



Air Pollution Emergency Schemes (Smog Alerts) in Europe

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Introduction Air Quality in European Cities:

Many areas suffer from serious environmental problems such as air pollution and waste that may cause health problems to the residents. The following document deals with exceptionally high air pollution periods (hereafter, for simplicity: smog) in the cities of Europe caused by nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), and/or particulate matter (PM₁₀; PM_{2,5}). This phenomenon is widespread all over the world, including the European continent.

In cases when smog occurs, on the one hand, the population should be kept informed of possible longer-lasting pollutant exposures and the related health risks. On the other hand, concrete measures should be taken to reduce air pollution. The national and municipal governments try to tackle those problems in multiple ways. This work delivers an overview about the various existing emergency schemes during a smog episode. It describes the limit values (information and alert thresholds) which are defined by responsible entities in various countries in order to initiate protection proceedings. The information threshold reflects a 'level beyond which there is a risk to human health from brief exposure for particularly sensitive sections of the population'. The alert threshold reflects a 'level beyond which there is a risk to human health from brief exposure for the general population'.

When the information threshold is exceeded, national and/or local authorities should inform the public and give advice. When the alert threshold is exceeded, they should take measures to reduce air pollution. However, European legislation does not define those thresholds for air pollutants.¹ Thus, national governments and municipalities have the voluntary opportunity to inform the public and undertake measures. In the following we present the existing warning procedures and emergency schemes in Europe.

¹ The Directive 2008/50/EC sets only, for instance, the PM₁₀ limit on the annual average concentration whereas the value should not exceed 40 mg / m³. Furthermore, the average daily value of 50 mg / m³ may not exceed more than 35 times a year. The European legislation missed the creation of a common standard about information and action guidance when it comes to temporary extremely high pollution exposures.

PM₁₀ INFORMATION AND ALERT THRESHOLD

Country	Warning Service*	National/ Regional Based Warning Implementation**	Information Threshold	Alarm Threshold	Warning Procedure	Reference
Austria (Graz)	Active/ Passive	Regional	50 µg/m ³	75 µg/m ³	Limit has to be exceeded for three days and predicted forecast is not changing the situation	<i>Government of the Land Steiermark</i>
Belgium	Active	National	50 µg/m ³ (weather forecast for the next day)	1 st stage: 70 µg/m ³ 2 nd stage: 100 µg/m ³ 3 rd stage: > 200 µg/m ³	Warning according to a two days forecast provided by IRCEL	<i>Belgian Interregional Environment Agency (IRCEL); Bruxelles Environnement</i>
Bosnia and Herzegovina (Sarajevo)	Active/ Passive	Regional	Pre-Warning: 50 µg/m ³ (weather forecast for the next three days) Warning: 300 µg/m ³	400 µg/m ³ (no expected weather change in the next two days)	Ministry of Physical Planning, Construction and Environmental Protection is responsible for observation	<i>Ministry of Physical Planning, Construction and Environmental Protection of Sarajevo Canton</i>
Czech Republic	Passive	National	100 µg/m ³	150 µg/m ³ /12h	Daily average for two consecutive days at two stations within an area of 100 km ²	<i>Parliament of the Czech Republic</i>
Finland	Active/ Passive	Regional	50 µg/m ³ (weather forecast for the next day)	50 µg/m ³ (value is exceeded since one day)	Weather forecast for one day	<i>Helsinki Region Environmental Services Authority (HSY)</i>
France	Active	National	50 µg/m ³ (weather forecast for the next day)	80 µg/m ³	Three Alarm Stages: 1 st stage: 80 µg/m ³ on an one day forecast or 50 µg/m ³ since two consecutive days + forecast for next two days above the level 2 nd stage: 80 µg/m ³ since two consecutive days + forecast for next two days above the level 3 rd stage: 80 µg/m ³ since four consecutive days + forecast for next two days above the level	<i>Lig'Air – Monitoring the air quality in the Center-Val de Loire region;</i> <i>Atmo Auvergne-Rhône-Alpes - observatory for monitoring air quality in Auvergne-Rhône-Alpes</i>

Germany (Stuttgart)	Active/ Passive	Regional (Baden- Württemberg)		50 µg/m³ (weather forecast for the next two days)	Between 15 th October and 15 th April DWD forecast for at least two days without improvement (no wind, no rain, nightly ground inversion, tight daytime mixture of weather levels →4 of 5 have to be fulfilled) Disadvantage: no exact correlation between weather and air pollution so it is possible that no warning even if high measures Note: Germany in general has no warning procedure and limits where public is informed and steps are undertaken to fight pollution.	<i>Deutscher Wetterdienst (DWD, German Weather Forecast Service)</i>
Hungary	Active	Regional	75 µg/m³	100 µg/m³ (situation is present since two consecutive days and no improvement is expected for the following day)	Weather forecast for two consecutive days	<i>Ministry of Agriculture - State Secretariat for Environmental Affairs Hungary</i>
Italy (Lombardy)	Active	Regional	50 µg/m³	75 µg/m³	For 7 consecutive days and at least two measure stations	<i>Official Bulletin of the Lombardy region</i>
Italy (Piermont Region including Torino)	Active	Regional	50 µg/m³	1st stage 'yellow': 50 µg/m³ for 7 consecutive days 2nd stage 'orange': 100 µg/m³ for 3 consecutive days 3rd stage 'cinnabar red': 150 µg/m³ for 3 consecutive days 4th stage 'red': 180 µg/m³ for 3 consecutive days	Valid until 15 th April 2017 Based on the present situation and the weather forecast for the next two days	<i>Regional Council of Piermont; City of Torino</i>

Luxembourg	Passive	National	50 µg/m³		First alarm in 2017 because 24h value was over 50 µg/m ³ at many stations	<i>Tageblatt Letzeburg</i>
Macedonia	Passive	National	50 µg/m³ (on 5 consecutive days)	100 µg/m³ (on 10 consecutive days)	Information and alarm after counted days of pollution (not regarding to the forecast)	<i>Ministry of Environment and Physical Planning Republic of Macedonia</i>
Norway (Bergen)	Passive	Regional	50 µg/m³	150 µg/m³	Five days forecast provided by Meteorological Institute from November to April Four different levels of pollution (daily value); Green stands for a low pollution level < 30 µg/m ³ , orange for a moderate pollution level 30-50 µg/m ³ , red for a high pollution level 50-150 µg/m ³ , purple for a very high pollution level > 150 µg/m ³	<i>Bergen City Council</i>
Poland (National)	Active	National	200 µg/m³	300 µg/m³	Ministry of Environment; Threshold is provided when value is exceeded on the daily concentration base	<i>Polish Ministry of Environment</i>
Poland (Krakow)	Active	Regional	150 µg/m³ (at all stations)	300 µg/m³ (at one station)	Local Regulation	<i>Municipality of Krakow</i>
Slovakia	Passive	National	100 µg/m³	150 µg/m³	Slovak Hydrometeorological Office (SHMÚ) publishes warnings; The warnings published after two consecutive days with measures in one effected area and there have to be more than 50 % of the stations over the critical value.	<i>Ministry of Environment of the Slovak Republic</i>
Spain (Catalonia)	Active/ Passive	Regional	50 µg/m³	80 µg/m³	When previous day's value of 50 mg/m ³ at one station is exceeded; and 24-hour forecast indicates that levels will remain high.	<i>City of Barcelona</i>

Switzerland	Active	National	75 µg/m ³	1 st alert stage: 100 µg/m ³ 2 nd alert stage: 150 µg/m ³	For at least three consecutive days with no better expected weather forecast; at least two measure stations are affected in one certain area	<i>Swiss Construction, Planning and Environmental Management Conference</i>
UK	Passive	National	76 µg/m ³	101 µg/m ³ (highly polluted)	UK Daily Air Quality Index (DAQI), Weather forecast in order to the air quality system which is based on a ten-level-system (low-very high)	<i>UK Department for Environment, Food and Rural Affairs</i>

Definitions:

* The column ‘Passive/Active’ describes the way in which the public is informed and activities are prescribed by governments or municipalities. ‘Active’ implies a system where the national government has set a limit value where extremely high air pollution (hereafter: smog) is defined as a health risk. In case the limit is surpassed, the authorities must inform the public through various channels (media, public places etc.) and several activities are undertaken to reduce the smog level. ‘Passive’ means prescription on the national level that information must be given to the public in case of smog, but there is no requirement to take concrete steps to reduce the smog. If both ‘active/passive’ are appearing, information and measures are not specified on national level but several regions of the country have created their own regulations.

** The ‘National/ Regional Based Warning Implementation’ means that concrete steps that must be taken by local authorities in the case of smog are defined on national or regional level.

Information Threshold: At this stage it is obligatory to inform the population and make it aware about risks to particularly sensitive groups (children, elderly, patients).

Alert Threshold: At this stage it is obligatory to take concrete steps to reduce smog. The entire population is affected by health risks.

OTHER POLLUTANTS THRESHOLDS (NO₂, O₃, PM_{2.5}, SO₂):

Country	Type of Pollutant	Information Threshold	Alarm Threshold	Reference
All EU countries (UK different)	O ₃	180 µg/m³/h	Level 1: 240 µg/m³/3h Level 2: 300 µg/m³/3h Level 3: 360 µg/m³/3h	
Czech Republic	SO ₂	350 µg/m³/3h	500 µg/m³/3h	<i>Parliament of the Czech Republic</i>
Finland	SO ₂	350 µg/m³/3h	500 µg/m³/3h	<i>Helsinki Region Environmental Services Authority (HSY)</i>
Finland	PM _{2.5}	40 µg/m³/3h		<i>Helsinki Region Environmental Services Authority (HSY)</i>
Finland, Belgium	NO ₂	Communication start 150 µg/m³/3h min. 6h over exceeding on two different measuring stations intensive communication between city and HSY and information to residents: 200 µg/m³/3h for the next two days min. 18h over exceeding on two different measuring stations	400 µg/m³/3h	<i>Helsinki Region Environmental Services Authority (HSY); Bruxelles Environnement</i>
France	NO ₂	200 µg/m³	400 µg/m³/h or 200 µg/m³ (present day + two day forecast)	<i>Lig'Air – Monitoring entity of air quality in the Center-Val de Loire region</i>
Hungary	SO ₂	400 µg/m³/3h	500 µg/m³/3h or 400 µg/m³ (exceeded more than 72 hours)	<i>Municipality of Debrecen</i>
Hungary	NO ₂	350 µg/m³/3h	400 µg/m³/3h or 350 µg/m³ (exceeded more than 72 hours)	<i>Municipality of Debrecen</i>

Macedonia	SO ₂	none	500 µg/m³	<i>Ministry of Environment and Physical Planning Republic of Macedonia</i>
Macedonia	NO ₂	none	400 µg/m³/3h	<i>Ministry of Environment and Physical Planning Republic of Macedonia</i>
Norway	PM _{2,5}	25 µg/m³	75 µg/m³	<i>Bergen City Council</i>
Norway	SO ₂	350 µg/m³	500 µg/m³	<i>Bergen City Council</i>
Norway, Czech Republic	NO ₂	200 µg/m³	400 µg/m³	<i>Bergen City Council</i>
Spain (Barcelona)	NO ₂	Intensive Control: 140 µg/m³ Warning: 160 µg/m³ (one measuring station within one full hour and depending on forecast)	200 µg/m³ (one measuring station within one full hour and depending on forecast)	<i>City of Barcelona</i>
Spain (Madrid)	NO ₂	Pre-warning: 180 µg/m³ Warning: 200 µg/m³ (two measuring stations over 180 µg/m ³ within two full hours within one zone)	400 µg/m³/3h (three consecutive hours within one zone)	<i>City Council of Madrid</i>
UK	PM _{2,5}	54 µg/m³	71 µg/m³	<i>UK Department for Environment, Food and Rural Affairs</i>
UK	SO ₂	533 µg/m³ (based on the 15-minute mean concentration)	1065 µg/m³ (based on the 15-minute mean concentration)	<i>UK Department for Environment, Food and Rural Affairs</i>

UK	NO ₂	401 µg/m³ (based on the hourly mean concentration)	601 µg/m³ (based on the hourly mean concentration)	<i>UK Department for Environment, Food and Rural Affairs</i>
UK	O ₃	161 µg/m³ (based on the running 8-hourly mean)	241 µg/m³ (based on the running 8-hourly mean)	<i>UK Department for Environment, Food and Rural Affairs</i>

City Emergency Schemes/ Short-Time Action Plans:

City (Country)	Proceedings	Reference:
AT – Graz (PM ₁₀)	<p>Very high pollution when value >75 µg/m³ at two stations and since three consecutive days of exceeding + one day forecast without better weather prognoses →more measures need to be taken; prohibition of the usage of a second solid material heater, Public transport: hour-ticket valid for the whole day (because of bad weather conditions in February 2017, this regulation was valid for the whole month (<i>WOCHE Steiermark 2017</i>));</p> <p>Other Regions: Speed limits on highway (e.g. A12) from 130 km/h to 100 km/h from November until April; restrictions for diesel cars and construction machines (<i>Pinter 2008</i>)</p>	<i>Government of the Land Steiermark</i>
BA - Canton Sarajevo (PM ₁₀)	<p>New plan since 2017 (but without a detailed number when plan is getting into force):</p> <p>1st level: Watering on streets in order to reduce particulate matter; Voluntary reducing of private car usage; every juristic entity (enterprises, industry and car owner) should be able to be more flexible in their working time in order to defuse/unload the public transport and traffic; cars with petrol (less than Euro 1) and diesel (less than Euro 3) will be prohibited to circulate (exception for vehicles: police, diplomatic, emergency vehicles, inspection, Ministry for Defence; public transport, public entities); Road ‘Bašćaršija – Ilidža’ will be prohibited for vehicles above 3.5 t (exception: trucks for food delivery, emergency vehicles, public entities); Reduce Warming (2°C less) for solid and oil heating facilities with more than 50 kW; for gas facilities 1 MW and lower reduction by 1°C; Waste burning is prohibited and can be reported under an Eco-phone 033/66 00 00 (fines 250-500 €); More controls will be installed.</p> <p>2nd level: Reduce Warming (3°C less) for solid and oil heating facilities with more than 50 kW; for gas facilities 1 MW and lower reduction by 2°C; more efficient traffic light control at the main road crossings in the city center; Construction work outside will be prohibited.</p> <p>3rd level: Maximum of public transport; no busses with less than Euro III; gas facilities 1 MW and lower reduction by 3°C; even-odd number plate scheme 7:00-24:00h (PM₁₀ was over 400 µg/m³ in December 2017); no school; <i>Alarm ends if weather forecast predicts better conditions</i></p>	<p><i>Ministry of Physical Planning, Construction and Environmental Protection of Sarajevo Canton;</i></p> <p><i>Government of Sarajevo Canton</i></p>
BE – Brussels (O ₃ , NO ₂ , PM ₁₀)	<p>Warning Threshold: Speed limit 90 km/h in the ring of Brussels and on the motorways of the Walloon and Flemish Region; speed limit 50 km/h in the Brussels-Capital Region and on the roads where you normally drive at 90 or 70 km/h; Police speed controls; recommendation for mobility behaviour;</p>	<i>Bruxelles Environnement</i>

	<p>1st alert threshold level: Even/odd number plate procedure with exceptions; public transport is free; no trucks over 3.5 t allowed between 7:00-10:00h and 17:00-20:00h (not affected by plate ban); temperature in buildings not more than 20°C</p> <p>2nd alert threshold level: No cars allowed except emergency and public transport</p>	
BG - Sofia	National Institute of Meteorology and Hydrology is starting in 2017 to create an early warning system for PM ₁₀ (48h-forecast)	<i>Mediapool</i>
CH - Switzerland (PM ₁₀ national intervention plan)	<p>Cantons are responsible for basic implementations and have also opportunities for special ones; Limits on motorway can be implemented by law art. 3 (6) SVG;</p> <p>Basic concept: Information Threshold (>75 µg/m³ + forecast three days): Information about stress situation; Impact and personal behavioural recommendations; Recommendations for personal contributions, no measures. 1st alert stage (>100 µg/m³ + forecast three days): Information on stress situation; Impact and personal behavioural recommendations; Recommendations for personal contributions; Additional regional or cantonal measures; Information about cancellation Measures: Speed limit on motorways down to 120 km/h for normal traffic; special truck speed limit down to 80 km/h on motorways and roads coupled with overtaking bans for trucks (max. eight days otherwise special permit required); Prohibition of the use of second solid material heater (boilers, ovens, etc.); Prohibition of any kind of outdoor fire. 2nd alert stage (>150 µg/m³ + forecast three days): The measures of the first alert stage will stay into force. In plus, prohibition of the use of diesel-powered machinery, equipment, construction machines and vehicles without particulate filters.</p> <p>Complementary measures by Cantons: Actions in the field of public transport like free ride (<i>Luzerner Zeitung 2017</i>); Creation of blocking zones (also parking) and blocking times for high-emission vehicles (requirement of an easy-to-implement identification system for vehicle types by emission category)</p>	<i>Swiss Construction, Planning and Environmental Management Conference</i>
CZ- Prague (PM ₁₀)	Drivers have been asked to leave the cars at home for weekend; Factories and industrial zones were also given the warning that they should be operating in the most efficient way; Smog Alert Plan will be announced until September 2017, into force 2018	<i>Johnston 2017</i>
DE – Munich (PM ₁₀)	Officially bad air quality rated by municipality with a value of 100 µg/m ³ but no emergency plan; Trial brought to the court by Deutsche Umwelthilfe → ban of all diesel cars is wanted	<i>Bayrischer Runfunk</i>
DE – Stuttgart (PM ₁₀)	Above 50 µg/m³/2 days forecast: Citizens are called to leave their cars at home, less heating = <u>voluntary</u> , appeal to citizen on radio, city homepage, monitors at streets, Twitter, Facebook	<i>Municipality of Stuttgart</i>

	<p>(voluntary system because everybody can choose the mobility behaviour for their own → creation of new mobility culture is the target)</p> <ul style="list-style-type: none"> - e.g. Porsche pays on alarm days the public transport ticket; for others one way tickets are only half-priced; who has a annual ticket gets a free admission to the TV tower (Fair Acting aspect); extra lines in public transport - city has built moss wall to filter pollutants (<i>Municipality of Stuttgart 2017</i>) <p>Voluntary sacrifice is not working, so from <u>2018 prohibition of diesel cars</u> which not fit in Euro 4 - on smog alert days (<i>State Government Press Office of Baden-Württemberg 2017</i>)</p> <p><u>Problems:</u></p> <ul style="list-style-type: none"> - Park and Ride system is not successful, people from outside do not use it (<i>Schulz-Braunschmidt 2017</i>) - Citizen disagree (on Facebook) with the alarm system because the city needs to publish many alerts → citizen call it ‘ridiculous, no progress, useless’ and some request for long-lasting solutions like bans or toll - Street sanitation machine was introduced in 2006/07 to clean up the pollutants but without success of solving the pollution situation - Statistical overview 2016+Jan/Feb 2017 for PM₁₀- Exceeding² - Efficiency assessment air pollution control plan for Stuttgart³ 	
ES – Barcelona (NO ₂ , PM ₁₀)	<p>If the value of 50 µg/m³ is reached; voluntary measures and recommendations for the public; communication campaigns with media; increased irrigation of streets (2:00 to 4:00h); enable bus lanes; increase the supply of public transport; taxi movement limitation; traffic restrictions; minimize particulate emissions (dust aspiration localized, showers or similar) in loading and/or unloading materials with powder stacking trucks or machinery; enhanced cleaning (vacuuming) of roads affected by vehicles and construction machinery; communicate with large emitting industries; speed reduction</p>	<i>Government of Catalonia</i>
ES – Madrid (NO ₂)	<p>NO₂→180 µg/m³ → consultation of weather agencies for a forecast →four steps</p> <ol style="list-style-type: none"> 1. Citizens will be informed, more public transport use and promotion, important roads speed limit to 70 km/h 2. Parking prohibition in M30 zone (Mon-Fri 9:00-21:00h; Sat 9:00-15:00h) (with some exceptions) 3. M30 only 50% of traffic; even or odd number plates (6:30-21:00h); free taxis should wait at the taxi place and shouldn’t drive without guests through the city – wait at taxi places for guests 50% exception rule: cars with more than three passengers allowed, zero emission, hybrid, disabled persons, rescue cars and similar, motorbikes, 4. Same like in 3., but an obligatory ban for free taxi drive <p>→ steps will be reassessed every morning at 6:00am if still necessary (under 160 µg/m³) Information broadcasted on Twitter: @EmergenciasMad; Social media of city; information signs at metro, bus, highway; Planned ban of all diesel cars from 2025</p>	<i>City Council of Madrid</i>

² (2016) <http://www.stuttgart.de/img/mdb/item/584403/120074.pdf> and (2017) www.stuttgart.de/img/mdb/item/584403/121717.pdf

³ <https://vm.baden-wuerttemberg.de/de/mensch-umwelt/luftreinhaltung/luftreinhalteplanung-stuttgart/faq-wirkungsgutachten/>

FI – Helsinki (PM ₁₀)	Weather forecast provided by Helsinki Region Environmental Services Authority (HSY) →City's decision on when they release an alarm for the public. Recommendation for car-sharing, public transport use, less heating, employer involvement; Public transport will be free of charge, traffic restrictions, even/odd number plates; possibility to water streets with sodium chloride solution, cleaning of streets and removing of particles	<i>Helsinki Region Environmental Services Authority (HSY)</i>
FR – Grenoble (O ₃ , NO ₂ , PM ₁₀)	On the second day of a high pollution event the speed limit of streets with up to 90 km/h will be lowered to 70km/h; Speed reduced to 70 km/h on highways If the pollution event lasts longer than five days only vehicles with a Crit'Air sticker are allowed to drive. Public transport can be used with one ticket throughout the day and renting a bike (Métrovélo) is half-price. If the events last longer than seven days, vehicles with Crit'Air sticker 4 and 5 are not allowed to circulate. Public transport and renting a bike (Métrovélo) are for free.	<i>Métromobilité Grenoble</i>
FR – Lyon (O ₃ , NO ₂ , PM ₁₀)	Automatic Warning Signals on motorway to reduce speed; even and odd number plate scheme (On odd days vehicles with license plates ending in an odd number are allowed to circulate. On even days, only vehicles with license plates ending in an even number are allowed to circulate.) During alarm: less heating, maximum temperature 19°C. On the second day of a high pollution event the speed limit of streets with up to 90 km/h is reduced to 70km/h Crit'Air Vignette from April 2017; organization of a memorial day to those who died in cause of pollution: 6 th December 2016 (http://www.lyoncapitale.fr/Journal/Lyon/Actualite/Actualites/Transports/Un-mort-par-jour-a-cause-de-la-pollution-a-Lyon)	<i>Municipality of Rhône</i>
FR – Paris (O ₃ , NO ₂ , PM ₁₀)	Free public transport; cars can be driven into the city depending on whether they have odd or even number plates. Vehicles built before 1997 are banned from circulation; intensive police controls; speed is everywhere reduced by 20 km/h Crit'Air Vignette = low emission zone from 15 th January 2017; diesel car ban from 2020 Information Threshold: Valid from 5.30am to midnight; Information to the public provided by media, more controls; temperature control in buildings, temporary speed reduction by 20 km/h, and to 110 km/h on motorways etc.; mobility recommendations, prohibition of burning of agricultural by-products; postpone fertilizing and silo cleaning; prohibition of fireplaces outside; prohibition of generators; vehicles >3,5t have to use bypass routes, Carry-out of aircraft training runs (except for those performed as part of initial training provided by an organization declared, approved or certified, with presence on board or supervision of an instructor) Alert threshold: Limit to the usage of diesel vehicles which are not equipped with particulate filters; limit road transport; industry has to limit emissions of particulate matter and nitrogen oxides; limiting particle-generating leisure activities like sports events, fireworks etc.; avoiding maintenance work on public and private green spaces	<i>Security Council of the Region Île-de-France</i>

FR - Voiron, Pays Voironnais (O ₃ , NO ₂ , PM ₁₀)	<p>Day 2-4 of alert: Speed reduction by 20 km/h on every road above 70 km/h; on special motorways a speed limit of 70 km/h; mobility recommendations like public transport promotion, carpool, cycling and walking</p> <p>Day 5-6 of alert: The measures taken previously are maintained and complemented by the first measures to restrict traffic and tariff measures on public transport and bicycle rental.</p> <ul style="list-style-type: none"> - Traffic is prohibited to passenger cars registered before 1 January 1997 and to Heavy Goods Vehicles registered before 1 October 2001, not classified under the Air Quality Certificates (CQA), on the perimeter of the Grenoble Metropolis and on Accesses by motorway from Grenoble A48 Voreppe and A41 Crolles. - In order to facilitate travel, the one-way ticket for the Pays Voironnais networks, TAG for the Agglomération Grenobloise and Grésivaudan is valid throughout the day; The rental of Métrovo (bicycle rental) is half-price; Use P + R and Carpool <p>Day 7+ of alert: The restriction measures taken previously are maintained and extended to other categories of vehicles. Tariff measures are also being extended to public transport and bicycle rental networks.</p> <ul style="list-style-type: none"> - Traffic is prohibited to petrol cars registered before January 1, 1997, to diesel cars registered before January 1, 2006, to Heavy Goods Vehicles, buses and gas coaches registered before October 1, 2001, to Heavy Goods Vehicles, buses and diesel coaches registered before On October 1, 2009, to two-wheelers registered before July 1, 2004 (vehicles not classified under the Air Quality Certificates + CQA 4 and 5) on the Grenoble metropolitan area and access By motorway to the Grenoble Metropolis from the A48 Voreppe and A41 Crolles tolls; - In order to facilitate travel, transportations of the Pays Voironnais, the Agglomération Grenobloise (TAG network) and Grésivaudan are free all day; The rental of Métrovélo is free. 	Community of Voironnais
HU – Debrecen (PM ₁₀)	Restrictions on stationary emissions sources; reduce the use of solid and oil-fired heaters and appropriate temperature in public facilities (min. 18°C can be defined as a limit); dust emissions associated activities (construction work, building materials transport etc.) may be suspended; transport restrictions; even/odd number plate scheme from 6:00-22:00h;	Environment Agency Austria; Municipality of Debrecen
HU – Miskolc (PM ₁₀)	Ban on open-air burning; traffic restrictions; reduce the use of solid and oil-fired heaters and appropriate temperature in public facilities (min. 18°C can be defined as a limit); temporary speed reduction; favouring the use of public transport arrangements (instead of travel tickets vehicle registration certificate showing); temporary expansion of parking facilities; even/odd number plate scheme from 6:00-22:00h; or complete traffic restrictions.	Municipality of Miskolc
IT – Cremona (PM ₁₀)	<p>During winter (15th October -15th April) from Mon-Fri at 07:30-19:30 no Euro 0 vehicles allowed, >12 days above 50 µg/m³ and forecast in the next to days without change prediction Temperatures in private and public buildings not above 20 degrees; school participation is limited; Driving prohibition for every vehicle (with exclusions) from 8.00-20.00h on every Sunday or holiday (not on motorway); >18 days above 50 µg/m³ Even-odd number plate scheme on every day from 9:00-18:00h (not for Euro 3, 4, 5 petrol and diesel vehicles; motorbikes, electro, gas, hybrid, carsharing, cars with at least three passengers) Alert ends when in two consecutive days the value is falling under 50 µg/m³</p>	Municipality of Cremona

<p>IT - Florence (PM₁₀)</p>	<p>Italy in general: if seven days with 50 µg/m³ are exceeded → traffic restrictions</p> <p>In order to undertake measures, mayor has to establish an ordinance to the public and it is valid for a certain day period;</p> <p>Prohibition of biomass use in open or closed fireplaces and traditional stoves for heating; Limitation to eight hours of daily operation period of the heating equipment fuelled by diesel or pellets and maintained at 18 °C;</p> <p>Prohibition of access and transit from 8:30 to 12:30 and from 14:30 to 18:30 in the town to: Motorcycles Euro 1, petrol cars Euro 1, diesel cars Euro 2 and Euro 3, freight diesel vehicles less than Euro III;</p> <p>One-way ticket is valid for the whole day (1.50€), even/odd number plate cars cannot drive from 7:30-12:30h + 16:30-18:30h</p>	<p><i>Agenzia Nazionale Stampa Associata;</i></p> <p><i>City Council of Florence</i></p>
<p>IT – Torino (PM₁₀)</p>	<p>Ecological Sundays (no vehicle circulation on the first Sunday of the month from 10:00-18:00h in the entire city)</p> <p>Permanent traffic bans during winter: Mon-Fri 8:00-19:00h Petrol, LPG and methane vehicles with less than Euro 1, diesel less than Euro 3; Mon-Fri 8:30-14:00h and 16:00-19:00h freight transport petrol with less than Euro I, diesel less than Euro III;</p> <p>1st stage: Daily 8:00-19:00h Petrol, LPG and methane vehicles with less than Euro 1, diesel less than Euro 5; Mon-Fri 8:30-14:00h and 16:00-19:00h freight transport petrol with less than Euro 1, diesel less than Euro V; Sat + holidays 8:30-15:00h and 17:00-19:00h freight transport petrol with less than Euro 1, diesel less than Euro V; temperature reduction of 2°C (or two hours of operation) of the heating of public buildings; ban of open fires; prohibition of free spreading of sewage in agriculture resulting from animal manure</p> <p>2nd stage: Mon-Fri 8:00-19:00h Petrol, LPG and methane vehicles with less than Euro 1, all diesel vehicles; Mon-Fri 8:30-14:00h and 16:00-19:00h freight transport petrol with less than Euro 1, all diesel vehicles; Sat + holidays 8:30-15:00h and 17:00-19:00h freight transport petrol with less than Euro 1, all diesel vehicles; City Center: daily 8:00-19:00h all vehicles (except residents of the area, LPG and methane Euro 1); City Center: daily 8:00-19:00h freight transport with less than Euro I; City Center: Mon-Fri 8:30-14:00h and 16:00-19:00h freight transport with less than Euro I, all LPG and methane; City Center: Sat + holidays 8:30-15:00h and 17:00-19:00h freight transport with less than Euro I, all LPG and methane</p> <p>3rd stage: Daily ban for all vehicles (there is a list existing with vehicle exceptions); speed restrictions</p> <p>4th stage: Free public transport</p>	<p><i>City Council of Torino</i></p>

NO – Bergen (NO ₂ , PM ₁₀)	<p>During prolonged pollution events for PM₁₀ or NO₂ vehicles are regulated with a raise in road tolls to 5 times the normal rate (25€ in peak hours or 10€ outside of rush hour → heavy vehicles twice amount) or an odd and even number plate scheme from 6:00-22:00h.</p> <p>Pollution exceeding has to be more than two consecutive days; On these days, public transport in the county is free of charge. Bergen city plans to enable staff to work at home. There is also a fund to replace old wood burning stoves and the option to keep ships out of Bergen port in high pollution events.</p>	<i>Bergen City Council</i>
NO - Oslo, (NO ₂)	<p>During high pollution for at least the following two days; Ban of private diesel vehicles on municipal roads for two days from 6:00-22:00h but not on national highways; other opportunity even or odd number plates can drive; city can decide to close red marked parking places in the city (exclusions for vehicles, e.g. vehicles over 7.5 tonnes which use Euro VI technology or driving to and from the ferry transport and airport upon departure / return that day)</p> <p>recommendation of scientific studies to reduce speed from 80 km/h to 60 km/h from October to April</p> <p>Planned: Raise of city toll (present 3,70€)</p>	<i>Municipality of Oslo</i>
UK – London (PM ₁₀)	<p>Alerts sent electronically to 2,500 bus countdown signs, river pier signs and signs on 270 underground stations; The red alert was issued because the scale showing air toxicity stands between seven and nine out of 10 (<i>Kitching 2017</i>); Drivers were also advised to turn off their engines when stuck in traffic, also voluntary and just a warning for health risks</p> <p>Pigeons with backpacks in order to better monitoring and air quality control → live data on smartphones (<i>Smedley 2017</i>) To face problem, from October 2017 ‘T-Charge’ charging pre-2006 diesel cars 25€ to enter on weekdays (<i>Voelcker 2017</i>)</p>	

Alert Providing:

Belgium	Passive	Air Quality Database http://www.irceline.be/en
Belgium	Active	SMS alert http://www.qualitedelair.brussels/content/recevoir-les-alertes-par-mail-ou-par-sms
Czech Republic	Passive	Air Quality Database http://portal.chmi.cz/files/portal/docs/uoco/web_generator/actual_hour_data_GB.html
ES Madrid	Active	SMS alert http://www.mambiente.munimadrid.es/sica/scripts/index.php?menu=servicios&smenu=sms
FR Centre-Val de Loire	Active	Sentimail: email service for pollution alerts https://www.ligair.fr/les-alertes
FR Grenoble	Active	SMS alert http://www.metromobilite.fr/siv.html
Germany	Active	Air Quality Database; email alert, a free service from organization “Netzwerk Fahrradfreundliches Neukölln (Berlin)” http://nsfw.fahrradfreundliches-neukoelln.de/en/station/DEBY115/
Norway	Passive	Air Quality Database http://www.luftkvalitet.info/home.aspx
PL Małopolskie	Passive	Air Quality Database for the Małopolskie Region including Krakow http://monitoring.krakow.pios.gov.pl/
Worldwide	Active	Plume Air Report: Phone App with live pollution levels and unique hourly air quality forecast https://plumelabs.com/en/products/air-report
UK (DAQI)	Passive	National Air Quality Database where pollutants are scored (0-10) and summarised into four forecast bands (low moderate, high and very high) https://uk-air.defra.gov.uk/
UK airALERT	Active	Regions of Sussex, Surrey, Sevenoaks and Southampton, <i>developed by Sussex Air Quality Partnership and ERG, King’s College London</i> http://www.airalert.info/Splash.aspx
UK airTEXT	Active	Maps + alerts by SMS text message, email and voicemail and 3-day forecasts of air quality http://www.airtext.info/
UK London	Active	Air iPhone App: displays the latest air pollution levels recorded at over 100 monitoring in the London Air Quality Network http://www.londonair.org.uk/london/asp/iPhone/
UK Scotland	Active	Know and Respond: alert service provided by pollution forecast http://www.scottishairquality.co.uk/
Worldwide	Passive	World Air Quality Index (promote Air Pollution awareness) http://aqicn.org

Active: Provided Programme is sending an alert information about exposures

Passive: Data is available in the internet but no alert warning is provided

Controls of Driving Bans / Speed Reduction

Fine for Ignoring Driving Ban:

City	Penalty
Madrid ⁴	90 €
Oslo ⁶	165 €
Paris ⁸	35 €

Brussels Speed Check during Smog Alert
2013/01: controlled 9,292 vehicles, speeding fines for 1,925 cars ⁵
2014/03: controlled 30,000 vehicles, speeding fines for 6,227 cars ⁷
Milan Even/Odd Check during Smog Alert
2015/12: controlled 1,500 vehicles, fines for 300 cars ⁹

⁴ <http://www.bild.de/regional/muenchen/umweltschutz/warum-koennen-alle-saubere-luft-nur-muenchen-nicht-50070250.bild.html>

⁵ <http://deredactie.be/cm/vrtnieuws.english/News/1.1533995>

⁶ <http://diepresse.com/home/wirtschaft/economist/5155952/Chaos-wegen-Fahrverbots-fuer-Dieselaautos-in-Oslo>

⁷ <http://deredactie.be/cm/vrtnieuws.english/Health%2Band%2BEnvironment/1.1909343>

⁸ <http://www.faz.net/aktuell/gesellschaft/gesundheit/frankreich-feinstaubbelastung-in-paris-erreicht-rekordwert-14563731.html>

⁹ http://www.ansa.it/english/news/2015/12/28/rome-milan-battle-smog-with-car-bans_d923a8e3-25df-499e-8fd0-7de12cf494c3.html

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