

Regional Training on Assessment of GHG Inventories in Waste

Environmental Protection Agency
Montenegro
Ranka Zarubica

General Information

- In 2006, with its succession, Montenegro became a member of United Nations Framework Convention on Climate Change (UNFCCC)
- In 2006 by succession, it became a member of the Vienna Convention on the Protection of the Ozone Layer.
- 2007 confirmed Kyoto Protocol
- Obligations associated with making of inventories of greenhouse gas emissions, its updating, data management and storage are by the Air Protection Law transferred to the Environmental protection Agency. GHG emissions inventory is integral part of the environmental information system;
- According to the Law on Air Protection, Rulebook has been adopted about the list of gases and method of preparing GHG emission inventory, and the exchange of information which states that GHG emissions inventory is made in accordance with the guidelines for reporting under the UNFCCC convention and Intergovernmental Panel on Climate Change (IPCC);
- Report of GHG inventory in Montenegro for the period 1990-2013 has been prepared in accordance with UNFCCC guidelines for reporting of annual inventories, adopted by the Decision 18/CP.8COP (Conference of Parties);
- With the calculation, following emissions resulting from human activity have been included: carbon dioxide(CO₂), methane (CH₄), nitrous oxide (N₂O), synthetic gases (HFC-e i SF₆).

Methodology

- Methodology of the Intergovernmental Panel on Climate Change (IPCC) in 2006;
- IPPC - Version 2.10.;
- For the calculation of annual methane emissions from solid waste municipal landfills, kinetic model of first order decay was used (Tier 2, FOD model, IPCC – 2006 guidelines);
- For the estimation of emissions for the waste sector, recalculated statistical data was used (MONSTAT) that are derived on the basis of recent demographic data, data on generated amounts of communal waste and its composition;
- For estimation of emissions of waste water discharges, MONSTAT statistical data was used, according to which 42% of Montenegrin population is connected to septic tanks.

Trends in the GHG emissions for the period 1990-2013

- The report shows trends of GHG emissions of total national emissions, as well as trends of emissions of all sectors of inventory structure;
- Emission sources and sinks of GHG are divided into six main sectors: Energy, Industrial processes, Use of solvents and other products, Agriculture, Forestry and Land Use, and Waste Management;
- GHG emissions are converted to CO₂ eq in accordance with the guidelines of the IPCC Second Assessment report (SAR IPCC) where the Global Warming Potential (GWP): CO₂-1, CH₄-21, N₂O-310, CF₄-6500, C₂F₆-9200 and SF₆-23900;
- Total CO₂ eq emissions.

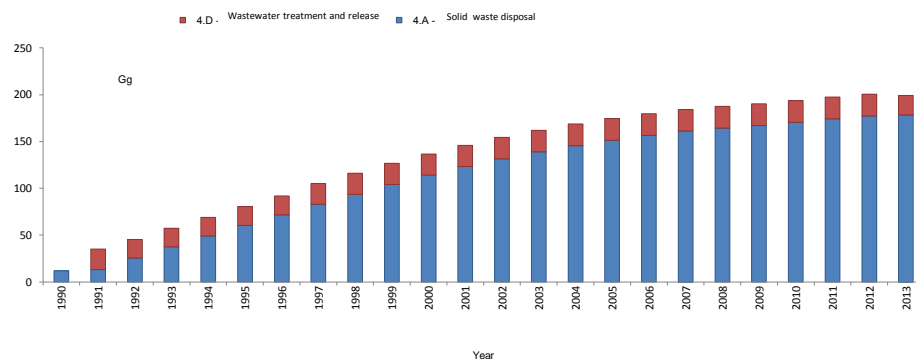
Waste Management Sector

- Contributed with 2.11% of total GHG emissions in Montenegro in 2011;
- Disposal of solid waste on landfills, waste water and waste incineration are the main activities that emit GHG;
- In the framework of national GHG inventory, the following categories are used for emissions calculations:
 - CH₄ emissions from solid waste, and
 - CH₄ emissions from wastewater of residential/commercial sector;
- Volume of generated municipal waste ranges from 0.25-1.5 kg per capita per day, with an average value of around 0.80 kg per capita per day. Estimated amount of municipal waste produced in Montenegro according to National Solid Waste Management Plan are 243,941 tons per year.



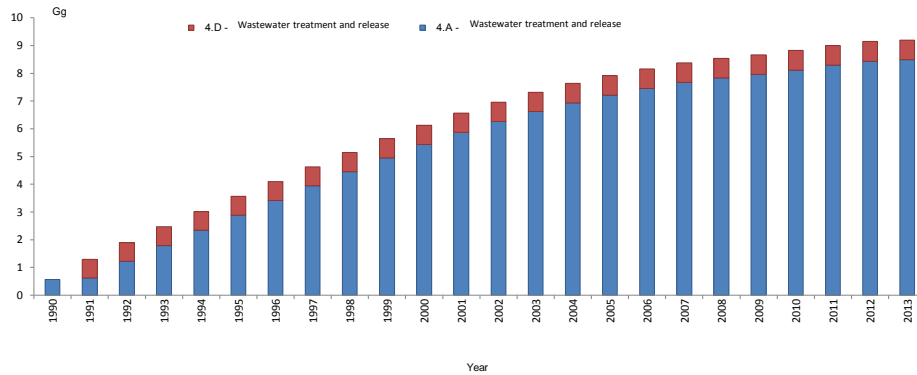
Waste Management Sector

(1990-2013) GHG emissions from waste sector record a slight constant growth. In estimated emissions from this sector, the largest share has a subsector of solid waste disposal.



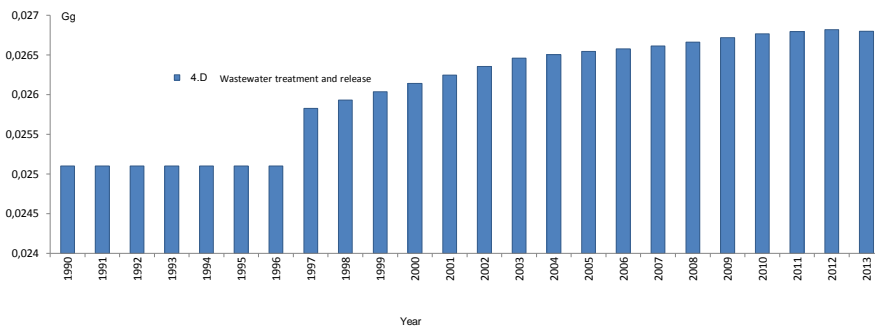
Waste Management Sector

CH₄ emissions from the waste sector record a slight constant growth. In total estimated emissions from this sector, CH₄ emissions are ranging from 77.63% to 96.96%, for the referenced period. Disposal of solid waste emits most of the CH₄ emissions from the waste sector.



Waste Management Sector

N₂O in the referenced period records a slight growth,



Uncertainty evaluation

- For the estimated uncertainties of the input data as well as emission factors, IPCC defined values have been used.
- Values of uncertainty estimation of activation data and emissions factors from the waste sector relating to waste disposal and waste water treatment and release are shown in the table below

Category	Gas	Uncertainty of activity data (%)	Uncertainty of emission factor(%)	Combined uncertainty(%)
4.A – Solid Waste Disposal	CH ₄	60	50	78.10
4.D – Wastewater Treatment and Release	CH ₄	60	60	84.85
4.D - Wastewater Treatment and Release	N ₂ O	60	500	503.59

Waste Management Sector

- In plan is to put in operation six regional sanitary landfills as follows:
 - Central (Cetinje, Danilovgrad and Podgorica);
 - Central (Nikšić, Plužine and Šavnik);
 - Coastal (Bar, Ulcinj)
 - Coastal (Budva, Herceg Novi, Kotor and Tivat);
 - North (Andrijevica, Berane, Bijelo Polje, Kolašin, Mojkovac, Plav, Pljevlja, Rožaje and Žabljak).

Waste Management Sector

- Currently in Montenegro, there are two regional landfills:
 - Livade in Podgorica, and
 - Možura in Bar;
- Volume of incinerated landfill gas in 2014 was 1 314 000 m³;
- Daily value would be 3 600 m³;
- During 2014, a new (second) torch was built, with capacity of 800 m³.




Priorities for mitigation and reducing emissions of greenhouse gases

- Waste Management Strategy was based on a vision of two key principles:
 - EU integration process, and
 - Implementation of the concept of “green economy” within three commercial areas (agriculture, energy and tourism);
- Therefore, vision of the Strategy refers to the implementation of the optimal modern waste management system in Montenegro in order to reduce the negative impact of waste on environment, and increase economic benefits of waste management, through the transformation of waste sources.



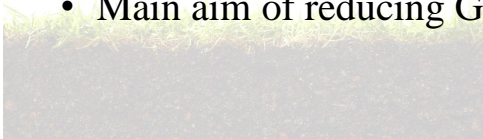


Problems

- Significant quantities of municipal waste not collected by authorized services;
 - There is a significant number of “illegal dump sites and unmanaged landfills” that do not have permits in accordance with the Law on Waste Management;
 - Less than 15% of communal waste goes for further processing;
 - A small portion of material is regenerated from the waste collected at the municipal level;
 - There is no energy utilization of waste.
- 



Targets

- Strengthening of economy and energy;
 - Achievement of at least 27% of participation of renewable energy and energy efficiency by 2030;
 - Reducing GHG emissions by at least 40%;
 - Directive on energy efficiency aims to 30% of energy savings by 2030, with indicative target of 27% that will be subjected for review in 2020;
 - Reform of the EU ETS system;
 - Main aim of reducing GHG emissions.
- 



Thank you for your
attention

