Reactive Nitrogen Flows Between Sector Energy and Transport and the Atmosphere in the EE Demoregion

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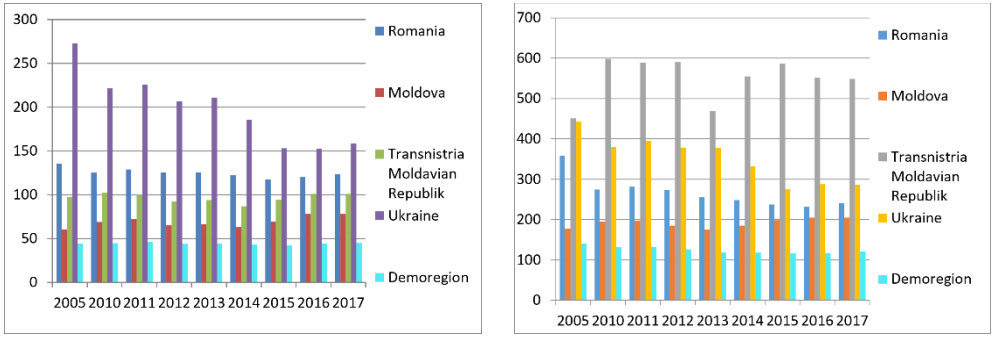
Introduction

The Convention on Long-range Transboundary Air Pollution (CLRTAP) approach has been used to calculate nitrogen fluxes in the energy and transport sectors. Air pollutants arise from energy production, mainly from the combustion of fossil fuels and biomass [1]. The nitrogen contained in the fuel is released only during combustion. Atmospheric nitrogen N_2 also takes part in the combustion process. Atmospheric nitrogen and fuel nitrogen are converted to reactive nitrogen forms [2]. Therefore, the exchange of reactive nitrogen compounds occurs only between the energy and transport sector and the atmosphere. All other exchanges take place with the non-reactive form of nitrogen [3]. The exchange between the energy sector and the atmosphere includes emissions of gaseous forms of nitrogen such as nitrous oxide (N_2O), ammonia (NH_3), nitrogen oxide (NO) and nitrogen dioxide (NO_2).

Methods

Emissions of N_2O, NOx and NH_3 from the Energy and Transport sectors of EE Demoregion were calculated using fuel combustion statistics data and Combustion emission factors for each type of fuel used. Data on emissions for the countries of Ukraine, Romania, Moldova were obtained directly from the National Register of air pollutants and greenhouse gases.



a **b**

Fig. 2 Intensity of release of Nr to the atmosphere, kg/ km^2 in Romania, Moldova, Transnistria, Ukraine and EE Demoregion (a-Energy; b-Transport)

a **b**

Fig. 1 Total release of Nr to the atmosphere in EE Demoregion (a-Energy; b-Transport)

Results and Discussion

The flows of Nr from the Energy and Transport sector to the atmosphere in EE Demoregion were calculated (Fig. 1). Nr flows for Energy and Transport sectors the countries of Ukraine, Romania, Moldova (RBDR) and Transnistria (LBDR) were calculated based on national inventories of air pollutants and greenhouse gases. To carry out a comparative assessment of air pollutant emissions between countries, Nr emissions from the energy and transport sectors were calculated per km2 for the countries: Ukraine, Romania, Moldova (RBDR) and Transnistria (LBDR) and EE Demoregion. (Fig. 2)

Conclusions

Nr emissions in the Energy sectors of EE Demoregion decreased in 2017 by 14% compared to 2005, by 7% compared to 2010. Nr emissions per km2 from stationary sources increased in the following order: EE Demoregion <Moldova (RBDR) <Romania <Ukraine <Transnistria (LBDR). The emissions from transport depends on the number of mobile sources and on the cost of fuel.Nr emission in transport increases in the following order: EE Demoregion <Moldova (RBDR) <Transnistria (LBDR) <Romania <Ukraine.

References: [1] IEA (2016) [2] HUT: NITROGEN. Helsinki University of Technology. ENE-47.153 (2017) [3] ECE_EB.AIR_119 (2013)