

CROATIAN AGENCY FOR THE ENVIRONMENT AND NATURE

Regional Training on assessment of GHG Inventories in Waste

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National System and results of GHG estimation in Waste Sector

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GENERAL INFORMATIONS

- Croatia is an Annex I Party of the UNFCCC, from 1996
 - Croatia ratified the Kyoto Protocol in April 27, 2007 and became a full Party in August 28, 2007
 - By accessing to the European Union on 1 July 2013, the Republic of Croatia has implemented into its legal system obligations on reporting according to Regulation (EU) No 525/2013 which include:
 - ✓ Inventory report of GHG emission (draft NIR, NIR and Approximated NIR)
 - ✓ Policy and measures
 - ✓ Long-term emission projections
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EU LEGISLATION IMPORTANT FOR MONITORING AND REPORTING

- REGULATION (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC
 - REGULATION (EU) No 749/2014 of 30 June 2014 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) No 525/2013 of the European Parliament and of the Council
 - Commission delegated Regulation (EU) No 666/2014 establishing substantive requirements for a Union inventory system and taking into account *changes in the global warming potentials* and internationally agreed inventory guidelines pursuant to Regulation (EU) No 525/2013 of the European Parliament and of the Council
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CROATIAN LEGAL FRAMEWORK

- Air Protection Act (Official Gazette, No.130/2011, 47/2014) – Chapter VIII of the act is related to monitoring greenhouse gas emissions and measures for mitigating and adapting to climate change
 - Regulation on the Monitoring of Greenhouse Gas Emissions, Policies and Mitigation measures in the Republic of Croatia (Official Gazette, No. 87/2012) - Part II
 - Decision on the adoption of the Plan for the protection of air, ozone layer and climate change mitigation in the Republic of Croatia for the 2013 – 2017 period (Official Gazette, No. 139/2013)
 - Decision on the establishment of the Committee for inter-sectoral coordination for a national system for monitoring greenhouse gas (Official Gazette, No. 6/2014)
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INSTITUTIONAL ARRANGEMENTS (1/2)

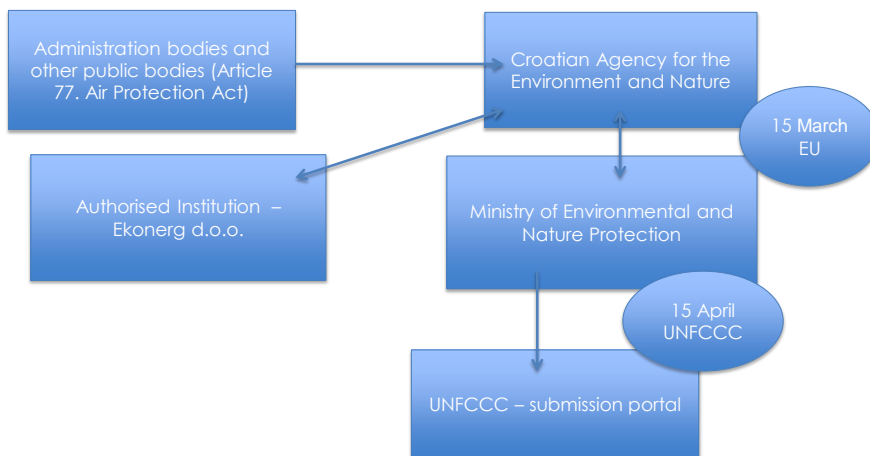
- for inventory preparation in Croatia is regulated in Chapter II of Regulation on the Monitoring of Greenhouse Gas Emissions, Policies and Mitigation measures in the Republic of Croatia (Official Gazette, No. 87/2012)
 - for inventory management and preparation in Croatia could be characterized as decentralized and out-sourced with clear tasks breakdown between participating institutions which including:
 - ✓ Ministry of Environmental and Nature Protection (MENP),
 - ✓ Croatian Agency for the Environment and Nature (CAEN)
 - ✓ and competent governmental bodies responsible for providing of activity data
 - ✓ Committee for inter-sectoral coordination for a national system for monitoring greenhouse gas
 - The preparation of inventory itself is entrusted to Authorized Institution which is elected for three year period by public tendering
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INSTITUTIONAL ARRANGEMENTS (2/2)

- **Ministry of Environmental and Nature Protection (MENP)** is a national focal point for the UNFCCC, with overall responsibility for functioning of the National System such as: communication with the UNFCCC, EU, control of methodology for emission and GHGs removal, calculations, approval of the GHG Inventory Report, submission to UNFCCC etc.
 - **Croatian Agency for the Environment and Nature (CAEN)** is responsible for: organization of the GHG Inventory preparation, collection of activity data, development of QA/QC Plan, implementation activities QA/QC, archiving of all documents which used for Inventory planning, selection of Authorized Institution. CAEN is responsible to the Reporting to the European Commission under MMR.
 - **Authorised Institution** is responsible for preparation of inventory, which include emission calculation in line with the methodology prescribed in new 2006 IPCC guidelines
 - **Committee for inter-sectoral coordination on the National System for monitoring of GHG emission** was established by Government decision and includes representatives from various ministries with active role in streamlining activity data collection, provides recommendations for inventory improvement, gives opinions on report and participates in the review of these reports
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COMMUNICATION SCHEME

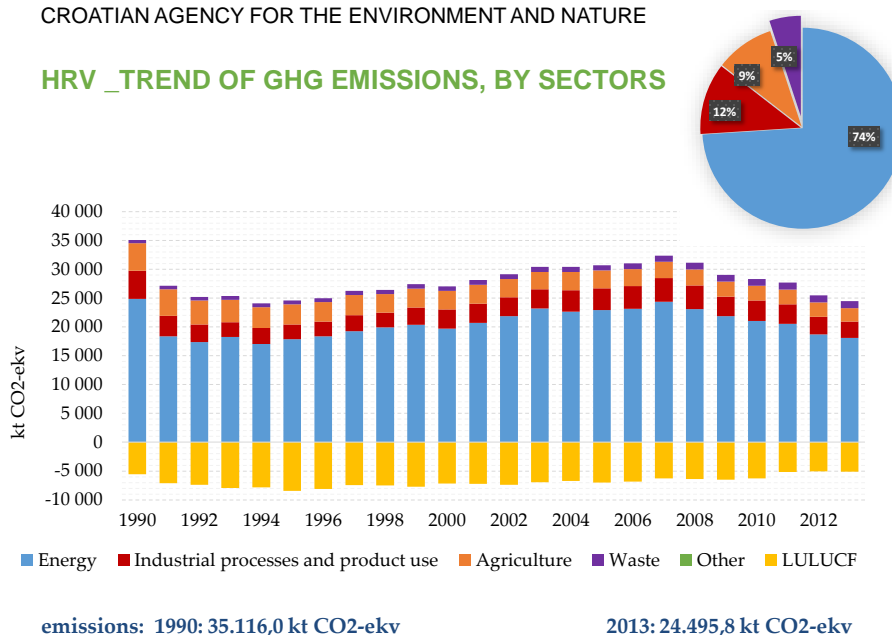


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CROATIAN GHG INVENTORY

- Last submitted Croatian Inventory of GHG emission is NIR 2015
- It was submitted to EU by October, 30 and to UNFCCC by November, 6
- In this NIR, the reported period is 1990-2013
- The methodologies used in the calculation of emissions are based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
- The calculation includes the emissions for all GHGs: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, NF₃ and indirect greenhouse gases: CO, NO_x, NMVOCs and SO₂
- CO₂-eq is calculated by multiplying the emissions of every gas with corresponding GWP
- The methodology for emission calculation could be described as a product of the particular activity data with corresponding emission factors
- GHG emission sources and sink are divided into five main sectors: Energy, IPPU, Agriculture, LULUCF and Waste

HRV _TREND OF GHG EMISSIONS, BY SECTORS



HRV _GHG EMISSIONS: WASTE (CRF 5.)_OVERVIEW OF SECTOR

Waste management activities, such as:

- CRF 5. A _solid waste disposal
- CRF 5. B _biological treatment of solid waste
- CRF 5. C _incineration and open burning of waste
- CRF 5. D _wastewater treatment and discharge

can produce emissions of GHGs (CO₂, CH₄, N₂O)

The methodology used to estimate emission for waste management activities requires:

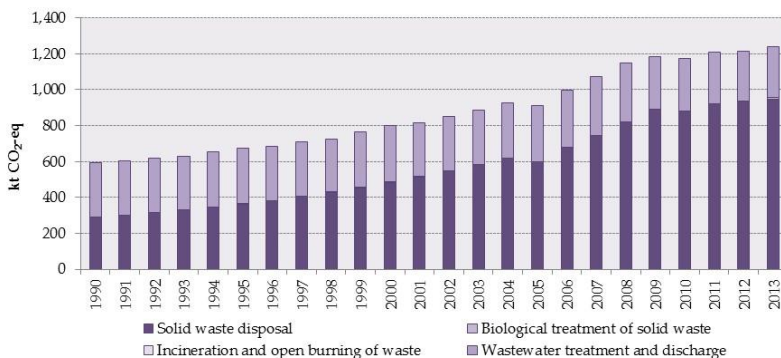
- Country-specific knowledge on waste generation
- Composition of waste and
- Management practice

Management activities in Croatia are not organized and implemented completely results in the lack and inconsistency of data.

Improvements (quality and quantity of data) are visible in last couple of years

HRV _GHG EMISSIONS: WASTE SECTOR (CRF 5.)

Figure: Total GHGs Emissions from Waste Sector (1990-2013)



HRV _GHG EMISSIONS: SOLID WASTE DISPOSAL (CRF 5.A.)

This sub category includes generated

- municipal solid waste
- industrial waste

Results of this activities are emissions of CH₄.

AD and data source

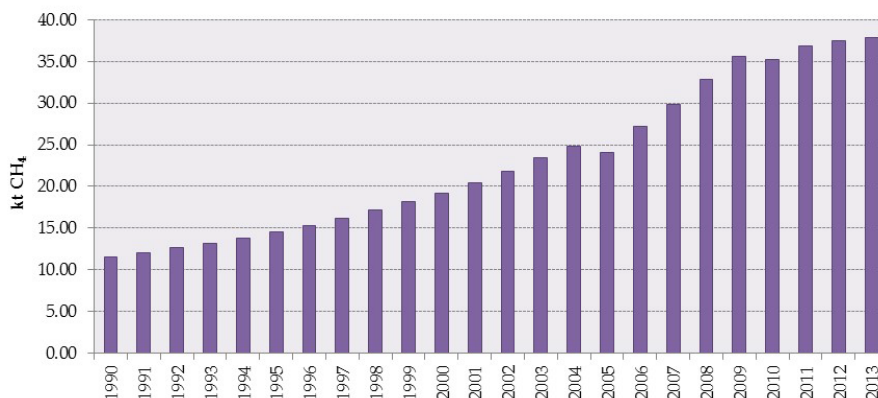
Main document for collecting data is: Annual data Collection Plan (ADCP) for Waste Sector which contains source categories, activity, activity data, data source and competent authority.

Main data suppliers for AD is CAEN which is:

- responsible for maintaining the Waste Management Information System
- collecting and processing waste data reported to **Croatian Environmental Pollution Register** and **Landfill Inventory Database**.

HRV_GHG EMISSIONS: SOLID WASTE DISPOSAL (CRF 5.A)

Figure: Annual Emissions of CH₄ from Solid Waste Disposal (1990-2013)



SOLID WASTE DISPOSAL (CRF 5.A)

Category specific planned improvements are:

- more accurate determination on waste quantities disposal to different types of SWDSs
- providing methodology to determine country-specific solid waste composition and periodic analysis of waste composition at major landfills (CAEN project)
- modification of **Croatian Environmental Pollution Register and Landfill Inventory Database** regarding solid waste with additional informations

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HRV_GHG EMISSIONS: BIOLOGICAL TREATMENT OF SOLID WASTE (CRF 5.B.)

In this category are included emissions of CH₄ and N₂O resulting from:

- composting and
- anaerobic digestion of organic waste at biogas facilities

AD and data source

AD of composting of municipal and industrial solid waste, sludge and other organic waste **is only for 2013.**

DS is CAEN (CEPR)

AD of anaerobic digestion of municipal and industrial solid waste, sludge and other organic waste is only for 2013.

DS are CAEN and biogas facilities.

Data on the total amount of CH₄ recovered are not available for entire period.

Category-specific planned improvements are related to aggregation of accurate data for CH₄ and N₂O emission calculations for entire period 1990-2013.

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HRV_GHG EMISSIONS: INCINERATION AND OPEN BURNING OF WASTE (CRF 5.C.)

This category includes emissions of CO₂, CH₄ and N₂O resulting from incineration of waste *without energy recovery*.

Emission from incineration of waste with energy recovery should be reported in Energy sector.

Croatian NIR includes emission of:

- CO₂ and N₂O from incineration of industrial waste
- CO₂ emission from incineration of clinical waste

Open burning of waste is prohibited by law.

AD and data source

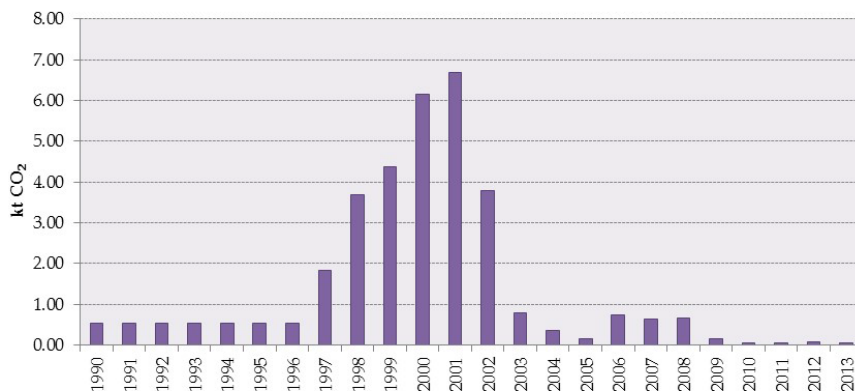
AD is from Croatian Environmental Pollution Register

DS is CAEN.

Category-specific planned improvements are related to aggregation of accurate data for CO₂ and N₂O emission calculations from incineration (different types of waste and detailed information on incineration technology) for entire period 1990-2013.

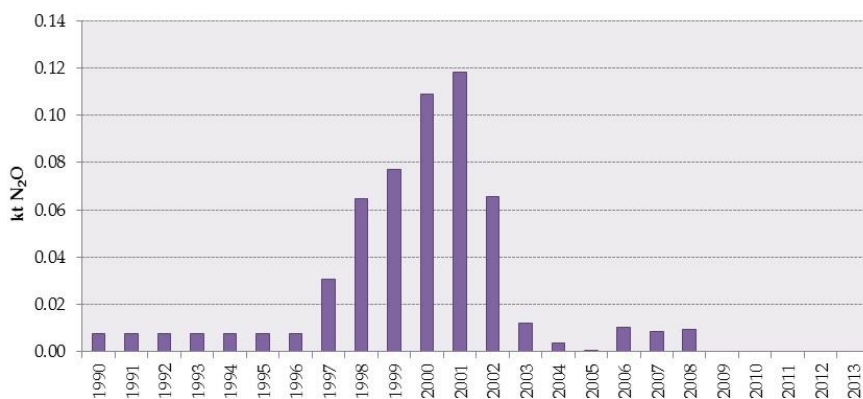
HRV_GHG EMISSIONS: INCINERATION AND OPEN BURNING OF WASTE (CRF 5.C.)

Figure: Annual Emissions of CO₂ from Incineration of Waste (1990-2013)



HRV_GHG EMISSIONS: INCINERATION AND OPEN BURNING OF WASTE (CRF 5.C.)

Figure: Annual Emissions of N₂O from Incineration of Waste (1990-2013)



* There was no incineration of industrial waste without energy recovery in the period 2009 - 2013

HRV_GHG EMISSIONS: WASTEWATER TREATMENT AND DRAINAGE (CRF 5.D)

In this category are included emissions of CH₄ and N₂O resulting from wastewater treatment

CH₄ emissions from domestic wastewater

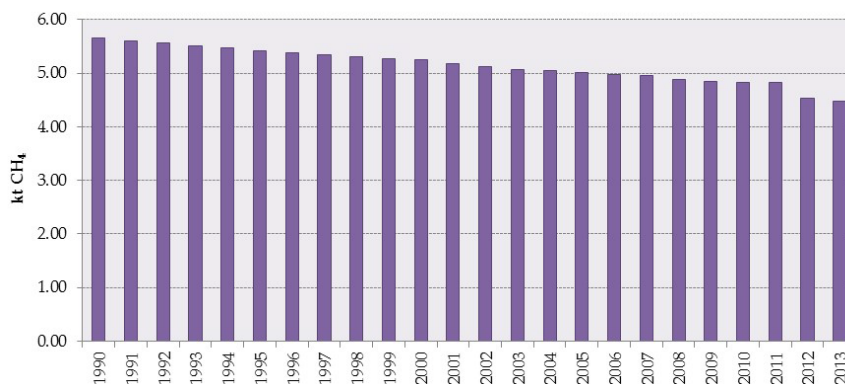
Disposal of domestic wastewater, in rural areas where systems such as septic tanks are used (partly anaerobic without flaring) results with CH₄ emissions

AD and data source

Data for populations with individual system of drainage and data for calculation of degradable organic component (DOC) were provided by state company **Croatian water**

HRV_GHG EMISSIONS: WASTEWATER TREATMENT AND DRAINAGE (CRF 5.D)

Figure: Annual Emissions of CH₄ from Domestic Wastewater (1990-2013)



HRV_GHG EMISSIONS: WASTEWATER TREATMENT AND DRAINAGE (CRF 5.D)

CH₄ emissions from treatment of industrial wastewater

They are related with 3 industries with the largest potential for wastewater CH₄ emission:

- manufacture of food products and beverages,
- manufacture of pulp, paper and paper products and
- manufacture of chemicals and chemical products

Anaerobic process is applied in this industrial wastewater treatments.

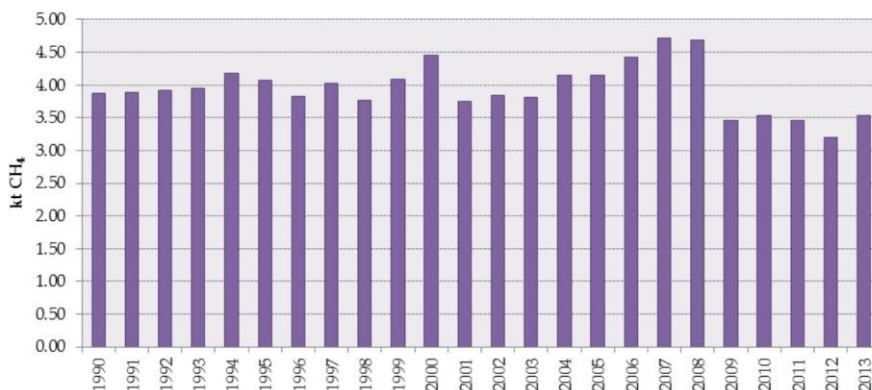
AD and data source

Data of industrial output for 3 industries were provided by **Croatian Chamber of Economy**

Data of wastewater output for 3 industries was taken from **Statistical Yearbooks**.

HRV_GHG EMISSIONS: WASTEWATER TREATMENT AND DRAINAGE (CRF 5.D)

Figure: Annual Emissions of CH₄ from Industrial Wastewater (1990-2013)



HRV_GHG EMISSIONS: WASTEWATER TREATMENT AND DRAINAGE (CRF 5.D)

Indirect N₂O emissions from wastewater

AD and data source

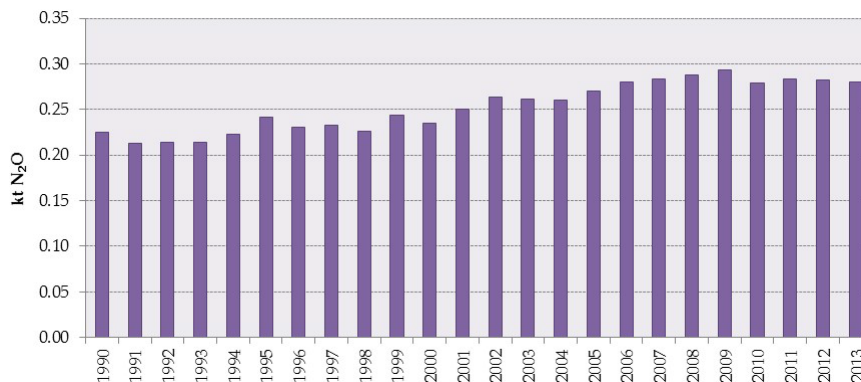
Data of population of HRV from 1990-2013 was taken from Statistical Yearbooks

AD of Protein intake value (PIV) were taken from FAOSTAT Statistical Database

Category-specific planned improvements are related primarily to establishment of effectively *Water Information System* with base for systematic gathering/provision of insufficient data needed for CH₄ emissions calculation

HRV_GHG EMISSIONS: WASTEWATER TREATMENT AND DRAINAGE (CRF 5.D)

Figure: Annual Emissions of indirect N₂O from Industrial Wastewater (1990-2013)



Thank you

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