



## Clean Air project

### A concept – structure of curriculum

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Intellectual Output: 01

The name of the partner: Krakow Smog Alert

Country: Poland

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#### A General part

##### A.1 Program title

Clean air curriculum as a base for clean environment

##### A.2 The aim of the program

The aim is to form an attitude by which children taking part in the training program become conscious, active “messengers” of air pollution education. The main aim of the training is to provide knowledge to the children and to help them acquire a holistic understanding of the problem of air pollution. The program pays attention also to the teachers. It aims to empower teachers to use best practices and employ the latest teaching methods independently; in doing so, the ultimate aim of the program is to facilitate the teachers in developing the required skills to create effective lessons about air pollution.

##### A.3 Target group

The target group of the program consists mainly of children from 6-14 years old and simultaneously the secondary target group is 14-19 year-olds. Also, we offer our training to teachers from primary and secondary schools in the rural areas.

The module 0 and module 5 are addressed to teachers and in the same time the modules 1 - 4 are addressed to the children (6-14 years old).

##### A.4 The goals of the program

- Children and teachers will be competent in critical questioning and analysis.
- Children and teachers will increase their interest in and capacity to take part in air pollution decision making
- Children and teachers will change their behavior regarding air pollution issues

##### A.5 Didactical principles

- **Pedagogy of Work:** Learning is based on practical work and not driven by theory. Students learn by making useful products or providing useful services to others.

- **Co-operative Learning:** Learning takes place in a collaborative context and emerges from the interaction of students among each other and with the teacher. It is based on co-operation in the productive process.
- **Enquiry-based Learning:** Students learn empirically through personal experience in real life situations by a kind of rudimentary problem solving or experimental groping. Learning is based on exploring a solution space for real-world problems experimentally by trial and error involving group work.
- **The Natural Method:** Learning is based on an inductive, global approach. It is always situated in the students' current living situation. Life here is conceived as a broad concept including nature, nature by itself, and the social and political aspects of contemporary life.
- **Centers of Interest:** Learning is based on students' learning interests and curiosity. Students within the context of the school and in alignment with others choose themselves what to work on and how to explore their topic of interest.

## A.6 The admission requirements and assessments regulations

No

### B Specific part

#### B.1 The organization of educational process

- Individual work
- Group work
- Extracurricular materials

#### B.2 Content

A title of content	Duration in hours
<b>Module 0: Introduction</b>	<b>1 hour</b>
<b>Module 1: What pollutes the air</b>	<b>1 hour</b>
<b>Module 2: Impact of the pollution on human health</b>	<b>1 hour</b>
<b>Module 3: Solutions for clean air environment</b>	<b>1 hour</b>
<b>Module 4: Preventing air pollution</b>	<b>1 hour</b>



<b>Module 5: Education about clean air protection</b>	<b>1 hour</b>
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Description of learning outcomes for each module:

**Module 0:**

- Teachers understand aspects on air pollution and the quality of atmospheric environment
- Teachers have knowledge on regulations of air pollution

**Module 1**

- Children describe the ways humans modifies the environment
- Children characterize gaseous and particulate matter pollution together with identification of sources
- Children listen and talk about experiences
- Children make contributions to small and large group discussions
- Children understand that air pollution is not visible

**Module 2**

- Children have knowledge on the impact of air pollution on human health
- Children acquire data through senses
- Children communicate data and information in appropriate form

**Module 3**

- Children develop scientific inquiry and critical thinking
- Children clearly understand, interpret and explain aspects regarding the air pollution and also are able to estimate, assess and come to conclusions
- Children are able to construct explanations

**Module 4**

- Children make wise choice in the use of natural resources and recycling of materials
- Children know safe, environmentally appropriate, and ethical practices
- Children are able to communicate valid conclusions

**Module 5**

- Teachers know where to find the best practices on teaching about air pollution



- Teachers apply various materials in their study courses

#### Methods of learning outcomes verification

- Involvement in teamwork
- Activity during classes

#### Key competencies:

- Collecting, analysing and organising information
- Communicating ideas and information
- Planning and organising activities
- Working with others in teams
- Using mathematical ideas and techniques
- Solving problems, and
- Using technology.

#### Key literacy terms:

Air, air pollution, alternatives, animals, behaviour, benzo(a)pyren, Best Environmental Practices (BEP's), biodiversity, burning, care, cars, changing, chimneys, clean, coal, conservation, ecosystem, emissions, energy, endangered, environment, environmental values, equipment, ethics, exhausts, facilities, features, fields, government, health, heaters, human-made, impacts, implementation, interest group, investigate, local, maintenance, particles, particle matter, permits, pollution, protect, rare, resource, restrictions, safety, smog, smoke, sources, technology, threatened, tourism, transport, water, wood, work.

### **B.3 Learning materials and readings**

Materials for each module will be available at: <http://cleanair-project.eu>

### **B.4 Training providers**

The program will be presented to teachers by the consortium partners during-multiplier events.

## **C Annexes**

### **Example Content**

Introduction

#### **Module 0: Introduction**

Unit 0.1 What is air?



Unit 0.2 What is air pollution?

### Module 1: What pollutes the air

Unit 1.1 A short overview of air pollution and smog in rural areas

Unit 1.2 Pollutants the air

Unit 1.3 Informing on air pollution

### Module 2: Impact of the pollution on human health

Unit 2.1 Respiratory system

Unit 2.2 Cardiovascular system

Unit 2.3 Effects of air pollution on children's health and development

Unit 2.4 Protect yourself

### Module 3: Solutions for clean air environment

Unit 3.1 What can be done?

Unit 3.2 Good practices from Poland, Romania, Slovakia, Spain, Czechia

Unit 3.3 Effects

### Module 4: Preventing air pollution

Unit 4.1 What can we do?

Unit 4.2 Prevention in rural areas

Unit 4.3 Effects

### Module 5: Education about clean air protection

Unit 5.1 Principles of education about air pollution

Unit 5.2 Best practices

Unit 5.3 Use in the rural areas

## Introduction



*“Never doubt that a small group of thoughtful, committed citizens*

*can change the world. Indeed, it’s the only thing that ever has.”*

*(Margaret Mead, cultural anthropologist, 1901-1978)*

The aim of this curriculum is to establish European quality standards for teaching about air pollution and to develop strategies for moving forward in this field. Teaching about air pollution is an important tool in the work for clean environment in general.

But what kind of training is needed, who needs training, on what, and what methods are the most successful? What can be learned from best practises in various European countries? What kind of knowledge and skills does a trainer need to ensure a successful outcome?

The curriculum was developed in 2018 as a common product of organisations and institutions from Poland, Slovakia, Czechia, Romania and Spain it was made possible in the frame of a “Strategic Partnership”, supported by the European funding programme Erasmus+.

The Universal Curricular Taxonomy System (UCTS) has been used to unambiguously interpret the available didactic content. UCTS is a universal tool for interpreting all segments of material, which are consistent and didactically useful. The following components of UCTS can be used in the interpretation of didactic materials:

- Learning unit (or Unit) – a smallest element of didactically useful material,
- Learning module (or Module) – a set of Units,
- Curriculum – a set of Modules.

A Learning unit is the smallest element of educational materials. It usually conveys a coherent message or provides testing materials. It intuitively refers to the smallest piece of didactically useful material available in the form of any medium (e.g. book, script, PowerPoint presentation, etc.). Thus, learning units are made of a set of learning objects covering a specific topic. These refer not only to the didactic content per se but also to exercises and references.

What does the teacher need to know?



The teacher must have broad knowledge of the air pollution. This includes knowledge of the history of fight with air pollution, pollutants and their impact on human health and environment, prevention methods etc. The teacher must know where to find statistics of air pollution in Europe, resources (books, websites, films etc.) and examples of best practises in prevention against air pollution. The teacher also needs different kinds of skills, such as performance and teaching skills, he/she must know tools like icebreakers, interactive methods to energise the participants, how to create tasks for the participants and other facilitation skills.

## **Module 0 Introduction**

### **Unit 0.1 What is air?**

Air is mostly gas. Air is all around us, but we can't see it. So what is air, exactly? It's a mixture of different gases. The air in Earth's atmosphere is made up of approximately 78 percent nitrogen and 21 percent oxygen. Air also has small amounts of lots of other gases, too, such as carbon dioxide, neon, and hydrogen. While air is mostly gas, it also holds lots of tiny particles. These particles in the air are called aerosols. Some aerosols—like dust and pollen—are picked up naturally when the wind blows. But the air can also carry soot, smoke, and other particles from solid fuel boilers, car exhaust, and power plants. These are major contributors to air pollution.

### **Unit 0.2 What is air pollution?**

Pollution enters the Earth's atmosphere in many different ways. Most air pollution is created by people, taking the form of emissions from solid fuel boilers, cars, factories. These man-made sources of pollution are called anthropogenic sources.

Some types of air pollution, such as smoke from wildfires or ash from volcanoes, occur naturally. These are called natural sources.

Air pollution is most common in municipalities where emissions from many different sources are concentrated. Sometimes, mountains or tall buildings prevent air pollution from spreading out. This air pollution often appears as a cloud making the air murky. It is called smog. The word "smog" comes from combining the words "smoke" and "fog."



**London smog** results from a high concentration of sulfur oxides in the air and is caused by the use of sulfur-bearing fossil fuels, particularly coal. This type of smog is aggravated by dampness and a high concentration of suspended particulate matter in the air.

**Los Angeles smog** occurs most prominently in urban areas that have large numbers of automobiles and requires neither smoke nor fog. This type of smog has its origin in the nitrogen oxides and hydrocarbon vapours emitted by automobiles and other sources, which then undergo photochemical reactions in the lower atmosphere.

Air pollution is usually thought of as outdoor air pollution. But there are many types of indoor air pollution as well.

Heating a house by burning substances such as kerosene, wood, and coal can contaminate the air inside the house. Ash and smoke make breathing difficult, and they can stick to walls, food, and clothing.

## **Module 1 What pollutes the air**

This module gives an insight into the problem of air pollution in rural areas; it shows the pollutants and it explains the importance of informing about air pollution.

### **Unit 1.1 A short overview of air pollution and smog in rural areas**

When the term “air pollution” is uttered, it brings to mind urban environments, replete with car-packed freeways and belching factories—not small villages and farmed fields. But rural areas are subject to local sources of pollution as well as secondary effects from urban areas—which means the total global health burden from air pollution falls largely on rural populations. In rural areas in the EU, where little monitoring is done for health assessments, there may be a significant understatement of the health impact of outdoor air pollution and the benefit of control.

People living in rural areas face health threats posed by:

- that generated in the home by using solid fuels for heating and cooking;
- “ambient” outdoor pollution from rural and urban sources;



Many households in rural areas use solid fuels, such as coal or wood in regular chimneys, or not certified biomass in low quality boilers, both for heating and cooking. The pollution caused by such fuels has well-established health effects.

## Unit 1.2 Pollutants in the air

You have learned very briefly about the air pollution. Now it's time to have a closer look at some pollutants which are harmful for us.

Among the most important pollutants are:

**Particulate matter** - Particulate matter (PM), also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets that get into the air. Once inhaled, these particles can affect the heart and lungs and cause serious health effects.

Particle pollution includes:

- **PM<sub>10</sub>**: inhalable particles, with diameters that are generally 10 micrometers and smaller; and
- **PM<sub>2.5</sub>**: fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.
  - How small is 2.5 micrometers? Think about a single hair from your head. The average human hair is about 70 micrometers in diameter – making it 30 times larger than the largest fine particle.

**Benzo(a)pyrene** – is a polycyclic aromatic hydrocarbon (PAH) and is found in fine particulate matter. Its origin is incomplete combustion of various fuels. The main sources of BaP in Europe are domestic home heating, in particular wood burning, waste burning, coke and steel production and road traffic. Other sources include outdoor fires and rubber tyre wear.

Humans can be adversely affected by exposure to air pollutants in ambient air. In response, the European Union has developed an extensive body of legislation which establishes **health based**



standards and objectives for a number of pollutants present in the air. These standards and objectives are summarised in the table below. These apply over differing periods of time because the observed health impacts associated with the various pollutants occur over different exposure times.

<i>Pollutant</i>	<i>Concentration</i>	<i>Averaging period</i>	<i>Permitted exceedences each year</i>
Fine particles (PM2.5)	25 µg/m <sup>3</sup>	1 year	n/a
Sulphur dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup>	1 hour	24
	125 µg/m <sup>3</sup>	24 hours	3
Nitrogen dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup>	1 hour	18
	40 µg/m <sup>3</sup>	1 year	n/a
PM10	50 µg/m <sup>3</sup>	24 hours	35
	40 µg/m <sup>3</sup>	1 year	n/a
Lead (Pb)	0.5 µg/m <sup>3</sup>	1 year	n/a
Carbon monoxide (CO)	10 mg/m <sup>3</sup>	Maximum daily 8 hour mean	n/a
Benzene	5 µg/m <sup>3</sup>	1 year	n/a
Ozone	120 µg/m <sup>3</sup>	Maximum daily 8 hour mean	25 days averaged over 3 years
Arsenic (As)	6 ng/m <sup>3</sup>	1 year	n/a
Cadmium (Cd)	5 ng/m <sup>3</sup>	1 year	n/a
Nickel (Ni)	20 ng/m <sup>3</sup>	1 year	n/a
Polycyclic Aromatic Hydrocarbons	1 ng/m <sup>3</sup> (expressed as concentration of	1 year	n/a



	Benzo(a)pyrene		
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### Unit 1.3 Informing about air pollution

#### Why do we need information and alert thresholds?

Determining appropriate information and alert thresholds is very important for the protection of people's health at times when concentration of air pollutants is elevated. Once the information threshold is reached, information about the increased concentration of air pollutants should be disseminated among as many residents of the affected area as possible. Elderly people, children and pregnant women should avoid spending too much time outside since members of these three sections of the population are particularly vulnerable to brief exposures to excessively polluted air. Appropriate guidelines should be sent to kindergartens, schools and hospitals. Media should become involved in dissemination the information on air pollution. These kind of actions contribute to raising public awareness of the smog problem as well, which is a key factor in developing cleaner air plans.

When the alert threshold is exceeded, immediate steps must be taken by local and regional authorities to reduce air pollution in the affected area, e.g. introducing free public transport, conducting extensive inspections of home furnaces, limiting traffic in city centres, conducting extensive inspections at industrial plants, etc.

#### INFORMATION AND ALERT THRESHOLDS FOR PM10 IN SELECTED COUNTRIES

Directive 2008/50/EC, despite the well-documented adverse health effects of brief exposures to particulate matter, lays down information and alert thresholds for SO<sub>2</sub>, NO<sub>2</sub> and ozone only, which means that EU Member States are not obliged to adopt such thresholds for particulate matter (PM10, PM2.5). The decision as to whether adopt them or not rests with the Member States.

#### POLAND

Information threshold: 200 µg/m<sup>3</sup> daily average

Alert threshold: 300 µg/m<sup>3</sup> daily average

Source: Regulation of the Minister of Environment dated 24 August 2012 on admissible levels of some substances in the air



## CZECH REPUBLIC

Alert threshold: 150  $\mu\text{g}/\text{m}^3$  daily average for two consecutive days at one station with an upward trend for PM10 readings observed at the same time over at least 6 consecutive hours at 50% of stations representative of the affected area.

Source: 201/2012 Sb., o ochraně ovzduší [https://www. zakonyprolidi.cz/cs/2012-201](https://www.zakonyprolidi.cz/cs/2012-201)

## SLOVAKIA

Information threshold: 100  $\mu\text{g}/\text{m}^3$  daily average

Alert threshold: 150  $\mu\text{g}/\text{m}^3$  daily average

Source: Zbierka zákonov SR Predpis č. 442/2013 Z. Z

Among all EU states, Poland has the most liberal rules for determining pollution levels and informing the general public about the scale of the problem. At the same time, the quality of air in our country is the worst in the whole European Union.

## Where to find statistics on air pollution?

As an air pollution teacher you don't have to know the latest statistics by heart. But you have to know where to find them. Statistics increases insight and knowledge, supports policy making and evaluation, informs monitoring and measurement of progress and provides citizens with an independent source of information.

For European statistics browse:

<https://www.eea.europa.eu/data-and-maps/data/aqereporting-8>

<http://airindex.eea.europa.eu/>

## Your own set of statistics?

We recommend to prepare your own training set of statistics and indicators from . Choose three simple but most interesting to demonstrate the power of numbers or work with the participants on



one thoughtfully selected thematic or policy field relating to the target group to find out areas of improvement.

## **Module 2: Impact of air pollution on human health**

The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into your lungs, and some may even get into your bloodstream.

### **Unit 2.1 Respiratory system**

Studies have linked particle pollution exposure to a variety of respiratory health effects, including:

- Respiratory symptoms including cough, phlegm, and wheeze.
- Acute, reversible decrement in pulmonary function.
- Inflammation of the airways and lung (this is acute and neutrophilic).
- Bronchial hyperreactivity.
- Acute phase reaction.
- Respiratory infections.
- Respiratory emergency department visits.
- Respiratory hospitalizations.
- Decreased lung function growth in children.
- Chronic loss of pulmonary function in adults.
- Asthma development.
- Premature mortality in people with chronic lung disease.

Though the respiratory system has remarkable resilience to air pollution via its repeated mobilization of defense and repair mechanisms, constant exposure to elevated particle pollution will contribute to reduced respiratory function, even in apparently healthy people. Therefore, although we cannot completely avoid particle pollution exposure, taking simple steps to reduce exposure will reduce the severity of lung and systemic adverse health effects in both healthy and more sensitive people.



### **What are the respiratory effects of acute exposure?**

Studies have reported respiratory effects related to acute exposure to fine particles, including respiratory symptoms (especially in children and those diagnosed with asthma), reduction in pulmonary function, and increased airway inflammation and responsiveness. Additionally, epidemiologic studies have demonstrated that respiratory effects associated with particle pollution can be serious enough to result in emergency department visits and hospital admissions, including COPD and respiratory infections.

The combination of experimental and epidemiologic studies has provided evidence of a relationship between short-term (daily) exposures to particle pollution and a number of respiratory-related effects, including elevated morbidity, higher frequency of emergency department visits and hospital admissions, as well as excess mortality. Often people with pre-existing diseases are at greatest risk for potential respiratory-related health effects due to short-term particle exposures.

### **What are the respiratory effects of chronic exposure?**

Epidemiologic studies provide evidence of associations between long-term exposure to fine particles and both decrements in lung function growth in children and increased respiratory symptoms.

## **Unit 2.2 Cardiovascular system**

Air pollution exposure is one such risk factor and is known to exacerbate existing, and contribute to the development of, cardiovascular disease.

Patients with cardiovascular disease, including those who have angina, heart failure, particular arrhythmias, or that have risk factors for heart disease (e.g., those who are smokers, obese, or older adults) may be at greater risk of having an adverse cardiovascular event from exposure to fine particles. Unlike some risk factors that contribute to cardiovascular morbidity and mortality, people can take steps to reduce their exposure to particle pollution.

### **How does particle pollution affect the cardiovascular system?**

The mechanisms by which exposure to fine particle pollution can affect the cardiovascular system are under continuous examination. Exposure to inhaled fine particles appears to affect cardiovascular health through three primary pathways:



- Systemic inflammation.
- Translocation into the blood.
- Direct and indirect effects on the autonomic nervous system.

### **What are the cardiovascular effects?**

Acute and chronic exposure to fine particle pollution has been shown to increase the risk of hospitalizations for cardiovascular conditions and mortality.

Clinically important cardiovascular effects of inhaled particles include:

- Acute coronary syndrome, including myocardial infarction, unstable angina.
- Arrhythmia.
- Exacerbation of chronic heart failure.
- Stroke.
- Sudden cardiac death.

### **What are the acute exposure effects?**

Population-based studies, small repeated-measure panel studies, and acute exposure studies in humans support the conclusion that inhalation of particle pollution induces small changes in blood pressure, oxygen saturation, endothelial function, systemic changes in acute phase reactants, coagulation factors, inflammatory mediators, and measures of oxidative stress. Systemic blood pressure and endothelial function changes, acute coronary syndrome (including myocardial infarction and unstable angina), increased ventricular arrhythmias in people with implantable (or internal) cardiac defibrillators (ICDs), exacerbation of heart failure, ischemic stroke, and cardiovascular mortality are all well-established clinical cardiovascular health effects associated with acute exposure to fine particles.

### **What are the chronic exposure effects?**

There is accumulating evidence that risk from chronic exposure (months to years) to inhaled fine particles accelerates atherosclerosis and reduces life expectancy.



### **Unit 2.3 Effects of air pollution on children's health and development**

The current level of air pollution in Europe adversely affects children's health. As a result of studies conducted around the world in recent decades, the knowledge and understanding of these effects have increased significantly. Reducing these effects is a priority of regional policies on health and the environment in the EU.

The effects of air pollution are present in a number of areas: the health and development of children during the prenatal period, on the development of the respiratory system and lung function (as well as respiratory morbidity), and on the incidence of childhood cancer, there are also links between air pollution and neurodevelopmental and behavioural effects.

Various periods of vulnerability characterize children. The intrauterine, perinatal and early childhood periods, during which the lungs are developing and maturing, are very vulnerable times. These are periods when the lungs are susceptible to injury by air pollutants. Exposure during these periods reduces the maximal functional capacity achieved in adult life and can lead to enhanced susceptibility during adulthood to infection and to the effects of such pollutants as tobacco smoke and those present in occupational exposures. Children with underlying chronic lung diseases, are especially vulnerable. These children are at greater risk of adverse effects from pollution than are healthy children. Also, children subject to higher exposures indoors – for example, from tobacco smoke or smoke from poorly maintained heating or cooking appliances – are at greater risk of being affected by outdoor pollutants.

There is now substantial evidence on the adverse effects of air pollution on different pregnancy outcomes and infant health. The evidence shows that air pollution, with concentrations typical of many European cities, increases the risk of death from respiratory causes in the postneonatal period.

The evidence also shows a relationship between exposure to ambient air pollutants and adverse effects on the development of lung function. Reversible lung function deficits, chronically reduced lung growth rates and lower lung function levels are associated with exposure to air pollution. Based on current knowledge, air pollutants seem to interact with other environmental factors, such as allergens, viruses and diet, that influence the overall impact of air pollutants on children's health.

There is a causal relationship between exposure to air pollutants and aggravation of asthma. The evidence is also sufficient to assume a causal link between exposure to particulate matter and increased prevalence and incidence of cough and bronchitis.



## Unit 2.4 Protect yourself

It's important to limit your exposure to smog. Here are some steps you can take to protect your health:

**If you have heart, vascular or lung disease, including asthma,** talk with your medical doctor. Discuss how much medicine to have on hand, and your asthma action plan if you have asthma.

**Consider buying an air cleaner.** Some room air purifiers can help reduce particle levels indoors, as long as they are the right type and size for your rooms as specified by the manufacturer. If you choose to buy an air cleaner, don't wait until there's smog - make that decision beforehand.

**Have a supply of professional dust proof masks on hand**

**Use common sense to guide your activities.** Even if you don't have a monitoring station in your area, if it looks or smells smoky outside, it's probably not a good time to go for a run. And it's probably not a good time for children – especially children with asthma – to be vigorously active outdoors, or active outdoors for prolonged periods of time. If you are active outdoors, pay attention to symptoms. Symptoms are an indication that you need to reduce exposure.

### How to tell if smoke is affecting you

High concentrations of smoke can trigger a range of symptoms.

- **Anyone** may experience burning eyes, a runny nose, cough, phlegm, wheezing and difficulty breathing.
- **If you have heart or lung disease,** smoke may make your symptoms worse
- **People with heart disease** might experience chest pain, palpitations, shortness of breath, or fatigue.
- **People with lung disease** may not be able to breathe as deeply or as vigorously as usual, and may experience symptoms such as coughing, phlegm, chest discomfort, wheezing and shortness of breath.

### Some people are more at risk

It's especially important for you to pay attention to local air quality reports if you are

- **a person with heart or lung disease,** such as heart failure, angina, ischemic heart disease, chronic obstructive pulmonary disease, emphysema or asthma.
- **an older adult,** which makes you more likely to have heart or lung disease than younger people.



- **caring for children, including teenagers**, because their respiratory systems are still developing, they breathe more air (and air pollution) per pound of body weight than adults, they're more likely to be active outdoors, and they're more likely to have asthma.
- **a person with diabetes**, because you are more likely to have underlying cardiovascular disease.
- **a pregnant woman**, because there could be potential health effects for both you and the developing fetus.

### Module 3: Solutions for clean air environment

#### Unit 3.1 What can be done?

Sometimes to make air clean and compliant with European air quality standards specific regulations are required. For instance in Poland:

- **Coal and Biomass quality standards.** The quality of coal sold to households is much worse than that of coal delivered to power stations because there are no standards or quality certificates for retailed coal. **As well Biomass must be certified and used in quality boilers.** This results in abnormal situations whereby mining waste (highly polluted coal sludge and flotation concentrates) is sold to citizens;
- **Anti-smog resolutions in regions** which introduce an obligation to have the old boilers replaced with modern and air-friendly heating systems;
- **Introduction of low emission zones in cities with heavy car traffic.** The number of cars per 1,000 inhabitants in Warsaw is over twice as high as in Berlin. The situation is similar in other large Polish cities. Air pollution by motor vehicle exhaust emissions is a major health problem, especially in the summer;
- **Control of open air fires in the agriculture and uncontrolled waste management practices.**
- Solutions that will allow for better control of **emissions from industrial facilities.**

Financing:

- **Support for the poorest citizens** in the process of heating system replacement (fuel poverty alleviation programmes), including subsidies to installation of new heat sources and thermal renovation of houses;



- **Introduction of soft loan programmes and tax incentives** to encourage the non-poor to replace their air polluting heating systems and conduct thermal retrofits of their houses.

Enforcement:

- Regulations aimed at improving air quality must be accompanied by **regulations encouraging citizens to take action**,
- To achieve this an effective system of control over the use of low power solid fuel boilers and types of fuels burnt in these devices has to be introduced.

Information:

- **Lowering smog alert thresholds.** European citizens are not fully informed of the dangers associated with air pollution. As well, among all EU states, countries such as Poland has the most liberal rules for determining pollution levels and informing the general public about the scale of the problem. Just to compare – in Paris, a smog alert is announced when PM10 levels reach 80  $\mu\text{g}/\text{m}^3$  whereas applicable alert threshold in Poland is almost four times higher, i.e. 300  $\mu\text{g}/\text{m}^3$ .
- **Information to citizens, and network of meters.**

### Unit 3.2 Good practices from Poland, Romania, Slovakia, Spain, Czechia

#### Poland

Raised public awareness has translated into changes in law:

- In January 2016 Kraków became the first city in Poland to introduce a ban on solid fuel heating in low power boilers (coming into force in 2019).
- In 2017-2018 anti-smog resolutions were passed by the authorities of Małopolskie, Śląskie, Łódzkie, Dolnośląskie, Wielkopolskie, Podkarpackie and Mazowieckie regions.
- In 2017 the national government introduced emission standards for low power, solid fuel boilers.
- Work is in progress on other essential regulations: coal quality norms and financial support schemes for boiler replacement and thermal renovation.

In Małopolskie region a network of eco-managers was created and local authorities were involved in the fight against air pollution.

#### Spain and other countries



TO BE DEVELOPED IN THE INTELLECTUAL OUTPUT 2

## **Module 4: Preventing air pollution**

### **Unit 4.1 What can we do?**

The following list cites several easy steps to minimize air pollution:

1. If you use old boiler replace it with newer model that are more efficient.
2. When buying a house, take a look at its Energy Certificate
3. Improve the insulation of your house and the quality of your windows
4. It is also important to burn the right coal and wood in the right way to prevent the generation of unnecessary air pollution. When buying a car, take a look to its energy certificate and type of fuel
6. Walk or ride a bike
7. Share a ride or use public transportation
8. Use energy-efficient light appliances
9. Choose environmentally friendly consumer products
10. Reduce, reuse & recycle
11. Educate
12. OTHERS TO BE DEVELOPED IN I.OUTPUT II

### **Unit 4.2 Prevention in rural areas**

- 1) Installing energy efficiency requirements for buildings;
- 2) Fostering the development of energy from renewable sources;
- 3) Replacing boilers with newer model that are more efficient.
- 4) It is also important to burn the right coal and wood in the right way to prevent the generation of unnecessary air pollution;



- 5) Do not burn yard waste. Composting leaves, plant clippings, and food is a viable alternative to burning along with chipping brush and dry wood.
- 6) Choose environmentally friendly consumer products;
- 7) Prevention measures to forest fires in the neighbouring zones;
- 8) Reduce, reuse & recycle;
- 9) Educate

In rural areas we need also **better monitoring of air pollution**. Air quality can fluctuate rapidly in every environment. For example, heating or cooking with biomass in the home can cause a rapid spike in indoor air pollution. Waste-burning tends to be practised at certain times of the day in many places. Monitoring systems can help individuals, parents, families, communities and local and national governments become more aware of how air pollution might affect them, and adjust to immediately prevailing conditions to minimize exposure. These measures will not in themselves stop the problem of air pollution – but they are a necessary and important first step. The more we know about air pollution, the better we can figure out how to protect children from its negative effects.

### **Unit 4.3 Effects**

The battle against air pollution can be won. We must first educate ourselves about air quality issues, which includes understanding and adhering to burning regulations in our areas. This knowledge will aid in making ‘air conscious’ decisions in our daily lives. Many changes do not require a great deal of effort beyond changing old habits. As we become more aware of air pollution and health issues, we can become better prepared to address them.

## **Module 5: Education about clean air protection**

### **Unit 5.1 Principles of education about air pollution**

Environmental education is concerned with those aspects of human behaviour which are more directly related to man’s interaction with environment and his ability to understand this interaction. One of the most glaring problems which the world faces today is the air pollution. There is an



immediate need to make people aware about this problem. Education and public participation may change and improve the quality of air.

- 1) Teaching about air pollution should be continuous and compulsory, right from the preschool, especially in the countries with poor air quality
- 2) Teaching about air pollution should have an interdisciplinary approach.
- 3) Teaching about air pollution should promote the value and necessity of examining the major air-related issues from the local, national, regional, and international point of view.
- 4) Teaching about air pollution should emphasize the complexity of the problem and the need to develop critical thinking and problem-solving skills.
- 5) Air pollution education should help learners discover the symptoms and real causes of air pollution related problems.

## **Unit 5.2 Best practices**

### **POLAND**

#### **Local education and information campaign to promote clean air within the framework of the LIFE IP project „Malopolska in healthy atmosphere”**

The campaign is addressed to the general public – especially as regards raising awareness of the air pollution problem, its causes and negative impacts (health, economic and social ones). It is particularly important to engage various opinion leaders who can pass on their knowledge to local communities encouraging them to take air quality improvement measures. These include: doctors, teachers, priests, firemen, local NGOs, universities of the third age, chambers of commerce and chambers of agriculture, Local Action Groups, local entrepreneurs, village leaders, village leaders. Individual campaigns are managed by Eco-Managers. They are responsible for taking specific actions at the local level, promoting the engagement of the above mentioned opinion leaders and establishing direct contact with local communities.

Within the framework of LIFE IP program Krakow Smog Alert set up a website: <http://smog.edu.pl> providing necessary materials for teachers and children to help disseminate the knowledge on air pollution. At [smog.edu.pl](http://smog.edu.pl), you can find an educational portal for children and teenagers prepared by



the Krakow Smog Alert. The portal was developed in response to the expectations of parents and teachers who were looking for materials that could support education about the effects and sources of air pollution.

The portal contains sections for children of all ages, teenagers and teachers. The latter, it will help, among other things, save time and diversify lessons. There are, among others, ready-made lesson plans, work sheets, educational games, audiobooks and educational videos. Care was also taken to ensure that young people could acquire information in an attractive and interesting way, and to show how to care for the environment, and especially for the air we all breathe.

Parents and teachers are people who are particularly interested in the impact of smog on our daily lives and how to protect themselves against it and prevent it from being generated. Educational materials and teaching aids that could help in getting to know the subject are available in the form of a portal where everyone will find what they need. The change in attitudes among the youngest will bring not only the effects visible in the coming years, but it can also be effective “here and now”. There are situations when children who became familiar with the problem of smog outside their home explained to their parents that they should give up the so-called smolders and not throw garbage into their furnaces.

This is another interesting “smog” project aimed at children. Another one is a collection of books on smog: the book “Smok na smog” [“Smog holdup”] was released in 2018, which, in cooperation with the Polish Smog Alert. It was prepared by the “Znak” publishing house.

– Polish Smog Alert has also set up an online portal which, as the first such portal in our country, focuses on various aspects of air pollution not only in Poland, but also in Europe and all over the world. [SmogLab.pl](http://SmogLab.pl) is visited by several tens of thousands users every month.

### **Unit 5.3 Teaching in the rural areas**

Air pollution is a global health issue of growing concern. Though generally thought of as an urban dilemma, it poses a health threat in rural areas as well. Today’s children are tomorrow’s leaders. As role models, parents and educators need to teach children how to care for the environment.

#### **Spain and other countries**



TO BE DEVELOPED IN THE INTELLECTUAL OUTPUT 2

**Useful links:**

<https://www.eea.europa.eu/data-and-maps/data/aqereporting-8>

<http://airindex.eea.europa.eu/>