bologna: Arpa Emilia Romagna
Cagliari: Comune di Cagliari
Catania: Arpa Sicilia
Florence: Arpa Toscana
Geova: Arpa Liguria
Messina: Arpa Sicilia
Milan: Arpa Lombardia
Naples: Arpa Campania
Palermo: Arpa Sicilia, RAP
Reggio Calabria: Arpa Calabria
Rome: Arpa Lazio
Turin: Arpa Piemonte
Venice: Arpa Veneto

MAP BASE

ORTHO FOTO 2012 - NATIONAL GEO-PORTAL

WEATHER DATA

Bari: Arpa Puglia
Bologna: Arpa Emilia Romagna
Cagliari: <https://www.wunderground.com/>
Catania: Regione Sicilia - SIAS Servizio Informativo Agrometeorologico Siciliano
Florence: Servizio Idrologico della Regione Toscana
Geova: Regione Liguria
Messina: Regione Sicilia - SIAS Servizio Informativo Agrometeorologico Siciliano
Milan: Arpa Lombardia
Naples: Regione Campania
Palermo: Regione Sicilia - SIAS
Reggio Calabria: Arpa Calabria
Rome: Arpa Lazio
Turin: Regione Piemonte
Venice: Arpa Veneto



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By
ANNA DONATI, FRANCESCO PETRACCHINI,
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