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Instytut Ochrony Środowiska
Państwowy Instytut Badawczy

Joint effectiveness of local and regional air quality plans in Poland - projected exposure in 2022 and 2026

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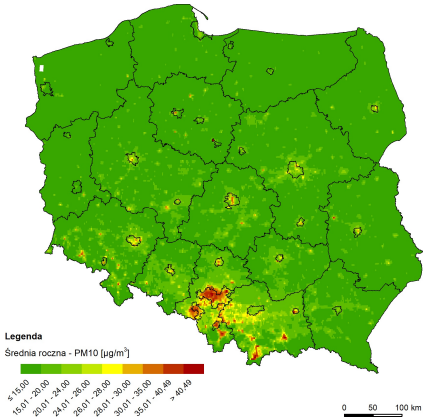
Assumptions

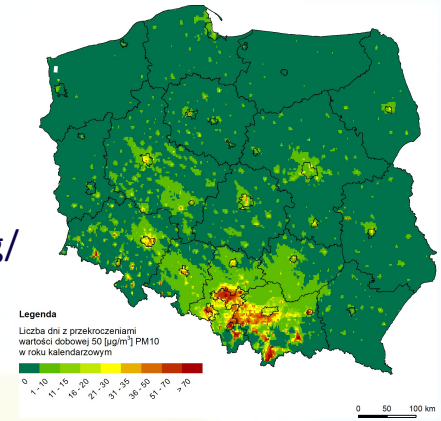
- In the scope of modelling for the National Air Quality Plan (legal obligations, carried out once a year) for the Ministry of Climate and Environment
- Involvement of Marshal Offices (responsible for the preparation and implementation of AQPs)
  - estimated pollution reduction for each activity sector to be achieved in 2026
  - estimated emission reductions in 2022 as a result of a partial implementation of reduction measures
  - most of the reported reduction was in the residential sector
- If no detailed information is available - proportional emission reduction for the whole zone
- National high-resolution inventory applied - Central Emission Database developed and updated by KOBIZE IOŚ-PIB (valid for 2019)
- Reference run – modelling for the annual air quality assessment for 2020

Air Quality assessment 2020 based on modelling

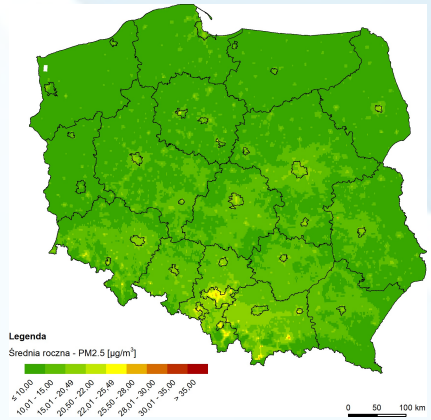
PM_{10} annual average



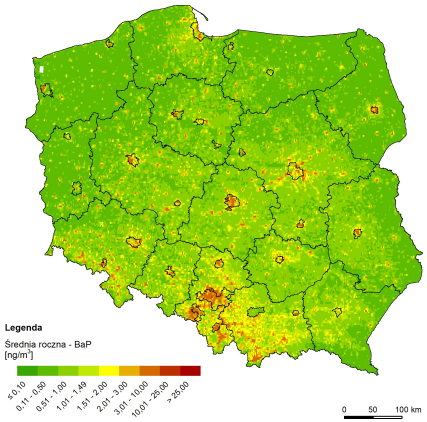
No of days PM_{10} > 50 µg/



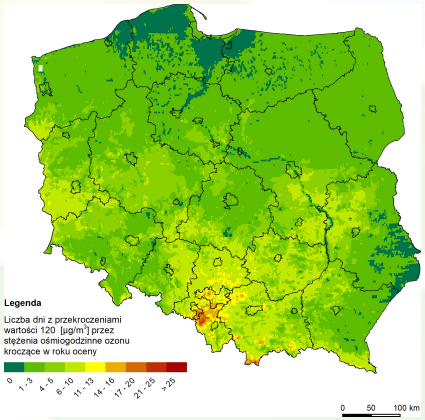
$PM_{2.5}$ annual average



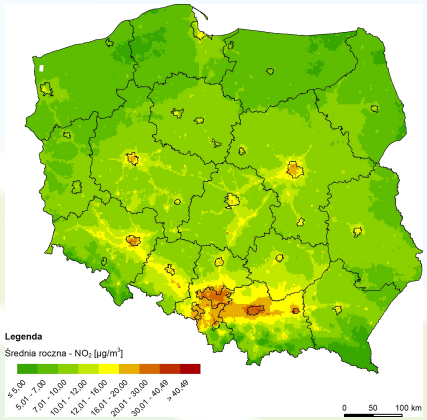
BaP annual average



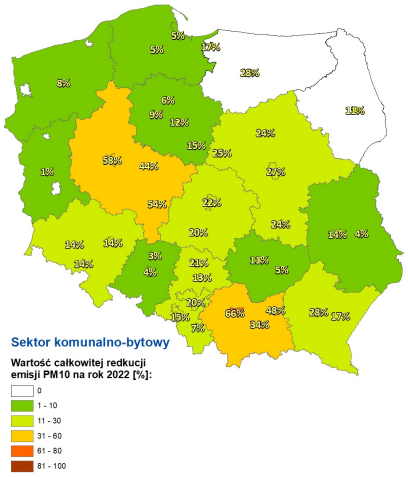
No of days O_3 > 120 µg/m³



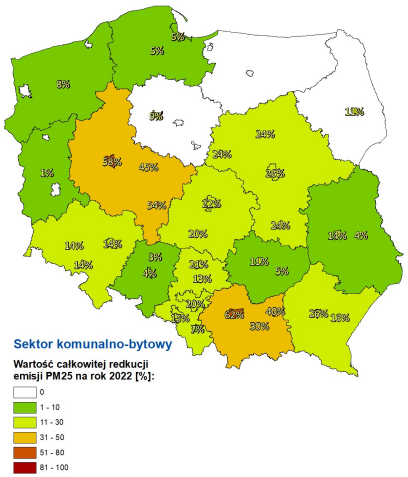
NO_2 annual average



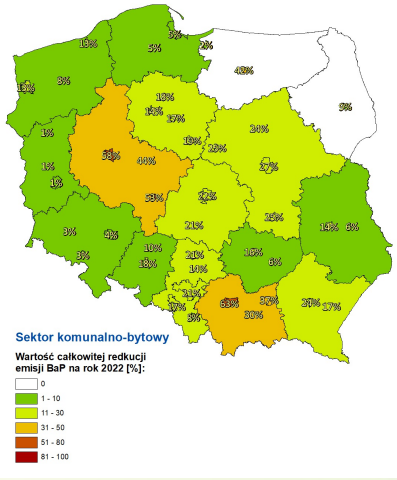
Emission reduction 2022



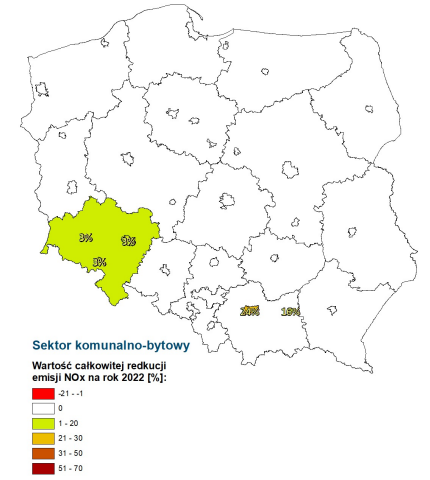
PM10



PM2.5

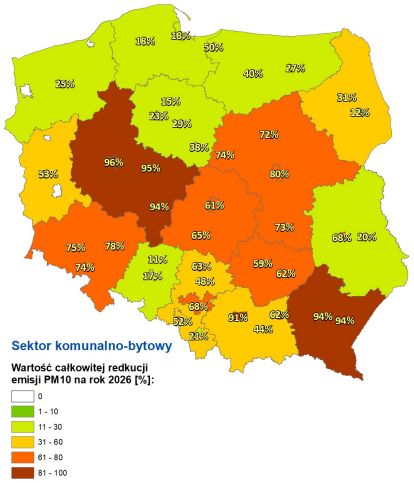


B(a)P

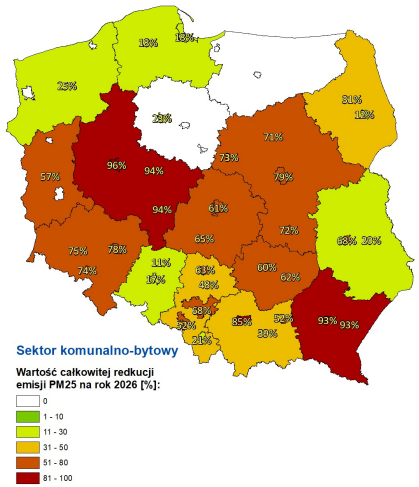


NOx

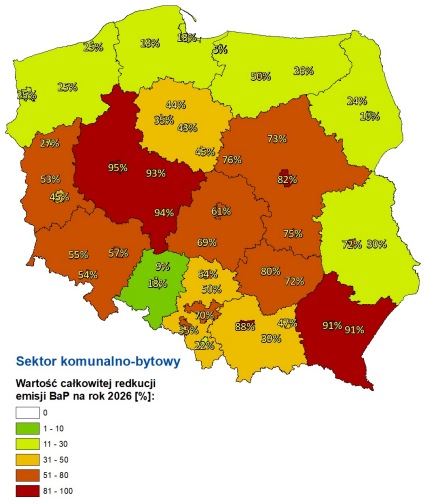
Emission reduction 2026



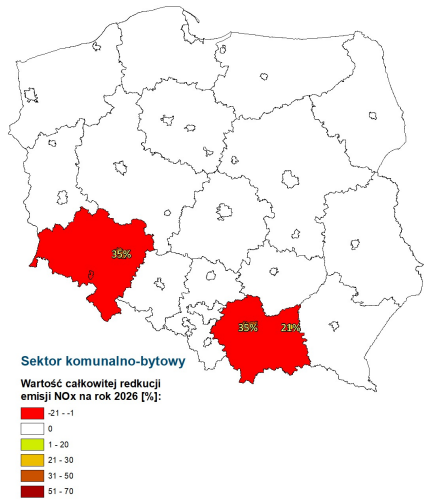
PM10



PM2.5



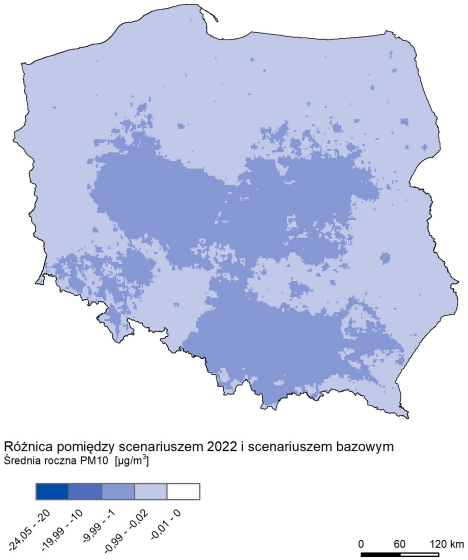
B(a)P

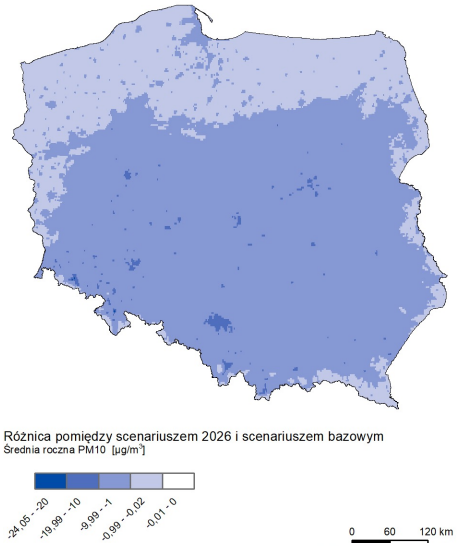


NOx

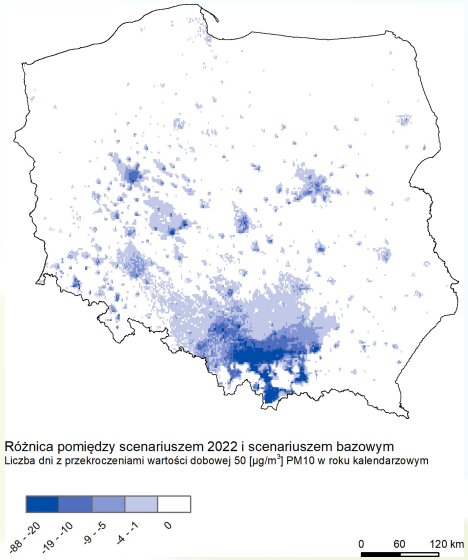
Exposure reduction – PM_{10}

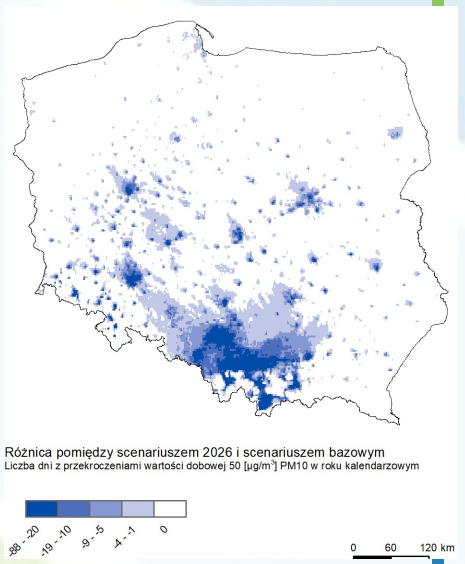
PM_{10} annual average reductions





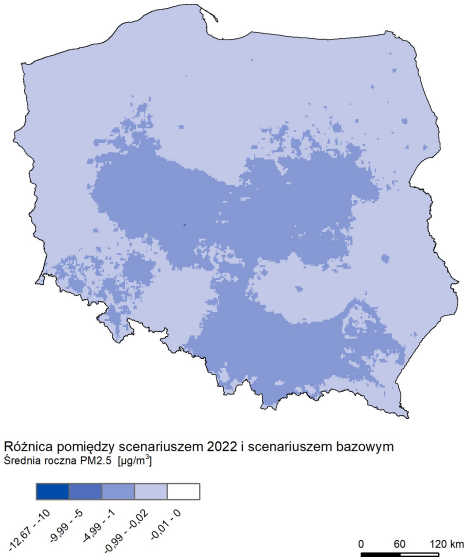
No of days PM_{10} > 50 µg/m^3 reduction

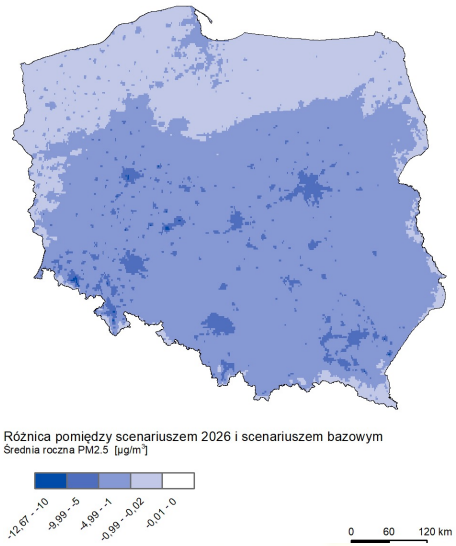




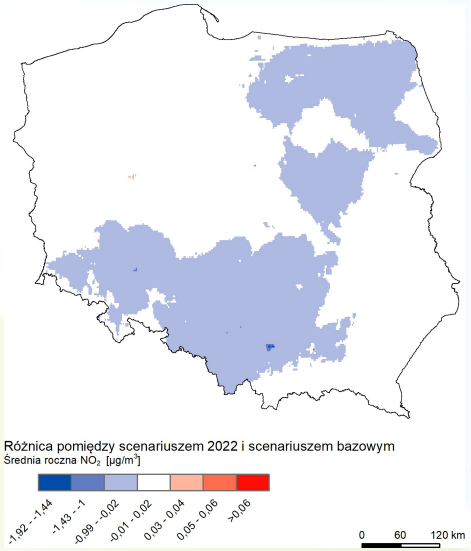
Exposure reduction – $PM_{2.5}$ and NO_2

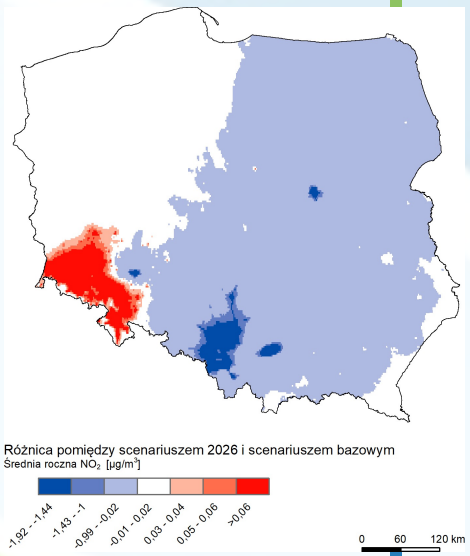
$PM_{2.5}$ annual average reductions



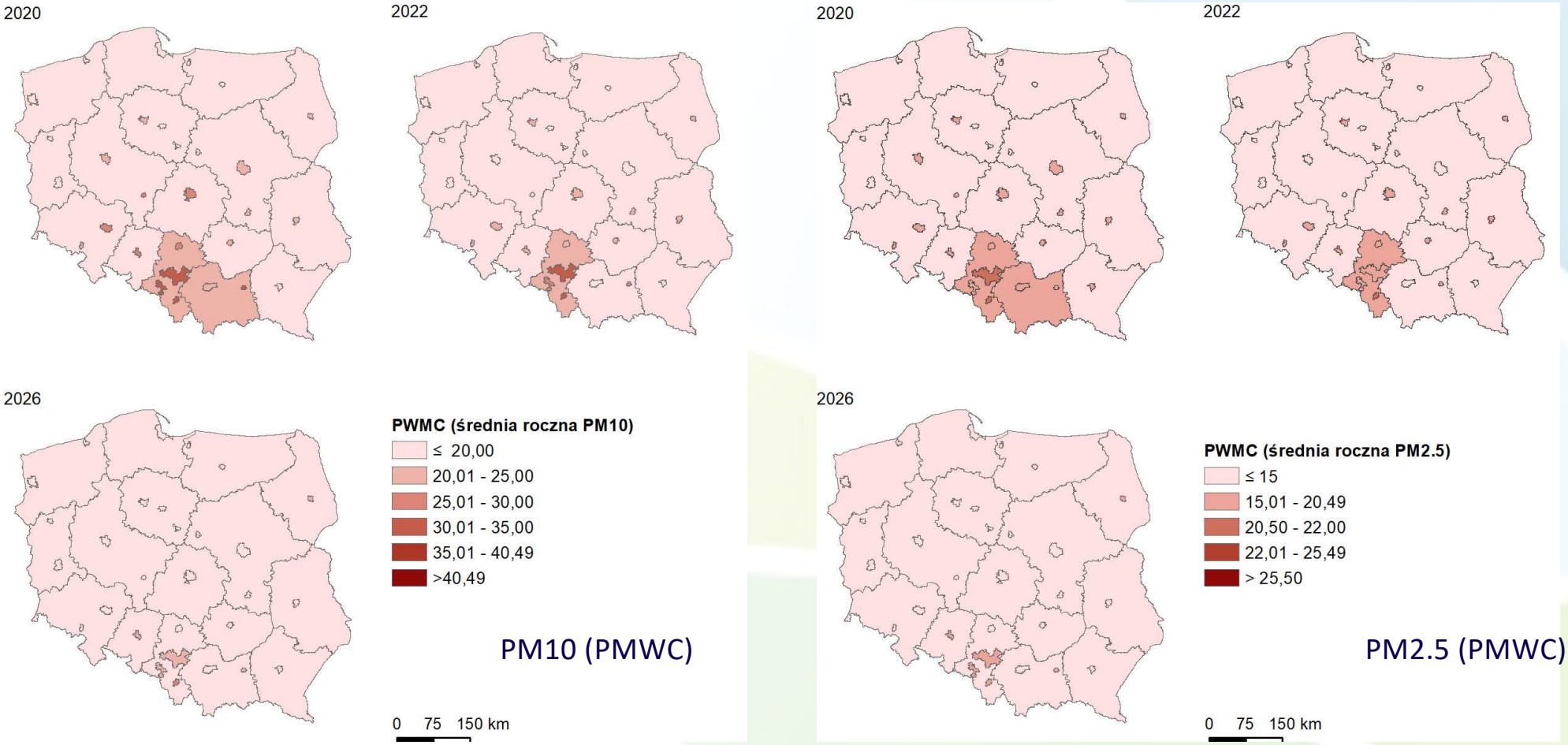


NO_2 annual average reductions

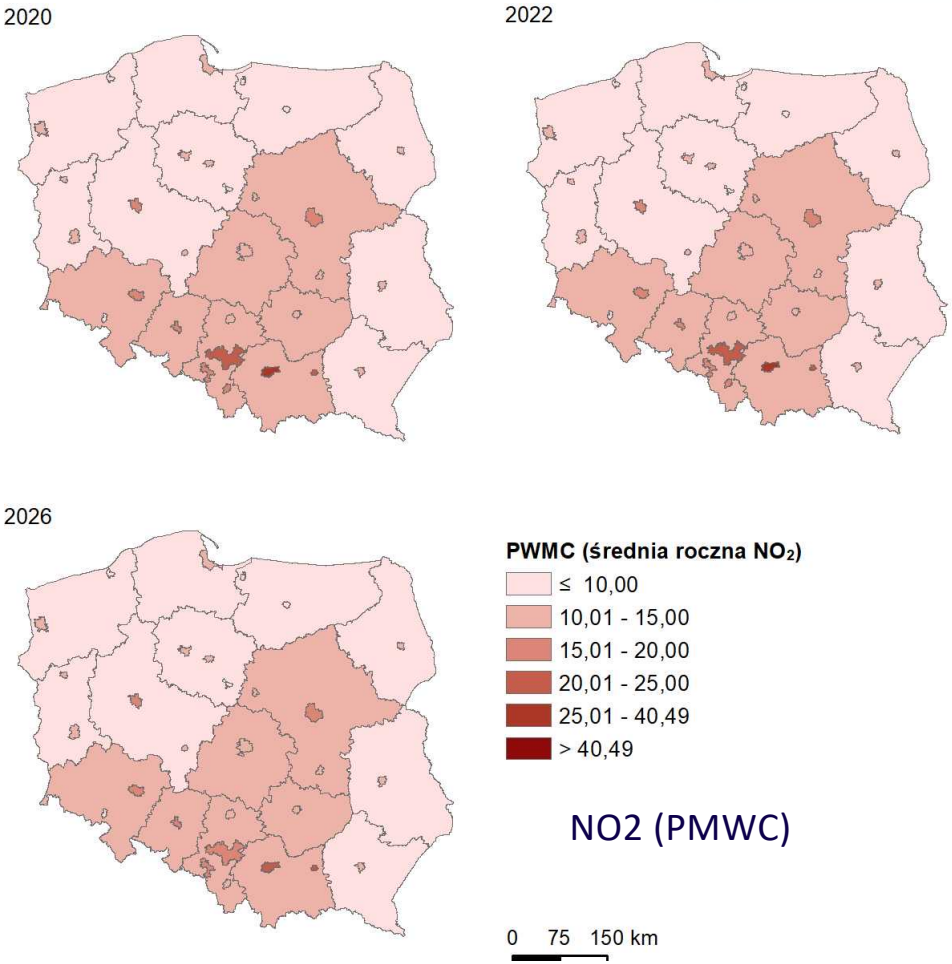




Population weighted concentrations



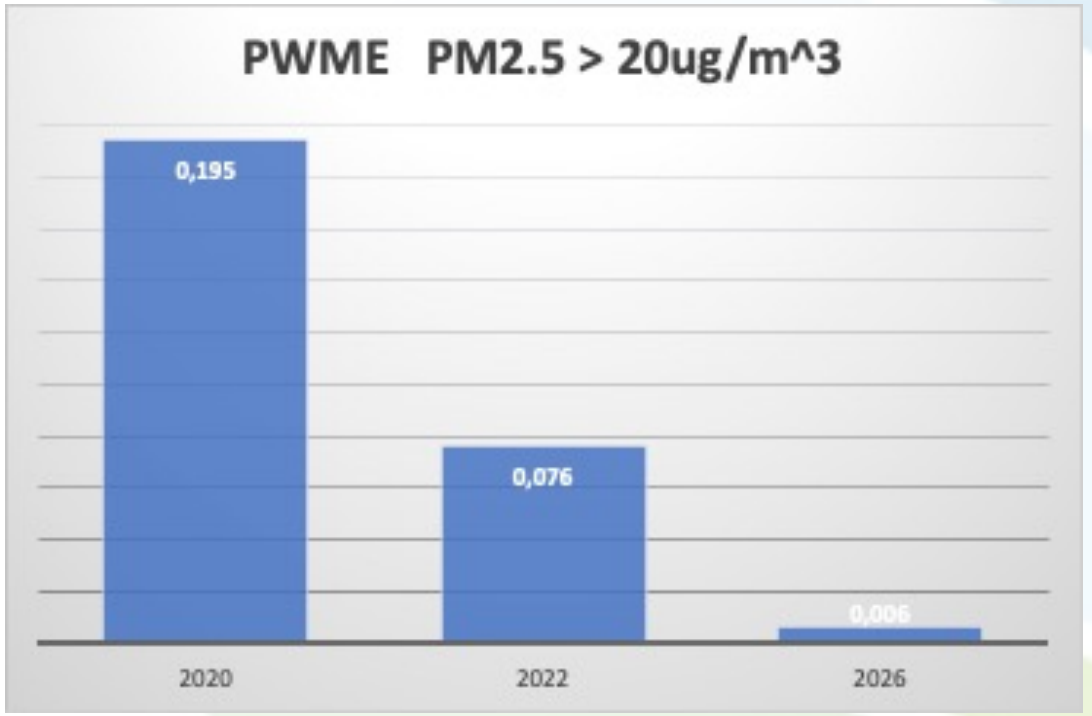
Population weighted concentrations



- Population Weighted Mean Concentrations (PMWC) show a significant improvement in the southern part of Poland and major cities for PM_{10} and $PM_{2.5}$
- Relatively small changes for NO_2

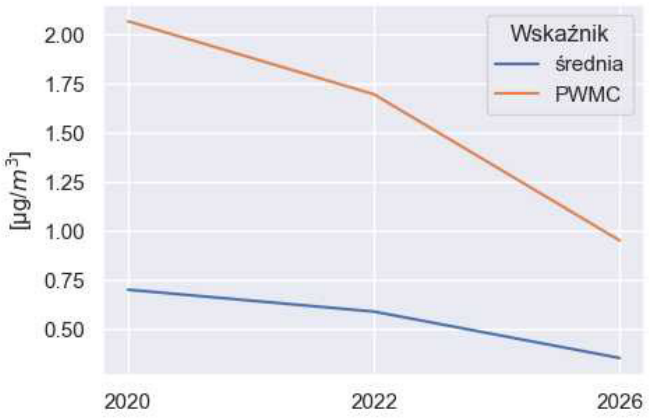
PWME ($PM_{2.5}$ > 20ug/m^3)

PWME:
2020 - 0.195
2022 - 0.076
2026 - 0.006

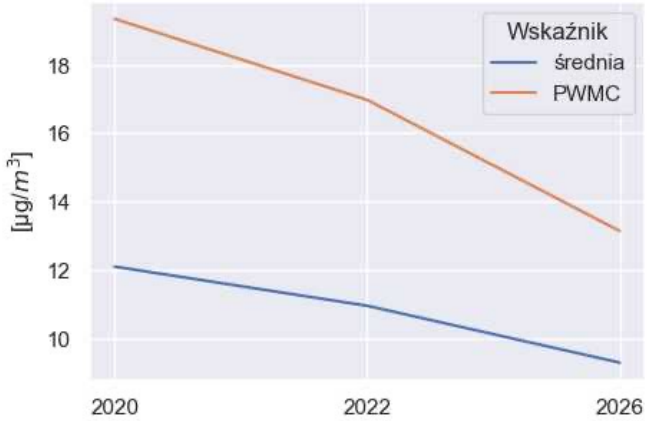


PMWC - country average

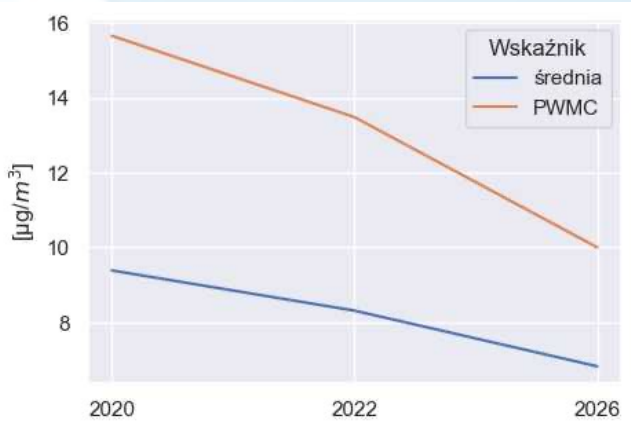
B(a)P



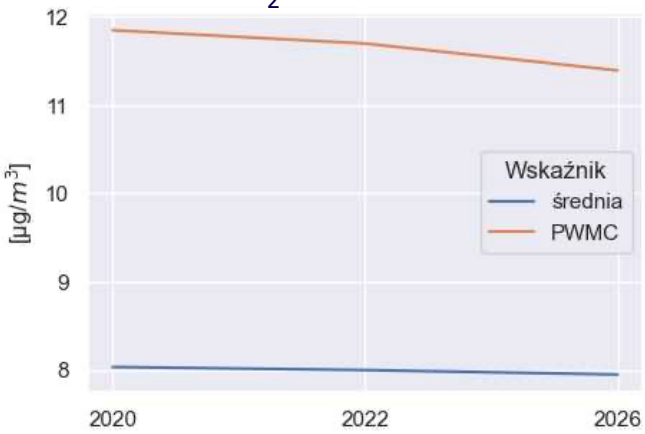
PM_{10}



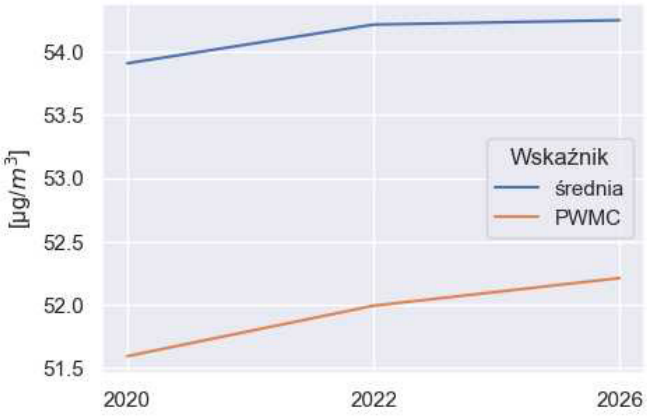
$PM_{2.5}$



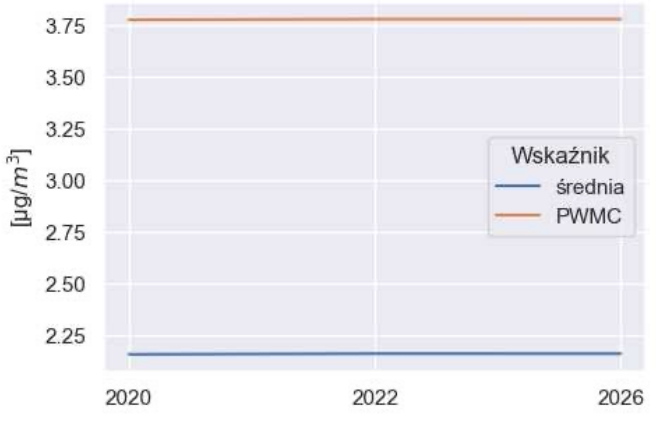
NO_2



O_3

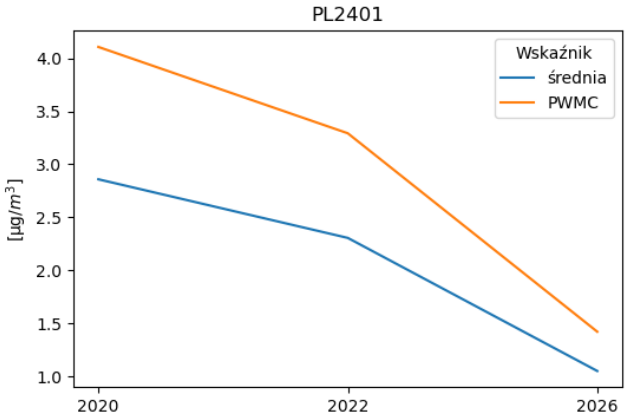


SO_2

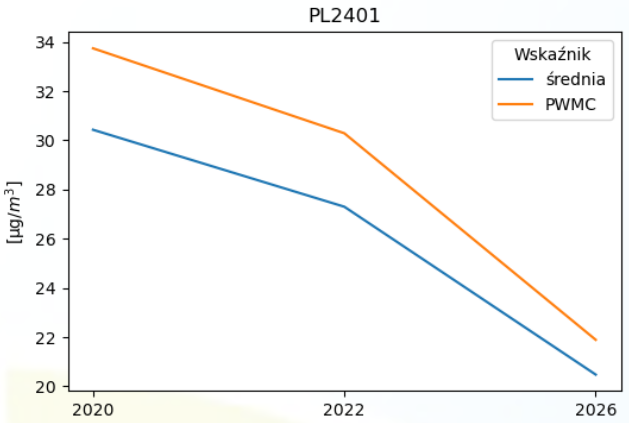


PMWC - Gornoslaska agglomeration

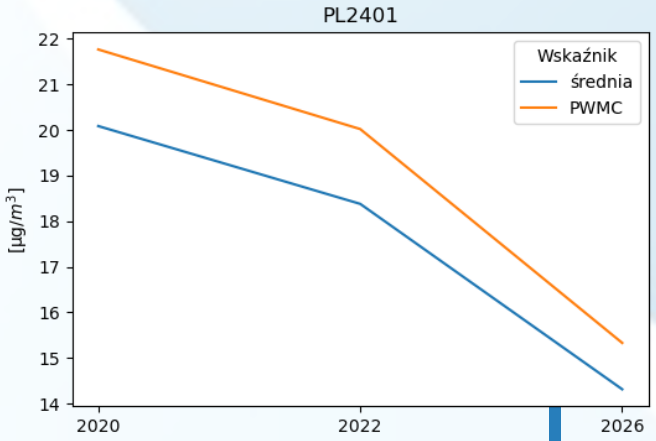
B(a)P



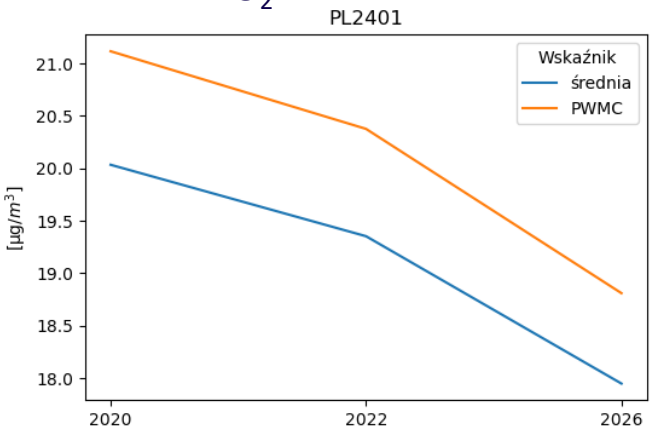
PM_{10}



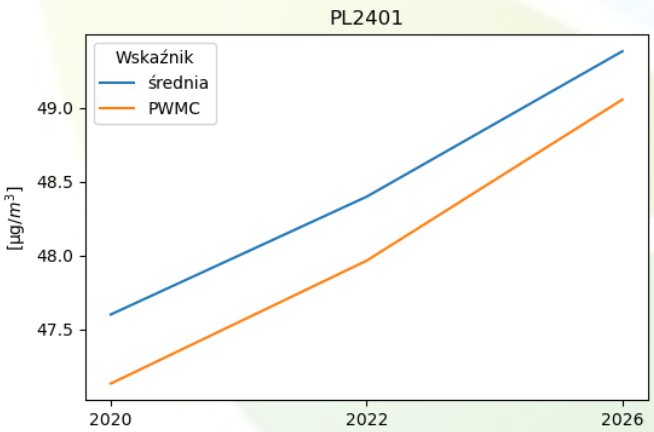
$PM_{2.5}$



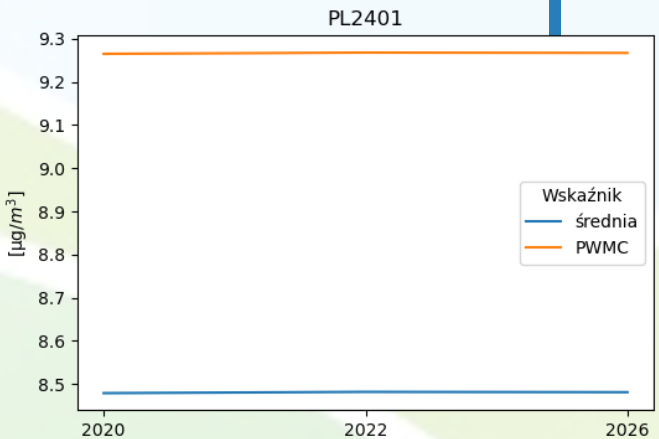
NO_2



O_3



SO_2



Summary

- The actions planned in the scope of the regional AQPs may result in a significant reduction of PMs and BaP concentrations
  - The most significant change in concentrations would occur in urban areas and the southern part of the country
  - Changes in concentration levels are not directly correlated with the assumed emission reductions in the region
  - In the case of NO_2, the changes are small because the reduction in the transport sector is accompanied by increase in emissions from the domestic sector
  - There would be a slight increase in background ozone levels across the country
- 2020 meteorology was anomalous (very warm February, relatively cool spring months) – the low temperature in winter or high temperatures in summer in the future may result in exceedances despite the implemented abatement measures

Plans

- Changes in morbidity and mortality → questionable since 2020 was biased with COVID19
- On the request by the Ministry of Climate and Environment, the following tasks will be undertaken:
  - Modelling of the annual progress in the AQP implementation (every year)
  - Revision of NAPCP (spring 2022)
  - Modelling in the scope of NAQP revision (to be in force by the end of 2021)
  - Changes in health exposure assuming that the new WHO levels are achieved
  - Assessment of the costs of the national AQ measures

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Thank you for your attention

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