BROWNFIELD SITES IN CROATIA

Why brownfield areas in Croatia?

Brownfield areas in Croatia occur largely due to:

- changes in the state structure and war
  - abandoned military complexes
- processes of transformation and privatization
- global economic processes
- economic crisis and the state of the recession
  - old industrial sites (traditional production industry), abandoned tourist facilities on the islands and the coastal area
Industrial sites

**Waste Management Strategy** (OG 130/2005) recognized 9 „crne točke“ – *hot spots* in Croatia (sites highly contaminated with waste)

1. Red mud pools and waste base at former aluminate factory Obrovac,
2. Salonit Vranjic
3. Slag landfill of Thermal power plant Plomin
4. Pit Sovjak near Rijeka,
5. „Oil slag” in Botovo – washing of railway vagons and locomotives
6. Phospogypsum landfill from Petrokemija Kutina,
7. Former factory of carchoal „Koksara” Bakar,
8. Hazardous waste landfill Lemić Brdo by Karlovac,
9. Former factory of ferroalloys at Dugi Rat

**Obligation of the development of the Remediation Program for contaminated sites**
Industrial sites

Waste Management Plan for the period 2007 - 2014 recognized additional hot spots

- Former Electrodes and ferroalloys factory - TEF, Šibenik
- Former factory Borovo, Vukovar
- Oil lagoons in DIV factory of screws (former TVIK) in Knin
- City of Komiža – island Biševo remediation of tar at Salbunara beach.
Hot spots

Brownfield sites in Croatia
## Hot spots – status of remediation

**Waste Management plan of the Republic of Croatia (OG 3/2017)**

<table>
<thead>
<tr>
<th>Hot spot</th>
<th>Status</th>
<th>Financed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red mud and waste base of the former alumina factory near Obrovac</td>
<td>Remediation program approved in 2015. Remediation begun in 2006 – still in progress</td>
<td>FZOEU</td>
</tr>
<tr>
<td>Slag landfill at Kaštela bay</td>
<td>Annex of Remediation Program in 2014. (City of Kaštela should develop Detailed Plan in order to proceed with project documentation development)</td>
<td>Owner, Local, FZOEU</td>
</tr>
<tr>
<td>Salonit Vranjic (asbestos)</td>
<td>Asbestos waste landfill „Mravinačka kava” finished in period 2007 - 2012</td>
<td>FZOEU</td>
</tr>
<tr>
<td>Slag landfill of Thermal power plant Plomin</td>
<td></td>
<td>Owner</td>
</tr>
<tr>
<td>Pit Sovjak near Rijeka</td>
<td>Location permit. TOR for remediation work - in preparation</td>
<td>FZOEU, EU</td>
</tr>
<tr>
<td>„Oil slag“ in Botovo – washing of railway wagons and locomotives</td>
<td>Remediation Program should be annexed. It is necessary to determine the legal adherent of the polluter.</td>
<td>Owner</td>
</tr>
<tr>
<td>Phosphogypsum landfill from Petrokemija Kutina</td>
<td>Remediation Program for closure developed in 2012.</td>
<td>Owner</td>
</tr>
<tr>
<td>Former charcoal factory „Koksara“ Bakar</td>
<td>Remediation finished at 2010</td>
<td>FZOEU</td>
</tr>
<tr>
<td>Hazardous waste landfill Lemić Brdo by Karlovac</td>
<td>Remediation finished in 2016</td>
<td>FZOEU</td>
</tr>
<tr>
<td>Former factory of ferroalloys at Dugi Rat</td>
<td>Remediation program developed and approved by MZOE in 2014</td>
<td></td>
</tr>
</tbody>
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**FZOEU – Environmental and Energy Efficiency Fund**
## Hot spots – status of remediation

### Waste Management plan of the Republic of Croatia (OG 3/2017)

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<th>Hot spot</th>
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<tr>
<td><strong>Former Electrodes and ferroalloys factory - TEF, Šibenik</strong></td>
<td>Remediation finished in 2015. (still persist point contamination with PAH-s). New Batižele development project (new business – residential area with touristic, cultural and educational content…)</td>
<td>FZOEU Local</td>
</tr>
<tr>
<td><strong>Borovo, Vukovar</strong></td>
<td>Remediation finished at 2009</td>
<td>Owner</td>
</tr>
<tr>
<td><strong>DIV d.o.o. from Samobor - repairs of mazut within the former TVIK scaffold factory in Knin</strong></td>
<td>As part of the PHARE 2006 project, a proposal for a rehabilitation plan was drafted. Company DIV d.o.o. is obliged to create a pollution remediation plan for the area of that company.</td>
<td>Owner</td>
</tr>
<tr>
<td><strong>island Biševo remediation of tar at Salbunara beach</strong></td>
<td>Finished 2008</td>
<td>National</td>
</tr>
</tbody>
</table>

**FZOEU – Environmental and Energy Efficiency Fund**
Pit Sovjak – site highly contaminated with hazardous waste

Remediation already planned at 80s of 20th Century

Recent project includes
• removing of bulk waste and oils,
• digging of tar and mixing with lime
• export to incineration outside Croatia
• covering of the pit with inert material
Former Ferroalloys and electrodes factory in Šibenik

Remediation finished in 2012

- demolition of old objects
- soil remediation
- slag recovery

Before

Now
Potential contaminated sites

In 2006 Agency for Environmental Protection developed Georeferenced base on potential contaminated and contaminated sites (GEOL)

• 2852 potentially contaminated sites on the territory of Republic of Croatia, owned by 1080 legal entities

• Current status - Base is not in function
Potential contaminated sites 2009 by counties

Source: Okoliš na dlanu, AZO, 2009
Soil screening values of pollutants in soil

EU legislation

• There is no Law on soil protection

• Most countries have their own soil screening values (SSV) of pollutants in the soil (Carlon, C. (Ed.) (2007) Derivation methods of soil screening values in Europe. A review and evaluation of national procedures towards harmonization. European Commission, Joint Research Centre, Ispra, EUR)

Croatian legislation

• There is no Law on soil protection

• Guidelines for permanent soil monitoring in Croatia, Croatian Agency for Environmental protection, AZO 2009 – suggested German standard BBodSchV, 1999

• Ewald Spitaler, Summary of thresholds for pollution and contamination of soils“ (Task 1.1.), PHARE 2006 – Development of hazardous waste management system, including the identification and management of „Hot spot sites“ in Croatia

• Kisić I., Sanacija onečišćenog tla, Agronomski fakultete Sveučilišta u Zagrebu, 2012 - Limit values of pollutants in soils depending on future use (agricultural, natural, residential, recreational, industrial)
National Strategy of Spatial Development (OG 106/2017) adopted in 2017. recognized „napuštena i preskočena područja” - brownfield areas in Croatia

Development of Register of brownfield areas in Croatia – in progress
Brownfield sites

Spatial Development Strategy of Republic of Croatia

Chapter 4. Priorities and Strategic Directions for Spatial Development - subsection Effective use of used space:

• revitalization of abandoned areas and buildings and decontamination of the area where any form of pollution is recorded
• Strategic planning and identification of brownfield locations through development priorities
• Evaluating the potential of the existing structure
• Brownfield as a development resource, from national to local level: inventory and evaluation
Brownfield sites

Spatial Development Strategy of Republic of Croatia

Chapter 4. Priorities and Strategic Directions for Spatial Development - subsection Effective use of used space:

• making a Brownfield register within the ISPU (Information system of spatial planning) as a unique and publicly available data viewer planned for urban transformation

• creation of Urban plan for urban transformation - avoiding uniform and single-purpose solutions, high quality of public content and public open spaces
The City of Zagreb

The Urban Agglomeration Development Strategy

The main goals:

- inventory of the brownfield area; creating a unique database
- development of revitalization projects for selected brownfield areas
- introduction of measures for more successful resolutions for property and legal relations
- remediation of contaminated sites in order to prevent the spread of contamination
- revitalization of industrial zones, former military facilities, etc., which will enable the use of existing (physical) resources within urban areas without loading the additional space and environment
The City of Zagreb

• Regional multifunction center Jedinstvo Facility - reconstruction of the former factory building
• Project for construction of the URIHO complex in Kajzerica
• Renewal of the warehouse building of the Technical Museum Nikola Tesla in the triangle Tratinska - Jukićeva – Brozova for the purpose of introducing new content and revitalizing the area
• Revitalization of the abandoned area of the former military area in Jastrebarsko into economic-social and public purposes
• Reconstruction of the abandoned military infrastructure for the purpose of Aircraft Training Center Lučko
• Reconstruction and revitalization of the abandoned Paromlin complex for the purpose of Zagreb City library
The City of Zagreb

- Zagreb Creative Cluster Gredelj - Revitalization of abandoned industrial area Gredelj for the purpose of Center of Creative Industries
- Block Badel
- Project of the University Campus Borongaj
- Former military hospitals in Vlaška Street
- Zagreb oil factory in Branimirova
- Zagreb Fair - transformation into a multifunctional space
The City of Zagreb

Gorica

vojna bolnica

Paromlin
The City of Zagreb

Gorica

vojna bolnica

Paromlin
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