

AIR QUALITY FORECASTING IN LATVIA

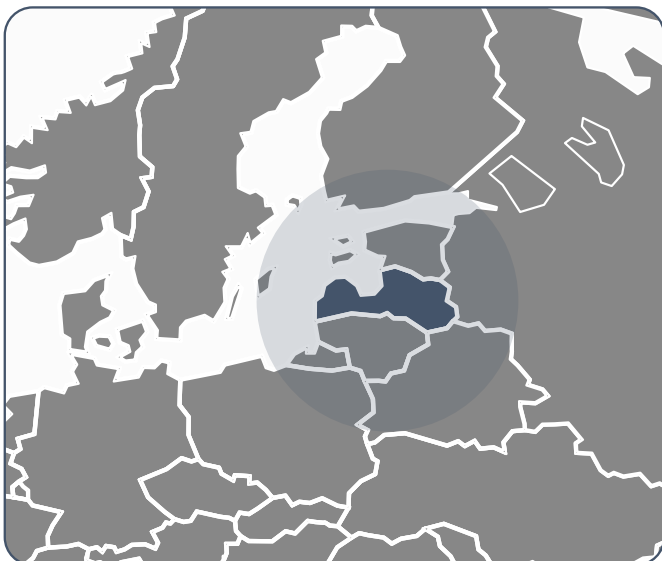
What it is about

Breathing polluted air increases the risk of debilitating and fatal diseases such as lung cancer, heart disease and strokes. Globally, it is now the 4th highest fatal risk factor causing 6.7m premature deaths each year. Even at low levels, it can provoke serious illness, possibly resulting in an emergency hospital admission.

The most harmful pollutants are micro particulate matters (PM10 and PM2.5), Nitrous oxides (NOX) and ozone. Most sources for these pollutants are anthropogenic and regulations are reducing overall emission levels. This is possible also thanks to improved monitoring capabilities that rely on a large number of insitu sensors but also on complex atmospheric modelling capabilities that are enabled by

satellites. Satellites such as the Sentinels provide a great help to understand the overall concentrations of pollutants at larger scale as well as the dynamics that drive their transport.

Using Sentinel data (along with many others) the Copernicus Atmospheric Monitoring Service can model air pollution and make forecasts for the coming days with increasing accuracy and confidence. This information, projected at city scale by the AirText service, enables citizens in Riga and London to make decisions in their daily lives. For vulnerable people, having a daily air quality forecast may become as important as having that for the weather.



What we found

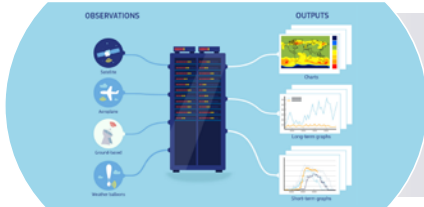
- Users are able to plan their activities so reducing their exposure to potentially damaging levels of air pollution and their risk of suffering respiratory or cardiological diseases.
- Hospitals using the service are able to reduce the risk for vulnerable patients and to have warnings when emergency peaks may occur.
- Policy makers are able to take more effective decisions which reduce pollution.
- Future forecasts will become more accurate and more frequently updated through the use of Sentinel-4 data from 2023/24.

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The Satellite Data

Copernicus Sentinel-3 and 5p satellites provide data on airborne concentrations of polluting gases.



The Service Provider

The Copernicus Atmospheric Monitoring Service managed by the European Center for Medium Range Weather Forecasts (ECMWF) take this data along with many others which are analysed in their atmospheric models to provide 3-day forecasts. The results are taken by CERC (UK) and ELLE (Latvia) and ingested into dedicated city models with the resulting detailed forecasts provided to users through mobile applications.



The Primary User

City and local authorities in Riga make the application available to their citizens as well as through other, multi-information channels such as those for transport or schools. Users receive alerts such that citizens and the local communities benefit by being able to moderate their activity when forecasts are for poor air so protecting their health and reducing the risk of needing emergency hospital treatment.



Secondary Beneficiaries

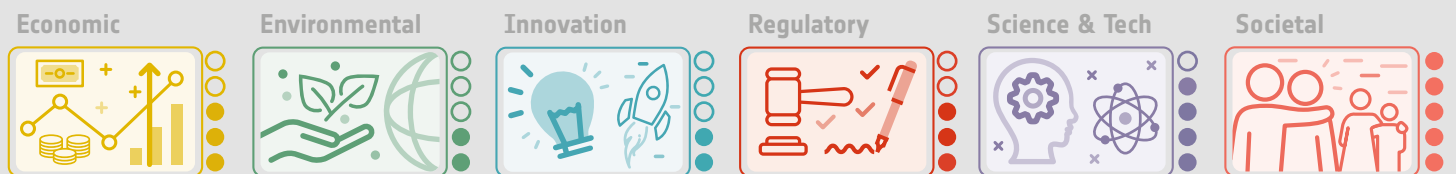
Hospitals, local businesses and the local authorities use the forecasts to help with their planning and policy decisions. Hospitals can plan for a surge in emergency admission and public transport promoted (free access) to reduce vehicle numbers.

| Air Quality Level | General population | Sensitive people |
|-------------------|--|---|
| Good | The air quality is good. Enjoy your usual outdoor activities. | The air quality is good. Enjoy your usual outdoor activities. |
| Fair | Enjoy your usual outdoor activities. | Enjoy your usual outdoor activities. |
| Moderate | Enjoy your usual outdoor activities. | Consider reducing intense outdoor activities, if you experience symptoms. |
| Poor | Consider reducing intense activities outdoors, if you experience symptoms such as sore eyes, a cough or sore throat. | Reduce physical activities, particularly outdoors, especially if you experience symptoms. |
| Very poor | Consider reducing intense activities outdoors, if you experience symptoms such as sore eyes, a cough or sore throat. | Reduce physical activities outdoors. |
| Extremely poor | Reduce physical activities outdoors. | Avoid physical activities outdoors. |

End User Beneficiary

Citizens and the local communities benefit by being able to moderate their activity when forecasts are for poor air so protecting their health and reducing the risk of needing emergency hospital treatment.

Total benefits



Evaluated benefits: €175k in Riga, €3.8m pa across the UK, €30m in the EU

About the project

Through a series of case studies, EARSC aims to gather quantitative evidence that the usage of Copernicus Sentinel data provides an effective and convenient support to various market applications. These studies are undertaken in the frame of the project "Showcasing the benefits brought

by the usage of Sentinels data to society, environment and economy: a bottom-up assessment based on traceable impacts along selected value chains", under an assignment from the European Space Agency (ESA) funded by the European Union as part of the Copernicus Programme.

Download the full report from the project website



<http://earsc.org/sebs>

