SUMMARY REPORT

WP Communication - Deliverable D.C.3.5

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A. Executive summary

A.1. Introduction

The World Health Organization considers air pollution, both outdoor and indoor, as an element of extreme interest in relation to the protection of environmental health, as a bad quality of the air we breathe can also cause serious effects on human health. Many advances have been made in the European Union to reduce pollutant emissions in order to improve the quality of outdoor air. However, indoor air quality also requires attention because it is in enclosed spaces that people spend most of their time. Internal exposure to air pollutants can occur in any confined environment; among these, schools.

The composition of the indoor air is often characterized by a mixture of compounds very variable compared to that which characterizes the outdoor air. Sometimes, in confined environments, pollutant concentration values are recorded to those present at the same time outside the environment or, more commonly, there is the presence of pollutants not detectable outside. Even low concentrations of contaminants in confined spaces can have a major impact on occupant health and well-being due to long-term exposure. The risk, in fact, rather than the concentration of pollutants, in general very low, is linked to the exposure, that is to the concentration integrated over time since, as mentioned, the average residence time in an environment confined within the time frame is extremely high day.

In particular, as regards the closed environments of schools, it is possible to hypothesize a relationship between sources and types of airborne pollutants, as shown in Table 1. Possible pollutants present in schools and related sources (Source: ISPRA).

Table 1 Possible pollutants present in schools and related sources

Sources	Pollutants
Tobacco smoke	Airborne particulate: carbon monoxide; volatile organic compounds; formaldehyde
Construction materials	Radon; formaldehyde; volatile organic compounds; asbestos
Furniture	Formaldehyde; volatile organic compounds
Printers and copiers	Volatile organic compounds; ozone
Air conditioning and ventilation systems	Biological agents; airborne particulate matter; nitrogen dioxide; carbon monoxide
Educational material and stationery	Volatile organic compounds
Cleaning products	Volatile organic compounds and aldehydes

A.2. InAirQ Project

The InAirQ project (Transnational Adaptation Actions for Integrated Indoor Air Quality Management, transnational adaptation actions for the integrated management of indoor air quality) aims to assess the impacts of indoor air quality on the vulnerable population of school-age children and take measures to improve the health of the school environment in Central European states. The main objective of the project is to develop policies and practical actions and initiate capacity building processes to reduce the negative health effects of indoor air quality in Central European countries. These policies and practical actions will lead to the mitigation of risks to human health deriving from exposure to indoor air pollution.

The InAirQ project is based on transnational methodologies and tools. In order to compare and evaluate the environmental situation of the partner States of the project, a "Virtual Health Repository" has been developed and describes the nature and extent of air pollution within schools. This tool is based on the relationship between health and environmental factors and is able to provide support for decisions regarding the development of policies and programs in the environmental and health sectors.

The InAirQ project is a cross-border project co-financed by the EU under the Interreg CENTRAL EUROPE program.

A.3. The partnership

InAirQ project has officially started on the 1st July 2016 under the coordination of National Public Health Institute (NPHI), Hungary, and is ending on 31st December 2019, after a prolongation of six months (from the initial date of 30th June 2019). The project is funded by Interreg CENTRAL EUROPE Program.

The project is implemented by 9 partners from 5 Central Europe countries (Figure 1): Hungarian National Public Health Institute, which is Lead Partner; the Municipality of Várpalota (Hungary), Nofer Institute of Occupational Medicine and Łodzkie Region (Poland); Slovenian National Institute of Public Health and the Primary School Karla Destovnika-Kajuha (Slovenia); National Institute of Public Health (Czech Republic); LINKS Foundation - Leading Innovation & Knowledge for Society and School Foundation of Compagnia di San Paolo (Italy).

The total value of the project is EUR 2.000.325,00, funded 80% by the European Regional Development Fund, while the partners co-finance the remaining quota.

Figure 1. Regions participating in the InAirQ Project

A.4. Report contents

This report is a summary of all activities carried out during the project lifetime regarding the research work and development, and the communication activities performed with the aim of spreading the main results across the regions and countries involved.

The document is starting with a general description of the project activities, passing through objectives and results; then it is reported a deep focus on the project research results obtained into the different phases of the process, highlighting, in the end, the main outcomes and potential impacts found. Finally, another relevant chapter describing the communication activities carried out by the partnership starting from the initial strategy and going on through the materials disseminated (Which? When? Where?) and the results achieved. The report ends with the summary of lesson learnt and potential impact/next steps of the project.

B. Project description

B.1. The context

Since the 1950s, the problem of air pollution (outdoor), considered to be a source of danger to human health and well-being, has been the subject of numerous international studies aimed at monitoring and reducing emissions of polluting substances and evaluate their effects on human health according to the exposure of people to certain pollutants in terms of both exposure duration and concentrations of pollutants in the air. Thus, with regard to outdoor air, the causes (car traffic, industrial plants, domestic heating systems, etc.), the potential effects and possible containment measures have been identified a long time ago.

The results obtained from these studies on outdoor air - in particular in relation to the high concentration of aggressive agents - have generated the mistaken belief that indoor environments constitute a shelter from any type of substance present in the outdoor air. In fact, indoor air quality in homes, offices, schools and, in general, buildings where people spend most of their lives, can represent a real threat to human health of the occupants, for several reasons.

In the first place, trivial actions such as opening windows to ensure air exchange mean that, thanks to mixing, the substances that pollute the outdoor air penetrate inside and are breathed by the occupants of the indoor environment. In addition, the concentration, the number and the dangerousness of the pollution sources inside may be greater than that outside: it is polluting sources of different types, which should not make us think to be safe only because we use them commonly.

We talk about detergents, perfumes, glues, building materials, furnishings, stationery, printers, etc.: sources that vary depending on the characteristics of the building and its facilities and the activities that take place within the confined environment. Obviously, the greater the outdoor pollution, the greater the risk for human health even within public and private buildings; but this does not mean that good indoor air quality also implies good air quality in confined spaces.

In general, indoor air quality is an important problem for public health, not only in terms of the risk of contracting more or less serious pathologies, but also of economic costs and decreasing productivity and general wellbeing of the population. This is due directly to the increase in expenses related to emergencies, to shelters, to drug therapies and indirectly to the days of work and / or school lost when the indoor air quality is likely to cause some diseases of those who attend that environment. These costs are also added to the non-quantifiable moral damages that fall on the patients and their families, causing a deterioration in the quality of life, loss of productivity and active social life.

Moreover, the scientific studies developed in the last decades have shown that some air pollutants are able to contribute to the increase in the incidence of malignant tumours;

many chemical compounds present in the indoor air are potentially irritating or stimulating of the sensory apparatus and therefore the origin of feelings of discomfort.

In particular, the school is an environment in which indoor air quality is of decisive importance for occupant health as children are weaker and potentially more at risk than the general population.

Recent industry studies have also shown that an indoor environment uncomfortable or unhealthy also has a negative impact on learning ability. Partly as a result of these studies, in recent years the focus of scientific and institutional world has turned to issues related to air quality in confined spaces, developing a greater sensitivity and awareness of the importance of the comfort of indoor environment.

B.2. Objectives and main activities

InAirQ Project, as already mentioned, aimed to assess the health risk of indoor air pollutants on a vulnerable population (i.e. children between age 6 and 14) and to take actions to improve the indoor environment in school buildings in Central Europe.

National vulnerability assessments and SWOT analyses have been compiled to assess and explore the actual risks related to indoor air quality (IAQ) in school buildings. The IAQ has been investigated in 64 school buildings selected in 5 countries (Czech Republic, Hungary, Italy, Poland and Slovenia).

The Virtual Health Repository has been developed in the frame of the InAirQ project to provide health relevant information on IAQ to decision makers.

Based on the results of the monitoring campaign, National Action Plans have been elaborated, tested and implemented, striving to improve children's health through changes in the indoor environment. Capacity-building courses are organized to the school managers and local/regional school operating bodies for the best implementation of the action plans, while the transnational Environment Quality Forum provided the follow up of the project results and sustain the co-operation with the potential stakeholders.

B.3. Results

Expected

InAirQ project partners are expecting to achieve all main objectives declared in previous paragraphs. Among them, the most important of the goals as the end of the project approaches are:

- to train many people on the theme of Indoor Air Quality improvement through Capacity Building training sessions and EQFs organized in this framework;
- to deliver relevant documents to school managers and teachers informing them about indoor air quality, risks and suggested action to put in place in order to improve the actual situation;

- to raise people's awareness about risks represented by poor indoor air quality; this is one of the key results of InAirQ project, because at the present time IAQ is still not so commonly considered as an important topic to monitor and manage;
- to influence municipalities and public bodies responsible of school planning and raise awareness also among experts, architects and engineers, because many of the IAQ issues can be resolved through technical or construction solutions.

Final results

The primary objective of the InAirQ project was to improve the indoor air quality (IAQ) in school buildings in the Central European region by integrated problem-solving approaches. Existing knowledge on factors which determine the IAQ in school buildings was collected in a harmonized way in all participating countries (Czech Republic, Hungary, Italy, Poland and Slovenia) and compared in order to identify current issues in the region and to take actions to overcome them. New data on IAQ was produced during the InAirQ monitoring campaign in which 64 primary school buildings were investigated in the five countries. Based on the results of the monitoring campaign, the health risk attributable to indoor air pollution could be determined for each school building by using the Indoor Health Index developed in the project. The results of the monitoring campaign for all 64 school buildings have been uploaded to the Virtual Health Repository which is an online platform available for all stakeholders and interested parties. At present, there is no consensus on how to regulate IAQ worldwide. There is a big effort to establish IAQ guidelines at national level in Central Europe. Thus, a joint transnational strategy for IAQ action plans was elaborated to provide support for the partners to develop the national IAQ action plans. The joint strategy was adopted by 5 regional and national institutions, one in each country, to support the elaboration of national policies. Good examples and best practices on IAQ improvement and health promotion were collected during two benchmark visits. Different practical actions were developed and tested to improve IAQ in school buildings. Three successful attempts for IAQ improvement were carried out in the frame of intervention studies (e.g., application of air cleaner, introduction of good cleaning and ventilation practices, real-time monitoring of IAQ in the classroom). In addition, 3 feasibility studies were prepared in which the effect of potential technical improvements in the pilot partner schools were discussed. The studies demonstrated that small scale investments or technical improvements could significantly improve IAQ in the classrooms. During the lifetime of the project some relevant target groups were reached by InAirQ project activities: Local Public Authorities (13), Regional Public Authorities (9), National Public Authorities (16), Education centres/schools (>100), Interested groups/NGOs (7). Several awareness campaigns on IAQ were performed in all participating countries to inform different stakeholder groups to have a deeper understanding on IAQ. In addition, awareness raising was an attempt to influence people's attitude in order to improve air quality both indoors and outdoors and, consequently, to protect schoolchildren's health. A series of communication tools was applied. Different communication materials (e.g., poster on actions to improve indoor air quality in classrooms) were produced and sent to the primary schools. Awareness raising was performed by the partners through TV and radio interviews (16) and Social Media (Facebook mainly). Presentations at different

national and international conferences and other events were given to raise awareness among general public, health experts, architects and decision makers (42 events). Environment Quality Forums were also regularly organized in all partner cities with the different stakeholders (5 EQFs each country). A joint training methodology and curriculum were prepared for selected target groups (e.g., school managers, teachers, architects) to support the successful implementation of the IAQ action plans developed in the project. Some scientific articles have been published in order to disseminate some results among the scientific community (5 articles). The training materials were adopted in each country and two 1-day-long capacity building courses were organized by the project partners. In total, 224 people were trained within the framework of the InAirQ project, through these 1 day-long capacity building trainings.

C. Research activities

C.1. SWOT Analysis

One of the first activities of InAirQ project was to analyze the school environment from different points of view order to build a solid knowledge of characteristics of schools in each of the countries involved in the project. To summarize the results was used a smart tool: the SWOT analysis. It can offer helpful perspectives at any stage of an effort, or detection of measures aimed at the mitigation of the problem. For example:

- exploring possibilities for new efforts or solutions to problems;
- making decisions about the best path for an initiative. Identifying opportunities for success in context of threats to success can clarify directions and choices;
- determining where a change is possible. An inventory of strengths and weaknesses can reveal priorities as well as possibilities, making decision makers able to define the juncture or turning points;
- adjusting and refining plans mid-course. A new opportunity might open wider avenues, while a new threat could close a path that once existed.

All above features of SWOT analysis simplify working out the new strategy or policy used to completely change or partly improve of the problematic area.

What is a SWOT Analysis?

SWOT analysis is a method that can be used to evaluate the Strengths, Weaknesses, Opportunities, and Threats that exist in the case of indoor air quality (IAQ) in school buildings under the InAirQ project.

- Strengths: internal positive attributes of the school environment that can facilitate activities aimed at improving the IAQ.
- Weaknesses: internal attributes of the school environment that may hinder activities aimed at improving the IAQ.
- Opportunities: external conditions that may facilitate activities aimed at improving the IAQ in schools.
- Threats: external conditions that may complicate activities aimed at improving the IAQ in schools.

According to the guidelines and common methodology, the partners have carried out their national SWOT analysis. The task of the lead partner was to compare the items of the national analyses in order to prepare a common assessment of the strengths, weaknesses, opportunities and threats. The *comparative analysis* should give a basis of the joint proposals how to solve the common problems. As each of the partners are members of the EU, the outcome of the analysis can be an initiative for a new legislation for controlling indoor air quality at European level.

Comparative SWOT Analysis results

	Internal analysis	
SWOT analysis tool	**STRENGTHS** ***What has a positive impact on the school environment regarding IAQ?***	**WEAKNESSES** ***What has a negative impact on the school environment regarding IAQ?***
	1. The involvement of municipality, management, technical personnel and teachers. 2. The manager-owner is usually the same (for public schools) – the municipality. 3. The renovation of schools. 4. Classes are structurally separated from the changing rooms, dining room and gyms. 5. The location inside the city guarantees a good accessibility through public transport or other means. 6. Direct contact with the parents of the students. 7. Good green infrastructure in the vicinity of schools (rather out of city center). 8. Municipal heating (the vast majority of schools).	1. Lack of finance. 2. Lack of staff (problem with cleaning staff). 3. Low awareness of indoor air quality and lack of efforts to improve IAQ. 4. Age of school buildings (old technologies and materials). 5. Lack of air conditioning system in classrooms. 6. Overcrowding of classes. 7. Ambient noise exposure. 8. Ambient air pollution. 9. Insufficient air exchange in classrooms in many schools (problems with ventilation ducts, lack of or only partial mechanical ventilation). 10. Purchases of furniture and other interior furnishings for classrooms by the students' parents (eg. new school lockers, cabinet with shelves for students, tables for students, floor panels).

External analysis	**OPPORTUNITIES** ***What are the Opportunities to improve the IAQ in the school environment?*** 1. Inspection of schools by national supervisor institutions. 2. Post-inspection recommendations for IAQ improvement. 3. Ongoing process of thermo-modernization of schools in line with the EU directive (new technologies - HVAC, recuperation - and low emission materials. 4. Guidance and recommendations developed in the frame of projects aimed at improving the indoor air quality in schools. 5. Common access to the publication of the air quality, results of measurements of the quality of outdoor and indoor air, the impact of air pollution on human health, including children, and methods to reduce the levels of airborne pollution. 6. Possibility of IAQ monitoring (microclimate sensors, pollutants monitoring).	**Opportunity-Strength (OS) Strategies** ***How can we use Strengths to take advantage of Opportunities?*** 1. Use of guidance and recommendations developed in projects aimed at improving the indoor air quality in schools. 2. Proper selection of materials and technological processes used in the thermo-modernization of the school. 3. Repair / clean the ventilation ducts during the thermo-modernization process. 4. The possibility of regulating the activity of children depending on outside air quality. 5. Introduction of proper cleaning technology: non-irritative cleaning chemicals, proper timing and frequency of cleaning. 6. Supervision activity focused on real and current air quality problems not only within the framework of legislation. 7. Educate pupils, school staff and leadership in schools about IAQ and its influence on the health and attentions of children and teachers. 8. Using modern technologies (such as sensors) to continually review IAQ status in schools. 9. The possibility of regulating the activity of children depending on outside air quality.	**Opportunity-Weakness (OW) Strategies** ***How can we overcome Weaknesses by taking advantage of Opportunities?*** 1. Promote the interest of founders and school leadership in improving IAQ. 2. Conducting of the literature review and disseminate selected publications among school personnel to raise awareness of air quality. 3. Educate school leaders and founders about the benefits and disadvantages of new technologies. 4. Optimization of the daily routine cleaning and thorough cleaning. Training and educating cleaning personnel about the proper technology of cleaning. 5. Reasonable updating of legislation and focusing on ongoing improvement in the framework of supervisory activities. 6. Proper timing of painting the classrooms (or other renovation works) with water soluble paints. 7. Detailed economic balance of possible measures with consideration and with respect to several factors (HVAC, recuperation), investment in sensors and personnel. 8. Exert an influence on the choice of furniture and other finishing materials

			purchased by parents (eg. according to the recommendations developed in the indoor air quality projects or relevant publications). 9. New furniture should be bought during summer and kept in rooms with proper ventilation. 10. Foster new form of collaboration between schools and foundations/public entities aim to find funds or direct solutions.
	THREATS ***What are the Threats that can negatively influence the IAQ in the school environment?*** 1. Surroundings of schools (industry, PM emission, agricultural field –spraying of pesticides, fertilizers, market places, car parking areas, railways). 2. Urban planning regardless of the proximity of schools (transport, industry, etc.) that cause negative impact of changes. 3. Heavy traffic and infiltration of large amounts of pollution (PM) inside school environment from the outside. 4. Use of chalk boards. 5. Lack of current detailed regulations and requirements. 6.Insufficient information on how to improve IAQ. 7.Disinterest of owners and school managers to improve	**Threat-Strength (TS) Strategies** ***How can we use Strengths to avoid Threats?*** 1. Slow down the traffic at schools (eg. to apply to the local authorities about the installation of speed bumps on the road in the school surrounding). 2. Applying for the additional funds to the local self-government on the basis of the post-inspection recommendations of the National Sanitary Inspection. 3. Frequent cleaning and exact removal of layer of dust and selection of the right time for cleaning / minor repairs. 4. Define requirements for the placement of schools (support for and cooperation with grass-roots associations around schools). 5. Foster the exchange of air inside classroom (open windows). 6. Urban planning: define	**Threat-Weakness (TW) Strategies** ***How can we minimize Weaknesses and avoid Threats?*** 1. Raising awareness of the indoor air quality among the school staff and parents of students. 2. Improvement of the involvement of school staff and parents to take actions towards the improvement of the quality of the indoor environment in schools. 3. Improve the level of awareness of staff and school founders - a discussion platform for communication between founders, schools, OECDs and professionals. The education of the founders of schools will increase the chances that they will understand the legitimacy of the requirements for the non-fulfillment of classes and staffing needs of schools.

	IAQ beyond the legislative requirements. 8. Unregulated marketing pressure (cleaners, coatings, cleaning agents), unsubstantiated information on how to improve IAQ, the use of unverified technologies and products in schools. 9. Lack of funds for necessary repairs and installation of modern HVAC systems (or recuperation). 10. Low awareness of indoor air quality among the school management and parents (less parental pressure on the school management).	requirements for the placement of schools. 7. Ensuring capacities, technical assistance and resources for the necessary measures. 8. Discussion platform for communication between schools, Public Health Authorities and professionals and for obtaining validated information. 9. Conducting of the literature review and disseminate selected publications among parents to raise awareness of air quality. 10. Updating legislation in cooperation with experts (and school representatives).	4. To initiate national legislations on indoor air quality, to update national building regulations. 5. Promote new form of funding for ongoing status monitoring/air quality monitoring in schools. 6. Consistent application of the precautionary principle when introducing new technologies and products. 7. Call on policies on the significance of non-compliant IAQs in schools and on the need to secure funding for ongoing status monitoring / air quality monitoring in schools. 8. In projects, optimize the exchange of air for individual parts of the building. 9. Construction parameters: implement solutions aim to optimize the exchange of air for individual parts of the building.

C.2. Vulnerability Assessment

An important step of the study conducted into InAirQ project, in parallel of SWOT, was the vulnerability assessment. National vulnerability assessments were prepared to review the quantitative and qualitative aspects of the primary school domain in the participating countries (Czech Republic, Hungary, Italy, Poland and Slovenia), the existing policies, i.e. officially adopted documents on indoor environment, as well as the previous experiences in the health risk assessment of the school environment.

All project partners prepared a substantial vulnerability assessment worth reading one by one. Their main findings are summarized and compared in this paragraph.

In the participating countries children spend 7 to 9 hours in primary school buildings where healthy indoor air is not yet guaranteed by law. With the exception of the Czech Republic there is no appropriate legal regulation on the indoor air quality in schools and there are no guidelines or rules on monitoring indoor air quality in these microenvironments. There is an urgent need to perform studies on indoor air pollutants in a school environment and

to trigger establishing indoor air quality guidelines/regulations at the national and EU level.

C.2.1. Number of primary schools

Due to the different sizes of the countries and their participating regions it is not possible to compare the given numbers directly. However, it can be seen that, in spite of Czech Republic and Hungary having similar population size (10.5 and 9.8 million inhabitants respectively), there are considerable differences between the two States in the number of primary school buildings; approximately 1.8 times more primary school buildings are located in the Czech Republic compared to Hungary. The average class size is similar in the Czech Republic than in Hungary with 19.5 and 20 pupils in each classroom on average respectively. It is interesting to note that although in Poland the law maximizes class size at 25 pupils, still 7% of classes accommodate even more than 30 children. The maximum class size is 25 pupils in Italy as well. In Slovenia, there are 16 (minimum) - 28 (maximum) pupils in classes (if there is a kid with special needs, the maximum number is reduced).

C.2.2. Types of school buildings

In general, it is difficult to compare the average age of the school building stock in the different countries because construction year statistics cover different ranges of years determined by the differences in the countries' history or for other reasons. The highest proportion of old school buildings (built before 1900) can be found in the Czech Republic (22%). Brick was the main material used in the case of old buildings. Concrete was mainly used as building material between 1970 and 1990. Approximately 40% of the school buildings in the Municipality of Ljubljana (Slovenia) were built in the latter period, while in other countries this proportion was only about 21-28%. New constructions built after 1990 range from 1.2% (Łódź; Poland) to 8% (Hungary). It is clear that the school building activity was more active at beginning and the middle of the 20th century compared to the past two decades in all countries. Most of the primary schools are run by the state either directly or indirectly by the district authorities. Hungary has the lowest proportion in this respect (81%), while 94% of the primary schools in the Czech Republic are maintained by the state.

C.2.3. State of the school buildings

In most countries the state of the school buildings varies considerably. In general, non-public school buildings are in a better condition than public schools. Renovation works (windows, insulation, heating, light, etc.) started after 2000 in the Czech Republic and Hungary, while they started 5 or 3 years ago in Poland and Italy, respectively. Partial renovation was performed in almost all primary schools included in the present survey in Slovenia. In some countries, asbestos may also cause some concern as between 1950 and 1990 asbestos was frequently used in the Czech Republic, Italy and Hungary. In Łódź only 1 school is affected by the asbestos problem.

C.2.4. Legal measures related to the management

There are no health-based indoor air quality standards or guidelines for chemical pollutants which are applicable to primary schools in most of the Central European countries. Only Czech Republic has legislation (since 2003) defining hygienic limit values of chemical, physical and biological indicators of residential rooms, which was accompanied by decrees on the requirements for educational establishments. National policies exist on some parameters related to indoor air quality (e.g. temperature, relative humidity, CO_2 concentration, formaldehyde emissions and ventilation) in the other Central European countries. Besides the international bodies, there is a big effort to establish indoor air quality guidelines at the national level in all Central European countries.

C.2.5. Monitoring of indoor environment

There are no special guidelines or rules on monitoring indoor air quality in schools in either of the partner countries.

C.2.6. Results of indoor air quality field campaigns conducted in recent years

Since 1994 in the Czech Republic 280 flats, 20 kindergartens, 25 nursery schools and 200 classrooms of 39 elementary schools have been monitored in the frame of the Environmental Health Monitoring System. Czech Republic, Hungary, Italy and Poland participated in the SINPHONIE project between 2011 and 2013. The concentration of PM2.5 mass, NO_2, formaldehyde, benzene, naphthalene, limonene, radon, CO_2, trichloroethylene and tetrachloroethylene were measured in classrooms and outdoors simultaneously. Physical parameters (temperature and relative humidity) as well as biological agents were also investigated. Hungary and Italy also participated in the SEARCH project between 2006 and 2013. The investigated parameters were the temperature, relative humidity and the concentration of PM10 mass, NO_2, formaldehyde, benzene, xylenes, toluene, CO and CO_2. Italian schools were also monitored in some other international studies (INDOOR, HESE, INDEX and EXPAH) including the determination of the concentration of PM10 mass, NO_2, formaldehyde, toluene, ethylbenzene, benzene and xylenes. There has not been a field campaign for monitoring indoor air quality in school buildings in Slovenia yet.

The comparison of the indoor air quality results obtained in the frame of international project (SEARCH, SINPHONIE) revealed that, in general, the measured values were in line with other European countries for all investigated parameters, except for formaldehyde, being much higher in Italy. The mass concentration of PM10 and PM2.5 was high in most of the countries and the microclimatic conditions were also inappropriate (e.g., insufficient air exchange rate, inappropriate temperature and relative humidity in the classrooms). In Lublin (Poland) the measured radon values also exceeded the recommended (WHO) levels in schools and especially in kindergartens.

C.2.7. Monthly outdoor air quality data for 12 months

All five countries have an air quality monitoring network consisting of several stations across each country. Air quality is regularly monitored for most health relevant pollutants such as NO2, PM10, PM2.5, As, Cd, Ni, Pb, benzene and benzo(a)pirene in the Czech Republic; SO_2, NO_2, CO, O_3, NO_X, PM10, and PM2.5 in Hungary and Poland; PM10, PM2.5, NO_2, O_3, benzene in Italy; PM10, NO_2, SO_2, CO, O_3, benzene, toluene, ethylbenzene and xylenes in Slovenia. In all countries, the PM10 mass concentration values often exceeded the 24-h limit value in winter. In several areas the PM10 mass concentration and NO_2 concentration were higher than the corresponding limit values also in other seasons due to the higher traffic density, geographical location and the unfavorable meteorological conditions. This situation was especially problematic in Turin (Piedmont, Italy) where 5 out of the measured 12 pollutants exceeded the corresponding limit values in 2015 throughout the regional territory, mainly due to high traffic intensity and the geographical location of Turin, as the city is situated at the foot of the Alps, more protected from winds.

C.3. Schools selection and Monitoring campaigns

The elaboration of specific Action Plans that are effective in improving the quality of indoor air in school buildings must necessarily start from the knowledge of the specific phenomena affecting school buildings and the activities that take place within them. For this reason, the InAirQ project, in the phase preceding the drafting of the Action Plan, envisaged the conduction of an indoor air quality monitoring campaign in 12 schools for each of the States participating in the project. The monitoring campaigns were conducted for one week in each of the schools involved during the 2017-2018 winter season.

The monitoring campaign focused mainly on the following parameters:

- VOCs: benzene, toluene, xylene ethylbenzene, trichloroethylene, tetrachloroethylene, α-pinene, limonene, 2-ethylhexanol, styrene (naphthalene);
- aldehydes: formaldehyde, acetaldehyde, propionaldehyde, benzaldehyde, hexanal;
- temperature, relative humidity, carbon dioxide, carbon monoxide, nitrogen dioxide, ozone;
- PM2.5 and PM10;
- radon.

The concentration of these pollutants in the air was measured, in parallel, indoors and outdoors, with the same measuring instruments installed near schools.

On a technical level, the monitoring envisaged for each pollutant was carried out according to two methods of different complexity and significance.

The first consists of a “passive monitoring”, and it has been used by all partners during their monitoring activities (common methodology and instruments) whose strengths are the low costs and the extreme compactness of the instrumentation while the critical points refer to the reduced sensitivity. For this monitoring method, absorbent pods are used in the classroom during lessons. The so-polluted pods are then analyzed in order to return a

picture of the indoor pollutants and the quantity of these pollutants absorbed by the occupants of the classroom during the period in which the pods are displayed.

Some partners accompanied the first monitoring method, in order to obtain more precise results, by a continuous and instantaneous monitoring, more significant if correctly implemented. Since by returning a graph that over time illustrates the trend of the various pollutants present, it allows correlations to be made in terms of cause and effect. In other words, through this type of monitoring, it is possible to try to associate the progress of the pollutants with the concrete actions that generated them or mitigated them: the use of blackboard chalk or cleaning products on one side or the opening windows on the other. An electronic control unit was used for this monitoring mode.

Pollutant monitoring has been accompanied by a meticulous collection of information:

- about the school building, through a questionnaire administered to the school staff involved in the project and aimed at acquiring information on the building that houses the school (construction materials, year of construction, possible presence of problems such as water leaks or mold, general indications on perceived comfort);
- about the classroom subject to monitoring, through another questionnaire aimed at acquiring more specific information on the classroom (orientation and location within the school, lighting, noise, perceived comfort, cleaning times, etc.);
- about the activities carried out in the classroom during the monitoring week, through a "Time Activity Diary" that the involved teachers have compiled daily indicating the number of people present in the classroom during the various hours of the day, the number of open windows, the possible performance of activities such as cleaning or use by students of substances such as glues, markers, etc.

The following paragraphs will report a general overview of the schools investigated in each region by the project partners.

C.3.1. Hungary

Number of school buildings investigated: 16.

Monitoring campaigns were conducted during the heating season of 2017/2018.

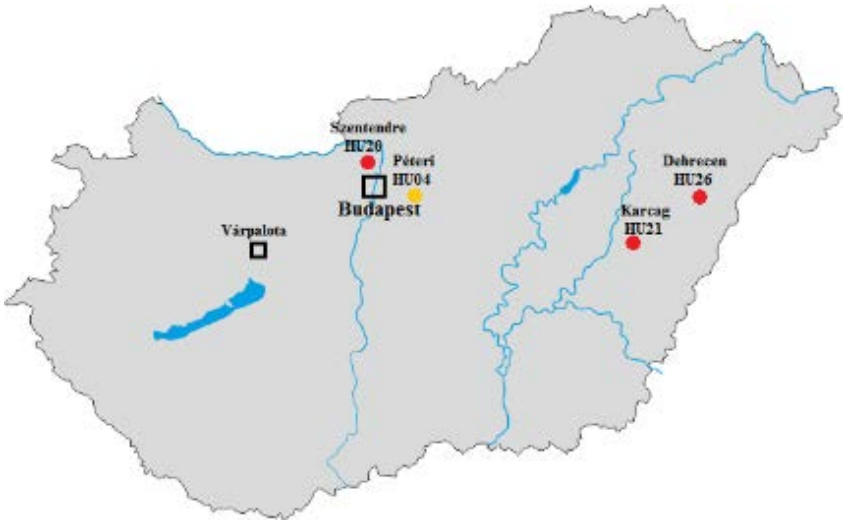


Figure 2. Map of Hungary, with the location of school buildings investigated outside of Budapest metropolitan area and Várpalota

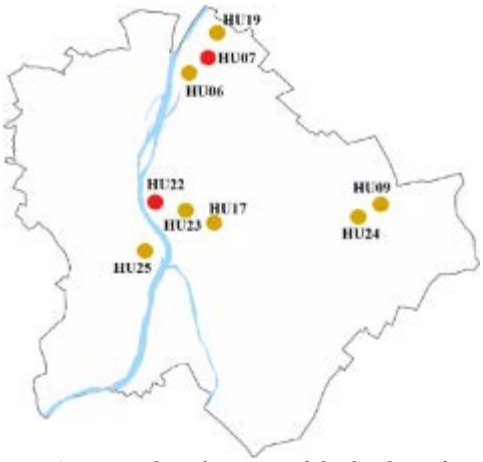


Figure 3. Map of Budapest, with the location of school buildings investigated

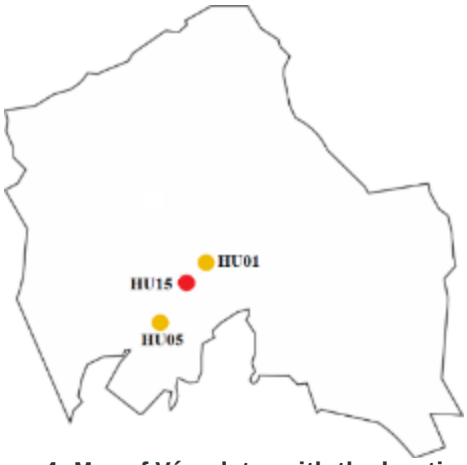


Figure 4. Map of Várpalota, with the location of school buildings investigated

Hungarian schools selected are located in different part of the country, about 7 outside the capitol city: 4 of them in Várpalota (Figure 4), 1 in Péteri, Szentendre, Karcag and Debrecen (Figure 2). The remained 9 schools are distributed across Budapest city in different parts of it (Figure 3). About 60% of them are built of bricks during last 50 years, but some others are older, from 18th century.

C.3.2. Poland

Number of school buildings investigated: 12.

Monitoring campaigns were conducted during the heating season of 2017/2018.

Figure 5. Map of Poland. All of the investigated school buildings are located in the city of Łódź

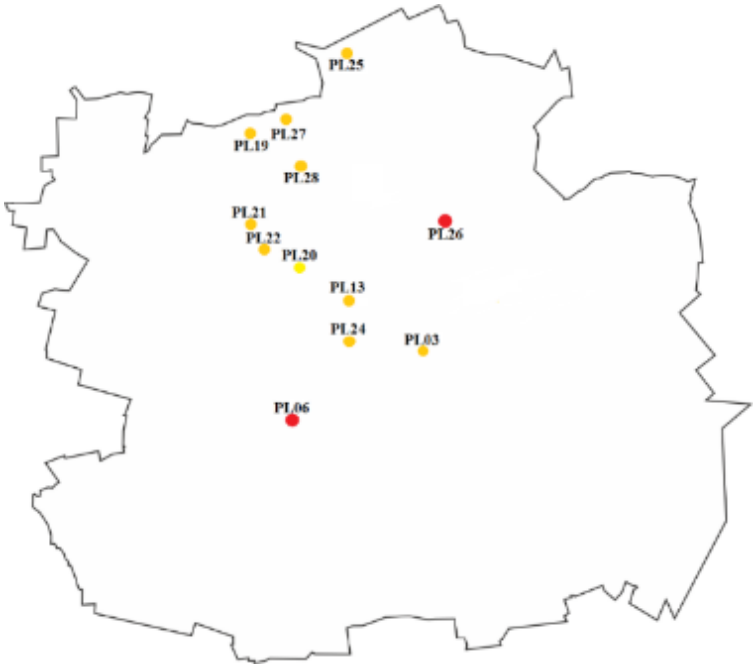


Figure 6. Map of Łódź, with the indication of the school buildings investigated

All Polish investigated school buildings are located in the city of Łódź (Figure 5 and Figure 6). Half of them are situated in residential and peripheral area of the city, the other half in the city center. They were built after the fifties of 20th century, almost entirely made by brick and concrete.

C.3.3. Slovenia

Number of school buildings investigated: 12.

Monitoring campaigns were conducted during the heating season of 2017/2018.

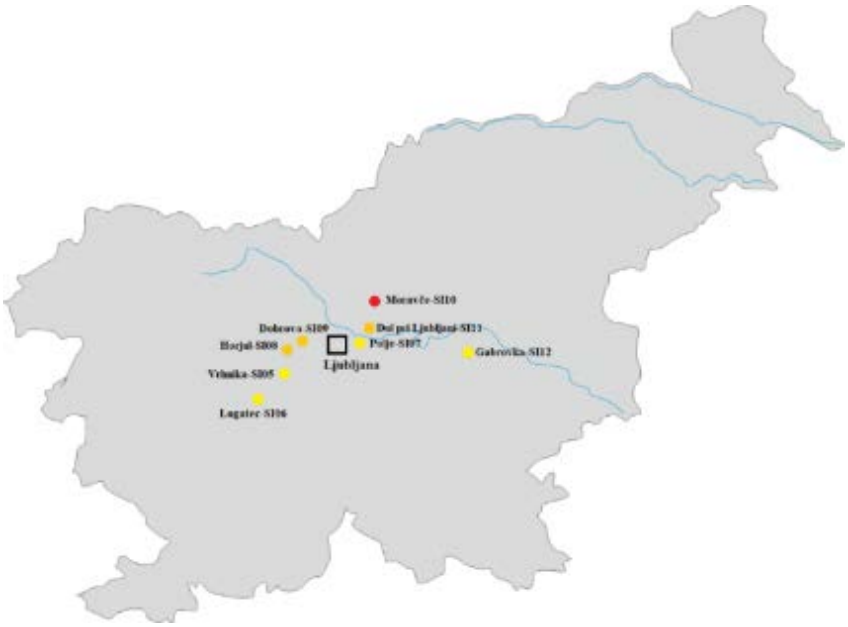


Figure 7. Map of Slovenia, with the location of school buildings investigated outside of Ljubljana metropolitan area

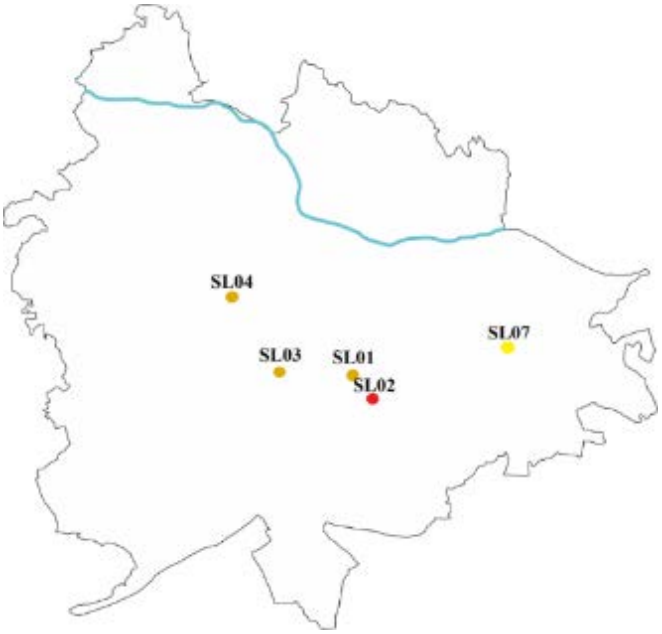


Figure 8. Map of Ljubljana, with the location of school buildings investigated

Slovenian school buildings selected for the project are located in the capitol Ljubljana (Figure 8) and in some towns nearby, like Logatec or Gabrovka (Figure 7). They belong to different periods, like Italian schools: some of them are very old buildings from the 19th

century and some other instead were built recently in the end of the 20th. Most of them are characterised by air conditioning and mechanical ventilation, and they have been renovated during the decades, especially windows replacement, new roof and façade.

C.3.4. Czech Republic

Number of school buildings investigated: 12.

Monitoring campaigns were conducted during the heating season of 2017/2018.

Figure 9. Map of Czech Republic, with the location of school buildings investigated outside of Prague metropolitan area

Figure 10. Map of Prague, with the location of school buildings investigated

3 of the 12 schools selected in Czech Republic are located out of Prague: CZ06 is located in the residential area of eastern Jihlava, CZ09 is located in the suburb area of Čelákovice

and CZ10 is located in the middle of the residential area of Mělnik (Figure 9). The remaining 9 schools are located in same area of Prague: a residential area of the northwest quadrant of the city (Figure 10).

6 of them have been completly reconstructed since 2000-2005, following new technologies and building methods, the other 6 have been only maintened with windows replacement, electrical systems and lighting. They are medium school buildings with capacity of about 500-600 pupils.

C.3.5. Italy

Number of school buildings investigated: 12.

Monitoring campaigns were conducted during the heating season of 2017/2018.

Figure 11. Map of Italy, with the location of school buildings investigated

The 12 Italian schools are located in the city of Turin (Figure 12) and in Chieri (Figure 13), a small town close to Turin, in the north west part of Italy. Most of the schools are situated near high traffic arterial roads or big industrial plants that characterized the city. We selected different typology of school buildings, some are very old, other are quite new: 4 of them have been renovated between 1995 and 2010, the remained have only been maintained. Few of them are linked with the district heating system of the city, that supply now a considerable part of Turin.

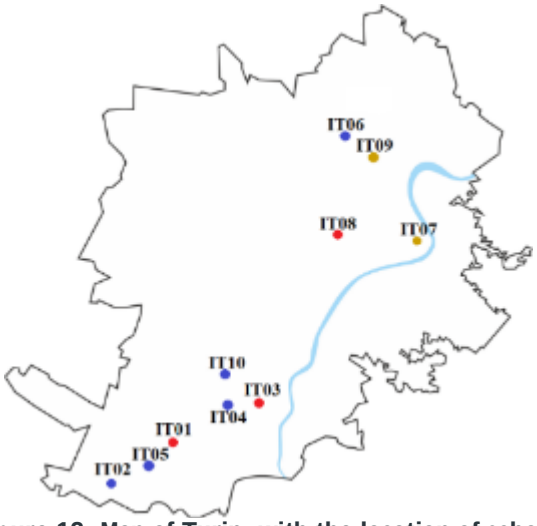


Figure 12. Map of Turin, with the location of school buildings investigated

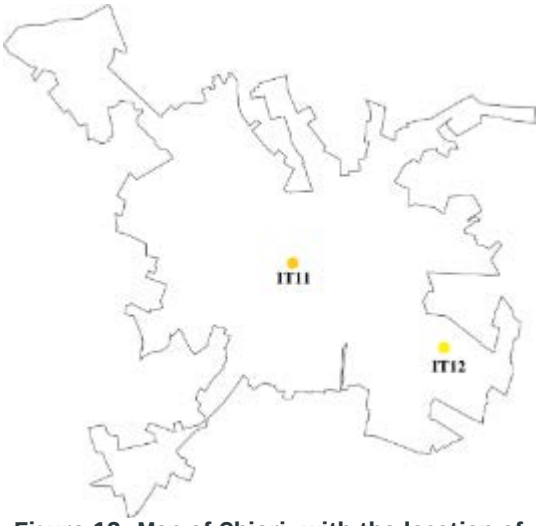


Figure 13. Map of Chieri, with the location of school buildings investigated

C.4. Virtual Health Repository

One of the main steps during InAirQ project was to build a complete repository to store online all the data collected during these 3 years of research work, but also with the purpose to disseminate simple data to citizens and policy makers.

In fact, Indoor air quality (IAQ) can be characterized by physical parameters (e.g., temperature, relative humidity, air exchange rate), chemical air pollutants (e.g., carbon dioxide, nitrogen dioxide, particulate matter, ozone, benzene, etc.) and biological agents (e.g., pollen, fungi). As already mentioned, during the monitoring campaign 64 primary school buildings were investigated in Central Europe (Czech Republic, Hungary, Italy, Poland and Slovenia) where the concentration of the most important air pollutants as well as the physical parameters were monitored. Due to the complexity of this issue, in order to create the perfect repository, a simple **Indoor Health Index** has been developed (i) to disseminate the results of the project among the public and stakeholders and (ii) to provide health relevant information about the IAQ.

The calculation of the Indoor Health Index is based different threshold values determined by the health effects of the air pollutants/physical parameters (recommendations of the WHO and/or EC and/or scientific papers).

We applied a five-scale categorization of the most important and frequent chemical air pollutants using for the cut off points (Table 2).

Table 2. Calculation of Indoor Health Index

Category	benzene (µg/m^3)	formaldehyde (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Healthy	<1.7	<10	<10
Moderate	1.7-4.99	10-19.9	10-24.9
Unhealthy	5-7.5	20-50	25-49.9
Very unhealthy	7.51-10	51-100	50-75
Dangerous	>10	>100	>75

Table 3. Categories based on the measured temperature, relative humidity and carbon dioxide concentration values

Category	RH (%)	T (°C)	CO_2 (ppm)
healthy	43 < RH < 67	18.5 < T < 25.5	<1200
moderate	37 < RH < 43 67 < RH < 73	17.5 < T < 18.5	1200-1800
unhealthy	RH < 37 RH > 73	T < 17.5 T > 25.5	>1800

The database in which the Indoor Health Index has been calculated is available upon request. To characterize the thermal comfort, different cut-off points for two physical parameters, temperature and relative humidity, as well as for the concentration of carbon dioxide have been set (Table 3).

The results of the Indoor Health Index were organized in a complete "**Virtual Health Repository**" stored on an online platform where can be visualized by anyone.

Now will be shortly reported all the result obtained after the monitoring campaigns carried out in all the 5 countries involved and displayed into the online Virtual Health Repository.

C.5. Monitoring phase results and Indoor Health Index

C.5.1. Hungary

In Hungary, the indoor air quality in almost all schools was in the unhealthy and very unhealthy category based on the indoor health index, way worse than Czech for example. The main air pollutant was particulate matter (PM2.5). It should be noted that the outdoor value for the PM2.5 mass concentration was also high; thus, the inappropriate indoor air quality was mainly caused by the outdoor air pollution. Furthermore, one of the comfort parameters was quite always was in the unhealthy range; the relative humidity was low in the classroom. Carbon dioxide concentration was relatively high in half schools.

Table 4 and Table 5 below report all the values considered for the calculation of Indoor Health Index in Hungary.

Table 4. Hungary: Indoor Health Index compared with pollutants measured outdoors

Building ID	Indoor				Outdoor		
	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Indoor Health Index	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
HU01	7.0	6.7	45	Unhealthy	8.8	2.0	45
HU04	3.4	4.2	47	Unhealthy	4.2	0.6	38
HU05	3.3	9.0	21	Moderate	4.8	1.7	19
HU06	7.0	5.6	35	Unhealthy	6.3	1.5	41
HU07	3.1	3.4	72	Very unhealthy	3.2	0.9	8
HU09	4.9	9.4	29	Unhealthy	5.1	1.0	24
HU15	4.4	8.9	50	Unhealthy	4.1	1.8	20
HU17	3.4	5.0	38	Unhealthy	3.3	1.7	50
HU19	4.6	11.4	47	Unhealthy	4.1	1.2	41
HU20	2.4	12.1	62	Very unhealthy	3.5	1.2	42
HU21	1.9	17.6	53	Very unhealthy	2.7	1.9	23
HU22	8.3	10.4	51	Very unhealthy	6.9	2.5	49
HU23	5.9	9.5	42	Unhealthy	3.4	1.8	85
HU24	5.6	8.4	38	Unhealthy	5.8	1.3	44
HU25	-	7.9	46	Unhealthy	1.2	1.2	45
HU26	4.1	9.3	59	Very unhealthy	4.4	1.7	67

Table 5. Hungary: comfort parameters

Building ID	Indoor			
	RH (%)	T (°C)	CO_2 (ppm)	Comfort
HU01	35.3	23.0	1539	Unhealthy
HU04	38.6	22.9	941	Moderate
HU05	45.7	23.1	1405	Moderate
HU06	29.3	21.6	767	Unhealthy
HU07	34.4	20.7	784	Unhealthy
HU09	28.2	24.3	1081	Unhealthy
HU15	36.7	23.3	1244	Unhealthy
HU17	29.3	24.5	1214	Unhealthy
HU19	44.4	21.3	1339	Moderate
HU20	38.1	22.1	1777	Moderate
HU21	54.8	21.7	2328	Unhealthy
HU22	31.4	23.2	1245	Unhealthy
HU23	28.8	22.9	1467	Unhealthy
HU24	35.7	21.3	1136	Unhealthy
HU25	38.1	22.7	1012	Moderate
HU26	39.6	24.1	1911	Unhealthy

C.5.2. Poland

In Poland, the indoor air quality was in the moderate category in almost all buildings, except 2 of them (unhealthy), based on the indoor health index. The main air pollutant was benzene, but relatively with medium-low levels. The outdoor value for benzene concentration was on the similar level. Considering the comfort parameters, should be noted that the relative humidity in the classroom was very low and classified unhealthy.

Table 6 and Table 7 below report all the values considered for the calculation of Indoor Health Index in Poland.

Table 6. Poland: Indoor Health Index compared with pollutants measured outdoors

Building ID	Indoor				Outdoor		
	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Indoor Health Index	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
PL03	4.2	7.1	6	Moderate	2.9	1.1	5
PL06	6.4	6.4	9	Unhealthy	5.3	1.8	17
PL13	3.3	5.0	-	Moderate	3.8	1.7	13
PL19	1.9	24.0	-	Unhealthy	2.4	1.4	-
PL20	2.3	6.7	18	Moderate	2.8	0.5	37
PL21	3.4	3.3	3	Moderate	2.4	0.9	10
PL22	1.7	2.7	10	Moderate	2.2	1.9	10
PL24	3.4	7.2	-	Moderate	3.3	0.9	31
PL25	4.3	5.9	-	Moderate	2.5	1.9	-
PL26	-	7.6	4	Healthy	7.0	1.8	-
PL27	1.4	9.0	21	Moderate	2.0	0.7	18
PL28	1.2	7.9	-	Healthy	1.5	2.8	20

Table 7. Poland: comfort parameters

Building ID	Indoor			
	RH (%)	T (°C)	CO_2 (ppm)	Comfort
PL03	30.4	19.1	1734	Unhealthy
PL06	40.1	21.0	2195	Unhealthy
PL13	32.5	22.9	1348	Unhealthy
PL19	28.3	21.7	1016	Unhealthy
PL20	37.9	21.3	1045	Moderate
PL21	28.3	21.7	1165	Unhealthy
PL22	34.6	22.7	1063	Unhealthy
PL24	34.7	21.5	999	Unhealthy
PL25	42.7	19.6	1551	Moderate
PL26	48.1	20.6	2276	Unhealthy
PL27	39.6	22.4	1633	Moderate
PL28	39.5	22.0	1669	Moderate

C.5.3. Slovenia

In Slovenia, the indoor air quality was in the moderate category in almost all buildings, except two of them (unhealthy) and one in "dangerous", based on the indoor health index. The main air pollutant was benzene, but relatively with medium levels. The outdoor value for benzene concentration was on the similar level. Concerning PM2.5, in some cases we registered high levels, but always in moderate category. Considering the comfort parameters, should be noted that the relative humidity in the classrooms was low in 3-4 schools and classified unhealthy.

Table 8 and Table 9 below report all the values considered for the calculation of Indoor Health Index in Slovenia.

Table 8. Slovenia: Indoor Health Index compared with pollutants measured outdoors

Building ID	Indoor				Outdoor		
	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Indoor Health Index	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
SI01	3.5	16.2	12	Moderate	5.2	2.2	19
SI02	4.4	9.8	15	Moderate	5.7	2.6	23
SI03	4.6	11.6	11	Moderate	5.0	1.5	14
SI04	5.7	8.4	11	Unhealthy	4.5	2.1	14
SI05	0.9	12.7	6	Moderate	1.7	1.6	4
SI06	2.8	11.8	14	Moderate	2.8	1.6	15
SI07	2.2	7.4	6	Moderate	2.1	1.5	5
SI08	4.6	17.3	10	Moderate	6.8	4.0	16
SI09	2.3	7.3	15	Moderate	7.6	1.0	15
SI10	11.1	7.6	19	Dangerous	6.2	2.7	24
SI11	5.5	14.0	15	Unhealthy	5.5	0.8	15
SI12	2.3	13.3	11	Moderate	2.5	2.1	11

Table 9. Slovenia: comfort parameters

Building ID	Indoor			
	RH (%)	T (°C)	CO_2 (ppm)	Comfort
SI01	45.5	22.5	1390	Moderate
SI02	32.6	22.0	1884	Unhealthy
SI03	39.9	20.6	1391	Moderate
SI04	31.1	22.8	892	Unhealthy
SI05	45.4	23.1	1193	Healthy
SI06	39.8	22.8	1139	Moderate
SI07	41.6	23.0	1111	Moderate
SI08	37.4	23.2	1297	Moderate
SI09	35.9	22.7	902	Unhealthy
SI10	37.6	23.2	1507	Moderate
SI11	43.7	22.6	1546	Moderate
SI12	40.8	20.9	1191	Moderate

C.5.4. Czech Republic

In Czech Republic, the indoor air quality of the schools selected was in the unhealthy category based on the indoor health index. The main air pollutant was the particulate matter (PM2.5). It should be noted that the outdoor value for the PM2.5 mass concentration was also high, thus the inappropriate indoor air quality was mainly caused by the outdoor air pollution. Only in one case, PM2.5 parameters reached urgent values, or so called very unhealthy. Furthermore, one of the comfort parameters was quite always was in the unhealthy range; the relative humidity was low in the classroom. Carbon dioxide concentration was relatively high in half schools.

Table 10 and Table 11 below report all the values considered for the calculation of Indoor Health Index in Czech Republic.

Table 10. Czech Republic: Indoor Health Index compared with pollutants measured outdoors

Building ID	Indoor				Outdoor		
	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Indoor Health Index	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
CZ01	2.3	12.1	78	Very Unhealthy	2.3	1.6	10
CZ02	1.8	7.2	15	Moderate	3.4	1.7	3
CZ03	2.0	7.9	21	Moderate	2.1	4.4	4
CZ04	1.5	6.0	13	Moderate	2.8	1.9	9
CZ05	5.7	6.6	32	Unhealty	4.6	3.2	15
CZ06	1.7	11.5	6	Moderate	1.8	2.9	8
CZ07	5.4	8.4	16	Unhealty	4.1	2.3	19
CZ08	4.5	5.5	15	Moderate	5.2	1.9	21
CZ09	4.2	4.8	45	Unhealty	5.8	1.9	16
CZ10	5.0	9.6	25	Unhealty	4.9	1.8	20
CZ11	4.5	7.7	27	Unhealty	5.3	2.3	42
CZ12	3.2	6.2	16	Moderate	3.0	2.7	28

Table 11. Czech Republic: comfort parameters

Building ID	Indoor			
	RH (%)	T (°C)	CO_2 (ppm)	Comfort
CZ01	42.9	25.4	1504	Moderate
CZ02	32.4	24.1	990	Unhealty
CZ03	34.3	23.0	1270	Unhealty
CZ04	31.7	23.8	1223	Unhealty
CZ05	34.8	23.1	893	Unhealty
CZ06	38.1	22.8	1597	Moderate
CZ07	38.0	23.6	1444	Moderate
CZ08	25.7	24.0	1094	Unhealty
CZ09	28.2	21.7	898	Unhealty
CZ10	26.5	23.6	1487	Unhealty
CZ11	29.6	24.0	1304	Unhealty
CZ12	30.6	25.3	775	Unhealty

C.5.5. Italy

In Italian schools' buildings, located in Turin city, one of the most polluted of the entire Europe, the indoor air quality in almost all schools was in the very unhealthy or "dangerous" category based on the indoor health index, the worst case of InAirQ project. The schools selected are exposed to the air pollution generated by the high-speed and high-volume traffic road that develops nearby them and the environmental condition that characterized north of Italy and the Alps doesn't help.

The main air pollutant was benzene. It should be noted that the outdoor value for the benzene and PM2.5 concentrations were very high; thus, the inappropriate indoor air quality was mainly caused by the outdoor air pollution. Furthermore, one of the comfort

parameters was quite always was in the unhealthy range: the relative humidity was low in the classroom. Carbon dioxide concentration was high in few schools.

Table 12 and Table 13 below report all the values considered for the calculation of Indoor Health Index in Italy.

Table 12. Italy: Indoor Health Index compared with pollutants measured outdoors

Building ID	Indoor				Outdoor		
	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Indoor Health Index	benzene ($\mu g/m^3$)	formaldehyde ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
IT01	8.7	5.7	18	Very unhealthy	9.6	3.7	21
IT02	17.8	2.2	12	Dangerous	12.7	3.4	6
IT03	8.3	8.0	10	Very unhealthy	13.0	2.7	18
IT04	12.3	12.0	9	Dangerous	13.6	4.6	14
IT05	20.1	8.4	11	Dangerous	28.8	5.4	21
IT06	16.8	9.3	8	Dangerous	20.2	2.0	14
IT07	6.1	8.3	12	Unhealthy	-	3.2	38
IT08	8.7	6.5	10	Very unhealthy	8.1	4.1	5
IT09	7.4	5.2	8	Unhealthy	7.8	1.7	20
IT10	14.6	33.9	11	Dangerous	21.0	4.3	15
IT11	4.9	4.4	9	Moderate	7.2	2.8	5
IT12	5.0	13.7	11	Unhealthy	12.9	10.3	6

Table 13. Italy: comfort parameters

Building ID	Indoor			
	RH (%)	T (°C)	CO_2 (ppm)	Comfort
IT01	30.6	19.9	1371	Unhealthy
IT02	28.3	21.4	936	Unhealthy
IT03	35.8	21.0	1407	Unhealthy
IT04	20.0	25.9	1146	Unhealthy
IT05	42.4	18.7	1898	Unhealthy
IT06	29.4	21.7	1262	Unhealthy
IT07	34.9	24.2	1582	Unhealthy
IT08	37.1	21.7	1467	Moderate
IT09	26.0	20.6	1405	Unhealthy
IT10	31.9	25.9	1766	Unhealthy
IT11	27.1	23.3	1097	Unhealthy
IT12	29.0	24.4	893	Unhealthy

D. Benchmark visits

Within the Project, two Benchmark visits were organised in order to learn some architectural, plant and behavioural recommendations from some great example in Europe: Austria (Vienna) in November 2017 and Finland (Espoo/Sipoo) in May 2018. During these two moment, project partners visited different schools, paying careful attention to the design of the buildings, the systems and all the innovative elements that can be considered as examples.

Here are reported some photos taken during those days.

Figure 14. 2nd Benchmark visit - Finland

Figure 15. 1st Benchmark visit - Austria

Based on the benchmark visits InAirQ project partners prepared a resuming table with the list of lessons learned and proposed action plans.

Topic	Element	Lessons learned from BV	Proposed action plan
PROCESS IMPROVEMENT	**Cleaning process**	BV2/FINLAND: using ecofriendly cleaning products	Use cleaning products with the least adverse impact on human health, more natural cleaners, avoid using colours, paints.
	Maintenance	BV2/FINLAND: Permenantly well maintained building	Regular inspection of the rooms and quick action and remediation in case of leakage of water and accumulation of moisture in the school buildings
	Monitoring	BV2/FINLAND: Inspection of building is carried out by the municipality.	Regular inspections of school buildings carried out by municipality.
		BV2/FINLAND: Continuous air quality monitoring in classrooms (CO2, T, RH)	Air quality monitors in each classrooms, regular monitoring.
		BV2/FINLAND: Monitoring depends on seasonal parameters (RH, T, moisture).	Monitoring depends on seasonal parameters (RH, T, moisture).
		BV2/FINLAND: Decentralised/centralised CO2 controlled mechanical or hybrid ventilation.	Decentralised/centralised CO2 controlled mechanical or hybrid ventilation.
		BV2/FINLAND: Modern building automation and control system (remote monitoring; performance meter providing summary – infromative format)	Modern building automation and control system.
TECHNICAL IMPROVEMENT	**Natural ventilation**	BV1/AUSTRIA: not openable windows, there is only mechanical ventilation – big problem	Need for combination of natural and mechanical ventilation.
	Mechanical ventilation	BV2/FINLAND: mechanical extract and supply ventillation with heat recovery (demand controlled ventilation, operated by temperature, CO2 and presence detectors)	Plan for maintenance of HVAC system. The plan should include monitoring, inspecting and cleaning HVAC components such as outside air intakes, outside air dampers, air filters, drain pans, heating and cooling coils, the interior of air handling units, fan motors and belts, air humidification, controls and cooling towers.
		BV1/AUSTRIA: mechanical ventilation in all building.	Mechanical ventilation in all building.
		BV2/FINLAND: Intensive air ventilation system in the dining room.	Intensive air ventilation system (mechanical ventilation) in the dining room.
		BV2/FINLAND: Night ventilation	Night ventilation
		BV1/VIENNA: Innovative ventilation concept, see attached file *Bauklimatik UE 2017-10-01-kleines Format.pdf*	Innovative ventilation concept – collaboration with MEP from the beginning of design/planning process, interdsicisplinary collaboration, innovative concepts integrated into building design.
	Furniture	BV2/FINLAND: using materials with low emissions	Using materials with low emissions.
	Construction material	BV1 &2/AUSTRIA & FINLAND: using prefabricated, high quality wooden facade elements (emmissions stays in the factory)	Using prefabricated, high quality wooden facade elements (emmissions stays in the factory)

		BV2/FINLAND: using a lot of concrete with low VOC emission	Using a lot of concrete with low VOC emission
	Windows / glass facade	BV1 &2/AUSTRIA & FINLAND: Big windows surfaces	**Impact on well-being*
		BV1 &2/AUSTRIA & FINLAND: Shading system (lower temperature)	Shading systems.
	Flooring:	BV1 &2/AUSTRIA & FINLAND: Mainly parquete (natural element)	Change of flooring with healthy building materials (use of parquet).
	Walls	BV1 &2/AUSTRIA & FINLAND: Walls without any paintings	Less decoration on walls.
	Greenery	BV2/FINLAND: A lot of plants in classrooms.	Implementation of plants into classrooms.
FUNDINGS	**Owner**	BV2/FINLAND: municipality is the owner of the building and have bigger role in the maintainance/ funding distribution etc. (vice president of the school has less power than in other EU countries).	Less power to vice presidents of school buildings, more power to municipality.
BUILDING LOCATION	**Urban planning**	BV1 &2/AUSTRIA & FINLAND: Location near greenery, in the low polluted area, not busy roads nearby, not near industry sources	Choosing good location for new school buildings: Location near greenery, in the low polluted area, not busy roads nearby, not near industry sources.
		BV2/FINLAND: urban planning implementation of school building based on the bioclimatic approach (sunlight, noise, comfort, IAQ, low level of outdoor air emmissions etc.)	Urban planning implementation of school building based on the bioclimatic approach (sunlight, noise, comfort, IAQ, low level of outdoor air emmissions etc.)
APPROACH / PLANNING PROCESS	**Comprehensive approach (planning phase)**	BV2/FINLAND: Comprehensive approach while designing school building: municipality and govrernment (with professionals: architects, urban planners, CMs, SEs, MEPs, LCFMs, public health experts, economists etc. – interdisciplinary teams), parents, school staff, children. For example Sipoo: Municipality manager – Management team – Different departments (Centre for development and land use planning, Economic and Administrative Centre, Social and Health Department, Department of Education, Department of Technology and Environment)	Comprehensive approach while designing school building
		BV2/FINLAND: New concept of designing school buildings: school building is not just a school building but a building combining different functions: community center, youth center, library etc.	New concept of designing school buildings
		BV2/FINLAND: Functional and logical planning of the building.	Functional and logical planning of the building.
	Planning process	BV2/FINLAND: Research plan → Investigations → Repair plan/repairs → Follow up	New planning process: Research plan → Investigations → Repair plan/repairs → Follow up
	Curriculum	BV2/FINLAND: Provided in the national level by governments, it was changed in 2016, new school curriculum has a huge effect on the design of the building and also planning process (new learning environments); teamwork, »flexible« classrooms, for different users	Change of curriculum (national level).

QUALITY OF SCHOOL ENVIRONMENT	**Room distribution**	BV2/FINLAND: Multifunctional areas, transparent, separable inner spaces (using mobile walls, sliding doors) for education and culture to the whole community – all places are »learning spaces« (comprehensive approach: learning, physial activity, life skills); »building serves the user«	Multifunctional spaces, new mobile furniture. **impact more on well-being*
		BV2/FINLAND: Central dining hall	Meals in one space, not in all classrooms (centralised).
		BV2/FINLAND: integrated inner and outside places for lectures	Integrated inner and outside places for lectures
RENOVATIONS	**Insulation**	BV2/FINLAND: In the same time with thermo- modernisation it is necessary to execute the modernisation of the heating system in combination with the ventilation system	In the same time with thermo-modernisation it is necessary to execute the modernisation of the heating system in combination with the ventilation system
OTHER IMPROVEMENTS	**Legislations**	BV2/FINLAND: Establishing the law regulations - monitoring parameters (CO2, T, RH), regulations for schools (number of pupils in classroom)	Establishing the law regulations - monitoring parameters (CO2, T, RH), regulations for schools (number of pupils in classroom)

E. Pilot Actions

E.1. Pilot #1: Awareness raising campaign

Environmental factors are a key factorable to determine the health and well-being of children. Accumulating evidence indicates that children, who comprise over one third of the world's population, are among the most vulnerable of the world's population and that environmental factors can affect children's health quite differently from adults' health.

Health is determined by a variety of factors. In addition to the physical environment, genetics, and biology, social, economic, and cultural factors play major roles. Although it is critical to understand the various driving forces during childhood that shape health and behaviour throughout life, the emphasis of this document is specifically on exposure to environmental chemicals.

Thus, the communication carried on in the framework of InAirQ project is called "Health Communication", whose definition is:

The study and use of communication strategies to inform and influence individual and community decisions that enhance health.

The InAirQ project considers that the effective mitigation of the health impacts of indoor air pollution on the most vulnerable population at the regional/national level requires a package of integrated measures to be mediated on a transnational scale. This is to facilitate experience sharing on a scale proportionate to the need for policy on indoor air pollution at the national level and to coordinate the development and implementation of

the planned actions at the local level. On this basis, the project activities have been structured to maximise opportunities for cooperation and the pooling of experience and ideas at the transnational level.

Objectives of campaign

To raise public awareness of a topic or issue is to attempt to inform a community's attitudes, behaviours and beliefs. Normally, raising awareness also means trying through information to influence these attitudes, behaviours and beliefs positively in the achievement of a defined purpose or goal: for example, improving public health. In other words, to raise awareness of something is to promote its visibility and credibility within a community or society. To raise awareness is also to inform and educate people about a topic or issue with the intention of influencing their attitudes, behaviours and beliefs towards the achievement of a defined purpose or goal.

The objectives of awareness raising process implemented as part of the InAirQ Action Plan is to inform and raise awareness about the issue of indoor air quality, especially in environments frequented by children, and to change behavioural attitudes in a way that pays attention to health needs when relating to indoor environments.

The importance of defining objectives of the process is related to the principle that effective communication is driven by its purpose: what do we want to change, and who needs to be reached so as to bring about change? We need to define how to capture the attention of the target audiences and deliver a convincing campaign message. Thus, the preliminary actions performed before the beginning of awareness raising campaign have been:

- identification of the problem,
- analysis of the situation,
- identification of the stakeholders and target audiences, and
- set up of the communication tools.

To be successful, a communication campaign has to reach people with a message that will help them decide to change their behaviour. If the message isn't understandable, if it doesn't reach its audience, if it doesn't seem to apply to them, or if it simply doesn't register at all, they won't respond. Thus, the objectives of InAirQ raising awareness campaign have been to deliver communication for three different scopes:

O1. Communication for Informing and Understanding. The project has targeted directly with the communication actions a number of groups/audiences. This because the partners believe that these groups can benefit from what InAirQ project has to offer. Thus, it has been important that these groups/audiences have a deeper understanding of the project's work.

O2. Communication for Awareness. Generally, creating awareness about the project's work helps the "word of mouth" type dissemination and helps the audience to build an identity and profile within their own communities.

O3. Communication for Action. "Action" refers to a change of practice resulting from the adoption of methods, activities or approaches offered by the project. These groups/audiences have been selected among those people that are in a

position to “influence” and “bring about change” within their organizations. These are the groups/audiences that have been equipped with the right skills, knowledge and understanding of the project work in order to achieve real change.

The communication objectives for each target group are shown in Table 14.

Table 14. Type of communication planned for each target group

TARGET GROUPS	TYPE OF COMMUNICATION		
	Communication for Awareness	Communication for Understanding	Communication for Action
Pupils of the involved schools and their parents			
Municipal and regional institutions			
Management bodies of the schools			

Awareness campaign audiences

The general objective of the dissemination activity is promoting the project and its outputs through a continuous process of communication towards identified target groups. The identification of targets of the awareness raising campaign helps to properly identify needs of the target groups and to select the most relevant approach to reach and influence their behaviour.

The project aims to arise the interest of a very broad audience from the operators of schools buildings to the users of the assets (pupils, their parents, teachers and school personnel). The findings of the project, deriving from the activities of development and testing of school management actions and adoption of technical improvements for schools, can potentially be replicated for all future interventions on the European existing school buildings.

The target groups for the awareness campaign activities are:

- Municipal and regional institutions
- Pupils of the involved schools and their parents
- Management bodies of the schools and school staff

Key messages

The InAirQ project aims to describe the health impacts of the indoor air quality on the vulnerable population and to take action to improve the healthy environment in schools in the CE area. The WHO and DG Health have warned that air pollution – indoor or outdoor – is a major environmental health concern, as it can lead to serious health effects. Indoor exposure to air pollutants may occur in any indoor environment, such as schools. According to the literature, the most vulnerable to the adverse effects of air pollution are children aged 6-14, 11% of total CE Programme area’s population.

The project communication lays upon three key messages, to be delivered to different audiences and through different communication tools:

1. Intervention methods for air pollution
2. Use of indoor materials and equipment
3. Maintenance and managers' responsibility.

Communication tools

In order to involve a greater number of targets in communication actions aimed at informing, raising awareness on the topic of indoor air quality and inducing a change in behaviour, directing it towards greater attention to the indoor air quality, a series of communication tools have been used:

Sending targeted emails. For some target groups (typically institutional ones) the offices and professional skills have been contacted through emails tailored to the recipient. The e-mails had the objective of informing the recipients about the InAirQ project (objectives, operating methods, output) in order to stimulate interest and increase awareness on the topic. The project activities have been communicated and meetings required to deepen the topic and stimulate, in this way, the debate within the institutions that can lead to a change in attitude and the issue of regulations and guidelines for the improvement of indoor air quality in schools.

Specific meetings with school pupils and their families. Raising awareness among the children of the schools involved in the project and their families on the subject of air quality is an action that can have a multiplier effect on the dissemination of information and awareness on the subject of indoor air quality. Children who have been provided with basic information on air quality and how to improve it will most likely spread the message to the people they are close to: families, other friends, etc. In the same way, even the families, informed and sensitized on the subject, will be stimulated to talk about it and to apply at home the indications provided during the meetings. The meetings have been carried out using supports such as the projection of slideshows and the distribution of informative materials about the pollutants characteristic of indoor air, their main sources and mitigation actions to be implemented to reduce indoor pollution.

Specific meetings with school staff. Since the goal of the InAirQ project is to improve the healthiness of the school environments, particular attention will be devoted to specific meetings with school staff, which should be sensitized on the issue so that the knowledge acquired is a spur to change behaviors orienting them towards a management more virtuous of school spaces. Also in this case the meetings have been conducted using supports such as slideshows and technical materials regarding intervention methods aimed at improving indoor air quality, use of indoor materials and equipment and maintenance and managers' responsibility regarding a more targeted and conscious choice of furnishings, or detergents, or educational materials with low toxicity and low impact on indoor air.

Production and dissemination of information materials. Communication actions, especially those aimed at "non-expert" targets (i.e. people, such as school staff, families and pupils, who do not necessarily have a specific competence or interest in the topic of

indoor air quality) should be assisted by supporting materials that, during or after the discussion, can be browsed and read in autonomy, constituting a sort of reminder on the topics dealt with during the meetings. For this purpose, the materials already produced within the InAirQ project (brochure, leaflet) have been used, and also new materials have been produced. The materials produced for school pupils and their families have a more informative cut compared to those produced for the school staff, which are more technical because the school staff is the one who, in the immediate future, will collect and carry out the inheritance of the InAirQ project, and will implement the actions planned to reduce indoor air pollution in schools. The materials produced will refer to the Action Plan for mitigation actions.

Use of the national Facebook pages of the project for dissemination. In the context of the Communication Strategy and especially the Social Media Campaign, 5 national pages of the InAirQ project were created (one for each State participating in the project), which will be used for the dissemination of the project contents and the messages of which it is he is a bearer. The materials produced will be uploaded to these Facebook pages and made available to the public.

Chapter F.4. Results achieved: numbers and figures reports a list of all communication activities performed in the States participating in InAirQ project.

E.2. Pilot #2: Intervention Plans tested

The Action Plan is a tool for preventing, identifying and solving indoor air quality problems in school buildings. It helps integrate activities that affect the IAQ into the system's normal use, management and maintenance. The aim is to provide a high-quality indoor air by improving or maintaining the situation, by solving problems and by setting rules and preventive measures.

The preparation of the Action Plan is based on the Joint Transnational Strategy for Indoor Air Quality Action Plans developed within the InAirQ project.

The preparation of Indoor Air Quality Action Plans is also based on risk assessment. An integral part of the preparatory process is the SWOT analysis, in the framework of evaluating the legal and political possibilities of the regional authorities, developing protocols for the field campaign and the possibilities of involving the parties (education, health, social and environment).

The indoor environment in schools is a complex system containing many interacting parameters that affect the health and well-being of their users. In order to describe the quality of the indoor environment in a particular school, the measured values (mostly in relation to the established limits or recommendations) or their aggregation, for example in the form of an indoor air quality index, are used. Within the school building can be defined several types of spaces that are used for different purposes (eg. the classrooms, canteen, laboratories, teacher's cabinets, gyms, locker rooms) and which are subject to different requirements with respect to their use.

The extent of air pollution in the building of a school depends on the interaction between the building and its external environment, as well as the way the building was built, how it is equipped and how it is used. The procedure for drawing up the action plan takes place in steps.

In the next paragraphs, the results of Action Plans tested by partners from Poland and Czech Republic are summed up.

E.2.1. Poland

The main aim of the action plan prepared in Poland is to minimize the impact of the thermomodernization of the school buildings on the indoor air quality to improve in consequence the children health.

Poland does not have any regulations related to the indoor air quality, which is the reason for lack of funds on this aim. The change of this state, implementation of relevant regulations will result in the necessity to reserve funds in the budget of local authorities for the purpose of air quality improvement. However, in the current situation, it is only possible to use low-cost or no cost actions.

In general, Poland has very low quality outdoor and indoor air. There are two main reasons, first is the economy (poverty and heating by coal) and second is the lack of awareness of the human health effects of the air pollution. In case of outdoor air pollution the awareness is campaigned by mass media but the indoor air pollution escapes people notice. The action plan on this field is to raise the awareness of different target groups by education/training/ seminars organized in cooperation of local authorities. Increasing awareness of school heads/teachers/technical personnel will result in the increase in their involvement in taking up actions for the sake of the indoor air quality improvement.

Subject of the indoor air quality should be introduced in the core curriculum of teachers education. Airing classrooms during classes with children is the most basic action towards ensuring a suitable air quality. Moreover, institutions responsible for thermo-modernization should be trained how to select proper materials and technological processes used in the case of thermo-modernization of a school. Those institutions should also implement clear and transparent procedures concerning schools selection for thermo-modernization as well as other renovations.

In order to start a process aimed at setting up detailed legal regulations in the field of the indoor air quality in Polish schools a project of such regulations it is necessary to start preliminary activities such as formal acceptance of guidelines elaborated as part of the projects (inter alia InAirQ) by local and regional self-governments authorities. The guidelines should include reference values for nuisance (physical parameters and CO_2 concentration) and harmful agents (chemical and biological air pollutants), and should also recommended methods for monitoring and measurement of the indoor air, as well as institutions that perform such studies, and include types of actions that improve air quality.

The following actions are thought to be effective towards the improvement of IAQ in school buildings:

1. Ventilation rate has to be checked. If the ventilation is poor:
   a) ventilation tracts should be clean or ream out or also check if is not blocked by furniture;
   b) mechanical ventilation (or hybrid ventilation) could be installed but should be considered the outdoor air quality, in case of high level of outdoor air contamination is the need of air filtration (e.g. carbon or HEPA filters) and the level of additional noise caused by operations of these systems;
   c) CO_2 alarm should be installed in classrooms;
   d) detailed procedures of ventilation and airing of the classrooms by teachers and cleaners should be prepared, implemented and executed;
   e) installation of proper trickle vents could be crucial to the proper air circulation inside the classroom;
2. If there is no possibilities to finance actions described in point 1a – 1e the possible solution is to minimize the number of students/pupils in classroom in which is diagnosed the low indoor air quality.
3. Equipment which emits volatile organic compounds and particles during operation (e.g. copiers, printers) should be used in separate rooms outside of classrooms.
4. Cleaning should be done according to specially developed procedures with clear formulated:
   - frequency (each day),
   - time of day (after the end of the classes),
   - equipment (mops and cloths for dusting from microfiber)
   - cleaning products (prohibitions of irritants products, sprays only if are absolutely necessary).
5. Floor should be made of solvent-free, low-emission materials with certificate and should stay clear without textile covering.
6. Furniture have to be made by low-emission materials with certificate on using in schools (children friendly).
7. Art works in classes should be undertaken only under control of teacher and with controlled ventilation or airing. Art materials (paints, sticks, markers etc.) have to be stored in hermetic cabinets /drawers / boxes.
8. All possible source of indoor pollutants should be moved to separate rooms or encapsulated in proper way (hermetic box, laminated surfaces) or replaced by new ones (e.g. furniture, painting surfaces of wall, decorations, boards).
9. Classes should be equipped with species of plants recommended for indoor environment absorbing PM and chemical pollutants.
10. Activities of children should be modified depending on the indoor air quality. During intensification of the atmospheric air pollution children activities taking place outside the school should be stopped or reduced to minimum.
11. The area surrounding a school should have as much greenery as possible.
12. When possible, car parks should be located in some distance from the classrooms windows. If not possible, specially prepared procedures of airing classrooms (the windows should be opened not in the peak parking hours) should be prepared, implemented and executed.

13. Schools directors can observe the incidence of respiratory diseases listed in the literature as associated with air pollution among students / pupils to undertake of activities in case of increased morbidity among school children (e.g. in selected classes).
14. In schools in which there is or is suspected on the basis of a proper map that there may be a high level of radon, action recommended by the WHO should be taken, such as:
    - improvement of natural ventilation of air,
    - airing classrooms in the morning before the lessons start,
    - increased ventilation under the floor, which prevents penetration of radon from the basement into utility rooms,
    - sealing floors and walls (e.g. sticking visible cracks and scratches),
    - educating users of the rooms in the field of natural ventilation (airing necessity).

The proposed plan of actions is feasible with engagement of all institutions and individuals associated with the school environment. Its feasibility will ensure taking actions in a specific order:

1. Awareness raising among the engaged parties (education/courses/trainings/media actions).
2. Indicating individuals and institutions responsible for improvement of the indoor air quality in educational units and supervision of this issues.
3. Defining current problems and preparing plans of actions at the school/local/regional and national level.
4. Indicating sources and determination of the budget at the school/local/regional level.
5. Taking up direct actions in accordance with the prepared plan, concentrating first on low-cost or no cost actions. If they do not bring about assumed results taking up technical actions. In case of the observed increased morbidity among children in a specific group (e.g. school, wing of the building, classroom) one should immediately ask the institution responsible for the school for allocation of funds allowing all possible actions to be taken to reduce the negative health effects in children.

E.2.2. Czech Republic

The primary goal is to minimize the impact of the outdoor and indoor environment on pupils' health. The first step is to describe and assess the current state of the school environment and to identify potential problems.

It includes several basic intermingling parts:

Finance and grant titles

For ensuring necessary funds and grants are needed to create, at the professional and amateur level, the necessary pressure on the management of schools and public or municipality administration. (Presentation of outputs, publicizing issues, special seminars).

Task for: Expert Methodological Center, professional groups/chambers, ministries

Creating a National Methodology and Data Center (Platform)

The problem is on the fragmentation of activities, the non-acceptance of a unified methodical approach, the unavailability and the incomparability of existing data and experience. It is necessary to create expert methodological Headquarters / Center.

The task of this Expert Methodological Center is / will be the co-operation in the implementation of the activities and tasks arising from the implementation of the National action plan, its ongoing updating and paralelly management and inventory of obtained IAQ data.

Task for: Expert Methodological Center, professional groups/chambers, ministries

Education, training, seminars, building capacities

The problem is the general lack of awareness of the effects of polluted indoor air on the health of children and the causes of this condition.

- For all interested groups is advisable to increase the awareness of teachers, other staff, children and parents about the importance of indoor air and the causes of its pollution, and discuss with them their role in ensuring IAQ quality.
- Create cross-sectoral working groups involving regional actors in the fields of education, health, the social area and the environment. The necessity is to involve stakeholders in the implementation of the action plan (to organize seminars and training events for school staff, school authorities, school units, discuss with architects, designers or builders, organize workshops, provide consultancy and methodological activities.) Extend publishing and presentation activities, including medialization of outputs.

Task for: Expert Methodological Center, professional groups/chambers

Continuous updating of related legislation

The aim is to ensure full (or at least sufficient) acceptance and application of the World Health Organization's requirements for indoor air quality in Czech legislation through cooperation with relevant public authorities / public health authorities, research institutions and professional chambers.

- Communication with supervisors (OOVZ = Public Health Authorities), with the concerned professional groups, universities …..
- Use of measurement data and problem cases (interconnection with the preparation of data and methodological platforms)
- Securing adequate inter-ministerial communications
- Update of recommended / reference and limit values, preparation of draft

Task for: Methodical management of hygiene services and OOVZ bodies

Unifying the methodologies for the measurement and evaluation of indoor environmental quality (surveillance activity)

1. **Continuous updating of the methodical guidelines for indoor air measurement and sampling**

   The goal is always to ensure a comparable and representative measurement within the classroom and school and, of course, between the measurement groups. Require a recognized quality system (authorization, accreditation).

   Task for: Expert Methodological Center

2. **Characterization procedure of the current state of indoor air quality in a building (Quality)**

   When identifying the cause of indoor air pollution, it is always necessary to include both the description of the assessed area / building and the subjective perception of users.

   This can only be ensured by following the approach below, which can be divided into two groups:

   A. The description of the factors influencing the indoor air of the building

   1. Outdoor air - outdoor sources

   Air quality should be assessed on the basis of interpretation of data from the network of measuring stations operated by CHMI (ISKO). In a particular case, it is always necessary to evaluate and take into account:

   a) Air pollution in the wider area, sources of pollution in the immediate vicinity of the building, e.g. main roads, parking, waste disposal facilities, industrial production, etc.

   b) Soil beneath the building and surrounding (radon, old loads ..).

   According to these parameters, place a specific school building into a type of urban site (estimate the level of outdoor load) or identify a potential radon load.

   2. Indoor air - indoor sources in building

The source (cause of emissions) of some pollutants is / may be a school building itself, operating regime including cleaning regime, children's activities or internal directive. One possible tool of description is the use of a questionnaire survey (see Appendix 2 and 3). Primarily it is necessary to focus on:

a) School building materials and equipment (eg building elements, occurrence of asbestos, insulating materials, wall and floor tiling, used paints and adhesives, room equipment - furniture, etc.).

- Source processes in school buildings
- incineration, heating, cooking
- identification of regular school activities of children (sport, art, school mode, etc.)

b) activities of operators and other users (use of cleaning products, smoking, use of laser photocopiers, printers ...) - Emergencies (damage to the building due to eg heating, leakage, ...)

c) Other factors that affect the quality of the indoor environment - method of ensuring the exchange of air in the building - occurrence of moisture and mold.

The identification of resources around the school and in the school building itself (the class) then defines / predetermines possible corrective actions. When preparing questionnaires, please follow the "Protocol of data collection" (see Appendix 1).

B. The subjective evaluation of indoor air quality its users.

Subjective user reviews can be obtained through a simple questionnaire or by evaluating complaints if they exist. One of the possible tools for subjective environmental quality assessment in schools is the use of SWOT analysis.

The result of this step is an overview of potentially problematic environmental and resource related parameters.

The output is a quantification of the present state of indoor air quality in a building.

If non-compliant parameters are found, there is a need to proceed without delay to the next step, i.e. to propose remedies. In other cases, it is necessary to consider and gradually implement all the steps that could / should lead to further improvement of the indoor air quality and minimizing existing burdens.

Task for: Methodical management of hygiene services and OOVZ bodies

Design, implementation and verification of the effectiveness of the implemented measures

This assumes:

1. **Suggestions for corrective measures / actions that will improve the quality of the environment.**

Measures may be:

a) Operational / mode, i.e. modifying the mode of some activities that can affect the quality of the indoor environment (e.g. increasing ventilation rate, limiting the number of people/children in the classroom, changing the cleaning period, ...)

b) Systemic, i.e. measures that will lead to removal of the source (e.g. replacement of floor coverings, prohibition of using some detergents, use of dust-free painting, etc.).

The proposal must be accompanied by:

a) Economic estimation and feasibility assessment

b) Timetable for implementation of individual measures respecting potential health risks.

2. **Implementation of remedial measures**

On the basis of the draft, the measures will be implemented in accordance with the timetable of the individual steps.

a) In the case of regime measures, it is necessary to formulate new rules for the operation and maintenance of the building and to ensure that all concerned persons are informed about the change in progress and their reasons.

b) In case of systemic measures, it is necessary to check the correctness of their implementation (eg control of used materials, control of used detergents, ...)

c) At the same time, it is advisable to increase the awareness of teachers, other staff, teachers and parents about the importance of indoor air and the causes of its pollution, and discuss with them their role in ensuring IAQ quality.

3. **Verification of the functionality of corrective actions**

The functionality of corrective actions should preferably be verified by means of a control measurement or by a control subjective user assessment as a questionnaire.

Require a recognized quality system (authorization, accreditation).

Task for: Expert Methodological Center, professional groups/chambers

Support for drawing subsidies to solve existing problems (microclimate, dust, asbestos, materials / equipment certification ...)

Obtaining the necessary funds / grants currently requires knowledge, time and experience. It is necessary to ensure at the decision-making level the simplification of access to subsidies and, at the same time, legal and economic assistance for the submission of applications.

a) Simplify and make clear the possibilities of drawing subsidy titles

b) Take advantage of the experience of drawing subsidies for solving identified problems and building new buildings (form: trainings, seminars, methodological and legal assistance)

c) Legislatively anchor the use of low-emission materials

Task for: Expert Methodological Center, professional groups/chambers, ministries

Support for science and research in the field of indoor environmental (air) quality

Create conditions for the development of research projects aimed at ensuring the quality of the indoor environment in school facilities (and other residential buildings).

Task for: Expert Methodological Center, professional groups/chambers, ministries

E.2.3. Hungary

The National Public Health Center has elaborated a protocol to test the efficiency of commercially available air cleaners in Hungary in 2017. The following IAQ parameters are

investigated before and during the normal use of the air cleaner: the concentration of PM_1, $PM_{2.5}$ and PM_{10} mass, volatile organic compounds (VOCs; benzene, toluene, ethylbenzene, xylene, trichloroethylene, tetrachloroethylene, α-pinene, limonene, naphthalene and styrene), aldehydes (formaldehyde, acetaldehyde, benzaldehyde, butanal, propanal, hexanal), bacteria, fungal spores and relative humidity. The concentration of ozone is monitored when it is supposed that ozone is generated in the device. The measurements are performed in a real environment (e.g. home, hospital), depending on the target consumers. The Healthier Air Certificate is provided to the manufacturer or distributor of the device if the following two criteria have been fulfilled: (i) none of the investigated air pollutant presents in higher concentrations during the use of the device compared to the values measured before the use of the cleaner; (ii) the concentration of air pollutants have to be lower in case of at least three air pollutant groups (PM, VOCs, aldehydes, bacteria, fungal spores) after the use of the device. The factors which might affect IAQ (e.g., cooking, cleaning, and airing) are considered during the evaluation of the results.

One of the devices, which successfully completed the test earlier, was selected for this study. The air cleaner contains both HEPA and carbon filter and has a humidifier function. Based on our previous test results, the concentration of PM1, PM2.5 and PM10 mass, bacteria and fungal spores significantly decreased during the use of the device in a home environment. Furthermore, the use of the air cleaner had a positive effect on the relative humidity of the indoor air as it increased to the healthy range during the use of the device. However, changes in the concentration of VOCs and aldehydes were not observed.

The selection of the school building was based on results of the detailed monitoring campaign which was carried out in the heating period of 2017/2018. The IAQ was investigated in sixteen primary school buildings in Hungary (Figure 1). In each building one classroom occupied by 3rd or 4th grade children was selected. The monitoring campaign lasted for 5 consecutive days in each primary school building. The IAQ was investigated from Monday morning to Friday afternoon; however, the sampling took place only when the classroom was occupied in order to provide a better estimate of exposure. Simultaneously, sampling and monitoring were undertaken outdoors with identical samplers and monitors.

The results of the monitoring campaign revealed that, in general, the major problems in the classrooms regarding the IAQ were (i) the high concentration of carbon dioxide due to poor ventilation; (ii) the high mass concentration of PM due to both indoor and outdoor sources; and (iii) low relative humidity levels.

The following criteria were applied for the selection of one school building out of the sixteen for the intervention study:

- high $PM_{2.5}$ mass concentration in the classroom based on the results of the detailed monitoring campaign;
- high indoor/outdoor ratio for the $PM_{2.5}$ mass concentration based on the results of the detailed monitoring campaign;
- low (<40%) relative humidity based on the results of the detailed monitoring campaign;
- availability of two classrooms with similar characteristics (e.g., similar floor size, occupant density, etc.);

- willingness of the school manager, teachers and students to take part in the intervention study.

E.3. Pilot #3: Feasibility Study

It has been proven that the levels of carbon dioxide in the classrooms are directly related to the attention of students: the higher the levels of carbon dioxide, the lower the ability of the students to stay focused. High levels of carbon dioxide arise from a lack of fresh air intake and have a negative influence on students' health and learning ability.

As we have seen from the results of the monitoring campaign, indoor air quality is typically affected by three major groups of pollutants:

i. outdoor air pollutants, such as e.g. carbon monoxide (CO), benzene (C_6H_6), ozone (O_3), oxides of nitrogen (NO, NO_2), and particles, which penetrate the building envelope, or enter the building through windows or air handling units;
ii. pollutants mainly generated in households, i.e. occupant-related pollutants like CO_2, bio-effluents and particulate matter (PM) in different size ranges;
iii. building-related pollutants, typically volatile organics (VVOCs, VOCs, SVOCs) originating from e.g. construction material, furnishings and office equipment as well as microbial contaminants such as viruses, fungi and bacteria.

The affection of IAQ by the infiltration of outdoor air to indoor environment depends also on the type and operation of the ventilation system of a building, which could be natural or mechanically ventilated.

Table 15 sums up the relationship between pollutants, their sources, comfort and health effects, and gives possible solutions about control measures.

Table 15. Relationship between pollutants, their sources, comfort and health effects and possible control measures

Pollutant	Sources	Comfort and Health Effects	Control Measures
Airborne Biological Pollutants Biological materials, bacteria, viruses, fungi (moulds and yeasts), pollen, dander, and insect (cockroaches and dust mites) parts are present nearly everywhere in indoor environments. These particulates range from less than one to several microns in size. When airborne, they are usually attached to dust particles of various sizes	People, plants, pets, and insects may serve as sources or carry biological agents into a building. Drapery, bedding, carpeting, and other places where dust collects can harbour them. Cooling towers, dirty air conditioning equipment, humidifiers, condensate drains, and ductwork can incubate bacteria and moulds. Other sources include wet or damp building	Tuberculosis, measles, staphylococcus infections, influenza and Legionnaires disease are some of the diseases caused by exposure to biological material in indoor air. Pollens and moulds can cause allergic reactions for a significant portion of the population. Common symptoms include sneezing, watery eyes, coughing, and shortness of breath, dizziness, lethargy, and	Good housekeeping and maintenance of HVAC equipment are very important. Adequate ventilation and good air distribution also help. Higher efficiency air filters remove viable particles along with other particles. Any water-damaged building materials or furnishings should be promptly cleaned, dried, or replaced. Maintain relative humidity

so that all sizes of airborne particles may include them.	materials and furnishings including insulation, carpet, ceiling tiles, wall coverings, and furniture.	fever.	between 40 to 60 percent. Cooling tower water treatment procedures exist to reduce levels of Legionella and other organisms.
Asbestos is composed of small, natural mineral fibres. Chrysotile is the most commonly used asbestos and represents about 95 percent of the asbestos used in buildings in the United States.	Widely used in insulation and other building materials manufactured before 1977. Examples include pipe and furnace insulation, vinyl floor tiles and sheet flooring, patching compounds, textured paints, roofing materials, wall and ceiling insulation, and brake and clutch pads.	No immediate acute health effects are known. Fibres deposited in the lung are the only known cause of mesothelioma, a cancer of the chest and abdominal lining. Asbestos is also associated with cancer of the oesophagus, stomach, colon, and other organs. It can also cause asbestosis, a non-cancerous chronic and debilitating lung disease found in high-level industrial exposures.	The recognized methods of responding to friable or hazardous asbestos containing materials include repair, removal, enclosure, and encapsulation. Removal has often been the abatement method of choice, although removal is not necessarily the most cost-effective method to protect human health and the environment.
Carbon dioxide (CO_2) is a colourless, odourless, and tasteless gas. It is a product of completed carbon combustion.	All combustion processes and human metabolic processes are CO_2 sources. Concentrations of CO_2 from people are always present in occupied buildings.	Carbon dioxide is a simple asphyxiant. At concentrations over 1.5 percent, breathing becomes more difficult. Above 3 percent, CO_2 causes nausea, headaches, and dizziness, and above 6 to 8 percent stupor and death can result. At lower concentrations (0.1 percent), building occupants may experience headaches, fatigue, or eye and respiratory tract irritation. At low concentrations, the build-up of CO_2 indicates inadequate ventilation.	Ventilate with fresh air to control carbon dioxide levels. Ventilation rates should meet WAC 51-13. Which requires 15 CFM/person in atypical classroom.
Carbon Monoxide (CO) is a colourless, odourless, and tasteless gas. It results from incomplete oxidation of carbon in combustion.	Incomplete oxidation during combustion in gas ranges, unvented heaters, leaky wood and coal stoves, and tobacco smoke may cause high concentrations of CO in indoor air. Worn or poorly adjusted and maintained	Acute or short-term effects of carbon monoxide (CO) exposure are due to the formation of carboxy-hemoglobin in the blood, which inhibits oxygen intake. At moderate concentrations, symptoms may mimic	Maintaining and properly venting combustion equipment is most important. Manage vehicular use adjacent to buildings and in vocational programs to avoid entry of exhaust into buildings. Additional

	combustion devices can be significant sources. Automobile, bus, or truck exhaust entering buildings from attached garages, nearby roadways or parking areas can also be a source of CO.	influenza and include fatigue, headache, dizziness, nausea, and vomiting. Other symptoms include impaired judgment and impaired vision. At higher concentrations, CO exposure is fatal.	ventilation can be used as a temporary measure when high levels of CO are expected for short periods of time.
Formaldehyde is a colourless, water-soluble gas. Due to its wide use, it is frequently considered separately from other volatile organic compounds (VOCs).	Materials containing formaldehyde are widely used in buildings, furnishings, and consumer products. Urea-formaldehyde resins are used in the manufacture of plywood, particleboard, fibreboard, and textiles. Other potential sources include furniture, shelving partitions, ceiling tiles, wall coverings, and carpet backing. The walls of some buildings have been insulated with urea-formaldehyde foam insulation (UFFI). Tobacco smoke and incomplete combustion of cooking and heating fuels are secondary sources.	Formaldehyde has a pungent odour and is detected by many people at levels of about 0.1 parts per million (ppm). Besides the annoyance, at higher concentrations it can also cause eye, nose, and throat irritation; coughing; wheezing; fatigue, skin rashes; and in rare cases, serious allergic reactions. Formaldehyde has caused nasal cancer in laboratory animals, but chronic effects have not been established for human beings. Some people exhibit a high sensitivity to very low concentrations.	For problem UFFI cases, removal is indicated although the cost can be high. Even then, residual materials may remain in the structure and continue to off-gas. Increased temperature, humidity, and ventilation will accelerate off gassing of formaldehyde. Therefore, ventilation may not be an effective means of control. Some manufacturers are producing products with lower off-gassing rates. Some surface treatments (such as nitrocellulose or water based polyurethane finishes) are being used to reduce off gassing.
Nitrogen Oxides The two most prevalent oxides of nitrogen are nitrogen dioxide (NO_2) and nitric oxide (NO). Both are toxic gases with NO_2 being a highly reactive oxidant, and corrosive. NO gradually reacts with the oxygen in the air to form NO_2.	The primary indoor sources are combustion processes, such as unvented combustion appliances, defective installation of vented appliances, welding, vehicle exhaust, and tobacco smoke. Combustion appliances include wood, gas, and coal stoves, as well as unvented kerosene heaters and fireplaces under some circumstances.	Oxides of nitrogen have no sensory effects in concentrations normally found in schools. Acute effects of lung dysfunction have been reported at higher concentrations. Oxides of nitrogen produce delayed short-term effects on airway activity. Persons at special risk are those with chronic bronchitis, emphysema, asthma, and children under two years old. Long-term or chronic effects are not well established.	Venting the sources of nitrogen dioxide to the outdoors is the most practical measure for existing conditions. This includes proper installation, operation, and maintenance of all combustion appliances and prevention of vehicle exhaust entry into buildings.
Other Volatile Organic Compounds (VOCs) are	VOCs are released from many housekeeping and	Several of these compounds have been	Selective purchasing and use of construction

compounds that vaporize (become a gas) at room temperature. There are hundreds of VOCs found in the indoor air, sometimes in concentrations suspected of being harmful.	maintenance products, building materials, furnishings and equipment, and from human metabolism. Examples include: acetone and alcohols that are by products of human metabolism and can be released from cleaners and personal care products; ammonia from cleaners and diazo copiers; aromatic hydrocarbons from combustion processes, pesticides, paints, and solvents; benzene from combustion processes, gasoline, and solvents; chlorinated hydrocarbons, from wood preservatives and solvents; styrene from carpet systems; phenols from equipment and furnishings; toluene from adhesives, gasoline, paints, and solvents; and 4-phenyl cyclohexane (4-PC) released from carpet systems.	identified individually as causing acute and chronic effects at high concentrations. At higher concentrations than are typically expected in school buildings, some VOCs have been linked to cancer in humans, and others are suspected of causing cancer. Anecdotal reports suggest that combinations of these compounds in low concentrations may be associated with sick building incidents. However, this has not been confirmed through rigorous experimental or observational studies. Symptoms attributed to VOCs include respiratory distress, sore throat, eye irritation, nausea, drowsiness, fatigue, headaches, and general malaise.	materials, furnishings, operational and maintenance materials can help reduce VOC emissions. Products should be stored in well-ventilated areas apart from occupied zones. Increased ventilation or direct exhaust can be used for activities that have high VOC emissions, such as painting. Scheduling the use of products to avoid occupant exposure to high levels of VOCs can also be useful.

Based on these preliminary considerations and on the evidences coming from the results of their respective monitoring campaigns, partners from Hungary, Slovenia and Italy prepared their own action plans, as summed up in the next paragraphs.

E.3.1. Hungary

To protect indoor environmental quality the designer should understand indoor air quality problems and seek to eliminate potential sources of contamination that originate from outdoors as well as indoors by:

- designing barriers to infiltration of outdoor pollutant sources into the school;
- selecting low-toxicity, low-emitting, moisture-resistant materials that can be safely installed and maintained;
- specifying the required sequence of work (for example, installing soft finishes after painting);
- specifying the required duration of ventilation during and after installation;
- protecting ducts and the ventilation system during construction or renovations;

- ensuring that requirements are included in all consultation, design and construction documents.

When selecting materials for interior surfaces and finishes for a high performance school, maintainers look for

- cost-effective,
- durable and
- materials-efficient products

that provide the desired acoustical performance and aesthetic qualities, and protect indoor air quality and health. Materials selection affects many other high performance goals in addition to indoor air quality. However, the feasibility study prepared by Hungarian Project Partners does not attempt to address these other factors, instead it encourages the schools to define and express their additional demands (e.g. design, energy efficiency etc.) and achieve ones in other field of teaching.

Potentially important sources of indoor air quality contaminants are interior building materials, office furniture, and equipment. Interior building materials — including carpets, carpet padding, paints, sealants and caulking, adhesives, floor and ceiling tiles, cabinets, moulding, composite wood products, and other wood work — can contain contaminants that are gradually emitted (off-gassed) throughout the life of the material. The contaminants include volatile and semi-volatile organic compounds (VOCs and SVOCS, respectively), and small particulate substances that act as eye or throat irritants. Additional IAQ contaminants can originate with office furniture, room dividers, and photocopiers.

The selection process should consider installation and maintenance requirements as well as how the material or furnishing performs during its service life. Many benign finishes must be installed using adhesive, sealants or coatings that emit ("off-gas") VOCs during and after installation. Some VOCs are odorous, irritating, or toxic. It is important to select products whose emissions are low and the least hazardous or offensive.

From an IAQ perspective, the schools (and maintainer, owner etc.) should generally seek to select materials that:

- require the use of the least toxic, low-VOC, water-based adhesives and coatings constituents;
- emit little or no odour;
- are easy to clean and maintain; and
- are not susceptible to moisture damage that can foster mould growth.

Below, general advices and strategies which should considered by the schools' managers and maintainer when conduct material selection are listed:

- Prioritize sensitive program areas. Identify and prioritize spaces where material selection issues are of particular.
- Use national, sector — and if available so-called consensus — standards when possible. Select products based on available consensus standards (developed by government agencies, environmental certification services, or trade organizations) that address health/toxicity issues relating to specific material types.

- Develop specification criteria. Facility maintainers, owners should provide specification criteria for appropriate materials and installation methods. Incorporate specifications into design and construction documents.
- Obtain supplier or manufacturer certifications. For materials that are deemed critical to the development project or purchase (e.g. public procurement) and for which standards or other references do not exist, obtain and review supplier /or manufacturers' certifications or test data, preferably. Contact supplier, manufacturers for clarification as needed. Review by experienced indoor air quality professionals may be justified for particularly critical materials or sensitive spaces.
- Require field approval for product substitutions. Review and approve builder or supplier requests for product substitutions to ensure that the indoor air quality criteria defined in the specifications have not been compromised. Require certifications for any product substitutions affecting critical items. Require justification from contractors for substitutions that do not meet environmental performance criteria. However, do not prohibit substitutions. The approval process for substitutions should be clearly spelled out and should require specific product ingredient information, as well as information about any adhesives, solvents or other materials that might be used during installation or maintenance.

E.3.2. Slovenia

Based on the field campaign (results of monitoring campaign) and action plans prepared on the basis of the analysis of different pollutants in the indoor air, Slovenian partners prepared action plans for 12 schools in Slovenia (Table 16).

For each action it has been evaluated its feasibility (last column), based on its investment (cost and time consuming), defining three classes of feasibility:

1. really feasible: cheap, fast
2. feasible: in the middle between 1 and 3, needed some time and some money
3. hardly feasible: expensive, slow (a lot of time needed)

Table 16. Action plans for 12 schools in Slovenia

School	What do we want to improve	Improvements			Who can do it?		Feasibility*
		Technical improvements	Process improvements	Other (law, etc.)	School personnel	External experts	
01	Lower the concentrations of Benzene **Formaldehyde** $PM_{2,5}$ CO_2		Reducing use of paints, varnishes, adhesives, artificial floor coverings (art decoration) (formaldehyde).		Teachers, all employees, Headmaster of the school		1, 2
		Mechanical ventilation (PM, benzene, CO_2)				Experts	3
			Use of natural cleaners (formaldehyde)		Cleaning lady Headmaster of the school		1
			Opening the windows after cleaning		Cleaning lady		1

School	What do we want to improve	Improvements			Who can do it?		Feasibility*
		Technical improvements	Process improvements	Other (law, etc.)	School personnel	External experts	
			(formaldehyde)				
			More frequent ventilation (CO2, formaldehyde)		Teachers (All employees of the school)		1
				Concentrations of CO_2 based on legislations Regular measurements		Government	2, 3
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
02	Lowering the concentrations of: Benzene $PM_{2,5}$ **CO_2** RH	Mechanical ventilation (benzene, PM, RH, CO2)				Experts	3
			Reconstruction of damaged area (water damage)		Headmaster of the school	Experts	2
			More frequent ventilation (CO2, RH*)		Teachers (All employees of the school)		1
				Concentrations of CO_2 based on legislations Regular measurements		Government	2, 3
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
			Frequent, thorough wet cleaning (especially critical – dusty places) (PM)		Cleaning lady responsible person for school hygiene		1
03	Lower the concentrations of: Benzene $PM_{2,5}$ CO_2 RH	Mechanical ventilation (benzene, PM, RH, CO_2)				Experts	3
			More frequent ventilation (CO2, RH)		Teachers (All employees of the school)		1
				Concentrations of CO_2 based on legislations Regular measurements		Government	2, 3
		Changing plastic windows (RH)			Headmaster of the school	Experts	3
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
04	Lower the concentrations of:	Mechanical ventilation (benzene, PM, RH)				Experts	3

School	What do we want to improve	Improvements			Who can do it?		Feasibility*
		Technical improvements	Process improvements	Other (law, etc.)	School personnel	External experts	
	Benzene PM2,5 RH		More frequent ventilation (CO_2, RH)		Teachers (All employees of the school)		1
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
			Frequent, thorough wet cleaning (especially critical – dusty places) (PM)		Cleaning lady responsible person for school hygiene		1
05	Lower the concentrations of: Formaldehyde		More frequent ventilation. Use of natural cleaners. Opening the windows after cleaning. Reducing use of paints, varnishes, adhesives, artificial floor coverings (art decoration).		Teachers (All employees of the school), Cleaning lady Responsible person for school hygiene		1, 2
06	Lower the concentrations of: Benzene $PM_{2,5}$ RH	Mechanical ventilation (benzene, PM, RH)				Experts	3
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
			Frequent, thorough wet cleaning (especially critical – dusty places) (PM)		Cleaning lady responsible person for school hygiene		1
07	Lower the concentrations of: Benzene RH	Mechanical ventilation (benzene, RH)				Experts	3
			Reconstruction of damaged area (water and moisture damage) (RH)		Headmaster of the school	Experts	2
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
08	Lower the concentrations of: Benzene **Formaldehyde** $PM_{2,5}$ CO_2 RH	Mechanical ventilation (benzene, RH, formaldehyde, PM, CO_2, RH)				Experts	3
			Reconstruction of damaged area (water and moisture damage) (RH)		Headmaster of the school	Experts	2
			More frequent ventilation (CO2, RH)		Teachers (All employees of the school)		1
				Concentrations of CO_2 based on		Government	2, 3

School	What do we want to improve	Improvements			Who can do it?		Feasibility*
		Technical improvements	Process improvements	Other (law, etc.)	School personnel	External experts	
				legislations Regular measurements			
			Use of natural cleaners. Opening the windows after cleaning (formaldehyde)		Cleaning lady responsible person for school hygiene		1
			Reducing use of paints, varnishes, adhesives, artificial floor coverings (formaldehyde).		Teachers (All employees of the school), Headmaster of the school		1, 2
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
			Frequent, thorough wet cleaning (especially critical – dusty places) (PM)		Cleaning lady responsible person for school hygiene		1
09	Lower the concentrations of: Benzene RH	Mechanical ventilation (benzene, RH)				Experts	3
			More frequent ventilation and temperature regulation (RH)		Teachers (All employees of the school)		1
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (benzene)		Teachers (All employees of the school),		1
10	Lower the concentrations of: **Benzene** **$PM_{2,5}$** CO_2 RH	Mechanical ventilation (benzene, RH, CO_2, PM)				Experts	3
			More frequent, proper (correct) ventilation and temperature regulation (RH, CO_2)		Teachers (All employees of the school)		1
				Concentrations of CO_2 based on legislations Regular measurements		Government	2, 3
			Reconstruction of damaged area (water and moisture damage) (RH)		Headmaster of the school	Experts	2
			Frequent, thorough wet cleaning (especially critical – dusty places) (PM)		Cleaning lady responsible person for school hygiene		1
			Do not open the windows (ventilation) during the hours when traffic is increased		Teachers (All employees of the school)		1

School	What do we want to improve	Improvements			Who can do it?		Feasibility*
		Technical improvements	Process improvements	Other (law, etc.)	School personnel	External experts	
			(heavy) (PM, benzene)				
11	Lower the concentrations of: Benzene Formaldehyde PM_2, CO_2	Mechanical ventilation (benzene, RH, CO_2, PM)				Experts	3
			More frequent, proper (correct) ventilation and temperature regulation (formaldehyde, CO_2)		Teachers (All employees of the school)		1
				Concentrations of CO_2 based on legislations Regular measurements		Government	2, 3
			Do not open the windows (ventilation) during the hours when traffic is increased (heavy) (PM, benzene)		Teachers (All employees of the school)		1
			Use of natural cleaners. Opening the windows after cleaning (formaldehyde)		Cleaning lady responsible person for school hygiene		1
			Reducing use of paints, varnishes, adhesives, artificial floor coverings (art decoration) (formaldehyde).				
12	Lower the concentrations of: Benzene Formaldehyde $PM_{2,5}$ RH	Mechanical ventilation (benzene, RH,formaldehyde , PM)				Experts	3
			Frequent, thorough wet cleaning (especially critical – dusty places) (PM)		Cleaning lady responsible person for school hygiene		1
			Reducing use of paints, varnishes, adhesives, artificial floor coverings (art decoration). Use of natural cleaners. Opening the windows after cleaning (formaldehyde)		Teachers (All employees of the school), Cleaning lady responsible person for school hygiene		1,2
			Reconstruction of damaged area (water and moisture damage) (RH)		Headmaster of the school	Experts	2
			Do not open the windows (ventilation) during the hours when traffic is increased		Teachers (All employees of the school)		1

School	What do we want to improve	Improvements			Who can do it?		Feasibility*
		Technical improvements	Process improvements	Other (law, etc.)	School personnel	External experts	
			(heavy) (PM, benzene)				
	*RH: depends what are the weather conditions when we ventilate the room.						

E.3.3. Italy

The selection of a solution is based on the data gathered during diagnostics, i.e. after the analysis of the monitoring campaign results and of the classroom questionnaires. The diagnostics may have determined that the problem was either a real or a perceived IAQ problem, or a combination of multiple problems. For each problem, a solution has been proposed using the basic control strategies described below.

There are a few basic control methods that can lower concentrations of indoor air pollutants. Often, only a slight shift in emphasis or action using these control methods is needed to control IAQ more effectively. Specific applications of these basic control strategies are listed below.

Source removal

Actions aimed at source removal may imply changing the ordinary materials used both during classrooms and labs both in cleaning operations, but also changing school furniture (tables, chairs, closets, paintings etc.), in order to eliminate a specific source of pollution in the indoor environment.

Source reduction/substitution

Source reduction and/or substitution may imply changing some of the ordinary materials used both during classrooms and labs both in cleaning operations, but also changing school furniture. This action is not about eliminating a source of pollution but about reducing the concentration of a pollutant in the indoor air by acting on its source, or changing a pollutant with another one (typically less harmful) by changing the source of pollution.

Ventilation

Lowering the concentration of pollutants by diluting the polluted air with clean air can be done by manual systems (i.e., simply open the windows and ventilate the premises at regular intervals) where the school does not have automatic air exchange systems. This result can also be accomplished through automatic systems that, at regular time intervals or (with more sophisticated systems) automatically operating after detecting that the concentration of some pollutants in the indoor air is too much high, makes a change of air between inside and outside can be the ideal solution where the school has no automatic air exchange systems. In Italy, this happens in more than 90% of schools.

Exposure control

Adjusting the time and location of pollutant exposure, including moving the pollutant source away from occupants or even relocating susceptible occupants is a more complex solution as it requires a detailed study of both the exposure times of the school occupants to the single pollutants and of the diffusion models of the individual pollutants in the air.

Air cleaning

This solution consists in applying filters to automatic ventilation systems. The filters ensure that the air which is forcibly fed from the outside in the interior is subjected to a "cleaning" process that mainly eliminates dust and suspended particulate matter. Obviously this system can only be applied to an existing forced ventilation system, or installed simultaneously with the installation of a new system for forced ventilation.

Regular monitoring campaigns of air quality

The implementation of further air quality monitoring campaigns must be carried out in ways that allow more detailed and detailed information to be obtained compared to those obtained by the InAirQ project monitoring body. In particular, it will be necessary to provide adequate monitoring periods (at least 30 days in the cold season and 30 days in the hot season) and to carry out monitoring campaigns with protocols and tools provided for by current European regulations. This action allows to have a more detailed knowledge of the phenomenon of indoor and outdoor pollution and their interaction and, therefore, to be able to formulate measures to contain and reduce indoor pollution specifically designed for the individual case study.

Education and awareness raising

This solution involves a major effort of communication and involvement to be carried out on the main actors of school day-to-day life: school managers, teachers and school staff, pupils and their families. The awareness-raising action should be carried out by specialized personnel (such as, for example, the Italian partners of the InAirQ project) and should benefit from all the knowledge shared and developed within the InAIrQ project. Communicating this type of information and the importance of pursuing good indoor air quality with the goal of protecting health is the first step towards a positive change in individual behaviours that could make sure that not only at school but also in the homes of all the people involved, the habits are changed and the air pollutants concentration is reduced.

Some solutions, such as major ventilation changes, may not be practical to implement due to lack of resources or the need for long periods of non-occupancy to ensure the safety of the students and staff. Use temporary measures to ensure good IAQ in the meantime. Other solutions, such as anti-idling programs, offer low-cost options that can be easily and quickly implemented.

Feasibility assessment

In the following table, the listed measures for the improvement of indoor air quality in the schools of Turin area are assessed with regard to their feasibility at local level and stakeholders which need to be involved to ensure the success of the initiative.

Table 17. Feasibility of measures to improve IAQ in Italian schools

Measure	Stakeholders to involve	Feasibility
Source removal	School managers School staff and teachers Children and their families Local school office Municipality	**Low** ☹ The local context (bureaucracy, public budget, current laws) makes it difficult to plan a total substitution of pollution sources, as pollution sources may be found in different tools and equipment from daily school life.
Source reduction/substitution	School managers School staff and teachers Children and their families Local school office Municipality	**Medium** 😐 The source reduction may be easy to operate depending on the pollution source we want to reduce. It's much more easier to reduce pollution sources originating from personal behaviours (such as tetrachloroethylene sources, coming from cleaning process of personal dresses) than sources which need investments and/or stakeholders' cooperation to be accomplished (such as substitution of school furniture, or cleaning products)
Ventilation (manual)	School managers School staff and teachers Children	**High** ☺ A simple solution like agreeing, at level of single school, a good practice such as periodically ventilating the classrooms to reduce the concentrations of pollutants (to a greater extent CO2) is extremely feasible, both because the stakeholders to be involved are very few (yes it deals with the school manager, the teachers and the school staff and the pupils) and because it is a solution at no cost.

Measure	Stakeholders to involve	Feasibility
Ventilation (automatic)	Local school office Municipality School managers	**Medium** 😐 This solution, although it foresees the involvement of institutional stakeholders and an investment in terms of plants, can be on average feasible because, in some cases, the installation of new plants may be done thanks to the attraction of private investments (for example, in Turin, by no-profit institutions bodies whose institutional mission is to improve public environments) or awarding European funds.
Exposure control	School managers School staff and teachers Local school office Municipality Research institutes / bodies specialised in studying air quality, pollutant sources and diffusion etc.	**Low** ☹ This solution has a low feasibility mainly because the need to carry out in-depth studies relating to the precise concentrations of pollutants in individual school environments, to the models of diffusion of pollutants, to sources of pollution and to methods of reducing concentrations is an element that times of identification and application of the solutions and involves a plurality of different subjects, which could be curbed by the difficulties implicit in the national context (typically the bureaucracy).
Air cleaning	Local school office Municipality School managers	**Low** ☹ This solution has low feasibility because in Italy only very few schools have forced ventilation systems - before applying this solution it is necessary to install a forced ventilation system.
Regular monitoring campaigns of air quality	Local school office Municipality Local Agencies operating in the field of environmental monitoring	**High** ☺ This solution is highly feasible because, despite increasing the number of stakeholders involved, it provides for the participation of ARPA - Regional Environmental Protection Agencies which, in their institutional missions, have to provide for environmental monitoring in consultation with local authorities. Local authorities, in turn, are normally interested in acquiring additional information on the state of the environment, especially when they are aimed at protecting children's health.

Measure	Stakeholders to involve	Feasibility
Education and awareness raising	School managers School staff and teachers Children	**High** ☺

E.4. EQFs and Training sessions

E.4.1. Environment Quality Forums

Environment Quality Forum (EQF) involves stakeholders and selected primary and secondary schools' managers, Ministry of Health and Education, and other social and professional bodies. It is a participatory manner that ensures representation and active participation of sensitive social groups. The main aim of the EQF meetings is to plan the communication /awareness raising actions, the strategy making process. So, EQFs are basically meetings to better disseminate project progress and outcomes.

For each participating country, Environment Quality Forums (EQFs) are composed of the most relevant 5-10 stakeholders at local level: e.g. school managers, responsible municipal and regional, paediatricians, student & parent associations, churches (as school owners), NGOs etc. InAirQ participating partners have organised stakeholder teams, whose composition have been tailored to the existing decision mechanisms in the partner areas.

Five meetings of EQF have been held in each of the participant cities (total 25 meetings):

- First meetings of EQF in partner cities are aimed at disseminating project objectives and involve stakeholders in vulnerability assessments and SWOT analyses ensuring broad engagement of and communication to stakeholders. First meetings have been held in February, 2017.
- Second meetings of EQF in partner cities are aimed at informing about project progress, assess and consult about results of vulnerability assessments (VA) and SWOT analyses thus ensuring broad engagement of and communication to stakeholders. Second meetings have been held in August, 2017.
- Third meetings of EQF in partner cities are aimed at informing about project progress, involve stakeholders in the creation of local indoor air quality action plans thus ensuring broad engagement of and communication to stakeholders. Third meetings of EQF have been held in May, 2018.
- Fourth meetings of EQF in partner cities are aimed at informing about project progress, involve stakeholders in creating Transnational EQF and finalisation of indoor air quality action plans thus ensuring broad engagement of and

communication to stakeholders. Fourth meetings of EQF have been held in October, 2018.

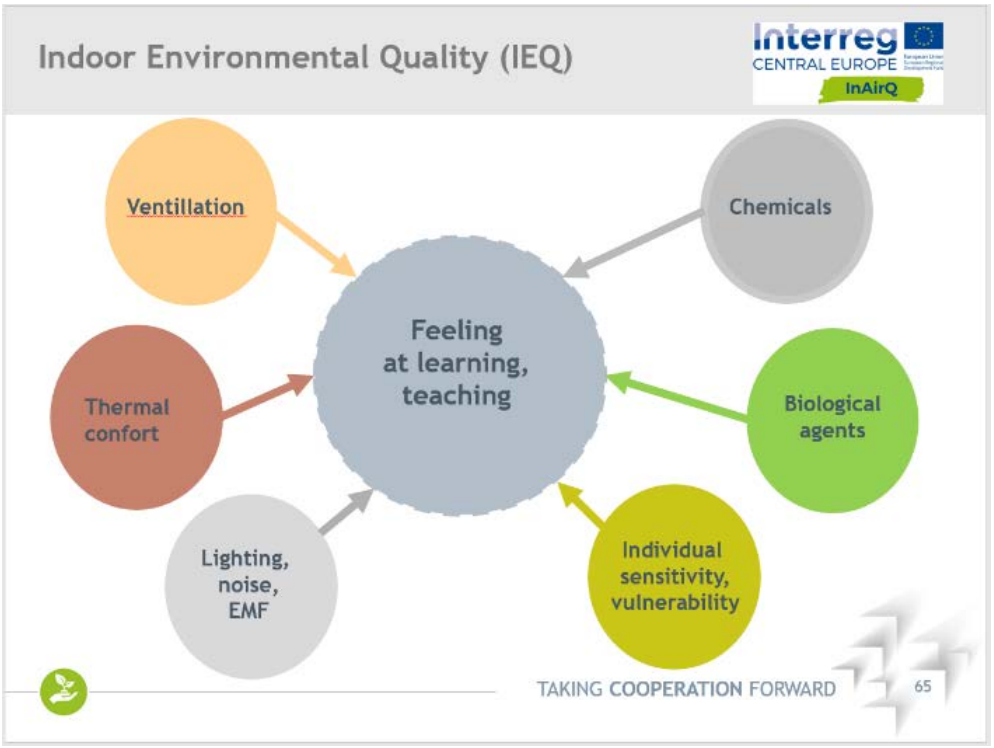
- Fifth meetings of EQF in partner cities are aimed at informing about project progress. These last meetings will act as policy briefing inviting policy makers. Result of the policy briefing will contribute to the finalisation of APs and Declaration of Schools. Fifth meetings of EQF have been held till the end of 2019.

Figure 16 1st EQF organised in Italy – presentation of Elisabetta De Martino

E.4.2. Capacity building and Joint training curriculum

A joint training methodology and curriculum have been developed to be adapted and tailor made to specific needs and institutional system of partner cities. Partner cities and networks have held training sessions specifically tailored for each of the involved groups. The training sessions were free of charge and were aimed at informing and building capacity among targeted professionals in the health, social and local government sectors with regard to the impact of air pollution on school-aged children.

Project partners have adapted training curriculum to their own specific regional/local/institution features and needs of target groups (municipality admin, educational actors, building sector) defined by the Action Plans and translate materials to national language. Some slides of the PowerPoint presentations prepared.


Indoor Environmental Quality (IEQ)
Interreg CENTRAL EUROPE InAirQ
Ventillation
Chemicals
Feeling at learning, teaching
Thermal confort
Biological agents
Lighting, noise, EMF
Individual sensitivity, vulnerability
TAKING COOPERATION FORWARD
65


Proposed action plans against mould
Interreg CENTRAL EUROPE InAirQ
Avoid dampness.
Assure adequate ventilation.
Do not leave corners without air movement.
Assure adequate heating, prevent cold surfaces.
Take care of the soil of plants, use special material which hinders the growth of fungi.
TAKING COOPERATION FORWARD
101

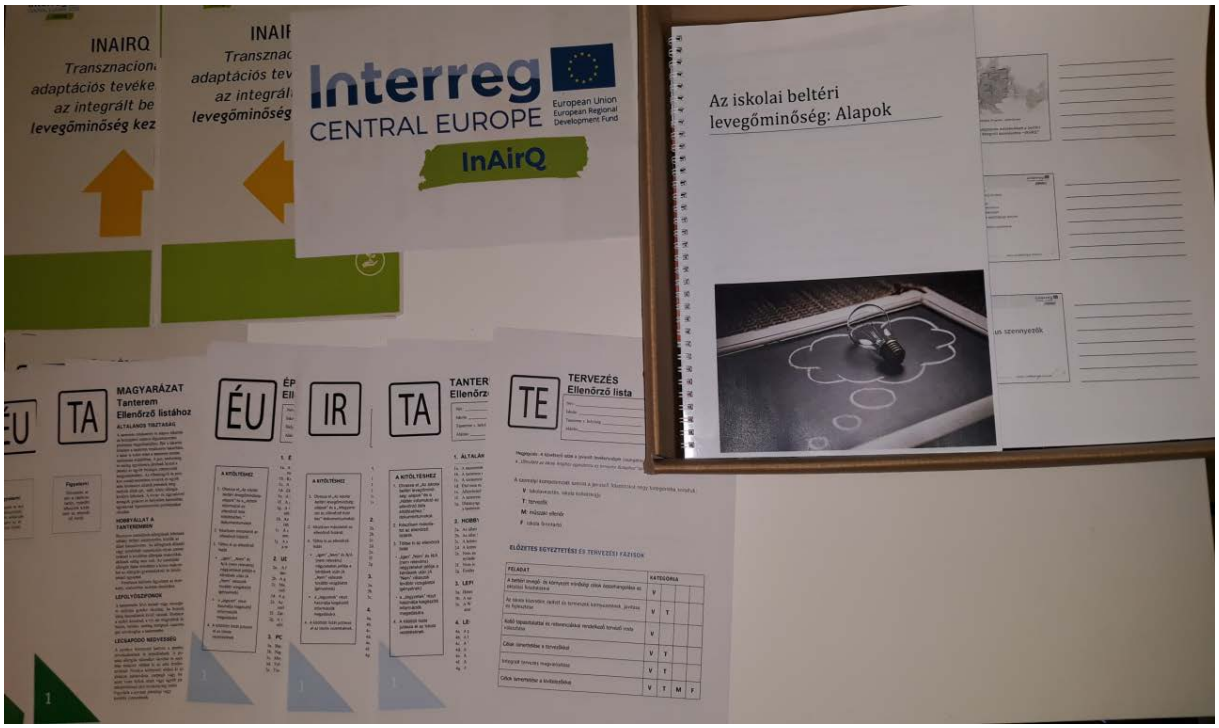


Figure 17 Join Training materials developed into InAirQ project

F. Communication and dissemination results

Communication is an important action in everyday life and among all individuals. The reasons can be many: if communication is lacking, ideas cannot have a passage, discoveries would remain hidden, thoughts would not be shared, people would not know each other fully and so would lack a pooling of positive situations or negative. It is important to communicate not only to share thoughts, problems or situations, but it is also essential to find the most suitable solution for them together with other people. So, we could say that communication is essential.

The communication is a dynamic process that begins with the conceptualizing of ideas by the sender who then transmits the message through a channel to the receive. Figure 18 shows the flowchart of communication.

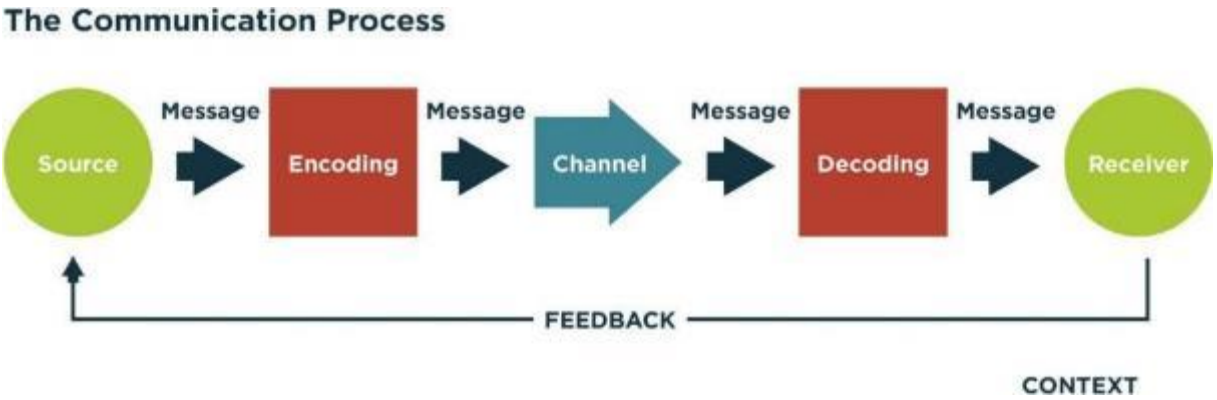


Figure 18. Flowchart of the Communication process

The only way the sender can make sure he is effective is by soliciting feedback from the receiver: a two-way exchange of information. This is why we prefer to speak about "communication", a dialogue aimed at satisfying both the receiver and the sender of information.

People active in the advertisement and marketing business spend huge amounts of money on adds, commercials, etc. to convince their target groups that they cannot live a happy life if they don't have phone x, gadget y, wear clothes from brands z, etc. They are highly skilled communication professionals. Air quality professionals usually are not communication professionals. However, if they want to be efficient in communicating with their intended public they have to associate communication specialists and learn to think like them.

The WHO and DG Health have warned that air pollution – indoor or outdoor – is a major environmental health concern, as it can lead to serious health effects. Much progress has been made in the EU to improve outdoor air quality and reduce the emission of pollutants. However, indoor air quality also requires attention because it is where we spend most of our time. Indoor exposure to air pollutants may occur in any indoor environment e.g.

schools. According to the literature, the most vulnerable to the adverse effects of air pollution are children aged 6-14, 11% of total CE Programme area's population.

InAirQ project, concerning dissemination activity and awareness raising, organised capacity building courses, tailored to the school managers and local/regional school operating bodies for the best implementation of the action plans, and Environment Quality Forum (EQF) providing the follow up of the project results and sustaining the co-operation to the potential stakeholders. The knowledge provided to partner national/regional health authorities and institutions the baselines of the indoor air quality and its health impacts at transnational scale. Local and regional authorities, network of schools and the pilot schools have contributed to elaborating, testing and implementing the action plans and participated to every capacity building activity. The project activities have been structured to maximise opportunities for cooperation and the pooling of experience and ideas at the transnational level.

So, communication played a key role in achieving the strategic and operational goals envisaged by the InAirQ project. Communication helped to raise awareness and inform stakeholders and the interested public about the project as well as to build, manage and sustain mutually fruitful relationships with and between key audiences; stimulated debate around the themes of protection of human health linked to indoor air quality; solicited stakeholders to provide inputs to set up strategies and actions aimed at improving indoor air quality in schools.

F.1. Communication strategy

During the project life-time, we noticed that majority of people are not aware of indoor air pollution. They are not informed about the possible causes of pollutants dispersion in closed places (houses, offices, schools) where they spend most of their time, but also in relation to the possible health damage. The first important step is to raise awareness among people and inform them, but the final scope is to stimulate sustainable changes in attitude, behaviors and practices.

To get the best out of communications, one "strategy tree" for each specific project objective has to be designed – there is no "one-strategy-fits-all" approach (Figure 19). An ideal planning starts with determining and defining specific communication objectives, target audiences and key messages. On the basis of this, follows the decision about which tactics and which activities and tools will best help to achieve these objectives.

The overall program of communication strategy – from communication objectives to results expected as well as audiences, approaches, and activities, was built on intensive desk research on good practices and empiric research leading to the lessons learnt.

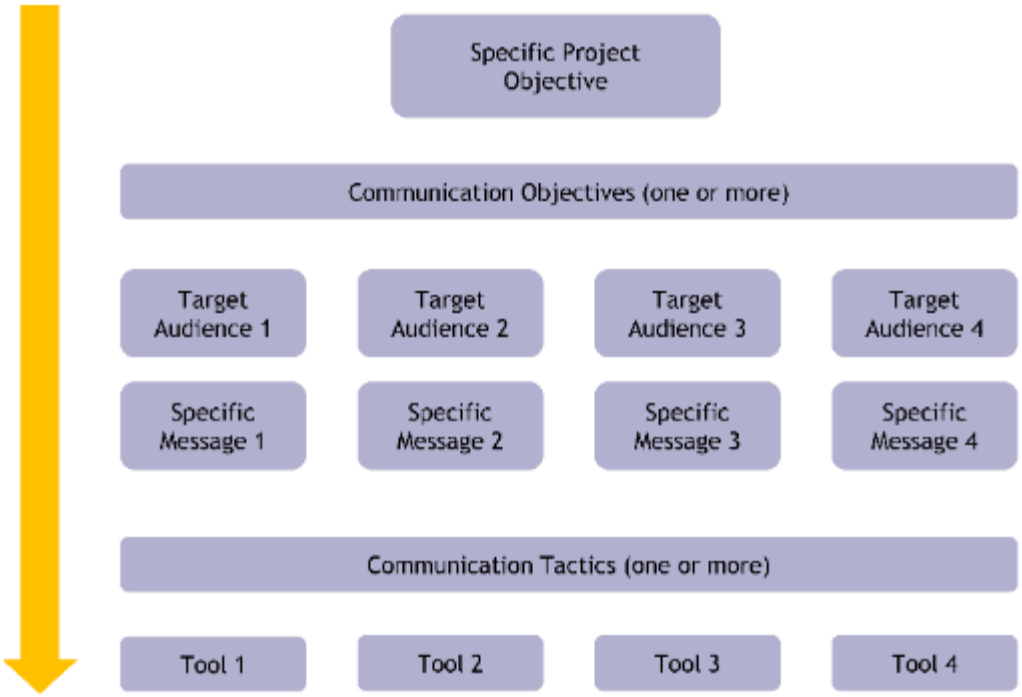


Figure 19. Communication "Strategy Tree": from specific objective to specific tools

From those activities derived 3 important pillars of the strategy, that are described below:

1. ***Communication to ensure internal involvement of all partners***

The internal communication strategy was designed to facilitate meetings, decisions and interactions between Partners, thanks to the procedures, tools and actions set up to keep the staff informed and involved.

Communication Tools

- Project meetings and Steering Committee meetings (meeting minutes)
- Common Database, Google drive folder
- Emails and conference calls or bilateral calls

Monitoring and Evaluation

- 15 Indicators related to WP Management

2. ***Communication to ensure external involvement in output development***

Facilitate experience sharing on a scale proportionate to the need for policy on indoor air pollution at the national level and coordinate the development and implementation of the planned actions at the local level.

Communication Tools

- Newsletter, Brochure and Leaflet, Official website
- Involvement in Environment Quality Forum
- Meetings with stakeholders aimed at developing the Action Plans

- Training 1-day aimed at school staff and teachers

Monitoring and Evaluation

- 4 Thematic results Indicators
- 14 specific Deliverables

3. ***Communication to transfer outputs to new target audiences***

The communication strategy defined how to capture the attention of the new target audiences and deliver a convincing campaign message through 3 different ways: Informing and Understanding, Awareness, Action.

Communication Tools

- Newsletter, Brochure and Leaflet,
- Official website and Social media campaign
- International conferences and Thematic events
- Press conferences and press-media releases
- Articles and summary report

Monitoring and Evaluation

- 4 Communication results Indicators
- 10 specific Deliverables

F.2. Type of activities conducted / materials disseminated

As mentioned, project partners used different means of communication to achieve the important objectives of Communication. Below are described all of them.

F.2.1. Newsletter

Electronic newsletters were issued regularly to inform PPs, stakeholders, registered subscribers and selected media about project information and progress, initiatives and partner's news in the frame of the project implementation (e.g. set up EQFs, launching campaigns etc.). In addition, they inform European regional development news and events.

The newsletters thus kept key audiences abreast of recent developments and they were expected to direct more user traffic to the InAirQ website, since now we could say that this not happened. Social media integration has been ensured for potential dialogue on news. Beside thematically mixed issues there were also issues focusing on specific topics, such as new legislations about the theme of indoor air quality, new evidences and researches carried on at national/EU level, thematic achievements and other local regional information.

A good newsletter has to be well designed and have a great copy (i.e. a professionally written text). Being a periodical, fresh content is a key to a newsletter's sustainability. The strategies for the dissemination of an effective newsletter were:

- to make sure that news are not outdated;
- to have a strong lead in to the news;
- to be consistent in the newsletter structure - including a variety of topics and sections to keep the reader interested;
- to include an editorial and use it to talk to the readers;
- to not repeat what already said in past newsletters;
- to prepare and regularly update the mailing list to which to spread the newsletter;
- to use photos and illustrations;
- to ask and encourage response and feedback.

Figure 20. InAirQ project, cover of Newsletter #4

The electronic newsletters were drafted by LINKS Foundation (ex SiTI) and disseminated by all project partners, uploading them onto other online dissemination tools employed by the project Partners (e.g. Facebook, LinkedIn…). The newsletters were also upload onto the official website of the project. The target value was a least two newsletters per year.

In the end we could say that all target were achieved, InAirQ project published 5 newsletters. They can be downloaded from the website at this link, into the section "Press corner":https://www.interreg-central.eu/Content.Node/InAirQ/InAirQ.html.

F.2.2. Brochure and leaflet

In early phase of the project, first year, InAirQ WP C leader drafted the project leaflet, that was translated by the PPs introducing the project and the partnership. Moreover, a brochure was produced, presenting the first results of the baselining (WT2).

1-page folded project leaflet (Figure 21) was designed and edited by the communication manager (LINKS) in English and PPs translate at national languages (HU, CZ, IT, PL, SI) and printed them. It introduced the partner organizations and presented the core aims of the InAirQ. The purpose was to disseminate them in every events, meeting or conference and in the end, we could say that the role of this material was very important.

Figure 21. InAirQ leaflet

In line with agreed structure and layout PPs select best practices and pilot activities to be presented. NPHC & LINKS edited and designed the publication and PPs translate it in 5+1 languages. Brochure have been distributed to schools & maintenance bodies, but also used like the leaflet for public dissemination during events and so on.

They can be downloaded from the website at the following link, into the section "Press corner" like newsletters:

https://www.interreg-central.eu/Content.Node/InAirQ/InAirQ.html.

F.2.3. Official website

A website is an invaluable tool for the project. It is the first source of information about the project partners for people outside the project, so it needs to contain the right information in a clear and accessible design and structure.

The aim of the InAirQ project portal was to constantly provide the target groups with adequate, up to date, high-quality information about the project, its objectives, progress and results, partnership and their contacts.

The target groups of the website were the interested general public, relevant stakeholders on the themes of indoor air quality and health protection of the youngest, potential beneficiaries, partners working with the programme, media. Website and corporate design and logo were provided by the Joint Secretariat of Interreg CENTRAL EUROPE Programme, at the address http://interreg-central.eu/Content.Node/InAirQ/InAirQ.html (Figure 22).

In order to achieve its objectives, the portal has been constantly updated with relevant information. Moreover, the online pages were highly transparent, well-structured and user friendly, making it as easy as possible for the visitors to fin d the information they need. It is readable by older as well as the newest Internet browsers. The InAirQ website as well provided links to the most important events regarding Interreg CENTRAL EUROPE Programme and/or related to indoor air quality. The project's outputs and deliverables are all accessible through the website. Also, the website will include a section dedicated to specific information and contact details from the Project Partners.

The website was very useful during the lifetime of the project and the purpose of its creation is achieved.

Figure 22 InAirQ, homepage of the official project website

F.2.4. Social media campaigns

Digital activities comprise social media, and multimedia in a wide meaning. For people with a disability, such as sight impairment, digital media and applications could sometimes be difficult to access. However, new advanced technologies more and more break such barriers and will be employed by the project whenever possible. Social media is generally defined as a group of internet-based applications that allow the creation and exchange of user-generated content. It will be used to strengthen links and interactions with and between relevant stakeholders, using an easy-to-understand, non-technical language where possible.

In line with the planned activities and focusing on raising awareness in each cities and regions LINKS launched since the beginning of the project a Social Media Campaign in English and Project Partners will translate the contents in their own national languages and launched social media (SM) campaigns for the most vulnerable target groups: school-aged children, teachers and parents, at national languages tailor made their recent and specific indoor air quality challenges (local, technical etc.) at schools and connect existing social networks (e.g. Schools for Health in Europe/SHE). The SM project groups invited the members of existing networks represented by SNPHS and FpS, and also EU-wide networks (e.g. Schools for Healthy Environment). Actualities of InAirQ have been posted on the SM pages (e.g. Facebook).

Social media activities are aimed at increase of the awareness on the project generating traffic to the website. The project partners used and constantly monitored the relevance of the social media platforms below:

- The project's Facebook page (Figure 23) was directed to a wider and more general audience. It offered snippets of news usually based on information provided about the project's development. Posts included photos, infographics, videos and other content that encourages dialogue and discussion between the project beneficiaries and stakeholders but also promotion of project events and conferences.
- The project's Twitter account was directed to a professional audience, made up of important multipliers including the media and policy makers on all governance levels. It was used very little compared to the expectations, only to raise awareness of this professional audience on information available about the project's development.

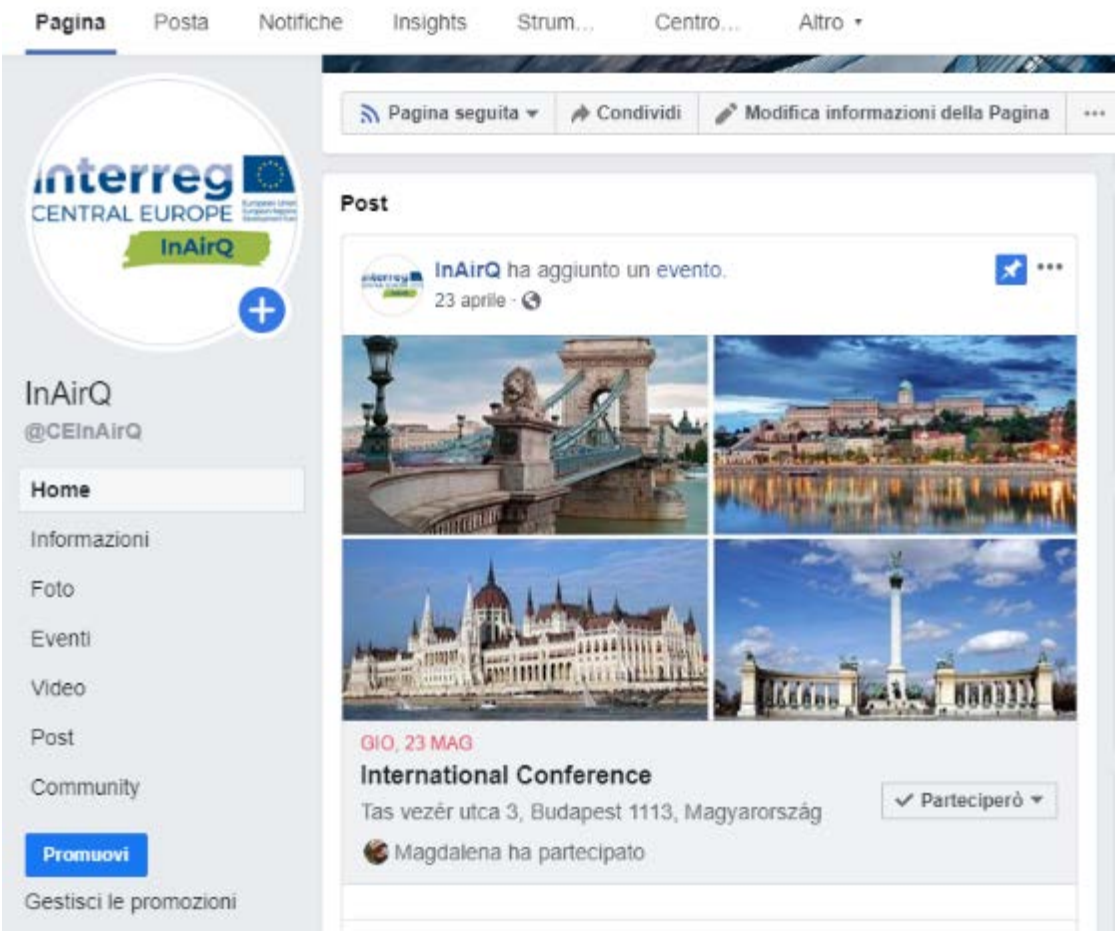


Figure 23 Official Facebook page of InAirQ project (international)

F.2.5. Public events: conferences, press release, poster presentation

During the 3-years project was necessary to organize events that the target audience and/or the media found interesting to attend. In the planning phase of the events we considered not only the messages we would like to communicate but also what our target audience would like to learn from the event.

We kept in mind that journalists and decision makers love to see, visit and talk to people. A trip to a project to see what exactly is going on and to see the people it was making an impact and helped in attracting attention (study visits and benchmark visits).

The strategy and method to apply in order to organize effective events were:

- to define one or few more specific events objectives. These should be concrete. Presenting project results is not an objective but a tactic for achieving something.
- to define who we need to invite to reach the objectives, who are the target audiences and what messages do we want to bring across?
- to consider activities and tools making our event more attractive for the audience;
- to think about documentation and evaluation from the beginning;
- to draft a checklist for the build-up phase of the event, including clear deadlines and an assignment of responsibilities;
- to draft an event script for the event, including an exact timing, an assignment of responsibilities, a directory of contact details of staff and speakers etc.
- to produce only promotional products that fit with our project objective.

The main important events organized were:

1. Kick-off conference of the Interreg CENTRAL EUROPE Program presenting the objectives and activities to journalists and stakeholders.
2. Midterm conference was organized by LINKS in month 14, in Turin, IT.
3. Final conference was organized by NPHC in month 34, in Budapest, HU. Both conferences have international relevancies: inviting representatives of EU network & initiatives on healthy schools. Many people attended them (more than 200-250) coming from all European countries.

InAirQ partners also organized press conference as launching media event in Budapest within the frame of the kick-off meeting. National media & broadcasts were invited. The LP together with the representatives of the CE JS presented the program.

It is important to intensify relations with the national media through national contact points. It is mainly these European media outlets that will be targeted with relevant news such as project events and project achievements. Together with news releases special interviews could be offered when regional policy issues become newsworthy in Brussels. Media and press coverage is organized linked to mid-term and final conference, transnational working group (WG) workshops and local Environmental Quality Forum meetings to better disseminate about project progress along the implementation phase.

Figure 24 Final Conference, 23-24 May 2019, Budapest

F.2.6. Publications: articles, journal papers and summary report

Knowledge provider partners: NPHC, NIOM, NIJZ, NIPH & LINKS drafted professional articles on project findings and ensure publishing in thematic (scientific) publications.

Project partners will sum up the major results and achievements of InAirQ project that contribute to change, improve the indoor air quality and environment situation in Central European schools and also cite the actions (pilots) and action plan completed.

To whom do we want to present our results with this publication? Much effort is spent on achieving project results and the final publication – no matter whether printed or digital –

should attract many readers of the different target groups addressed throughout the project lifespan, so that all the work will be properly visible or valued.

The main characteristics of the final publication are:

- to include an "Executive Summary". Even though this is the first thing our audience will read, this section should be written last;
- to have our reader in mind, we want them to (re)act;
- to remember that we are presenting our results: we will concentrate on these, rather than on the journey how we did get there;
- to keep the balance between too much and too little detail;
- to remember that quantity does not guarantee quality: it is conciseness and clarity that makes a good publication;
- to include information about our pilot actions;
- to include lessons learnt and make appropriate conclusions;
- to include contact details also for after the project end;
- to respect publicity obligations and any potential copyrights;
- to prepare targeted mailing lists and cover letters to send it out.

Language: EN.

F.3. Target group

The key stakeholder audiences project needs to communicate with are called "target groups". These groups all have different characteristics and needs. To be effective, it is important to know precisely to whom we need to address and think about the target audience every time we communicate.

In the case of the involvement of stakeholder groups for output development, we need to outline the reason why we are engaging that very stakeholder group, the expected contribution to the project's output and the involvement tools that PPs will put in place to ensure the stakeholders' active involvement. An outline of the reasons of the choice to engage these very target groups and what is the expected contribution from each target group is shown in Table below.

Table 18. Involvement of stakeholders to ensure external involvement in output development

IDENTIFIED TARGET GROUP: LOCAL PUBLIC AUTHORITY		
WHY ENGAGE?	**EXPECTED CONTRIBUTION TO ACTIVITY / OUTPUT / DELIVERABLE**	**INVOLVEMENT TOOL**
Local public authorities, which practically manage the schools, are informed about technical issues and challenges affecting school buildings and thus are able to give technical advice about changes PPs want to achieve with InAirQ project	Sharing their knowledge concerning the technical aspects of schools (e.g.: plants, ventilation, heating, building materials etc.) which may affect indoor air quality.	Sharing of the Virtual Health Repository Newsletter Bottom-up approach. Meetings and workshops to discuss technical issues related to indoor air quality improvement

Local public authorities, which practically manage the schools, are informed about technical issues and challenges affecting school buildings and thus are able to give technical advice about changes PPs want to achieve with InAirQ project	Contributing to the development of indoor air quality Action Plans by sharing their knowledge concerning the technical aspects of schools (e.g.: plants, ventilation, heating, building materials etc.) which may affect indoor air quality and the aspects related to human health as it is affected by indoor air quality.	Project brochure Meetings aimed at developing the contents of Action Plans
Local public authorities, which practically manage the schools, have to be involved in order to promote and support the testing of Action Plans in the schools they manage	Support the testing of Action Plans in the schools they manage (authorizing PPs to enter the schools to perform Project activities) Support the performing of ARC towards school staff, parent Associations etc.)	Project brochure Meetings aimed at sharing the contents of Action Plans
Local authorities need to adapt the joint training methodology and curriculum to the specific needs of the schools they manage	Actively participate in the training sessions providing information and suggestions on how to adapt AP to their specific situations.	1-day training Training material aimed at pediatricians, school managers, planners, builders, public officers
IDENTIFIED TARGET GROUP: REGIONAL PUBLIC AUTHORITY		
WHY ENGAGE?	**EXPECTED CONTRIBUTION TO ACTIVITY / OUTPUT / DELIVERABLE**	**INVOLVEMENT TOOL**
Regional Public Authorities constitute the linkage between national Authorities (which set out regulations and laws related to school environment) and local authorities which practically apply the contents of national regulations), providing them with financial and technical support and coordinating major interventions on school buildings and policies aimed at preserving human health.	Sharing their knowledge and experience related to school management and to human health protection and to coordination of interventions at local level	Sharing of the Virtual Health Repository Newsletter Bottom-up approach. Meetings and workshops to discuss technical issues related to indoor air quality improvement
Regional public authorities are public bodies responsible, at an intermediate level, for school buildings management and for the application of health policies at local level. They are able to give technical advice about both technical and financial aspects to be considered in the development of APs.	Contributing to the development of indoor air quality Action Plans by sharing their knowledge concerning the technical aspects of schools (e.g.: plants, ventilation, heating, building materials etc.) which may affect indoor air quality and the aspects related to human health as it is affected by indoor air quality, based on their knowledge of regional specificities.	Project brochure Meetings aimed at developing the contents of Action Plans
Regional Public Authorities are public bodies responsible, at an intermediate level, for school buildings management and for the application of health policies at local level. They may offer a valuable contribution to raise stakeholders' awareness towards indoor air quality issues.	Contribute to the ARC by sharing their knowledge and experience related to school management, to human health protection and to coordination of interventions at local level	Involvement of Regional Authorities in the awareness raising events

Regional authorities need to adapt the joint training methodology and curriculum to the specific needs of the schools they manage	Actively participate in the training sessions providing information and suggestions on how to adapt AP to their specific situations.	1-day training Training material aimed at pediatricians, school managers, planners, builders, public officers
IDENTIFIED TARGET GROUP: NATIONAL PUBLIC AUTHORITY		
WHY ENGAGE?	**EXPECTED CONTRIBUTION TO ACTIVITY / OUTPUT / DELIVERABLE**	**INVOLVEMENT TOOL**
School/building national authorities are responsible for legislation and regulation of issues related to school buildings (management, building regulations, ergonomic standards etc.) Health National Authorities are responsible for regulations related to human health (pollution thresholds, prevention etc.).	Sharing their knowledge and experience related to school management, to human health protection and to the implementation of policies aimed at preserving human health in school's coordination of interventions at local level	Sharing of the Virtual Health Repository Newsletter Bottom-up approach. Meetings and workshops to discuss technical issues related to indoor air quality improvement
National public authorities are responsible for national policies related to citizens' health protection and to public buildings' management. They are able to provide technical advice about both technical and financial aspects to be considered in the development of APs.	Contributing to the development of indoor air quality Action Plans by sharing their knowledge concerning the technical regulations on public buildings and which may affect indoor air quality and the aspects related to human health as it is affected by indoor air quality, based on their knowledge of national specificities.	Project brochure Meetings aimed at developing the contents of Action Plans
National Public Authorities are public bodies responsible for legislation and regulation of issues related to school buildings and to human health protection. They may offer a valuable contribution to raise stakeholders' awareness towards indoor air quality issues.	Contribute to the ARC by sharing their knowledge and experience related to building regulations, to human health protection and to coordination of interventions at local level	Involvement of National Authorities in the awareness raising events
National authorities need to adapt the joint training methodology and curriculum to the specific needs of the national context they operate in.	Actively participate in the training sessions providing information and suggestions on how to adapt AP to their specific situations.	1-day training Training material aimed at pediatricians, school managers, planners, builders, public officers
IDENTIFIED TARGET GROUP: EDUCATION/TRAINING CENTRE AND SCHOOL		
WHY ENGAGE?	**EXPECTED CONTRIBUTION TO ACTIVITY / OUTPUT / DELIVERABLE**	**INVOLVEMENT TOOL**
The School institutions need to be engaged in these activities both because they know, although empirically, the indoor air quality situations in their respective schools; and because they are the main target of InAirQ project	Sharing their experiences in the EQF.	Sharing of the Virtual Health Repository Newsletter Bottom-up approach. Meetings and workshops to discuss technical issues related to indoor air quality improvement

School institutions know the specificities of their own buildings, and may give advice on the aspects related to day-by-day life in schools.	Contributing to the development of indoor air quality Action Plans by sharing their knowledge concerning day-by-day life in schools.	Project brochure Meetings aimed at developing the contents of Action Plans
School institutions have to be involved in order to promote and support the testing of Action Plans in their school buildings.	Support the testing of Action Plans in their school buildings (authorizing PPs to enter the schools to perform Project activities) Support the performing of ARC towards school staff, parent Associations etc.	Project brochure Meetings aimed at sharing the contents of Action Plans
School institutions need to give their advice related to their own specific situations in the process of adaptation of joint training methodology and curriculum to the specific needs of their school buildings	Actively participate in the training sessions providing information and suggestions on how to adapt AP to their specific situations.	1-day training Training material aimed at pediatricians, school managers, planners, builders, public officers
IDENTIFIED TARGET GROUP: INTEREST GROUPS INCLUDING NGOS		
WHY ENGAGE?	**EXPECTED CONTRIBUTION TO ACTIVITY / OUTPUT / DELIVERABLE**	**INVOLVEMENT TOOL**
Interest groups are mainly constituted by school staffs and to children's parents. These people need to be engaged because they may support and spread the contents of awareness raising campaign, and because they may give advice on issues related to indoor air quality in schools.	Support the testing of Action Plans in school buildings Support the performing of ARC towards school staff, parent Associations etc.	Project brochure Meetings aimed at developing the contents of Action Plans

The preliminary identification of target groups and their expected contribution to project's outputs, activities and deliverables is the basis to define each target group's role in output development. Now we are in the end of the project, we could affirm what are the results achieved.

Audience	Communication objectives	Status quo in 2016	Status quo reached in 2019	Activities
Local Public Authorities	Increase knowledge	Local Public Authorities do not know what is planned by the project	Have gained a deeper knowledge about the indoor air quality effects on kids' health.	▪ Newsletter ▪ Project website ▪ WG workshop ▪ Sharing of Virtual Health Repository ▪ Participation in EQF and trainings
	Raise awareness	Local Public Authorities do not know what is	Are aware that changing management	▪ Newsletter ▪ Project website

		planned by the project	attitudes may improve health conditions of school kids.	▪ WG workshop ▪ Sharing of Virtual Health Repository ▪ Participation in EQF and trainings
	Influence attitude	Local Public Authorities do not know what is planned by the project	▪ Are aware of their role in changing attitudes related to indoor air quality in schools, and are willing to play it. ▪ Have provided information and suggestions on how to adapt APs to their specific situations	▪ Newsletter ▪ Project website ▪ Project brochure ▪ Awareness Raising Campaign and events ▪ Meetings aimed at collecting information for the drafting of intervention plans
Regional Public Authorities	Increase knowledge	Regional Public Authorities do not know what is planned by the project	Have gained a deeper knowledge about the indoor air quality effects on kids' health.	▪ Newsletter ▪ Project website ▪ WG workshop ▪ Sharing of Virtual Health Repository ▪ Participation in EQF and trainings
	Raise awareness	Regional Public Authorities do not know what is planned by the project	Are aware that changing management attitudes may improve health conditions of school kids.	▪ Newsletter ▪ Project website ▪ WG workshop ▪ Sharing of Virtual Health Repository ▪ Participation in EQF and trainings
	Influence attitude	Regional Public Authorities do not know what is planned by the project	▪ Are aware of their role in changing attitudes related to indoor air quality in schools, and are willing to play it. ▪ Have provided information and suggestions on how to adapt APs to their specific situations	▪ Newsletter ▪ Project website ▪ Project brochure ▪ Awareness Raising Campaign and events ▪ Meetings aimed at collecting information for the drafting of intervention plans
National Public Authorities	Increase knowledge	National Public Authorities do not know what is planned by the project	Have gained a deeper knowledge about the indoor air quality effects on kids' health.	▪ Newsletter ▪ Project website ▪ WG workshop ▪ Sharing of Virtual Health Repository ▪ Participation in EQF and trainings
	Raise awareness	National Public Authorities do not know what is planned by the project	Are aware that triggering a national politic aimed at improving management attitudes may improve health conditions of school	▪ Newsletter ▪ Project website ▪ WG workshop ▪ Sharing of Virtual Health Repository ▪ Participation in EQF

			kids.	and trainings
	Influence attitude	National Public Authorities do not know what is planned by the project	▪ Are aware of their role in changing attitudes related to indoor air quality in schools, and are willing to play it. ▪ Have provided information and suggestions on how to adapt APs to their specific situations	▪ Newsletter ▪ Project website ▪ Project brochure ▪ Awareness Raising Campaign and events ▪ Meetings aimed at collecting information for the drafting of intervention plans
Education / Training centres and schools	Increase knowledge	Involved schools do not know what is planned by the project	Have gained a deeper knowledge about the indoor air quality effects on kids' health.	▪ Newsletter ▪ Project website ▪ WG workshop ▪ Sharing of Virtual Health Repository
	Raise awareness	Involved schools do not know what is planned by the project	Are aware that changing management attitudes may improve health conditions of school kids. Are willing to change attitude (relating maintenance and operation protocols) in order to improve indoor air quality in schools.	▪ Newsletter ▪ Project website ▪ Project brochure ▪ Awareness Raising Campaign and events
	Influence attitude	Involved schools do not know what is planned by the project	Are aware of their role in changing attitudes related to indoor air quality in schools and are willing to play it, allowing to test intervention measures in their school buildings	▪ Newsletter ▪ Project website ▪ Project brochure ▪ Awareness Raising Campaign and events ▪ Meetings aimed at collecting information for the drafting of intervention plans
Interest groups including NGOs	Raise awareness	Interest groups do not know what is planned by the project	Are aware that changing management attitudes may improve health conditions of school kids.	▪ Newsletter ▪ Project website ▪ Awareness Raising Campaign and events ▪ Draft Action Plans

F.4. Results achieved: numbers and figures

Table 19. Target groups reached per participating State

STATE	TARGET GROUPS REACHED
HUNGARY	Ministry of Human Capacities National Public Health Center Government Offices Klebelsberg Centre for Public Education Institution Management School managers, teachers, parents and children of the 16 schools involved in the monitoring campaign School managers, teachers, parents and children of the primary schools reached by the "Journey towards the clean air" contest (entries from 63 schools were received; about 250,000 people were reached during the campaign) and other awareness raising activities (e.g., "Learning is easier in clean air" poster was sent to all primary schools) Municipality of Várpalota Municipality of Zugló
POLAND	School managers & Teachers from Lodzkie region and – by emails – from Poland Technical University of Lodz, University of Lodz, Warsaw University of Technology, Ministry of Health, Health Department (Lodzkie Region) Environmental Department (Lodzkie Region) Department of Education (City of Lodz) Regional Fund for Environmental Protection and Water Management in Lodz Medical Chamber The Polish Chamber of Nurses and midwives Polish Scouting Organization Institute of Occupational Medicine
SLOVENIA	Ministry of Health Ministry of Education, Science and Sport National Institute of Public Health Slovenian Environment Agency, Air Quality Sector University of Ljubljana, Faculty of Medicine, Division of Pediatrics University of Ljubljana, Faculty of Medicine, Division of Public Health University of Ljubljana, Faculty of Civil and Geodetic Engineering, Division of Buildings and Constructional complexes University of Ljubljana, Faculty of Architecture Slovenian Radiation Protection Administration Agregat d.o.o. - Experts for mechanical ventilation Municipality of Celje, Municipality of Ljubljana, Municipality Sevnica,

	Municipality Škofja Loka, Municipality Jesenice Representatives from 22 Primary schools Representatives from 6 Secondary schools Researchers of NIJZ, Ljubljana. _____ All municipalities in Slovenia (app 250) and all primary schools in Slovenia (app 450) - Mail invitation. Civil servants of local and regional authorities such as representatives of municipalities responsible for elementary schools in municipalities, ministries, other decision-making bodies – participation in trainings Teachers, headmasters of the 12 schools were actively involved in the project (especially in the monitoring phase). Pupils and parents of chosen classrooms in 12 chosen schools were actively involved in the project (especially in the monitoring phase).
CZECH REPUBLIC	Hygienic Station of the capital city of Prague Regional Hygiene Station of the Central Bohemia Region Prague City Hall Primary school Antonína Čermáka Institute of Public Health and Preventive Medicine, 2nd Medical School of Charles University National Institute of Public Health Prague (NIPH) Ministry of Education, Youth and Sports of the Czech Republic
ITALY	Municipality of Turin Municipality of Chieri Metropolitan City of Turin (Province) Piemonte Region – Environment Sector Piemonte Region – Air Quality Sector Piedmont Regional Agency for the Protection of Environment (ARPA Piemonte) Valle d'Aosta Regional Agency for the Protection of Environment (ARPA VDA) CSI Piemonte (Consortium for the Informative System) Engineers Association of Turin Architects Association of Turin Polytechnic of Turin – Environmental department Teachers of the 12 schools involved in the project School managers of the 12 schools involved in the project Employees and technician of FpS – School Foundation of Compagnia di San Paolo (15 people) Researchers of LINKS Foundation (10 people)

Table 20. Target groups reached against target values

Target groups	Specification of the target groups	Target value	Reached value
Local public authorities	Government Offices (Hungary) Municipality of Várpalota (Hungary) Municipality of Zugló (Hungary) Department of Education (City of Lodz, Poland) Municipality of Celje (Slovenia) Municipality of Ljubljana (Slovenia) Municipality of Sevnica (Slovenia) Municipality of Škofja Loka (Slovenia) Municipality of Jesenice (Slovenia) Prague City Hall (Czech Republic) Municipality of Turin (Italy) Municipality of Chieri (Italy) Metropolitan City of Turin (Province) (Italy)	8	13
Regional public authorities	Klebelsberg Centre for Public Education Institution Management (Hungary) Health Department (Lodzkie Region, Poland) Environmental Department (Lodzkie Region, Poland) Regional Fund for Environmental Protection and Water Management in Lodz (Poland) Regional Hygiene Station of the Central Bohemia Region (Czech Republic) Piedmont Region – Environment Sector (Italy) Piedmont Region – Air Quality Sector (Italy) Piedmont Regional Agency for the Protection of Environment (ARPA Piemonte) (Italy) Valle d'Aosta Regional Agency for the Protection of Environment (ARPA VDA) (Italy)	5	9
Education/training centres and schools	School managers, teachers, parents and children of the 16 schools involved in the monitoring campaign (Hungary) School managers, teachers, parents and children of the primary schools reached by the "Journey towards the clean air" contest (entries from 63 schools were received; about 250,000 people were reached during the campaign) and other awareness raising activities (e.g., "Learning is easier in clean air" poster was sent to all primary schools) (Hungary) School managers & Teachers from Lodzkie region and – by emails – from Poland Technical University of Lodz (Poland) University of Lodz (Poland) Warsaw University of Technology (Poland) University of Ljubljana, Faculty of Medicine, Division of	60	> 100

	Pediatrics (Slovenia) University of Ljubljana, Faculty of Medicine, Division of Public Health (Slovenia) University of Ljubljana, Faculty of Civil and Geodetic Engineering, Division of Buildings and Constructional complexes (Slovenia) University of Ljubljana, Faculty of Architecture (Slovenia) Representatives from 22 Primary schools (Slovenia) Representatives from 6 Secondary schools (Slovenia) Institute of Public Health and Preventive Medicine, 2nd Medical School of Charles University (Czech Republic) Primary school Antonína Čermáka (Czech Republic) Teachers of the 12 schools involved in the project (Italy) School managers of the 12 schools involved in the project (Italy)		
National public authorities	Ministry of Human Capacities (Hungary) National Public Health Center – public health professionals (Hungary) Government Offices (Hungary) Ministry of Health (Poland) Medical Chamber (Poland) The Polish Chamber of Nurses and midwives (Poland) Polish Scouting Organization (Poland) Institute of Occupational Medicine (Poland) Ministry of Health (Slovenia) Ministry of Education, Science and Sport (Slovenia) National Institute of Public Health (Slovenia) Slovenian Environment Agency, Air Quality Sector (Slovenia) Slovenian Radiation Protection Administration (Slovenia) Researchers of NIJZ (Slovenia) National Institute of Public Health Prague (NIPH) (Czech Republic) Ministry of Education, Youth and Sports of the Czech Republic (Czech Republic)	15	16
Interest groups including NGOs	Healthy Várpalota Association / Egészséges Palotáért Egyesület (Hungary) AKTIVÁL Association /AKTIVÁL Egyesület (Várpalota) Foundation for 'Bán Aladár' Primary School / Bán Aladár Általános Iskoláért Alapítvány (Várpalota) Foundation for 'Várkerti' Primary School / Várkerti Általános Iskoláért Alapítvány (Várpalota) Independent Trade Union of Teachers (Hungary) Hungarian Society of Hygiene (Hungary) National Association of Public Health Training and Research Institutes (Hungary) PlanIdea Knowledge Center Public Interest Ltd.	20	24

	National Section of Education “Solidarity” (Poland) Związek Harcerstwa Polskiego (Polish Scouting and Guiding Association) Medical Chamber (Poland) Polish Chamber of Nurses and Midwives (Poland) Fundacja Prospołeczna PODUCHA (Poland) Fundacja ASPI (Poland) Fundacja CONVIVO (Poland) Łódzka Federacja Organizacji Pozarządowych (Poland) Fundacja Nowoczesna Polska (Poland) Agregat d.o.o. - Experts for mechanical ventilation (Slovenia) Czech Green Building Council / Česká rada pro šetrné budovy (Czech Republic) Czech Association for Asbestos / Removal Česká asociace pro odstranění azbestu (Czech Republic) CSI Piemonte (Consortium for the Informative System) (Italy) Engineers Association of Turin (Italy) Architects Association of Turin (Italy) Polytechnic of Turin – Environmental department (Italy)		

F.4.1. Hungary

Type of activity	**Conference**
Event title	Népegészségügyi Képző- és Kutatóhelyek Országos Egyesületének XII. Konferenciája
Date	29-31 August 2018
Location	Budapest, Hungary
Number of speakers	~100
Number of participants	>130 (1 member of the InAirQ team)
Type of participants / stakeholders	Public sector, university/research
Brief description of activity	The national conference covered a wide range of topics in the field of public health. The InAirQ project was presented at the conference.
Link (if available)	http://nke2018.hu/ (in Hungarian)
Attached materials (if available)	The abstract and the presentation have been uploaded to the Google Drive.

Type of activity	**Event**
Event title	European Mobility Weekend
Date	15-16 September 2018

Location	Budapest, Hungary
Number of speakers	-
Number of participants	~200 000 people (National Public Health Center was one of the exhibitors on the event; 4 members of the InAirQ team participated at the event to raise awareness)
Type of participants / stakeholders	General public
Brief description of activity	Four members of the InAirQ team together with other colleagues from the National Public Health Center participated at the European Mobility Week in Budapest. The InAirQ team provided brochure to the visitors as well as the equipment used for indoor air quality monitoring was presented.
Link (if available)	-
Attached materials (if available)	Pictures are available.

Type of activity	**Conference**
Event title	International Conference on Risk Assessment of Indoor Air Chemicals
Date	16-18 September 2018
Location	Berlin, Germany
Number of speakers	~35
Number of participants	>200 (1 member of the InAirQ team)
Type of participants / stakeholders	Public sector, private sector, university/research
Brief description of activity	The focus of the conference was on the impact of the indoor environment on health and well-being. Furthermore, the aim of the conference was to promote and strengthen networking and cooperation between all stakeholders engaging in research, monitoring and risk assessment. The InAirQ project was presented at the conference.
Link (if available)	https://www.umweltbundesamt.de/en/international-conference-on-risk-assessment-of (in English)
Attached materials (if available)	The abstract and the poster presentation have been uploaded to the Google Drive.

Figure 25 Hungary, picture of the International Conference on Risk Assessment of Indoor Air Chemicals

Type of activity	**Conference**
Event title	Magyar Higiénikusok Társasága XLV. Vándorgyűlés
Date	8-10 October 2018
Location	Budapest, Hungary
Number of speakers	~67
Number of participants	>100 (4 members of the InAirQ team; 1 presentation on the InAirQ project)
Type of participants / stakeholders	Public sector, university/research
Brief description of activity	Annual meeting of the Hungarian Society of Hygiene. The national conference covered a wide range of topics in the field of public health. The results of the InAirQ project were presented at the conference.
Attached materials (if available)	The abstract and the slideshow presentation have been uploaded to the Google Drive.
Link (if available)	-

Type of activity	**Conference**
Event title	The built, natural, and social environments: impacts on exposures, health and well-being (ISES ISIAQ 2019)
Date	18-22 August 2019
Location	Kaunas, Lithuania
Number of speakers	~300
Number of participants	>500 (2 members of the InAirQ team)
Type of participants / stakeholders	Public sector, private sector, university/research

Brief description of activity	The aim of the conference was to understand the interactions between numerous and complex factors affecting healthy living, focusing on air pollutant exposure in built environment, and to enrich the discussions to the effects of natural and social environments. The outcomes of the InAirQ project (mainly the health risk associated with the concentration of indoor air pollutants) was presented at the conference.
Attached materials (if available)	The abstract and the presentation have been uploaded to the Google Drive.
Link (if available)	http://isesisiaq2019.org/ (in English)

Type of activity	**Conference**
Event title	Magyar Higiénikusok Társasága XLVI. Vándorgyűlés
Date	1-3 October 2019
Location	Budapest, Hungary
Number of speakers	66
Number of participants	>100 (2 members of the InAirQ team; 2 presentations on the InAirQ project)
Type of participants / stakeholders	Public sector, university/research
Brief description of activity	Annual meeting of the Hungarian Society of Hygiene. The national conference covered a wide range of topics in the field of public health. The results of the InAirQ project (health risk and contest) were presented at the conference.
Attached materials (if available)	The slideshow presentations have been uploaded to the Google Drive.
Link (if available)	-

Type of activity	**Conference**
Event title	Strategies and operational tools to support adaptation actions in vulnerable population groups during the Severe Air Pollution Episodes (SAPEs) - workshop
Date	6 November 2019
Location	Parma, Italy
Number of speakers	9
Number of participants	~40 (1 member of the InAirQ team)
Type of participants / stakeholders	Public sector, university/research
Brief description of activity	The aim of the was to discuss the health impact of air pollution on the vulnerable population. The relevant health effects were presented in detail as well as some tools for awareness raising were discussed. The contest launched by the Hungarian InAirQ team on indoor air

	pollution was presented at the workshop.
Attached materials (if available)	The slideshow presentation and the program have been uploaded to the Google Drive.
Link (if available)	-

Type of activity	**Training**
Event title	"Learning is easier in clean air" seminar for teachers and educational professionals
Date	3 April 2019
Location	Budapest, Hungary
Number of speakers	1 training module
Number of participants	104
Type of participants / stakeholders	Teachers, educational professionals
Brief description of activity	Capacity building training was held in the National Public Health Center, Hungary for teachers, school managers and other educational professionals. During the 30-min long presentation, the IAQ-related problems in the school building were describes and examples for intervention were demonstrated to the audience.
Attached materials (if available)	Pictures, program (in Hungarian), presentation (in Hungarian) are available
Link (if available)	Google Drive (WPT3_Action_Plans_and_Capacity_Building -> Capacity building trainings -> Hungary)

Figure 26 Hungary, picture of the seminar "Learning is easier in clean air"

Type of activity	**Training**
Event title	Capacity building training courses for teachers, school principals and municipal and maintenance staff professionals
Date	17 and 18 December 2019
Location	Várpalota, Hungary
Number of speakers	2x4 training modules
Number of participants	40
Type of participants / stakeholders	Teachers, educational professionals, technicians
Brief description of activity	The municipality hired expert for preparation of tailored training materials and taking capacity building courses in 2 different training sessions..
Attached materials (if available)	Pictures, program (in Hungarian), presentation (in Hungarian) are available
Link (if available)	Google Drive (WPT3_Action_Plans_and_Capacity_Building -> Capacity building trainings -> Hungary)

Figure 27 Training course in Várpalota, Hungary

Type of activity	**Press release**
Type of media	A press conference has been organized in the frame of the International conference on the International Conference on Problem-Solving Approaches to Ensure Schoolchildren's Health. TVs were present at the event.
Media name	Media presented at the event: RTL Klub, MTV One interview was given to a radio channel (Inforadio) regarding the event.
Date	23 May 2019
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage for all media: RTL Klub: 886.123 MTV: 287.321 Inforadio: 93.640 In addition, several media took over the news.
Brief description of activity	The focus of the press event was on the international conference and the declarations.
Link (if available)	RTL Klub: https://www.rtlmost.hu/hirado-p_7724/rtl-hirado-2019-05-23-c_12386869
Attached materials (if available)	Photos and other materials are available on the Google Drive

Type of activity	**Interview**

Type of media	TV
Media name	Duna Tv
Date	3 April 2019
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage: 827.000
Brief description of activity	Awareness raising - “Journey towards clean air” - competition for schoolchildren
Link (if available)	https://www.facebook.com/tisztiorvos/videos/332621790725562/
Attached materials (if available)	-

Figure 28 Hungary, screenshot of the interview with Duna TV

Type of activity	**Interview**
Type of media	TV
Media name	MTV
Date	4 May 2019
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage: 113.885
Brief description of activity	Awareness raising - “Journey towards clean air” - competition for schoolchildren
Link (if available)	https://www.facebook.com/tisztiorvos/videos/1312743132225294/

Attached materials (if available)	-

Figure 29 Hungary, screenshot of the interview with MTV

Type of activity	**Interview**
Type of media	TV
Media name	RTL Klub
Date	6 May 2019
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage: 623.350
Brief description of activity	Awareness raising - “Journey towards clean air” - competition for schoolchildren
Link (if available)	https://rtl.hu/rtlklub/reggeli/2019-05-06
Attached materials (if available)	-

Type of activity	**Press release**
Type of media	TVs
Media name	Media presented at the event: TV: HírTv, TV2, MTV Newspaper: Bors, Ripost
Date	11 December 2018
Location	Budapest, Hungary

Target/audience type	General public
Number of people reached or coverage	National coverage for all media: HírTv: 50.882 TV2: 877.036 MTV: 307.610 Bors: ~70.000 Ripost: n.a. In addition, several media took over the news.
Brief description of activity	The focus of the press event was on the indoor air quality action plans.
Link (if available)	TV2: https://tenyek.hu/belfold/278171_rossz-levego-miatt-beteg-sok-gyerek.html
Attached materials (if available)	Photos are uploaded to the Google Drive

Figure 30 Hungary, screenshot of the press release at Tenyek TV

Type of activity	**Interview**
Type of media	Radio
Media name	Inforádió
Date	11 December 2018
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage: 86.000
Brief description of activity	The topic of the interview was the indoor air quality in primary school buildings.
Link (if available)	n.a.

Attached materials (if available)	-

Type of activity	**Interview**
Type of media	TV
Media name	TV2
Date	18 December 2018
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage: 139.934
Brief description of activity	The topic of the interview was the indoor air quality in primary school buildings.
Link (if available)	https://www.facebook.com/tisztiorvos/videos/vb.214579338566491/341500096437258/?type=2&theater
Attached materials (if available)	-

Type of activity	**Interview**
Type of media	TV
Media name	ATV
Date	20 December 2018
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage: 140.224
Brief description of activity	The topic of the interview was the indoor air quality in primary school buildings.
Link (if available)	http://www.atv.hu/videok/videok/video-20181221-szmogriado-budapesten?fbclid=IwAR2KCbk6oaHh-fzavh1G-NmCdGM_TOC-B1s5qIvPrOhUZs8fWVanePYp0Y8
Attached materials (if available)	-

Figure 31 Hungary, screenshot of the interview at ATV

Type of activity	**Interview**
Type of media	TV
Media name	MTV1
Date	22 December 2018
Location	Budapest, Hungary
Target/audience type	General public
Number of people reached or coverage	National coverage :63.721
Brief description of activity	The topic of the interview was the indoor air quality in primary school buildings.
Link (if available)	https://www.mediaklikk.hu/video/ma-este-2018-12-22-i-adas/
Attached materials (if available)	-

Type of activity	**Social media campaigns**
Type of media	Social media
Media name	Facebook (Tisztifőorvos, Nemzeti Népegészségügyi Központ, InAirQ Magyarország)
Date	Year 2019
Location	-
Target/audience type	Followers, general public
Number of people reached or coverage	Number of people reached: InAirQ Magyarország: ~27.400 Tisztifőorvos: ~76.700 Nemzeti Népegészségügyi Központ: ~54.700

	Number of posts = 8
Brief description of activity	Awareness raising - "Journey towards clean air" - competition for schoolchildren – communication materials
Link (if available)	Official Facebook profiles of InAirQ Magyarország, Tisztifőorvos and Nemzeti Népegészségügyi Központ
Attached materials (if available)	-

Type of activity	**Social media campaigns**
Type of media	Social media
Media name	Facebook (Tisztifőorvos, InAirQ Magyarország)
Date	December 2018
Location	-
Target/audience type	Followers, general public
Number of people reached or coverage	Number of people who watched the videos: ~ 11.000 Number of posts = 5
Brief description of activity	The interviews given to MTV1 and TV2 (TV) on the 11 and 18 December 2018 have been shared on 2 official Facebook profiles.
Link (if available)	Facebook (http://bit.ly/2qOr4K4)
Attached materials (if available)	-

Type of activity	**Social media campaigns**
Type of media	Social media
Media name	Facebook (Nemzeti Népegészségügyi Központ, InAirQ Magyarország)
Date	Year 2018
Location	-
Target/audience type	Followers, general public
Number of people reached or coverage	Number of people reached: 18.125 Number of posts = 9
Brief description of activity	Numerous posts about the participation of the InAirQ project on the European Mobility Week was highlighted and shared on 2 official Facebook profiles, a video advertising the importance of ragweed pollen allergy as many pupils suffer from this disease and some information about all the results reached by InAirQ project during the year (VHR published, Hungarian EQFs, project meeting with PPs)
Link (if available)	Facebook (http://bit.ly/2qQugVp)
Attached materials (if available)	Pictures are available.

F.4.2. Poland

Type of activity	**Conference**
Event title	Healthy Buildings Europe 2017 Conference
Date	2-5 July 2017
Location	Lublin, Poland
Number of speakers	n.a. (1 from InAirQ)
Number of participants	About 300
Type of participants / stakeholders	Teachers & school manager & public workers (from all Lodzkie region)
Brief description of activity	Poster presentation titled "Actions to improve Indoor Air Quality in school buildings – The InAirQ project". The poster was presented by first author Anna Kozajda from NIOM. The poster sesions were organized similar as oral presentations, each poster was presented in oral form during thematic session (the title of session: School Indoor Environment). with short presentation prepared in PowerPoint MS Office program. During the conference among Polish participants was spread project leaflets in Pl language version.
Link (if available)	http://hb2017-europe.org/
Attached materials (if available)	Photos /Agenda / Extended Abstract of the poster

Type of activity	**Conference**
Event title	XIV National Conference - Indoor Air Quality Problems in Poland
Date	23-24 November 2017
Location	Warsaw, Poland
Number of speakers	1 from InAirQ
Number of participants	101
Type of participants / stakeholders	Teachers & school manager & public workers (from all Lodzkie region)
Brief description of activity	The project promotion action was prepared and presented in oral form by Anna Kozajda form NIOM. The presentation was titled in Polish "Projekt InAirQ Planowanie Działań dla Zintegrowanego Zarządzania Jakością Powietrza). Identyfikacja czynników modyfikujących środowisko szkolne w krajach Europy Środkowej." (in English "Project InAirQ Transnational Adaption Actions for Integrated Indoor Air Quality Management. Identification of factors modifying the school environment in the countries of Central Europe
Link (if available)	https://www.renew-school.eu/en/technical-workshop-problems-of-indoor-air-quality-in-poland/
Attached materials (if	Presentation

available)	

Type of activity	**Training**
Event title	Activus Senior Academy (University) - Lecture
Date	4 April 2018
Location	Lodz, Poland
Number of speakers	1
Number of participants	101
Type of participants / stakeholders	Teachers & school manager & public workers (from all Lodzkie region)
Brief description of activity	The lecture titled „Jakość powietrza wewnętrznego i zewnętrznego – czynniki szkodliwe, skutki zdrowotne i działania ochronne" (EN title: Indoor and outdoor air quality - harmful factors, health effects and protective activities.") was presented by Anna Kozajda on the Activus Senior Academy leaded by the University of Lodz on April 4, 2018. Among participants were distributed the project leaflets.
Link (if available)	http://www.activus.uni.lodz.pl/wykladyzajecia/rok-akademicki-20172018/
Attached materials (if available)	Presentation

Type of activity	**Event**
Event title	Dzień Bezpiecznego Internetu
Date	25 May 2019
Location	Lodzkie Region office
Number of speakers	15
Number of participants	About 100
Type of participants / stakeholders	Teachers & school manager & pupils
Brief description of activity	Presentation of the project and awareness raising about IAQ thematic
Link (if available)	https://si.lodzkie.pl/dzien-bezpiecznego-internetu-lodzkie-2019/
Attached materials (if available)	Photos /Agenda in link

Figure 32 Poland, picture of the event "Dzień Bezpiecznego Internetu"

Type of activity	**Event**
Event title	Dni OtwarteFunduszy Europejskich
Date	10-12 May 2019
Location	Łowicz, Zduńska Wola, Tomaszów Mazowiecki
Number of speakers	-
Number of participants	About 25.000
Type of participants / stakeholders	Public sector, private sector, NGOs, university/research, general public, etc.
Brief description of activity	Promotional stands along with InAirQ info-materials were simultaneously present in three locations. Adults could learn about the design and methods of caring for the quality of air at home or work, while the children could solve the puzzles concerning the indoor air quality.
Link (if available)	https://rpo.lodzkie.pl/blog/item/3430-po-majowce-bawimy-sie-na-dofe-sprawdzcie-atrakcje
Attached materials (if available)	Photos

Figure 33 Poland, picture of the event "Dni OtwarteFunduszy Europejskich"

Type of activity	**Conference**
Event title	CyberBezpieczni (Cyber challenges for educational workers & regional offices workers)
Date	3 October 2019 and 9 October 2019
Location	Lodzkie Region office and Łódzki Dom Kultury
Number of speakers	15
Number of participants	About 250
Type of participants / stakeholders	Teachers & school manager & public workers (from all Lodzkie region)
Brief description of activity	Promotional stands along with InAirQ info-materials were presented in other events of RL. Public workers and teachers/managers of schools could learn about the project, incise methods of caring for the quality of air at home or work.
Link (if available)	https://si.lodzkie.pl/o-jakosci-powietrza-na-wydarzeniach-organizowanych-przez-wojewodztwo-inairq/ https://www.facebook.com/InAirQPolska/ https://si.lodzkie.pl/konferencja-cyberbezpieczni-bezpieczenstwo-w-administracji-publicznej-3-edycja/ https://si.lodzkie.pl/cyberbezpieczni-wyzwania-dla-pracownikow-oswiaty-3-edycja/
Attached materials (if available)	Photos /Agenda in link below/

Figure 34 Poland, picture of the event "CyberBezpieczni (Cyber challenges for educational workers & regional offices workers)"

Type of activity	**Training**
Event title	Problemy zdrowotne i czynniki ryzyka związane z pracą nauczycieli (Health problems incuded in teachers work)
Date	13 November 2019
Location	Polsko-Amerykański Ośrodek Kształcenia Zawodowego/ Łódź
Number of speakers	10
Number of participants	About 80
Type of participants / stakeholders	Teachers & school manager
Brief description of activity	Competence workshop for teachers/managers of schools made by Anna Kozajda (NIOM) Promotional stand + info point awareness campaign by Magdalena Suchan (LR)
Link (if available)	https://si.lodzkie.pl/warsztaty-kompetencji-dla-nauczycieli-w-ramach-projektu-inairq/ https://www.facebook.com/InAirQPolska/
Attached materials (if available)	Photos /Agenda in link below/

Figure 35 Poland, picture of the event "Problemy zdrowotne i czynniki ryzyka związane z pracą nauczycieli" (Health problems incuded in teachers work)

Type of activity	**Training**
Event title	Warsztay kompetencji/EQF
Date	19 November 2019
Location	SkyHUB/Łódź
Number of speakers	2
Number of participants	About 26
Type of participants / stakeholders	Teachers & school manager & EQF members
Brief description of activity	Competence workshop for teachers/managers of schools made by Anna Kozajda (NIOM): "Capacity building in improving indoor air quality in classrooms at institutions related to the school environment". Promotional stand + lecture about awareness campaign by Magdalena Suchan (LR)

Link (if available)	https://si.lodzkie.pl/piate-ostatnie-forum-jakosci-srodowiska/
Attached materials (if available)	Photos /Agenda in link

Figure 36 Poland, picture of the event "Warsztay kompetencji/EQF"

Type of activity	**Conference**
Event title	XV Conference „Problems of Indor Air Quality in Poland"
Date	2019 November 27-28
Location	Warsaw University of Technology
Number of speakers	30
Number of participants	More than 100
Type of participants / stakeholders	Scientists & Safety and Hygiene Inspectors & State Sanitary Inspectors
Brief description of activity	The most important national conference related to the topic of Indoor Air Quality in Poland. Project InAirQ will be presented by dr Anna Kozajda (NIOM) with oral presentation titled "Indoor air quality in schools in Łódź - results of the InAirQ project".
Link (if available)	http://iaq.is.pw.edu.pl/program/
Attached materials (if available)	Presentation

Type of activity	**Event / Conference**
Event title	Scout Seminar
Date	22-24.11.2019
Location	Załęcze Wielkie
Number of speakers	10
Number of participants	About 170

Type of participants / stakeholders	Youth liders (from all Lodzkie region)
Brief description of activity	Promotional info-stand with InAirQ materials were presented in Regional scout seminar - courtesy of the EQF member – Chorągiew Łódzka ZHP. Scout liders and regional activists could learn about the project, incise methods of caring for the quality of air at home or office.
Link (if available)	www.lodzka.zhp.pl
Attached materials (if available)	Photos

Figure 37. Poland, picture of the scout seminar

Type of activity	**Website marketing**
Type of media	Website
Media name	Si.lodzkie.pl / partner web page
Date	21 January 2019
Location	
Target/audience type	Public sector, private sector, NGOs, university/research, general public, etc.
Number of people reached or coverage	Number (estimation) Coverage (local, national or international)
Brief description of activity	NIOM has prepared sheets addressed to the parents about the essence of taking care of their children's health and care for the quality of air. the article is waiting for the blowout in the LIBRUS

	school service, meanwhile it has appeared on the LR website.
Link (if available)	https://si.lodzkie.pl/zadbajmy-o-zdrowie-dzieci-i-mlodziezy/
Attached materials (if available)	-

Figure 38 Poland, screenshot of the project website homepage

Type of activity	**Social media campaigns**
Type of media	Social media
Media name	FB / national FB: InAirQ Polska; www.facebook.com/SI.lodzkie
Date	During whole 3 years
Location	Poland - Europe
Target/audience type	general public
Number of people reached or coverage	Number of campaigns = more than 50 (posts) Number of followers = more than 100 people Coverage national and international
Brief description of activity	Facebook is a place where information related to the subject of the InAirQ project, an invitation to cooperation or themed articles and materials for use by schools and NGOs
Link (if available)	www.facebook.com/InAirQPolska/ www.facebook.com/SI.lodzkie https://si.lodzkie.pl/category/inairq/ https://si.lodzkie.pl/projekty-si/perspektywa-2014-2020/inairq/
Attached materials (if available)	Photos

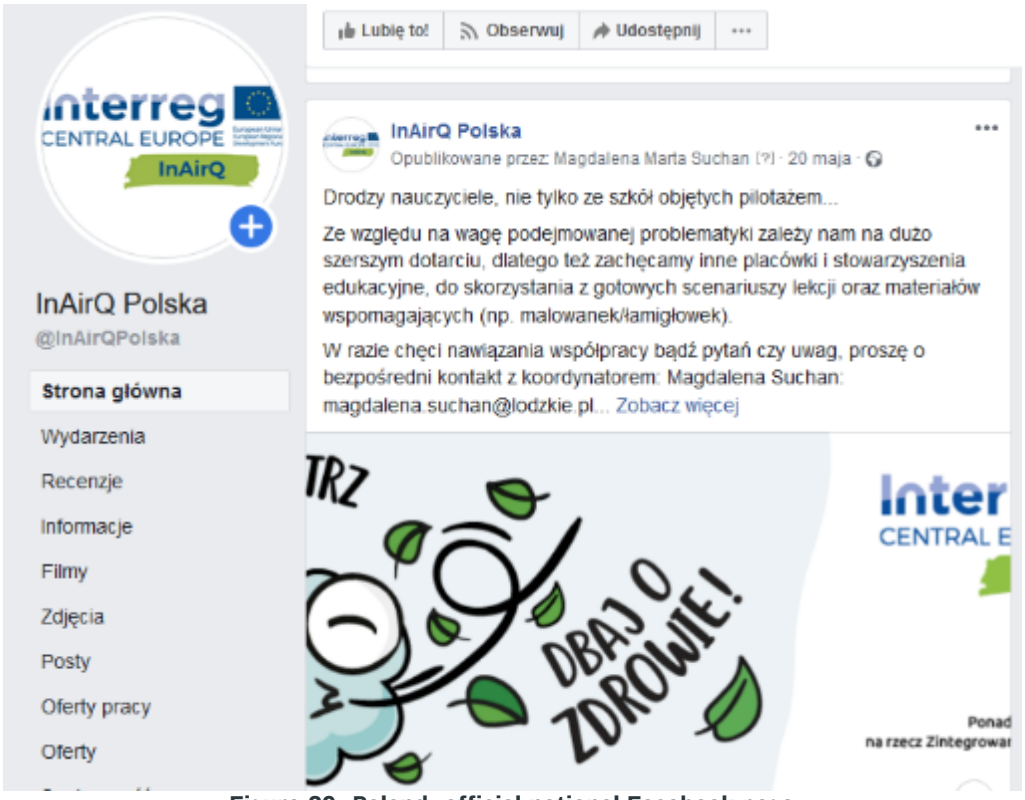


Figure 39. Poland, official national Facebook page

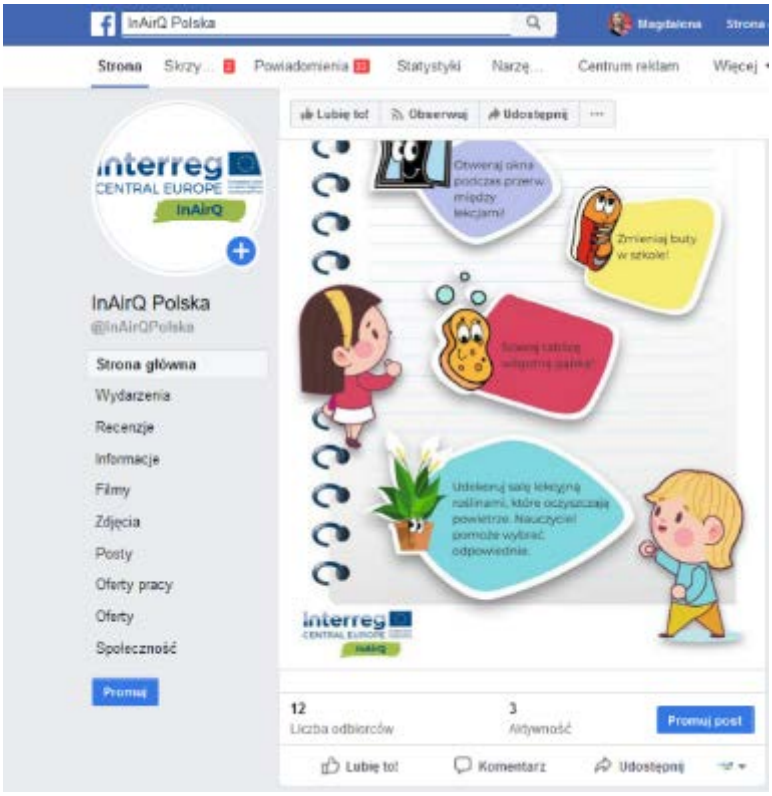


Figure 40 Poland, official national Facebook page

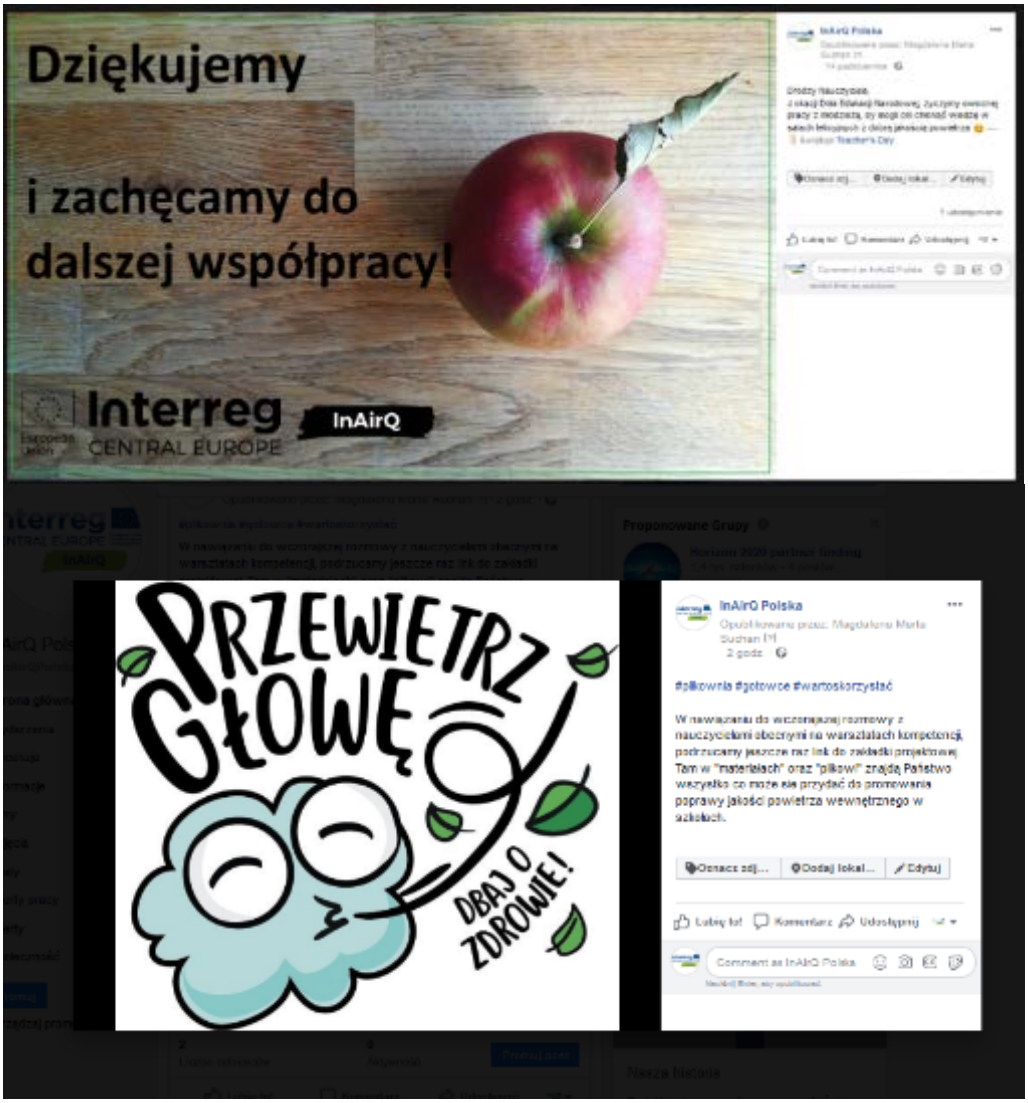


Figure 41 Poland, posts on the national Facebook page

Type of activity	Interview
Type of media	TV
Media name	Local TV Toya
Date	4 November 2017
Location	Lodzkie Region
Target/audience type	General public, all habitants of region
Number of people reached or coverage	Number = not available Coverage (local)
Brief description of activity	To better disseminate the project implementation Lodzkie Region (PP4) in cooperation with NIOM (PP3) organized the interview in local TV Toya (Lodzkie Region). In the interview participate both PL Project Partners: representative of Lodkzie Region (Director Krzysztof Pijanowski) and representative of NIOM (Anna Kozajda). In the interview were presented main goals, the most important tasks (with special emphasis on the measurements in schools) and

	significance of the project for children health. The interview was broadcasted on November 4, 2017. According to the information from TV Toya the interview got enthusiastic comments and opinion from the viewers in form of the calls and e-mails to the TV studio.
Link (if available)	http://tvtoya.pl/catchuptv/show/smog_talk,13218
Attached materials (if available)	-

Type of activity	Press release
Type of media	Newspaper
Media name	Ziemia Łódzka
Date	December 2019
Location	Lodzkie Region
Target/audience type	(public sector, private sector, NGOs, university/research, general public, all habitants of region)
Number of people reached or coverage	Number = not available Coverage (local)
Brief description of activity	Article about indoor quality and ideas how to make it better
Link (if available)	n.a.
Attached materials (if available)	

F.4.3. Slovenia

Type of activity	**Conference**
Event title	"Analysis of the situation in the field of architecture of public kindergartens and schools in Slovenia - recording, evaluation and protection of examples of quality (sustainable) architectural practice"
Date	23 January 2018
Location	Ministry of Education, Science and Sport in Slovenia
Number of speakers	1 - mag. Simona Uršič, NIJZ
Number of participants	App 50
Type of participants / stakeholders	public sector, NGOs, university/research
Brief description of activity	Lecture: Harmful substances in kindergartens and schools and their consequences on the health and well-being of children, the importance of ergonomically designed equipment
Link (if available)	/

Attached materials (if available)	Slideshow

Type of activity	**Conference**
Event title	"National Environmental Protection Program and its Dialogue with Local Communities"
Date	5-6 April 2018
Location	Moravske toplice, Hotel Ajda
Number of speakers	Speakers: dr. Andreja Kukec, dr. Anja Jutraž Authors: dr. Andreja Kukec, dr. Anja Jutraž, Peter Otorepec, mag. Simona Uršič, Andrej Uršič (NIJZ)
Number of participants	n.a.
Type of participants / stakeholders	Public sector, private sector, NGOs, university/research
Brief description of activity	Lecture: Impact of air quality in the indoor environments on human health (short presentation of the project InAirQ)
Link (if available)	http://www.bistra.si/nacionalni-program-varstva-okolja-in-njegov-dialog-z-lokalnimi-skupnostmi/
Attached materials (if available)	Slideshow

Type of activity	**Conference**
Event title	15th World Congress on Environmental Health
Date	20-23 March 2018
Location	SkyCity Convention Centre, Auckland, New Zealand
Number of speakers	dr. Andreja Kukec (NIJZ)
Number of participants	n.a.
Type of participants / stakeholders	University/research
Brief description of activity	Lecture: Meta-analysis of effect of atmospheric pollution on a birth outcomes: evidence for future research (short presentation of the project as part of this lecture)
Link (if available)	http://www.2018wceh.org/
Attached materials (if available)	Slideshow

Type of activity	**Lecture/ presentation – education for primary school teachers**
Event title	"Predstavitev določenih zdravstvenih stanj pri učencih osnovnih šol in predlogi ukrepanja" / "Presentation of certain medical conditions in pupils of elementary schools with suggestions for action"

Date	15 April 2019
Location	NIJZ, Ljubljana
Number of speakers	dr. Anja Jutraž (NIJZ)
Number of participants	50
Type of participants / stakeholders	Teachers in primary school
Brief description of activity	Lecture: Presentation of the project
Link (if available)	/
Attached materials (if available)	Slideshow

Figure 42 Slovenia, slideshow presented at the event "Predstavitev določenih zdravstvenih stanj pri učencih osnovnih šol in predlogi ukrepanja" / "Presentation of certain medical conditions in pupils of elementary schools with suggestions for action"

Type of activity	**Conference**
Event title	InAirQ International Conference - International Conference on Problem-solving Approaches to Ensure Children's Health
Date	22-24 May 2019
Location	Budapest, Hungary
Number of speakers	dr. Anja Jutraž (NIJZ)
Number of participants	n.a.
Type of participants / stakeholders	university/research
Brief description of activity	Lecture: How can we create a healthy school environment?
Link (if available)	https://www.nnk.gov.hu/international-conference-inairq-vhr
Attached materials (if available)	Slideshow

Type of activity	**Conference**
Event title	International Days of Public and Environmental Health Profession 2019
Date	16–18 October 2019
Location	City Museum of Ljubljana
Number of speakers	25
Number of participants	200
Type of participants / stakeholders	Nation institution (public and environmental health sector), private sector, university/research, general public
Brief description of activity	Title: RESEARCH TRENDS IN EPIDEMIOLOGY Purpose of the activity (see slides)
Link (if available)	https://www.sanitarc.si/wp-content/uploads/2017/08/PROGRAM-16.-18.-10.-2019-2.pdf
Attached materials (if available)	PPT slideshow

Type of activity	**Training**
Event title	Indoor air quality in school environment
Date	9 October 2019
Location	National Institute for Public Health, Ljubljana
Number of speakers	8 speakers: dr. Anja Jutraž (NIJZ), dr. Mateja Dovjak (UL FGG), Peter Novak (Agregat d.o.o.), dr. Janja Turšič (Agencija RS za okolje), Dr. Tomaž Šutej (Uprava RS za varstvo pred sevanji), mag. Simona Uršič (NIJZ), dr. Andreja Kukec (UL MF, NIJZ), Sonja Šorli (OŠ KDK)
Number of participants	16 participants

Type of participants / stakeholders	Managers / principals and other teaching staff of educational institutions
Brief description of activity	Capacity building training for managers / principals and other teaching staff of educational institutions. Agenda: Part 1: architecture Dr. Anja Jutraž, NIJZ: Comprehensive approach towards designing school environments Dr. Mateja Dovjak, UL FGG: A Strategy for Addressing the Possible Impact of Construction Products on Indoor Air Quality in School Environments Peter Novak, AGREGAT d.o.o: Ventilation systems in schools and kindergartens Part 2: Health Dr. Janja Turšič, ARSO: The Problem of Ambient Air Pollution Dr. Tomaž Šutej, Uprava RS za varstvo pred sevanji: Radon Damage and Measures Mag. Simona Uršič, NIJZ: The influence of indoor air on health and care for preserving and promoting the health of children and pupils in kindergartens and schools Dr. Andreja Kukec, UL MF in NIJZ: Parameters of indoor air quality and their effects on children's health Part 3: Project InAirQ Sonja Sorli, OŠ Karel Destovnik Kajuh: How can we detect bad air at school? Presentation of results of survey among pupils Dr. Anja Jutraž, NIJZ: Indoor Air Quality in Primary Schools in the Ljubljana Health Region - SWOT Analysis Mag. Simona Uršič, NIJZ: Results of Air Quality Measurements within the InAirQ Project Dr. Andreja Kukec, UL MF in NIJZ: Action plans to improve indoor air quality in primary schools
Link (if available)	https://www.dropbox.com/sh/myzbwct6i67ku47/AADW5kVX7SYsmAd2mNkKDEBfa?dl=0
Attached materials (if available)	Materials of the event are available at the posted dropbox link

Figure 43 Slovenia, picture of the event "Indoor air quality in school environment", 9 October 2019

Type of activity	**Training**
Event title	Indoor air quality in school environment
Date	16 October 2019
Location	National Institute for Public Health, Ljubljana
Number of speakers	8 speakers: dr. Anja Jutraž (NIJZ), dr. Mateja Dovjak (UL FGG), Peter Novak (Agregat d.o.o.), dr. Janja Turšič (Agencija RS za okolje), Dr. Tomaž Šutej (Uprava RS za varstvo pred sevanji), mag. Simona Uršič (NIJZ), dr. Andreja Kukec (UL MF, NIJZ), Sonja Šorli (OŠ KDK)
Number of participants	10 participants
Type of participants/stakeholders	Civil servants of local and regional authorities such as representatives of municipalities responsible for elementary schools in municipalities, ministries, other decision-making bodies
Brief description of activity	Capacity building training for civil servants of local and regional authorities such as representatives of municipalities responsible for elementary schools in municipalities, ministries, other decision-making bodies. Agenda: Part 1: architecture Dr. Anja Jutraž, NIJZ: Comprehensive approach towards designing school environments Dr. Mateja Dovjak, UL FGG: A Strategy for Addressing the Possible Impact of Construction Products on Indoor Air Quality in School Environments Peter Novak, AGREGAT d.o.o: Ventilation systems in schools Part 2: Health Dr. Janja Turšič, ARSO: The Problem of Ambient Air Pollution Dr. Tomaž Šutej, Uprava RS za varstvo pred sevanji: Radon Damage and Measures Mag. Simona Uršič, NIJZ: The influence of indoor air on health and care for preserving and promoting the health of children and pupils in kindergartens and schools Dr. Andreja Kukec, UL MF in NIJZ: Parameters of indoor air quality and their effects on children's health Part 3: Project InAirQ Sonja Šorli, OŠ Karel Destovnik Kajuh: How can we detect bad air at school? Presentation of results of survey among pupils Dr. Anja Jutraž, NIJZ: Indoor Air Quality in Primary Schools in the Ljubljana Health Region - SWOT Analysis Mag. Simona Uršič, NIJZ: Results of Air Quality Measurements within the InAirQ Project Dr. Andreja Kukec, UL MF in NIJZ: Action plans to improve indoor air quality in primary schools
Link (if available)	https://www.dropbox.com/sh/myzbwct6i67ku47/AADW5kVX7SYsmAd2mNkKDEBfa?dl=0
Attached materials (if available)	Materials of the event are available at the posted dropbox link

Figure 44 Slovenia, picture of the event "Indoor air quality in school environment", 16 October 2019

Type of activity	Social media campaign
Type of media	Social media
Media name	Facebook
Date	All year 2018 and 2019
Location	Ljubljana
Target/audience type	General public
Number of people reached or coverage	n.a.
Brief description of activity	Presentation of InAirQ project to general public through Facebook with posts about it.
Link (if available)	
Attached materials (if available)	

Figure 45. Slovenia, official national Facebook page

Type of activity	**Interview (dr. Andreja Kukec, ULMF and NIJZ, member of InAirQ project)**
Type of media	TV
Media name	"Ugriznimo v znanost"
Date	20.9.2018
Location	Ljubljana
Target/audience type	General public
Number of people reached	n.a.
Brief description of activity	Presentation of project InAirQ Discussing problem of indoor air quality in primary schools
Link (if available)	http://bit.ly/37FeDRn
Attached materials (if available)	

Figure 46 Slovenia, picture from the interview with dr. Andreja Kukec, ULMF and NIJZ, member of InAirQ project

Type of activity	**Scientific Article**
Type of media	Newspaper
Media name	Enboz
Date	March 2017
Location	Ljubljana
Target/audience type	Public sector, private sector, NGOs, university/research
Number of people reached or coverage	n.a.
Brief description of activity	Article "Indoor air quality in Slovenian pre-school buildings and InAirQ project" in eNBOZ
Link (if available)	http://www.nijz.si/sites/www.nijz.si/files/uploaded/enboz_marec_2017.pdf
Attached materials (if available)	Article is available online

Type of activity	**Scientific articles**
Type of media	Chapter in Monography
Media name	Book
Date	Publication date: 2019
Location	Ljubljana
Target/audience type	Public sector, private sector, NGOs, university/research

Number of people reached or coverage	n.a.
Brief description of activity	Title of the book: Pogledi na prostor javnih vrtcev in osnovnih šol Publisher: Univerza v Ljubljani, Fakulteta za arhitekturo Editor: Martina Zbašnik Senegačnik, 2019 ISBN 978-961-7032-17-8 Title of article: Pomen interdisciplinarnega sodelovanja pri zagotavljanju kakovosti notranjega zraka / The importance of interdisciplinary collaboration in ensuring the indoor air quality Authors: Anja Jutraž, Peter Otorepec, Simona Uršič, Andreja Kukec, Tamás Szigeti
Link (if available)	-
Attached materials (if available)	

Figure 47. Slovenia, pages from the book "Pogledi na prostor javnih vrtcev in osnovnih šol"

Type of activity	**Training**
Type of media	Presentation
Media name	Presentation
Date	May 2019

Location	Ljubljana
Target/audience type	Pupils in the primary school
Number of people reached or coverage	30
Brief description of activity	Presentation title "what kind of air we breathe", Presentation of the project in primary school (for pupils of the 3rd grade)
Link (if available)	-
Attached materials (if available)	Slideshow

Type of activity	**Communication/Training**
Type of media	Letter
Media name	Letter
Date	February 2019
Location	Ljubljana
Target/audience type	Teachers in the primary school
Number of people reached or coverage	12 schools
Brief description of activity	Informing primary schools about the results of monitoring campaign – letter/ paper with results and suggestions for improvements. Acquaintance with the results of measurements of the quality of internal and external air taken in your school
Link (if available)	-
Attached materials (if available)	

Type of activity	**Meeting with Public Authority**
Type of media	-
Media name	Meeting
Date	June 2019
Location	Ljubljana
Target/audience type	Head of the primary school sector in Municipality of Ljubljana
Number of people reached or coverage	1 (indirectly mayor)
Brief description of activity	Meeting with the representatives at the Municipality of Ljubljana Presentation of the project, discussion about possibilities for future collaboration, plans for signing declaration forms, discussions about capacity building trainings
Link (if available)	
Attached materials (if available)	

Type of activity	**Press release / Distribution of training material**
Type of media	Book
Media name	Kakovost notranjega zraka v osnovnih šolah
Date	December 2019
Location	Slovenia
Target/audience type	Municipalities (250 in Slovenia) Primary schools (Network of healthy schools in Slovenia) 3 Ministries Chamber of Architects University of Ljubljana (different faculties)
Number of people reached or coverage	Local coverage
Brief description of activity	Distribution of training material, that was prepared for capacity building trainings in Slovenia, at the end of the project: - Book of scientific papers - Manual
Link (if available)	-
Attached materials (if available)	-

F.4.4. Czech Republic

Type of activity	**Conference**
Event title	Conference on Hygiene of Children and Youth
Date	15-16. 11. 2017
Location	Chodovà Planà
Number of speakers	1
Number of participants	30
Type of participants / stakeholders	Private sector, public health authority, school managers
Brief description of activity	InAirQ project has been presented to relevant stakeholders during this National conference
Attached materials (if available)	Presentation, program
Link (if available)	-

Figure 48. Czech Republic, slideshow presented at the conference "Conference on Hygiene of Children and Youth"

Type of	**Event**
Event title	Workshop for cooperating schools and other institutions
Date	31. 5. 2018
Location	Primary school Líbeznice
Number of speakers	5
Number of participants	16
Type of participants / stakeholders	Private sector, public health authority, school managers
Brief description of activity	Program: • Introduction - A brief recap of the state of the project solution (Dr. H. Kazmarová) • Measured schools - Overview of results (Ing. V. Vrbíková) • Experience from practice (Dr. B. Kotlík) • How it can be - benchmark visits (Dr. Kazmarová) • Communication, mediation, presentation (Dr. Kotlík) • Action Plan - Elementary School Marjánka, Prague 6 (Ing. M. Mikešová) • Supplementary Communication - Healthy School (Dr. M. Kódl)
Link (if available)	-

Attached materials (if available)	Slideshows

Type of activity	**Conference**
Event title	Conference Silesian Days of Preventive Medicine
Date	21-23. 3. 2018
Location	Ostravice
Number of speakers	28 (2 speakers with topic on project InAiQ)
Number of participants	250
Type of participants / stakeholders	(public health authorities, researchers)
Brief description of activity	Silesia's Preventive Medicine Days are a traditional, wide-ranging conference, covering public health, prevention and environmental issues In program: "InAirQ (The system wants it)" H. Kazmarová, B. Kotlík "Do We Save (Where InAirQ Project Leads)" B. Kotlík, H. Kazmarová
Link (if available)	http://sdpm.cz/2018/index.php
Attached materials (if available)	Slideshows

Type of activity	**Conference**
Event title	Chodovoplánské dny hygieny dětí a mládeže
Date	14.-15.11.2018
Location	Chodová Planá
Number of speakers	19 (1 speaker with topic on project InAiQ)
Number of participants	85
Type of participants / stakeholders	Public health authorities, private sector
Brief description of activity	A traditional national conference focusing on the issues of child and youth hygiene In program: "Do We Need Limits in Indoor Air (InAirQ Project)" B. Kotlík, H.Kazmarová
Link (if available)	-
Attached materials (if available)	Slideshow

Type of activity	**Conference**

Event title	Slezské dny preventivní medicíny Silesian Days of Preventive Medicine
Date	20. - 22. March 2019
Location	Ostravice, Czech Republic
Number of speakers	40
Number of participants	120
Type of participants / stakeholders	hygienic service
Brief description of activity	Presentation: “Kolik muziky je za málo peněz? (a jaké)” “How much music is there for little money? (and which)”
Link (if available)	http://sdpm.cz/
Attached materials (if available)	photos

Type of activity	**Conference**
Event title	Ovzduší (2019)
Date	23.-24. April 2019
Location	Brno
Number of speakers	30
Number of participants	80
Type of participants / stakeholders	Researchers
Brief description of activity	Posters: **InAiRQ** “**Intervenční studie**” **-** “InAirQ intervention study” Nadnárodní adaptační opatření řízení kvality vnitřního prostředí Projekt - InAirQ Transnational adaptation measures to control indoor air quality project - InAirQ
Link (if available)	http://recetox.muni.cz/index.php?pg=odborne-akce--ovzdusi-2019
Attached materials (if available)	photos

Figure 49 Czech Republic, posters of InAirQ intervention study presented at the conference "Ovzduší"

Type of activity	**Conference**
Event title	Conference on Hygiene of Children and Youth
Date	13. – 14. 11. 2019
Location	Chodová Planá
Number of speakers	30
Number of participants	80
Type of participants / stakeholders	(Czech hygienic service, departments Hygiene of Children and Youth)
Brief description of activity	Presentation at national conference in the Czech Republic "… na Marjánce, na malém vršíčku …" (Prague Intervention study) B. Kotlík, H. Kazmarová, M. Mikešová, V. Vrbíková, L. Kuklová
Attached materials (if available)	PPT presentation
Link (if available)	

Type of activity	**Conference**
Event title	Environmental Health Monitoring 2019
Date	13. 10. 2019

Location	Prague
Number of speakers	25
Number of participants	80
Type of participants / stakeholders	(Czech hygienic service)
Brief description of activity	Presentation at national conference in the Czech Republic "… InAirQ - Intervenční studie …" (Prague Intervention study) B. Kotlík, H. Kazmarová, M. Mikešová, V. Vrbíková, L. Kuklová
Attached materials (if available)	PPT Presentation
Link (if available)	http://www.szu.cz/topics/environmental-health/environmental-health-monitoring

Type of activity	**Conference**
Event title	EAC 2019 (European Aerosol Conference)
Date	25. – 30. 8. 2019
Location	Gothenburg, Sweden
Number of speakers	120
Number of participants	1025
Type of participants / stakeholders	(university, research)
Brief description of activity	Poster: "Discomfort or dust – what is the biggest problem in indoor environment?" B. Kotlík, H. Kazmarová, M. Mikešová, V. Vrbíková, L. Kuklová
Attached materials (if available)	Poster and Photos
Link (if available)	https://eac2019.se/

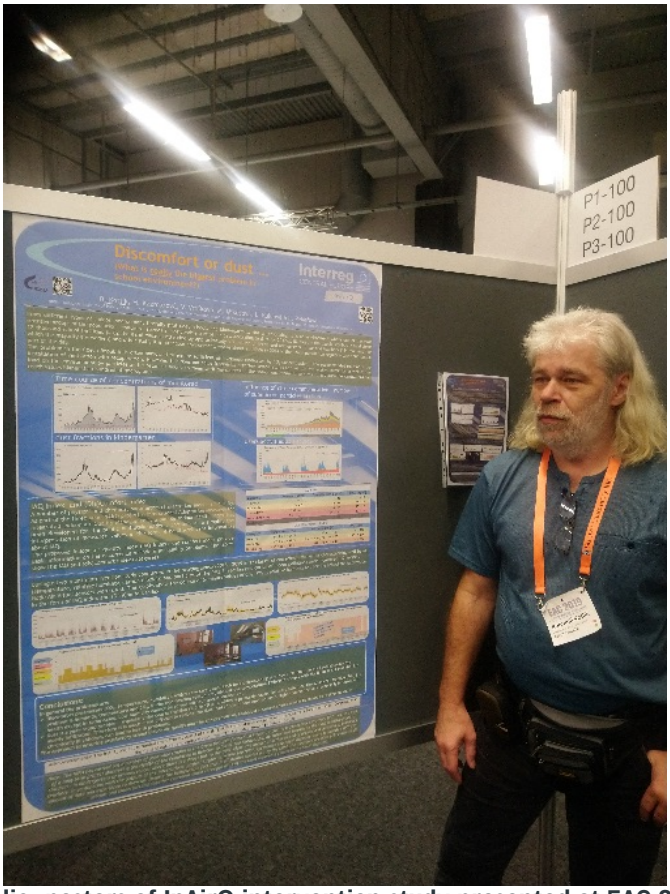


Figure 50 Czech Republic, posters of InAirQ intervention study presented at EAC 2019 (European Aerosol Conference)

Type of activity	**Conference**
Event title	ODBORNÁ KONFERENCE „16. SETKÁNÍ V ČISTÉM OVZDUŠÍ“
Date	3. – 4. 10. 2019
Location	Tábor
Number of speakers	12
Number of participants	60
Type of participants / stakeholders	(university, research)
Brief description of activity	Presentation at national conference in the Czech Republic “…INAIRQ – co je zásadním problémem ve vnitřním prostředí …” (InAirQ - which is a major problem in the indoor environment) B. Kotlík, H. Kazmarová, M. Mikešová, V. Vrbíková, L. Kuklová
Attached materials (if available)	PPT presentation
Link (if available)	-

Type of activity	**Interviews**
Type of media	TV
Media name	Nationwide TV channel ČT
Date	2017-2018
Location	Prague
Target/audience type	general public
Number of people reached or coverage	Number of interviews = 3 Number of people = 1,5 million Coverage national
Brief description of activity	In order to raise awareness about Indoor air quality. Inairq project partner gave three interviews in public media (nationwide TV channel CT) - once in the main evening news and twice in a publicity program (Studio 6, Věda).
Link (if available)	n.a.
Attached materials (if available)	

Figure 51 Czech Republic, pictures from the interviews on the Nationwide TV channel ČT

Type of activity	Interviews
Type of media	TV
Media name	Private TV channel Nova
Date	2018
Location	Prague
Target/audience type	general public
Number of people reached or coverage	Number of interviews: 2

	Number of people: 1,5 million Coverage: national
Brief description of activity	Twice in private media (nationwide TV channel Nova) - once in the main evening news and once in a publicity program (Střepiny).
Link (if available)	
Attached materials (if available)	

Type of activity	**Interviews**
Type of media	Radio
Media name	Regional radio station (Jihlava)
Date	2018
Location	Prague
Target/audience type	general public
Number of people reached or coverage	Number of interviews: 1 Number of people: n.a. Coverage: regional
Brief description of activity	One interview was given to the regional radio station (Jihlava)
Link (if available)	
Attached materials (if available)	

Type of activity	**Social media campaigns**
Type of media	Social media
Media name	Facebook
Date	October 2017 – December 2019
Location	Torino, Italy
Target/audience type	public sector, private sector, NGOs, university/research general public
Data and coverage	Number of posts/campaigns: 17
Brief description of activity	Use of national Facebook (All public media presentations of the project have their own links on the Facebook page of the project) and a project web page.
Link (if available)	-
Attached materials (if available)	

Type of activity	**Technical publication**
Type of media	quarterly

Media name	Klimatizace 2-3/2018, ročník 50
Date	2018
Location	Czech Republic
Target/audience type	(public sector)
Number of people reached or coverage	n.a.
Brief description of activity	“Projekt InAirQ - (zamysleme se nad vnitřním ovzduším, kde nejde a nikdy nepůjde jenom o měření a o limity)” (InAirQ project (Consider the internal atmosphere, where it is not, and never will not only measurement and the limits) (RNDr. Kotlík, Ph.D.)
Link (if available)	https://janka.cz › casopis › klima2-3_vse-web
Attached materials (if available)	Photos

Projekt InAirQ
(zamysleme se nad vnitřním ovzduším, např. ve školách,kde nejde a nikdy nepůjde jenom o měření a o limity)

RNDr. Bohumil Kotlík, Ph.D [1]

Předem, tohoto redakcí vyžádaného sdělení, bych se chtěl přímat kněnicílkavečem. Tou první je, že nejsem zatížený technologiemi, tedy nutností řešit kompromis mezi potřebným a možným a toto téma tak rád přenechám povolanějším. Tou druhou je, že za více než dvacet let měření kvality vnitřního ovzduší ve školách a školkách jsem nevidě děti, které by se dusily a pokud se často uváděného počtu únavy/ospalosti týká, tak jsme usínali především my – měřící skupina. Nakolik to bylo způsobeno zvyšující se koncentrací oxidu uhličitého ve třídě, našim brzkým ranním vstáváním nebo skutečností, že jsme po x té slyšeli výklad vyjmenovaných slov či základů sčítání a odčítání, ponechávám otevřeným. Tou třetí je, že neumím využít limit CO_2 stanovený Vyhláškou MMR č. 20/2012 Sb. Respektive příliš nechápu jeho význam. I zde je více důvodů. Jedním je samotná definice limitu, která umožňuje nejednotné vyhodnocení situace, tou druhou je jeho hodnota 1 500 ppm. A tak u vědomí, že první možné „zdravotní“ dopady jsou uváděny pro koncentraci 3 000 ppm CO_2 a vyšší a že Pettenkoferovo kritérium, na kterém není mimochodem potřeba už více než 100 let nic měnit, říká „že maximální hodnota koncentrace CO2 ve vnitřních prostorech a pobytových místnostech, ve kterých se ještě člověk cítí komfortně, je 1 000 ppm (0,1 %)“ tuším problém. A ještě tu je Průmyslová toxikologie, která uvádí „Organizmus se na vyšší koncentrace CO_2 dobře adaptuje, při dlouhé expozici se udává velmi slabý narkotický účinek, koncentrací do 5 000 ppm je možno dýchat řadu hodin bez příznaků.“ To by se také nemělo opomíjet. Stanovená hodnota tak nemá primárně „zdravotní“ význam a zároveň překračuje uznávané kritérium. Dopady tohoto překročení, čímž nechci snižovat význam působení diskomfortu, byly v poslední době mediálně často účelově nadhodnocovány. Trochu se přitom zapomíná, že diskomfort může ve vnitřním prostředí představovat nejenom zvýšená hodnota oxidu uhličitého, ale moc nízká nebo naopak moc vysoká vlhkost a teplota.

Vnitřní ovzduší se obvykle definuje jako „ovzduší, které nemá přímé spojení s ovzduším venkovním a/nebo je nakolik ovlivněno vnitřními zdroji, že se významně liší od ovzduší venkovního. Může mít zcela specifické mikroklima“. Je komplikované, prostorově a časově variabilní, multifaktorové.

[1] STÚ – Národní referenční laboratoř pro vnitřní a venkovní ovzduší

Expozičně významné typy vnitřního prostředí

Z různých typů vnitřního prostředí doslova čtu školy a školky. Nikoli bezdůvodně, jedná se o prostředí, ve kterém tráví značnou část dne jedna z nejvíce citlivých skupin obyvatelstva – děti. Podle údajů za rok 2016-2017 (novější nebyly k srpnu 2018 k dispozici respektive nebyly dohledatelné) bylo v ČR:

- 5 209 různých typů mateřských škol = a v nich 362 653 dětí v 15 856 třídách;
- 4 140 základních škol = 906 188 dětí v 45 116 třídách;
- 489 základních uměleckých škol s 965 pobočkami = 248 542 dětí;
- 1 307 středních škol, učiliš a gymnázií = 424 849 dětí a mladistvých v 19 380 třídách.

Celkem to je asi 12,1 tisíc školských zařízení, budov, které navštěvovalo přibližně 1,7 milionu dětí a mladistvých, a lze odhadnout, že se jednalo o 81,7 tisíc tříd. Jedná se o již několik let ustálený stav, kdy meziroční změny jsou zanedbatelné. (Zdroj: http://www.msmt.cz/vzdelavani/skolstvi-v-cr/statistika-skolstvi/statisticka-rocenka-skolstvi-vykonove-ukazatele). Druhým, expozičně mnohem významnějším typem mikroprostředí, jsou pak byty. Ale ty zatím legislativně řešit neumíme a je otázkou jestli chceme. Zvláště pak v případě kolaudací či pronájmů by to totiž už chtělo více než pouhou formu doporučení, která snad může mít význam u užívaných bytů. Cesta k certifikaci budov – obytných prostor je bohužel ještě dlouhá a vždy se na ni později objeví překážky „způsobené“ uživateli – například jejich životním stylem a aktivitami (obtáz i aktivitami sousedů – typickým příkladem je infiltrace cigaretového kouře, ale našly by se mnohé další).

Ale co je zde doopravdy problém?

Nechme teď stranou komerčně zaměřené mediální kampaně či případná PR vyjádření. Na rozdíl od venkovního ovzduší, je zde naše poznání (zatím) totiž vždy omezeno na časově ohraničené studie, často zaměřené pouze na vybrané typy mikroprostředí. Percepci vnitřního prostředí přitom ovlivňuje celá řada spolupůsobících faktorů. Z těch hlavních lze uvést architektonické řešení, umístění budovy a hluk v jejím okolí, orientace a uspořádání vnitřního prostoru, vybavení, osvětlení, doba dozvuku (akustika). A co z toho ve vnitřním pro-

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KLIMATIZACE

Figure 52. Czech Republic, pictures from the Technical publication

F.4.5. Italy

Type of activity	**Training**
Event title	"Qualità dell'aria negli edifici scolastici: progetti, prospettive e quesiti"
Date	18 May 2018
Location	Torino, Via P.C. Boggio 61
Number of speakers	4
Number of participants	25
Type of participants / stakeholders	Professional sector, university/research, general public
Brief description of activity	The seminar was organized with the aim of attracting the attention of the professional world on the subject of indoor air quality, involving local engineers in a training seminar. Link of the invitation and some photos of the day are attached.
Link (if available)	http://www.ording.torino.it/agg-professionale/eventi-formativi/icalrepeat.detail/2018/05/18/2411/22%7C16%7C111%7C15/
Attached materials (if available)	Photos, Minutes, Participants list and Evaluation questionnaire

Figure 53. Italy, picture of the training session "Qualità dell'aria negli edifici scolastici: progetti, prospettive e quesiti"

Type of activity	**Training**
Event title	"Capacity buildings training and Action Plan presentation"
Date	2-4-8-16 April 2019
Location	Torino, different premises (4 meetings)
Number of speakers	2

Number of participants	21 teachers (150 children)
Type of participants / stakeholders	Teachers and schools
Brief description of activity	The training was organized with the aim of inform teachers and pupils of the schools involved into the project about the results obtained during the monitoring phase and suggest them how to implement the Action Plan in order to reduce air pollution indoor their classrooms. We presented them 2 documents with 1 abstract (more spreadable among teachers) and a poster to hang in class for the pupils.
Link (if available)	n.a.
Attached materials (if available)	Document delivered, Participants list and Presentation

Figure 54. Italy, picture of the training session "Capacity buildings training and Action Plan presentation"

Type of activity	**Training**
Event title	Environment Quality Forum and Training Event
Date	6 September 2019
Location	Torino, Piazza Bernini 1
Number of speakers	3
Number of participants	17
Type of participants / stakeholders	School's managers, public authorities and environmental agencies
Brief description of activity	This training took place on September 6, 2019, at the premises of School Foundation (Esedra room), located in Piazza Bernini in Turin, Italy. The stakeholders invited were schools managers (the

	ones involved in pilot cases) and experts from public institutions or environmental agencies, for example the Turin Metropolitan City and Regional Agencies for the Protection of Environment. The main purpose of this session was to train local experts on how to help schools solve their needs regarding education on IAQ issue and environment in general.
Link (if available)	n.a.
Attached materials (if available)	Photos, Participants list and Presentations

Figure 55. Italy, picture of the Environment Quality Forum and Training Event

Type of activity	**Conference**
Event title	Air and Climate: The synergistic approach to policies on air quality and climate: knowledge and tools
Date	10 October 2019
Location	Torino, Biblioteca Nazionale Universitaria, Piazza Carlo Alberto, 3
Number of speakers	12
Number of participants	200
Type of participants / stakeholders	Public authorities, private sector, environmental agencies, generic public
Brief description of activity	InAirQ project partners participated to the conference organized by ARPA Piemonte within the framework of the CLIMAERA Franco-Italian cross-border cooperation project. It aims to find solutions through a common strategic approach in air-climate-energy environmental policies to limit the air quality deterioration and climate change.
Link (if available)	http://www.arpa.piemonte.it/news/il-10-ottobre-a-torino-parliamo-di-aria-e-clima

Attached materials (if available)	Photos, Participants list and Presentations

Figure 56. Italy, flyer of the event "Air and Climate: The synergistic approach to policies on air quality and climate: knowledge and tools"

Figure 57. Italy, picture of the event "Air and Climate: The synergistic approach to policies on air quality and climate: knowledge and tools"

Type of activity	**Social media campaigns**
Type of media	Social media
Media name	Facebook
Date	October 2017 – December 2019 (22 campaigns)
Location	Torino, Italy
Target/audience type	Public sector, private sector, NGOs, university/research general public
Data and coverage	Number of posts = 22 Number of people reached: 1836 (coverage) Interactions: 303 (comments and likes)
Brief description of activity	Social media campaigns are very important nowadays in order to spread relevant information to a massive group of people. Italians partners used the National Facebook page of the project with a precise scheme and logic, posting with a specific timing, in order to keep interesting the subject during the 3 years activities.
Link (if available)	https://www.facebook.com/CEInAirQItalia/
Attached materials (if available)	Screenshots of the facebook page

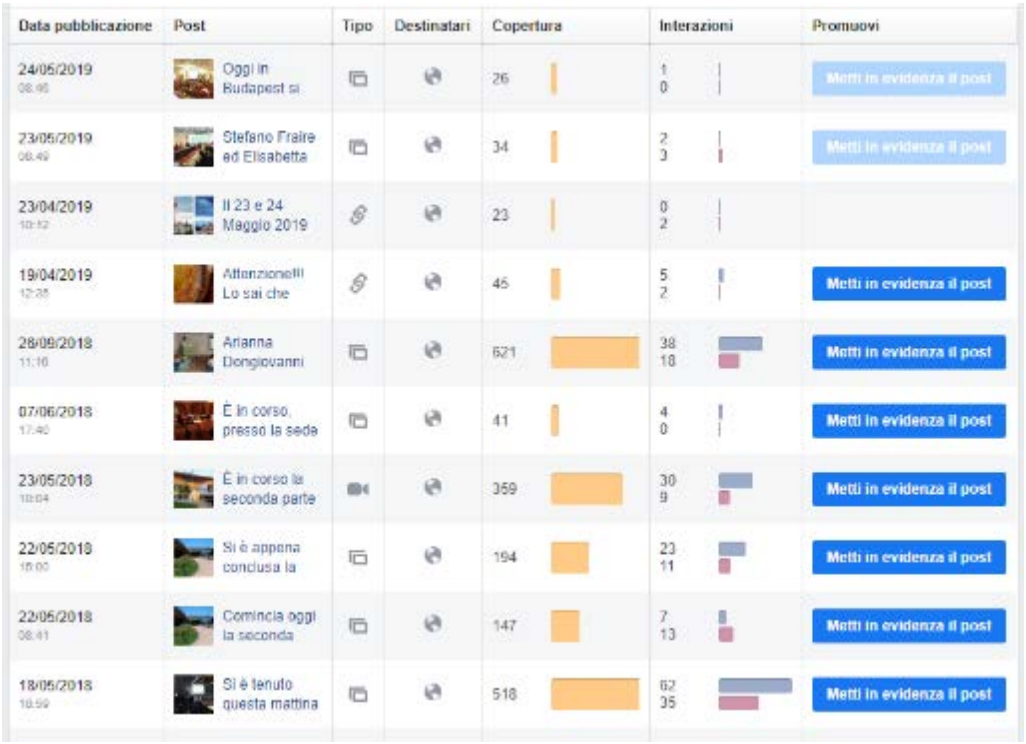


Figure 58. Italy, screenshots of the Social Media Campaign

Type of activity	**Scientific Article**
Type of media	Scientific magazine
Media name	Rivista BioEcoGeo Magazine
Date	December 2018
Location	Torino, Italy

Target/audience type	private sector, university/research, general public
Number of people reached or coverage	Coverage: n.a.
Brief description of activity	One important activity conducted by Italian partners is the publication on scientific magazines about the project activities to raise awareness among technicians and other fundamental stakeholders. E. Cimnaghi, A. Dongiovanni, Un progetto europeo che valuta l'aria nelle scuole, Rivista BioEcoGeo Magazine, ISSN 2037-2418, Milano, pp. 12-15, novembre – dicembre 2018.
Link (if available)	http://www.bioecogeo.com/
Attached materials (if available)	Screenshot of the article into the magazine


PROGETTI

UN PROGETTO EUROPEO CHE VALUTA L'ARIA NELLE SCUOLE

di ELISABETTA CIMNAGHI e ARIANNA DONGIOVANNI

È Torino la città italiana scelta per controllare gli inquinanti all'interno delle aule scolastiche. Tre anni di questionari e monitoraggi per scoprire esattamente cosa respirano i ragazzi per buona parte della loro giornata

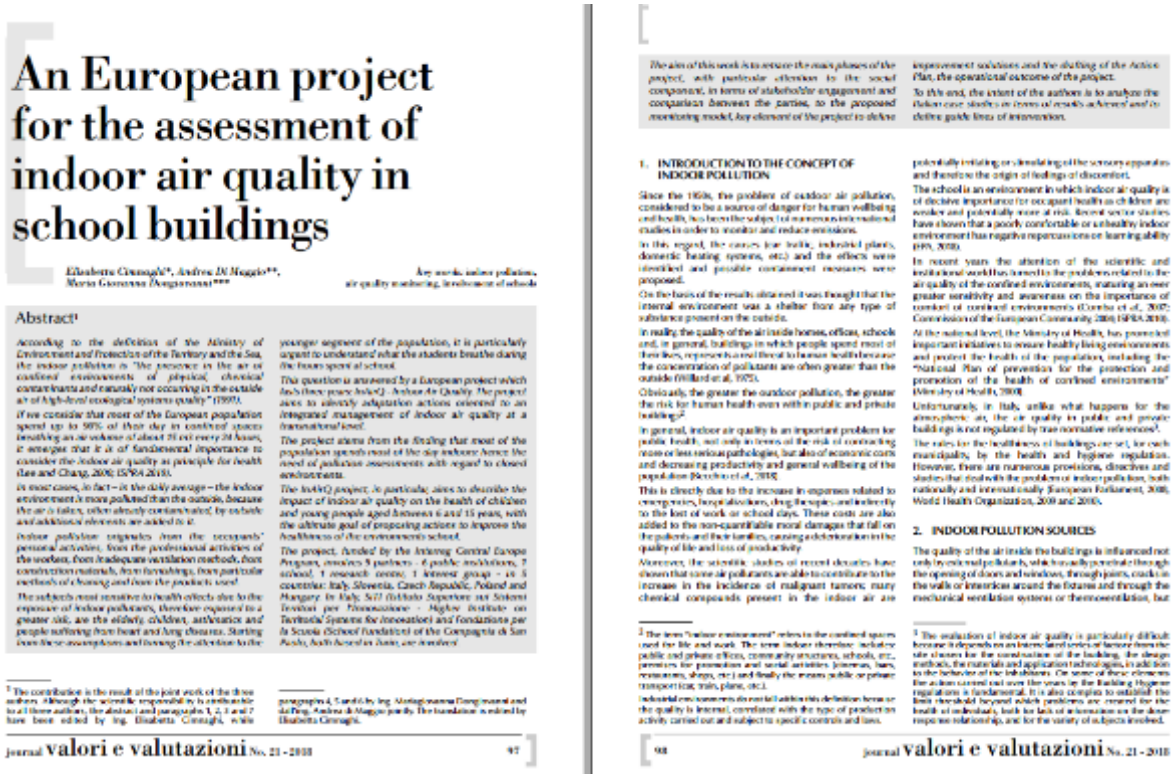
PROGETTI

I PRINCIPALI INQUINANTI SU CUI SI CONCENTRANO LE AZIONI DI MONITORAGGIO SONO:

Figure 59. Italy, article "Un progetto europeo che valuta l'aria nelle scuole" published on BioEcoGeo Magazine

Type of activity	Scientific Article
Type of media	Scientific magazine
Media name	Valori e Valutazioni magazine (SIEV Journal)
Date	November 2018 (Number 21)
Location	Torino/Roma, Italy
Target/audience type	Private sector, university/research, general public
Number of people reached	Coverage: n.a.

or coverage	
Brief description of activity	One important activity conducted by Italian partners is the publication on scientific magazines about the project activities to raise awareness among technicians and other fundamental stakeholders. E. Cimnaghi, A. Di Maggio, A. Dongiovanni, A European project for the assessment of indoor air quality in school buildings, Journal Valori e Valutazioni, official magazine of SIEV (Società Italiana di Estimo e Valutazione), ISSN 2036-2404, n. 21, 2018, pp. 97-104.
Link (if available)	https://siev.org/valori-e-valutazioni/
Attached materials (if available)	Screenshot of the article into the magazine



An European project for the assessment of indoor air quality in school buildings

Elisabetta Cimnaghi*, Andrea Di Maggio**, Maria Giovanna Dongiovanni***

Abstract

1. INTRODUCTION TO THE CONCEPT OF INDOOR POLLUTION

2. INDOOR POLLUTION SOURCES

journal valori e valutazioni No. 21 - 2018

journal valori e valutazioni No. 21 - 2018

Figure 60. Italy, article "An European project for the assessment of indoor air quality in school buildings", published on "Valori e Valutazioni" magazine