Air quality in Poland
- measurement system
and assessment results

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Air quality monitoring in the system of National Environmental Monitoring

Driving forces data concerning social economic activity, meteorological and hydrological conditions, transboundary inflows, emission data generated outside the SEM

ASSESSMENT AND OUTLOOKS

STATE
1. Monitoring of the quality of air
2. Monitoring of the quality of waters
3. Monitoring of the quality of soil and earth
4. Monitoring of nature
5. Monitoring of noise
6. Monitoring of electromagnetic fields
7. Monitoring of ionic radiation

PRESSURES

National Environmental Monitoring
Air quality monitoring

In compliance with the law, the act on Environmental Protection, the Voivodship Inspectorates for Environmental Protection are responsible for the arrangement and functioning of air quality monitoring and assessment system.

The Chief Inspectorate for Environmental Protection is responsible for coordinating the activities within the system and providing assessments on national scale.

The main goals are:

- to obtain information about the levels of pollutants in the air in relations to air quality standards,
- to identify the areas requiring air quality improvement,
- to monitor the effectiveness of air quality plans and programs.
NEM - air quality monitoring

European level

**European Commission**
Managing air protection management on the EU level

**European Environment**
Maintaining the European repository of air quality data, analyzing air quality data on the European level, preparing reports

National Level

**Minister of Environment**
Managing air protection management, approving the air quality assessment report for the European Commission

**Chief Inspectorate for Environmental Protection**
Coordinating the activities associated with air quality measurements and assessments, consolidated air quality assessments, the national database, fulfillment of the reporting duties arising from EU

Voivodship level

**Voivodship Marshal**
Air protection management, Preparing and supervising the implementations of air protection plans

**Voivodship Inspector of Environmental Protection**
Air quality assessment in zones along with zone classification, monitoring of average exposure indicators

**IMGW**
meteorological data

The entities managing the data (business entities, local government administration, CSO,VSO)
Data on the loads of the emissions of pollutants into the air

**IMGW and IOŚ**
Air quality measurements at regional background stations (EMEP)

**Business entities**
Air quality measurements at the monitoring stations belonging to business entities

**Scientific and research institutes and universities**
Air quality measurements at the monitoring stations belonging to the institutes and universities

Department of Monitoring and Environmental Information
Air quality measurement network in Poland

Within the framework of National Environmental Monitoring functioning approximately:

- 680 automatic analyzers (SO$_2$, NO$_2$, NO, NO$_x$, CO, O$_3$, BTX, PM10, PM2,5, Hg), 550 of which belong to VIEP;
- 217 PM10 and PM2,5 samplers, 214 of which belong to VIEP.

Within the system there are in total approx. 260 stations which provide automatic and manual measurements, 150 of which provide automatic measurements.
Strengthening of air quality monitoring network in Poland in the years 2013-2015

„Strengthening technical capacities of Inspection of Environmental Protection Inspection through the procurement of measurements, laboratory and it equipment” project financed by the European Economic Area Financial Mechanism

LVS samplers PM10/PM2,5 – 111 pieces

Gas analyzers (SO₂, NOx, O₃, CO, BTX) – 223 pieces

PM10/PM2,5 monitors – 54 pieces

Measuring containers – 14 pieces
Air quality measurement network in Poland

- pomiary manualne
- pomiary automatyczne

Number of measurements sites

<table>
<thead>
<tr>
<th>Year</th>
<th>Manual Measurements</th>
<th>Automatic Measurements</th>
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<tbody>
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<td>2008</td>
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<td>150</td>
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<tr>
<td>2014</td>
<td>1400</td>
<td>100</td>
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</tbody>
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Air quality measurement network in Poland

- suburban stations
- urban background stations
- regional background stations
- including EMEP stations
The quality and representativeness of air quality measurements

Intercalibrations of gas analyzers in NRL

Field intercomparisons PM10 and PM2.5

Equivalence tests

The inspection of the correctness of stations locations

Checking and calibration at stations
The annual mean concentration of SO$_2$ in the selected Polish cites between 2004-2014 (urban background stations)

(source: NEM)
The annual mean concentration of NO$_2$ in the selected Polish cites between 2004-2014 (urban background stations)

(source: NEM)
The annual mean concentration of NO₂ in the selected Polish cites between 2004-2014 (transport stations)

- Wrocław (DsWrocWisA)
- Bydgoszcz (KpBydgPlPozn)
- Łódź (LdLodzWIOSAZachodn)
- Kraków (MpKrakowWIOSAKra6117)
- Warszawa (MzWarNiepodKom)
- Częstochowa (SlCzestCzes_arkr1)
- Katowice (SlKatowKato_aleja)
- Szczecin (ZpSzczecin002)
The annual average concentration of NO\textsubscript{2} - modeling results for 2014

(source: NEM)
Change of NOx, CO and PM2.5 from road transport in Poland in 2000-2012 vs. changes in the number of cars

(source: CSO/KOBIZE)

Passenger cars by age in Poland

(source: CSO)
Changes of emissions the major gaseous pollutants vs. changes in GDP in Poland

(source: CSO/KOBIZE)
The annual mean concentration of PM10 in the selected Polish cites between 2004-2014 (urban background stations)

Annual mean concentration of PM10, µg/m³


- Wrocław (DsWrocOrzech)
- Toruń (KpTorunDziewulsk)
- Lublin (LbLublin_Sliwins_5)
- Łódź (LdLodzWIOSACzernik)
- Gorzów Wlkp. (LuGorzowWIOS_AUT)
- Kraków (MpKrakowWIOSBulw6118)
- Warszawa (MzWarszUrsynow)
- Opole (OpOpole3a)
- Krosno (PkKrosnoWIOSKletowki)
- Gdynia (Pm.a04a)
- Suwałki (PdSuwPulaski)
- Kielce (SkKielJagielWios)
- Gliwice (SgLiwGliw_mewy)
- Poznań (WpPoznanSzymanowskiego17)
- Olsztyn (WmOlsztyWIOS_Puszkin)
- Szczecin (ZpSzczecin001)
The concentration of PM10 in the selected Polish cites in 2014 (urban background stations)
The number of days with exceedances of the PM10 - modeling results for 2014

(source: NEM)
The annual mean concentration of PM10 in the selected Polish regional background stations between 2010-2014

- Woj. Dolnośląskie (DsOsieczow)
- Woj. Kujawsko-Pomorskie (KpZielBoryTuch)
- Woj. Łódzkie (LdGajewWIOSAGajew)
- Woj. Mazowieckie (MzGranicaKPN)
- Woj. Śląskie (SlZlotyJano_lesni)
- Woj. Warmińsko-Mazurskie (WmPuszcz_IOS_Borecka)

(source: NEM)
The annual mean concentration of PM2.5 in the selected Polish cities between 2010-2014 (urban background stations)

(source: NEM)
Average exposure indicators for PM2,5 for 2013

National average exposure indicators for PM2,5, µg/m³

(source: NEM)
Composition of PM2,5 in 2013 at regional background stations

Concentrations measured in PM2,5, µg/m³

- Masa składników nieoznaczonych
- węgiel organiczny
- węgiel elementarny
- Suma Cl-, Mg2+, Ca2+, Na+, K+
- NH4+
- NO3-
- SO42-

(source: NEM)
The structure of primary energy consumption in Poland in 2012 (source: CSO)

- Coal: 40.1%
- Crude oil: 24.1%
- Lignite: 12.0%
- Natural gas: 14.1%
- Peat and wood: 4.6%
- Others: 5.1%

The structure of emissions of major pollutants in Poland in 2012 by sectors of the economy (source: KOBiZE)
The daily mean concentration of benzo(a)pyrene in PM10 in the selected Polish cites in 2014 (urban background stations)

(source: NEM)
The annual mean concentration of benzo(a)pyrene in PM10
In the selected Polish cites between 2008-2014
(urban background stations)

(source: NEM)
The annual mean concentration of benzo(a)pyrene in PM10 - modeling results for 2014

(source: NEM)
The structure of emissions of polycyclic aromatic hydrocarbons in Poland in 2012

Production processes: 10.3%
Road transport: 1.8%
Other sectors: 1.1%
Combustion processes outside the industry, mainly in households: 86.8%

(source: KOBiZE)
Polluting air by ozone from the perspective of health protection

The number of days with exceedance of maximum daily 8-hour mean exceeding 120 µg/m³ for 2014; resolution 5 km

(source: NEM)
Polluting air by ozone from the perspective of vegetation protection

AOT40 indicator for the territory of Poland averaged for 2012-2014; resolution 5 km

(source: NEM)
Information about air quality on the internet websites of Inspection for Environmental Protection

http://powietrze.gios.gov.pl/gios/
“Up to date” data on EEA webpage
http://maps.eea.europa.eu/Hub/AirQuality/
Thank you for attention