DIRECTORATE FOR THE ENVIRONMENTAL TRANSITION ENERGY AND CLIMATE SECTOR

PROPOSAL FOR DECISION OF THE MUNICIPAL COUNCIL

SUBJECT: Approval of Articles 3, 11 and amendment to Article 4 (1) of the Air Quality Regulation of the Municipality of Milan. The measure does not involve costs.

THE DIRECTOR ENERGY AND CLIMATE SECTOR Giuseppina Sordi (signed electronically) THE DIRECTOR NATURE AND ENVIRONMENT DIRECTORATE Angelo Pascale (signed electronically)

THE MAYOR Giuseppe Sala (signed electronically)

THE MUNICIPAL COUNCIL

MOBILITY, ENVIRONMENT AND LAND AGENCY – s.r.l. with a single shareholder – Directorate and Coordination: Municipality of Milan Registered office: Via Tommaso Pini, 1 - 20134 Milan Social Capital EUR 10.400,00 – Tax code and registration number with the Milan Business Register: 12908910156 – REA Milano 1597731



Whereas:

- on 19 November 2020, the Municipal Council approved by Decision No 56 the Air Quality Regulation of the City of Milan, which provides for limitations on activities that generate air emissions with a view to safeguarding air quality and saving energy or reducing environmental degradation. The Regulation, in its entirety, included limitations on the following emission sources:

Article 3) Civil heating systems, limited to the use of the following fuels: diesel, kerosene and other light and medium petroleum distillates and emulsions thereof, firewood, charcoal, biomass fuels, biodiesel;

Article 4) Combustion of woody biomass for production and catering activities;
Article 5) Closure of doors for retail establishments and public establishments;
Article 6) Trade in public areas;
Article 7) Construction site management;
Article 8) Non-road mobile machinery;
Article 9) Outdoor smoking;
Article 10) Outdoor combustion;
Article 11) Electric charging stations;

- following the approval of the above-mentioned Regulation, several actions were brought against the Municipality of Milan, for some of which the Tribunale Amministrativo Regionale per la Lombardia (Regional Administrative Court, Lombardy, hereinafter 'TAR Lombardia'), as the administrative court of first instance, and the Council of State following an appeal have already given decisions;

- on the basis of the judgments delivered to date by the TAR Lombardia and the Council of State, the following articles had to be annulled:

Article 3) Combustion of woody biomass for production and catering activities; Article 10) Outdoor combustion, limited only to the prohibition on the ignition of fireworks, in implementation of judgments No 2033/2022 and No 2034/2022 of the TAR Lombardia; Article 11) Electric charging stations;

- therefore, the articles of the Air Quality Regulation currently in force are as follows:

Article 4) Combustion of woody biomass for production and catering activities;
Article 5) Closure of doors for retail establishments and public establishments;
Article 6) Trade in public areas;
Article 7) Construction site management;
Article 8) Non-road mobile machinery;
Article 9) Outdoor smoking;
Article 10) Outdoor combustion, limited to the prohibition of barbecues in the period from 1 October to 31 March.

Whereas, moreover:

- the annulment of *Article 3 Civil heating systems* of the Regulation by judgment No 09669/2022, Section 4[^] of the Council of State was transposed into national law following an appeal brought by the companies 'Cristoforetti Servizi Energia s.p.a.' and 'S. Valli s.n.c. di Valli Augusto e Margherita', for the amendment of the sentence of first instance of the Tribunale amministrativo regionale per la Lombardia (Regional Administrative Court, Lombardy) No 2710 of 6 December 2021 dismissing the action brought by those companies against the Municipality of Milan;

- the Council of State upheld the appeal in relation to the second ground of appeal put forward by the appellants, rejecting the other grounds of appeal as inadmissible or referring to the same grounds of rejection as those set out already by TAR Lombardia. The statement of reasons adopted by the Council of State is based on the alleged infringement of Article 5 of Directive n.2015/1535 of 9 September 2015, which requires Member States to immediately communicate to the Commission any draft technical regulation. Article 1(f) of the Directive further specifies that only technical regulations applicable in a Member State or a major part of it are subject to prior notification to the Commission. The Council of State recognises that the contested rule, namely the provision in Article 3 of the Air Quality Regulation, is a technical regulation. However, the Council deviates from what was stated by the TAR, which held that the same grounds of appeal did not exist, since it considers that, on the basis of the wording of Directive (EU) 2015/1535 and the provisions of Article 34(2) of the Criminal Code, it is for the European Commission (to which the communication referred to in Article 5a of Law No 317/1986 is ultimately addressed) to assess whether the territory of the Municipality of Milan can be regarded as a 'major part of a Member State'. The ruling of the Council of State also mentions that 'If it considers it appropriate, the Municipality of Milan may readopt the same provision in accordance with EU and national legislation and the grounds for the present judgment';

Noting that

- in Milan, as well as in the entire Po Valley Basin, despite the general improvement in air pollution indices, the European Limit Values for environmental quality are still not respected (Directive 2008/50/EC, transposed by Legislative Decree No 155/2010) with regard to Atmospheric Particulate (PM10 and PM2.5), Nitrogen Dioxide (NO2) and Ozone (O3). As far as these pollutants are concerned, Milan is today the city with the highest pollution levels in the entire Metropolitan City of Milan, as reported in the Air quality report for the Metropolitan City of Milan in 2022 (ARPA Lombardia 14/07/2023);

- the above-mentioned legal framework is set to deteriorate. In fact, following the publication in September 2021 of the new Air Quality Guidelines by the World Health Organisation, pursuant to which the guide values for air particulate matter and nitrogen dioxide were revised downwards, the European Parliament and the Council of the European Union, acting on a proposal from the European Commission, approved in April 2024 a new Air Quality Directive providing for the introduction in 2030 of limit values for air pollutants that are much lower and stricter than the current ones, both for nitrogen dioxide and for air particulate matter;

- the gradual improvement in the quality of energy fuels in the domestic sector and combustion techniques in recent years, together with the transition to fuels with a lower environmental impact, has led to a gradual decrease in the emission contribution of combustion in the domestic sector in Milan. However, the most recent data relating to the Regional Atmospheric Emissions Inventory for 2021 (INEMAR ARPA Lombardia) show that combustion in the non-industrial sector contributes a non-negligible share of the total emissions of the city of Milan;

Recalling:

- European and global energy governance policies and policies to reduce air emissions of local pollutants from domestic combustion plants, which now need to be increasingly integrated with climate change guidelines;

- the European Union's long-term greenhouse gas reduction strategies, such as COM(2018) 773 final of 28 November 2018 and Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action, which already set 2030 targets on energy efficiency and reduction of greenhouse gas emissions with the ultimate aim of achieving net zero greenhouse gas emissions in the Union by 2050 and the subsequent achievement of negative emissions;

- the REPowerEU Plan (COM(2022) 230 final), published following the outbreak of the Russia-Ukraine war, which reinforces the above-mentioned strategy. This Plan strongly reiterates the intention 'of achieving at least -55 % net GHG emissions by 2030 and climate neutrality by 2050 in line with the European Green Deal'. Europe intends to pursue this through a number of broad policy lines such as: energy savings, diversification of energy imports and replacement of fossil fuels by accelerating Europe's clean energy transition. From the latter perspective, the REPowerEU Plan attaches great importance to technologies such as solar photovoltaic, heat pumps, hydrogen uptake and the use of biomethane. As regards bioenergy more generally, the REPowerEU Plan states as follows: '*Prioritizing use of non-recyclable biomass waste and agricultural and forest residues will ensure a sustainable energy production that can contribute to the REPowerEU objectives*'.

Recalling also:

- the commitments undertaken by the Municipality of Milan to improve air quality and decarbonisation, including:

- the Air and Climate Plan of the Municipality of Milan, approved by the Municipal Council by Decision No 4 of 21 February 2022, which identifies the actions necessary to achieve the following objectives:
 - ✓ compliance with the limit values for concentrations of the air pollutants PM10, PM2.5 and NO2 (Directive 2008/50/EC) as soon as possible and the WHO Guidelines on a broader time horizon (2050);
 - ✓ 45% reduction of CO2 by 2030 as part of the transition to a Carbon Neutral City by 2050;
 - ✓ contributing to limiting the local temperature increase by 2050 to no more than 2°C by means of urban cooling and reducing the phenomenon of the heat island in cities.

- one of the actions of the Air and Climate Plan, *Action 1.5.1 Regulation of polluting activities*, refers specifically to the Air Quality Regulation and provides, after a first period of implementation of the Regulation, for the possibility of updating it on the basis of the results of technical and scientific studies. These insights cover all sources of emissions, including: the use of low-impact biofuels, technological solutions to monitor compliance with the limitations on the use of heaters and ways of limiting air emissions from non-road machinery not covered by the municipal regulation (e.g. gardening, soil clean-up, etc.);

- in implementation of the Air and Climate Plan, during these first years of application of the Air Quality Regulation, the municipal administration, with the technical support of the Mobility, Environment and Land Agency (AMAT), has carried out further technical and scientific research and comparisons with industry associations and undertakings in the sector;

- both the Milan Sustainable Urban Mobility Plan (SUMP approved by Decision No 38/2018 of the Municipal Council) and the Air and Climate Plan of the Municipality of Milan (ACP approved by Decision No 4/2022) aim to reduce traffic as a priority action to improve air quality. The local ban on the use of liquid and solid fuels for heating laid down in Article 3 of the Air Quality Regulation, annulled following Sentence No n.09669/2022 of the Council of State, the supply of which requires the use of means of road transport, is therefore in line with those plans, since it contributes to reducing road traffic induced by the transport of combustible materials by favouring the use of fuels supplied by pipeline or on-site products.

Having considered that:

- some legislative changes have taken place since the adoption of the Air Quality Regulation, this should be taken into account when updating the text. These include Annex I 'Provisions for the installation, operation, maintenance, control and inspection of thermal installations powered by woody biomass' to Regional Council Decision No 5360/2021 of the Region of Lombardy, which introduces, in paragraph 4(b), the definition of 'Localised heating appliance': a heat generator not connected to a heat distribution system, such as, for example, a fireplace, a stove, an economical cooker'. With this in mind, the regional decision provides for a census of the same installations on the Regional Thermal Installation Register. The obligation to register these appliances referred to in Article 3(6) of the Air Quality Regulation, now annulled following a ruling of the Council of State, is therefore superseded by the regional legislation in force;

- in view of the increasingly challenging air quality objectives, it is appropriate to initiate all further control measures on thermal installations, in addition to the activities already in progress, in line with the provisions of the current legislation. In this regard, reference is made to Legislative Decree No 152/2006, which lays down, for both medium-sized civil heating systems and installations with a rated thermal input exceeding 0.035 MW fuelled with biomass, the obligation to carry out periodic checks on compliance with the relevant emission limit values. Article 288(8b) of Legislative Decree 152/2006 also provides that the competent authority for checks on thermal installations, i.e. the municipality, may request the acquisition of documents for the purpose of control activities aimed at reducing emissions;

- some of the provisions of the Regulation have not been properly complied with due to certain specificities which have made its implementation difficult. These include the obligation, set out in *Article 4(1) 'Burning of woody biomass for production and catering activities'*, for production and catering activities in the territory and using solid biomass combustion, to self-declare some essential information about the activity, such as: the characterisation of the type of installation used, or the possible presence (and effectiveness) of pollutant abatement systems. This obligation sets the deadline of 1 March 2021, which is now outdated: the high turnover in the ownership of the management of these catering activities has created significant difficulties in fulfilling this obligation within the set deadline.

Given that:

- the municipal administration considers it appropriate to repropose the annulled regulations referred to in *Article 3* of the Regulation concerning certain types of thermal installations, which have already been considered logical and reasonable in two instances, updated as appropriate in the light of the evolution of the context of the European guidelines on energy strategies, current sectoral legislation and scientific knowledge and technological progress;

- with a view to reinstating Article 3, notification of a technical regulation was sent to the European Commission on XXX via the Ministry of Enterprises and Made in Italy pursuant to Articles 5a and 34(2) of Law No 317/86 on '*Provisions implementing European guidelines on European standardisation and the procedure for the provision of information in the field of technical regulations and rules on Information Society services*' as last amended by Legislative Decree No 223 of 15 December 2017;

- in reply to the above request,..... (report the EC/Ministry of Enterprises' reply/non-reply)

- the administration also considers, on the basis of these additional regulatory and technical and scientific considerations referred to above, and as set out in the Technical Report (Annex 1 as an integral part of this act), reformulating in line with the current legislation the *Article 3* previously proposed and subsequently annulled supplementing *Article 4(1)*, and introducing a new *Article 11* replacing the previous annulled one following Sentence No 2857/2021 of TAR Lombardia, namely:

 making it compulsory, with a view to implementing knowledge and monitoring thermal installations in the municipal territory, as provided for in Legislative Decree No 152/2006, to transmit to the municipal offices the measured emission values of the medium-sized civil heating systems with a rated thermal input of 1 MW or more and less than 3 MW, fuelled with any fuel and civil heating systems with a rated thermal input exceeding 500 kW fuelled with biomass;

- allowing the use of heat generators from civil heating systems fuelled with fuel wood or biomass fuels resulting from crop cuts in wooded areas and used for own consumption, i.e. limited to what is produced on the spot, with corresponding certification as already contained in the ordinary regional procedures for applying for the cutting of a forest. This proposal is in line with the European strategic guidelines contained in the REPowerEU Plan and the principles of environmental sustainability;
- confirming the obligation to submit information on catering activities, which use woody biomass, while removing the time limit currently set by *Article 4(1)* of the Regulation currently in force, and explicitly specifying the electronic means of transmission;
- Introducing new restrictions for non-road mobile machinery equipped with internal combustion engines with compression-ignition engines (diesel) of a power of less than 19 kW and those with positive-ignition engines (petrol, mixture) of any power. These types include, for example, vegetation maintenance machinery (such as: brush cutters, lawnmowers, grass trimmers, hedge trimmers and the like) or soil clean-up machinery (such as blowers or similar). The restrictions will be gradually started over time, beginning with the machines having the greatest impact, in line with the deadlines already provided for in *Article 8* of the current Milan Air Regulation on non-road mobile machinery for construction and work sites.

Further considering that:

- with regard to administrative penalties applicable to infringements of the proposed amendments to the Regulation introducing new provisions, that is:

- ✓ the reinstating of limitations relating to civil heating systems, annulled following Sentence No 09669/2022 of the Council of State;
- ✓ the obligation to transmit to the municipal offices the measured emission values of the medium-sized civil heating systems with a rated thermal input of 1 MW or more and less than 3 MW, fuelled with any fuel and civil heating systems with a rated thermal input exceeding 500 kW fuelled with biomass;
- ✓ new limitations for non-road mobile machinery, such as vegetation maintenance machinery (brush cutters, lawnmowers, grass trimmers, hedge trimmers and the like) or soil clean-up machinery (such as blowers or similar).

we would like to align them, by analogy, with those already set out in Annex A to the Regulation currently in force, which identifies the minimum and maximum limits within which the sanction must be included, with reference to the provisions already laid down in Article 7a(1) of Legislative Decree 267/2000, according to which 'unless otherwise provided by law, an administrative fine of between EUR 25 and EUR 500 shall apply for infringements of the provisions of the municipal and provincial regulations';

- as regards the definition of payment to a lesser extent, we confirm the application of Article 16(1) of Law No 689/1981;

Noting:

- the report of the Mobility, Environment and Land Agency 'Approval of Articles 1 and 4(1) and Article 11 of the Air Quality Regulation of the Municipality of Milan: technical and scientific reasons' sent on 3 May 2024....., documents in....., setting out the scientific technical reasons supporting the rewording of the articles of the Regulation subject to amendment, which is annexed (Annex A) to the Technical Report (Annex 1) as an integral part thereof.

Given that:

- subsequent management decisions and acts are required to implement what is necessary in order to define the operational procedures of the provisions of the amended Air Quality Regulation as described above;

- this measure does not involve costs.

Having regard to:

- Article 16(1) of Law No 689/1981;
- Article 36 of the Statute of the Municipality of Milan;
- Article 5a of Law No 317/1986 'Obligations of Italian public administrations with a view to the adoption of technical regulations';
- Article 7a(1) of Legislative Decree 267/2000:
- Legislative Decree No 152 of 3.4.2006 (Consolidated Text on the Environment), as amended;
- Directive (EU) No 2015/1535 of 9 September 2015;
- Decision No 56 of the Municipal Council of 19 November 2020 approving the Air Quality Regulation of the Municipality of Milan;
- Regional Council Decision No 5360 of 11 November 2021 on 'New provisions for the installation, operation, maintenance, control and inspection of thermal installations powered by woody biomass update of Regional Council Decision 3965 of 31 July 2015';
- the Municipal Council Decision No 4 of 21 February 2022 on 'Rebuttal to comments and final approval of the Air and Climate Plan document and its annexes.'
- the Technical Report (Annex 1), annexed to this measure as an integral and substantial part of it;
- the technical regularity opinion issued, pursuant to Article 49(1) of Legislative Decree No 267/2000, by the Director of the Energy and Climate Sector, annexed to this measure as an integral and substantial part of it;
- the opinion on its legality issued by the Secretary-General, annexed to this measure as an integral and substantial part of it.

HEREBY DECIDES:

- 1) to approve, for the reasons set out above and described in more detail in the annexed Technical Report (Annex 1), which are to be referred to in full and endorsed, Articles 3 and 11 and the amendments to Article 4(1) of the Air Quality Regulation as described in the Technical Report;
- 2) to instruct the competent manager to carry out the obligations related with this Decision;
- 3) to provide that the Regulation in question enters into force on the 30th day following the date of enforceability of this Decision.

Annex 1, an integral part of the proposed Municipal Council Decision No consisting of ... pages

> THE DIRECTOR ENERGY AND CLIMATE SECTOR Giuseppina Sordi (signed electronically)

12/07/13

DIRECTORATE FOR THE ENVIRONMENTAL TRANSITION ENERGY AND CLIMATE SECTOR

Approval of Articles 3, 11 and the amendments to Article 4(1) of the Air Quality Regulation of the Municipality of Milan.

The measure does not involve costs.

TECHNICAL REPORT

The following provisions are intended to replace the articles already contained in the current Air Quality Regulation, approved by the Municipal Council on 19 November 2020 by Decision No 56, and supplementing the legislation currently in force at national and regional level. Please find below a brief description of the articles subject to amendment. With regard to the technical reasons and the emission contribution related to each individual provision, please refer to the *Technical and scientific reasons* submitted by AMAT (in judicial police documents No... of...), annexed to this report as an integral part (Annex A).

Article 3 CIVIL HEATING SYSTEMS

Text approved by Municipal Council Decision 56/2020 (currently annulled following Sentence No 09669/2022- Section 4^ of the Council of State)	Reformulation proposal	
Parag	raph 1	
It is prohibited to install (including as a replacement) heat generators for civil heating systems with a rated thermal input of less than 3 MW (in accordance with Title II, Part 5 of Legislative Decree 152/2006, as amended) or similar within the meaning of the regional legislation in force, as well as local heating appliances (as defined in Article 4(b) of Regional Council Decision No X/3965 of 31 July 2015), powered by the following fuels: - diesel, kerosene and other light and medium petroleum distillates and emulsions thereof; - firewood; - charcoal - biomass fuels; - biodiesel. The installer (whose requirements comply with Articles 3 and 4 of Decree No 37 of the Minister for Economic Development of 22 January 2008) and the person responsible for the thermal installation (as defined by Regional Council Decision No X/3965 of 31 July 2015) must ensure compliance with this provision.	It is forbidden to install (including as a replacement) heat generators for civil heating systems or similar, as defined by the regional legislation in force, with a rated thermal input of less than 3 MW (Title II, Part 5 of Legislative Decree No 152/2006 as amended) and powered by the following fuels (defined in accordance with Annex X to Part V of Legislative Decree No 152/2006, as amended): - diesel, kerosene and other light and medium petroleum distillates and emulsions thereof; - firewood; - charcoal - biomass fuels; - biodiesel. The installer (whose requirements comply with Articles 3 and 4 of Decree No 37 of the Minister for Economic Development of 22 January 2008, as amended) and the person responsible for operating and maintaining the thermal system (as defined by Regional Council Decision No XI/3502 of 5 August 2020, as amended, and Regional Council Decision No XI/5360 of 11 October 2021 as amended) must	
	ensure compliance with this provision	
Parag	ranh 2	
With effect from 1 October 2022, it is prohibited to use	With effect from 1 October 2025, it is prohibited to	
heat generators for civil heating systems with a rated thermal input of less than 3 MW (in accordance with Title II, Part V of Legislative Decree 152/2006, as amended) or similar within the meaning of the regional legislation in force, as well as local heating appliances (as defined in Article 4(b) of Regional Council Decision No X/3965 of 31 July 2015), powered by the following fuels: - diesel, kerosene and other light and medium petroleum distillates and emulsions thereof; - biodiesel.	use heat generators for civil heating systems or similar, as defined by the regional legislation in force, with a rated thermal input of less than 3 MW (Title II, Part 5 of Legislative Decree No 152/2006 as amended) and powered by the following fuels (defined in accordance with Annex X to Part V of Legislative Decree No 152/2006, as amended): - diesel, kerosene and other light and medium petroleum distillates and emulsions thereof; - biodiesel.	
Parag	raph 3	
Without prejudice to the legislation in force on heat generators, with effect from 1 October 2022, it is prohibited to use heat generators for civil heating systems with a rated thermal input of less than 3 MW (in accordance with Title II, Part V of Legislative Decree No 152/2006, as amended) or similar, within the meaning of the regional legislation in force, as well as local heating appliances (as defined in Article 4(b) of Regional Council Decision No X/3965 of 31 July 2015), which have been installed for more than 10 years and are powered by the following fuels: - firewood; - charcoal - biomass fuels.	Without prejudice to the legislation in force on heat generators, with effect from 1 October 2025, it is prohibited to use heat generators for civil heating systems or similar, as defined by the regional legislation in force, with a rated thermal input of less than 3 MW (Title II, Part 5 of Legislative Decree No 152/2006, as amended), which have been installed for more than 10 years and are powered by the following fuels (defined in accordance with Annex X to Part V of Legislative Decree No 152/2006, as amended): - firewood; - charcoal - biomass fuels.	
With regard to the position of the person responsible for With regard to the position of the person responsible for		
the thermal installation or, if delegated, the Responsible Third Party, as well as the related responsibilities, please refer to the principles set out in Regional Council Decision No X/3965 of 31 July 2015.	the thermal installation or, if delegated, the Responsible Third Party, as well as the related responsibilities, please refer to the principles set out in Regional Council Decision No XI/3502 of 5 August 2020, as amended, and Regional Council Decision No XI/5360 of 11 October 2021, as amended.	

Paragraph 5

 Without prejudice to the overall legislation in force on heat generators, the prohibitions laid down in paragraphs 1, 2 and 3 of this Article shall not apply to: (a) heat generators of civil heating systems serving nonmethane fractions within the meaning of Article 8 of Law No 448 of 23/12/1998 outside the built-up centre as defined in Municipal Council Resolution No 21 of 10/05/2018, as amended; (b) heat generators for which replacement or adaptation is not technically possible and, at the same time, for which there are no alternative thermal installations with heat generators powered by fuels permitted by this Regulation. In such cases, a certified technical report drawn up by an authorised technician (within the meaning of the definition in Article 4 of Regional Council Decision No X/3965 of 31 July 2015) must be submitted to the Municipal Authority, demonstrating the technical impossibility of replacing or upgrading the installation in accordance with the following timetable: on 1 October 2021, for the installations referred to in paragraph 2 fuelled with diesel, kerosene and other light and medium petroleum distillates and emulsions thereof, biodiesel; two years before the deadline referred to in paragraph 3 for installations powered by firewood, charcoal, and biomass fuels. 	 Without prejudice to the overall legislation in force on heat generators and requirements for civil heating systems, the prohibitions laid down in paragraphs 1, 2 and 3 of this Article shall not apply to: (a) heat generators of civil heating systems serving non-methane fractions within the meaning of Article 8 of Law No 448 of 23/12/1998 outside the built-up centre as defined in Municipal Council Resolution No 21 of 10/05/2018, as amended; (b) heat generators for which replacement or adaptation is not technically possible and, at the same time, for which there are no alternative thermal installations with heat generators powered by fuels permitted by this Regulation. In such cases, a certified technical report drawn up by an authorised technician (within the meaning of the definition in Regional Council Decision No XI/3502 of 5 August 2020, as amended, and Regional Council Decision No XI/5360 of 11 October 2021, as amended) must be submitted to the Municipal Authority, demonstrating the technical impossibility of replacing or upgrading the installation in accordance with the following timetable: on 1 October 2025, for the installations referred to in paragraph 2 fuelled with diesel, kerosene and other light and medium petroleum distillates and emulsions thereof, biodiesel; two years before the deadline referred to in paragraph 3 for installations powered by firewood, charcoal, and biomass fuels; c) heat generators from civil heating systems powered by firewood or biomass fuels used for own consumption and resulting from crop cuts in relevant wooded areas, within the meaning of Regional Law No 31 of 5 December 2008, as amended, and Regional Regulation No 5 of 20 July 2007, as amended.
	accordance with the overarching legislation in force.
Parag Without prejudice to the legislation in force on heat generators, owners of buildings with localised heating appliances powered by fuels referred to in paragraph 1 of this Article, which are excluded from the scope of Regional Council Decision No X/3965 of 31 July 2015, as amended (for example: commercial cookers, thermo- cookers and open fireplaces) must send the municipal authorities, by 1 March 2021, information on the type of installations installed, as better defined by subsequent acts made available by the competent municipal offices. This obligation shall apply even if the appliances referred to in this paragraph are not used.	raph 6 With effect from 1 October 2026, the measured emission values of medium-sized civil heating systems, i.e. having a rated thermal input of 1 MW or more and less than 3 MW (or similar in accordance with the legislation in force), as well as the measured emission values of civil heating systems with a rated thermal input exceeding 500 kW powered by biomass (as provided for in Regional Council Decision No XI/5360 of 11 October 2021, as amended), recorded in the context of the checks provided for in Title II, Part 5 of Legislative Decree No 152/2006, as amended, must be sent to the Milan Municipal Authority in accordance with the procedures to be found on the dedicated website of the Municipality of Milan.
	The transmission to the Milan Municipal Authority, as referred to in this paragraph, will not be due if it is already provided for in the overarching legislation (by way of example, but not limited to: possible recording of data collected in the CURIT (Single Regional Cadastre of Heating Systems) made mandatory by regional

Article 4(1) COMBUSTION OF WOODY BIOMASS FOR PRODUCTION AND CATERING ACTIVITIES

Current text	Reformulation proposal	
Paragraph 1		
Food and catering production activities using woody	Food and catering production activities using woody	
biomass, which are already in existence on the date of	biomass, which are already in existence on the date of	
entry into force of this Regulation, are required to	entry into force of this Regulation, are required to submit	
submit to the Milan Municipal Authority, by 1 March	to the Milan Municipal Authority information on	
2021, information on biomass- and flue-powered	biomass- and flue-powered equipment, by filling out the	
equipment, as further defined by subsequent acts made	form on the dedicated web page on the Municipality of	
available by the competent municipal offices.	Milan's website	

ARTICLE 11 NON-ROAD MOBILE MACHINERY USING LOW-POWER ENGINES

The articulation proposed below replaces the previous Article 11 – Electric charging stations, which was annulled in implementation of Sentence No. 2857/2021 of TAR Lombardia.

Proposed wording		
Paragraph 1		
 Paragraph 1 For all engines of a net power of less than 19 kW installed in non-road mobile machinery and positive ignition engines of a net power of not less than 19 kW installed in non-road mobile machinery, referred to in European Directives 97/68/EC, as amended, and in Regulation (EU) 2016/1628, as amended, the following prohibitions apply: from 1 October 2025, for positive-ignition engines of any category and having a net power of less than 19 kW, complying with type-approval stage I or earlier, or installed in non-road mobile machinery constructed by 31 December 2014 if the type-approval stage for atmospheric emissions is not available; from 1 October 2030, for positive-ignition engines of any category and having a net power of less than 19 kW, complying with type-approval stage II or earlier, or installed in non-road mobile machinery constructed by 30 June 2021 if the type-approval stage for atmospheric emissions is not available; from 1 October 2030, for compression-ignition engines of any category and having a net power of less than 19 kW, not complying with type-approval stage V or later, or installed in non-road mobile machinery constructed by 30 June 2021 if the type-approval stage for atmospheric emissions is not available; from 1 October 2030, for positive-ignition engines of any category and having a net power of less than 19 kW, not complying with type-approval stage V or later, or installed in non-road mobile machinery constructed by 30 June 2021 if the type-approval stage for atmospheric emissions is not available; from 1 October 2035, for positive-ignition engines of a net power of less than 19 kW, not complying with type-approval stage V or later, or installed in non-road mobile machinery constructed by 30 June 2021 if the type-approval stage for atmospheric emissions is not available; from 1 October 2035, for positive-ignition engines of a net power of less than 19 kW and having a cylinder capacity of less than 50 cc. co		
complying type-approval stage V or later.		
Paragraph 2		
For the purpose of certifying that the requirements laid down in paragraph 1 of this Article have been met, the relevant technical documentation must be made available to control and supervisory staff, such as (but not limited to): legible engine type-approval marking in accordance with the legislation in force, approval/type-approval certificate issued by the competent offices, declaration of conformity issued by the manufacturer, purchase tax document.		
Paragraph 3		
The prohibitions laid down in this Article shall not apply to generator sets equipped with an internal combustion engine used for trade in public areas, as referred to in Article 6 of this Regulation.		

Annex A Administrative fines

Please find below the additions to Annex A to the current Air Quality Regulation limited to the administrative penalties applicable to infringements of the proposed amendments to the Regulation introducing new provisions.

CIVIL HEATING AND COOKING SYSTEMS

12/07/13

Article	Infringement found	Minimum fine	Maximum fine
Article 3(6)	(from 1 October 2026) not sending to the	EUR 60	EUR 360
	Municipal Administration the measured values,		
	as part of the controls provided for in Title II,		
	Part 5 of Legislative Decree No 152/2006, as		
	amended, of the emissions of medium-sized		
	civil heating systems, or having a rated thermal		
	input of 1 MW or more and less than 3 MW (or		
	similar in accordance with the legislation in		
	force), and the measured emission values for		
	civil heating systems with a rated thermal input		
NON DO AD MA	exceeding 500 kW that are powered by biomass.		
NON-ROAD MC	BILE MACHINERY WITH LOW-POWER EN	GINES (Replacing t	he current Article 11
annulled pursuant	to Sentence No 2857/2021 of the TAR Lombardia)		
Article 11(1)	Failure to comply with the prohibitions on the	EUR 80	EUR 480
	use of engines of a net power of less than		
	19 kW installed in non-road mobile machinery		
	and positive ignition engines of a net power of		
	not less than 19 kW installed in non-road		
	mobile machinery, referred to in European		
	Directives 97/68/EC, as amended, and in		
	Regulation (EU) 2016/1628, as amended, by the		
	dates laid down in Article 11(1) depending on		
Article 11(2)	Life date of construction.		EUD 490
Afficie $\Pi(2)$.	control and supervision with the technical	LUK OU	EUK 400
	documentation for the number of attesting		
	compliance with the requirements laid down in		
	Article 11(1)		



Air Quality

Approval of Articles 3, 11 and amendments to Article 4(1) of the Air Quality Regulation of the Municipality of Milan (Municipal Council Decision 56/2020): technical and scientific reasons Annex A

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Mobility Environment and Land Agency Ltd Arch. Valentino Sevino Director-General Registered Office: Via Tommaso Pini, 1 – 20134 Milan Office premises: Via Tommaso Pini, 1 – 20134 Milan Telephone + 39 02 8846 7298 Fax + 39 02 8846 7349 e-mail: info@amat-mi.it

Head of the Environmental Transition Section Manuela Ojan

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1. GENERAL REASONS

In Milan, as well as in the entire Po Valley Basin, despite the general improvement in air pollution indices, the European Limit Values for environmental quality are still not respected (Directive 2008/50/EC, transposed by Legislative Decree No 155/2010) with regard to Atmospheric Particulate (PM10 and PM2.5), Nitrogen Dioxide (NO₂) and Ozone (O₃).

For this reason, in May 2018 the European Commission referred the Italian Republic to the European Court of Justice for breaching the legal limits on concentrations of PM10, following the infringement procedure opened in July 2014 (Reasoned Opinion No 2014_2147) for exceeding the limit values of PM10 between 2008 and 2012 in 19 zones and agglomerations, including the agglomeration of Milan. Moreover, the Court of Justice of the European Union had already held Italy liable for the infringement of EU legislation relevant for the years 2006 and 2007 (judgment C-68/11 of 19 December 2012).

In addition, in 2019 the European Commission referred the Italian Republic to the European Court of Justice for the systematic and continuous exceeding of the limit values for nitrogen dioxide (NO₂) in 12 zones and agglomerations, including the agglomeration of Milan, following the infringement procedure opened in May 2015 (procedure No 2015_2043).

In both cases, the European Court of Justice issued a judgment condemning the Italian Republic (Case C-644/18 of 10 November 2020 'Systematic and continuous exceeding of the limit values applicable to microparticles (PM10) in certain Italian zones and agglomerations' and Case C-573/19 of 12 May 2022 'Systematic and continuous exceeding of the limit values set for nitrogen dioxide (NO_2) in certain Italian zones and agglomerations', thus establishing the serious situation in which several areas of the Po Valley, including the city of Milan, find themselves.

Finally, in 2024 the European Commission sent a new letter of formal notice to the Italian Republic concerning infringement procedure 2014_2147 for the persistent failure to comply with the judgment of the Court of Justice of the EU of 10 November 2020 (Case C-644/18).

As far as the above pollutants are concerned, Milan is the city with the highest pollution levels in the entire Metropolitan City of Milan. Indeed, the 2022 Air Quality Report of the Metropolitan City of Milan (ARPA Lombardia, 14/07/2023) states that:

- the maximum annual number of exceedances of the daily limit value of PM10 was not respected at any of the Milan monitoring stations (whereas in other monitoring stations, such as Cassano d'Adda and Turbigo, this limit was respected);
- the only monitoring station for the entire Metropolitan City where the annual limit value for PM2.5 was not respected is the one in via Senato in Milan;
- throughout the Metropolitan City of Milan, there are only two monitoring stations where the limit value on the average annual concentration of nitrogen dioxide (NO₂) was not respected, one of them is in viale Marche in Milan (the other is in Cinisello Balsamo).

The first data for 2023 presented by ARPA Lombardia at the Air Quality Steering Committee in Lombardy on 27 March 2024 show a better situation than in 2022. However, the daily limit value for PM10 has not yet been respected in Milan at two out of four stations, and in all of Lombardy only three stations have exceeded the annual nitrogen dioxide limit value, one of which in Milan.

The legal framework thus outlined is set to deteriorate. In fact, following the publication in September 2021 of the new Air Quality Guidelines by the World Health Organisation, pursuant to which the guide values for air particulate matter and nitrogen dioxide were revised downwards, the European Parliament and the Council of the European Union, acting on a proposal from the European Commission, approved in April 2024 a new Air Quality Directive providing for the introduction in 2030 of limit values for air pollutants that



are much lower and stricter than the current ones, both for nitrogen dioxide and for air particulate matter: for example, the Limit Value for the average annual PM10 concentration will decrease from 40 to 20 μ g/m³, the one for the average annual concentration of PM2.5 from 25 to 10 μ g/m³, the one for the average annual nitrogen dioxide (NO₂) concentration from 40 to 20 μ g/m³.

2. LOCAL REGULATION FOR IMPROVING AIR QUALITY

In view of the situation outlined in the previous paragraph, the Milan Municipal Authority has adopted specific local measures aimed at reducing emissions of air pollutants, with specific reference to air particulate matter and nitrogen oxides. Fine air particulate matter has been recognised as being definitely carcinogenic to humans, and the combined action of air particulate matter and nitrogen dioxide during the winter period has a greater impact on human health. In addition, ozone is a secondary pollutant (i.e. generated in the atmosphere as a result of chemical and physical transformation of gases called 'precursors') whose concentrations cannot be reduced decisively by exclusively local actions.

For these reasons, the Municipal Authority has focused its attention primarily on air particulate matter and nitrogen dioxide, proposing the objective of reducing air emissions. Indeed, it has already been demonstrated that the increased local effectiveness in terms of limiting air particulate matter concentrations is achieved by reducing emissions of primary particulate matter, meaning particulate matter emitted into the air already in the form of fine dust. In the case of nitrogen oxides, the reduction of their emissions not only leads to a decrease in nitrogen dioxide (NO₂) concentrations but also helps to contain secondary particulate matter formation for which nitrogen oxides are a precursor.

The actions taken by the Milan Municipal Administration in the field of limiting local air emissions are numerous and, just to mention the main examples, range from the regulation of road traffic of the most polluting vehicles (for example, the Limited Traffic Areas "Area B" and "Area C") to the regulation of urban activities with the greatest emission impact.

In particular, the latter measure was approved by Municipal Council Decision No 56 of 19/11/2020 '*Approval* of the Air Quality Regulation of the Municipality of Milan', in turn, forming part of the Milan Air and Climate Plan, which was finally approved by the Municipal Council by Council Decision No 4 of 21/02/2022.

At the time of its publication, the above mentioned Air Quality Regulation of the Municipality of Milan provided for the regulation of various anthropogenic activities other than road traffic, including (Article 3) certain types of civil heating systems with a rated thermal input of less than 3 MW (within the meaning of Title II, Part Five of Legislative Decree No 152/2006, as amended).

This provision was challenged before the Tribunale Amministrativo Regionale per la Lombardia (Regional Administrative Court, Lombardy) and an appeal was lodged with the Council of State against its Sentence No 2710 of 6 December 2021, in which the applicants' arguments were rejected. By Sentence No 9669 of 4/11/2022, the Fourth Chamber of the Council of State upheld part of the applicants' arguments and, overturning the judgment of first instance, annulled Article 3 of the aforementioned Regulation, which, therefore, at the time of drafting this report is not in force.

It seems appropriate to analyse the reasons for the outcome of such judicial proceedings.

It should be pointed out that the applicants' arguments were rejected in relation to both the alleged lack of power of the Municipal Authority (TAR 2710/2021, § 2.1) and the alleged unreasonableness of the choice made by the Municipality of Milan to identify certain types of installations as targets of the prohibition (TAR 2710/2021, § 3.3; Council of State 9669/2022, § 7.2).

The Council of State, on the other hand, accepted the appellants' arguments only in so far as '*the contested provision clearly contains a draft technical regulation*' (Council of State No 9669/2022, § 7.4) and, as such, is governed by Directive (EU) 2015/1535 of 9 September 2015 (transposed into law by Legislative Decree No 223



of 15 December 2017 amending Law No 317 of 21 June 1986). The above-mentioned legislation on 'technical regulations' within the Community provides that a draft technical regulation must be notified in advance to the European Commission. Since no such prior notification had been made to the Commission, the Council of State found the contested Article 3 of the Milan Air Regulation to be unlawful, adding that '*if it considers it appropriate, the Municipality of Milan may readopt the same provision in accordance with EU and national legislation and the grounds for the present judgment*' (Council of State 9669/2022, § 9).

This report therefore sets out the reasons why the Milan Municipal Authority considers it appropriate to repropose the annulled regulations concerning certain types of thermal installations in Milan, which have already been considered logical and reasonable in two instances, and which have been updated as appropriate in relation to the evolution of the context of the European guidelines on energy strategies, current sectoral legislation and scientific knowledge and technological progress.

We also set out the technical reasons why it is appropriate to amend the current Article 4 'Combustion of woody biomass for production and catering activities' and to adopt a new regulatory measure concerning non-road mobile machinery with low-power engines.

3. CIVIL HEATING SYSTEMS

3.1 OBJECTIVE

As part of the strategies to reduce atmospheric emissions from heat generators for civil heating systems, prioritise intervention on heat generators powered by fuels with a high local environmental impact.

3.2 TECHNICAL AND SCIENTIFIC REASONS

The gradual improvement in the quality of energy fuels in the domestic sector and combustion techniques in recent years, together with the transition to fuels with a lower environmental impact, has led to a gradual decrease in the emission contribution of combustion in the domestic sector in Milan. However, the latest data on the regional inventory of atmospheric emissions for 2021 also show that combustion in the non-industrial sector (excluding the specific activity of pizzerias with wood-fired ovens) contributes a non-negligible share of the overall emissions of the city of Milan of 6 % for PM10, 8 % for PM2.5 and 19 % for nitrogen oxides (NOx) (data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review).



Figure 3.1. Percentage breakdown of PM10 air emissions in Milan



Fuochi d' artificio 2%	Fireworks 2 %
Combustionedi tabacco 7%	Tobacco combustion 7 %
Combustionenon industrial 6%	Industrial combustion 6 %
Uso solvent 7%	Solvent use 7 %
Trasportosustrada 44%	Road transport 44 %
Altre sorgenti 12%	Other sources 12 %
Pizzerie 13%	Pizzerias 13 %
Industria 9%	Industry 9 %

Data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review



Figure 3.2. Percentage breakdown of PM2.5 air emissions in Milan



Fuochi d' artificio 2%	Fireworks 2 %
Combustionedi tabacco 9%	Tobacco combustion 9 %
Combustionenon industrial 8%	Industrial combustion 8 %
Uso solvent 7%	Solvent use 7 %
Trasportosustrada 38%	Road transport 38 %
Altre sorgenti 13%	Other sources 13 %
Pizzerie 15%	Pizzerias 15 %
Industria 8%	Industry 8 %

Data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review



Figure 3.3. Percentage breakdown of NOx air emissions in Milan



Altre sorgenti 10%	Other sources 10 %
Combustionenon industrial 19%	Industrial combustion 19 %
Industria 4%	Industry 4 %
Trasportosustrada 67%	Road transport 67 %

Data source: INEMAR ARPA Lombardia - Emissions in Lombardy in 2021, version under public review

3.2.1 Diesel-powered heat generators

The traditional fuels most used in Milan for domestic heating and, more generally, for non-industrial combustion are natural gas and, in a minority share, diesel. Thanks to the gradual improvement in the quality of thermal energy fuels and combustion techniques over the last decades, the emission differences between different types of heating systems have narrowed, but diesel is still characterised by air emissions that tend to be higher than natural gas.

This is publicly visible in the latest European Environment Agency (EEA) Air Pollutant Emission Inventory Guidebook 2023. By way of example, the following table shows the EEA Guidebook emission factors for a residential heating system with a capacity not exceeding 50 kW thermal power.



Table 1 Emission factors for residential combustion systems with a capacity of less than 50 kW

	PM10 (g/GJ)	NOx (g/GJ)
Diesel	1.5	69
Natural gas	0.2	42

Data source: EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023 - Small combustion

In addition, for PAHs (Polycyclic Aromatic Hydrocarbons, compounds that are toxic/carcinogenic to humans), the same official literature shows very important differences between diesel and natural gas: for example, for the same category of heating systems mentioned above, for Benzo(a)pyrene the emission factor is 0.56 ug/GJ for natural gas versus 80 ug/GJ for diesel.

These differences between the two analysed fuels also have direct experimental confirmation. The main evidence that emerged after two major measurement campaigns are set out below.

A measurement campaign on real air emissions from heating systems for civil use powered by conventional fuels, carried out in 2005 by the then Stazione Sperimentale per i Combustibili (now Innovhub) on behalf of the Ministry of the Environment, showed that the atmospheric dust emitted by heating systems was, in the laboratory and under optimal combustion conditions, on average below the detectability threshold with both diesel and natural gas. However, the measurements carried out on installations on-site (and thus under real-life conditions) showed a difference rather similar to that reported by the EEA Emission Inventory Guidebook: 0.29 g/GJ atmospheric particulate matter and 42 g/GJ nitrogen oxides for natural gas, 1.19 g/GJ atmospheric particulate matter and 62 g/GJ nitrogen oxides for diesel. The study of the then Stazione Sperimentale per i Combustibili showed that, in real use, lack of alignment with optimal combustion conditions has more serious consequences for a diesel-powered boiler than a natural gas-powered boiler.

More recently, between 2021 and 2022, an extensive measurement campaign, carried out on-site and under real-life conditions, was organised in Milan on the emissions of civil heating systems powered by different fuels and of diverse capacities, totalling approximately 100 heat generators, and also involving an accredited UNI CEI EN ISO/IEC 17025:2018 laboratory for measurements. Part of the measurement campaign was carried out as part of a European project called LIFE-REMY – Reducing Emission Modelling uncertaintY (LIFE20 PRE/IT/000004 - https://liferemy.eu/) and the results obtained were reported in the final project documentation (Deliverable 1.2 - *Emission factor uncertainty from domestic heating systems report*).

As regards diesel-powered heat generators, the measurement campaign showed a significant variability in the emission levels, with an average value of air dust emissions in line with expectations, if not slightly higher (2.9 g/GJ, similar to the emission factor provided by the aforementioned EEA Emission Inventory Guidebook 2023 for non-residential combustion systems of between 50 kW and 1 MW) and lower than expected for nitrogen oxides (46 g/GJ).

However, during the same measurement campaign it was pointed out that NOx emission factors for natural gas-powered heating systems were also lower than expected: 34 g/GJ for heat generators using traditional technology (the use of which is now limited) and only 20 g/GJ for heat generators using condensation technology.

In conclusion, the experimental evidence confirms what is stated in the accredited European bibliography, namely that, compared to methane gas, the atmospheric emissions of heat generators using diesel are between 5 and 10 times higher as regards atmospheric dust and approximately two times higher as regards nitrogen oxides (NOx).

Moreover, the proposed date for introducing a ban on the use of diesel (October 2024) coincides with the intentions signed on 4 June 2019 by the Presidency of the Council of Ministers, the Ministry of the



Environment, the Ministry of Economy and Finance, the Ministry of Economic Development, the Ministry of Infrastructure and Transport, the Ministry of Agricultural Policy, the Ministry of Health, the Regions and the Autonomous Provinces under the Memorandum of Understanding 'Action Plan for the Improvement of Air Quality', which, in Action Scope 4 (Domestic heating), states as follows: '*introduce, as of 2024, in areas affected by air quality problems and where the natural gas distribution network is available, a ban on the use of diesel-powered heating installations, both public and private'*.

3.2.2 Solid biomass-powered heat generators

As regards PM10 emissions from the city of Milan, the largest contribution among civil heating systems is that of heat generators powered by biomass fuels, which (according to the above mentioned data from the 2021 INEMAR regional emissions inventory) contribute 5 % of the total PM10 emissions in Milan (more than twice all the heating installations in Milan powered by natural gas or diesel).

Indeed, although there are a limited number in the municipality of Milan, older technology solid biomass thermal installations are characterised by very high emission factors compared to liquid and gaseous fuels: for air particulate matter, emissions from biomass installations can be up to 860 g/GJ for an open fireplace, are around 380-480 g/GJ for high-efficiency stoves or conventional woody biomass boilers, and fall to 60-80 g/GJ for non-high performance pellet stoves (data source: EEA Emission Inventory Guidebook 2023).

The pellet-powered heat generators with the best technology (classified as 5 stars in accordance with Decree No 186 of the Ministry of the Environment of 7 November 2017 laying down rules governing the requirements, procedures and skills for the issuing of a certification of heat generators powered by solid biomass fuels) are characterised by lower air emissions of PM10, around 8-10 g/GJ (data source: INEMAR ARPA Lombardia). These are lower emission values, but still higher than the environmental performance of a natural gas heat generator: for example, the aforementioned Ministerial Decree No 186/2017 provides for a limit for the concentration of particulate matter in pellet boiler fumes or 5 star chips of 10 mg/m³ while heat generators powered by gaseous fuels, or also liquid, operating correctly are characterised by dust concentrations in fumes below 1 mg/m³.

If the pellet thermal installation is equipped with an additional dust abatement system, air particulate emissions are generally lower and can be estimated at around 1-2 g/GJ (REMY project, Deliverable 1.2 — *Emission factor uncertainty from domestic heating systems report*), but at present, the overarching legislation does not require its adoption.

Moreover, even in the case of better technology and the adoption of dust abatement systems, at the moment nitrogen oxide emissions remain high and, on average, higher than those of diesel heating systems (*ibid*.).

For these reasons, it seems appropriate to add to the ban on the use of diesel for heating also a general ban on the use of biomass fuels for civil heating systems, at least as long as the legislation in force does not make it possible to univocally identify 'high environmental quality and high-efficiency installations' (as defined in the Integrated National Energy and Climate Plan – December 2019), meaning installations with an environmental performance (in relation to local impact) comparable to those powered by natural gas, and at least as long as concentrations of particulate matter and nitrogen oxides in Milan continue to pose an environmental concern.

However, we propose not to impose this prohibition on heat generators from civil heating systems powered by firewood or biomass fuels used for own consumption and resulting from crop cuts in relevant wooded areas, within the meaning of the legislation in force (Regional Law No 31 of 5 December 2008, as amended, and Regional Regulation No 5 of 20 July 2007, as amended), for the reasons set out in paragraphs 3.2.4 and 3.2.5 below.



3.2.3 Medium-sized civil heating systems

According to Article 283(1)(d(a)) of Legislative Decree No 152/2006, 'medium-sized civil heating system' means a 'civil heating system with a capacity of 1 MW or more'. Since they fall within the scope of Title II, Part 5 of Legislative Decree No 152/2006 and therefore fall within the scope of 'civil heating systems with a rated thermal input of less than 3 MW', medium-sized civil heating systems mean systems with a rated thermal input equal to or greater than 1 MW and less than 3 MW.

Article 286 of Legislative Decree No 152/2006 provides that medium-sized civil heating systems must be subject to regular checks on compliance with the relevant emission limit values.

In addition, Legislative Decree No 152/2006 provides that all civil heating systems with a rated thermal input of more than 0.035 MW using biomass are to be subject to regular monitoring of compliance with the relevant emission limit values. However, this provision must be examined in the light of the current regional legislation, in particular Regional Council Decision No 5360 of 11 October 2021, which provides ('10. Requirements for thermal installations') that only 'civil heating systems with a rated thermal input exceeding 500 kW are subject to the emission limits laid down in Article 286 of Legislative Decree No 152/2006', as for those with a rated thermal input not exceeding 500 kW, '... the environmental certification referred to in Ministerial Decree No 186/2017, issued by a notified body and made available by the manufacturer' is sufficient.

Finally, Legislative Decree No 152/2006 provides that the measured values, the methods used and the name of the person who carried out the measurement must be attached to the installation booklet.

In view of the above, in the context of the local policies put in place by the Milan Municipal Authority on the reduction of emissions of nitrogen oxides and particulate matter, and taking into account the fact that the Milan Municipal Authority is the competent authority in its territory for the checks on civil heating systems provided for in the legislation in force, it is appropriate to propose that it be made compulsory to transmit to the municipal offices the measured emission values of the medium-sized civil heating systems fuelled with any fuel and of civil heating systems with a rated thermal input exceeding 500 kW powered by biomass (as provided for in Regional Council Decision No XI/5360 of 11 October 2021, as amended), detected in the context of the checks provided for in Title II, Part 5 of Legislative Decree No 152/2006, as amended.

In fact, pursuant to Article 288(8b) of Legislative Decree No 152/2006, 'The documents attached to the installation booklet shall be kept for at least six years. These documents shall be made available without undue delay to the competent authority requesting their acquisition. The competent authority requires the acquisition of the documents for control purposes....'.

3.2.4 Overarching policy framework

A local ban on the use of liquid and solid heating fuels seems consistent with the national and regional framework.

Indeed, as we have seen above, the ban on the use of diesel for heating purposes had already been the subject of agreement between the Government and the Regions in the 'Action Plan for the Improvement of Air Quality' of 2019.

As regards biomass thermal installations, the above-mentioned national plan states: 'The development of the thermal RES sector is in fact affected by the environmental problem linked to the emission impacts of existing solid biomass heating plants. Therefore, the installation of new biomass heating systems will need to be guided in such a way as to favour high environmental quality and high-efficiency plants, also considering the possibility of introducing restrictions on ex-novo installations in areas with critical air quality situations'.



The analysis carried out by the current PRIA – Regional Air Quality Action for the Region of Lombardy (updated as at 2018) is entirely similar, which, under the heading 'Stationary resources and rational use of energy – Renewable energy sources', reads as follows:

'For energy production with low or zero emissions of air pollutants, regional action is aimed at increasing the use of renewable energy sources that do not include woody biomass. Therefore, the low or zero emission renewable sources that can be developed appear to be: solar photovoltaic, solar thermal, closed-cycle or open-cycle water heat pumps, hot air-powered and gas-powered'.

Also from a technological point of view, the RSE – Ricerca Sistema Energetico (Energy System Research) – dossier No 09/2019 'Energy from woody biomass', addresses the issue of the use of woody biomass for energy purposes and states that local pollution issues can be addressed only to medium-large sized combustion installations: 'Local pollutants: this is a major problem in the case of thermal uses in small boilers, stoves and fireplaces, for which it is difficult to imagine effective abatement solutions. On the other hand, it is much less significant for medium-large sized combustion installations (typically cogenerative) (a few thermal MW): the use (now mandatory pursuant to the legislation in force) of bag filters is capable of drastically reducing emissions of fine dust, while the new rules introduced in many Italian regions are leading operators to introduce nitrogen oxide abatement systems, with measures that can be applied easily and at low cost'.

Therefore, the proposal to introduce a ban on the use of biomass fuels in civil heating systems with a rated thermal input of less than 3 MW (and in similar thermal installations according to the regional legislation in force) seems appropriate, taking into account that civil heating systems with a rated thermal input of 3 MW or more (covered by Title I, Part 5 of Legislative Decree No 152/2006, as amended) are subject to specific authorising procedures for the release of air emissions, under which the environmental compatibility of the thermal system and its air pollutant abatement equipment can be verified..

From the point of view of European and global energy governance policies, policies to reduce air emissions of local pollutants from domestic combustion installations must now deal with the guidelines on climate change in an increasingly stringent manner.

The European Union's long-term greenhouse gas reduction strategies (see, for example, COM(2018) 773 final of 28.11.2018 "A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy" and Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action) already set 2030 targets on energy efficiency and reduction of greenhouse gas emissions with the ultimate aim of achieving net zero greenhouse gas emissions in the Union by 2050 and the subsequent achievement of negative emissions.

This European strategy was recently reinforced with the REPowerEU Plan (COM(2022) 230 final), published following the outbreak of the Russia-Ukraine war. This Plan strongly reiterates the intention '... of achieving at least -55 % net GHG emissions by 2030 and climate neutrality by 2050 in line with the European Green Deal'. Europe intends to pursue this through a number of broad policy lines such as: energy savings, diversification of energy imports and replacement of fossil fuels by accelerating Europe's clean energy transition. From the latter perspective, the REPowerEU Plan attaches great importance to technologies such as solar photovoltaic, heat pumps, hydrogen uptake and the use of biomethane. As regards bioenergy more generally, the REPowerEU Plan states as follows: 'Prioritizing use of non-recyclable biomass waste and agricultural and forest residues will ensure a sustainable energy production that can contribute to the REPowerEU objectives'.

The proposal for an Air Quality Regulation in Milan takes note of this strategic approach and, despite a local ban on the use of biomass for energy production purposes (as already explained in point 3.2.2 above), provides that heat generators from civil heating systems powered by firewood or biomass fuels resulting from crop cuts in wooded areas and used for self-consumption are not subject to the ban on use. In other words, the use of forest residues (as directed by the REPowerEU Plan) is allowed, but limited to what is produced on site, with a statement that the biomass used is actually produced locally; this statement is already contained in



the ordinary regional forest felling application procedures. The reason for this proposal is linked to principles of environmental sustainability, as this would balance the production of air pollutants (both local and climate-changing) during energy recovery with the forest removal from which biomass originates.

The use of biomass from areas far from the place of production would lead to excess atmospheric emissions, not compensated by removals, both during energy recovery and transport from the place of production to the place of consumption. For the latter, see also the paragraph below.

Therefore, the strategy outlined in the proposal for a Regulation on air quality in Milan seems appropriate both with the need to reduce emissions of the main local air pollutants (particulate matter and nitrogen oxides) as soon as possible, limiting the use of fuels with a high local environmental impact, and with the overarching strategies on energy production.

3.2.5 Logistical aspects

A local ban on the use of liquid and solid heating fuels, with the exception of those produced locally and used for own consumption, also appears to be consistent with the general municipal authorities' strategies on reducing local emissions of air pollutants.

As shown above in Figure 3.1 to Figure 3.3, the main source of local pollutants in Milan is road traffic.

For a long time, the municipal administration has implemented strategies and planning activities for road transport to reduce its environmental impacts. The SUMP – Milan's Sustainable Urban Mobility Plan (Municipal Council Decision 38/2018), for example, sets as one of its objectives: 'creating the conditions to improve sustainable accessibility to the city, while reducing vehicle traffic and the number of cars on public land' for the purpose of 'making a decisive contribution to the improvement of the urban environment, reducing air pollution and noise, restoring the usability of public spaces and enhancing, also economically, the city's historical and architectural heritage' (SUMP Milan, paragraph 1.2).

The most recent CAP – Air and Climate Plan (Municipal Council Decision 4/2022) reinforces the above policy line, with the objective of achieving a 'net reduction in personal mobility using motor vehicles for private use' by 2030 (Objective 2.1).

In this context, it seems fully appropriate to limit the use of liquid and solid heating fuels, the supply of which requires the use of means of road transport: by encouraging as much as possible the use of fuels supplied by pipeline or on-site products, road traffic induced by the transport of combustible materials is reduced.

3.3 IMPACT ASSESSMENTS

3.3.1 Environmental impacts

From an environmental point of view, the proposed prohibitions and regulations on civil heating systems will allow for a reduction in emissions of primary air particulate matter and nitrogen oxides. In fact:

- based on data from the air emissions inventory from the city of Milan (data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review), the potential transformation of diesel thermal installations into methane gas with condensation boilers (as a minimum conversion option) would allow a reduction of approximately 3 tonnes/year of PM10 and from 10 to 20 tonnes/year of total nitrogen oxides (NOx);



- based on the same data, the potential transformation of biomass thermal plants into methane gas with condensation boilers (as a minimum conversion option) would allow a reduction from 20 to 25 tonnes/year of PM10 and by about 5 tonnes/year of total nitrogen oxides (NOx);
- based on the average consumption of diesel and biomass heat generators, and taking into account that almost all diesel heat generators power whole buildings (> 35 kW) and that around half of the total installed capacity in Milan of biomass heat generators powers whole buildings, while the remaining part of biomass installations are heat generators of less than 35 kW, it can be estimated that the annual fuel supply for diesel or biomass thermal installations in Milan is required to travel around 60 000 to 90 000 km/year with trucks and between 10 000 and 30 000 km/year with light motor vehicles within the city, which would correspond to less than 0.1 tonnes/year of both PM10 and NOx, provided that Euro 6 emission class vehicles are used.

However, the emission contribution linked to the use of locally produced forest residues, which according to this proposal would be allowed, should be excluded from the above air emission reductions.

According to data from the Lombardy Region relating to the harvesting of woodland, between 2011 and 2022 an average of around 350 tonnes per year of wood cut in wooded areas were declared in the municipality of Milan. Assuming a calorific power of 18 MJ/kg (source: EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023 – 1.A.4 Small combustion) and assuming that forest residues are used by heat generators of at least 5 stars (pursuant to Ministerial Decree 186/2017), an annual atmospheric emission of less than 0.1 tonnes/year of PM10 and approximately 0.6 tonnes/year of NOx can be estimated.

In conclusion, the proposed regulation on civil heating systems will allow an overall reduction in annual air emissions of at least 23 tonnes/year of PM10 and at least 15 tonnes/year of total nitrogen oxides, representing 4 % and 0.3 %, respectively, of the total annual emissions of the city of Milan (data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review). If the conversion of banned thermal installations led to a shift to zero-emission technologies, the reduction of emissions would be even higher.

3.3.2 Socio-economic impact

This paragraph contains some additional considerations in relation to the need to replace an existing generator with another permitted technology, if it was subject to the prohibitions on use proposed here.

First of all, the regulatory proposal presented here provides for the possibility that it is not technically possible to replace or adapt the heat generator.

In this case, the proposal provides that, in the event that there are no alternative thermal installations with heat generators powered by permitted fuels, the heat generator is excluded from the prohibition on use on the condition that a certified technical report drawn up by an authorised technician (within the meaning of the definition in Regional Council Decision No XI/3502 of 5 August 2020, as amended, and Regional Council Decision No XI/5360 of 11 October 2021, as amended) is submitted, demonstrating the technical impossibility of replacing or upgrading the installation.

Therefore, no impact on thermal installations is expected if the technical problems of replacement or adaptation are insurmountable and are objectively documented.

In addition, thermal installations installed in non-methane fractions are also excluded from the prohibition, i.e. where there is no possibility of connection to the methane gas distribution network.

With regard to diesel heat generators not covered by the case of non-replacement or adaptation, the proposed decommissioning or replacement of heat generators not meeting the required requirements is in line with the need to pursue energy savings and the replacement of fossil fuels set out in the REPowerEU Plan. In fact, this



regulatory proposal provides for the start of this process starting with heat generators with the greatest environmental impact.

As of February 2024, 635 diesel-powered thermal installations were active in Milan; on that date, 67 % of diesel heat generators were over 15 years old, and almost all of them (99 %) had been installed before 2019, i.e. before the entry into force of the provisions contained in the aforementioned Regulation (EU) No 813/2013. Therefore, they use outdated technology with regard to the energy and environmental performance of modern heat generators and do not appear to be compatible with the requirements of energy efficiency and energy savings required by the European strategic guidelines or with those of an environmental nature, contributing to non-compliance with the limit values on air quality and hindering the relevant remediation process that the European Court of Justice requires to be compulsorily pursued.

In addition, we have previously seen that around half of the total installed capacity of biomass heat generators in Milan is small-sized generators (< 35 kW), such as stoves, fireplaces, inserts, etc. If there are no alternative thermal installations with heat generators fuelled with eligible fuels, the biomass heat generator would not be subject to the prohibition on use; otherwise, its decommissioning should not have any particular impact, as it is a heat generator additional to that permitted by local regulation.

In the case of biomass heat generators for whole buildings, where they are not covered by the exclusion cases already described above, the proposed regulation provides for a gradual decommissioning from the 10th year from the installation, taking into account both the fact that the average age of these generators is lower than diesel generators and the economic incentives they have been subjected to.

Furthermore, it should be recalled that this proposal does not provide for an absolute ban in the strict sense of the use of biomass for the production of heat, as it allows for the use of forest residues produced on site. In other words, the use of a fuel (even renewable) with a higher environmental impact than other fuels is permitted only in proportion to the production capacity in the territory in which it is used. This approach, as well as ensuring that the supply chain is truly 'net zero' in terms of CO_2 (carbon dioxide), and thus fully in line with the European guidelines for promoting zero-impact energy production and carbon neutrality, also implies mitigating the effects of local pollutant emissions: in scientific literature, it is well known that vegetation plays a certain role in absorbing and removing air pollutants and, therefore, the wooded areas from which the biomass used has been extracted are able to remove some of the pollutants produced during its combustion.

4. BURNING OF WOODY BIOMASS FOR PRODUCTION AND CATERING ACTIVITIES

4.1 OBJECTIVE

To reduce air particulate matter emissions from production and catering activities using solid biofuels.

4.2 TECHNICAL AND SCIENTIFIC REASONS

For a long time, the official data from the regional air emissions inventory by INEMAR Lombardia have indicated that the emissions contribution of primary air particulate matter in Milan from catering activities using wood ovens is the most significant one after vehicle traffic. This was also confirmed by the latest version of INEMAR Lombardia for the year 2021; see in this regard Figure 4.1 below (data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review).





Figure 4.1. Percentage breakdown of PM10 air emissions in Milan by emission source

Data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review For these reasons, the aforementioned Municipal Council Decision No 56/2020 had already introduced, in the 'Air Quality Regulation of the Municipality of Milan', specific rules on food production and catering activities using woody biomass.

Those rules were based on the technical and scientific information available and consolidated at the time, which, however, was incomplete as regards both the emission performance of these types of installations and the number of activities using solid biofuels for food preparation and present in the municipality of Milan.



From the point of view of consolidating information on the emission performance of wood ovens for cooking food, the Milan Municipal Authority, including through AMAT, has actively participated in at least two very robust scientific activities, namely the LIFE-REMY European Project (<u>https://liferemy.eu/</u>) and the national PROFILE PIZZA project (<u>https://www.innovhub-ssi.it/progetti/progetto-profile-pizza-.kl</u>), the latter coordinated by Innovhub SSI Stazioni Sperimentali per l'Industria, a limited company wholly owned by the Milan Monza Brianza Lodi Chamber of Commerce. The results of these two experiences, which are being consolidated, will soon make it possible to quantify the unit emission contribution of these installations more steadily.

On the other hand, as regards the number of activities in the municipality, Municipal Council Decision No 56/2020 had already introduced an obligation, for the production and catering activities in the municipality of Milan using solid biomass fuels, to self-declare certain essential information on the activity itself, such as the characterisation of the type of installation used, or the possible presence (and effectiveness) of pollution abatement systems (Article 4(1)).

A precise deadline was set for the obligation to send the above information relating to existing activities to the Milan Municipal Authority, i.e. by 1 March 2021. By this date, a dedicated IT form, which is still active, had been prepared on the website of the Municipality of Milan to facilitate the electronic transmission of information.

However, the high turnover in the ownership of the management of these catering activities, together with the challenges caused by the COVID-19 pandemic for most of the years 2020 and 2021, has created significant difficulties in fulfilling this obligation.

However, while there is still a need to have a realistic quantification of the number of activities using solid biofuels for food preparation and present in the municipality of Milan, it is proposed to confirm the obligation to provide the above information, as provided for in Municipal Council Decision No 56/2020, while removing the deadline and explicitly specifying the electronic means of transmission.

4.3 IMPACT ASSESSMENTS

Since Article 4(1) of the current Air Quality Regulation of the Municipality of Milan already provides for the obligation to transmit the information referred to in the previous paragraph for the activities in place, and since the appropriate forms are already in place on the website of the Municipality of Milan for the electronic transmission of information, we believe that the proposed regulatory amendment does not have any socio-economic impact and reinforces the municipal administration's objective of strengthening local policies to reduce the environmental impact of this source.

5. NON-ROAD MOBILE MACHINERY USING LOW-POWER ENGINES

5.1 OBJECTIVE

To reduce air emissions from low-power non-road mobile machinery used in Milan.

5.2 TECHNICAL AND SCIENTIFIC REASONS

Pursuant to Article 3 of Regulation (EU) 2016/1628 of the European Parliament and of the European Council of 14 September 2016 on 'requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery', 'non-road mobile machinery' means 'any mobile machine, transportable equipment or vehicle with or without bodywork or wheels, not intended for the transport of passengers or goods on roads, and includes machinery installed on the chassis of vehicles intended for the transport of passengers or goods on roads'.



In other words, all mobile machinery not approved as a road vehicle falls within that category.

From the point of view of the air emissions inventory, INEMAR Lombardia groups these sources within the macrocategory 'Machinery and other mobile sources', whose estimated contribution to the city's emission levels is limited (not more than 1 %) for all major pollutants (data source: INEMAR ARPA Lombardia – Emissions in Lombardy in 2021, version under public review).

However, as already technically justified by the preliminary documents of Municipal Council Decision 56/2020 *'Approval of the Air Quality Regulation of the Municipality of Milan'* and as reflected in more detail in the Milan Air and Climate Plan, approved by Municipal Council Decision 4/2022, "proximity" air pollution phenomena can persist locally, meaning air pollution phenomena which, even if they do not pose a problem in a large area, can be significant in terms of local impact.

These phenomena are becoming increasingly important, especially in the context of environmental improvement actions which aim to take action at local level and in the context of a general progressive reduction in air pollution levels, such as the one we recently witnessed (at least for the pollutants on which the Milan Air Regulation focuses).

This is why the current Air Quality Regulation in Milan already lays down rules for certain categories of non-road mobile machinery, namely current generators (generator sets) for itinerant commercial activities (Article 6 – Trade in public areas) and non-road mobile machinery used in construction and work sites (Article 8 – Non-road mobile machinery). Indeed, machinery in that category and equipped with internal combustion engines can remain switched on in the same place for long periods, which could cause problems of local environmental pollution of various kinds (atmospheric, acoustic, etc.), with a non-negligible impact on both operators and other categories of citizens who find themselves close to the switched on machines (customers, residents, etc.). This is particularly true for a city such as Milan, characterised by very weak average winds, where the accumulation of air pollutants is often also very important at local level, especially in areas where urban planning is particularly unfavourable to the dispersion of pollutants.

In line with what has already been approved by Municipal Council Decision 56/2020, and in line with the related environmental objectives of reducing air pollution, it is therefore proposed to supplement the Milan Air Regulation with a new article to regulate non-road mobile machinery equipped with low-power internal combustion engines and other than generator sets for itinerant commercial activities, which are already subject to Article 6 of that Regulation. By way of illustration, this category includes, but is not limited to, for example, vegetation maintenance machinery (such as: brush cutters, lawnmowers, grass trimmers, hedge trimmers and the like) or soil clean-up machinery (such as blowers or similar).

These machines, viewed individually, can be characterised by very high emissions of atmospheric particulate matter and other pollutants, as documented by some scientific work. See, for example, Michal Vojtíšek-Lom et al, 2015 '*Off road combustion engine emission characterisation*', where experimental measurements of air emissions released under real-world conditions of use by certain machinery of this type, such as lawnmowers or weed-eaters, are summarised and from which the following image is taken.



Figure 5.1. Example of atmospheric particulate matter (PM) emissions from certain types of non-road mobile machinery with low-power engines



Lawnmower and weed-eater – test summary (PAH analysis and toxicology assays to follow)



Lawnmower and weed-eater-test summary (PAH	Lawnmower and weed-eater-test summary
analysis and toxicology assays to follow)	(PAH analysis and toxicology assays to follow)
Wolfgarden	Wolfgarden
4-cycle	4-cycle
Briggs&Stratton	Briggs & Stratton
US EPA Stage II	US EPA Stage II
Stiga	Stiga
US EPA Phase 1	US EPA Phase 1
Mid-09's	Mid-09's
Mower	Mower
Weed-eater	Weed-eater
Stihl FS350	Stihl FS350
2-cycle	2-cycle
Pall TX 40 filters 2-44 mg/filter	Pall TX 40 filters 2-44 mg/filter
Quartz fiber filters hundreds mg/filter	Quartz fiber filters hundreds mg/filter
PM [g/h] (mass deposited on filter)	PM [g/h] (mass deposited on filter)
M. Voltisek-Lom; Off-road combustion engine	M. Voltisek-Lom; Off-road combustion engine
emissions characterization	emissions characterization
P4TA-CERTAM International Workshop, Rouen,	
March 25-25, 2015	

Image source: Michal Vojtíšek-Lom et al, 2015 'Off road combustion engine emission characterization'

Such machinery is currently not regulated by Municipal Council Decision 56/2020. In fact:

- Article 6 of the Milan Air Regulation applies to current generators (generator sets) equipped with an internal combustion engine and used for commercial activities in public areas, which are expressly excluded in this proposal because they are already regulated;
- Article 8 of the Milan Air Regulation applies to non-road mobile machinery powered by diesel with a capacity of not less than 19 kW and used on construction and work sites.

The proposal to supplement the current Milan Air Regulation provides for the regulation of non-road mobile machinery with compression-ignition engines (diesel) with a capacity of less than 19 kW and those with positive-ignition engines (petrol, mixture, etc.) of any capacity.

The proposed new regulation follows the same general principles as the current Regulation, i.e. it is based on existing legislation on air emission limits, taking into account that more recent technologies generally have a lower environmental impact than outdated ones, and thus introducing a temporal increase in bans on use starting from the most obsolete technologies.

In addition, the proposal takes into account that European legislation:

 regulated non-road mobile machinery with compression-ignition (diesel) engines with a capacity of less than 19 kW only by Regulation (EU) No 1628/2016, introducing Stage V type approval (which is currently the only one for such machinery);



regulated non-road mobile machinery with positive-ignition engines (petrol, mixture...) initially by Directive 97/68/EC of the European Parliament and of the Council of 16 December 1997, limited to machinery with a net power of not less than 19 kW and introducing Stage I and Stage II type approval. Only subsequently, Regulation (EU) No 1628/2016 also introduced Stage V type approval for non-road mobile machinery with positive-ignition engines for all capacities up to 56 kW.

Finally, within the regulatory framework outlined above, the proposal aligns, where possible, with the deadlines already provided for in Article 8 of the current Milan Air Regulation on non-road mobile machinery for construction and work sites.

In summary, in a context where the use of non-road mobile machinery referred to in this paragraph currently has no local or overarching regulation, the proposal provides for:

- as of 1 October 2025, the prohibition of the use of non-road mobile machinery with positive-ignition engines (petrol, mixture ...) with a net power of less than 19 kW complying with stage I type-approval or earlier. Although Directive 97/68/EC already required Stage II engines to be type-approved in the period from 2005 to 2009, on the basis of the information kindly provided by FederUnaComa National Federation of Manufacturers of Machinery for Agriculture and Gardening and related Components it was necessary to take into account the fact that the transition between Stage I and Stage II engines was more complex. As a first approximation, 31 December 2013 can be considered as the date of last production of Stage I engines, but since it may be easier to refer to the date of construction of the complete machine (as this is found on the marking) for the purposes of verification and control of compliance with regulatory provisions, it was preferable to refer to the deadline of 31 December 2014. Given the potential difficulties that may be encountered in obtaining information on the exact type-approval stage, especially for older mobile machinery, the regulatory proposal introduces the above-mentioned date as a dividing line in determining whether or not the mobile machinery is subject to a ban on use, should the type-approval stage for atmospheric emissions not be available;
- as of 1 October 2030, the prohibition of the use of non-road mobile machinery with positive-ignition engines (petrol, mixture ...) with a net power of less than 19 kW complying with stage II type-approval or earlier. For reasons entirely similar to those already set out in the preceding paragraph, if the type-approval stage for atmospheric emissions is not available, reference will be made to 30 June 2021 as the date of construction of the complete machine by which it is to be considered to be subject to the prohibition on use;
- at the same time, a prohibition on the use of non-road mobile machinery with compression-ignition (diesel) engines with a net power of less than 19 kW and not complying with Stage V type-approval or later is again proposed as 1 October 2030. As mentioned above, for such non-road mobile machinery, the legislation in force does not provide for any other type-approval stage;
- as of 1 October 2035, the prohibition of the use of non-road mobile machinery with positive-ignition engines (petrol, mixture ...) with a net power of less than 19 kW and a cylinder capacity of less than 50 cc, complying with stage V type-approval or earlier. On the basis of the current overarching regulatory framework, as no type-approval stage subsequent to Stage V is currently foreseen, this wording means that if no other new type-approval stage is introduced by 1 October 2035, non-road mobile machinery of this type can no longer be equipped with positive-ignition engines. Given the good growth in battery-powered gardening equipment in recent years, such as weed-eaters, chainsaws, pole-mounted powered pruners, lawnmowers, blowers/vacuum devices or hedge trimmers (+ 48 % nationwide sales in 2020, + 36 % in 2021) and the increasing supply of such products on the market, the ban should facilitate the transition to full electric in this sector. On the basis of sales data for 2022, the equipment listed above totalled around 87 % of the total 2022 sales of garden machinery in the Metropolitan City of Milan, thus confirming the general growth of battery-powered electric machines in the sector;



- as of 1 October 2039, the prohibition of the use of non-road mobile machinery with positive-ignition engines (petrol, mixture ...) with a net power of not less than 19 kW and not complying with stage V type-approval or later. Again, for such non-road mobile machinery, the legislation in force does not provide for any other type-approval stage. 2039 was chosen in line with the deadlines already in force for non-road mobile machinery with a capacity of not less than 19 kW and used on construction and work sites.

In short, the purpose of the proposal is to have, by 2039, all non-road mobile machinery with a net power of less than 19 kW, all non-road mobile machinery with positive-ignition engines (petrol, mixture ...) with a net power of not less than 19 kW and all non-road mobile machinery with compression-ignition (diesel) engines with a net power of not less than 19 kW used on construction and work sites, with at least stage V type-approval (or later, where introduced by overarching legislation), or electrical.

A simplified timetable for the proposed temporal progression of the rules is set out below.

Figure 5.2. Timetable summarising the progression of the prohibitions provided for in the proposed regulation



5.3 IMPACT ASSESSMENTS



As we have seen

above, from the overall perspective of the city as a whole, the expected benefit in terms of reducing air emissions should not be particularly high.

At the same time though, it has also been seen that in reality the machinery covered by the regulatory proposal can have a rather high local environmental impact, especially if it is equipped with diesel- or mixture-powered engines and outdated technology, which could have a negative impact on operators using the appliance and on citizens in the vicinity.

To have an idea of what the equivalent impact of these machines could be, based on the emission factors provided by the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023 for activity 1.A.4 '*Non-road mobile machinery*', one hour of use of a weed-eater with a two-stroke engine (i.e. powered by a mixture) with Stage II type-approval is equivalent, from the point of view of PM10 emissions, to the consumption of approximately 300 cigarettes.



In several cities in North America, the environmental sustainability of the use of motorised blowers to remove leaves from the soil has been discussed, and the arguments are sometimes also based on considerations similar to the one set out above. For example, the Respiratory Health Association states as follows: '... using a two-stroke gas-powered leaf blower for 30 minutes produces pollutants equal to those generated by driving a Ford F-150 truck 3,900 miles, or as far as from Texas to Alaska'.

Therefore, a significant improvement in 'local' air pollution is expected, bearing in mind that in Milan many such machines are used for the routine maintenance of both public and private green spaces, so close to children's playground areas, residences, etc.

5.3.2 Socio-economic impact

From the point of view of the number of machines potentially concerned by the proposal to supplement the Milan Air Regulation, the impact may not be negligible.

On the basis of the data kindly provided by FederUnaComa – National Federation of Manufacturers of Machinery for Agriculture and Gardening and related Components – and by Comagarden – Garden Machinery Manufacturers – it is estimated that in 2022 the national market for vegetation maintenance machines amounted to around 1 400 000 units, of which 8.6 % (or approximately 82 700 units) were sold in the Metropolitan City of Milan.

Given that the average age of these machines has been estimated at around 10 years and assuming that the geographical distribution of their use can be represented in the first instance by the distribution of the resident population, it can be estimated that the number of non-road mobile green maintenance machines used in Milan is of the order of around 400 000, of which 20-25 % are Stage I or earlier.

In order to take into account the potential impact on the replacement of the machinery fleet, the proposed temporal progression of the bans explicitly took into account the age of the machinery.

As can be seen from the information given in point 5.2 above, prohibitions on non-road mobile machinery with positive-ignition engines with a net power of less than 19 kW of Stage I or earlier are introduced when such machinery is at least 11 years old, or older than or equal to the average age of those machines; in fact, as already mentioned, most of them will be much older.

The same goes for non-road mobile machinery with a net power of less than 19 kW of Stage II or in any case earlier than Stage V, for which the ban of use will enter into force when such machinery is at least 9 years old and its engines have been built at least 10 years prior to the introduction of the ban.

Similar reasoning applies to the remaining proposed bans, considering that, at the time of drafting this report and for some years now, Stage V is the only type-approval category available for sale.

Finally, it is reasonable to assume that the costs of purchasing machinery used by companies or professionals have shorter payback times than those for a private 'hobbyist' citizen. Therefore, companies specialised in processing and activities requiring the use of non-road mobile machinery with low-power engines should be less affected.