D.T1.1.3:

REPORT ON PAST AND CURRENT RELEVANT EU-FUNDED PROJECTS

AIR TRITIA CE 1101

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1. Executive Summary

This report presents the analysis of result of previous EU financed transboundary projects and other relevant national projects executed in the AIR TRITIA project area. Moreover, it also includes information on ongoing projects focused on air quality assessment and management which are relevant for AIR TRITIA project.

List of relevant projects:

Transboundary projects:

- AIR SILESIA
- AIR PROGRESS
- CLEAN BORDER

National projects – Czech Republic:

- Mid-term strategy (till 2020) for the improvement of air quality in the Czech Republic (including Program for the Improvement of Air Quality in Agglomeration Ostrava/Karviná/Frýdek-Místek and Program for the Improvement of Air Quality in zone Moravia-Silesia)
- Projects being executed by the Health Institute Ostrava (2016 – 2020)
- Projects supported by the Technology Agency of the Czech Republic

National projects – Poland:

- LIFE IP "Implementation of Air Quality Plan for Małopolska Region – Małopolska in a healthy atmosphere"
- MONIT-AIR "Integrated monitoring system of spatial data to improve air quality in Krakow"

National projects – Slovak Republic:

- Central Meetbike
- SOLEZ - Smart Solutions supporting Low Emission Zones and other low-carbon mobility policies in EU cities
- Mid-term strategy (till 2020) for the improvement of air quality in the Slovak Republic
- Studies developed by RUVZ (Regional Public Health Authorities in the Slovak Republic)
- Operational program Quality of Environment (2014-2020)
- Integrated Regional Operational Program (2014-2020)
- Program for the Improvement of Air Quality in the Žilina Self-Governing Region

Operational conclusions:

- Previous projects include substantial volume of data and information which could be used during the implementation of AIR TRITIA project (air quality measurements, estimates of emissions, results of modelling, impacts of road transport on air quality and of particular categories of stationary emission sources, instruments and measures to reduce emissions)
- There are certain ongoing/parallel/emerging projects which will generate data and information which could be used in AIR TRITIA project (air quality measurements, estimates of emissions, results of modelling)

Technical Conclusions:

- The most serious long-term problem in all three AIR TRITIA countries is the exceedance of air quality standards for suspended particulate matter PM10 and PM2.5 caused by anthropogenic emissions
- The greatest health risk is caused by serious exceedances (multiples of target value) of air quality standard for benzo (a) pyrene in the Czech Republic and Poland
- The levels of SO2 is in the region of the Silesian Voivodship are approximately two times higher than those in the Moravian-Silesian Region
- The results of analyses indicate higher concentrations of PM10, benzo [a] pyrene and PCDD / F on the Polish side of the area
- The largest area with the highest air pollution in the area is located approximately between the Czech-Polish border and Rybnik surroundings
- The pollution originated in this area has also significant influence on the border regions of the Czech Republic
- Domestic boilers and local energy sources have the greatest influence on the Polish side, but the impact of large industrial installations is also significant
- On the Czech side, the most polluted sites are characterized by the high impact of large industrial installations, but the share of other types of low-emission sources is not negligible; outside the main industrial areas, more than half of PM10 pollution is generated by local heating and transport
- Pollution sources located in the Czech Republic influence air quality in Slovakia, however the impact of Polish sources cannot be neglected both in the Czech Republic and in Slovakia
- Winds are more frequent from the Czech Republic to Poland; however, Polish sources produce more PM10 emissions, which are transmitted to the Czech Republic in a highly concentrated form especially during unfavourable dispersion conditions and therefore the impact of Czech sources in Poland and that of Polish sources is comparable
- The highest concentrations of pollutants are measured during calm periods or low wind speeds and especially during thermal inversion situations
- Exceptionally high concentrations are due to long-lasting inversion situations throughout the winter during the winter, i.e. December - February; the differences among average annual concentrations of pollutants in particular years are large and depend on meteorological conditions, especially in the cold half of the year

Recommendations:

- Make maximal use of existing data and information obtained within pervious projects
- Special attention should be paid to air quality data to develop time series which can help to reduce the impact of meteorological conditions in particular years (using moving averages)
- Coordination with other ongoing projects (including exchange od data and information) will be necessary to avoid overlaps and duplicities (and to make use of mutual synergies)

2. Introduction

The project called “Uniform approach to the air pollution management system for functional urban areas in Tritia region” (CE 1101, acronym AIR TRITIA) is the Interreg CENTRAL EUROPE project focused on programme priority specific objective 3.3 To improve environmental management of functional urban areas to make the more livable places.

As the problem of air pollution has been presented to decision makers with some distortions, inaccuracies and almost exclusively at a national level, the AIR TRITIA project aims to create effective international air quality management through development of joint information database, management and prediction tools and air quality strategies. The project is implemented by cooperation of 11 partners from 3 different countries: Czech Republic, Slovakia and Poland.

In accordance with the AIR TRITIA project work-plan, this “Report on past and current relevant EU-funded projects” summarizes information about relevant projects and results:

“The project follows up on three EU projects of the Interreg programme, carried out in terms of the area of interest: CLEAN BORDER, AIR SILESIA and AIR PROGRES CZECHO-SLOVAKIA. The teams of partners (VSB, GIG, ZU and IMGW) of the project in question participated in each project. In terms of the CLEAN BORDER project training, emissions from small-scale furnaces were measured on the Czech-Polish border.

In terms of the AIR SILESIA project, analysis of causes of air pollution was carried out in the border of the AIR TRITIA area of years 2006 and 2010.

Within the AIR PROGRES CZECHO-SLOVAKIA project, areas with a low air quality were identified in Žilina, and methods of special monitoring were tested successfully (measuring of vertical profiles of air pollution using unmanned airships). Also, modelling of the influence of Polish sources on Slovakia was carried out, showing that the air pollution in the Žilina region needs to be tackled in the TRITIA area. Data and information on air pollution from this project will be used in the AIR TRITIA project. Also, data and information on emissions from spoil tips found in the vicinity of furnaces will be used, which are the result of the Interreg project “Dust from Spoil Tips”, concluded in 2016 (partners VSB, GIG).

AIR TRITIA project will also use experience from Interreg CE project called Take a Breath! (TAB). Its purpose was to strengthen the powers of local and regional administration in target area, but also to increase the awareness of citizens and local businesses in terms of activities and plans related to air quality. Results of the project: the methodologies, tools and elaborated way of communication between stakeholders and beneficiaries will be adapted in AIR TRITIA project (as leader of TAB is project partner in AIR TRITIA).” Also, some minor information can be taken from Interreg Central Europe projects UFIREG, ACT CLEAN and INCA-CE.

Besides the above mentioned EU funded transboundary projects, additional both EU funded and national projects are taken into account:

National projects – Czech Republic:

- Mid-term strategy (till 2020) for the improvement of air quality in the Czech Republic (including Program for the Improvement of Air Quality in Agglomeration Ostrava/Karviná/Frýdek-Místek and Program for the Improvement of Air Quality in zone Moravia-Silesia)
- Projects being executed by the Health Institute Ostrava (2016 – 2020)
    - Operation of the measuring vehicle and automatic measuring stations, measurement of ambient air pollutant concentrations and evaluation of measurements by measuring vehicle and AMS (Statutory City of Ostrava)

- Operation of three automated monitoring stations monitoring air quality and semi-mobile measuring techniques in the territory of Ostrava, Opava and Český Těšín in 2017 (Moravian-Silesian Region)
- Modernization of Air Quality Monitoring Facilities (EU - CF under the Operational Program Environment)
- Use of markers to identify the origin of fuel in local furnaces (TA CR)

- Projects supported by the Technology Agency of the Czech Republic
  - Research on specific emissions of pollutants from solid fuel combustion in local furnaces
  - Searching for ways to reduce pollutant emissions and improve air quality in the Czech Republic by means of transport-organizational measures (implemented in time)

National projects – Poland:

- LIFE IP "Implementation of Air Quality Plan for Małopolska Region – Małopolska in a healthy atmosphere"
- MONIT-AIR "Integrated monitoring system of spatial data to improve air quality in Krakow"

National projects – Slovak republic

- Central Meetbike
- SOLEZ - Smart Solutions supporting Low Emission Zones and other low-carbon mobility policies in EU cities
- Mid-term strategy (till 2020) for the improvement of air quality in the Slovak Republic
  - Strategy for reduction of PM10
  - Resolution of the Government of the Slovak Republic no. 77 of 11 February 2013 on the Strategy for the Reduction of PM10
  - Regional program for improving the air quality in the SR for ground-level ozone
- Studies developed by RUVZ (Regional Public Health Authorities in the Slovak Republic)
  - Monitoring of biological allergens in the air
- Operational program Quality of Environment (2014-2020)
  - Operation of three automated monitoring stations monitoring air quality and semi-mobile measuring techniques on the territory of Žilina, Martin and Ružomberok in 2017 (Žilina Region)
  - Modernization of Air Quality Monitoring Facilities (EU-CF under the Operational Program Environment), 2013-2015
- Integrated Regional Operational Program (2014-2020), new challenges:
  - Improving environmental aspects in cities and urban areas by building green infrastructure elements and adapting the urban environment to climate change as well as introducing system elements to reduce air and noise pollution.
  - Improving air monitoring
- Program for the Improvement of Air Quality in the Žilina Self-Governing Region
  - A study on air quality, the share of stationary pollution sources, air quality improvement programs and action plans in the Žilina Self-Governing Region

- Air Quality Improvement Program – territory of the Žilina city
- Air Quality Improvement Program – territory of the city Ružomberok and Likavka
- Air Quality Improvement Program – territory of the city Martin and Vrútky

3. Interreg CENTRAL EUROPE relevant projects

CENTRAL EUROPE was the name of the programme, before it became the part of Interreg programmes in 2014. From 2007 to 2013, there were 26 environment projects realized within the "Environmental Risk Management and Climate Change" priority. Budget for all these projects together was above 55 million EUR, and total 272 partners participated on the project in this priority.

From these 26 projects, AIR TRITIA project team identified 4 project, which can have possible information to benefit the AIR TRITIA implementation. These 4 project are summarized in the table below:

Table 1: CE 2007 – 2013 project with possible benefits identified for AIR TRITIA

Project Name	Short Description
TAB	Air pollution not only has negative impacts on human health in central Europe, it can also detract from attractiveness and competitiveness of our cities and regions. A great deal can be done toward mitigation on the regional level, which is why TAB develops international systems to monitor air pollution and uses the resulting data to create pollution-reduction plans for regions.
UFIREG	The air in cities is rife with ultrafine particles. While ambient ultrafine particles appear likely to have a negative impact on our health, there are not enough conclusive studies on this threat. UFIREG is measuring ultrafine particles in five central European cities, and analysing their impact on human health, with the goal of contributing to environmental policy.
ACT CLEAN	Companies in Central Europe can greatly reduce any negative environmental impacts created by industry and business if they need to be more environmentally friendly, the ACT CLEAN project created the first area-wide network for cleaner production.
INCA-CE	Every year, extreme weather events in central Europe pose challenges for civil protection authorities, hydrologists and road maintenance services – all of whom need more timely warnings of potential problems. By deepening transnational cooperation between meteorologists and concerned public agencies, INCA-CE improves our preparedness for severe weather emergencies.

Source: Project Stories from the CENTRAL EUROPE Programme (Environmental Risk Management and Climate Change), CENTRAL EUROPE Programme, 2014

The TAB project aims to reduce the adverse effects of air pollution and to limit the ways by which the effects of climate change may exacerbate air pollution through the incidence of extreme weather events. TAB chose to achieve this goal by collection of comparative environmental data in Virtual Observatory to understand the nature and extent of air pollution and its interactions with climate and by wide consultation with stakeholders (local government, industry, health sector, interest groups and communities) to formulate responses into Adaptation Action Plans containing a set of integrated tools and actions, aiming at reducing and ultimately mitigating air pollution effects at local/regional levels.

The Virtual observatory was created as the on-line tool build on the google maps system. This observatory presents data about the air pollution situation via the created AQHI (Air Quality Health Index). This is currently containing data from the years 2011 to 2014. AIR TRITIA project plans to take some experience from this tool, but highly improve the functions of its own AQMS (Air Quality Management System) not only to show new (2015 – 2017) and current data (2018+), but also it improve the overall functionality. Also, the AQMS will be connected to PSW (Prediction Warning System), to provide the information about extreme air pollution situations to the population of target areas.

The second result of the TAB project are Adaptation Action Plans. AIR TRITIA project will use these results as experience source for its own strategies and action plans (D.T3.3.1, D.T3.3.5). Strategies will take into account new knowledge and highly improve the benefit and value of the AIR TRITIA outputs.

The experience change between TAB and AIR TRITIA project will be simple, as the TAB lead partner is one of the project partners of AIR TRITIA project.

The UFIREG project aims to the air pollution problems connected to the ultrafine pollution particles. To investigate the exposure of the population to UFP, UFIREG partners have established standardised UFP measurements using custom-made mobility particle size spectrometers in five cities located in Germany (Augsburg, Dresden), the Czech Republic (Prague), Slovenia (Ljubljana) and Ukraine (Chernivtsi). Epidemiological studies in the frame of the project have assessed the short-term effects of UFP on human mortality and morbidity, especially in relation to cardiovascular and respiratory diseases.

The results of the epidemiological analyses within the UFIREG indicate delayed effects of UFP on respiratory mortality as well as immediate and prolonged effects of UFP on respiratory hospital admissions. Moreover, results showed a significant association between PM2.5 and respiratory hospital admissions. The effects of PM2.5 on natural and cardiovascular mortality as well as cardiovascular hospital admissions were heterogeneous.

The result of the UFIREG project indicates necessity of ultrafine particles measurements in the air management strategies. The results of UFIREG epidemiologic studies can be used as the base for the epidemiologic studies within the AIR TRITIA implementation (D.T1.2.2). Also, the importance of the ultrafine particles should be the reason to include this particles to all AIR TRITIA measurements, but this need further investigation in connection to current technology and possibility to measure this particles with high effectivity and mainly high accuracy.

Although project ACT CLEAN isn´t focused on air quality, it contains some activities that can inspire the AIR TRITIA implementation. The experience can be taken mainly form ACT CLEAN´s database, which contain examples of environmentally friendly measures for the cleaner production, as the AIR TRITIA project will create a database for air pollution solutions and measures. Whole ACT CLEAN international network can be example for the transnational best practice exchange in the field of air pollution management.

While creating an AQMS and PWS tools, AIR TRITIA can take experience from another CENTRAL EUROPE project, INCA-CE. The main result of this project is system, which warns population against extreme weather emergencies. As the air pollution situations are connected with meteorological situations, the PWS can try to build up on INCA-CE tools and with innovation build up on previous project results.

In September 2017, the 3rd call of Interreg CENTRAL EUROPE will be launched, with another 60 mil. EUR to co-finance the transnational cooperation projects. It’s possible that that new “air quality” project will be funded within this programme in the priority 3. When the 3rd call will be successfully ended, AIR TRITIA project team will check new projects with possibility of cooperation and practice sharing in the field of air quality management.

4. Other EU funded transboundary projects

4.1. AIR SILESIA

The project ran from July 1, 2010 to June 30, 2013 and was funded from the Czech Republic-Poland Operational Program Cross-border Cooperation 2007-2013 (registration number: CZ.3.22 / 1.2.00 / 09.01610). An information system with full project results and detailed summary reports is available at www.air-silesia.eu in Czech and Polish languages.

Project partners included:

- Ostrava-based Health Institute (lead partner),
- Czech Hydrometeorological Institute,
- Central Mining Institute Katowice,
- Institute of Meteorology and Water Management – National Research Institute
- Institute of Environmental Engineering Research Zabrze
- VŠB - Technical University of Ostrava.

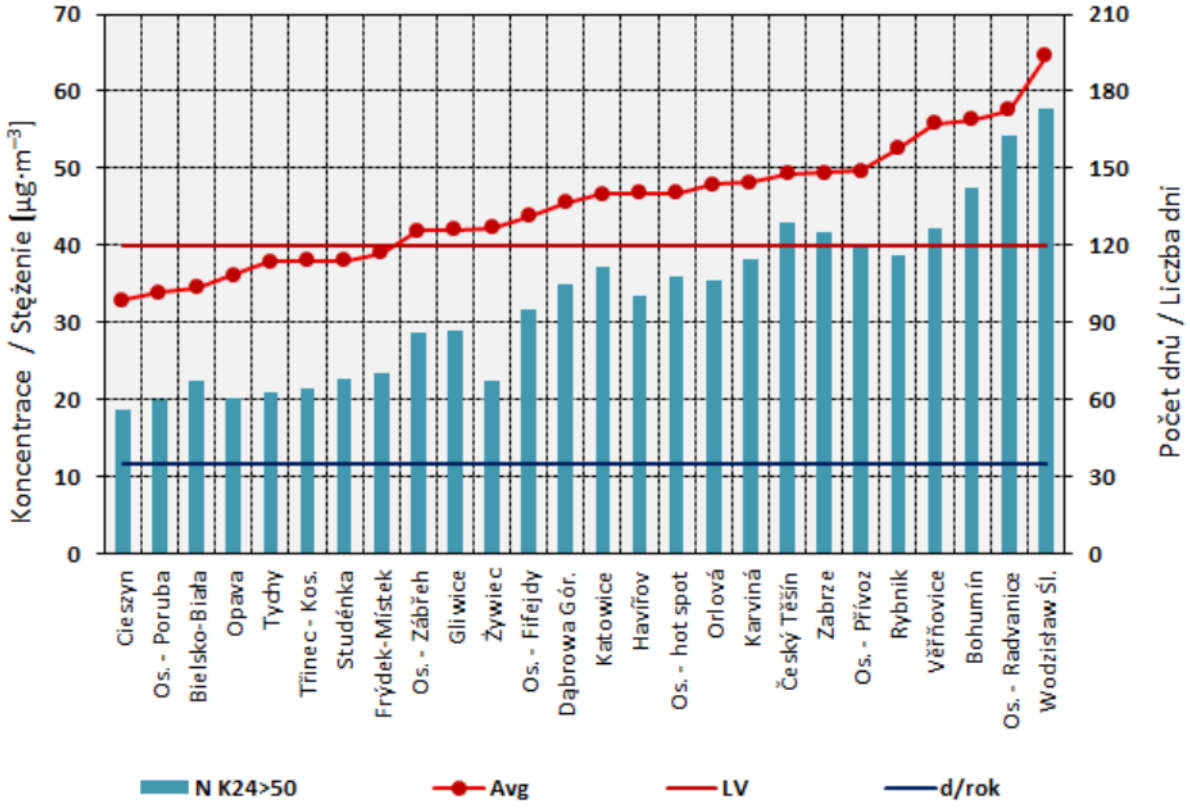
The project was unique not only as for the extent of the information processed but also as for the extent of cooperation between the Czech and Polish institutions. For the first time, information on air pollution across the cross-border region was assessed using the same methodology. Spatial digital data, detailed information on all types of air pollution sources and meteorological and air pollution data were prepared as a background for detailed assessment. National monitoring networks were supplemented by temporary measurements at other sites. In addition, air pollutants not covered by regular measurements were monitored. The ground level measurements were extended by flight measurements of air pollution. The collected data have become the basis for the development of an algorithm for forecasting actual concentrations of pollutants, air pollution modelling and the assessment of cross-border pollutant transmission between the Czech Republic and Poland.

The results of measurements, analyses and evaluations carried out in the Polish-Czech border area in the Silesian and Moravian-Silesian regions have led to the following conclusions:

- The most serious long-term problem is the exceedance of air quality standards for suspended particulate matter PM10 and PM2.5 caused by anthropogenic emissions (Figure 1)
- The greatest health risk is caused by serious exceedances (multiples of target value) of air quality standard for benzo [a] pyrene (Figure 2)
- The levels of SO2 is in the region of the Silesian Voivodship are approximately two times higher than those in the Moravian-Silesian Region;
- The results of analyses of samples taken during the project period indicate higher concentrations of PM10 , benzo [a] pyrene and PCDD / F on the Polish side of the area (Figures 1-3)
- The largest area with the highest air pollution is located approximately between the Czech-Polish border and Rybnik surroundings (Figures 4)
- The pollution originated in this area has also significant influence on the border regions of the Czech Republic (Figures 5 and 6)
- Domestic boilers and local energy sources have the greatest influence on the Polish side, but the impact of large industrial installations is also significant (Figure 6)

- On the Czech side, the most polluted sites are characterized by the high impact of large industrial installations, but the share of other types of low-emission sources is not negligible; outside the main industrial areas, more than half of PM10 pollution is generated by local heating and transport (Figures 4 and 6)
- Winds are more frequent from the Czech Republic to Poland; however, Polish sources produce more PM10 emissions, which are transmitted to the Czech Republic in a highly concentrated form especially during unfavourable dispersion conditions and therefore the impact of Czech sources in Poland and that of Polish sources is comparable
- The highest concentrations of pollutants are measured during calm periods or low wind speeds and especially during thermal inversion situations
- Exceptionally high concentrations are due to long-lasting inversion situations during the winter, i.e. December - February; the differences among average annual concentrations of pollutants in particular years are large and depend on meteorological conditions, especially in the cold half of the year

Figure 1: Average annual concentrations of PM10 and annual average number of days with daily concentration higher than 50 µg.m-3, 2006-2010



Notes:
N K24>50 … average number of days per year with daily concentration higher than 50 µg·m-3
Avg …average annual concentration
LV …annual limit value
d/rok … acceptable number of days with exceeded daily limit value (35 days/year)

Figure 2: Average annual concentrations of benzo[a]pyrene, 2008-2010

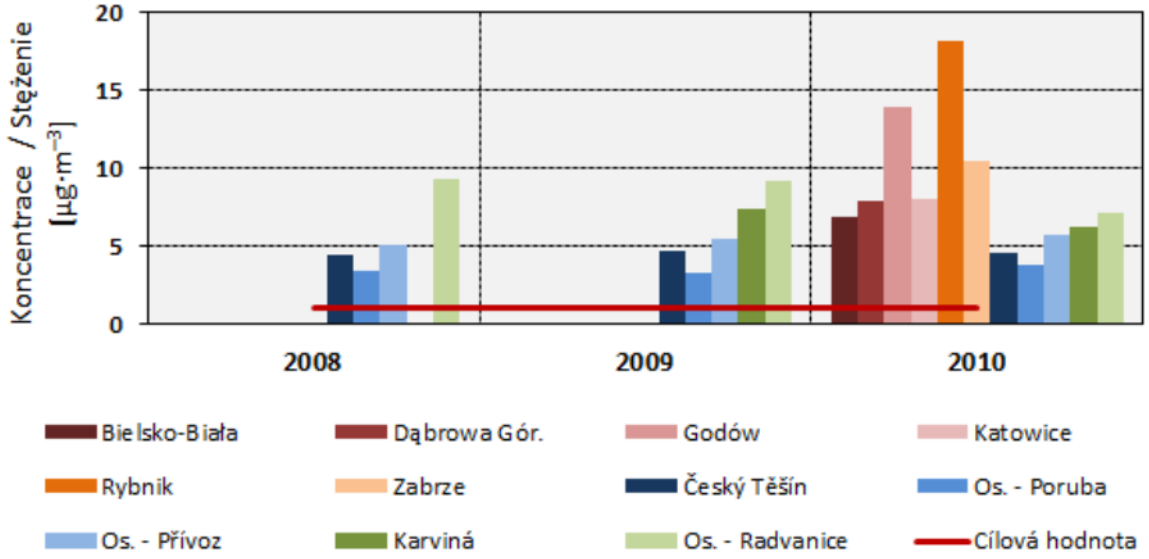


Figure 3: The average concentration of 2,3,7,8-TCDD - average concentration of 8-13 twenty-four-hour samples taken in the period 1.7.2007-2011-31. 3. 2013

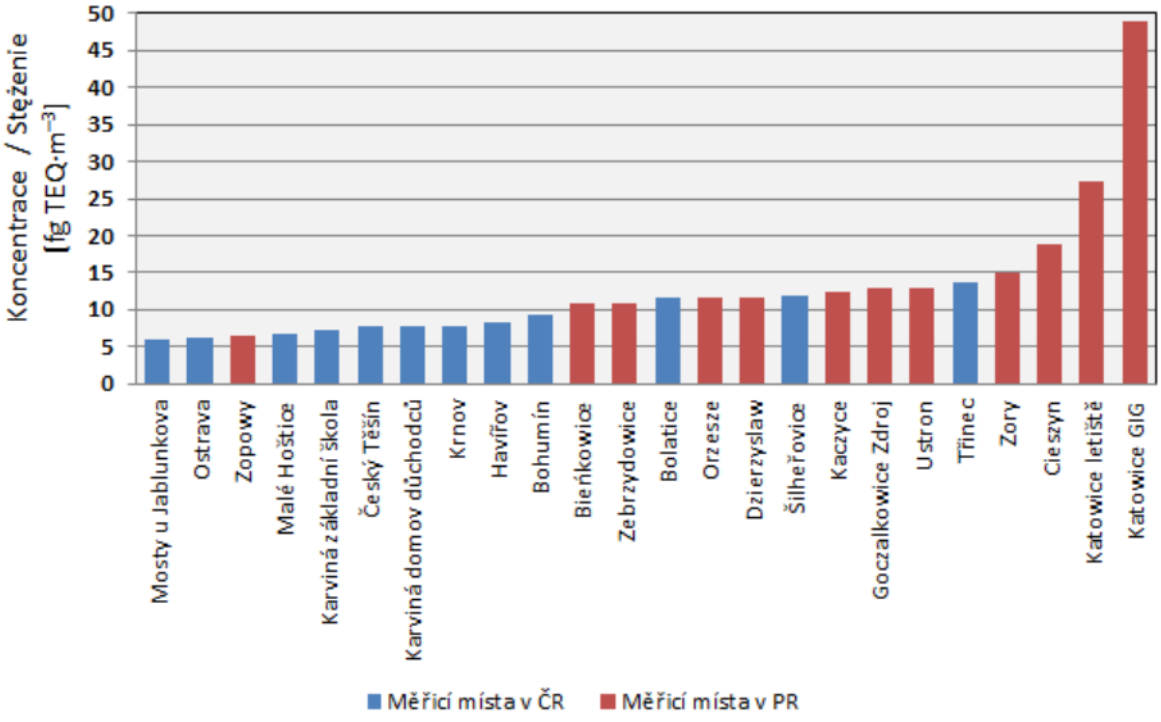


Figure 4: Average annual concentrations of PM10 in 2010

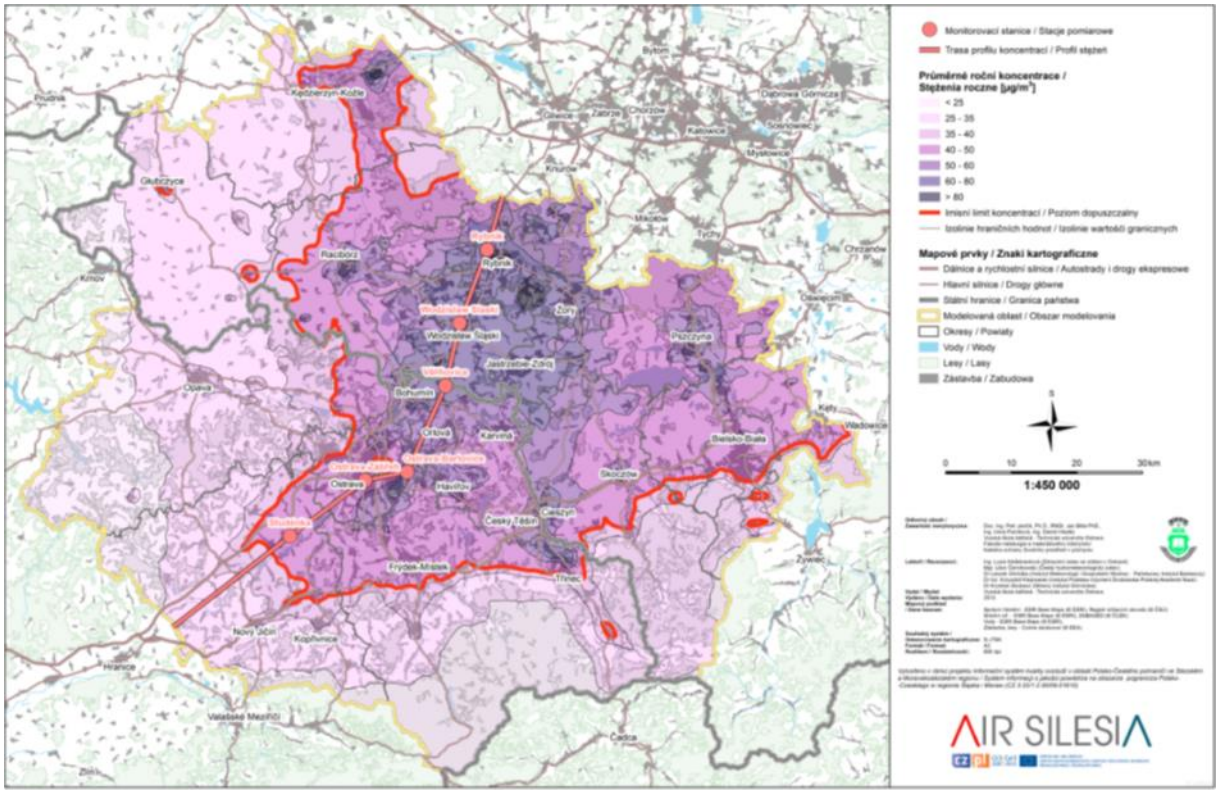


Figure 5: Mutual share of Polish and Czech pollution sources in average annual concentrations of PM10 in 2010

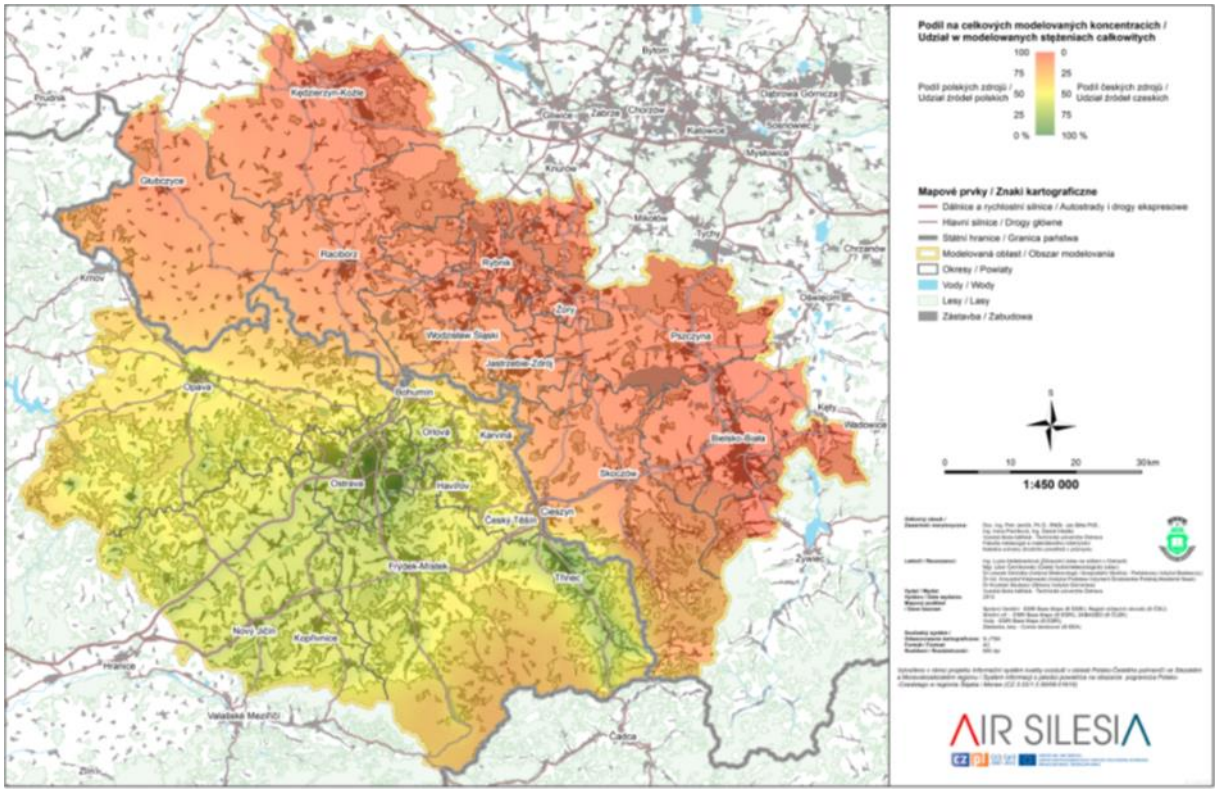
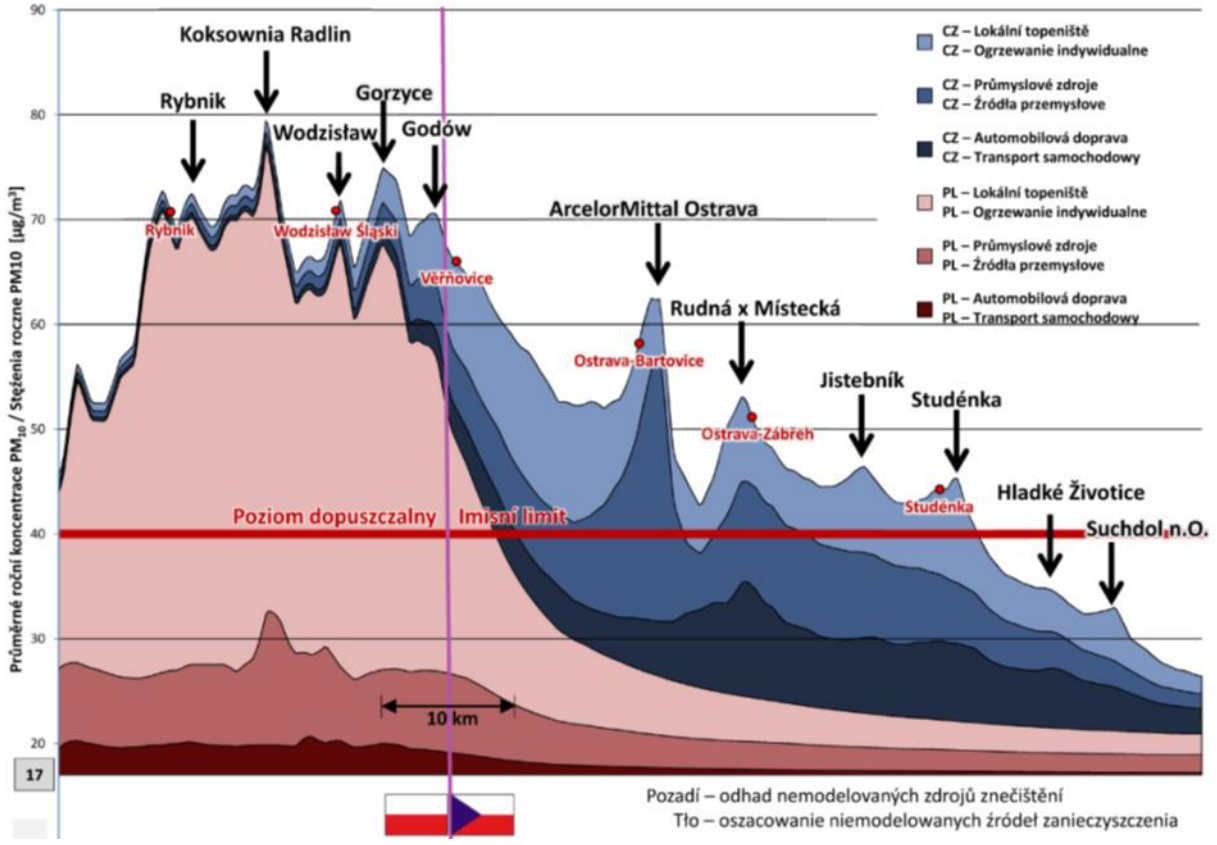


Figure 6: Average annual concentrations of PM10 in the cross-border line Rybnik, Wodzisław Ślaski, Věřňovice, Ostrava-Bartovice, Ostrava-Zábřeh, Studénka, Hranice na Moravě



4.2. AIR PROGRESS CZECHO-SLOVAKIA

The main objective of the AIR PROGRES CZECHO-SLOVAKIA project (see http://apcs.vsb.cz/index.php?page=sekce/vysledky.php) was the investigation of causes of degraded air quality in the Czecho-Slovak border area of the Moravian-Silesian Region and the Žilina Self-Governing Region. Project was executed by the Mining University-Technical University of Ostrava (Institute of Environmental Technologies) and University of Žilina (Faculty of Civil Engineering) from November 2013 to October 2014.

In order to achieve the main objective of the project, a common information database was created in which socio-demographic data were collected for the whole area of interest, pollution sources were described and necessary meteorological and spatial data were processed. An integral part of the project was also the joint measurement of air pollution. Supplementary measurements of air quality served to illustrate the situation in sites where the State Air Quality Monitoring Network is not sufficiently dense and to obtain further information on the transmission of pollution in the area, including measurement of vertical contamination profiles by unmanned airship.

Based on this database, the Mining University has developed a Pollutant Dispersion Model and the University of Žilina has developed the Transport Model Transport of the area of interest. The description of the air quality in the region and the analysis of the causes of pollution were made by the mathematical modelling of pollutants dispersion in the air by the ADMOSS system (Mining University-Technical University Ostrava) and by subsequent analyses in the GIS environment.

Main conclusions of the AIR PROGRES CZECHO-SLOVAKIA project are:

- In the area of interest, the annual limit value for PM10 was exceeded in 2012 in the Czech territories adjacent to Poland (Ostrava - Karviná agglomeration and Třinecko) and in the Slovak city of Zilina,
- 27.5% of permanent residents of the area of interest were exposed to excessive concentrations of PM10.
- Local/household heating represented the main source of PM emissions followed by industrial installations while the impact of road traffic was limited to the vicinity of busy roads
- Pollution sources located in the Czech Republic had influenced on air quality in Slovakia, however the impact of Polish sources cannot be neglected both in the Czech Republic and in Slovakia
- Annual limit value for NO2 was exceeded mainly due to road transport in the centre of Ostrava (1 % of residents of the area of interest exposed to excessive concentrations)

5. Other relevant projects

5.1. Czech Republic

Mid-term strategy (till 2020) for the improvement of air quality in the Czech Republic

Under the EU funding, the detailed "2015 Mid-term strategy (till 2020) for the improvement of air quality in the Czech Republic" was developed which has created strategic framework for the " National Emission Reduction Program of the Czech Republic" and for programs of air quality improvement in zones and agglomerations adopted in 2016, which include Program for the Improvement of Air Quality in Agglomeration Ostrava/Karviná/Frýdek-Místek and Program for the Improvement of Air Quality in zone Moravia-Silesia . Detailed description of these documents is presented in Deliverable D.T1.1.2: Report on the state of current national legislation and policies to improve the air quality.

All documents include detailed analyses of air quality in the Czech Part of the AIR TRITIA project region (assessment of air quality, sources of air pollution, modelling of future developments of air quality).

Figure 7: Field of average annual concentration PM10, agglomeration Ostrava/ Karviná / Frýdek-Místek, 5-year average 2008-2012

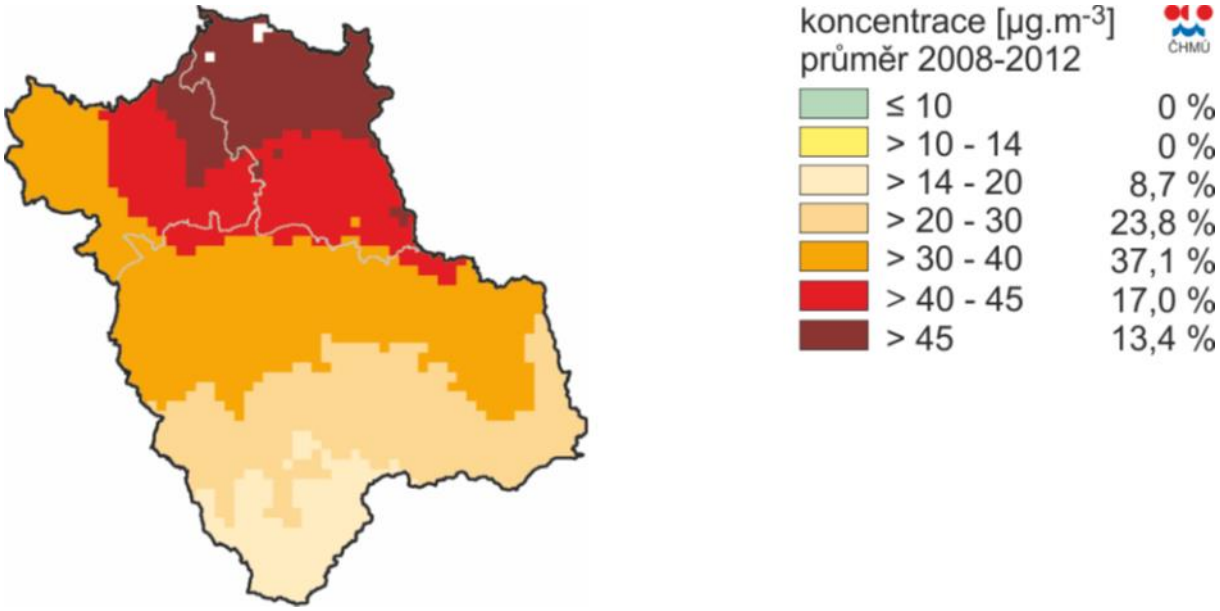


Figure 8: Field of average annual concentration PM2.5, agglomeration Ostrava/ Karviná / Frýdek-Místek, 5-year average 2008-2012

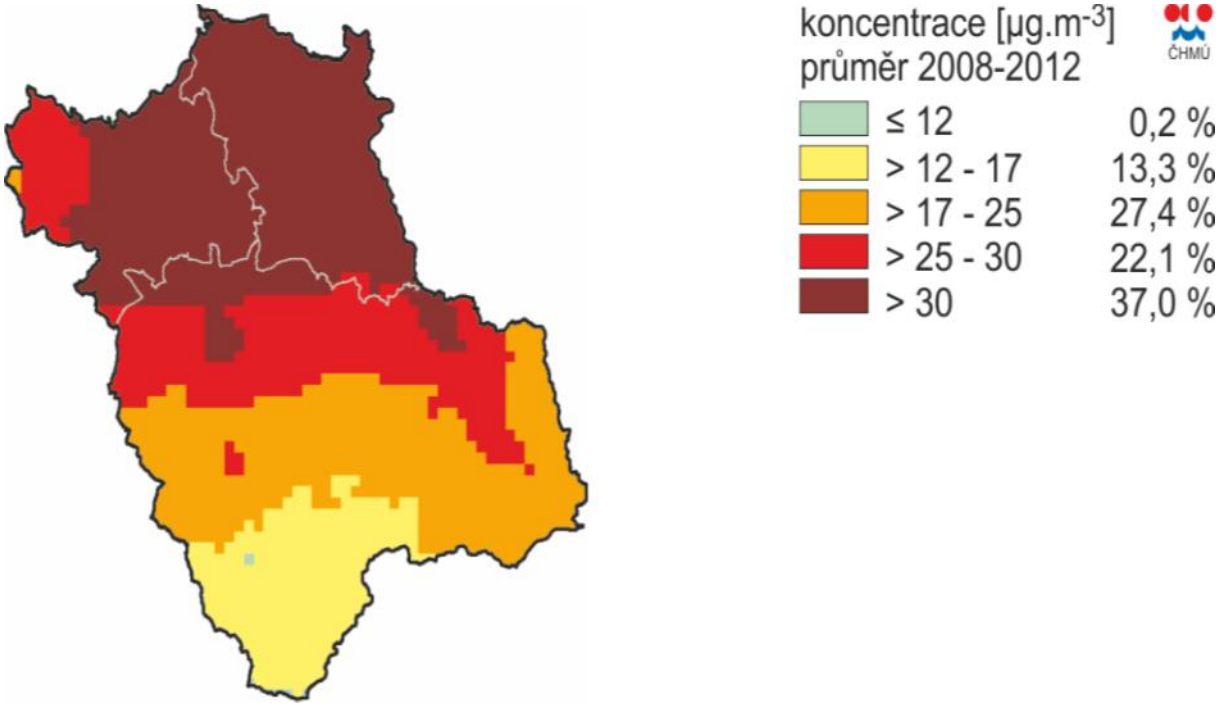
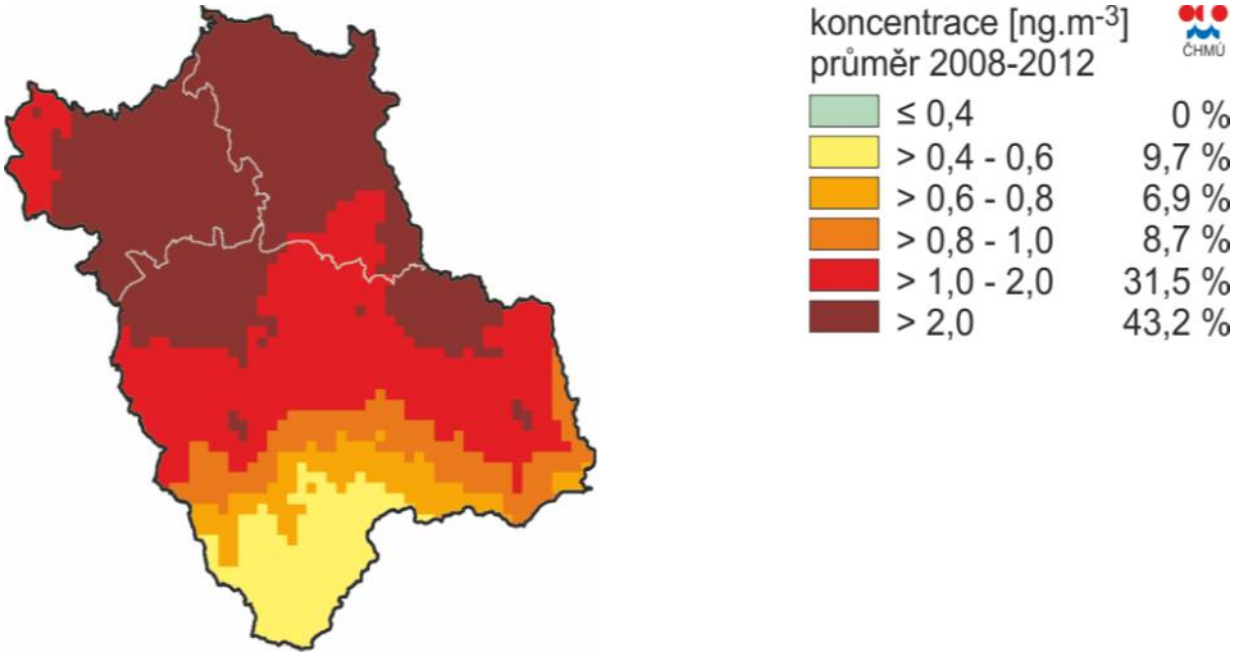


Figure 9: Field of average annual concentration b(a)p, agglomeration Ostrava/ Karviná / Frýdek-Místek,5-year average 2008-2012



Heath Institute Ostrava - Running projects:

Link (CS, EN, PL): https://www.zuova.cz/

- Operation of the measuring vehicle and automatic measuring stations, measurement of ambient air pollutant concentrations and evaluation of measurements by measuring vehicle and AMS (Statutory City of Ostrava); 2016 - 2019
- Operation of three automated monitoring stations monitoring air quality and semi-mobile measuring techniques in the territory of Ostrava, Opava and Český Těšín in 2017 (Moravian-Silesian Region); 2017, see www.ims-msk.cz
- Modernization of Air Quality Monitoring Facilities (MoZeK Ov) (EU - CF under the Operational Program Environment); 2018
- Use of markers to identify the origin of fuel in local furnaces (TA CR); 2017-2020

Projects supported by the Technology Agency of the Czech Republic:

Programs BETA and BETA2 (Link (CS): https://www.tacr.cz/index.php/cz/

- Research on specific emissions of pollutants from solid fuel combustion in local furnaces
- Searching for ways to reduce pollutant emissions and improve air quality in the Czech Republic by means of transport-organizational measures (implemented in time)

5.2. Poland

LIFE IP "Implementation of Air Quality Plan for Małopolska Region - Małopolska in a healthy atmosphere":

Link (EN): http://powietrze.malopolska.pl/en/life-ip/

Main objectives:

- The full implementation of the Małopolska Air Quality Plan, which will result in emission reduction to permissible levels
- The effective use of available EU and national funds aimed at improving air quality.

The scope of the project includes:

- Establishing a network of 60 Eco-managers in order to support the implementation of air quality actions at the municipal level,
- Strengthening advisory and administrative services for Krakow residents with respect to elimination of stoves and solid fuel boilers,
- Operating a regional-level Excellence Centre, to provide training and knowledge base for local authorities and Eco-managers,
- Conducting information and education campaigns at the regional and local levels,
- Developing an instrument for high resolution modelling of pollution dispersion for Krakow and analysis of variants of possible actions aimed at emission reduction,
- Preparing an international air-pollutants modelling system for Małopolska, Silesia, the Czech Republic and Slovakia.

Detailed description of the Małopolska Air Quality Plan is presented in Deliverable D.T1.1.2: Report on the state of current national legislation and policies to improve the air quality.

Project MONIT-AIR "Integrated monitoring system of spatial data to improve air quality in Krakow":

Project co-financed from the European Economic Area Financial Mechanism 2009-2014. Link (EN): http://www.ekocentrum.krakow.pl/742,a,monit-air.htm

The project is implemented by the Municipality of Kraków - Environmental Management Department of the Municipality of Kraków in partnership with the Institute of Meteorology and Water Management - National Research Institute in Warsaw IMWM-NRI (Department Modeling of Air Pollution).

Project task:

- Assessment of the conditions of ventilation in Kraków using an advanced modeling system
- Low emission inventory
- Control of elimination of solid fuel stoves under the computer-assisted Low Emission Reduction Program
- Map of land cover and the overall inventory of land covered by vegetation, with a particular emphasis on urban green areas
- Computerized management system for green areas and detailed inventory of green areas

KLIMAT "The impact of climate change on the economy, the environment and society"

Project co-financed from the European Commission R&D project nr POIG 01.03.01-14-011/08-00. Link (PL) http://klimat.imgw.pl

Tasks implemented within the framework of the KLIMAT project:

- Climate change and their impact on Poland's natural environment and their economic consequences.
- Status of air pollutants in Poland and its impact on quality of life - possibilities of limiting effects – Coordynator task dr Leszek Ośródka (IMWM-NRI)
- Sustainable management of water, geological and forest resources of the country.
- Natural disasters and internal (civil and economic) safety of the country.
- Development of methods of forecasting and warning systems against dangerous hydrological and meteorological phenomena and their use in the protection of the country.
- Baltic Sea as a component of the climate system and its role in the emergence of a state of emergency.
- Threats and conditions and possibilities for implementation of national water supply to the population in the light of European Union legislation.
- Counteracting degradation of Polish retention tanks.
- The prospective development of the Vistula river basin with the environmental impact assessment of hydropower investments.
- Project technical service (project preparation, external audit, project promotion and results, international cooperation and project management).

5.3. Slovak republic

Central Meetbike

Link (EN): http://www.centralmeetbike.eu/

Transport situation in EU became worse with growing motorised road transport. It has a bad impact mainly in urban areas. One of the solutions how to improve the situation is to create conditions for cycling and „educate“ more people to use bike for short distances. Because the bicycle can be used in combination with public transport, it can be a very effective mode of transport now and also in the future if good conditions for cycling will be created.

The support of cycling is on the highest level in Germany so Central Meetbike project applied German experiences as a source to the Czech Republic, Poland and Slovakia.

Central Meetbike is a project aimed at supporting the development of cycling in the city for the purpose of reducing the individual car transport. The increase in the number of cyclists in the city directly or indirectly contributes to the reduction of the use of cars as the dominant means of transport in the city, which greatly burdens on the environment in the city.

In order to achieve this goal the different (soft/hard) measures have been implemented:

- Visits of foreign partners to gain experience in the planning of building infrastructure
- The implementation of a survey of traffic patterns, to determine what the share of particular transport modes is
- Green Action Plan for the development of cycling
- Development of Master Plan of Cycling
- Implementation of pilot activities - complement the bicycle infrastructure in the city (bike shelters, stands for bikes, pulse counters)
- Promotions and campaigns

SOLEZ - Smart Solutions supporting Low Emission Zones and other low-carbon mobility policies in EU cities

Link (EN): http://www.interreg-central.eu/Content.Node/SOLEZ.html

The majority of European cities have grown around an identifiable centre, where commerce, entertainment, shopping and political power are concentrated. As a result, city centres are responsible for a considerable part of urban traffic, from/to other urban areas and the hinterlands, where the urbanization phenomenon is spreading year by year causing an increasing transport demand. Various possible instruments can be used to tackle these phenomena, such as access restriction policies, the location and charging of parking, improvement of public transport services. Nevertheless, each of these approaches has proved to present pros and cons that need to be carefully evaluated to identify the most effective mix of solutions for each Functional Urban Area (FUA).

The SOLEZ project brings together cities which are working on low carbon mobility solutions at different extents, so to enhance their strategies and develop smart services and products around the concept of Low Emission Zones (LEZ) in FUAs urban areas.

Project activities will take into account local administrators’, residents’, tourists’ and private operators’ needs, and will lead to:

- Identification and analysis of LEZ good practices for Central European FUAs,

- Enhanced dialogue with key stakeholders about access restriction policies application in the partner cities, through the definition and implementation of proper participatory strategies and stakeholders involvement initiatives,
- Design, development and pilot application of innovative ICT-based services and solutions supporting LEZ and other access restriction policies, by contributing to reduce the negative side effects of these interventions.
- Through this, SOLEZ will contribute to the achievement of EU targets for traffic reduction in FUAs, improving capacities of public administrators for low-carbon mobility planning and increasing the proposed interventions acceptability by:
    - Development of Strategic manual for low-carbon mobility
    - Smart software built-in electro busses

Operational programme Quality of Environment (2014-2020)

Link (EN): https://www.minv.sk/?operational-programme-quality-of-environment-2014-2020

Operational Programme Quality of Environment (OP QE) is a programming document of the Slovak Republic for drawing aid from the EU Structural Funds and the Cohesion Fund in the programming period 2014 - 2020 in the area of sustainable and efficient resource use ensuring environmental protection, active adaptation to climate change and promotion of an energy efficient, low-carbon economy.

The OP QE Strategy, i.e. the selection of thematic objectives and respective investment priorities, as well as definition of specific objectives, results and activity/intervention types, was set up to:

- Support fulfilment of the priorities defined in the document Europe 2020 - A strategy for smart, sustainable and inclusive growth and to contribute towards achievement of the National Reform Programme of the Slovak Republic's goals, as well as the requirements resulting from the EU legislation in the area of energy sector and the environment;
- Respect the needs and challenges at the national or regional levels, which must be responded to, and focus on addressing them with the aim of ensuring sustainable and efficient use of resources, including energy resources.

The global objective of the OP QE is to support sustainable and efficient resource use ensuring environmental protection, active adaptation to climate change and promotion of an energy efficient, low-carbon economy. To achieve the above said global objective, following three basic thematic objectives were incorporated into the OP QE investment strategy:

- Supporting the shift towards a low-carbon economy in all sectors,
- Promoting climate change adaptation, risk prevention and management,
- Preserving and protecting the environment and promoting resource efficiency.

Figure 10: Development trends of emissions PM10 and PM2.5 2000 – 2012

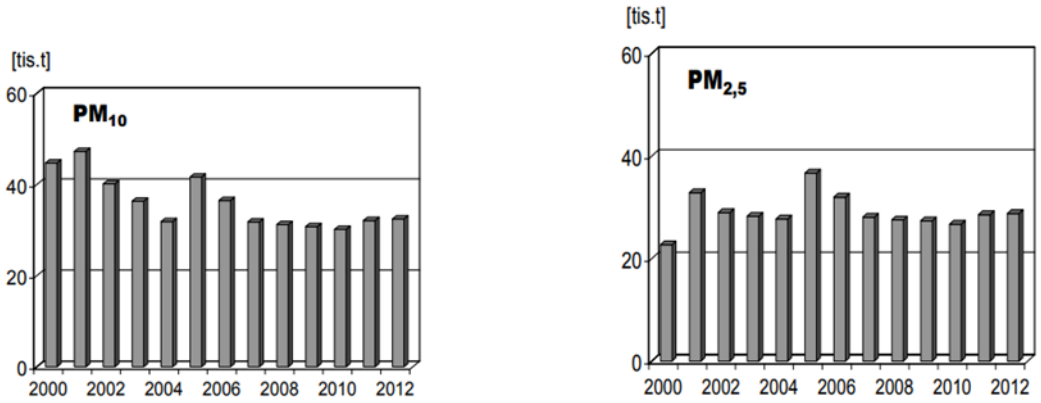
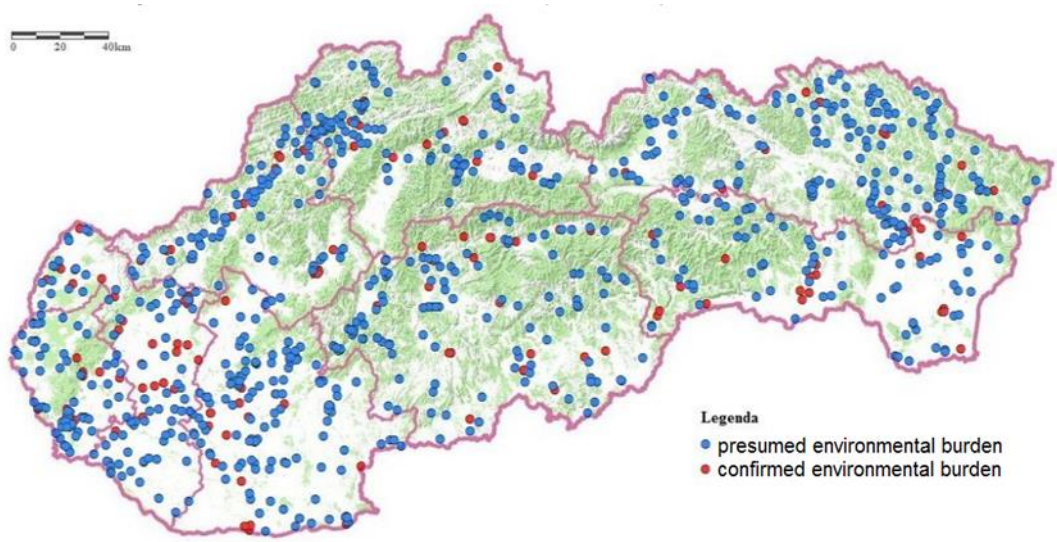


Figure 11: Confirmed and presumed environmental burdens in the SR (March 2014)



Source: Information system environmental burdens (http://envirozataze.enviroportal.sk), 2014

Integrated Regional Operational Programme (2014-2020)

Link (SK, EN): http://www.mpsr.sk/index.php?navID=47&sID=67&navID2=1127

Content: Strategy for the operational programme's contribution to the Union strategy for smart, sustainable and inclusive growth and the achievement of economic, social and territorial cohesion

Its global objective is to contribute to the promotion of the quality of life and to ensure sustainable provision of public services with impact on balanced and sustainable regional development; as well as economic, territorial and social cohesion of regions, cities and municipalities.

The strategy of the IROP builds upon the Europe 2020 Strategy, contributing to the achievement of its priorities, that is in particular sustainable and inclusive growth; reflecting the territorial needs and challenges of particular regions.

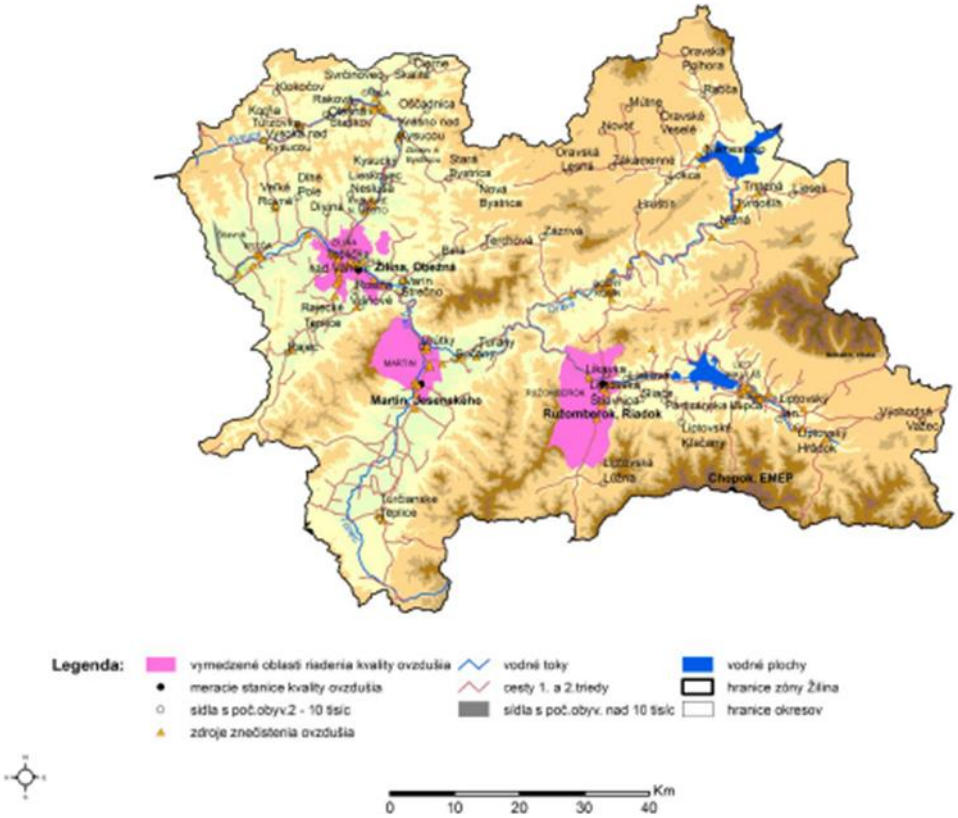
The strategy leads to:

- Development of selected dimensions/components affecting the quality of life and regional competitiveness.
- Development/reinforcement of economic, social and territorial cohesion at regional and sub-regional levels as a precondition for the reduction of growing disparities between and within regions.

Air quality assessment in Slovak Republic and Žilina Self-governing Region 2015

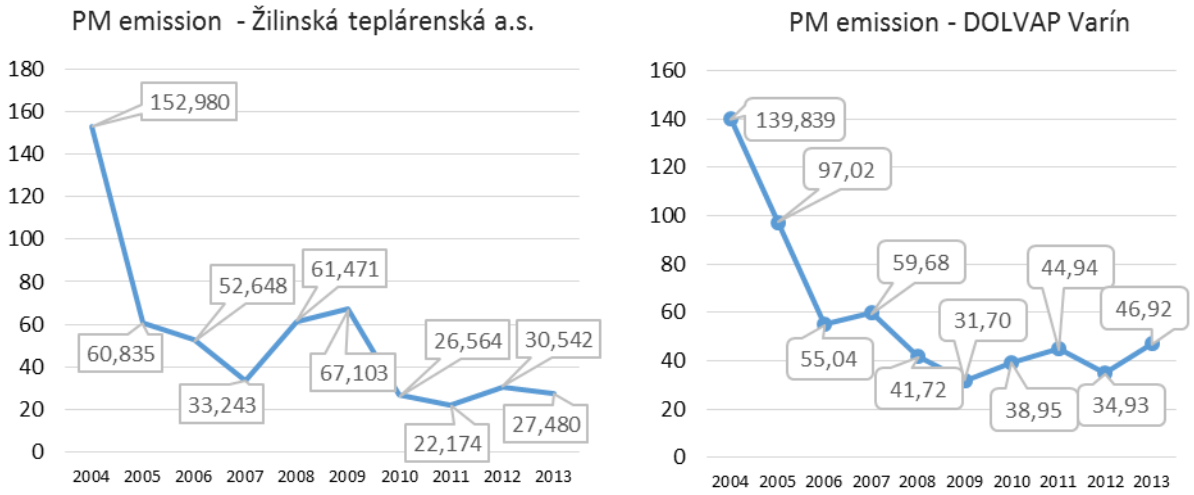
In order to determine the method of air quality assessment in agglomerations and zones of Slovakia, the 5-year period 2011-2015 was calculated, according to the upper and lower assessment thresholds. In 2015, the limit or target value for human health protection for any pollutant measured was not exceeded. The PM2.5 level in the city of Žilina was not monitored, but Žilina and Ružomberok and Likavka were included among the defined air quality management areas based on model calculations.

Figure 12: Žilina Self-Governing Region´s zones and defined areas of air quality management



NEIS (National Emission Information System) is operated by the Slovak Hydro-meteorological Institute (SHMI). The system includes procedures for the collection of data on emissions of large and medium-sized sources, their verification in environmental departments of district authorities and the import of these data into the central database. NEIS is developed in accordance with legislation in force in the Slovak Republic and the EU. Based on the NEIS database, air pollution data are available every year in the Slovak Republic and in the Region.

Figure 13: The course of particulate matter of the biggest polluters in the Žilina Self-Governing Region in the period 2004 – 2013



Local heating represents significant contribution to total emissions contributing to local air pollution especially in the winter months. SHMI has developed a method for calculating their emissions based on the energy balance.

Another problematic area lies in road transport emissions. Žilina is a transport hub which has serious impact on air pollution. Exhaust and non-exhaust (tyre, brake and road surface wear) are calculated in the Slovak Republic by the COPERT IV model as a total for the whole country. The value of these emissions in the Žilina domain was calculated from total national emissions using top-down method based on the road-to-road ratio in the domain to the total length of the road network in Slovakia. Subsequent distribution of emissions from the domain to the individual summation sections takes into account the length of the sections, the number of runs and also the categories of vehicles. Road dust resuspension is calculated by the bottom-up method of the AP 42 emission factor (US EPA).

As a result of the recurrent negative situation in air pollution in the city the Territorial General Transport and consequently the Žilina Sustainable Transport Plan were developed. The main objective of the Žilina transport system design is to create conditions for sustainable mobility. The following fundamental principles are included:

- Good walking access to transport resources and destinations within the city is a good starting point.
- Poly-functionality (representation of basic amenities) within the urban structure of the city.
- Creation of conditions for efficient city traffic through public transportation, replacement of diesel fuelled buses (hybrid and electric buses).
- Creation of conditions for the realization of continuous areas of pedestrian zones in the historical part of town.
- Increase of the share of walking, cycling and public transportation in the transport mix.
- Effective layout of the ZAKOS street network in order to minimize the transport performance of internal, source and destination automotive traffic.
- Shift of transit road transport to the D1 and D3 motorways.

6. Conclusions and recommendations

6.1. Conclusions

Operational conclusions:

- Previous projects include substantial volume of data and information which could be used during the implementation of AIR TRITIA project (air quality measurements, estimates of emissions, results of modelling, impacts of road transport on air quality and of particular categories of stationary emission sources, instruments and measures to reduce emissions)
- There are certain ongoing/parallel/emerging projects which will generate data and information which could be used in AIR TRITIA project (air quality measurements, estimates of emissions, results of modelling)

Technical Conclusions:

- The most serious long-term problem in all three AIR TRITIA countries is the exceedance of air quality standards for suspended particulate matter PM10 and PM2.5 caused by anthropogenic emissions
- The greatest health risk is caused by serious exceedances (multiples of target value) of air quality standard for benzo (a) pyrene in the Czech Republic and Poland
- The levels of SO2 is in the region of the Silesian Voivodship are approximately two times higher than those in the Moravian-Silesian Region
- The results of analyses indicate higher concentrations of PM10, benzo [a] pyrene and PCDD / F on the Polish side of the area
- The largest area with the highest air pollution in the area is located approximately between the Czech-Polish border and Rybnik surroundings
- The pollution originated in this area has also significant influence on the border regions of the Czech Republic
- Domestic boilers and local energy sources have the greatest influence on the Polish side, but the impact of large industrial installations is also significant
- On the Czech side, the most polluted sites are characterized by the high impact of large industrial installations, but the share of other types of low-emission sources is not negligible; outside the main industrial areas, more than half of PM10 pollution is generated by local heating and transport
- Pollution sources located in the Czech Republic influence air quality in Slovakia, however the impact of Polish sources cannot be neglected both in the Czech Republic and in Slovakia
- Winds are more frequent from the Czech Republic to Poland; however, Polish sources produce more PM10 emissions, which are transmitted to the Czech Republic in a highly concentrated form especially during unfavourable dispersion conditions and therefore the impact of Czech sources in Poland and that of Polish sources is comparable
- The highest concentrations of pollutants are measured during calm periods or low wind speeds and especially during thermal inversion situations
- Exceptionally high concentrations are due to long-lasting inversion situations throughout the winter during the winter, i.e. December - February; the differences among average annual concentrations of pollutants in particular years are large and depend on meteorological conditions, especially in the cold half of the year

6.2. Recommendations

It is recommended to AIR TRITIA project management:

- Make maximal use of existing data and information obtained within pervious projects
- Special attention should be paid to air quality data to develop time series which can help to reduce the impact of meteorological conditions in particular years (using moving averages)
- Coordination with other ongoing projects (including exchange of data and information) will be necessary to avoid overlaps and duplicities (and to make use of mutual synergies)

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ADMOSS	A Dynamical Model of "Quasi-stationary" States in Large-Scale Atmospheric Motions
AMS	Automated Monitoring Station
CHMI	Czech Hydro-meteorological Institute
CE	Central Europe
CF	Cohesion Fund
CR	Czech Republic
CS	Czech language
EU	European Union
FUA	Functional Urban Area
GIG	Central Mining Institute (Poland)
GIS	Geographic information system
IMWM	Institute of Meteorology and Water Management (Poland)
IP	Integrated project
IROP	Integrated Regional Operational Program
LEZ	Low emission zone
LIFE	EU's financial instrument supporting environmental, nature conservation and climate action projects
MoE	Ministry of Environment
NEIS	National Emission Information System (Slovakia)
OP QE	Operational Program Quality of Environment (Slovakia)
PCDD/F	Polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran
PL	Poland, Polish language
PM	Particulate matter
SHMI	Slovak Hydro-meteorological Institute
SK	Slovakia, Slovak language
SR	Slovak Republic
TAB	Take a breath project
TA CR	Technology Agency of the Czech Republic
TSP	Total suspended particles
VSB	Mining University – Technical University Ostrava
ZAKOS	Basic road communication network
ZU	Health Institute (Czech Republic)