Social aspects of low emission zones: Milan case study

This is one of a set of five city case studies prepared as part of a study by the Institute for European Environmental Policy for the Clean Air Fund. The study investigates the social impacts of low emission zones (LEZ) and looks at how they can be deployed in a socially acceptable way, gathering support from the local population. The other case studies cover Stockholm, the Brussels-Capital Region, Warsaw and Sofia.

About Milan

Milan is the capital of Lombardy. It is located in northern Italy, within south-western Europe, on the western side of the Po Valley. The entire city covers 18.2 thousand hectares, and counts 1,358,420 inhabitants within the municipality (Statista, 2024) and 4,329,748 when considering the whole metropolitan city (Eurostat, 2023). Population density within the municipality is very high, approximately 7,726 inhabitants per km^2, whereas in the rest of the metropolitan city it is notably lower at around 2,000 inhabitants per km^2 (Comune di Milano, 2020)

Regarding demographics, the average age is 46 years old. 13% of the population is less than 15 years old, 64% between 15 and 64, and 23% over 64. 48% of the population are males and 52% are females (Eurostat, 2023). The gross average income in the Milan region is EUR 33,000/year, which places it as the Italian region with the highest average salary,

compared to the national average of EUR 29,000/year (Statista, 2024). The region's GDP per capita in 2016 was 165% of the Italian average (Istat, 2018; The World Bank, 2022).

Due to its high population density and significant industrialization level, Milan ranks among the most air-polluted European cities (Mattioli et al., 2012). Moreover, northern Italy is subject to adverse geo-climatic conditions: low wind speed and frequent temperature inversion result in high air pollution levels (ibid). Residents in the Po Valley are estimated to lose approximately 2-3 years of life due to air pollution (Agenzia Mobilità Ambiente Territorio, hereinafter AMAT, 2024). In January 2024, the average daily value of PM10 in Milan was around 100 mg/m^3, well above the value limit of 50 mg/m^3 (Agenzia Regionale per la Protezione dell'Ambiente, hereinafter ARPA, 2024).

About the Low Emission Zones

Italy is the European country with the largest number of LEZs, equivalent to 172, followed by Germany with 78 (Statista, 2023). These data result from the alarming air pollution conditions in the country, especially in the north, which fails to comply with the EU standards. In the period 2002-2008, Italy exceeded both the daily and annual limit values of PM10 set by the EU air quality directive 1999/30/EC (later revised in the directive 2008/50/EC), which led to the Commission bringing the country before the European Court of Justice in 2010 (Mattioli et al., 2012). In 2018, the country was once again referred to the European Court of Justice after an infringement procedure launched by the Commission in 2014 for failing to comply with the air quality directive over persistently high levels of PM10 (European Commission, 2019). As a directive, Member States have discretion over how to achieve the target, and one of the tools chosen by Italy is the LEZs. Indeed, road transport is closely related to air quality. As illustrated in Figure 1, in Milan, road transport is the largest local source of PM10 and NO$_X$: 63% of PM10 emissions derive from road transport. Thus, improving air quality first requires alleviating pollution from road transport (AMAT, 2024).

Figure 1: Sources of PM10 in Milan (AMAT, 2024)
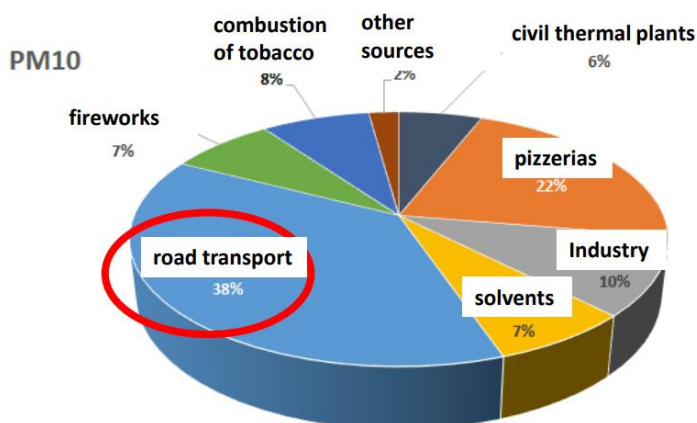
Source: INEMAR Lombardia 2019

Due to the peculiar geoclimatic conditions above-mentioned and its advanced industrialization, the Po Valley has an air pollution rate greater than the national average. According to IQAir, a Swiss agency specialized in daily air quality monitoring, on 18 February 2024, Milan recorded the third worst air quality index in the world (IQAir, 2024). Currently, the industrial capital has an air quality index equal to 110, against the national average of 57 (Ibid). The primary reason behind the city's air pollution level is PM2.5, whose concentration is estimated to be almost 8 times the standard value set by the World Health Organization (Ibid).

Despite a well-developed public transport system, Milan is still rated among the most car-dependent European cities with a car ownership level of 0.49 per person (AMAT, 2024). It should be noted that the motorization rate significantly decreased in the last decade, as in 2009, it was 0.6 (Comune di Milano, n.d.). Considering the large share of the transport sector in GHG emissions and its consequent public health effects, a regulatory intervention was necessary. On 2 January 2008, the Ecopass, the first version of the LEZ, was introduced by the right-wing city government of the time, in striking contrast with the European counterparts where LEZs have been implemented under center-left wing governments (Mattioli et al., 2012). The mayor of the time, Letizia Moratti, was a member of the micro-party *Casa della Libertà* affiliated with the macro-party *Forza Italia* and founded by ex-prime minister Silvio Berlusconi. It was introduced through a top-down approach as one of the proposals presented by Letizia Moratti during the electoral campaign for city mayor. Once she was elected, Ecopass was implemented as part of her political program.

Ecopass was a pollution charge: the ticket payment was based on the emission class of the vehicle. The primary aim of Ecopass was reducing air pollution, with decreased congestion as a side goal. Initially, the major social benefits fostered by Ecopass were in terms of congestion. At the time, the least polluting vehicles were allowed to enter free of charge, which yielded good results in terms of congestion and reduction of vehicle emissions. The pollution charge significantly reduced traffic. However, the congestion effect decreased over time because of the purchase of new cars meeting the environmental standards. Since the least polluting vehicles could access the area for free, the vehicular fleet was renewed. This resulted in the number of vehicles in circulation in 2011 being the same as in 2007, making Ecopass lose the congestion advantage it had gained (AMAT, 2024). In 2011, along with political pressure, the reduced effect led the local administration to promote a referendum to upgrade the pollution charge to a congestion charge that would be more socially equitable, i.e. everyone pays regardless of Euro standard class.

Driven by public health concerns and doubts about the effectiveness of the Ecopass, given its limited area (only 8 km^2) and the large number of exempted vehicles, Milan citizens, led by the association *MilanosiMuove,* collected 25,000 signatures for a referendum in 2011 on extending and upgrading the system in place. Turnout for the referendum was 40% of inhabitants, whilst the minimum number of voters needed for a valid result was only 30% of inhabitants (AMAT, 2024). 79% voted for upgrading it to a congestion charge, introducing the Low Emission Zone C, also known as Area C, in 2012 (Mattioli et al., 2012). The area covered remained the same, but the exemptions were significantly reduced. This was the first

bottom-up approach of a LEZ in Europe (Ibid). When Area C was implemented, former mayor Moratti had been replaced by a center-left mayor. The main difference from the Ecopass lies in the increased number of charged vehicles, from 12% to 92% (AMAT, 2012).

LEZ B, also known as Area B, was then introduced in 2019, covering 128.29 km^2 of the area outside the city centre, equivalent to 70% of the municipality, and becoming Italy's largest LEZ (European Commission, 2019). Unlike Area C, Area B does not involve any charging, but it prohibits access and circulation of excessively polluting vehicles. To ensure maximum social inclusion, it encompasses 95% of the population. Indeed, residents outside Area C requested to extend the LEZ, as they feared that their areas would turn into parking zones for the most polluting vehicles (AMAT, 2024).

Currently, Milan is the only city in the world with 2 types of road pricing, namely congestion and pollution charges.
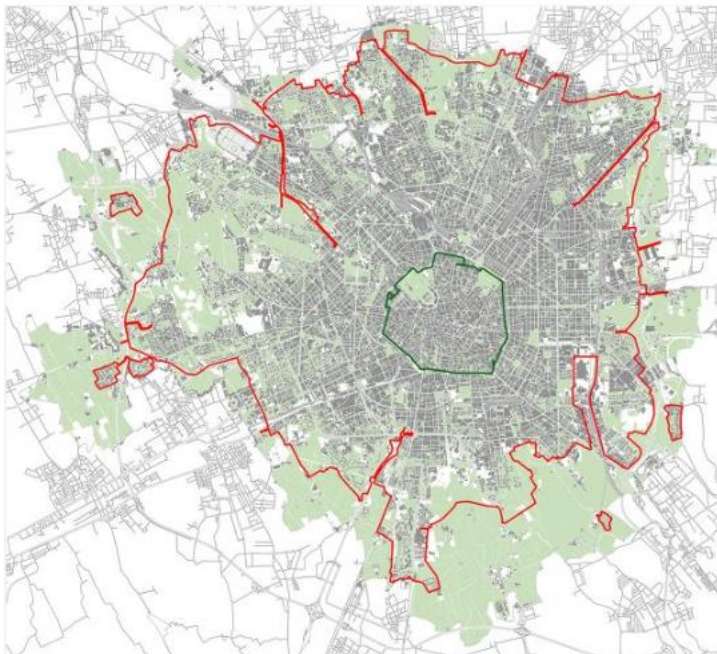

Figure 2: Map portraying the location of LEZ C and B in Milan. The red line marks Area B and the green one Area C. Figure from Urban Access Regulations in Europe, n.d.

The following table summarizes the key features of LEZ C and LEZ B.

Table 1: Key characteristics of LEZ C and LEZ B. From AMAT, Comune di Milano and Urban Access Regulations in Europe

	LEZ Area C	LEZ Area B
Date of implementation and changes	2012, successive strengthening of requirements, latest strengthening of requirement in 2024	2019, successive strengthening of requirements, latest strengthening of requirement in 2024
Vehicles included	All vehicles with a length < 7.5m, except for two-stroke motorcycles and mopeds	Heavy buses and trucks, light buses and trucks, private vehicles with a length < 12m, except for two-stroke motorcycles and mopeds
Requirements	Currently petrol vehicles Euro 3 and diesel vehicles Euro 4. From October 2024, petrol vehicles Euro 4 and diesel vehicles Euro 6 abc. From 2028 petrol Euro 5 and diesel Euro 6 abc. From 2030 only petrol Euro 5. Electric, hybrid, bi-fuel and LPG vehicles have free access.	Electric, hybrid, LPG, biofuel vehicles, Euro 5 and 6 petrol vehicles will always be allowed. Currently, petrol vehicles Euro 3 and diesel vehicles Euro 6abc. From 2025 petrol vehicles Euro 4 and diesel vehicles Euro 6abc. From 2028 petrol vehicles Euro 5 and diesel vehicles Euro 6abc. From 2030 only petrol Euro 5. From October 2023 heavy trucks and buses are required to be equipped with a blind spot sensor and a sticker warning of the danger. The same will apply to light trucks and buses from October 2024.
Compliance and sanctions	€70- €285 fine, depending on the vehicle's emissions	€163- €658 fine and risk of suspension of license in case of repeated infringements
Financial costs and gains	Costs: approximately € 2-3 million per year for management costs. Ecopass and Area C implementation and infrastructure costs overlapped, for the first year of Ecopass they were approximately € 20 million. Gains: € 30 million per year until 2019. In 2020 € 16 million, in 2021 € 20 million, in 2022 € 26 million.	Costs: € 30 million for electronic gates – € 15/20 thousand per gate, overall 188 gates. Gains: € 0, as Area B is not subject to a charge.
Environmental impact	Reduction of 19% in PM10, of 10% in NO_X, and of 22% in CO_2 by 2017	PM10 emissions halved in the first 4 years (15t). Reduction of 4%-5% in NO_X each year from 2019 to 2022. Expected decrease of 25t of PM10 and 900t-1500t of NO_X by 2026

Area C and Area B are active from Monday to Friday from 7.30 am to 7.30 pm. Access to Area C, for vehicles meeting the environmental requirements, costs EUR 7.50 (raised from EUR 5 from October 2023), whilst access to Area B for compliant vehicles is free (Comune di Milano, n.d.). The two LEZs encompass, respectively, 43 and 188 checkpoints (Ibid). Vehicles used by disabled people, social and health workers, armed and police forces, and firefighters are exempted in both areas. Additionally, taxis with up to 9 seats are exempted from paying for access tickets to Area C, but they must comply with the environmental requirements (Comune di Milano, n.d.). If used for roadside assistance, passenger transport, and postal services, vehicles longer than 7.5m and 12m that are compliant are respectively allowed in Area C and Area B (Ibid). Moreover, from October 2023, Milan residents owning a Euro 4 and Euro 5 diesel vehicle or a Euro 2 petrol vehicle are granted 25 days of access to Area B (Ibid). From

October 2024, residents in Area C will be entitled to 50 free accesses and a discounted price of EUR 3 from the 51st access onwards (Ibid). Initially, they were granted 40 free accesses and paid EUR 2 from the 41st onwards. The number of accesses was later increased to address social acceptability concerns, even though most residents used less than the 40 accesses allowed. Indeed, thanks to raised awareness and a well-functioning public transport system, only 20% of the residents used all the accesses available to them (AMAT, 2024).

Furthermore, to address street vendors' concerns the introduction of Area B was accompanied by the *Move-In* project. The latter allows polluting vehicles that are restricted from entering Area B to circulate within the LEZ up to a certain distance. The targeted vehicles must install a black-box that through satellite connection detects the kilometres travelled. As illustrated in Figure 3, the mileage limitation varies depending on the Euro standard.

Figure 3: Annual distance granted until September 2024 under the Move-In project (AMAT, 2024)

Vehicles Categories (km/year)		
Engine type and Class	**Private vehicles (max. 8 seats) Commercial vehicles (> 8 seats; ≤5t)**	**Commercial vehicles (mass ≤ 3.5 t) Commercial vehicles (≤ 12 t)**	**Private vehicles (> 8 seats; >5t) Commercial vehicles (> 12 t)**
Petrol Euro 0	200	200	200
Diesel Euro 0	200	200	200
Petrol Euro 1	300	300	300
Diesel Euro 1	300	300	300
Petrol Euro 2	600	600	600
Diesel Euro 2	600	600	600
Diesel Euro 3	1.500	1.500	1.500
Diesel Euro 4	1.800	2.000	2.000
Diesel Euro 5	2.000	-	-

As shown in Figure 4, before Covid-19, Area C revenues amounted to approximately EUR 30 million per year. Following the pandemic, they significantly dropped to EUR 16 million in 2020 and then gradually rose again in the following years (ibid). Revenues from Area C are allocated to three main categories: 62% is invested in the improvement of public transport both outside and inside the area, 22% in new sustainable mobility projects, and 16% in the operating costs for both Areas. Operating costs involve back-office and front-office activity, the collection of data and the maintenance of technological infrastructures (ibid).

Figure 4: Annual Area C Revenues (AMAT, 2024)

Moreover, the city government released EUR 27 million in incentives to companies and low-income classes to enhance the purchase of environmentally friendly vehicles (ibid).

Social Aspects – Investigations and Stakeholder Consultations

Area C and Area B effects have been and continue to be evaluated. The following paragraphs describe such evaluations and the processes behind them. For the present case study, we conducted three interviews to assess the impacts of the two areas. The three interviewees were the Milan Councillor for Mobility and Environment in charge at the time of Ecopass and main promoter of its upgrade to Area C, the General Director and Interim Mobility Planning Area Director at AMAT – the technical agency of the municipality of Milan specialised in the monitoring, planning and control of green areas, mobility and public transport – and the current Milan Councillor for Mobility. The interviews were held online respectively on April 24th, May 5th and May 24th, 2024.

Area C

Since Area C follows on from Ecopass, most of the ex-ante analyses on potential impacts were carried out before Ecopass' implementation. Technical studies were conducted on pollution impacts and traffic reduction by the municipality of Milan, rather than as a result of stakeholder consultations.

As explained by Edoardo Croci – Mobility and Environment Councillor of Milan at the time of Ecopass and promoter of its upgrade to Area C - before the introduction of Area C the administration held multiple roundtables with various stakeholders, including residents, logistics operators, retailers, and commuters' association. Although the area covers only 4% of the territory of Milan, it is an extremely crowded area due to its high concentration of offices and tourist spots. Retailers and logistics operators expressed opposition to the measure out of concerns about the restrictive effects on their businesses (Croci, 2024). Following consultations, to address these concerns, the payment ticket for them was lowered to EUR 3 instead of the planned EUR 5 (later raised to EUR 4 instead of EUR 7.5). However, according to the General Director and Interim Mobility Planning Area Director at AMAT, once

the scheme entered into force, they were the first to benefit from it as the reduction in congestion speeded up deliveries and therefore increased their business (Sevino, 2024).

The transition from Ecopass to Area C was the result of a referendum. Its promotion started with a small number of people from minor parties, especially from the Green party and the radicals, who played key roles in the campaign's organisation. Croci highlighted the importance of hundreds of volunteers and several citizen organisations in mobilising public support. To enhance public involvement, the campaign included supportive testimonials from several singers and actors. The success of the referendum with almost 80% votes in favour, according to Croci, was largely due to the public's firsthand experience of the benefits of Ecopass, which was already in place (Croci, 2024).

Since the introduction of Area C, the administration tried to be as transparent as possible with the release of a monthly report on the impacts (Croci, 2024). The key indicators concern congestion and pollution (emissions and concentrations), improvements in the frequency of public transport, and health, but do not address social impacts (Sevino, 2024). Indeed, despite substantial analysis and monitoring of congestion, pollution and air quality effects, the interviews reveal a lack of analysis of socio-economic impacts, except in terms of improved public transport and health effects (Censi, 2024; Sevino, 2024).

One of the main positive effects of Area C was a big modal shift from private cars to public transport, which allowed the number of people accessing the area to remain the same. The results illustrated in the graph from AMAT in Figure 5 show that, following the introduction of the measure, the daily transits in the area notably dropped from 131.898 in 2011 to 74,673 in 2023, a reduction of 43%. The data from 2020 are probably a consequence of limited movements due to COVID-19 (AMAT, 2024).
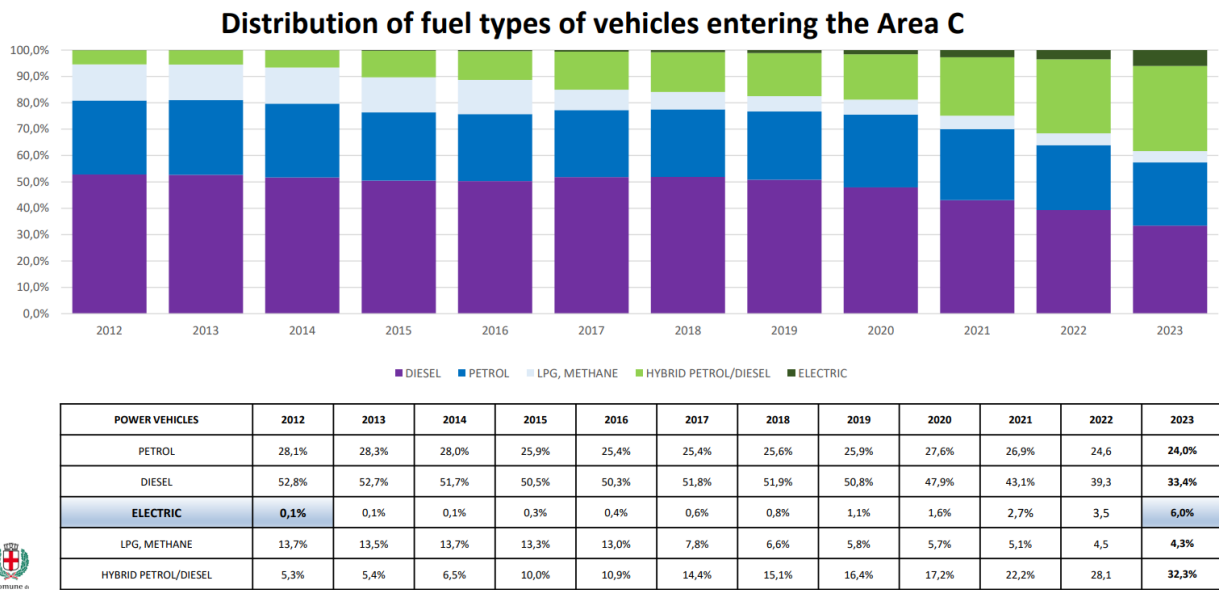
Figure 5: Area C transits: Annual trend (AMAT, 2024)
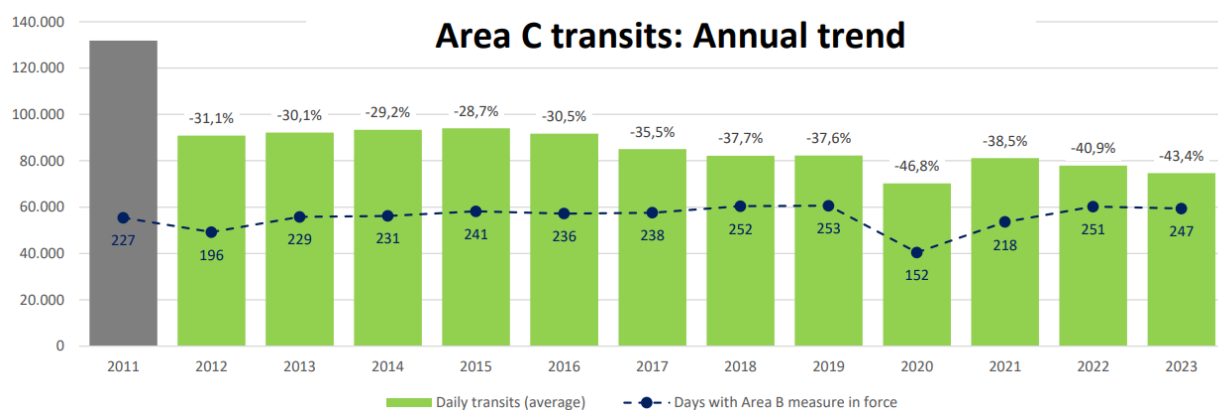
Aside from reducing congestion, Area C led to a renewal of the vehicular fleet. As illustrated in the graphic from AMAT in Figure 5, the distribution of fuel types of vehicles entering the area has significantly changed throughout the years with a gradual increase in eco-friendly vehicles (electric and hybrid ones) and a steady decline in the most polluting ones (diesel).

The latter passed from accounting for 52% of the vehicular fleet in 2012 to one-third (33%) in 2023. On the other side, electric vehicles rose from 0.1% in 2012 to 6% in 2023 and hybrid vehicles from 5.3% in 2012 to 32.3% in 2023, almost the same share as diesel vehicles. The proportion of petrol vehicles roughly remained the same (AMAT, 2024). The shift in the distribution of vehicles was facilitated by the municipal administration, which from 2015 to 2022 issued seven calls for companies and low-income citizens equivalent to a total amount of EUR 23 million funds to promote the purchase of vehicles with a lower environmental impact (Comune di Milano, 2022).

Figure 6: Distribution of fuel types of vehicles entering the Area C (AMAT, 2024)

Distribution of fuel types of vehicles entering the Area C

POWER VEHICLES	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PETROL	28,1%	28,3%	28,0%	25,9%	25,4%	25,4%	25,6%	25,9%	27,6%	26,9%	24,6	24,0%
DIESEL	52,8%	52,7%	51,7%	50,5%	50,3%	51,8%	51,9%	50,8%	47,9%	43,1%	39,3	33,4%
ELECTRIC	0,1%	0,1%	0,1%	0,3%	0,4%	0,6%	0,8%	1,1%	1,6%	2,7%	3,5	6,0%
LPG, METHANE	13,7%	13,5%	13,7%	13,3%	13,0%	7,8%	6,6%	5,8%	5,7%	5,1%	4,5	4,3%
HYBRID PETROL/DIESEL	5,3%	5,4%	6,5%	10,0%	10,9%	14,4%	15,1%	16,4%	17,2%	22,2%	28,1	32,3%

The change in fuel type vehicle distribution together with the increased use of public transport resulted in environmental improvements. The two graphs below indicate a historical series of daily average atmospheric emissions of PM10 and NO$_X$ expressed in kg/day. Both substances show a steadily declining trend: PM10 emissions dropped from 12 kg/day in 2012 to 7.2 kg/day in 2022, and NO$_X$ emissions from 194 kg/day in 2012 to 46 kg/day in 2022 (AMAT, 2024).

Figure 7: PM10 and NOX daily emissions expressed in kg/day (AMAT, 2024)
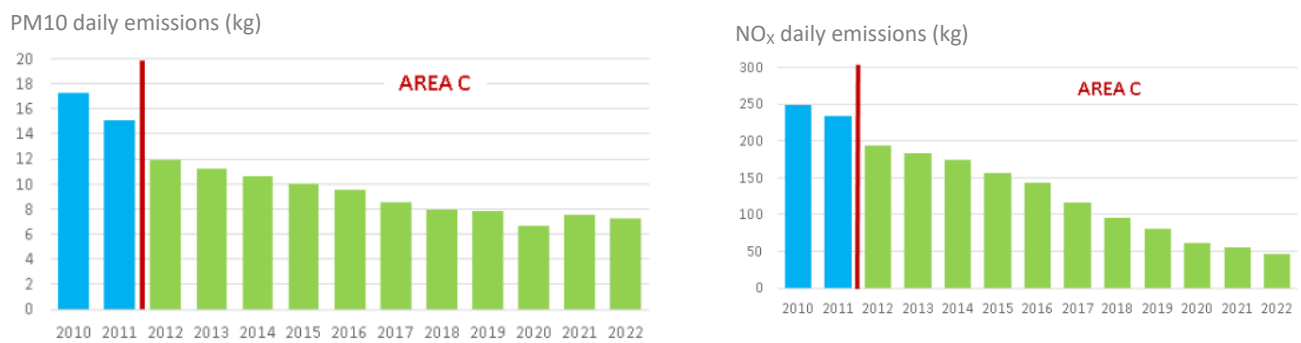
From our interview with the General Director and Interim Mobility Planning Area Director at AMAT it emerged that there were also improvements in the quality of the urban environment: urban design was improved for the benefit of residents and users, with the creation of cycle lanes and pedestrian areas. Areas previously reserved for parking were turned into pedestrian zones, and new bike and car sharing services were introduced. Accordingly, the housing market has increased its value (Sevino, 2024).

Area B

The implementation of Area B followed a series of roundtable discussions with relevant stakeholders and thorough analyses of its potential environmental and congestion effects. The stakeholders involved were the same as in Area C (i.e. logistic operators, retailers, commuters) but on a larger scale due to the considerably larger area concerned of 170 km^2 against 8 km^2 of Area C. Implementation of Area B encountered less public opposition in the initial phase than Area C, as it did not involve any charging. However, with the gradual increase of restrictions and controls, especially following the introduction of the ban on diesel vehicles Euro 5 in October 2022, opposition grew as well - specifies the General Director and Interim Mobility Planning Area Director at AMAT. Yet, as the interviewee points out, it is more of a political debate than a technical one (Sevino, 2024). Indeed, most local media's criticism of the measure stems from right-leaning newspapers, opposed to the city government, which since 2011 - after the mayor Letizia Moratti - has always been affiliated with the left-wing coalition.

Particular attention was given to the most vulnerable social groups as well as retailers and other significantly affected businesses. Area B involved several accompanying measures, including incentives to businesses and citizens with an EESI (Equivalent Economic Situation Indicator) income less than or equal to EUR 20,000, to foster the purchase of less polluting vehicles. Indeed, lower-income citizens are the most affected by the measure since they are less likely to afford a new eco-friendly vehicle. For this reason, from 2019 to 2022, the municipality provided an amount of public contributions equivalent to EUR 27 million (Figure 8) (AMAT, 2024).

Figure 8: Public contributions to businesses and low-income residents to incentivise the purchase of less polluting vehicles (AMAT, 2024)

|	BUSINESSES AMOUNT ALLOCATED	RESIDENTS AMOUNT ALLOCATED	TOTAL
2018 APPLICATION	€ 2.229.200,00	€ -	€ 2.229.200,00
2019 APPLICATION	€ 3.000.000,00	€ 1.000.000,00	€ 4.000.000,00
2020 APPLICATION	€ 5.056.200,00	€ 8.500.000,00	€ 13.556.200,00
2021 APPLICATION	€ -	€ 3.000.000,00	€ 3.000.000,00
2022 APPLICATION	€ 2.000.000,00	€ 3.000.000,00	€ 5.000.000,00
	€ 12.285.400,00	**€ 15.500.000,00**	**€ 27.785.400,00**

Similarly to Area C, Area B has also experienced a change in the vehicle fleet distribution. However, the results of the new distribution of vehicles are less striking than for Area C. This is likely due to a narrower time span: Area C has been in force for more than ten years, Area B only since 2019. As shown in Figure 9, within almost a year and a half, Area B entrances of diesel-powered vehicles decreased by 8%, from constituting 40% of the vehicle fleet in February 2022 to 32% in June 2023. By contrast, hybrid vehicles increased from 9% to 14% and electric vehicles rose from 1% to 2% (AMAT, 2024).

Figure 9: Car fleet distribution by engine entering Area B (AMAT, 2024)
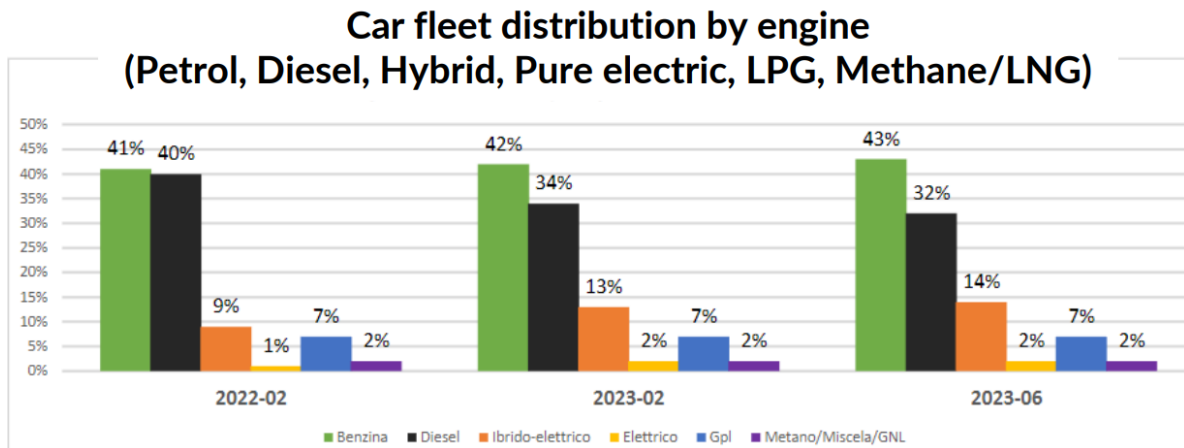
This shift in the car fleet composition translates to reduced air pollution. AMAT estimates that between 2022 and 2023 150 tonnes of NO_X were avoided. Additionally, it forecasts that Milan will witness a decrease of 70-150 tonnes of NO_X annually in the next six years (AMAT, 2024).

Figure 10: Avoided emissions of NOx (AMAT, 2024)
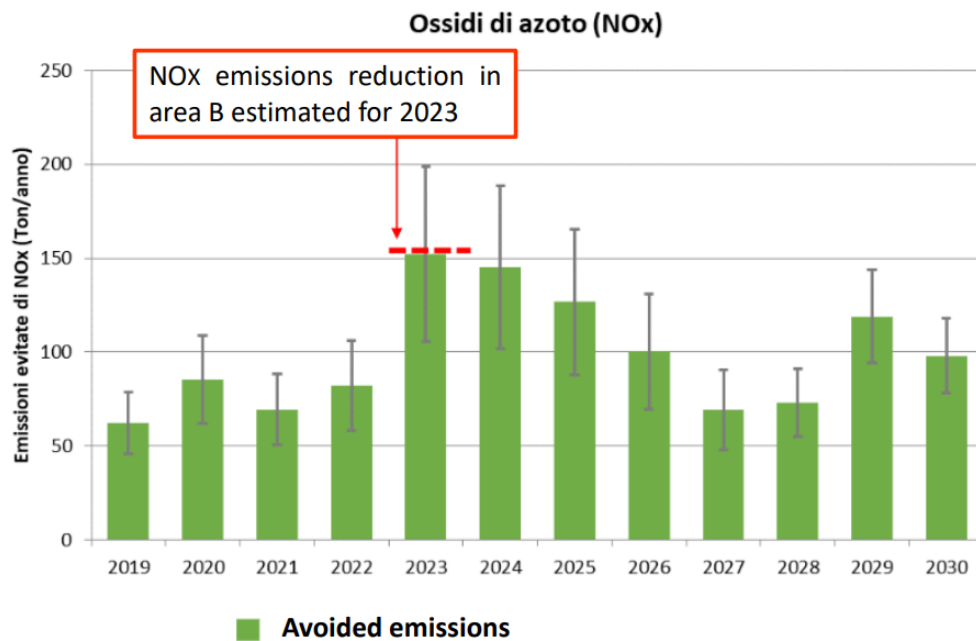
Just as for Area C, the interviews revealed a lack of studies on social impacts and social acceptability.

Transferable lessons and recommendations

The Milan scenario provides some insightful information that can be applied to other cities aiming to implement a LEZ. Some of the key lessons regarding social acceptability to consider when implementing a LEZ are:

1. **Initial focus on what is useful rather than popular.**

Citizens do not have an informed decision on something completely new for them. In the initial phase, the city administration should rely on the expertise of technical specialists. Administrators should implement necessary, albeit difficult, policies at the risk of being unpopular. This way, citizens can form their opinions after an initial test that enables them to experience firsthand the effects (positive or negative) of the LEZ, thereby reducing the influence of emotive arguments. The city government must have a long-term vision that transcends the electoral consensus in the short-term.

2. **Investment in alternative services.**

The restriction of private use of vehicles must be combined with the provision of a range of alternative services that allow access to the LEZ, so that citizens' freedom of movement is not restricted. The revenues from the LEZ should be reinvested to:

- Improve public transport and increase its frequency

- Install bike and car sharing services in the city

- Create new public places in previous parking areas

3. **Transparency and clear communication.**

The administration should ensure clear communication on both the rules of the LEZ and its impacts.

   a. **Clear communication of the rules and restrictions involved in the LEZ is needed.** In the case of Milan, 88% of fines stem from non-Milanese users who were probably not fully aware of the rules.

   b. **Regular reports should be published on the environmental and traffic impacts**, being as transparent as possible. This is fundamental to raise public awareness.

4. **Stakeholders' involvement.**

The administration may rely on experts initially to construct the measures, but must still share them with stakeholders. In the later stages, stakeholders should be involved through roundtables, public debates and open consultations to understand their concerns and mitigate them with new provisions (e.g. financial incentives, or a certain number of free accesses to the LEZ).

References

Agenzia Mobilità Ambiente Territorio. (2012). Area C Sintesi della valutazione dei risultati conseguiti nei primi 6 mesi di applicazione del provvedimento ed effetti della sospensiva disposta a seguito dell'ordinanza del Consiglio di Stato. Retrieved from Comune di Milano : https://www.comune.milano.it/documents/20126/695296/Sintesi+risultati+traffico+effetti+sospensione+Area+C+-+16+gennaio-25+luglio+prima+settimana+settembre+2012.pdf/b038514e-4477-c50f-ec61-7a613d064a2c?t=1572449703033

Agenzia Mobilità Ambiente Territorio. (2024). Congestion Charge and Low Emission Zone in Milan: Area C and Area B - Overview on Air Pollution: health and environmental protection. Retrieved from Agenzia Mobilità Ambiente Territorio.

Agenzia Regionale per la Protezione dell'Ambiente. (2024). PM10 e PM2.5. Retrieved from Agenzia Regionale per la Protezione dell'Ambiente Lombardia: https://www.arpalombardia.it/temi-ambientali/aria/inquinanti/pm10-e-pm25/

Censi, A. – Mobility Councillor of Milan. (2024, May 24). Low Emission Zones in Milan cities – overview of social impacts. (E. Marchetti, & C. Antonelli, Interviewers)

Comune di Milano. (2020). Milano e i suoi quartieri anno 2020. Retrieved from Comune di Milano: https://www.comune.milano.it/documents/20126/2313917/MILANO+QUARTIERI+2020.pdf

Comune di Milano. (2022, January 15). Mobilità: Area C compie 10 anni. Retrieved from Comune di Milano: https://www.comune.milano.it/

Comune di Milano. (n.d.). Area B. Retrieved from Comune di Milano: https://www.comune.milano.it/aree-tematiche/mobilita/area-b#navpageinside

Comune di Milano. (n.d.). Area C. Retrieved from Comune di Milano: https://www.comune.milano.it/aree-tematiche/mobilita/area-c#navpageinside

Comune di Milano. (n.d.). Tasso di Motorizzazione. Retrieved from Comune di Milano: https://www.pgt.comune.milano.it/adottato/vasraall2-quadro-di-riferimento-territoriale-e-ambientale/2-analisi-dei-fattori-determinanti/23-mobilita-e-trasporti/238-tasso-di-motorizzazione

Croci, E. - Previous Transport, Mobility and Environment Milan Councillor. (2024, April 24). Low Emission Zones in Milan – overview of social impacts. (E. Marchetti, & E. Watkins, Interviewers)

European Commission. (2019). Commission takes Italy to Court over air pollution and failure to properly treat urban waste water. Retrieved from European Commission: https://ec.europa.eu/commission/presscorner/detail/nl/IP_19_1475

European Commission. (2019). EU Urban Mobility Observatory. Retrieved from European Commission: https://urban-mobility-observatory.transport.ec.europa.eu/news-events/news/italys-largest-low-emission-zone-area-b-launched-milan-2019-04-17_en?prefLang=et

Eurostat. (2023). Retrieved from Eurostat: https://ec.europa.eu/eurostat/databrowser/view/met_pjanaggr3__custom_10682926/default/table?lang=en

IQAir. (2024). Air quality in Milano. Retrieved from IQAir: https://www.iqair.com/italy/lombardy/milano

Istat. (2018). Regional Accounts. Retrieved from Istat: https://www.istat.it/it/files//2018/12/EN-Regional-Accounts-Year-2017-13-12.pdf

Mattioli, G., Boffi, M., & Colleoni, M. (2012). Milan's pollution charge: sustainable transport and the politics of evidence. Human Dimensions of Global Environmental Change - Evidence for Sustainable Development. Berlin.

Sevino, V. - General Director and Interim Mobility Planning Area Director at AMAT. (2024, May 13). Low Emission Zones in Milan – overview of social impacts. (E. Marchetti, & C. Antonelli, Interviewers)

Statista. (2023). Total number of declared low-emission zones (LEZs) in Europe in 2022, with a projection for 2025, by country. Retrieved from Statista: https://www.statista.com/statistics/1321264/low-emission-zones-europe-by-country/

Statista. (2024). Average annual gross salary in Italy in 2023, by region. Retrieved from Statista: https://www.statista.com/statistics/708972/average-annual-nominal-wages-of-employees-italy-by-region/

Statista. (2024). Total resident population of the city of Milan from 2019 to 2023. Retrieved from Statista: https://www.statista.com/statistics/1456620/milan-population/

The World Bank. (2022). GDP per capita - Italy. Retrieved from The World Bank: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=IT

Urban Access Regulations in Europe. (n.d.). Milano LEZ Area B. Retrieved from Urban Access Regulations in Europe: https://urbanaccessregulations.eu/countries-mainmenu-147/italy-mainmenu-81/milano-lez-area-b

Urban Access Regulations in Europe. (n.d.). Milano Area C: LEZ & CS. Retrieved from Urban Access Regulations in Europe: https://it.urbanaccessregulations.eu/countries-mainmenu-147/italy-mainmenu-81/lombardia/milan-area-c-charging-scheme#:~:text=Veicoli%20elettrici%2C%20ibridi%2C%20ciclomotori%20e,per%20accedere%20all'Area%20C.

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