

# PRTRs and impacts at national level

## Benefits, practical uses and experiences at global level

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**Environmental Protection Agency**  
**Republic of Serbia**

Implementation of Pollutant Release and Transfer Registers (PRTRs) as a tool for Persistent Organic Pollutants (POPs) reporting, dissemination and awareness raising for Belarus, Cambodia, Ecuador, Kazakhstan, Moldova and Peru  
25<sup>th</sup> – 27<sup>th</sup> March 2019, Siem Reap, Cambodia

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- Republic of Serbia is a sovereign state situated at the crossroads of Central and Southeast Europe in the southern Pannonian Plain and the central Balkans.
- Serbia is a parliamentary republic, with the government divided into legislative, executive and judiciary branches.
- The country covers a total of 88,361 km<sup>2</sup>.
- Politically Serbia is divided on 4 territories: North Serbia (Vojvodina), Central, East and West Serbia.
- There are 138 municipalities and 23 cities.
- Population in 2016 – 7.058.322

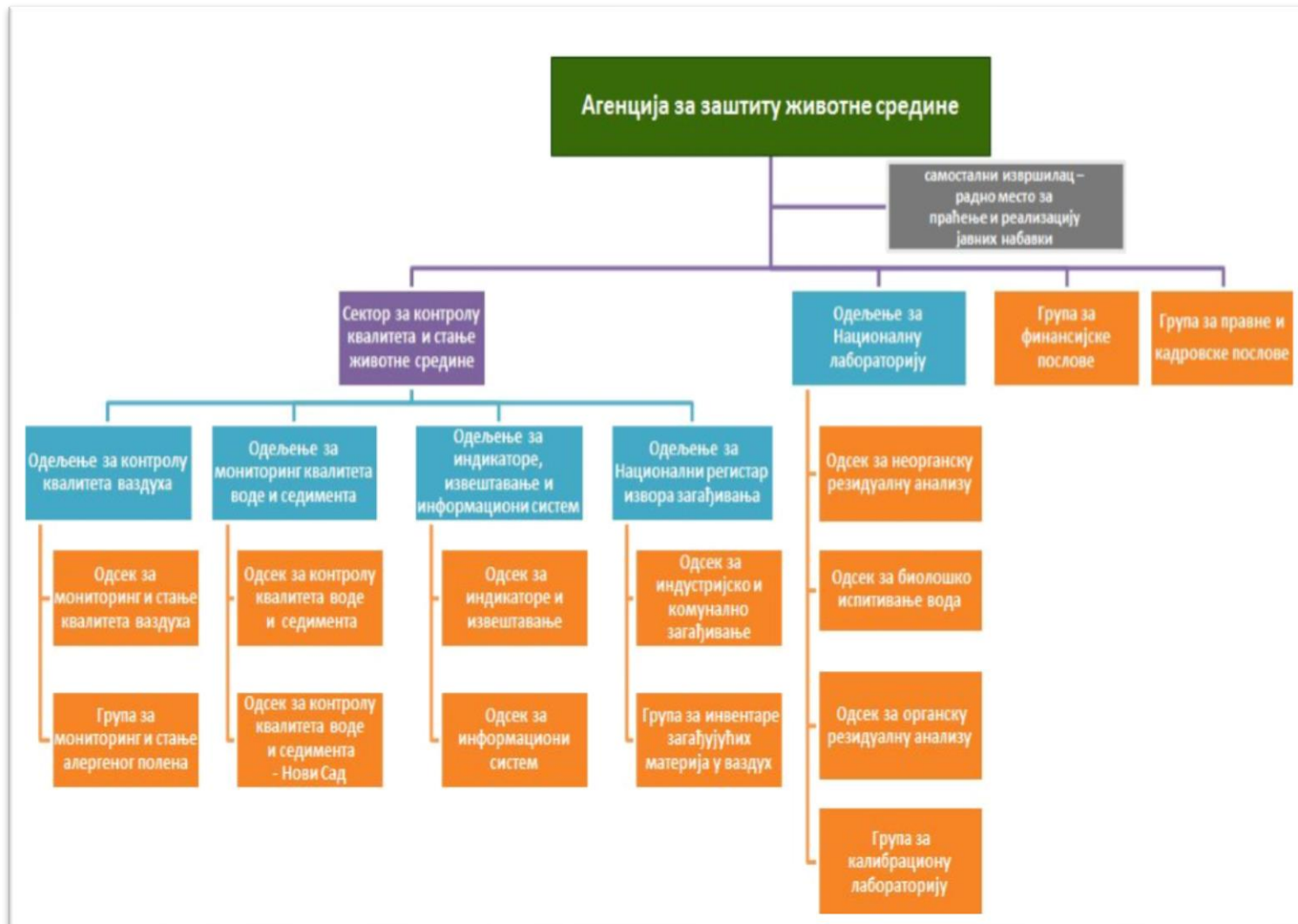


## Environmental Protection Agency

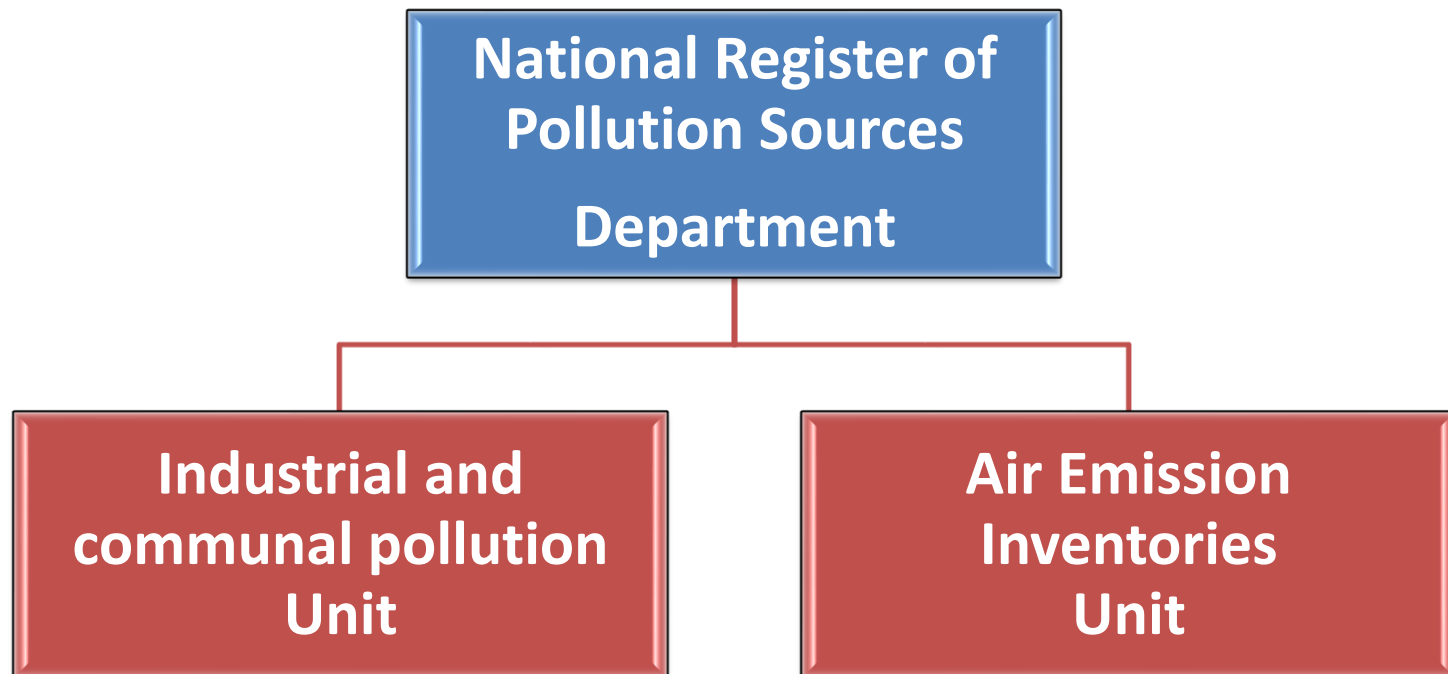
The Environmental Protection Agency is a body within the Ministry of Environmental Protection, as a legal entity, performs professional tasks related to:

- Development, coordination and management of the national information system for environmental protection (monitoring of the state of environmental factors through environmental indicators, the registry of pollutants, etc.);
- The implementation of the national monitoring air and water quality;
- Management National Laboratory;
- The collection and compilation of environmental data, processing and preparation of State of the environment reports and implementation of environmental policy;
- The development of procedures for the processing of environmental data and their assessment;
- Keeping data on best available techniques and practices and their implementation in the field of environmental protection;
- Cooperation with the European Environment Agency (EEA) and the European Network for Information and Observation (EIONET) , as well as other duties specified by law.

## Environmental Protection Agency



## Department of National Register of Pollution Sources



## NATIONAL REGISTER OF POLLUTION SOURCES

The National Register of Pollution Sources is a set of systematic information and data on environmental pollution sources.

That is a register of all human activities that may have a negative impact on the quality of the environment in a given area.

This Register is an information subsystem of the Environmental Information System of the Republic of Serbia, which is managed by the Environmental Protection Agency in accordance with the Law on Ministries and the Law on Environmental Protection.

The National Register was established to meet the growing needs of state authorities, as well as the wider community, for information on sources and quantities of polluting substances emitted by the environment.

The activities of reporting and data collection started in 2007 with the establishment of the National Register of Pollution Sources.

During 2009 and 2010, a complete legal framework for managing the National Pollution Register was adopted.

In 2010 a set of by-laws was adopted, which regulated the reporting system.



It encompasses a series of thematic units:

- PRTR - Pollution Release and Transfer Register;
- Emissions to air;
- Emissions to water;
- Emissions to soil,
- Waste management;
- Products that become special waste streams after use.

The existing part of the register related to air emissions includes a series of databases and inventories such as:

- PRTR,
- Emissions to air in accordance with the Regulation on ELV,
- Large combustion plants,
- Inventory of main pollutants according to CLRTAP,
- Greenhouse Gas Inventory by UNFCCC,
- Inventory of unintentionally released long-lasting organic pollutants – Stockholm convention.
- VOC
- F gases

The existing part of the register related to water emissions includes:

- PRTR,
- Emissions to water from WWTP and communal water discharge system.

The current legal framework is not well developed and it is necessary to change it.

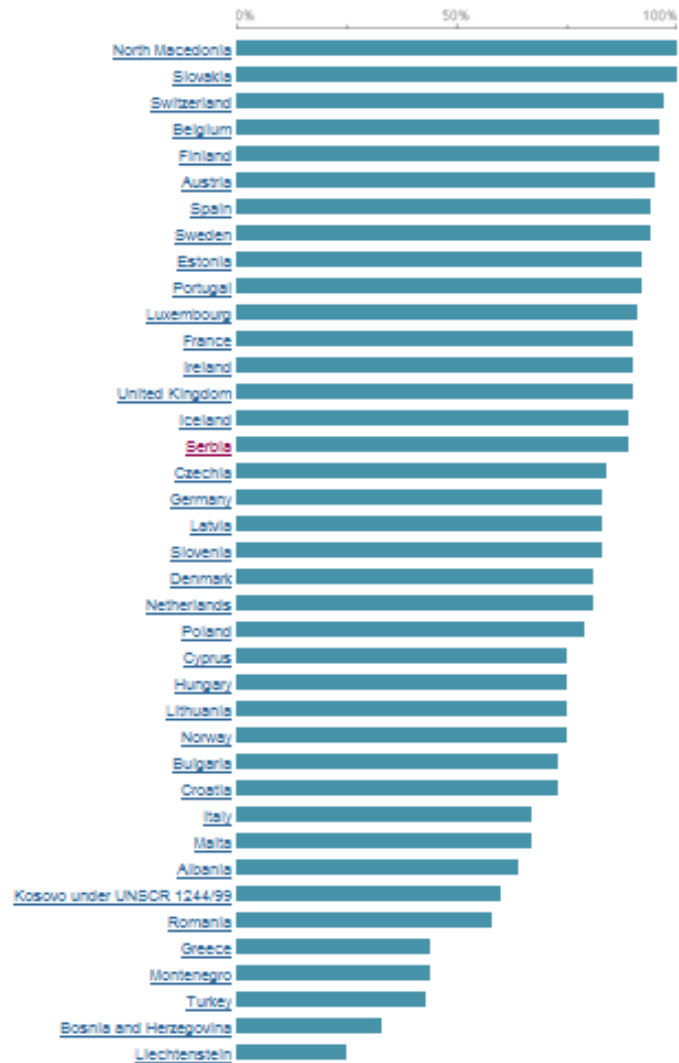
The area of the National Register related to waste management includes the following components:

- PRTR,
- Generation and management of municipal and Industrial waste,
- Packaging and packaging waste,
- Products that after use become special waste streams,
- Special waste streams,
- Medical waste,
- Hazardous waste,
- Landfills and waste landfilling,
- Recovery, recycle of waste
- Imports and exports of waste,
- PCBs and RSV waste,
- Register of issued waste management licenses.

# National Register of Pollution Sources

## Eionet core data flows 2018

The preliminary scores presented below are based on 12 out of 12 data flows which will be evaluated for 2018.



## Eionet core data flows 2018

## National Register of Pollution Sources vs PRTR

Number of reported waste generated facilities and facilities participating in National Register of Pollution Sources

| Year | Waste generation | Waste reuse | Waste disposal | Waste import | Waste export |
|------|------------------|-------------|----------------|--------------|--------------|
| 2011 | 758              | 157         | 14             | 18           | 57           |
| 2012 | 1142             | 134         | 17             | 23           | 79           |
| 2013 | 1582             | 253         | 24             | 30           | 90           |
| 2014 | 1941             | 274         | 29             | 40           | 92           |
| 2015 | 2228             | 291         | 28             | 45           | 90           |
| 2016 | 2761             | 306         | 33             | 48           | 93           |
| 2017 | 3410             | 305         | 33             | 46           | 94           |

Number of reported waste generated facilities and facilities participating in PRTR

2011 – 2017 from 285 – 292 facilities

## National Register of Pollution Sources vs PRTR

### Number of submitted reports in National Register of Pollution Sources

| Year | Waste generation | Waste disposal | Waste reuse | Waste disposal | Waste import | Utility waste | Total* |
|------|------------------|----------------|-------------|----------------|--------------|---------------|--------|
| 2013 | 6602             | 24             | 253         | 90             | 30           | 106           | 7105   |
| 2014 | 8014             | 29             | 274         | 92             | 40           | 96            | 8545   |
| 2015 | 9266             | 28             | 291         | 90             | 45           | 96            | 9816   |
| 2016 | 11050            | 33             | 306         | 93             | 48           | 96            | 11626  |
| 2017 | 12794            | 33             | 305         | 94             | 46           | 102           | 13374  |

### Number of reported waste generated facilities and facilities participating in PRTR

2011 – 2016 from 455 – 521 reports

## National Register of Pollution Sources vs PRTR

**Total waste generation amount in National Register of  
Pollution Sources in 2016**

**9.197.100 tons**

**85.5%**

**Total waste generation amount in PRTR in 2016**

**7.864.400 tons**



## PRTR register

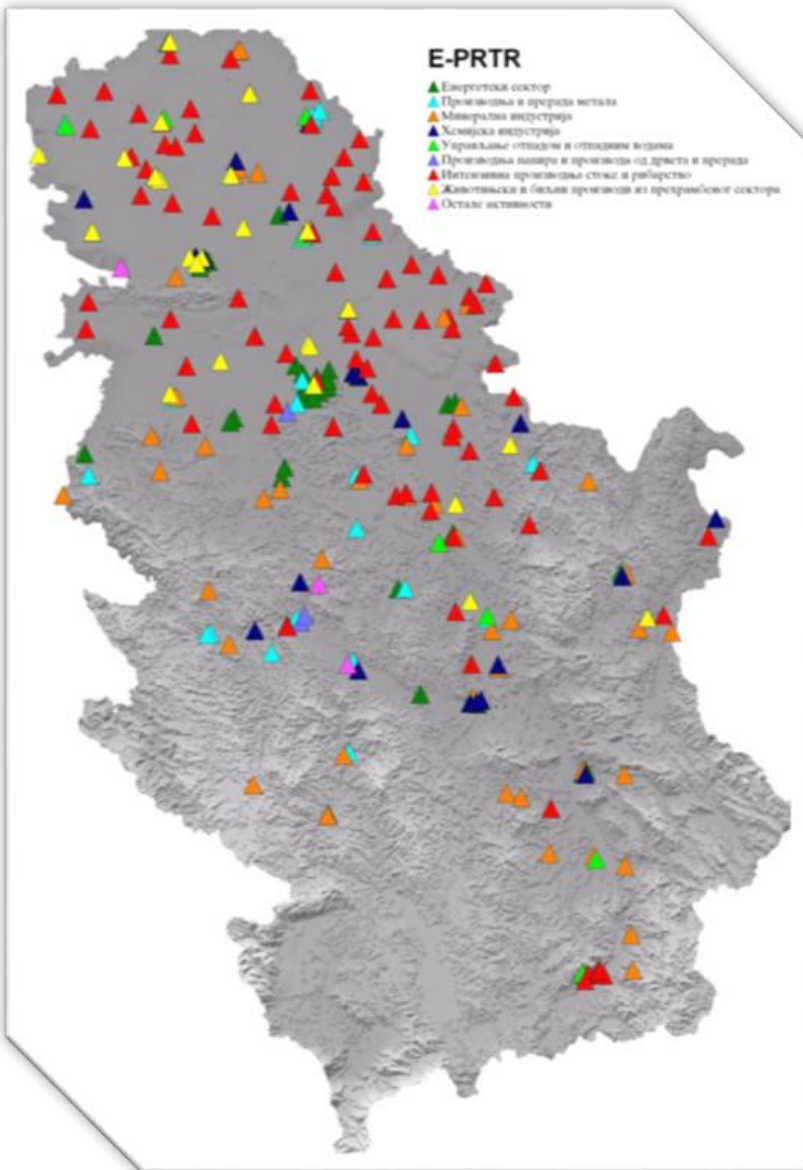
SEPA started with implementation of PRTR protocol and E-PRTR directive in 2008.

Adopted PRTR protocol and E-PRTR directive 166/2006 through the Bylaw of National Register of Pollution Sources in 2010.

PRTR protocol ratified in 2011.

IS developed in 2012.

GIS developed in 2016.



# National Register of Pollution Sources

- Capacity thresholds (Annex I) are implemented.
- **Thresholds for releases (Annex II) are not implemented. All amounts of released pollutants must be reported.**
- All data in Format for the reporting of release and transfer (Annex III) are obligatory.
- Additional data in forms:
  1. Raw materials consumption, fuel consumption, amount of products;
  2. Technical data about stacks, wastewater outlets, waste managements.
- **There is no confidentiality toward** SEPA – All data must be reported. SEPA take care about confidentiality.
- Data are collected once a year.

## THE REPORTING FORMS

There are 5 different forms:

1. General data,
  2. Emissions to air,
  3. Emissions to water,
  4. Emissions to land,
  5. Waste management.
- ✓ The forms are not developed in line with PRTR protocol. We asked for more data than PRTR protocol.
  - ✓ We want to avoid the possibility of mistakes, cheating and fake emission data using different methods (drop down lists, mandatory fields etc.)
  - ✓ We asked for data which give us opportunity to use emission models to calculate their emissions as validation tools.

## CONSTITUTION OF THE REPUBLIC OF SERBIA

### Right to Healthy environment

#### Article 74

Everyone shall have the right to healthy environment and the right to timely and full information about the state of environment.

Everyone, especially the Republic of Serbia and autonomous provinces, shall be accountable for the protection of environment. Everyone shall be obliged to preserve and improve the environment.

## PRTR LEGAL SYSTEM

### LAW ON ENVIRONMENTAL PROTECTION

- ✓ System of environmental protection - framework
- ✓ Polluter monitoring
- ✓ Reporting obligations
- ✓ Register of environmental pollution sources – methodology, forms, time framework, guidelines, data submission
- ✓ Control of data submission and accuracy of submitted data
- ✓ Fees
- ✓ Access to information
- ✓ Penalties

### SECTORAL LAWS

## Different kind of Guidelines in SEPA

- Guidelines for using SEPA IT system
- Guidelines for form filling
- Guidelines for emission estimation

These Guidelines have the purpose of reducing the possibility of errors.

## Guidelines for emission estimation

These guidelines are part of bylaw and their use is obligatory.

The basis for guidelines developing are:

- ✓ 2016 EMEP/EEA air pollutant emission inventory guidebook
- ✓ 2006 IPCC Guidelines for National GHG Inventories
  
- Livestock
  - Broilers
  - Laying hens
  - Pigs and sows
  
- Mining - ongoing
- Household appliances
- Landfills - ?

## **Guidelines for emission estimation**

















The basis for guidelines developing are:

- ✓ 2016 EMEP/EEA air pollutant emission inventory guidebook
- ✓ 2006 IPCC Guidelines for National GHG Inventories version 2015



## Guidelines for emission estimation

- Rules on the methodology for the development of national and local register of pollution sources and methodology for the type, method and time of data collection ( "RS Official Gazette", Nos. 91/2010, 10/2013 and 98/2016)

| document   | Download   | Directions and emission calculators   |
|--|--|---|
| The text of the Ordinance amending the Ordinance 98/2016 |    |   |
| The text of the Ordinance Amending Ordinance 10/2013     |    |   |
| text Rules   |    |    |
| Attachment 1.  |    |   |
| Appendix 2.  |    |   |
| Appendix 3.  |    |   |
| Appendix 4.  |    |   |
| Appendix 5.  |  |   |
| 5.1 Broilers   |  |  |
| 5.2 Laying hens  |  |  |
| 5.3 pigs and sows  |  |  |
| Form 1.  |  |   |
| Form 2.  |  |   |

## Guidelines for emission estimation

### Emission calculator

- ✓ Easy to use tool
- ✓ Simple Excel file
- ✓ The values from yellow cells must be typed into air emission PRTR forms

| Гајење бројлера                           |   |                                |   |
|---|---|--------------------------------|---|
| Редни број турнуса у току године<br>А     | Број узгојених животиња у току турнуса<br>Б | Број дана трајања турнуса<br>В | Број хранидбених дана у турнусу<br>Г<br>Г=Б x В |
| 1   | 0   | 0                              | 0   |
| 2   | 0   | 0                              | 0   |
| 3   | 0   | 0                              | 0   |
| 4   | 0   | 0                              | 0   |
| 5   | 0   | 0                              | 0   |
| 6   | 0   | 0                              | 0   |
| 7   | 0   | 0                              | 0   |
| ЗБИР БРОЈА ХРАНИДБЕНИХ ДАНА У ТОКУ ГОДИНЕ |   |                                | 0   |

Улазни подаци!

| ПРОСЕЧНИ ГОДИШЊИ БРОЈ ЖИВОТИЊА |   |
|--------------------------------|---|
|                                | 0 |

| Зарађујућа материја   | Емисиони фактор<br>kg/AAП/god. | Емитована количина<br>(kg/god) |
|---|--------------------------------|--------------------------------|
| NM VOC  | 0,108                          | 0,00                           |
| NH <sub>3</sub>   | 0,22                           | 0,00                           |
| PM <sub>10</sub>  | 0,069                          | 0,00                           |
| NO <sub>x</sub> (укупни оксиди N изражени као NO <sub>2</sub> ) | 0,001                          | 0,00                           |
| CH <sub>4</sub>   | 0,01                           | 0,00                           |

ВАЖНО!  
Подаци из жуто обојених поља се уносе у образац 2.

## INFORMATION SYSTEM OF NATIONAL PRTR REGISTER

Information system of National PRTR register is one of the most important subsystems of the environmental information system in the Republic of Serbia, which is lead by Environmental Protection Agency.

**This information system is completely developed in the Environmental Protection Agency.**

By using the software tools of this information system, data has being collected and processed, verified and analyzed, and after all, delivered to interested parties.

Whole system is bilingual – Serbian and English.

## INFORMATION SYSTEM NRIZ

- Created and follow the national legislation.
- Based on Microsoft platform.
- TEAMS SR used for development, SQL server chosen for a database.
- TEAMS ensures modular improvements of IS.
- Bilingual interface – Serbian and English
- IS is web oriented and available on webpage of Serbian Environmental Protection Agency. <http://www.sepa.gov.rs/>

## INFORMATION SYSTEM OF NATIONAL PRTR REGISTER

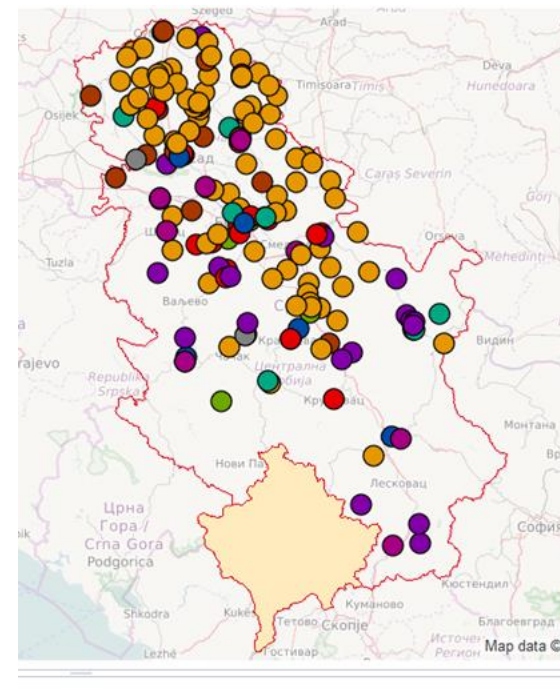
For all these activities it is necessary to establish strong IT support:

1. Modular IT system.
2. GIS component.

IT system is continually expanded with the goal that all implemented segments merged into a single system in accordance with national and international legislation (**Single window reporting**).

IT system needs to help operators to deliver their reports on the easiest way and as quickly as possible, but also help administrators to more easily verify data and prepare the necessary reports.

- Modular IT system.
- GIS component.
- Facilities have obligation to report using IT system of National register of Pollution Sources established in SEPA.
- No paper or Excel reporting for PRTR.
- IT system is continually expanded with the goal that all segments of National Register of Pollution Sources merged into a single system in accordance with national and international legislation,



## SELECTION OF FORMS

Automatic system for selection of forms using a set of questions.  
Company select forms alone during input of master data.

ACTIVITIES

Economic Activity\* 2

When choosing activities, pay attention to whether the chosen activity meets the conditions minimum threshold values the capacity of the facility.

Activity\* 2.(b)

Is the selected activity main activity for the facility?

QFA1\* -

Select Activity\*

Search

| Code        | Name  |
|-------------|---|
| 0           | Facility does not belong to any of the proposed economic activity with the capacity displayed                     |
| 2.(a)       | Metal ore (including sulphide ore) roasting or sintering installations  |
| 2.(b)       | Installations for the production of pig iron or steel (primary or secondary melting) including continuous casting |
| 2.(c).(i)   | Installations for the processing of ferrous metals - Hot-rolling mills  |
| 2.(c).(ii)  | Installations for the processing of ferrous metals - Smitheries with hammers                                      |
| 2.(c).(iii) | Installations for the processing of ferrous metals - Application of protective fused metal coats                  |
| 2.(d)       | Ferrous metal foundries   |
| 2.(e).(i)   | Installations for the production of non-ferrous crude metals from ore, concentrates or secondary raw materials    |
| 2.(e).(ii)  | Installations for the smelting, including the alloying, of non-ferrous metals, including recovered products       |
| 2.(f)       | Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process     |

Maximize Clear Ok Cancel

## COMPETENT AUTHORITY PORTAL

### - Reporting -

The procedure of reporting i.e. data delivery is reduced to the simple filling of electronic forms. After entering, data is stored in the database.

The system has the history of the records. Each data change is recorded, and in that way significantly simplifies the tracking of data changes.

During the reporting period, according to the defined methodology, system administrators approve data submitted and then lock the reports. Data in locked reports can no longer be changed.

Data submitted is sent, after analytical processing, to the interested parties.



- Admin
- Master Data
- Permits For Waste Management
- Import from Parent Client
- Forms
  - General Data (Form 1)
  - Emissions to Air (Form 2 / GVE)
  - Emissions to Water (Form 3)
  - Emissions to Land (Form 4)
  - Waste Production (Form 5 / GIO1)
  - Waste Disposal (Form GIO2)
  - Waste Treatment (Form GIO3)
  - Export of Waste (Form GIO4)
  - Imports of Waste (Form GIO5)
  - Waste Collectors and Holders (Form DEO6)
  - Movement of Waste (Form DKO)
  - Communal Waste (Form KOM1)
  - Special Product Streams (Form PTP2)
  - Packaging (Form AAO1)
  - Packaging Waste (Form AAO2)
  - Non sanitary landfill (Form DEP1)
  - Wild dumps (Form DEP2)

## COMPETENT AUTHORITY PORTAL (CA)

CA solution is implemented in accordance with domestic and international legislation for reporting in the field of environmental protection.

The portal of the competent authority is an application which, according to its purpose, can be viewed from two aspects:

1. From the user's side, this application is a system for data submitting of a company as a reporting entity.
2. On the side of the competent authority, the application is a system for analyzing the collected data, which provides a clear picture of the state of the environment in the Republic of Serbia.

Bearing in mind these aspects, user roles in the system are clearly defined, so appropriate access rights are automatically assigned to each user of the system.

## SEPA AUTHORITY PORTAL (CA)

**NACIONALNI REGISTAR IZVORA ZAGADIVANJA**

Početna

Meni Traži

- Admin
- Matični podaci
- Dozvole za upravljanje otpadom
- Import iz 'Parent Client' rešenja
- Obrasci
- Izlazne tabele
- Izveštaji
- Prikazi

### 1. Matični podaci

- 1. Preduzeća
- 2. Postrojenja
- 3. Lista osoba
- 4. Korisnički nalogi

### 2. Obrasci

- 01. Obrasc 1
- 02. Obrasc 2 / GvE
- 03. Obrasc 3
- 04. Obrasc 4
- 05. Obrasc 5 / GIO1
- 06. Obrasc GIO2
- 07. Obrasc GIO3
- 08. Obrasc GIO4
- 09. Obrasc GIO5
- 10. Obrasc GIO6
- 11. Obrasc DKO
- 12. Obrasc KDM1

### 3. Izveštaji - pregled i štampa

- 01. Obrasc 1
- 02. Obrasc 2
- 03. Obrasc 3
- 04. Obrasc 4
- 05. Obrasc 5
- 06. Obrasc GIO1
- 07. Obrasc GIO2
- 08. Obrasc GIO3
- 09. Obrasc GIO4
- 10. Obrasc GIO5
- 11. Obrasc GIO6
- 12. Obrasc GIO6

### 4. Dostavljanje podataka

| Obrasc                                    | Broj  |
|---|-------|
| Ukupno dostavljenih godišnjih izveštaja   | 25013 |
| Ukupno PRTR postrojenja ispunilo obaveznu | 241   |
| Obrasc 1                                  | 299   |
| Obrasc 2 / GvE                            | 1606  |
| Obrasc 3                                  | 303   |
| Obrasc 4                                  | 1     |
| Obrasc 5 / GIO 1                          | 12758 |
| GIO 2                                     | 33    |
| GIO 3                                     | 304   |

## SEPA AUTHORITY PORTAL (CA) – Tracking changes

|          |   |                                     | Godina | Preduzeće*                                       | Napomene | Napomena administratora | Zaključaj opšte                           | Dozvoljene korekcije | Admin | Kreirao              | Datum i vreme kreiranja | Ažurirao | Datum i vreme ažuriranja |
|----------|---|-------------------------------------|--------|--|----------|-------------------------|---|----------------------|-------|----------------------|-------------------------|----------|--------------------------|
|          | <input type="checkbox"/>                              | <input checked="" type="checkbox"/> | 2017   | TRGOVINSKO PREDUZEĆE KOMIS AUTO DOO VALJEVO      |          |                         | True                                      | False                | False | komis                | 9.5.2018. 11:32:42      | komis    | 9.5.2018. 14:58:41       |
| Količine |   |                                     |        |  |          |                         |   |                      |       |                      |                         |          |                          |
|          | Vrste proizvoda po periodima*                         |                                     |        | Naziv proizvoda*                                 |          |                         | Količina proizvoda stavljenih na tržište* |                      | PDV** | Dozvoljene korekcije | Admin                   | Kreirao  | Datum i vreme kreiranja  |
|          | Akumulatori (za period od: 01.01.2017 do: 31.12.2017) |                                     |        | Industrijske baterije ili akumulatori (18DIN/KG) |          |                         | 51  |                      |       | False                | False                   | komis    | 9.5.2018. 11:32:42       |
|          | Gume (za period od: 01.01.2017 do: 31.12.2017)        |                                     |        | Gume (36DIN/KG)                                  |          |                         | 24  |                      |       | False                | False                   | komis    | 9.5.2018. 14:58:41       |
|          | Vozila (za period od: 01.01.2017 do: 31.12.2017)      |                                     |        | Vozila (12000DIN/T)                              |          |                         | 1   |                      |       | False                | False                   | komis    | 9.5.2018. 14:47:22       |
|          | <input type="checkbox"/>                              | <input checked="" type="checkbox"/> | 2017   | TRGOVINSKO PREDUZEĆE KOMIS AUTO DOO VALJEVO      |          |                         | True                                      | False                | False | komis                | 9.5.2018. 11:32:42      | komis    | 9.5.2018. 14:47:22       |
| Količine |   |                                     |        |  |          |                         |   |                      |       |                      |                         |          |                          |
|          | Vrste proizvoda po periodima*                         |                                     |        | Naziv proizvoda*                                 |          |                         | Količina proizvoda stavljenih na tržište* |                      | PDV** | Dozvoljene korekcije | Admin                   | Kreirao  | Datum i vreme kreiranja  |
|          | Akumulatori (za period od: 01.01.2017 do: 31.12.2017) |                                     |        | Industrijske baterije ili akumulatori (18DIN/KG) |          |                         | 50  |                      |       | False                | False                   | komis    | 9.5.2018. 11:32:42       |
|          | Vozila (za period od: 01.01.2017 do: 31.12.2017)      |                                     |        | Vozila (12000DIN/T)                              |          |                         | 1   |                      |       | False                | False                   | komis    | 9.5.2018. 14:47:22       |
|          | Gume (za period od: 01.01.2017 do: 31.12.2017)        |                                     |        | Gume (36DIN/KG)                                  |          |                         | 24  |                      |       | False                | False                   | komis    | 9.5.2018. 11:32:42       |
|          | <input type="checkbox"/>                              | <input checked="" type="checkbox"/> | 2017   | TRGOVINSKO PREDUZEĆE KOMIS AUTO DOO VALJEVO      |          |                         | True                                      | False                | False | komis                | 9.5.2018. 11:32:42      |          |                          |
| Količine |   |                                     |        |  |          |                         |   |                      |       |                      |                         |          |                          |
|          | Vrste proizvoda po periodima*                         |                                     |        | Naziv proizvoda*                                 |          |                         | Količina proizvoda stavljenih na tržište* |                      | PDV** | Dozvoljene korekcije | Admin                   | Kreirao  | Datum i vreme kreiranja  |
|          | Akumulatori (za period od: 01.01.2017 do: 31.12.2017) |                                     |        | Industrijske baterije ili akumulatori (18DIN/KG) |          |                         | 50  |                      |       | False                | False                   | komis    | 9.5.2018. 11:32:42       |
|          | Gume (za period od: 01.01.2017 do: 31.12.2017)        |                                     |        | Gume (36DIN/KG)                                  |          |                         | 24  |                      |       | False                | False                   | komis    | 9.5.2018. 11:32:42       |



## Portal for data submission trend monitoring

Republika Srbija  
Ministarstvo poljoprivrede i zaštite životne sredine  
Agencija za zaštitu životne sredine

**DOSTAVLJANJE PODATAKA ZA  
NACIONALNI REGISTAR IZVORA ZAGAĐIVANJA**

**PRTR REGISTAR (REGISTAR VELIKIH IZVORA ZAGAĐIVANJA)**

- [Preduzeća koja su dostavila izveštaje](#)
- [Preduzeća koja nisu dostavila izveštaje](#)

**PROIZVODI KOJI NAKON UPOTREBE POSTAJU POSEBNI TOKOVI OTPADA**

- [Preduzeća koja su dostavila izveštaje](#)
- [Preduzeća koja nisu dostavila izveštaje](#)

**UPRAVLJANJE OTPADOM**

**Proizvođači otpada - GIO1**

- [Preduzeća koja su dostavila izveštaje](#)

**Operatori na deponiji - GIO2**

- [Preduzeća koja su dostavila izveštaje](#)
- [Preduzeća koja nisu dostavila izveštaje](#)

**Operatori postrojenja za tretman - GIO3**

- [Preduzeća koja su dostavila izveštaje](#)
- [Preduzeća koja nisu dostavila izveštaje](#)

**Izvoznici otpada - GIO4**

- [Preduzeća koja su dostavila izveštaje](#)
- [Preduzeća koja nisu dostavila izveštaje](#)

**Uvoznici otpada - GIO5**

- [Preduzeća koja su dostavila izveštaje](#)
- [Preduzeća koja nisu dostavila izveštaje](#)

**KOMUNALNI OTPAD**

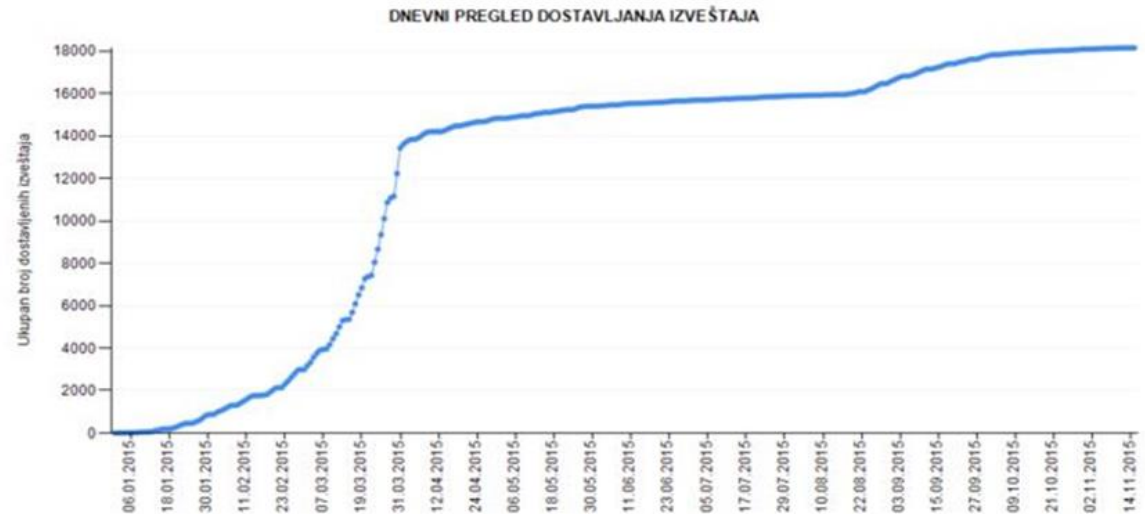
- [Dokladi za koje su dostavljani podaci](#)
- [Dokladi za koje nisu dostavljani podaci](#)

**AMBALAŽA STAVLJENA NA TRŽIŠTE**

- [Preduzeća koja su dostavila izveštaje po operatorima](#)
- [Preduzeća koja su dostavila izveštaje i nemaju operatore](#)

[TREND DOSTAVLJANJA IZVEŠTAJA](#)

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Agencija za zaštitu životne sredine  
NACIONALNI REGISTAR IZVORA ZAGAĐIVANJA



## Portal for data submission trend monitoring

### PRTR REGISTAR (REGISTAR VELIKIH IZVORA ZAGAĐIVANJA)

#### Preduzeća koja su dostavila kompletne izveštaje

U izveštaju je prikazana lista PRTR preduzeća koja su u potpunosti ispunila obavezu izveštavanja.

"Da" znači da je obaveza izveštavanja ispunjena za dati obrazac.

"Ne" znači da obaveza izveštavanja nije ispunjena za dati obrazac.

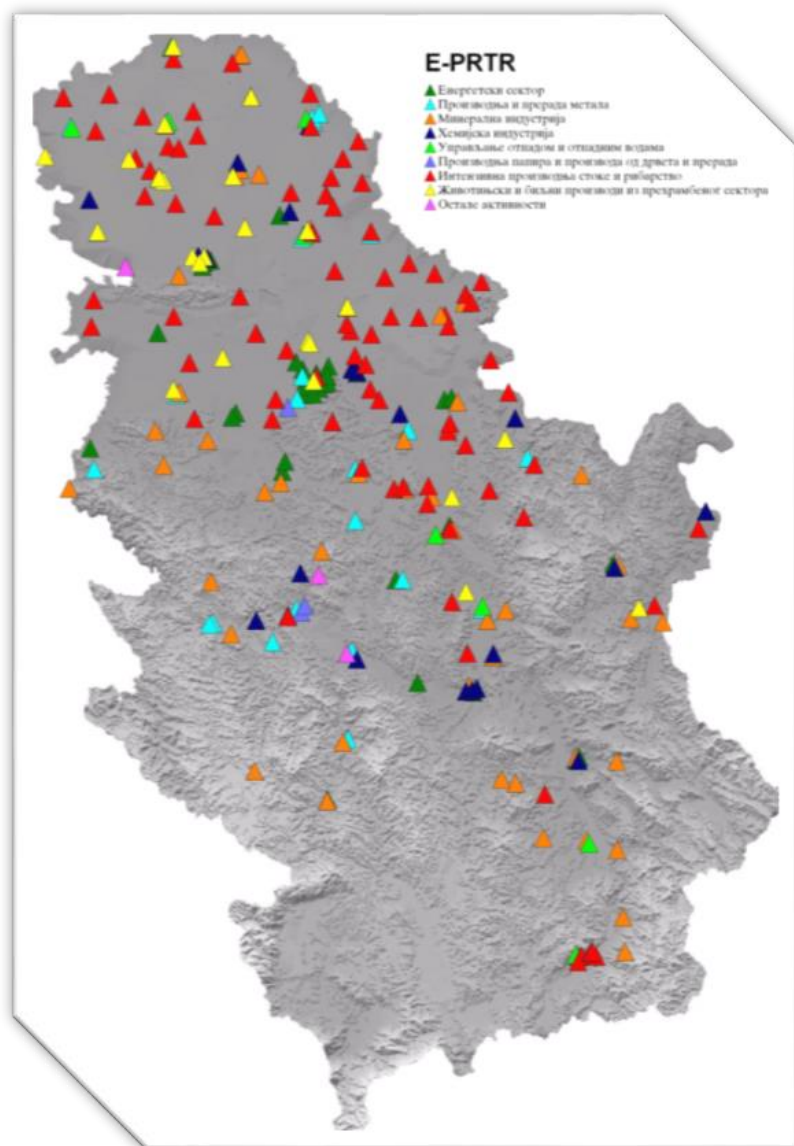
"-" znači da ne postoji obaveza izveštavanja za dati obrazac.

Oznaka npr. "10/8" (u kolonama Obrazac 2, Obrazac 3 i Obrazac 4) predstavlja broj ispusta ili izvora zagađivanja za koje je trebalo dostaviti izveštaje (10) / broj ispusta ili izvora zagađivanja za koje je ispunjena obaveza izveštavanja (8).

Izveštajna godina: 2017

| 1 of 6                    |           |   |                      |                     |               |   |           |           |           |           |           |                                    |    |
|---------------------------|-----------|---|----------------------|---------------------|---------------|---|-----------|-----------|-----------|-----------|-----------|------------------------------------|----|
| Opština sedišta preduzeća | PIB       | Preduzeće   | Adresa preduzeća     | Opština postrojenja | Nacionalni ID | Postrojenje   | Obrazac 1 | Obrazac 2 | Obrazac 3 | Obrazac 4 | Obrazac 5 | Registrovano u godini izveštavanja |    |
| Ada                       | 106684675 | FARMAHALAS d.o.o. ADA   | Vinogradska 9        | Ada                 | 106684675/1   | FARMAHALAS d.o.o. Farma svinja                              | Da        | 1/1       | Da        | -         | -         | -                                  | Da |
| Alibunar                  | 101086675 | PP PEŠČARA DOO BANATSKI KARLOVAC  | NEMANJINA 76         | Alibunar            | 101086675/1   | Farma tovljenika "PEŠČARA"                                  | Da        | 1/1       | Da        | -         | -         | -                                  | Da |
| Apatin                    | 100962933 | Apatinska pivara D.O.O  | Trg Oslobođenja 5 5  | Apatin              | 100962933     | Apatinska pivara d.o.o                                      | Da        | 10/10     | Da        | 1/1       | Da        | -                                  | Da |
| Bačka Palanka             | 100495907 | CARLSBERG SRBIJA  | Proleterska 17       | Bačka Palanka       | 100495907     | CARLSBERG SRBIJA  | Da        | 7/7       | Da        | 1/1       | Da        | -                                  | Da |
|                           | 100753461 | Tarkett doo   | Industrijska zona 14 | Bačka Palanka       | 100753461     | Tarkett doo, Fabrika podnih obloga                          | Da        | 21/21     | Da        | 5/5       | Da        | -                                  | Da |
| Bačka Topola              | 101443938 | Agroindustrijski kombinat Backa Topola doo  | Maršala Tita 61      | Bačka Topola        | 101443938     | Agroindustrijski kombinat Backa Topola ad, Kafilerija Zibel | Da        | 1/1       | Da        | 1/1       | Da        | -                                  | -  |
|                           | 101444060 | Perutnina Ptuj-Topiko d.o.o.za proizvodnju promet živine i živinarskih proizvoda Bačka Topola | Petefi Brigade 2     | Bačka Topola        | 101444060/1   | Perutnina Ptuj - Topiko d.o.o Farma živine Repro centar     | Da        | 1/1       | Da        | -         | -         | -                                  | Da |
|                           |           |   |                      |                     | 101444060/2   | Perutnina Ptuj - Topiko d.o.o Farma živine                  | Da        | 1/1       | Da        | -         | -         | -                                  | Da |





SEPA collect data from various fields of industrial and communal pollution:

- Emission to air
- Emission to water
- Waste generation and management
- Inland movement of waste
- **Transboundary movement of waste**
- Products that become special waste streams after use
- **VOC**
- **F gasses**
- **CLRTAP and GHG inventories**
- etc.



## Data quality

Data providers are facilities.

- Two types of data:

1. Master data – Name, Address, Technical data
2. Annual data – Emissions, Consumption, Products

- ✓ All master data are mandatory and typed once, except in the case of changing. SEPA compare entered master data with other data sources such as Agency for Business Registration, Custom office etc.

- ✓ Annual data are mandatory for prescribed emission sources within facility and pollutants. All data cells are protected from incorrectly entered data.

If all the required fields are not entered, the form can not be saved and user is forced to go back and correct mistakes.

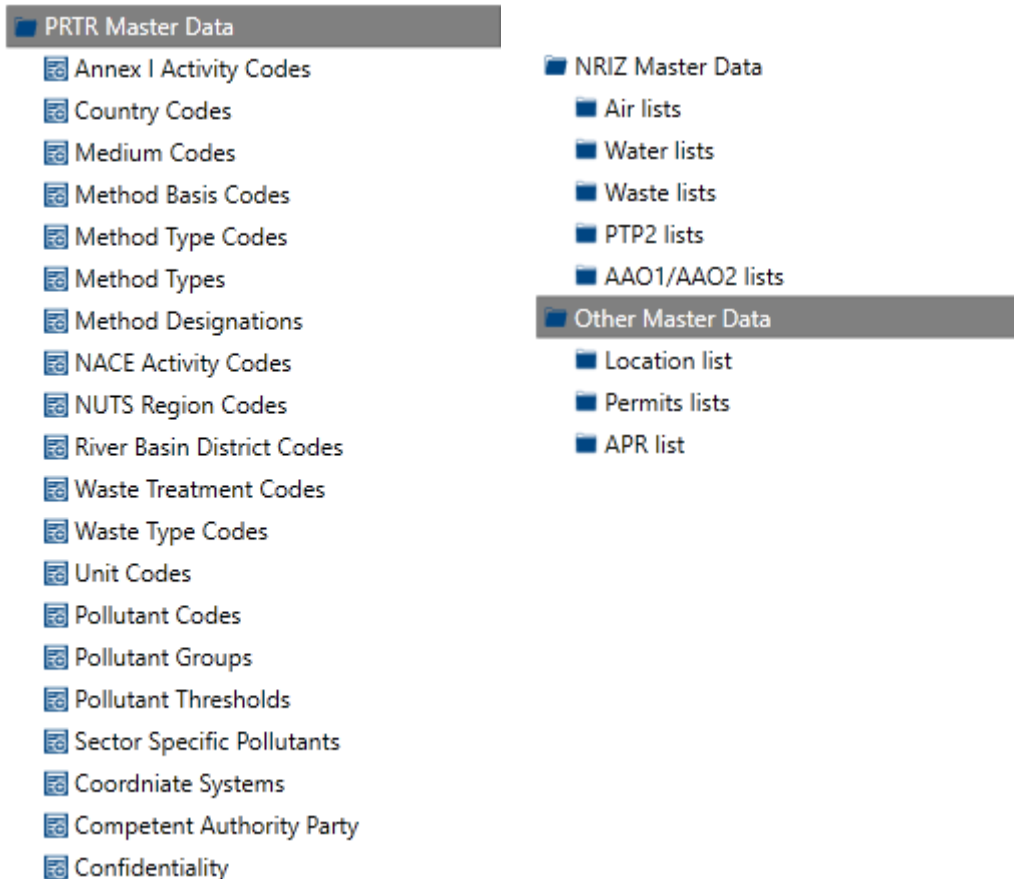
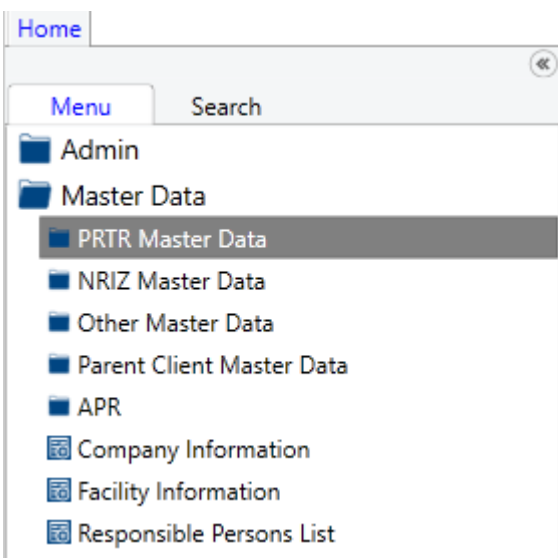
Detailed control of entered numeric data is not possible but SEPA IT system, after entering, checks overlay values through the years.

## Data quality

Data providers are facilities. They are not always interested to give a detailed answer, they want to avoid reporting, so it is necessary to encourage to fill data properly.

- Don't give the opportunity to operators to make a mistake.
- Minimize free writing (everybody can make a typing mistakes) – especially in the cells which can be use for search or sort data
- Use code lists instead of words for search – waste code from European waste catalog, NACE codes for economic activities, business registers, etc.
- If the list code do not exist make your own.
- Use of all possible IT controls such as:
  - drop down lists,
  - previously prepared queries,
  - previously prepared reports,

## Data lists



## Data quality check using overlay statistic method

| Postrojenje   | Indeksni broj | Opis otpada  | 2011    | 2012   | 2013     | 2014   | 2015  |
|---|---------------|--|---------|--------|----------|--------|-------|
| Preduzeće za proizvodnju, trgovinu i usluge Gir d.o.o.              | 12 01 01      | struganje i obrada ferometala                                | 300     | 2      | 9,3      | 10,8   | 13,7  |
| Privredno društvo za proizvodnju, promet, uvoz izvoz Komak-M d.o.o. | 19 12 02      | metali koji sadrže gvožđe                                    | 330     | 3      | 289      | 444    | 415,3 |
| Apatinska pivara ad   | 15 01 01      | papirna i kartonska ambalaža                                 | 190,1   | 304,8  | 481,9    | 421,9  | 433,3 |
| Apatinska pivara ad   | 15 01 07      | staklena ambalaža  | 18812,6 | 1881,4 | 1619,1   | 1247,6 | 401,9 |
| Apatinska pivara ad   | 19 12 04      | plastika i guma  | 33      | 49     | 115,7    | 32,2   | 62,8  |
| "Knjaz Miloš" AD  | 15 01 04      | metalna ambalaža   | 98      | 3      | 18       | 12     | 10    |
| "Knjaz Miloš" AD  | 15 01 07      | staklena ambalaža  | 373     | 198    | 233      | 219    | 91    |
| KOVIS BP d.o.o. export-import Bačka Palanka                         | 20 03 01      | mešani komunalni otpad                                       | 4,8     | 0      | 4,8      | 4,8    | 4,8   |
| Dom zdravlja "dr Janoš Hadži" Bačka Topola                          | 20 02 01      | biodegradabilni otpad  | 30      | 30     | 30       | 30     | 30    |
| NISSAL  | 10 03 16      | plivajuća pena/šljaka drugačiji od onih navedenih u 10 03 15 | 230     | 310    | 226203,3 | 290    | 333   |

## Data validation

- Analytical reports – Dozens of different reports for internal use and reports preparation.
- Data validation reports
- Data compared through the years.
- Comparison between facilities
- Emission to air, emission to water, waste management reports

Teams SR report - Internet Explorer

http://www.emc-centar.gov.rs/TeamsCInternal/ReportView.aspx?FacilityName=WasteGroup&group=odlozba&year=2015&UnitRange=odlozba&Period=Year

Količine proizvedenog otpada - Grupa, Podgrupa, Indeksni broj

| Indeksni broj | Opiš  | Količina [t] |
|---------------|---|--------------|
| 01            | OTPADEK KOJI NASTAJA U ISTRAŽIVANJIMA, ISKOPAVANJIMA I U RUČNIKA I U KAMENOLOMIMA, I U PODIZANJU I U REMONIRANJU TR | 376319.24    |
| 02            | OTPADEK IZ POLJOPRIVREDE, KONTAKTILNOSTI, AGROKULTURE, UMARŠTVA, LOVA I RIBOLOVA, PREPRME I PREPADE I RRA           | 168532.48    |
| 03            | OTPADEK OD PRAVADE DRVITA I PROVOJENOSTI KAPILA, KARTONA, PLOVE, PANKA, IMAKASTIVA                                  | 10718.68     |
| 04            | OTPADEK IZ TEKSTILNE, KOKARNE I KOŠARKE INDUSTRIJE  | 171465.3     |
| 05            | OTPADEK OD KATINGSKIH NAPETI, PREČIŠĆAVANJA PEROVONOS GASA I PROČIŠĆENOSTI TRETMANA USLUS                           | 5171.11      |
| 06            | OTPADEK OD MEKANSKIH REMONIRANJA  | 1699.14      |
| 07            | OTPADEK OD OBRANSKIH REMONIRANJA  | 1699.14      |
| 08            | OTPADEK OD PRODUKCIJE, KOMUNIKACIJE, IMAKOVANJA I UPOTRREBE PREMAZA (BOJE, LAKOVI I STAKLUNE GLAZURE) I             | 1418.48      |
| 09            | OTPADEK IZ FOTOGRAFISKE INDUSTRIJE  | 1275.95      |
| 10            | OTPADEK IZ TERMOČIŠNOSTI  | 4421161.83   |
| 11            | OTPADEK OD REMONIRANJA TRETMANA POVRŠINE I ZAŠTITE METALA I DRUGIH MATERIJALA, IMAKOVANJA IMAKOVANJA IMAKOVANJA     | 1291.35      |
| 12            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 51726.71     |
| 13            | OTPADEK OD ULJA I OSTATAKA TEČNIH GORIVA I OSTATAKA JETIŠNIH ULJA I OSTATAKA IMAKOVANJA IMAKOVANJA IMAKOVANJA       | 11663.3      |
| 14            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 87.88        |
| 15            | OTPADEK OD AMALJAZI, APOKOSITNI, KRIJE ZA BRIGANJE, FILTRIRANI MATERIJALI I ZAŠTITNE TRAMINE, AKO NISU DRUGAČI      | 85517.28     |
| 16            | OTPADEK KOJI NISU DRUGAČI SPECIFIKOVANI U KATALOGU  | 46176.36     |
| 17            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 104314.18    |
| 18            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 6000.84      |
| 19            | OTPADEK IZ POSTROJENJA ZA OBRANSKOST, POSLOVA ZA TRETMAN OTPAĐNIH VODA VAN MESTA NASTAJANJA I PRIP                  | 180958.1     |
| 20            | KOMUNALNI OTPADEK IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                                 | 17772.38     |

Teams SR report - Internet Explorer

http://www.emc-centar.gov.rs/TeamsCInternal/ReportView.aspx?FacilityName=EmissiontoAir&year=2015&UnitRange=odlozba&Period=Year

Emisije u vazduh po zagađujućim materijama

| Indeksni broj | Opiš  | Količina [t] | Indeksni broj | Opiš  | Količina [t] |
|---------------|---|--------------|---------------|---|--------------|
| 01            | OTPADEK KOJI NASTAJA U ISTRAŽIVANJIMA, ISKOPAVANJIMA I U RUČNIKA I U KAMENOLOMIMA, I U PODIZANJU I U REMONIRANJU TR | 376319.24    | 01            | OTPADEK KOJI NASTAJA U ISTRAŽIVANJIMA, ISKOPAVANJIMA I U RUČNIKA I U KAMENOLOMIMA, I U PODIZANJU I U REMONIRANJU TR | 376319.24    |
| 02            | OTPADEK IZ POLJOPRIVREDE, KONTAKTILNOSTI, AGROKULTURE, UMARŠTVA, LOVA I RIBOLOVA, PREPRME I PREPADE I RRA           | 168532.48    | 02            | OTPADEK IZ POLJOPRIVREDE, KONTAKTILNOSTI, AGROKULTURE, UMARŠTVA, LOVA I RIBOLOVA, PREPRME I PREPADE I RRA           | 168532.48    |
| 03            | OTPADEK OD PRAVADE DRVITA I PROVOJENOSTI KAPILA, KARTONA, PLOVE, PANKA, IMAKASTIVA                                  | 10718.68     | 03            | OTPADEK OD PRAVADE DRVITA I PROVOJENOSTI KAPILA, KARTONA, PLOVE, PANKA, IMAKASTIVA                                  | 10718.68     |
| 04            | OTPADEK IZ TEKSTILNE, KOKARNE I KOŠARKE INDUSTRIJE  | 171465.3     | 04            | OTPADEK IZ TEKSTILNE, KOKARNE I KOŠARKE INDUSTRIJE  | 171465.3     |
| 05            | OTPADEK OD KATINGSKIH NAPETI, PREČIŠĆAVANJA PEROVONOS GASA I PROČIŠĆENOSTI TRETMANA USLUS                           | 5171.11      | 05            | OTPADEK OD KATINGSKIH NAPETI, PREČIŠĆAVANJA PEROVONOS GASA I PROČIŠĆENOSTI TRETMANA USLUS                           | 5171.11      |
| 06            | OTPADEK OD MEKANSKIH REMONIRANJA  | 1699.14      | 06            | OTPADEK OD MEKANSKIH REMONIRANJA  | 1699.14      |
| 07            | OTPADEK OD OBRANSKIH REMONIRANJA  | 1699.14      | 07            | OTPADEK OD OBRANSKIH REMONIRANJA  | 1699.14      |
| 08            | OTPADEK OD PRODUKCIJE, KOMUNIKACIJE, IMAKOVANJA I UPOTRREBE PREMAZA (BOJE, LAKOVI I STAKLUNE GLAZURE) I             | 1418.48      | 08            | OTPADEK OD PRODUKCIJE, KOMUNIKACIJE, IMAKOVANJA I UPOTRREBE PREMAZA (BOJE, LAKOVI I STAKLUNE GLAZURE) I             | 1418.48      |
| 09            | OTPADEK IZ FOTOGRAFISKE INDUSTRIJE  | 1275.95      | 09            | OTPADEK IZ FOTOGRAFISKE INDUSTRIJE  | 1275.95      |
| 10            | OTPADEK IZ TERMOČIŠNOSTI  | 4421161.83   | 10            | OTPADEK IZ TERMOČIŠNOSTI  | 4421161.83   |
| 11            | OTPADEK OD REMONIRANJA TRETMANA POVRŠINE I ZAŠTITE METALA I DRUGIH MATERIJALA, IMAKOVANJA IMAKOVANJA IMAKOVANJA     | 1291.35      | 11            | OTPADEK OD REMONIRANJA TRETMANA POVRŠINE I ZAŠTITE METALA I DRUGIH MATERIJALA, IMAKOVANJA IMAKOVANJA IMAKOVANJA     | 1291.35      |
| 12            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 51726.71     | 12            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 51726.71     |
| 13            | OTPADEK OD ULJA I OSTATAKA TEČNIH GORIVA I OSTATAKA JETIŠNIH ULJA I OSTATAKA IMAKOVANJA IMAKOVANJA IMAKOVANJA       | 11663.3      | 13            | OTPADEK OD ULJA I OSTATAKA TEČNIH GORIVA I OSTATAKA JETIŠNIH ULJA I OSTATAKA IMAKOVANJA IMAKOVANJA IMAKOVANJA       | 11663.3      |
| 14            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 87.88        | 14            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 87.88        |
| 15            | OTPADEK OD AMALJAZI, APOKOSITNI, KRIJE ZA BRIGANJE, FILTRIRANI MATERIJALI I ZAŠTITNE TRAMINE, AKO NISU DRUGAČI      | 85517.28     | 15            | OTPADEK OD AMALJAZI, APOKOSITNI, KRIJE ZA BRIGANJE, FILTRIRANI MATERIJALI I ZAŠTITNE TRAMINE, AKO NISU DRUGAČI      | 85517.28     |
| 16            | OTPADEK KOJI NISU DRUGAČI SPECIFIKOVANI U KATALOGU  | 46176.36     | 16            | OTPADEK KOJI NISU DRUGAČI SPECIFIKOVANI U KATALOGU  | 46176.36     |
| 17            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 104314.18    | 17            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 104314.18    |
| 18            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 6000.84      | 18            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 6000.84      |
| 19            | OTPADEK IZ POSTROJENJA ZA OBRANSKOST, POSLOVA ZA TRETMAN OTPAĐNIH VODA VAN MESTA NASTAJANJA I PRIP                  | 180958.1     | 19            | OTPADEK IZ POSTROJENJA ZA OBRANSKOST, POSLOVA ZA TRETMAN OTPAĐNIH VODA VAN MESTA NASTAJANJA I PRIP                  | 180958.1     |
| 20            | KOMUNALNI OTPADEK IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                                 | 17772.38     | 20            | KOMUNALNI OTPADEK IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                                 | 17772.38     |

Teams SR report - Internet Explorer

http://www.emc-centar.gov.rs/TeamsCInternal/ReportView.aspx?FacilityName=WasteManagement&year=2015&UnitRange=odlozba&Period=Year

Količine generisanog otpada - pregled po godinama

| Indeksni broj | Opiš  | Količina [t] | Indeksni broj | Opiš  | Količina [t] |
|---------------|---|--------------|---------------|---|--------------|
| 01            | OTPADEK KOJI NASTAJA U ISTRAŽIVANJIMA, ISKOPAVANJIMA I U RUČNIKA I U KAMENOLOMIMA, I U PODIZANJU I U REMONIRANJU TR | 376319.24    | 01            | OTPADEK KOJI NASTAJA U ISTRAŽIVANJIMA, ISKOPAVANJIMA I U RUČNIKA I U KAMENOLOMIMA, I U PODIZANJU I U REMONIRANJU TR | 376319.24    |
| 02            | OTPADEK IZ POLJOPRIVREDE, KONTAKTILNOSTI, AGROKULTURE, UMARŠTVA, LOVA I RIBOLOVA, PREPRME I PREPADE I RRA           | 168532.48    | 02            | OTPADEK IZ POLJOPRIVREDE, KONTAKTILNOSTI, AGROKULTURE, UMARŠTVA, LOVA I RIBOLOVA, PREPRME I PREPADE I RRA           | 168532.48    |
| 03            | OTPADEK OD PRAVADE DRVITA I PROVOJENOSTI KAPILA, KARTONA, PLOVE, PANKA, IMAKASTIVA                                  | 10718.68     | 03            | OTPADEK OD PRAVADE DRVITA I PROVOJENOSTI KAPILA, KARTONA, PLOVE, PANKA, IMAKASTIVA                                  | 10718.68     |
| 04            | OTPADEK IZ TEKSTILNE, KOKARNE I KOŠARKE INDUSTRIJE  | 171465.3     | 04            | OTPADEK IZ TEKSTILNE, KOKARNE I KOŠARKE INDUSTRIJE  | 171465.3     |
| 05            | OTPADEK OD KATINGSKIH NAPETI, PREČIŠĆAVANJA PEROVONOS GASA I PROČIŠĆENOSTI TRETMANA USLUS                           | 5171.11      | 05            | OTPADEK OD KATINGSKIH NAPETI, PREČIŠĆAVANJA PEROVONOS GASA I PROČIŠĆENOSTI TRETMANA USLUS                           | 5171.11      |
| 06            | OTPADEK OD MEKANSKIH REMONIRANJA  | 1699.14      | 06            | OTPADEK OD MEKANSKIH REMONIRANJA  | 1699.14      |
| 07            | OTPADEK OD OBRANSKIH REMONIRANJA  | 1699.14      | 07            | OTPADEK OD OBRANSKIH REMONIRANJA  | 1699.14      |
| 08            | OTPADEK OD PRODUKCIJE, KOMUNIKACIJE, IMAKOVANJA I UPOTRREBE PREMAZA (BOJE, LAKOVI I STAKLUNE GLAZURE) I             | 1418.48      | 08            | OTPADEK OD PRODUKCIJE, KOMUNIKACIJE, IMAKOVANJA I UPOTRREBE PREMAZA (BOJE, LAKOVI I STAKLUNE GLAZURE) I             | 1418.48      |
| 09            | OTPADEK IZ FOTOGRAFISKE INDUSTRIJE  | 1275.95      | 09            | OTPADEK IZ FOTOGRAFISKE INDUSTRIJE  | 1275.95      |
| 10            | OTPADEK IZ TERMOČIŠNOSTI  | 4421161.83   | 10            | OTPADEK IZ TERMOČIŠNOSTI  | 4421161.83   |
| 11            | OTPADEK OD REMONIRANJA TRETMANA POVRŠINE I ZAŠTITE METALA I DRUGIH MATERIJALA, IMAKOVANJA IMAKOVANJA IMAKOVANJA     | 1291.35      | 11            | OTPADEK OD REMONIRANJA TRETMANA POVRŠINE I ZAŠTITE METALA I DRUGIH MATERIJALA, IMAKOVANJA IMAKOVANJA IMAKOVANJA     | 1291.35      |
| 12            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 51726.71     | 12            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 51726.71     |
| 13            | OTPADEK OD ULJA I OSTATAKA TEČNIH GORIVA I OSTATAKA JETIŠNIH ULJA I OSTATAKA IMAKOVANJA IMAKOVANJA IMAKOVANJA       | 11663.3      | 13            | OTPADEK OD ULJA I OSTATAKA TEČNIH GORIVA I OSTATAKA JETIŠNIH ULJA I OSTATAKA IMAKOVANJA IMAKOVANJA IMAKOVANJA       | 11663.3      |
| 14            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 87.88        | 14            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 87.88        |
| 15            | OTPADEK OD AMALJAZI, APOKOSITNI, KRIJE ZA BRIGANJE, FILTRIRANI MATERIJALI I ZAŠTITNE TRAMINE, AKO NISU DRUGAČI      | 85517.28     | 15            | OTPADEK OD AMALJAZI, APOKOSITNI, KRIJE ZA BRIGANJE, FILTRIRANI MATERIJALI I ZAŠTITNE TRAMINE, AKO NISU DRUGAČI      | 85517.28     |
| 16            | OTPADEK KOJI NISU DRUGAČI SPECIFIKOVANI U KATALOGU  | 46176.36     | 16            | OTPADEK KOJI NISU DRUGAČI SPECIFIKOVANI U KATALOGU  | 46176.36     |
| 17            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 104314.18    | 17            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 104314.18    |
| 18            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 6000.84      | 18            | OTPADEK OD OBRANSKIH IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                              | 6000.84      |
| 19            | OTPADEK IZ POSTROJENJA ZA OBRANSKOST, POSLOVA ZA TRETMAN OTPAĐNIH VODA VAN MESTA NASTAJANJA I PRIP                  | 180958.1     | 19            | OTPADEK IZ POSTROJENJA ZA OBRANSKOST, POSLOVA ZA TRETMAN OTPAĐNIH VODA VAN MESTA NASTAJANJA I PRIP                  | 180958.1     |
| 20            | KOMUNALNI OTPADEK IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                                 | 17772.38     | 20            | KOMUNALNI OTPADEK IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA IMAKOVANJA                                 | 17772.38     |

## New Serbian PRTR data validation tool

### Blockchain technology

This technology will be applied to the waste movement in Serbia and annual reporting on waste management



## Polluter pays principle

The 'polluter pays' principle is the commonly accepted practice that those who produce pollution should bear the costs of managing it to prevent damage to human health or the environment. For instance, a factory that produces a potentially poisonous substance as a by-product of its activities is usually held responsible for its safe disposal.

The polluter pays principle is part of a set of broader principles to guide sustainable development worldwide (formally known as the 1992 Rio Declaration).



## Polluter pays principle

They have a dual function: fiscal and environmental. Their use provides financial resources, as well as an incentive for the private and business sector to align their behavior and activities with the policy objectives of the environment. Therefore, they have an incentive and criminal character.

According Serbian Environmental Law, all PRTR companies need to pay polluter pays fees.

- Emission to air,
- Waste generation and management,
- **Emission to water.**



## Extended Producer Responsibility

Extended Producer Responsibility (EPR) is a policy approach under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products.

Assigning such responsibility could in principle provide incentives to prevent wastes at the source, promote product design for the environment and support the achievement of public recycling and materials management goals. Within the many countries the trend is towards the extension of EPR to new products, product groups and waste streams such as electrical appliances and electronics.

## Extended Producer Responsibility

### Products:

- Tires,
- Motor oils
- Vehicles
- Electric and electronic equipment
- Batteries and accumulators

In the information system of the National Register, in the period from 2011 to 2018, collected data for fees in the amount of more than 62 billion RSD, or around 600 millions USD.

## **Challenges and Problems**

### **Human Capacities in SEPA in 2008**

In SEPA only one person was in charge on the PRTR.

### **Human Capacities in SEPA in 2018**

In SEPA there are 3 permanent employees and 4 employees on contract in charge on the PRTR.

## Challenges and Problems

### The reporting obligations – spreading information

The report submitting entities attempt to evade their obligations in all possible ways, no matter of the field – Air or water emissions, water etc., stating that they were not aware of the obligation to report, that they cannot collect data or that they simply do not want to report.

It is not acceptable that companies do not know about reporting obligations after 8 years from passing the bylaws. It is visible from practice that report submitting entities very successfully exchange information among themselves. For the purpose to overcome this problem, the Agency sends a letter to all report submitting entities each year, early in April, in order to inform them that they did not fulfil their obligations.

## Challenges and Problems

### The reporting obligations – spreading informations

One of the main problems is that companies do not have reporting continuity, except large operators. Some of them change person submitting the report each year, leading to different results each year.

For the purpose of building capacities of report submitting entities, the employees of the National Register Department hold 15 and 20 seminars a year, independently or in cooperation with the Ministry or Chamber of Commerce on all the report-related topics, especially for the newly established reporting.

For example, 7 seminars in the entire Serbia were held for the Document on waste movement, as new reporting obligation. Average report submitting entities response is over 100, or even 200 attendees.

## Challenges and Problems

Existing PRTR register is high level instrument which can be used for data collection and report preparation for different international conventions and other reporting obligations.

PRTR register with minor data changes and extensions can be used for fulfill many other reporting obligations.

**Public Access to Data is prescribed by Environmental law.**

### **Principle of public information and participation**

In the exercise of the right to healthy environment everyone shall be entitled to be informed of the environmental status and to participate in the process of decision making whose implementation may have an effect towards the environment.

Different ways to present data to public:

1. Reports

- State of Environment report
- Sectoral reports – Waste, packaging and packaging waste, plastic bags, products etc.

2. Open data portal – E-government

3. PRTR portal with GIS component

4. NRIZ data portal

5. Waste GIS portal



## Serbian National PRTR portal



Republika Srbija  
Ministarstvo zaštite životne sredine  
Agencija za zaštitu životne sredine  
PRTR registar

[Home](#)  
[Public data](#)  
[Documents](#)  
[Reporting for operators](#)  
[Informations for operators](#)  
[Additional informations](#)  
[PRTR around the world](#)  
[Map](#)  
[Language: !\[\]\(15a01675795da3c0924461c44b8bf202\_img.jpg\)](#)  
[!\[\]\(5c21dc776ae4aea2d2bd6ea020387e51\_img.jpg\) Srpski](#)  
[!\[\]\(0bed848855ad146c0c43ffbd1e78abd6\_img.jpg\) English](#)

### POLLUTION RELEASE AND TRANSFER REGISTER

**On:** 

Dear users,

Welcome to the Pollution Release and Transfer Register portal of Republic of Serbia. This Register is a part of National Register of Pollution Sources, leads by Serbian Environmental Protection Agency.

PRTR register is a special international treaty developed as a Protocol of the Aarhus Convention and it is a new kind of international agreements in the environmental field. For the first time and on a detailed and specific way environmental issues and human rights are linked.

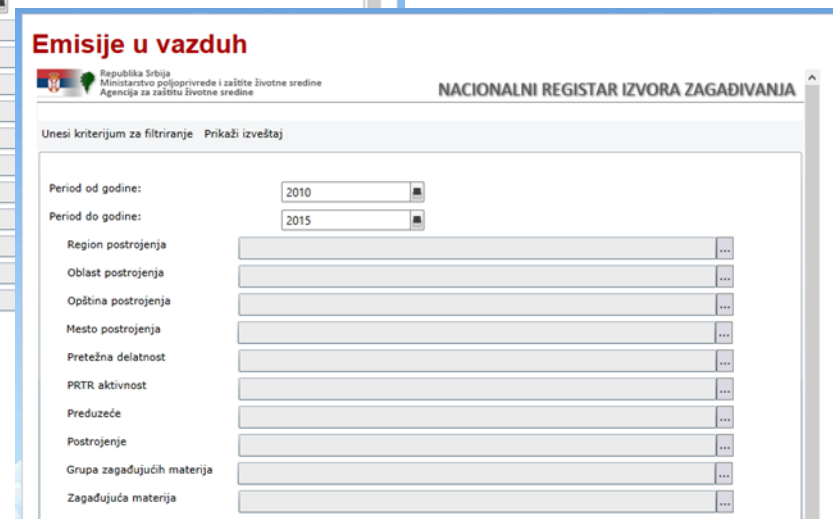
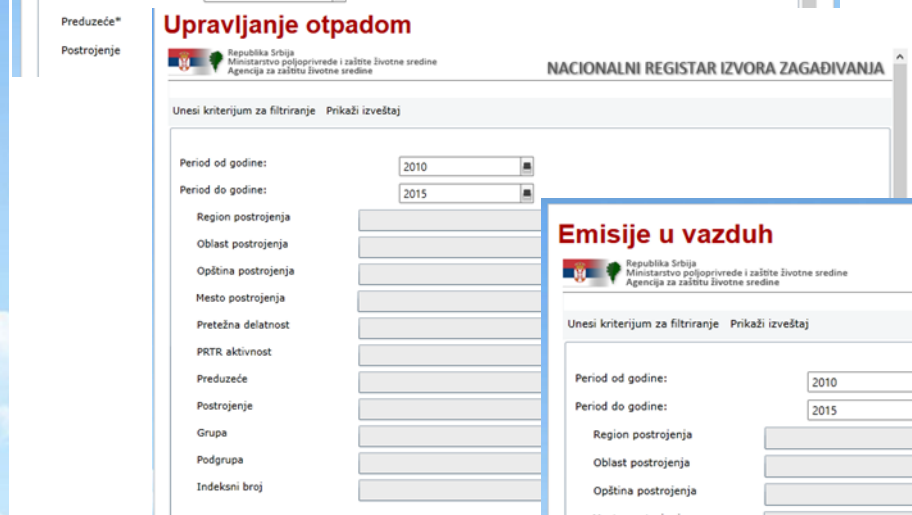
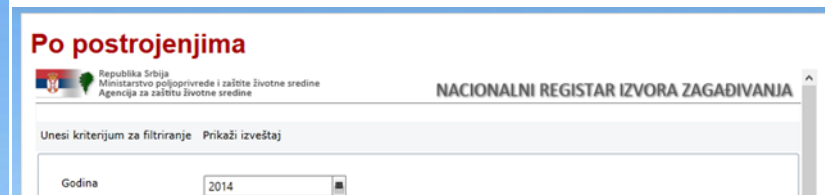
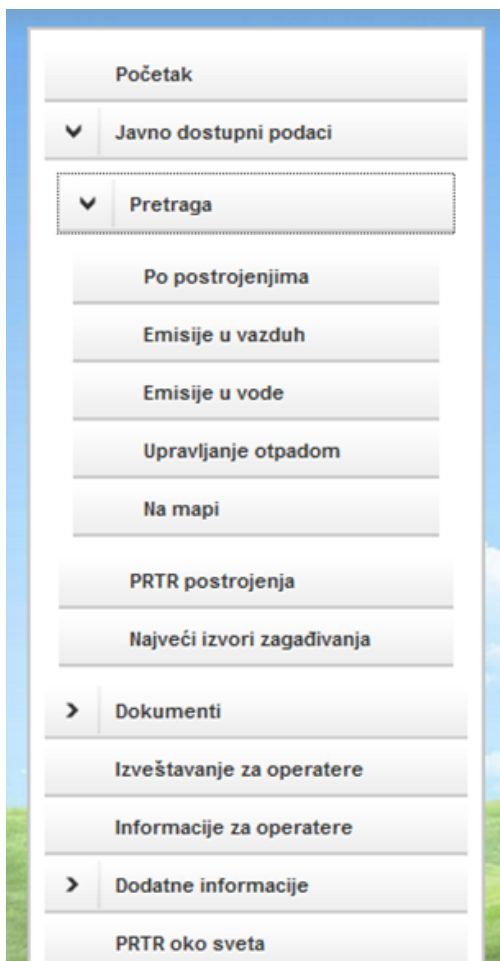
Serbia and Montenegro signed the PRTR Protocol in 2003. Serbia ratified protocol in 2011.

Serbia started with implementation of the PRTR Protocol and E-PRTR directive in 2008. Information system was developed in 2012, and GIS was developed in 2016.

In 2011, Serbia began with the submission of data from the E-PRTR Register of the European Environment Agency in Copenhagen on a voluntary basis, which is positively rated by the European Commission in all EC Progress Reports.



## Serbian National PRTR portal Search engine



# Serbian National PRTR portal

## Search on maps

Prostorni upit:

Godina:

NUTS2:

PRTR aktivnost:

Pretežna delatnost:

Emisije i otpad:

Voda:

Vazduh:

Otpad:

Map data © OpenStreetMap contributors, CC-BY-SA

Podaci o postrojenju   Emisije u vazduh   Emisije u vodu   Upravljanje otpadom

**Postrojenja (179 geoobjek(a)ta, 0 izabrano)** Opcije ▼

| Nacionalni ID | Postrojenje                 | Preduzeće                     |
|---------------|-----------------------------|-------------------------------|
| 100333611/1   | Farma B.P.S.                | D.O.O. "Agroprodukt-Šinković" |
| 103917325/1   | valjaonica betonskog gvozda | METALFER STEEL MILL D.O.O.    |
| 101487998     | TIPOPLASTIKA                | Tipoplastika doo              |
| 100123252     | 77. Milišević, Farmacija    | Farmacija Milišević           |

Transferring data from www.sepa.gov.rs...

# Serbian National PRTR portal

## Reports

Podaci o postrojenju
Emisije u vazduh
Emisije u vodu
Upravljanje otpadom

Preduzeće: **PD Termoelektrane Nikola Tesla**  
Nacionalni ID: 101217456/1  
Postrojenje: **PD Termoelektrane Nikola Tesla, TENT A**  
Adresa: Bogoljuba Urosevica Crnog 44, 11500 Beograd-Obrenovac

Pretežna delatnost: 35.11 - Proizvodnja električne energije  
Osnovna PRTR aktivnost: 1.(c) - Termoelektrane

Geografska dužina: 20.158189  
Geografska širina: 44.670558

Podaci o postrojenju
Emisije u vazduh
Emisije u vodu
Upravljanje otpadom

Zagađujuća materija: Azotni oksidi (NOx/NO2)  
Oznaka zagađujuće materije: **NOX**  
Način određivanja: Proračun  
Količina: **18000000** kg

Zagađujuća materija: Suspendovane cestice (PM10)  
Oznaka zagađujuće materije: **PM10**  
Način određivanja: Proračun  
Količina: **3640000** kg

Zagađujuća materija: Sumporni oksidi (SOx/SO2)  
Oznaka zagađujuće materije: **SOX**  
Način određivanja: Proračun  
Količina: **101000000** kg

Podaci o postrojenju
Emisije u vazduh
Emisije u vodu
Upravljanje otpadom

Zagađujuća materija: Hloridi (kao ukupni Cl)  
Oznaka zagađujuće materije: **CHLORIDES**  
Način određivanja: Merenje  
Količina: **11100000** kg

Zagađujuća materija: Arsen i jedinjenja arsena (kao As)  
Oznaka zagađujuće materije: **AS AND COMPOUNDS**  
Način određivanja: Merenje  
Količina: **1740** kg

Zagađujuća materija: Fluoridi (ukupni F)  
Oznaka zagađujuće materije: **FLUORIDES**  
Način određivanja: Merenje  
Količina: **33300** kg

Podaci o postrojenju
Emisije u vazduh
Emisije u vodu
Upravljanje otpadom

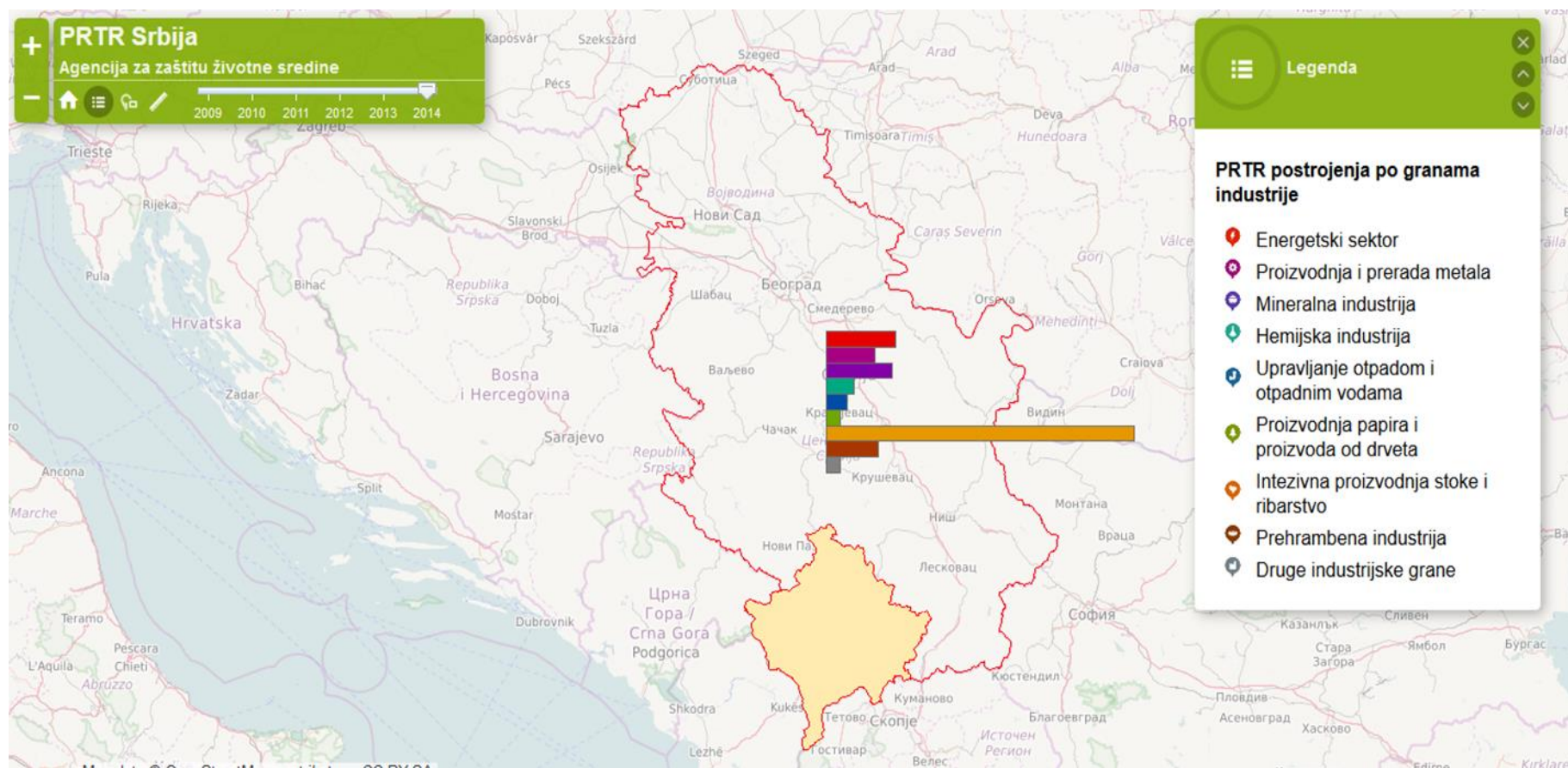
Vrsta otpada: Opasan otpad u zemlji  
Način određivanja: Procena  
Količina: **4** t  
Način postupanja: Namenjeno za odlaganje

Vrsta otpada: Opasan otpad u zemlji  
Način određivanja: Procena  
Količina: **59** t  
Način postupanja: Namenjeno za ponovnu upotrebu

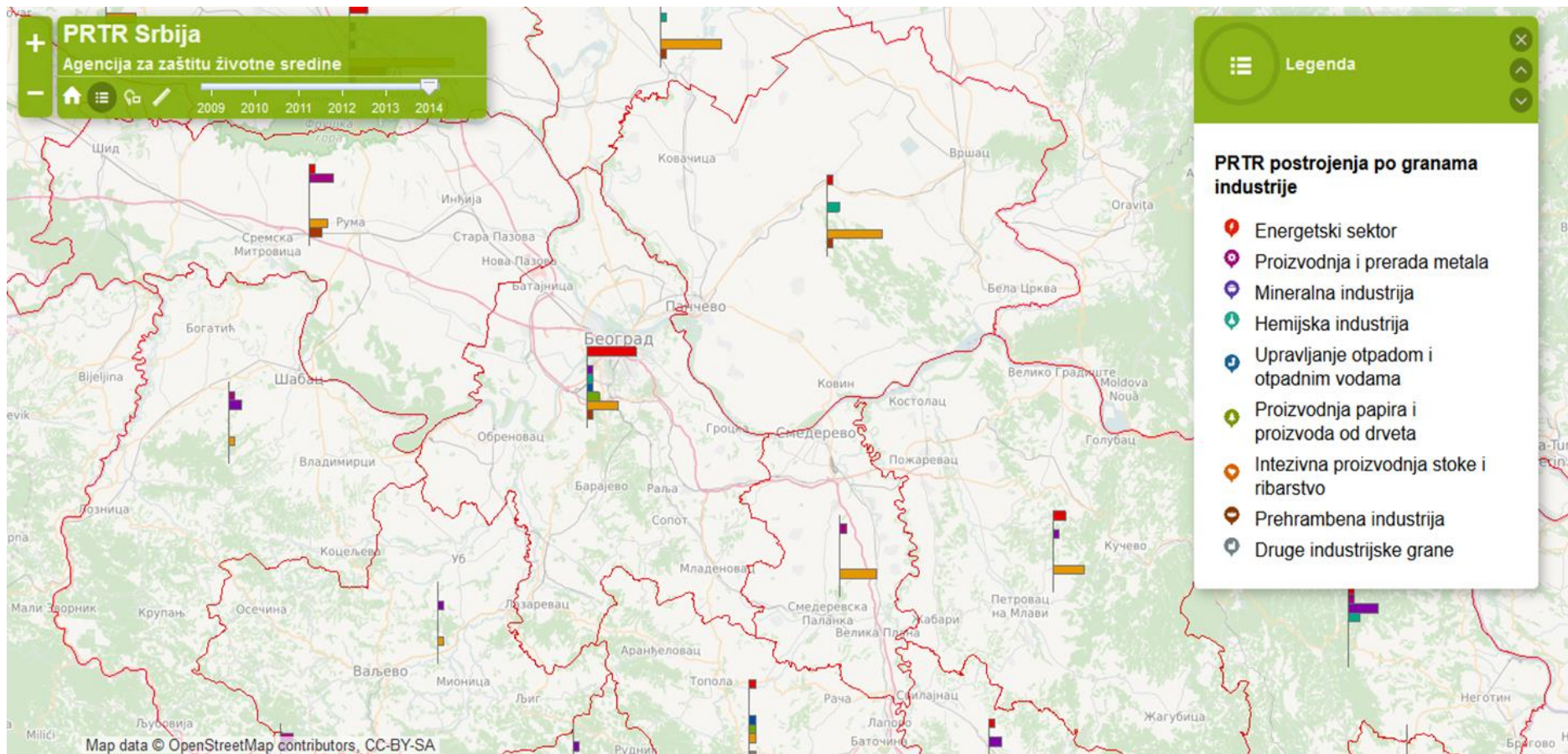
Vrsta otpada: Opasan otpad u zemlji  
Način određivanja: Merenje  
Količina: **26** t  
Način postupanja: Namenjeno za ponovnu upotrebu



## Serbian National PRTR portal Navigation

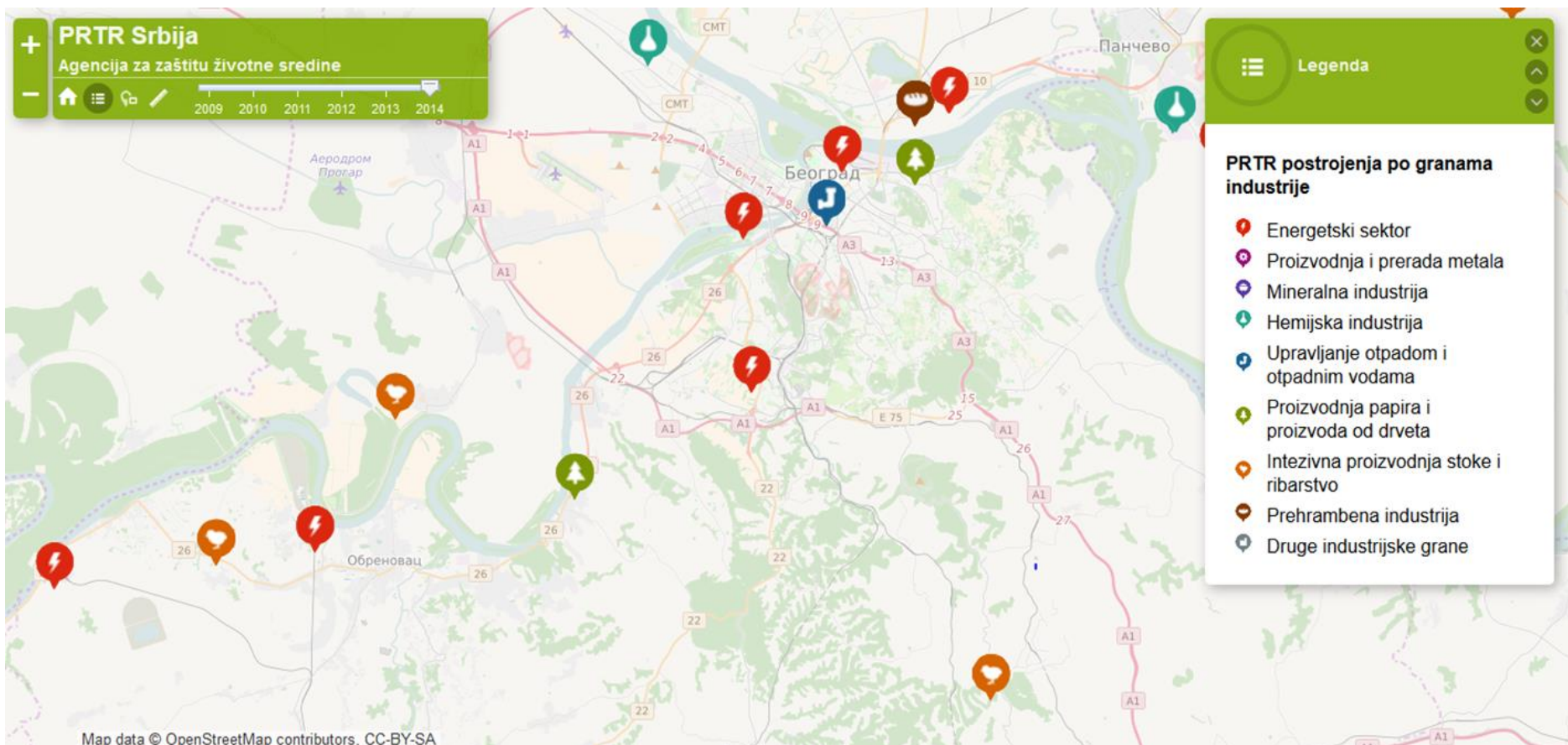


## Serbian National PRTR portal Navigation





## Serbian National PRTR portal Navigation



## Serbian National PRTR portal Navigation

The screenshot displays the Serbian National PRTR portal interface. At the top left, a green header bar contains the text "PRTR Srbija" and "Agencija za zaštitu životne sredine", along with a home icon, a menu icon, and a timeline from 2009 to 2014. The main area shows a map of a region with labels like "Кртинска", "Уровци", "Забрежје", "Обреновац", and "Боре Марковића". A red lightning bolt icon on the map indicates a selected facility. A white popup window titled "Pogon" is open, displaying the following information:

**Podaci o postrojenju**

Preduzeće: PD Termoelektrane Nikola Tesla  
Nacionalni ID: 101217456/1  
Postrojenje: PD Termoelektrane Nikola Tesla, TENT A  
Adresa: Bogoljuba Urosevica Crnog 44, 11500 Beograd-Obrenovac

Pretežna delatnost: 35.11 -  
Proizvodnja električne energije  
Osnovna PRTR aktivnost: 1.(c) -  
Termoelektrane i druga postrojenja za sagorevanje

Below the popup, three buttons are visible: "Emisije u vazduh", "Emisije u vode", and "Upravljanje otpadom". On the right side, a green header bar contains a menu icon and the text "Legenda". Below it, a white box titled "PRTR postrojenja po granama industrije" lists the following categories with corresponding icons:

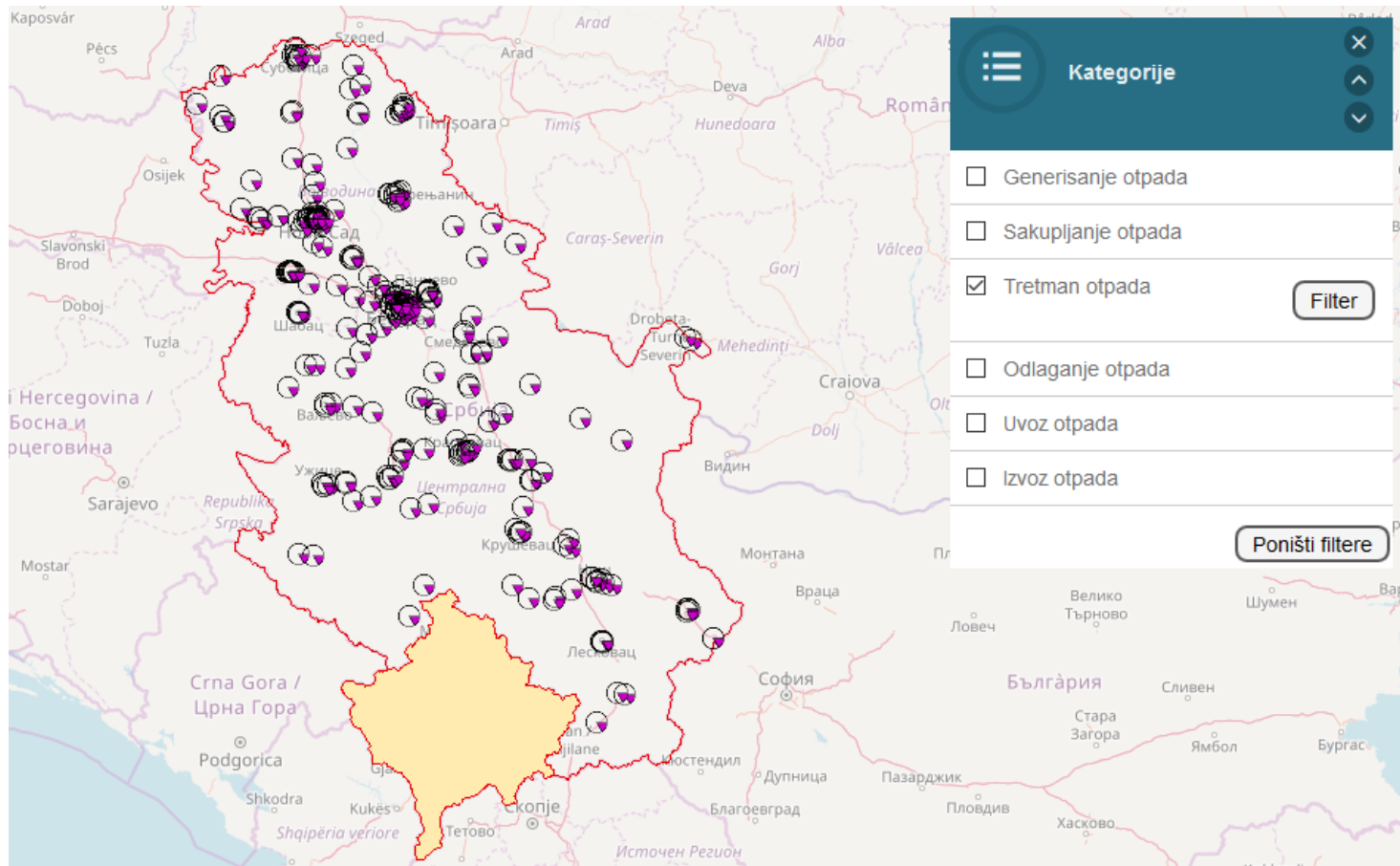
- Energetski sektor
- Proizvodnja i prerada metala
- Mineralna industrija
- Hemijska industrija
- Upravljanje otpadom i otpadnim vodama
- Proizvodnja papira i proizvoda od drveta
- Intezivna proizvodnja stoke i ribarstvo
- Prehrambena industrija
- Druge industrijske grane



# NRIZ GIS

## Waste management portal

**Waste  
treatment  
facilities**



# NRIZ GIS

## Waste management portal

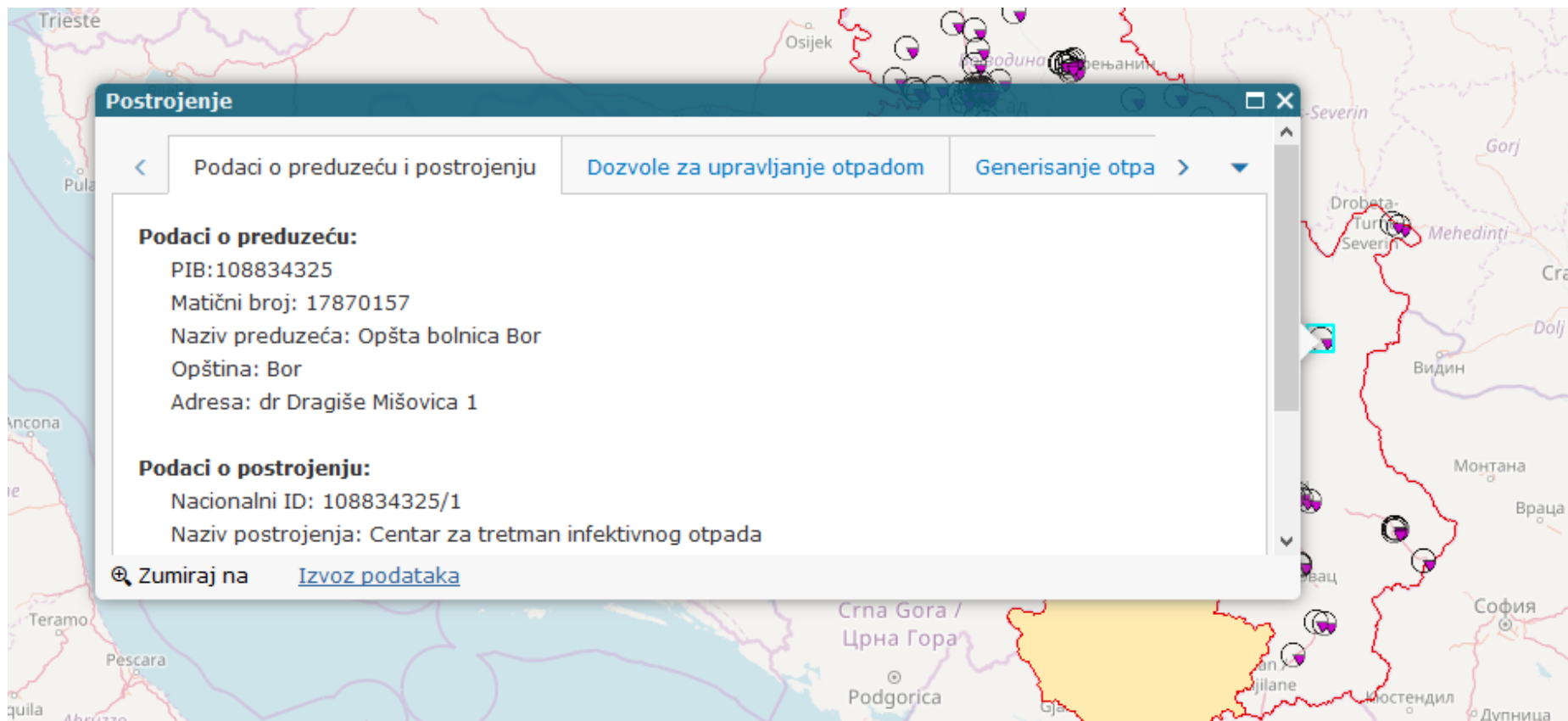
### Filters

- Geographical areas
- Waste codes
- Amount

The screenshot displays the NRIZ GIS Waste management portal interface. A map of the Balkans is visible in the background, showing parts of Romania, Bulgaria, and Serbia. Overlaid on the map is a 'Tretman otpada' (Waste Treatment) filter dialog box. The dialog box has a title bar with a close button. Below the title bar, there is a dropdown menu for 'Izveštajna godina: 2015'. The main section of the dialog is titled 'Geografske celine' (Geographical areas) and contains a search bar labeled 'Pretraži geografske celine'. Below the search bar, there are several checkboxes for selecting geographical areas: '(-) ☐ Srbija', '(+) ☐ Srbija - Jug', '(+) ☐ Region Južne i Istočne Srbije', '(+) ☐ Region Kosovo i Metohija', '(+) ☐ Region Šumadije i Zapadne Srbije', '(-) ☐ Srbija - Sever', '(+) ☐ Beogradski region', and '(+) ☐ Region Vojvodine'. Below these checkboxes, there are two expandable sections: 'Vrste otpada i indeksni brojevi' (Waste types and index numbers) and 'Količine otpada' (Waste quantities). At the bottom of the dialog box, there are two buttons: 'PONIŠTI' (Reset) and 'FILTRIRAJ' (Filter). To the right of the dialog box, there is a sidebar titled 'Kategorije' (Categories) with a list of waste management categories: 'Generisanje otpada', 'Sakupljanje otpada', 'Tretman otpada' (checked), 'Odlaganje otpada', 'Uvoz otpada', and 'Izvoz otpada'. There is a 'Filter' button next to the 'Tretman otpada' category. At the bottom of the sidebar, there is a 'Poništi filtere' (Reset filters) button.

# NRIZ GIS

## Waste management portal



# Open data portal

Догађаји  
Пројекти  
Архива

## Трибина "Мапирање циркуларне економије у Србији"

Агенција за заштиту животне средине је учествовала на трибини под називом "Мапирање циркуларне економије у Србији", одржаној 8. фебруара 2018. године у просторијама Привредне коморе Србије, у организацији Удружења индустрије отпада Србије "Храбри чистач", Групе за анализу и креирање јавних политика, а уз подршку компаније *Veolia*. Трибина је била део преко 60 догађаја који су се одржали широм света, у оквиру светске недеље посвећене теми циркуларне економије покренуте од стране *Circular Economy Club* (Клуб за циркуларну економију) из Лондона.

Трибина је имала за циљ да прикаже еколошке и економске предности, али и могућности и проблеме увођења циркуларне економије у Републици Србији. Представница Агенције за заштиту животне средине је истакла значајну улогу Агенције у тој области, јер Агенција активно сарађује са ЕЕА и припрема Национални профил за Извештај ЕЕА о ресурсној ефикасности, циркуларној економији и снабдевању сировинама "2018 More From Less Report".



[Овде](#) можете наћи претходни извештај "More from less - material resource efficiency in Europe", а Национални профил Републике Србије из 2016. године [ОВДЕ](#).

8.02.2018

## Обвезници извештавања о производима који после употребе постају посебни токови отпада

На сајту Агенције за заштиту животне средине се од 7. фебруара налази списак предузећа која до сада нису доставила извештаје о производима који после употребе постају посебни токови отпада (Образац *PTP2*). Списак је направљен на основу

## загађивања



Подаци - Емисије у ваздух



Подаци - Емисије у воде



Подаци - Управљање отпадом

# Open data portal

|                             |                                   |   |
|-----------------------------|-----------------------------------|---|
| Period from year            | <input type="text" value="2010"/> |  |
| Period to year              | <input type="text" value="2016"/> |  |
| Region of facility          | <input type="text"/>              |   |
| Area of facility            | <input type="text"/>              |   |
| Municipality of facility    | <input type="text"/>              |   |
| Location of facility        | <input type="text"/>              |   |
| Principal business activity | <input type="text"/>              |   |
| PRTR Code                   | <input type="text"/>              |   |
| Company                     | <input type="text"/>              |   |
| Facility                    | <input type="text"/>              |   |
| Waste Group                 | <input type="text"/>              |   |
| Waste Subgroup              | <input type="text"/>              |   |
| Index Number                | <input type="text"/>              |   |

# Open data portal

## Količine generisanog otpada - pregled po godinama

\*Količine generisanog otpada prikazane su u t/god.

| Region postrojenja | Oblast postrojenja         | Opština postroje | Mesto postrojenj | Pretežna delatnost    | PIB       | Preduzeće                     | Postrojenje      | PRTR kod | Indeksni br | Opis otpada                              | 2016   | 2017 |
|--------------------|----------------------------|------------------|------------------|-----------------------|-----------|-------------------------------|------------------|----------|-------------|--|--------|------|
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 101019512 | VIZARTIS DOO                  | Vizartis         |          | 12 01 04    | prašina i čestice obojenih metala        | 1,63   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 101019512 | VIZARTIS DOO                  | Vizartis         |          | 15 01 02    | plastična ambalaža                       | 0,175  |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 101019512 | VIZARTIS DOO                  | Vizartis         |          | 15 01 10*   | ambalaža koja sadrži ostatke opasnih     | 0,04   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 101019512 | VIZARTIS DOO                  | Vizartis         |          | 15 02 02*   | apsorbenti, filterski materijali (uključ | 0,22   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 101019512 | VIZARTIS DOO                  | Vizartis         |          | 19 12 01    | papir i karton                           | 104,82 |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 07 02 99    | otpadi koji nisu drugačije specifikiran  | 131,27 |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 08 01 11*   | otpadna boja i lak koji sadrže organs    | 1,63   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 08 03 18    | otpadni toner za štampanje drugačiji     | 0,13   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 12 01 01    | struganje i obrada ferometala            | 46,9   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 12 01 03    | struganje i obrada obojenih metala       | 5,72   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 12 01 05    | obrada plastike                          | 3,26   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 15 01 01    | papirna i kartonska ambalaža             | 6,96   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 15 01 02    | plastična ambalaža                       | 2,37   |      |
| Beogradski region  | Beogradska oblast (Grad Be | Beograd-Barajevo | Barajevo         | 1812 Ostalo štampanje | 104793667 | PRIVREDNO DRUŠTVO ZA PROIZVOD | BG Reklam d.o.o. |          | 15 01 10*   | ambalaža koja sadrži ostatke opasnih     | 1,11   |      |

- ✓ Development of different IT modules – VOC, F gasses, etc.
- ✓ Improvement of legal acts for waste reporting according new Circular economy directives.
- ✓ Blockchain technology for waste tracking.
- ✓ “ NO PAPER REPORTING” according new Electronic documents Law.
- ✓ Development of GIS portal for air emissions and water emissions.
- ✓ Development of portals for UNFCCC and CLRTAP convention reports.



# Conclusions - Benefits of PRTR implementation

Implementation of PRTR protocol and development of National PRTR register is the best path to determine all pollution sources in country – air, water, soil, waste.

Who benefits from the established PRTR registry?

- ✓ Government
- ✓ Environmental authorities
- ✓ Industry
- ✓ Society
- ✓ Environmental consultants, laboratories etc
- ✓ NGO
- ✓ Science and development
- ✓ **Environment**



## Benefits of PRTR register

### BENEFITS TO THE INDUSTRY

- Improves the **knowledge** of industry on environment.
- Access to data on the level of emissions of a **rival** company.
- Industrial facilities can learn about their pollutants and obtain information on processes of which they may not be aware, and can utilize this **knowledge** for improving their image and obtain financial gain.
- Data provided by the industry gains **official support** through validation and dissemination.
- The **concept of environment** starts to become a priority as a result of competition among facilities; and pollution may be reduced.
- Information on air and water pollution can be extrapolated to new projects thereby costly environmental problems can be **prevented**.

## Benefits of PRTR register

### BENEFITS TO THE INDUSTRY

- The fact that the **public can access** information on facilities may industry to be more sensitive towards the environment, leading them to take measures to prevent pollution.
- For industrialists, their **commitments** to the environment can be monitored concretely, and are **verifiable**.
- E-PRTR data will help operators to find out whether there is a need for implementing **best available technologies** and practices.
- Reliable E-PRTR data enhances the opportunity for **fair competition** in international markets.
- E-PRTR may improve the acceptance of facilities by **residents in the nearby area**.

## Benefits of PRTR register

### BENEFITS FOR ENVIRONMENTAL AUTHORITIES

- Holistic, **integrated** collection of pollution data. One system – wide range of integrated information.
- Opportunity to **compare** data with other states when determining environmental policies.
- Gaining **information** on whether emissions are at a level that threatens the country.
- Opportunity to **monitor** improvements or declines in performance of industry.
- Better information on pollution helps to **prevent** pollution.
- Generation of empirical data for the development of **environment management strategies**, and coastal and environment plans.
- Enables to do inter-sectoral and inter-facility **comparisons**.
- Uncommon pollutants, in addition to common ones, will be **visible**.

## Benefits of PRTR register

### BENEFITS FOR THE ENVIRONMENT

- Helps to achieve global sustainability
- A reliable and easily accessible E-PRTR database will motivate firms to invest into clean technologies and will indirectly **improve air, water and soil quality.**

**THANK YOU FOR YOUR ATTENTION**