





TAKING
COOPERATION
FORWARD

 Parma, 06.11.19

 **THE AWAIR Project - Background and Development of a joint AWAIR APP**

 Dr. Regina Pickford, Helmholtz Zentrum München (HMGU)

BACKGROUND



TAKING COOPERATION FORWARD



THE AWAIR PROJECT



AWAIR:

Environment**A**I integrated, multilevel know**W**ledge and approaches to counteract critical **AIR** pollution events, improving vulnerable citizens quality of life in Central Europe **Functional Urban Areas**

Start: September 2017
End: August 2020



European Union

Interreg
CENTRAL EUROPE

AWAIR



TAKING COOPERATION FORWARD

Functional urban areas and Partners



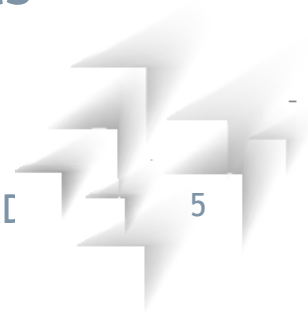
- Municipality of Parma, Italy
- Municipality of Budapest, Hungary
- Municipality of Katowice, Poland
- Municipality of Graz, Austria
- Arpae Emilia-Romagna, Italy
- CINSA, Italy
- Central Mining Institute, Poland
- Helmholtz Zentrum München, Germany



AWAIR - SELECTED GOALS

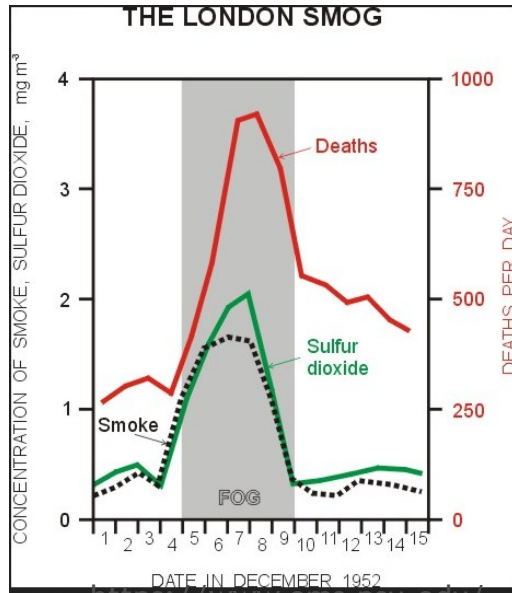


- Better communication with citizens during **Severe Air Pollution Episodes**
- Greater protection of the health of citizens during Severe Air Pollution Episodes
- Focus on **susceptible groups**
- Improvement of environmental management capacities to cope with Severe Air Pollution Episodes
- Communication of results to research projects and administrators in other countries.



SEVERE AIR POLLUTION EPISODES - AN HISTORIC EXAMPLE

London Smog December 1952



„Five days in deathly fog“

One of the first signs was that the undertakers ran out of coffins – and the florists out of flowers.

The show of the opera "La Traviata" had to be stopped as the smog blocked the spectators' view to the stage.

The number of deaths was comparable to that of the cholera epidemic in 1854 and the influenza epidemic in 1918

Spiegel online, 2012

2.000 people died
10.000 suffered from
respiratory diseases



SEVERE AIR POLLUTION EPISODES TODAY



- Occur when levels of atmospheric pollutants exceed **national and international standards** and become extremely **harmful** to people's health
- Causes: complex, depend on various factors e.g. emissions, meteorological parameters, topography, atmospheric chemical processes and solar radiation
- Usually occur when the weather conditions build up very high pollutant concentrations,
- they are rarely the consequence of changes in local sources, e.g. amount of traffic on the road



THE AWAIR APP



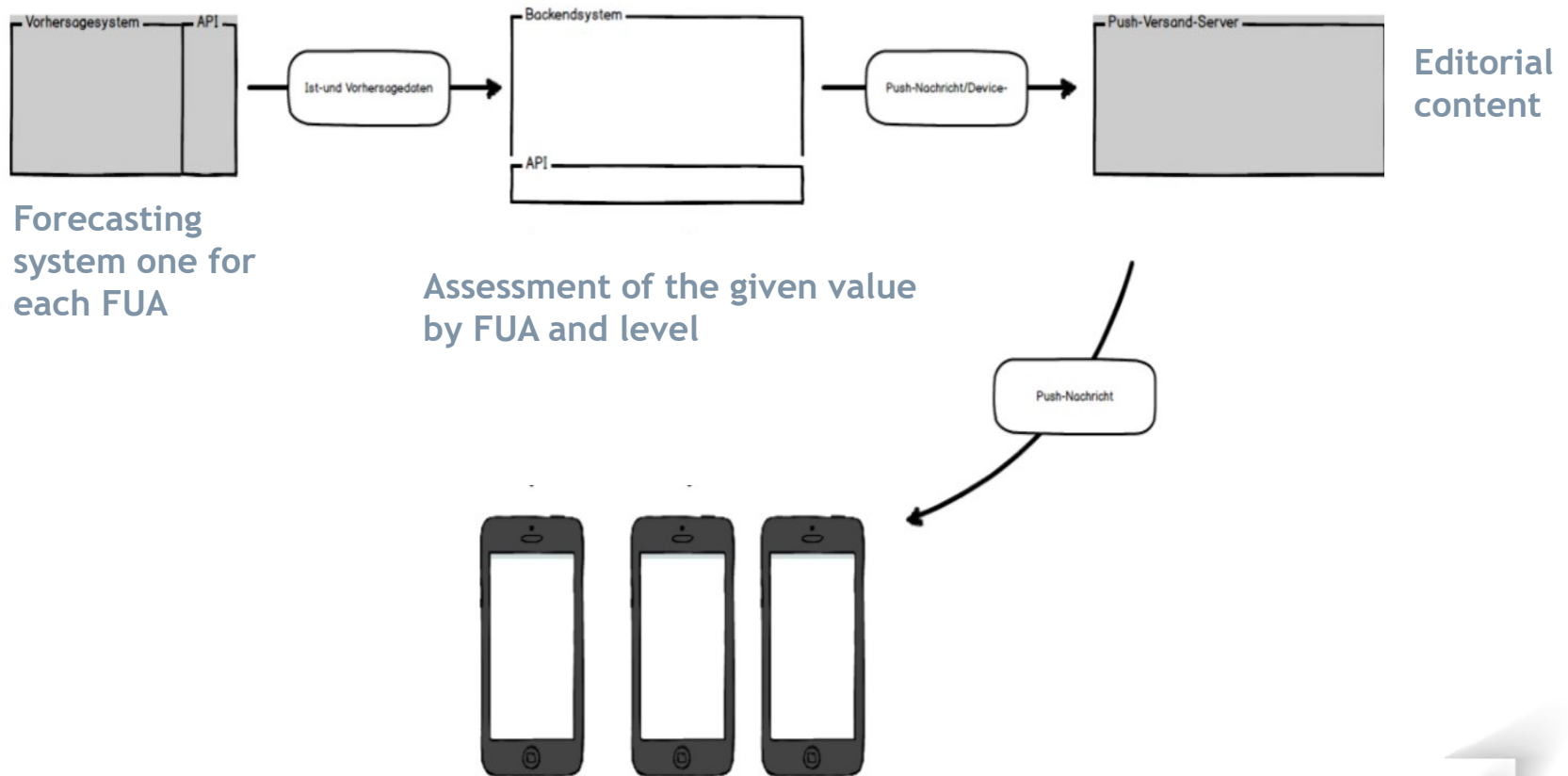
THE AWAIR APP WILL...



- warn citizens in case of severe air pollution episodes
- raise the awareness for the impacts of air quality on health
- focus on susceptible groups
- increase the general knowledge on air quality
- prompt changes in attitude and behaviour in citizens and stakeholders

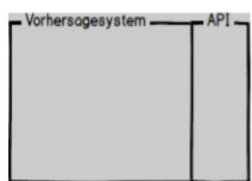


TECHNICAL CONCEPT OF THE APP

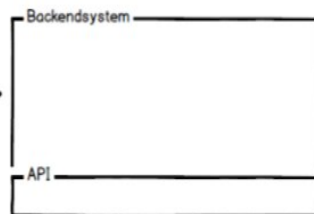


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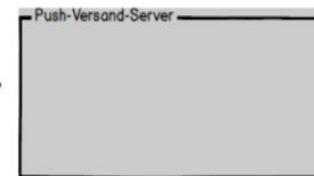
Forecast for
Katowice:
 $40\mu\text{g}/\text{m}^3 \text{PM}_{10}$



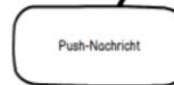
Forecasting system one for each FUA



Assessment of the given value by FUA and level



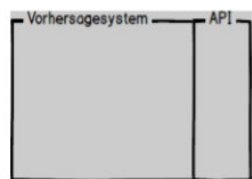
Editorial content



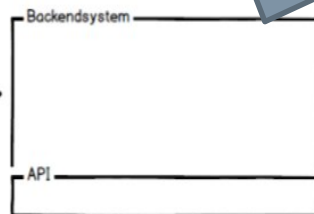
TECHNICAL CONCEPT OF THE APP

Forecast for Katowice:
 $40\mu\text{g}/\text{m}^3 \text{PM}_{10}$

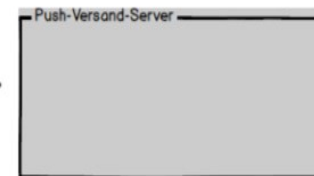
For Katowice
this is below
the alert level



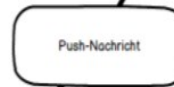
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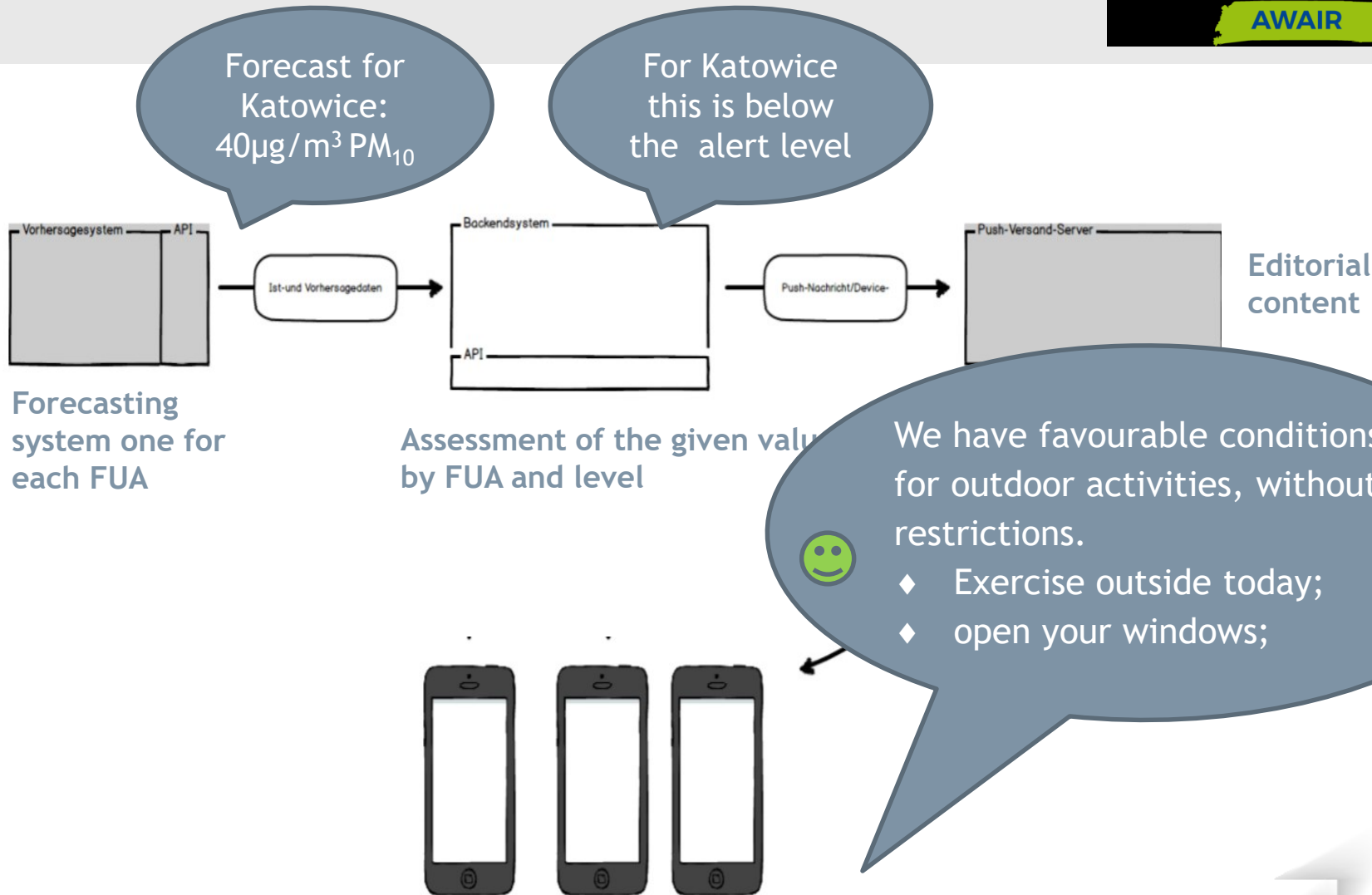
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Editorial content



TECHNICAL CONCEPT OF THE APP



THE AWAIR APP WILL

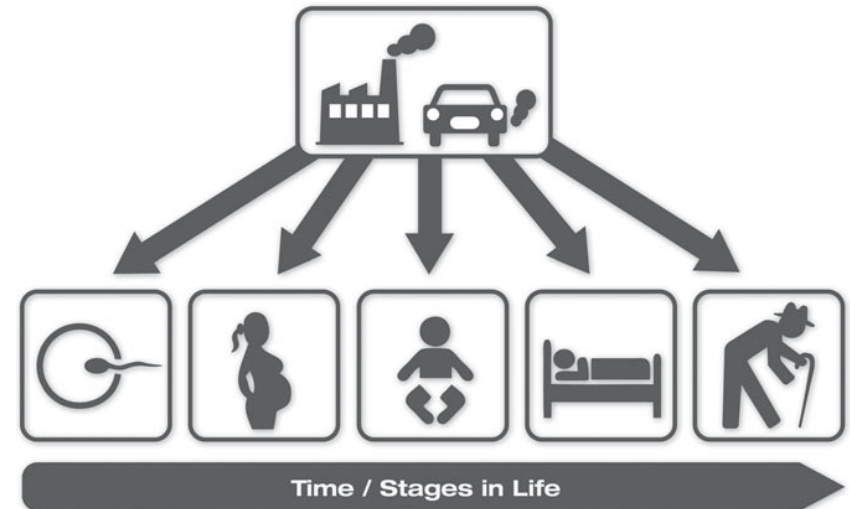


- warn citizens in case of severe air pollution episodes
- raise the awareness for the impacts of air quality on health.
- **focus on susceptible groups**
- increase the general knowledge on air quality
- prompt changes in attitude and behaviour in citizens and stakeholders



WHO IS SUSCEPTIBLE...

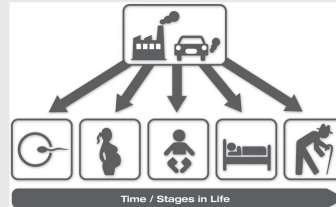
- Pregnant women
- Children
- People with chronic diseases:
 - Respiratory diseases
 - Cardiovascular disease
 - Cancer
 - Diabetes
- Elderly



Stages in life of special susceptibility toward air pollution
(from Ruckerl, 2011)



...AND WHY:



- **Pregnant women:** the developing organ system of the fetus is vulnerable to environmental toxicants -> higher rates of cell proliferation and changing metabolic capacities
- **Children:** their lungs are not mature yet; their respiratory rate is higher than that of adults; their immune system is not fully developed
- **People with chronic diseases:** acute exacerbations of underlying diseases on days with high levels of air pollution like smog situations; impaired immune system
- **Elderly:** compensation mechanisms for toxic substances not as good anymore; often in combination with existing diseases



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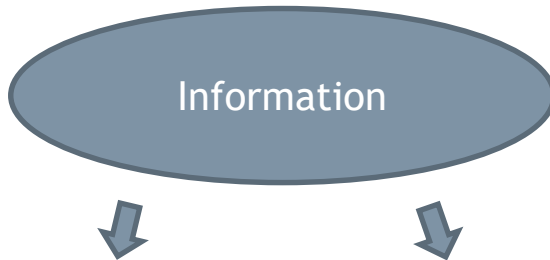


SUGGESTED BEHAVIOUR (I)

Alert level	What does this mean?	What you can do for your health	What you can do to help decrease air pollution
No alert/green The air quality is good/satisfactory;	Air pollution poses little or no risk for any person	We have favourable conditions for outdoor activities, without restrictions. <ul style="list-style-type: none">◆ Exercise outside today;◆ open your windows;	If possible use your bike or walk <ul style="list-style-type: none">◆ to run you errands◆ for your way to work /school/ kindergarden



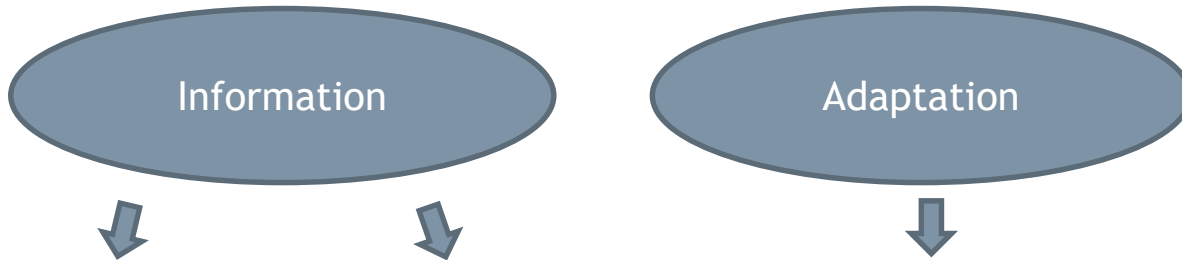
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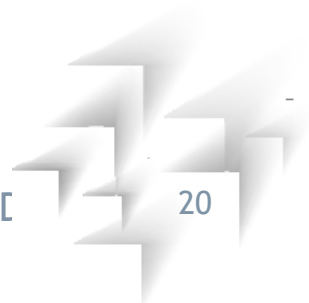
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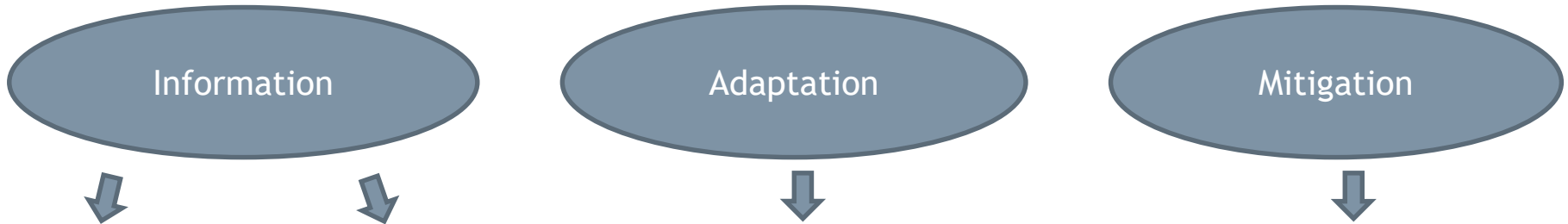
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SUGGESTED BEHAVIOUR (II)

Alert level	What does this mean?	What you can do for your health	What you can do to help decrease air pollution
Alert level 1/yellow The air quality is acceptable.	For people who are unusually sensitive to air pollution there may be a moderate health concern.	<p>The conditions are moderate for outdoor activities.</p> <ul style="list-style-type: none"> ◆ If possible, go to a clean place like a park for outdoor activities; ◆ <i>Parma</i>: open your windows early in the morning (before 7 am), [after lunch (2-4 pm) only between 01.10. and 30.04.] or late at night (after 11 pm); ◆ <i>Katowice</i>: Close your windows early in the morning or late at night, leave them open during the day; ◆ <i>Zugló</i>: open your windows or ventilate regularly early in the morning (before 7 am), at midday (12-14 pm) and at night (after 9 pm); 	<ul style="list-style-type: none"> ◆ Only use the car if really needed, ◆ avoid extended idling ◆ prefer public transport ◆ if possible, use time windows with less traffic to run your errands <p>If you are not specifically sensitive to air pollution use your bike or walk to run you errands and for your way to work /school/ kindergarden</p>



SUGGESTED BEHAVIOUR (III)

Alert level	What does this mean?	What you can do for your health	What you can do to help decrease air pollution
<p>Alert level 2/ orange The air quality is moderate.</p>	<p>Members of sensitive groups may experience health effects. The general public is not likely to be affected. Extended exposure to air pollution can pose a small health hazard.</p>	<p>The conditions are moderate for outdoor activities.</p> <ul style="list-style-type: none"> ◆ Limit outside physical activity; ◆ Children and people with chronic diseases, should avoid outdoor exertion ◆ Avoid lighting candles and refrain from using fragrance dispensers. - to be discussed ◆ <i>Parma</i>: open your windows early in the morning (before 7 am), [after lunch (2-4 pm) only between 01.10. and 30.04.] or late at night (after 11 pm); ◆ <i>Katowice</i>: Close your windows early in the morning or late at night, leave them open during the day; ◆ <i>Zugló</i>: open your windows or ventilate regularly early in the morning (before 7 am), at midday (12-14 pm) and at night (after 9 pm); 	<ul style="list-style-type: none"> ◆ Combine errands to reduce "cold starts" of your car ◆ avoid extended idling ◆ if possible, use time windows with less traffic to run your errands ◆ avoid residential wood burning;



SUGGESTED BEHAVIOUR (IV)

Alert level	What does this mean?	What you can do for your health	What you can do to help decrease air pollution
<p>Alert level 3/ red The air quality is bad.</p>	<p>For the entire population prolonged exposure to substances in the air increases the risk of adverse health effects, for example changes in the respiratory, cardiovascular and immune systems. Sensitive populations are particularly at risk.</p>	<ul style="list-style-type: none"> ◆ If possible, avoid physical activity outside ◆ limit stays in the open air to the necessary minimum; ◆ Sick, elderly people, pregnant women and young children should absolutely avoid being outdoors. ◆ Sick people: if available, keep emergency medication at hand. ◆ Avoid lighting candles and refrain from using fragrance dispensers. - <i>to be discussed</i> ◆ Keep the windows closed and turn on air purifiers, if available. 	<ul style="list-style-type: none"> ◆ Only use the car in emergencies ◆ avoid residential wood burning



WHAT THE AUTHORITIES DO (I):

What the authorities do	Zugló/Budapest	Katowice	Parma
No alert/green	--	--	01.04-30.09 none
Alert level 1/yellow	<p>None</p> <p>(the new administration of the city will change this policy and wants to start an active communications about the air quality matters)</p>	<ul style="list-style-type: none"> -information about an alert level on the City's website -intensive controls of installations of solid fuel combustion -controls regarding the prohibition of burning plant residues - recommendation to restrict the use of fireplaces - recommendation to use public transport instead of cars 	<p>01.10 to 31.03: Traffic restrictions in the main urban areas:</p> <p>http://www.liberiamolaria.it/info and</p> <p>https://www.arpae.it/misure_emergenziali.asp?idlivello=1697</p>



WHAT THE AUTHORITIES DO (II):

What the authorities do	Zugló/Budapest	Katowice	Parma
Alert level 2/orange	<p>Mayor's public release about the 'information level of smog regulation' on the national Press Agency and the City's website.</p> <p>According to the recent regulation the mayor may ask</p> <ul style="list-style-type: none"> • for voluntary restriction of Euro 3-4-5 diesel vehicles and use of motorcycles without registration plates and • the authorities to control of burning plant residues • restrict of installations of solid fuel combustion • for use public transportation system instead of single cars 	<ul style="list-style-type: none"> -information about an alert level on the City's website -intensive controls of installations of solid fuel combustion -controls regarding the prohibition of burning plant residues - recommendation to restrict the use of fireplaces - recommendation to use public transport instead of cars 	<p>01.10 to 31.03 (only when daily concentrations of PM10 exceed 50 µg/m³ for 3 consecutive days)</p> <p>Traffic restrictions in the main urban areas (including diesel EURO4), indoor heating lowering and ban of some agricultural activities and biomass burning.</p>



WHAT THE AUTHORITIES DO (III):

What the authorities do	Zugló/Budapest	Katowice	Parma
Alert level 3/ red	<p>Mayor's public release about the 'alarm level of smog regulation' on the national Press Agency and the City's website.</p> <p>According to the recent regulation the mayor may order</p> <ul style="list-style-type: none"> • the traffic ban of Euro 3-4-5 diesel vehicles and motorcycles without registration plates <p>may ask</p> <ul style="list-style-type: none"> • the authorities to control of burning plant residues • restrict of installations of solid fuel combustion • for use public transportation system instead of single cars • the drivers to limit their speed to 20 km/h 	<ul style="list-style-type: none"> -information about an alert level on the City's website -intensive controls of installations of solid fuel combustion -controls regarding the prohibition of burning plant residues -free public transport - changes in the organization of car traffic -Recommendation to restrict the use of fireplaces - recommendation to use public transport instead of cars 	Not applicable in Parma FUA




- Should we include tips on nutrition?
 - E.g. Eat plenty of fresh fruits and vegetables: Fresh fruits and vegetables contain ingredients that can decrease the negative health impact of air pollutants; Take fish oil capsules on a regular basis: Fish oil contains omega3 fatty acids which have been shown to decrease the negative impact of air pollutants on the cardiovascular system
- Are there additional susceptible groups?
- Any other suggestions we could give for best behaviour?
Breathing masks?
- Should we use 3 or four levels of air pollution?






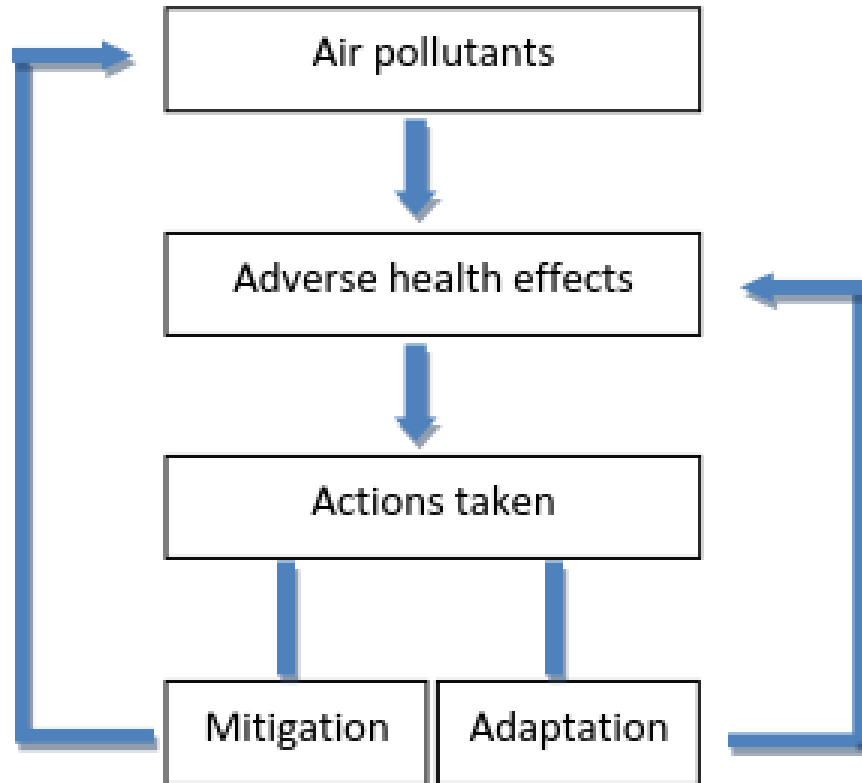
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ADAPTATION VS. MITIGATION



ALERT LEVELS BY CITY

Alert level	Zugló (PM ₁₀)	Katowice (PM ₁₀)	Parma (Arpae air quality index)
Green	<50	0-49	0-49
Yellow	50-75	50-149	50-99
Orange	75-100	150-199	100-149
Red	100<	>200	> 150



INDIVIDUAL ALERT LEVELS IN EACH CITY I

➤ Katowice, Poland

Level	Measured as
Acceptable level	>50 $\mu\text{g}/\text{m}^3$ PM_{10}
Society informing level	>200 $\mu\text{g}/\text{m}^3$ PM_{10}
Alarm level	>300 $\mu\text{g}/\text{m}^3$ PM_{10}

➤ Parma, Italy - **update**

Alert Level	Triggered
First alert level	when the daily limit of $50\mu\text{g}/\text{m}^3$ is exceeded for 3 consecutive days
Second alert level	by exceeding the daily limit of $50\mu\text{g}/\text{m}^3$ for 10 consecutive days



INDIVIDUAL ALERT LEVELS IN EACH CITY II

➤ Zuglo, Budapest, Hungary

Level	Triggered
Information threshold	more than $75 \mu\text{g}/\text{m}^3$ PM_{10} at the same time at 3 measurement stations
Alert threshold	The average of the results are higher than the alert limit ($100 \mu\text{g}/\text{m}^3$ PM_{10}) which was simultaneously measured 2 consecutive days on 3 different measuring stations and no improvement is expected for the following day



AIR QUALITY STANDARDS

	PM ₁₀		PM _{2.5}		NO ₂	
	Daily mean	Annual mean	Daily mean	Annual mean	Hourly mean	Annual mean
EU	50 µg/m ³ (max. 35 exceeding per year)	40 µg/m ³	--	25 µg/m ³	200 µg/m ³ (max 18 exceeding per year)	40 µg/m ³
US EPA	150 µg/m ³ (≤1 exceeding per year)	--	35µg/m ³	12/15 µg/m ³	100 ppb (188 µg/m ³)	53 ppb (99,6 µg/m ³)
WHO	50 µg/m ³	20 µg/m ³	25 µg/m ³	10 µg/m ³	200 µg/m ³	40 µg/m ³



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