AWAIR DECISION SUPPORT SYSTEMS

Deliverable D.T2.2.5

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Aims:
The report collects partners' data about existing and planing in future decision support systems (dss) to help local administrators how to act during SAPE's (e.g. low emission zones, traffic stop) and provide guidance in activation mitigation and adaptaion actions.

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INTRODUCTION

What is DSS?

Decision support system (DSS) is tool which supporst public administrators and public authorities to help how act during SAPES. DSS can be defined as a matrix of tactics and actions that can be taken according to current level of SAPE.

DSS OF THE DIFFERENT CITIES UNDER STUDY

Katowice City Hall, Katowice, Poland

Municipalty of the capital city of Budapest District XIV Zugló, Budapest, Hungary

Municipalty of Parma, Parma, Italy

CITY OF KATOWICE, POLAND

The city of Katowice, as part of its information and mitigation activities, introduced a number of activities related to the improvement of the existing so-called Short-term actions. The ad hoc measures are related to the "Short-term Action Plan" (PDK), which, depending on the air quality, introduces appropriate levels of PDK (from I to III) in the Silesian region, where the city of Katowice is located, and obliges subordinate units to take levels of information and operational activities. The current PDK is related to the guidelines contained in the "Air protection program for the Silesia region "(POP) of 2017 and the ordinance of the Minister of the Environment of August 24, 2012 on the levels of certain substances in the air (Journal of Laws of 2012, 1031).

In the case of PM10 dust, the existing regulation distinguished the following levels of informational and operational activities:

• 50 µg / m3, - exceeding the permissible concentration

• 200 µg / m3 - notification of the possibility of exceeding the alert level, public information level,

• 300 µg / m3 - exceeding the alarm level,

This regulation had different levels compared to the POP adopted for the voivodship, according to which the notification levels are as follows:

• 150 µg / m3 - notification of the possibility of exceeding the alert level, the level of informing the public,

• 200 µg / m3 - alarm level exceeded, smog alarm

Due to the provisions included in the POP, the conditions for announcing that the limit concentration level has been exceeded are not taken into account, because in accordance with the adopted methodology, it is active throughout the year.

Additionally, the applicable POP introduced air quality notification based on the pollution forecast for the next day, depending on the air quality index.

During the project, the Regulation was updated, as a result of which new - lower - levels of information on air pollutants were introduced. Regulation of the Minister of Environment of October 8, 2019 (Journal of Laws of 2019, item 1931) amending the regulation on the levels of certain substances in the air, determined the following levels:

• 100 µg / m3 - notification about the possibility of exceeding the alert level, the level of informing the public,

• 150 µg / m3 - alarm level exceeded, smog alarm

Currently, public consultations are underway on the development of a new POP for the Silesia Region, which are aimed at, inter alia, unification of the levels related to informing about air quality

Based on the received data and criteria for announcing the level of PDK implementation, the Crisis Management Department (WCZK) prepares information and launches the PDK implementation procedure in accordance with the implementation cards for levels I to III.

For the implementation of PDK, a list of information and operational activities was defined, as well as a list of notified entities that were assigned to each level, and entities responsible for the implementation of information and operational activities were specified.

During the heating periods (from 15/09 to 15/05 of each year), the managers of institutions where children, elderly people, pregnant women, sick people and people with weakened immunity are obliged to check the current concentrations of air pollutants directly on the website maintained by the Chief Inspector of Environmental Protection:

http://powietrze.katowice.wios.gov.pl/

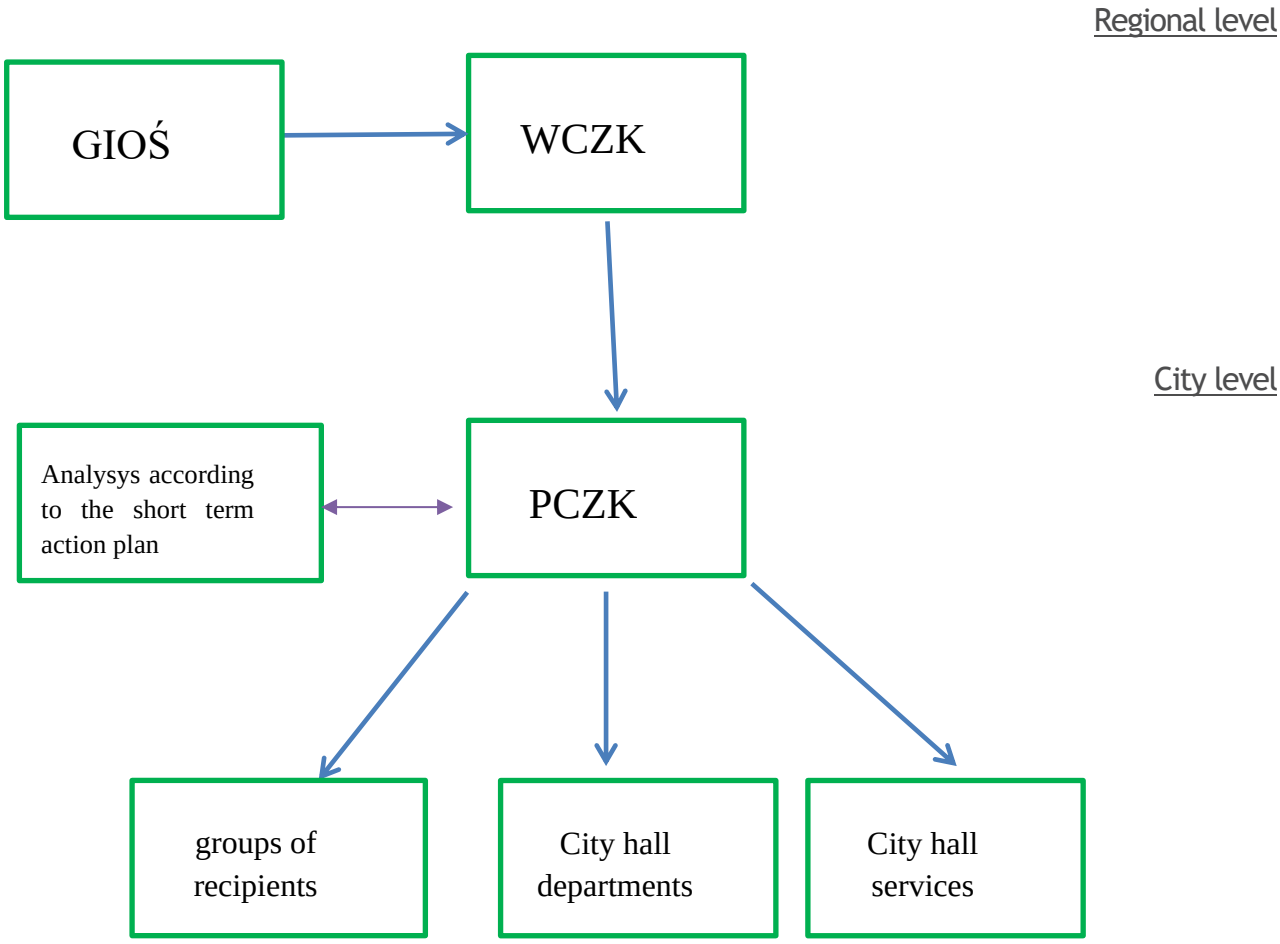


Figure. 1 Data transfer scheme.

The PDK structure is a centralized structure based on an action matrix developed for the needs of PDK. Information on the change in level is provided by the WCZK on the basis of information provided by the Chief Inspectorate of Environmental Protection (GIOŚ). The message contains, among others, the following information:

- Current information on the state of air quality as of the date of sending the message
- Forecasted air quality for the next day. In the case of a message posted on Thursday / Friday, information about the air quality status for the weekend is provided.
- The zone which may be exceeded - the Śląskie Voivodeship is divided into 6 zones, Katowice is located in the Agglomeration zone (coinciding with the FUA described in d. 2.1.2)
- Air quality index for a given zone depending on the selected parameter.

WCZK transmits this information by means of special messages to PCZK, and these notify individual entities. In the case of Katowice, on the basis of the information provided, an appropriate action is implemented with PDK and a predefined message with the necessary attachments is sent to the indicated groups of recipients.

Information and operational activities

The implemented information measures include notifying as many inhabitants as possible about the state of air quality. The action list includes notification through such information channels as:

– city website www.katowice.eu;

– FB profiles: Katowice - the official city profile, Miejskie Centrum Energii;

– website www.katowice.eu;

– messages displayed in public buildings;

– sms in the KISS system;

– preparation of information for local media

– information displayed on the monitors of the air quality monitoring system.

In turn, the goal of operational activities is to temporarily reduce emissions. The action list includes:

– the Mayor's appeal to the inhabitants, in which the Mayor asks for help, through conscious decisions (e.g. not to smoke in fireplaces), in the immediate reduction of pollution levels.

– increased inspections of the Municipal Police in Katowice aimed at proper waste management and the burning of appropriate solid fuels.

Evaluation of activities:

- Information on the air quality of PDK level I is provided by e-mail to facility administrators. The administrator must confirm the receipt of the e-mail with the information, and then post the relevant information on the door of the building. Currently, as part of the construction of the air quality monitoring system for the city of Katowice, information on the PDK level and the forecast for the next days is displayed on air quality monitors.

Strengths / Weaknesses:

Strengths:

- established pattern and organization of activities
- a large number of entities that receive information, which translates into a large range of notified residents, including sensitive groups
- information channels with a large local reach
- a large number of information activities

Weaknesses

- large dependence on the date of providing information from the WCZK

- no control over the display of information by the administrators of individual facilities

- limited number of possible operational activities

- difficulty in coordinating mitigation and information activities, despite the centralized structure. Different entities are responsible for individual actions

Future:

It is planned to develop a notification system about sending messages to addressees directly from the PDK module in the air quality monitoring system and to place information on the current PDK level on presentations displayed on air quality monitors.

Another proposed functionality is the extension of the system with a module for reporting excessive smoke or waste incineration to the Municipal Police in Katowice.

After updating the POP and PDK for the voivodship, it is planned to conduct further training for facility administrators in the field of providing information on the air quality condition (primarily

At the moment, there are no proposals for additional mitigation measures.

MUNICIPALITY OF PARMA, ITALY

Since 2002 Parma Municipality has signed agreements for air quality with Emilia Romagna Region and other Municipalities. These agreements provided emergenzial measures during autumn/winter period such as traffic and heating limitation. The Regional Agreements for Air Quality included weekly control by ARPAE with the issue of a bulletin. Based on it, every Municipality withdrew emergential measures in case of previous days without PM10 exceedence.

In 2017 the regional system was updated through the approval of the Integrated Air Plan of the Emilia-Romagna Region (PAIR, approved by DGR n.115 11/04/2017).

During winter (namely, between October 1st and March 31st of the following year) all municipalities with more than 30,000 inhabitants in Emilia-Romagna implement a number of restrictions during working days (every week, from Monday to Friday) and on some Sundays as well (the so called “ecological Sundays”), in order to reduce the concentration of the most critical pollutants, such as particulate matters (PM10 and PM2.5) and NO2.

In case of SAPE the restrictions are stregthened.

The Mobility Department of Parma Municipality with the collaboration of Environmental Department prepares every year, in September, the Mayor Order with the mapp of all the area in which limitations are applied.

The local Police Department is responsible to overseen the respect of the Order.

Structure of DSS

The centralized system implemented by the Emilia Romagna Region is based on emission of a bulletin by Regional Agency for Prevention (Arpae) with measures to active in case of alert.

The emergential mechanism has been recently updated by the the Region with DGR n.33 13/01/2021. The bulletin is now delivered each Monday, Wednesday and Friday in the morning with the next days considered alert days if PM10 concentration values forcasted are above the EU daily PM10 limit value (50 mg/m3). Previously, as described in the other deliverables of the project, the bulletin was based on the PM10 values mesured on the three previous days to each Monday and Thursday.

The emergential measures keep on to the next checking day included.

When the check day occurs in a non-working day, the bulletin will be issued the first available working day.

Figure – ARPAE bulletin

In the Parma Municipality the bulletin is received by e-mail by the Environment and Mobility Department who send: alert to local Police for controls, to the Press Office to inform the population, to the Company for barriers deployment, updating to the variable messages panels on the streets (Figure and ,).

Figura – Variable message panel ("PM Emergency", "Traffic restrictions in the city center on Thursday")

Figura – Variable message panel (Air quality not accetable)

The bulletin and all information on air quality are published on ARPAE WebSite (https://www.arpae.it/misure_emergenziali.asp?idlivello=1697)

The mitygation and adaptation actions that are activated according to level of pollution

As described in the Joint Deliverable D.T2.1.2 - D.T2.1.3 - D.T2.2.1 the Mayor Order includes the following measures implemented during the period 1/10/-31/03:

- Diesel cars having emissions class equal or below EURO 3 and petrol cars with emission classes equal to EURO 2 or below are not allowed to circulate from 8.30 a.m. to 6.30 p.m;
- Ban of installation of new wood biomass plants for domesting heating < 3 stars and from 1/01/2020 ban of installation of new biomass plants < 4 stars The wood biomass plants are certified, as provided by DM 186/2017-Annex 1 and in conformity with EU Directives, on the base of emissive performance classes ("stars"), taking into consideration both energy efficiency and emissions (particulate, COT, NOx, CO).

During the red ARPAE bulletin the following emergential measures are applied:

- Limited restriction up to diesel Euro 4 vehicles;
- Reducing 1° C in heated rooms up to a maximum temperature of 19° C in homes, offices, places for recreational activities, associations or worship, in commercial activities and up to the maximum temperature limit of 17° C in any industrial and craft activities;
- Ban on the use of wood biomass plant for domestic heating (in the presence of an alternative plant) with emission class < 4 stars.
- Prohibition of outdoor combustion (green waste,bonfire, barbecue, fireworks);
- Prohibition to stop any vehicle with the engine on;
- No spreading of zootechnical slurry (excluding landfill with direct injection to the ground);
- Intensifying the controls on aforementioned bans.

The DGR 33/2021 updated the mechanism of alert bulletin, as previously described, and it added the following measure:

Promotion of the implementation of a structural smartworking period with additional incremental extention in case of SAPE.

The evaluation and supervision process.

The Emilia-Romagna Region is responsible for coordination of measures at regional level. The Region organize regular meetings with the Municipalities to share the state of the art of the measures implementation;

The Parma Municipality coordinates and implements at local level all the actions and measures and participates to regional meetings, as well as being responsible for the communication to the population.

The ARPAE Parma is responsible for the control and the validation of local data which are verified at first dayly and then monthly and by semester with statistical tools which allow final quality of data.

Strengths and weaknesses of DSS

The system is centralized and the main strangth of the DSS is to apply a common approach in the Region.

A weakness can be identified in the difficulty to reach all the population, in particular those that are vulnerable, with a fast and effective communication.

Future plans

The main objectives of the new DSS are:

- to implement a protocol in order to improve the management system of SAPEs
- to build a prompt system for administrators to inform vulnerable people on SAPEs by identifyng the most efficient means of communication for each category, taking into consideration: average technological knowledge, mostly visited area, database availabilities;
- to define additional tools needed to promptly carry out the comunication

To achieve the objects above mentioned, a coordinator Team is expected. This team will include some member from different department of Parma Municipality: Environment, Mobility, Press office, Welfare and School Services.

The tasks of the coordinator team are:

- to receive from ARPAE information on air quality (data and forecasts) and bulletins which are issued each Monday, Wednesday and Thursday,
- to send relevant communications,
- to update communication lists,
- to monitor and to keep DSS updated, interacting with Health local Institution (AUSL) and local department for Air Quality of ARPAE

The coordinator Team will fill in the contact list.

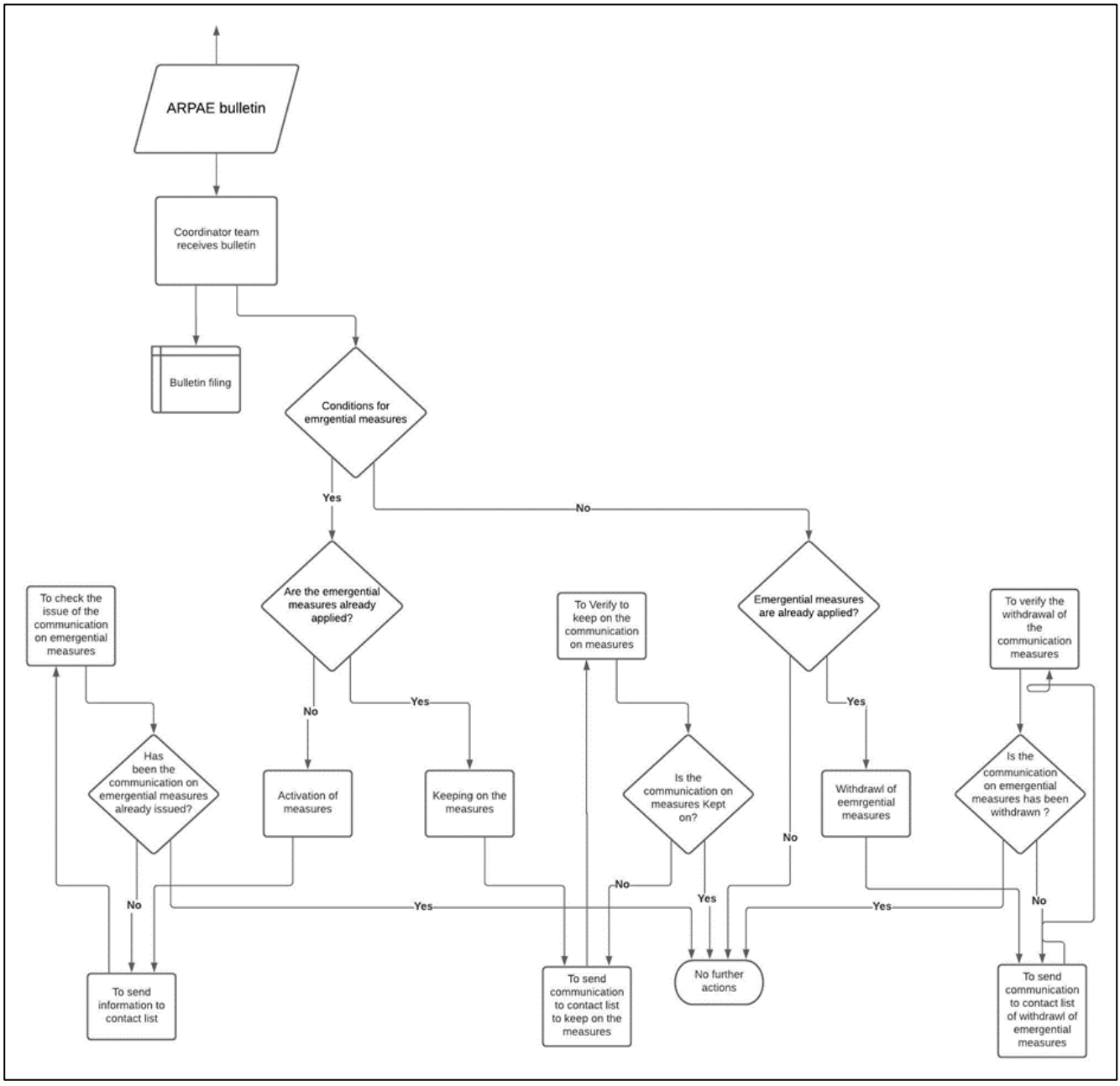
The contact list will must be available to all Team members through a sharing tool provided by the Municipality. Each Team member can modify the contact list. The list structure can be broaden with additional fields that are considered required.

Communication tool	Target population involved	Preliminary actions	Contact management
Exemple: sms ALERT	All the citizens who voluntarily adhere to the platform	Log-in to the specific platform (it is needed a preliminary advertising campaing on the main means of communication to inform about the messaging service)	Telephone number list of those citizens who voluntarily adhere to the platform
…	…	…	…

Figure Table with different communication tools

Data privacy must be carried out in accordance with EU GDPR and national Laws; for this purpose the data acquisition should be ruled in accordance with the owner of the data treatment and the data protection responsible.

The DSS Coordinator Team is responsable to revise the DSS; in particular, after a DSS test, it will be done a first revision / validation during the first monitoring.



Fgure Parma DSS Flow Chart (*People Exposure reduction protocol in case of SAPE* , Ambiter srl 2021)

DISTRICT OF ZUGLO, BUDAPEST, HUNGARY

Regulation

The regulation of smog alert is based on the following acts and decrees:

- Act LIII, paragraph 48 of 1995 on the general rules for the protection of environment
- Government decree 306/2010. (XII. 23.) on the protection of air
- Decree No. 4 of 2011 (I. 14.) VM of the Ministry of Rural Development concerning the limit values for air load levels and emission limits for stationary air pollution point sources
- Decree No 69 of 2008 (XII. 10.) of the Municipal Assembly on the smog alert plan of Budapest Capital
- Act CLIV, paragraph 45 of 1997 on healthcare
- Act XI, paragraph 4 of 1991 on the Healthcare Authority and Administration
- Government decree 1330/2011. (X. 12.) on the inter-sectoral action program regarding the decrease of particulate matter (PM10) (inoperative)
- Government decree 277/2005. (XII. 20.) on the Hungarian Meteorological Service
- Decree 4 of 2002 (X. 7.) KvVM concerning air pollution zones

Thresholds

The first annex of the Decree No. 4 of 2011 (I. 14.) VM of the Ministry of Rural Development sets value limits. The regulation regarding the ambient air has three types of value limits (increasingly):

Health limit: does not cause permanent damage to health and has to be followed for the protection of human health. Exceedances can result harmful air pollution.

Information limit: the limit set for certain pollutants that has a negative effect on sensitive groups (children, seniors, ill). If exceeded the residents must be informed (by the Municipality of the Capital in Budapest). Exceedance must result milder measures in a smog situation.

Alert limit: a level of air pollution that if exceeded only for a short period of time it can be harmful for human health and needs immediate action. Exceedance must result traffic restriction measures.

[µg/m3]		Health limit	Information limit	Alert limit	Number of tolerable exceedance of the health limit	Limit of annual average
Nitrogen dioxide (hourly average)	NO2	100	350(1)	400(2)	18	40
Sulfur dioxide (hourly average)	SO2	250	400(1)	500(2)	24	50
Ozone (hourly average)	O3	-	180(1)	240(2)	-	-

Ozone	O3	120(4)	-	-	80	-
Particulate matter pollution (daily average)	PM10	50	75(3)	100(3)	35	40

Notes:
(1) three consecutive hours
(2) three consecutive hours or exceeded information limit for more than 72 hours
(3) two consecutive days and based on the weather forecast it won't be better the next day
(4) daily maximum of 8-hour moving averages

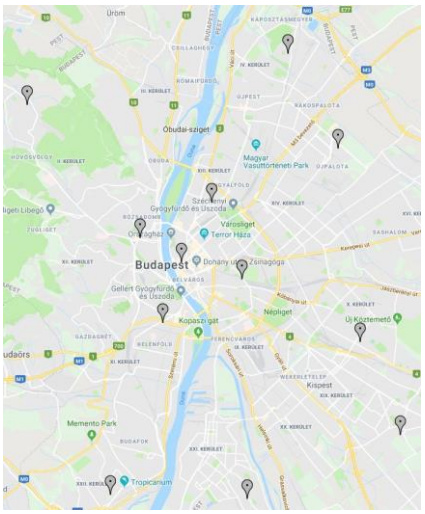
The regulation is outdated because there is no daily limit regarding PM2,5.

Immission monitoring

The National Air Pollution Monitoring Network (Országos Légszennyezettségi Mérőhálózat – OLM) has consecutive air quality data. The Network has two parts: automatic monitoring stations; manual monitoring stations.

The professional control of OLM is part of the Ministry of Rural Development. The regional government offices responsible for the operation of the monitoring stations. The collection, validation and evaluation of the Network's data is provided by the Air Purity Reference Centre of the Hungarian Meteorologial Service (OMSZ).

There are twelve automatic monitoring stations in Budapest and five others in the FUA area: Tököl, Vác, Százhalombatta.



1. Figure: Monitoring stations in Budapest

Emission databases

In Hungary, the emmision database is created by OMSZ. It gives an estimate on the annual emission of 15 pollutants on a 0,1° × 0,1°resolution horizontal grid.

The annual emission of the bigger polluters (point sources) are summarized in the emission database based on their annual self-declaration.

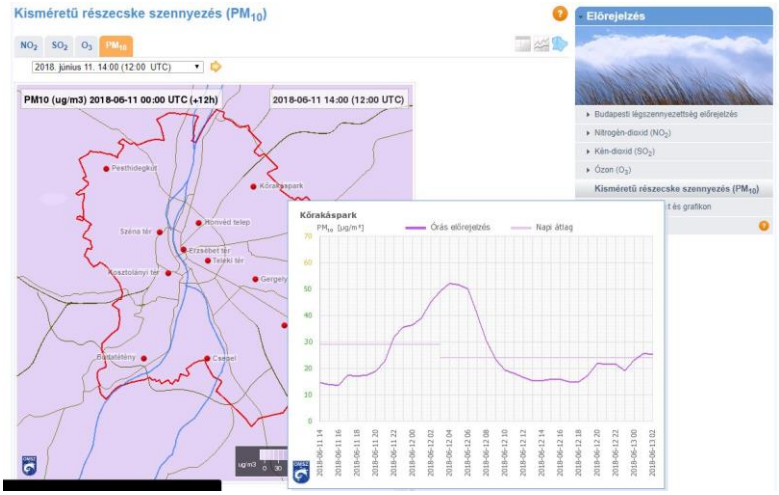
The emission database does not have enough information on the spatial and temporal changes of traffic (line source) and the residential heating (diffuse source).

Modeling and forecasting

Based on the emission of primer pollutants we can estimate the spacial and temporal changes of the concentration of pollutants by using meteorological factors with chemical-transmission models.

OMSZ simulates the air quality of Budapest and the surrounding area (not the whole FUA) by using the CHIMERE air chemical model.

They calculate the concentration of four pollutants for the next 48 hours and show on a map how the air quality will look like in different points of the city. See:



2. Figure: Forecasting for Budapest

https://www.met.hu/levegokornyezet/varosi_legszennyezettseg/elorejelzes/tajekoztato/

1) The structure of DSS – is it decentralized (the institutions have instruction that they need to follow, they need to check informations about SAPE's on their own and main departament is only supervising the effectiveness), or centralized (the instructions are sent to institutions according to current air pollution level by the main departament responsible for it). If possible describe the way and time from receiving the information about SAPe or possibillity of SAPE in city to receiving informations by institutions.

Data publicity

The data of OLM are publicly available at levegominoseg.hu:

http://www.levegominoseg.hu/automata-merohalozat

The site is outdated, to use it is difficult.

Forecasts are available at the homepage of OMSZ:

https://met.hu/levegokornyezet/varosi_legszennyezettseg/elorejelzes/budapest/pm10/

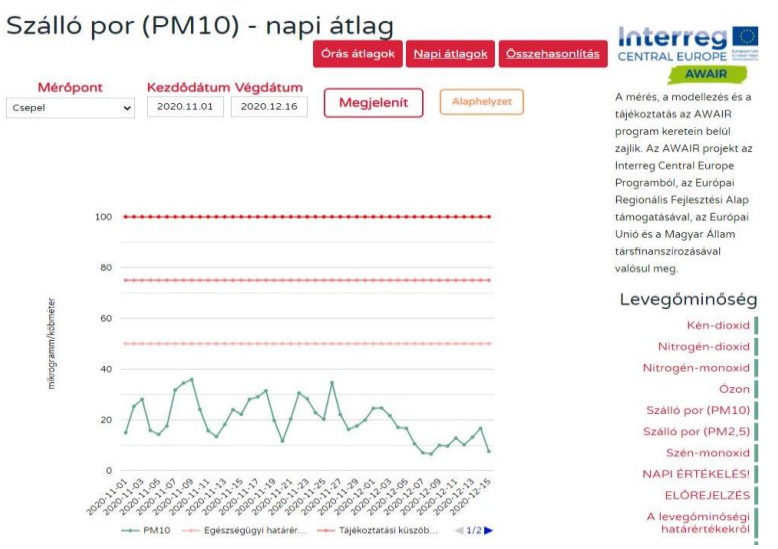
The Chief Medical Officer gives information on their own website about air quality based on the Air Hygene Index of NNK:

https://www.nnk.gov.hu/index.php/kozegeszsegugyi-laboratoriumi-foosztaly/terkepes-informaciok/levegohigienes-index

3. Figure: Online information about the air quality on the Zugló site

The Chief Medical Officer also publishes daily evaluations on Facebook.

Zugló developed an own site for inform the public about the air quality:



https://zefi.zuglo.hu/levegominoseg/pm10

Decision support

- The order process of smog alert starts at the government offices that monitors the pollution levels 24/7 and if the criterias set by the government decree are met they notify the assigned responsible at the municipality.
- In Budapest the meteorological and immission data is gathered by the Budapest Municipality Police Directorate (Fővárosi Önkormányzat Rendészeti Igazgatósághoz – FÖRI) and the Budapest Municipality Control Center (Fővárosi Ügyeleti és Irányító Központ – FÜIK) has to 'implement the tasks defined in the smog alert plan of Budapest capital'.

4. Figure: Recent decision support scheeme of Budapest

Order of smog alert

- Only those settlements can order a smog alert that have immission monitoring stations (in the FUA area: Budapest, Vác, Tököl, Százhalombatta)
- In Budapest, the smog alert is ordered and – based on the measurement results - cancelled by the Mayor. If it is ordered, the measures defined by Decree No 69 of 2008 (XII. 10.) must be taken.

- The information or the alert threshold of smog alert must be ordered if the 1-hour average of NO2 concentration or 8 hours sliding average of O3 concentration exceeds the certain limit for 3 consecutive hours. In case of PM10 if the 24-hour average exceedes the limit for 2 consecutive days and the other criteria of the regulation are met the smog alert must be ordered.

2) The mitygation and adaptation actions in SAPE

Public information in SAPE situation

The information regarding smog alert is available on the website of the municipality of Budapest https://budapest.hu/Lapok/szmog.aspx Moreover, it sends a press release to the National News Agency.

The third annex of the Decree No. 4 of 2011 (I. 14.) VM of the Ministry of Rural Development:

Residential information has to contain at least the following:

- Information about exceeding the limit:
- the location, the area concerned,
- rate of exceedance (proportionally to the information or alert limits),
- the start and potential end of exceedance,
- and by giving the biggest 1-hour, 8-hour and 24-hour average concentration.

Forecast for the following period (time of day or whole day):

- the area concerned,
- the (information or alert) limit to be expected,
- the changes to be expected regarding the pollution levels (improvement, stabilization or deterioration).

Information for the residents concerned about the possible health effects and the suggested actions to take:

- the sensitive groups (children, seniors, ill),
- the symptoms to be expected,
- the precautionary measures to take by the populace concerned,
- and the place to get more information.

Information about the suggested actions to take to decrease the pollution and the exposition by presenting the possible causes of pollution and the suggestions to decrease emissions.

Actions in Budapest

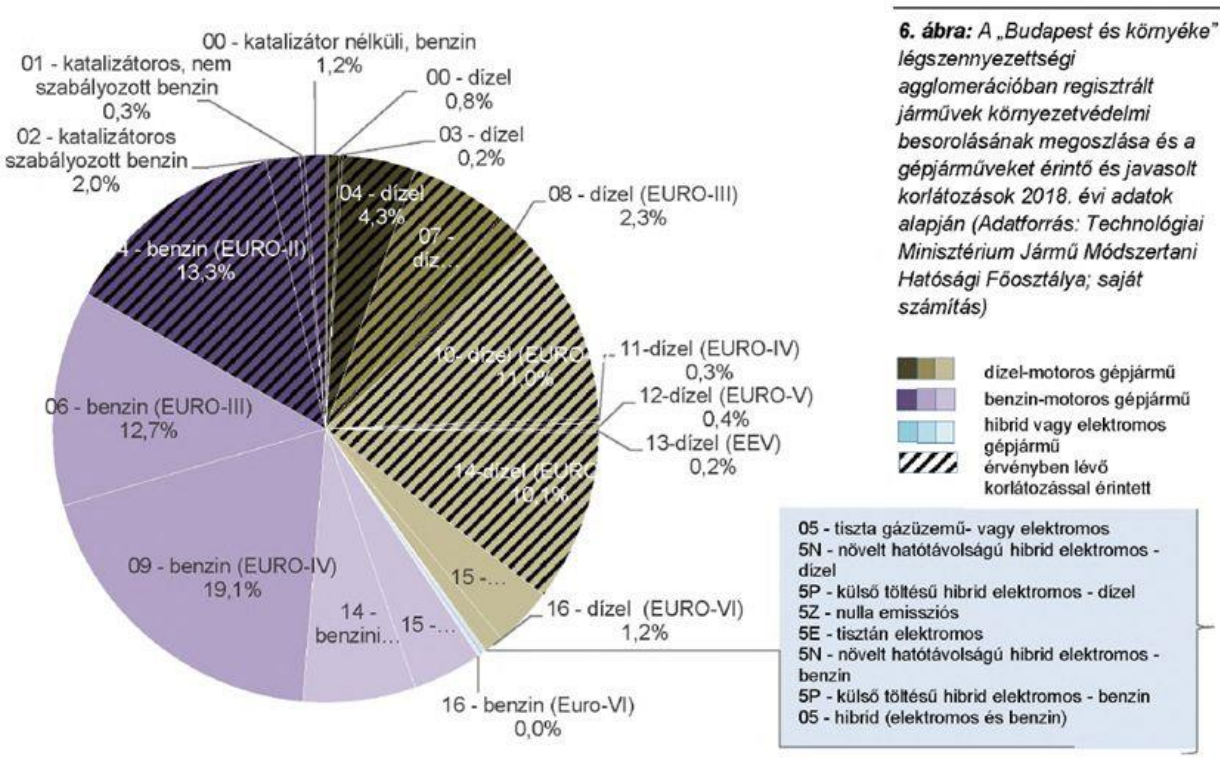
The Mayor in case of the information threshold:

- informs the residents about other regulations;
- may ask the notary of all capital districts to acutely monitor the possible prohibition of open incineration of garden waste;

- may ask for action to reduce further deterioration of the smog situation (the voluntarily imposed self-regulation of the residents and air polluntants) (for more detail, see the decree)

The Mayor in case of the alert threshold:

- informs the residents about other regulations;
- may order
  - the restriction or prohibiton of motor vehicles that are not under the exception of regulation (see the figure); and
  - the restriction or prohibition of mopeds and bicycles powered by an internal combustion engine;
  - the operators of point sources to use other energy sources and modes of operation or the reduction of emission or the suspension of operation;
- may ask the notary of all capital districts to acutely monitor the possible prohibition of open incineration of garden waste;
- may ask for action to reduce further deterioration of the smog situation (the voluntarily imposed self-regulation of the residents and air polluntants)



6. ábra: *A „Budapest és környéke" légszennyezettségi agglomerációban regisztrált járművek környezetvédelmi besorolásának megoszlása és a gépjárműveket érintő és javasolt korlátozások 2018. évi adatok alapján (Adatforrás: Technológiai Minisztérium Jármű Módszertani Hatósági Főosztálya; saját számítás)*

5. Figure: Restriction in SAPE situation based on the environmental score in the traffic license of vehicles. The srtiped slices of the pie diagram show which vehicles must stop in case of smog alert.

3) The evaluation and supervision process.

There is no regulated system, assigned committee and practice for the monitoring of the evaluation of air quality data and the process of smog alert. In the Mayor's office there is basically of one responsible person to monitor the process and to prepare the decisions. The replacement of this experienced and motivated colleague is not solved yet. Control mechanisms are not implemented.

4) strengths and weaknesses of DSS (based on your own opinion)

The weaknesses of the current regulation of smog alert:

- It can only be ordered in settlements that have at least one automatic monitoring station to detect immission
- The system is slow and strict
- The public information system is weak
- The preparation of decisions is insufficiently regulated
- The actions taken during a smog alert do not bring relevant improvement
    - The settlements of the agglomeration around Budapest cannot and should not be separated regarding air quality protection
    - The only relevant regulation is the restriction of the polluting vehicles based on their environmental classification
    - The daily commute from the agglomeration means a huge environmental burden
    - During the winter smog the emission of heating is bigger in Budapest than the emission of traffic
    - The heating of houses of agglomeration settlements impairs in a large extent of the quality of air in Budapest

5) Future plans

Recommendations of AWAIR FUA platform

Immission measurement

- OMSZ should take over the operation of the immission measurement network. The state should made available resources to develop and maintain the system.
- The number and location of monitoring stations are sufficient in Budapest but there should be more stations in the area of FUA.
- We should pay particular attention to monitoring PM2,5. There should be more monitoring stations. On the other hand, the measurement of SO2 and CO is not justified at every station.
- The measuring of benzole, VOC-, PAH-compunds etc. is ad hoc, we should pay more attention to them.

Emission database

- We need detailed knowledge about the pollutant sources for effective daily analysis and forecast of air quality.

- It would be important to use the GPS information of motor vehicles for estimating the actual emission values. This is only good for a short-term forecast of air-quality. GPS-based information sources: toll payment database, Waze, etc.
- The spatial structure of traffic emission can be refined by a model describing urban traffic.
- The databases can be built into the atmospheric propagation models (CHIMERE) as an input of traffic.
- To refine the data of communal heating we need more data (e.g. number of flats, type of heating, age of furnace etc.). This is mostly available in Budapest in the database of the chimney sweeping company.

Modeling and forecasting

- The model must be developed continuously and the results of the forecast must be compared to the immission data and the whole thing should be examined statistically.
- OMSZ should have forecast data by district.
- When ordering a smog alert, the emission-based forecast data should be considered beside the immission data.
- The value of EEA AQI should be calculated daily from the data and should be put first in communication.

Index	Description	NO2	NOx	SO2	CO	O3	PM10	PM2.5
		µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3
1	Excellent	0 - 16	0 - 28	0 - 20	0 - 1200	0 - 48	0 - 16	0 - 10
2	Good	16 - 32	28 - 56	20 - 40	1200 - 2400	48 - 96	16 - 32	10 - 20
3	Tolerable	32 - 40	56 - 70	40 - 50	2400 - 3000	96 - 120	32 - 40	20 - 27
4	Polluted	40 - 80	70 - 140	50 - 100	3000 - 6000	120 - 220	40 - 80	27 - 50
5	Dangerous	80 -	140 -	100 -	6000 -	220 -	80 -	50 -

Data publicity

- These data are public data so we should build a database that is available for everyone.
- A unified information system should be implemented based on the measures and models. The current monitoring data, the forecast and the potential health effects should be made available for the public on an official state website.

Thresholds

- The daily average limit value of PM2,5 should be defined in the threshold regulation based on the WHO recommendation.
- When deciding about air quality, PM2,5 should be considered rather than PM10.

Regulation

- The order and cancellation of smog alert should not be regulated in a municipal level but on a regional level
- Modification of every law according to the aforementioned changes
- Modification of the threshold regulation according to the aforementioned changes

Decision support

There should be a task force that prepares the decisions professionaly. The following organisations should delegate members to this body

- OMSz (meteorological institute)
- NNK (public health institute)
- disaster management authority
- Environmental authority
- concerned municipalities or municipal associations
- NGOs

Order of smog alert

- Country-wide or regional state authority should order the smog alert instead of mayors
- The task force should make a recommendation to each zone even if there is not a country-wide SEPA situation.
- The ordered smog alert should apply to the air quality zones defined in the government decree. The smog alert should be in effect in Budapest and all the settlements of the FUA.

Recommendations and actions

The current regulations do not make a significant change in air quality in case of smog alerts. The relevant actions should develop based on the local capabilities of the air quality zones – unified regulations are not effective in this case.

Recommendations and actions at the INFORMATION THRESHOLD

- Utilization of cars (carshare)
- Start of school delayed
- Order of home office
- Monitoring
    - Increased patrolling of Disaster Authority, locsal militia and rangers
    - increased monitoring and sanctioning of waste inceneration
    - ‘Smoke Monitoring’ patrol service
    - inspection of working chimneys

Actions at the ALERT THRESHOLD

1) Mobility actions

a) Restrictions:
   - Restriction of car traffic (alternative suggestions)
     - prohibition based on environmental classification (current regulation is based on this)
     - temporary prohibition of diesel fuled vehicles
     - restrictions based on even-odd license plates
   - Congestion zones
   - Restriction or prohibiton of freight traffic
     - Regulation of freight transport
     - Prohibition of supplier traffic for large construction projects
   - Prohibition of the most pollutant buses
   - Prohibition of pollutant cabs
   - Increase of parking fees

b) Supports:
   - Public transport
     - Establishment of temporary agglomeration public transport connections
     - Increased frequency of suburban rail transport
     - Increased frequency for buses in the agglomeration
     - Free public transport (BKV) tickets at Park and Rides
     - Free charge of use of public transport
     - New, temporary bus lanes
   - Free micro mobility tools

2) Actions to reduce heating emission

a) Restrictions
   - Prohibiton of hobby heating (fireplace)
   - Recalibration of district heating or central heating in office buildings by 1°C and by 3°C at night
   - In houses where there is both a gas and a solid fueled stoves, prohibition of the latter
   - Restriction of industrial point sources
     - Stopping the waste incinetation for the SAPE days

b) Supports: The state and/or the municipality can support the conversion to more environment-friendly heating systems but the effect of that is not relevant during smog alert but on the long term.

INFORMATION during smog alert

- Information should start at the reaching of the health limit.
- Public service media providers must report on current air quality and forecasts.
- Local authorities and NGOs should participate more intensively in information providing.

Other communication possibilities

- Agglomeration: local newspaper's website; website of the settlement; Instagram; local mobile app; e-mail chain; local social media; local TV; mayor's FB page
- Capital: AWAIR app; BKK App; BKK Facebook channel; budapest.hu; City Council FB channel; Waze; direct and permanent connection to the bigger online news portals (perhaps with buying place on the site); direct reach of the leaders of the institutions

- State: central text message; TV, radio; digital signs on the road; intensive information about harmful fuels; weather forecasts; statement by the prime minister; communication on public spaces

Implementation and control

- The police and the local police should have authorized and competent staff to act
- The penalties must be developed precisely.

SUMMARY:

All three cities participating in the project create their decision support systems based on legal regulations in their countries. The dominant model is a centralized system where information on the state of air quality is sent by an institution at the regional level to individual towns and from there, being sent to the appropriate unit in the city hall, is sent to individual institutions, to the media and posted on websites. Cities have a similar number of operational and information activities, with Katowice having the largest number of information activities, and Zuglo having the largest number of operating activities. All cities have dss updated in a similar period, with Parma from 2018 being the newest. Despite the preparation of an update to the PDK adopted in 2016, Katowice has not updated the document.

The levels of information on the state of air quality are similar in Parma and Katowice. Zuglo has stricter limits than Parma and Katowice.

They all use press releases and local media to report on the state of air quality. In terms of operational activities, the city guard or its equivalent is used.

In the analyzed systems, several levels of alarms are distinguished depending on the level of air pollution with a given pollutant. The SAPE in Parma is based on the exeedence on PM10, and in Hungary and Poland could be included other pollutants like ozone.

In the presented strengths of the system, all cities mention the creation of a coherent system of information and management during smog alerts. A common disadvantage of the implemented systems is the difficulty in reaching a wider population. All cities plan to develop the system and improve it by planning the creation of dedicated teams responsible for monitoring the system, increasing the number of information and operational activities, and indirectly introducing changes in local law to increase the efficiency and scope of activities already carried out.

Anexes:

Katowice - Plan Działań Krótkoterminowych dla miasta Katowice z załącznikami

Parma - Protocollo per la riduzione dell esposizione delle persone in caso di eventi acuti di inquainemento tmosferico