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REPUBLIC OF SERBIA
Ministry of
Environmental Protection

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Presentation of project activities

Environmentally sound management and final disposal of PCBs in the Republic of Serbia

September 12 2023, Geneva

Tehnološko Metalurški Fakultet
Univerzitet u Beogradu

PCBs Serbia

Project overall objectives

The overall objective of this project is to protect human health and the environment by reducing and eliminating the releases of and exposure to PCBs through establishment of an environmentally sound PCB management system including final disposal of 200 tons of PCB contaminated equipment. The project is co-financed by Global Environmental Facility (GEF), Electric Power Company of Serbia (EPS), Serbian Railways and by the Ministry of Environmental Protection of Serbia (MoEP).

Faculty of Technology and Metallurgy University of Belgrade is Project Management Unit (PMU) and the Ministry of Environmental Protection is National Execution Agency (NEA).

Global Environment Facility (GEF)

Ministry of Environmental Protection

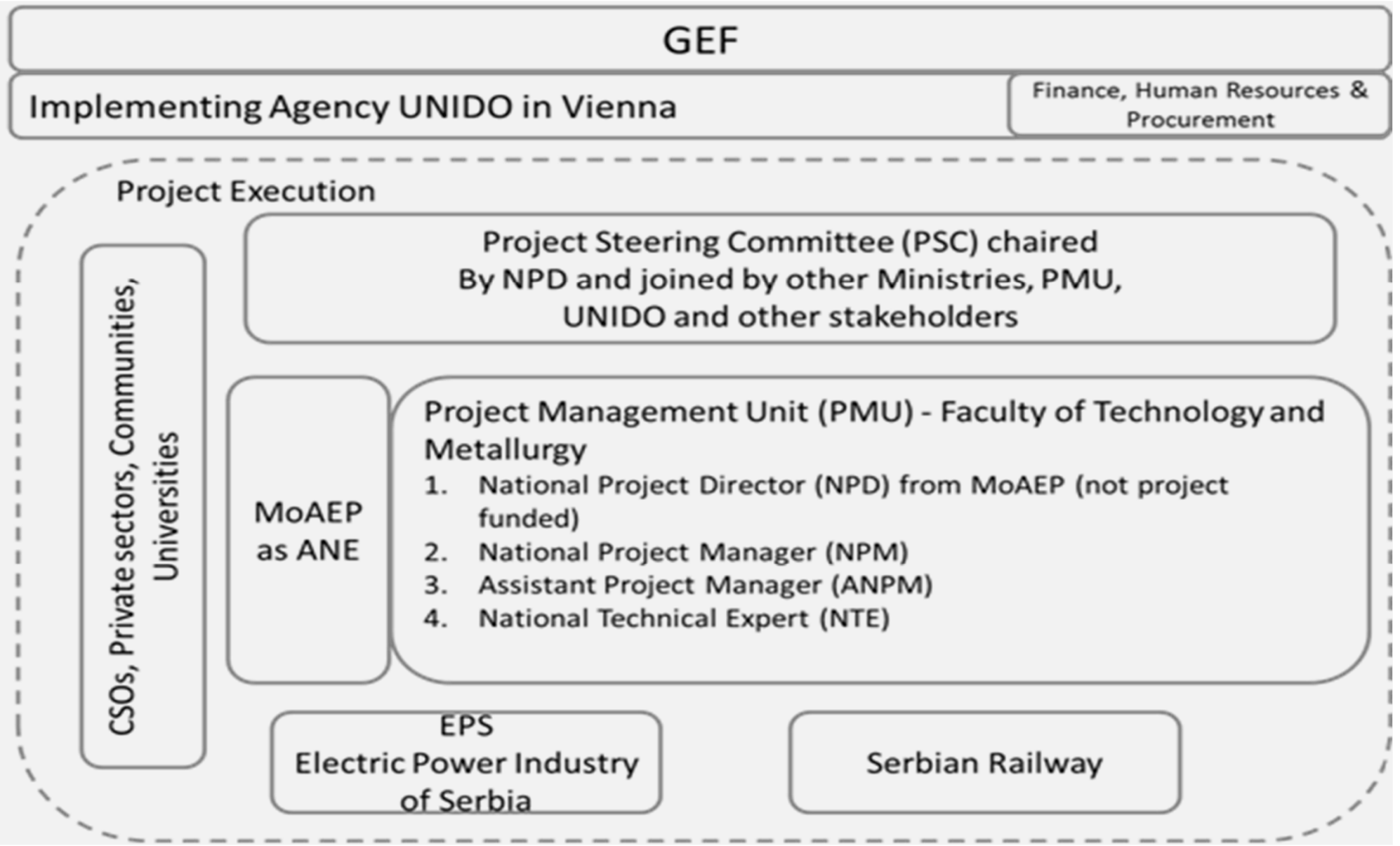
Implementing Agency UNIDO - Vienna

Electric-Power Company of Serbia (EPS)

Serbian Railways (ZS)

Faculty of Technology and Metallurgy - PMU

Project management structure



The budget

Overall project budget:	11,189,600 US$
GEF financing:	2,100,000 US$
Co-financing:	9,089,600 US$
EPS:	8,000,000 US$
The Ministry (MoEP):	650,800 US$
ZS:	438,800 US$

JP EPS 8,000,000 US$ (in kind 6,400,000; 1,600,000 cash):

Decontamination of PCB contaminated equipment, substitution of transformers (end of life), purchase of new transformers

MoEP 650,800 US$ (in kind 559,600; 91,200 cash):

Remediation of PCB contamination at FIAT automotive site in Kragujevac and human resources to support the project

JP Železnice Srbije 438,800 US$ (in kind 187,000; 251,800 cash):

The inventory of PCB contaminated equipment and study on environmentally sound management of PCB equipment

GEF contribution breakdown – managed by UNIDO and PMU FTM

- **UNIDO** **1,596,925 US$**

- Inventory of PCB contaminated equipment; Purchase of PCB test kits; Investigation of PCB contaminated site; Pilot remediation of contaminated site within the Public Private Partnership scheme; Decontamination of 200 tons of PCB contaminated equipment; International experts

- **PMU – FTM** **503,075 US$**
- National travel; National experts; National meetings; International meetings; Minor office equipment; Miscellaneous; Project management cost

Project components

(Output 1): Strengthening national coordination mechanism by improving system for ESM of waste and chemicals; Legal, regulatory and political framework for ESM of PCBs;
(Output 2): Building the institutional capacity for ESM of PCBs; Monitoring and training related to PCBs; Establishing and improving analytical capacities for monitoring of PCBs; Raising awareness among the general population and target groups; Establishing sustainable mechanism for ESM of PCBs;
(Output 3): Detailed inventory of PCB waste and equipment; Sampling of equipment, waste and stocks; Establishing inventory of PCB waste, stocks, equipment and sites
(Output 4); Establishing possible technical solutions for final disposal of the equipment, insulating oils and waste containing low concentrations of PCBs; Selection of the most adequate BAT / BEP PCB disposal technologies with respect to the local conditions; Decontamination and/or final disposal of 200 tons of contaminated equipment
(Output 5); Integration of Public Private Partnership scheme in the framework of national plan for the contaminated sites; Most adequate BAT / BEP options for remediation of PCB sites; Pilot site clean-up; Developing national priorities for PCB sites
(Output 6); Monitoring of project execution: GEF, UNIDO, MoEP and PSC

Current state of Project activities – August 2022

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All Outputs are draft documents prior to the adoption by Project Steering Committee

Due to availability of project budget and COVID-19 pandemic the activities have been extended to cover year 2023

Project duration to date: 89 months

Half a year Progress reports submitted: 12

Ongoing Progress reports: Extended contract Amendment No. 3 PR No. 1 in progress

Output 1: Legal, regulatory and policy framework for ESM of PCB established

Output 1.1. – Existing legal acts updated based on the available Gap Analysis Evaluation Report

- Copies of the existing laws and regulations
- The analysis of the legal framework related to PCBs and recommendations to bridge the existing gaps
- Rulebook on PCB contaminated equipment revised

Output 1.2. – Technical guidelines, protocols and procedures prepared and improved for ESM of PCB – containing electrical equipment, waste and contaminated sites

- Technical guidelines document prepared and presented in dedicated Workshop
- Guidelines on health hazards and equipment handling and testing completed and presented in Workshops
- Documents available at Project web site www.PCBsSerbia.rs

Output 1 – Completed 100%

Comments: Much of the legislation already in place prior to this Project

Output 2: Institutional capacities and awareness improved for sound PCB management

Output 2.1. – PCB management roles in different government institutions defined

- Roles and responsibilities of Government bodies defined
- Training on roles and responsibilities performed in a Workshop

Output 2.2. – Monitoring institutions trained and active

- PCB inspection mechanism defined, training session on test kits held
- Technical guidelines presented and discussed, along with safety procedures

Output 2.3. – Analytical capacities improved for PCB sampling, analysis and monitoring

- 2 Labs accredited for PCB in oils and labs accredited for PCB in soil and waste
- Adoption of PCB analytics facilitated at Institute Vinca, PCB standards proposed to ISS

Output 2.4. – Awareness and knowledge on POPs/PCBs issue among different target groups improved

- Workshop with NGOs, Web site www.PCBsSerbia.rs active, Workshops, events at EPS
- Collaboration with media, Study programs, University Courses and Training on PCB polluted site management held

Output 2.5. – Sustainable incentive mechanism developed for ESM of PCBs

- Completed

Output 2 – Completed 100%

Comments: Much of 2.1, 2.2, 2.3 and 2.4 already in place prior to this Project

Output 3: Detailed inventory of PCB containing equipment and waste carried out

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Output 3.1. – Sampling of in-service equipment, waste and stockpiles completed

- Project preliminary inventory in non-energy: 307 units tested 56 contaminated; Project inventory in non-energy sector : 1100 units tested 92 contaminated; 5 training events for EPS
- **Output 3.2. – PCB presence determined by screening and laboratory analysis**
- Service provider selected; Screening with test-kits done by grid technical maintenance; 15% randomly selected samples double checked by Dexsil Instrument; Positives analysed using GC – ECD method for quantitative results

Output 3.3. – Database prepared and maintained for PCB-containing equipment, waste, stockpiles and contaminated equipment

- Excel format database developed for PCB owners and for National Inventory to be maintained by SEPA – follows the Rulebook, provides guidance and easy to use; Each transformer assigned a unique number (by SEPA); 23 owners + Energy sector – each with its own excel file

Output 3.4. – Detailed inventory developed for PCB-containing equipment and wastes in the demonstration areas, countrywide estimations and prioritization of transformers for disposal

- Detailed inventory developed; Labeling of PCB units done; Prioritization done by owners; Vast majority of PCB contamination is “low POPs”

Output 3.4. – Continued

Inventory results as percentage of positives:

- GEF-UNIDO preliminary: 20.52%; GEF-UNIDO current: 8.36%; EU IPA EPS > 35 kV: 7.75%; Elektro-Vojvodina 20/0.4 kV: 7.88%; Serbian Railways: 3.73%

- Countrywide **estimation** for "low POPs" equipment:
  - **Average degree of contamination: 6.5%**
  - **Average oil content - stationary unit: 400 kg**
  - **Average oil content – pole mounted unit: 150 kg**
  - **Transformer / Oil weight ratio: 4**
  - **Number of contaminated units in Serbia: 2850**
  - **PCB contaminated oil weight: 905 tons**
  - **PCB contaminated equipment weight: 3 600 tons**
  - Priorities set for decontamination and final disposal within the current project and within the non-power sector in Serbia: HBIS Smederevo, HIP Petrohemija Pancevo, Azotara Pancevo

Output 3 – Completed 100%

Output 4: Pilot quantities of 200 tons of PCB-containing equipment and waste disposed of in an environmentally sound manner

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Output 4.1. – BAT/BEP disposal options and technologies applicable to the disposal strategy validated

- Disposal strategy developed based on the Inventory and BAT/BEP options (technology matrix); National Management Plan for PCB contaminated equipment developed; Options analyzed in Cost/Benefit Analysis

Technology matrix for short listed options

Technique	Treatment efficiency	Functional safety	Environmental safety	Emission and effluent release	Total investment cost	Operating cost	Overal cost/benefit ratio	Time needed for adoption
Retrofilling	***	***	**	*	****	****	**	****
BCD	****	**	***	***	**	**	**	*
Na	***	*	*	***	***	*	*	*
KPEG	***	***	***	***	****	***	****	****
CDP Marconi	***	***	***	***	***	****	****	***

**** = excellent; ***= good; **= medium; *= critical

Output 4.2. – PCB treatment service provider selected

- Technical vendor Workshop held in May 2019 with participation of national stakeholders, MoEP and major technology providers: Sea Marcon, Tredi, EI Nikola Tesla, Rade Koncar Skopje, SetCar, Ecology partners and Polyeco; National management plan and Inventory were presented and technical discussions facilitated
- Terms of reference for the selection of service provider generated;
- Service provider selected for the entire system of ESM of PCB: export of high POPs units, decontamination of low POPs large and small units, recycling of valuable materials following guidelines for ESM of PCBs for final disposal - developed with UNIDO PM and IE
- Technical evaluation performed at UNIDO headquarters in Vienna 2 – 4 October 2019
- **Three bids were submitted for evaluation:**
  - Consortium led by “Rade Koncar” Skopje (members: “Rade Koncar”, “Sea Marconi”, “Tredi” and “PolyEco”
  - Consortium led by “Jugo-Impex” Nis (members: “Jugo-Impex”, “Ecology Partners”, “IRM Bor”, “WSA”)
  - Consortium led by MITECO (members: “MITECO”, EI “Nikola Tesla”, “SetCar”, “Valorec”)

Output 4: Pilot quantities of 200 tons of PCB-containing equipment and waste disposed of in an environmentally sound manner - Continued

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Output 4.2. – PCB treatment service provider selected

- Consortium led by MITECO (members: "MITECO", EI "Nikola Tesla", "SetCar", "Valorec") was selected and Contract signed

Output 4.3. – Permits for the storage operation/technology treatment installation obrained

- Selected service providers already in possession of valid permits

Output 4.4. – Monitoring system established in the interim storage / treatment facility

- Monitoring systems already exist at the premises of selected service provider (MITECO, EI Nikola Tesla, SetCar and Valorec); Upgrade of monitoring system performed

Output 4.5. – 200 tons of PCB-containing equipment and waste disposed

- **317 tons** disposed-of or decontaminated following (HBIS and HIP)
- 320 tons disposed-of or decontaminated following (HBIS and HIP) through extension of project in 2021

Output 4 – Completed 318% and when completed in 2023 should be 373%

Output 5: Public private partnership policy integrated into national assessment scheme for PCBs contaminated sites

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Output 5.1: PCB contaminated sites investigated

- Terms of Reference on the PCB contaminated site investigation; Visiting major sites and conducted interviews to collect the relevant information about the PCB contamination history and the extent of the contamination including geographical scope and PCB contamination profile (RT Bor, transformatori - ABS "Minel-Trafo" in Mladenovac and former Minel Dinamo site in Belgrade; PCB contaminated site investigation report finalized. No potential investment interest observed.

Output 5.2: Criteria defined for prioritization of PCB contaminated sites within the PPP framework

- A list of criteria for priority setting are based on Risk score, Size, Type of operations and Management characteristics; Priorities setting methodology based on 6 steps
- Prioritized list of PCB contaminated site for decontamination; Based on this data, three potentially PCBs contaminated sites were chosen: FOM Prokuplje, Župa, Kruševac, Fabrika radijatora Zrenjanin and Fabrika radijatora Zrenjanin was selected as "potentially high risk site".

Output 5.3: Risk assessment for a pilot site completed

- Terms of Reference for the risk assessment at the prioritized sites.
- A gender sensitized report on the risk assessment.
- Risk assessment study is developed to address guideline for the future risk assessment studies in Serbia.
- Workshop dedicated to ES Management of polluted sites held and workshop dedicated to Risk Assessment of polluted sites held as well.

Output 5.4: Finalization of pilot remediation agreement under PPP scheme

- Official document announcing the selection of the pilot site by NEA; Site privatized – new owner is Mat Real Estate; Site will be dedicated to production of agricultural machinery;
- Terms of Reference for the pilot site remediation – Completed;
- Conclusions and recommendations of the Risk Assessment Study – Completed;
- Remediation operation completed following rules and regulations;

Output 5: Public private partnership policy integrated into national assessment scheme for PCBs contaminated sites

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Output 5.4: Finalization of pilot remediation agreement under PPP scheme - continued

- PCB waste removed;

Output 5.5: Management plan for PCB contaminated sites developed

- Draft version of management plan for PCBs contaminated sites in Republic of Serbia completed

Output 5 – Completed 100%

Output 6: Project monitoring and evaluation

Output 6. – Mid-term evaluation

- Mid-term evaluation completed
- Findings positive
- Project extended in 2023

Output 6. – Terminal evaluation close to finalization

- Evaluation positive, rating S – satisfactory (70-90%)
- Additional information related to results and extension in 2023 submitted
- Current outstanding issue: statement on co-financing by Electric Power Company of Serbia (EPS)

Output 6 – Completed 100%

Project extension in 2022

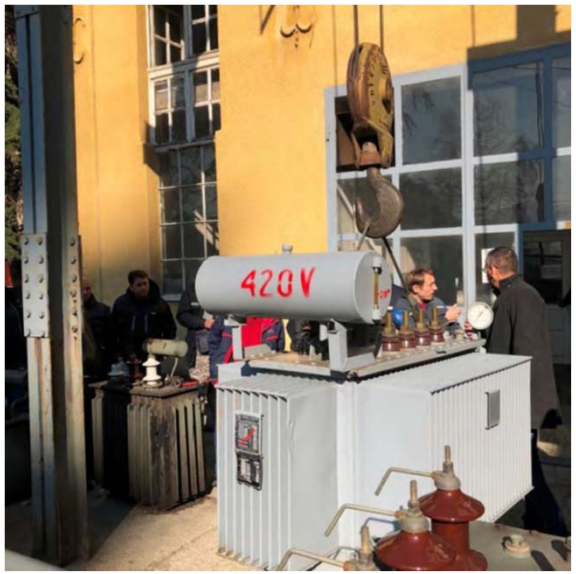
Activities for extension in 2022:

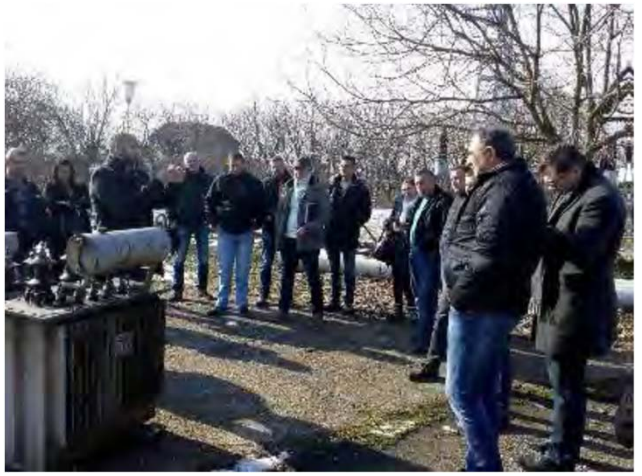
- Expand disposal and decontamination of PCB – approx. 110 tons in 2022 delayed and moved to 2023
- PCB in open applications and unintentional PCB – Guidelines and survey
- Providing guidance for the national system upgrade to meet the SC deadline
- Visits to RECETOX, Austrian EPA and UNIDO – study visits and exchange of experience
- National management plan for remaining PCB in Serbia with focus on small high POPs transformers (PCB > 1000 ppm)
- PCB treatment unit upgrade (rinsing of decontaminated units)
- Technical project/documentation for PCB site clean-up supported by IE

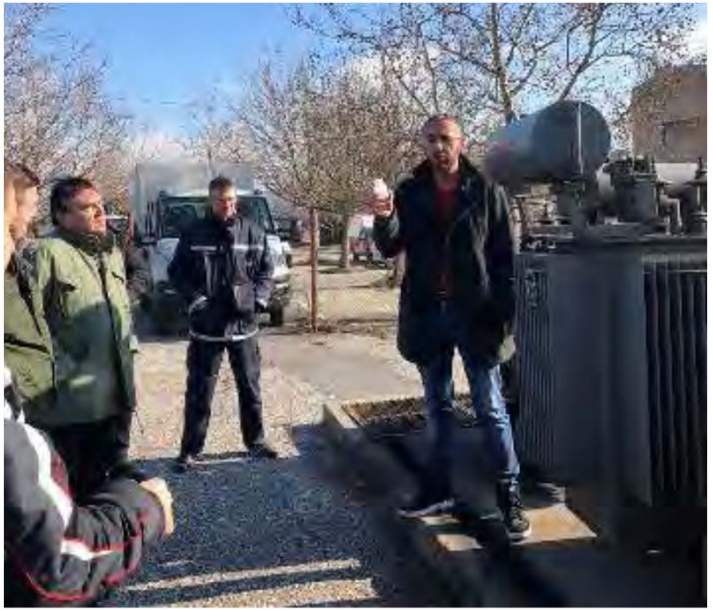
- **Second/final Progress Report for 2022 recently submitted**

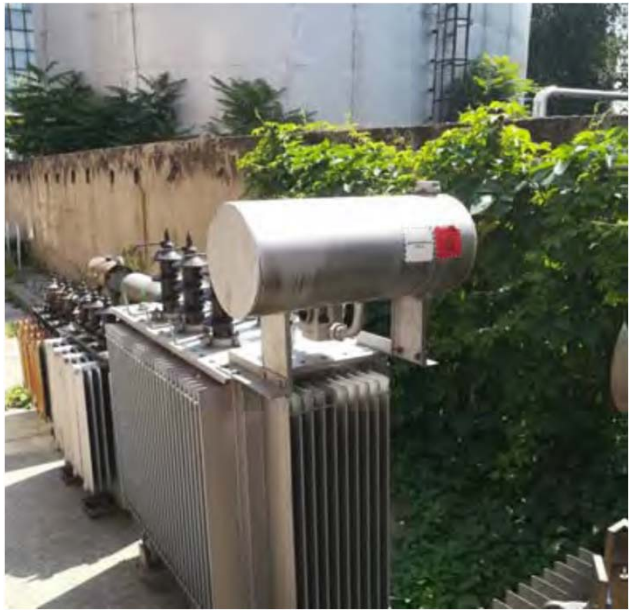
Output 6: Photo gallery

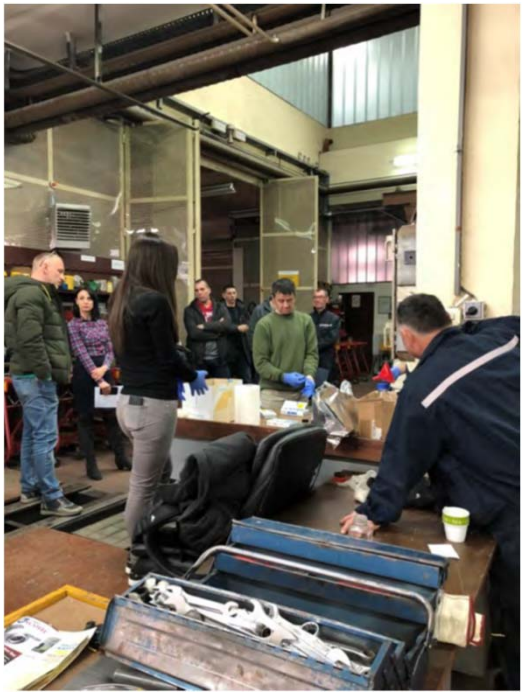
PCBs Serbia











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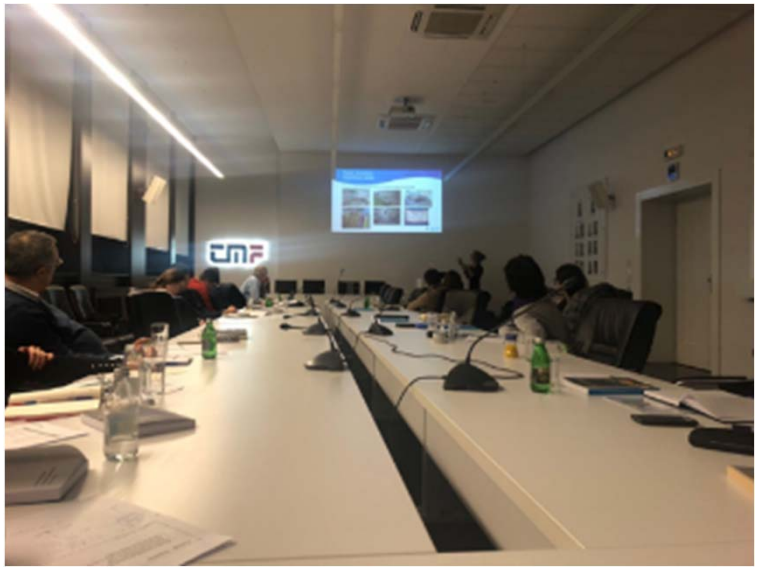

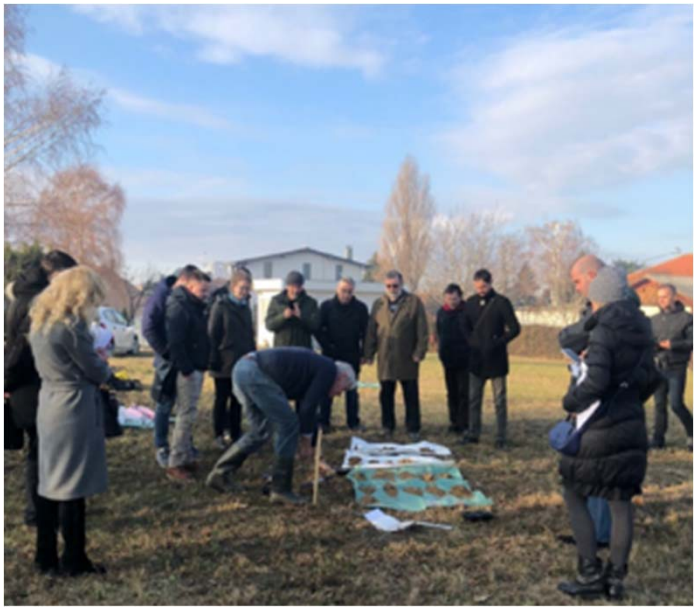

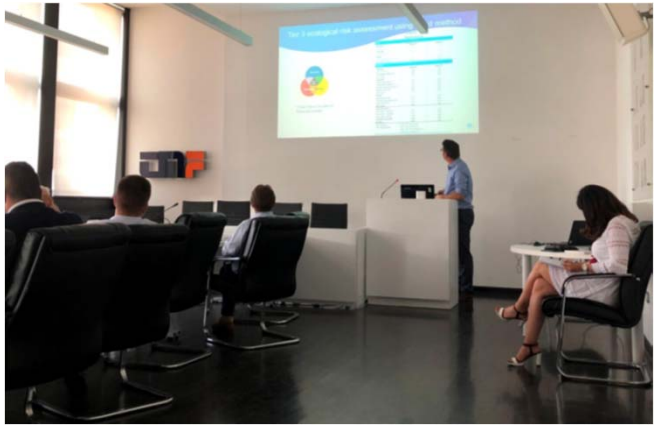

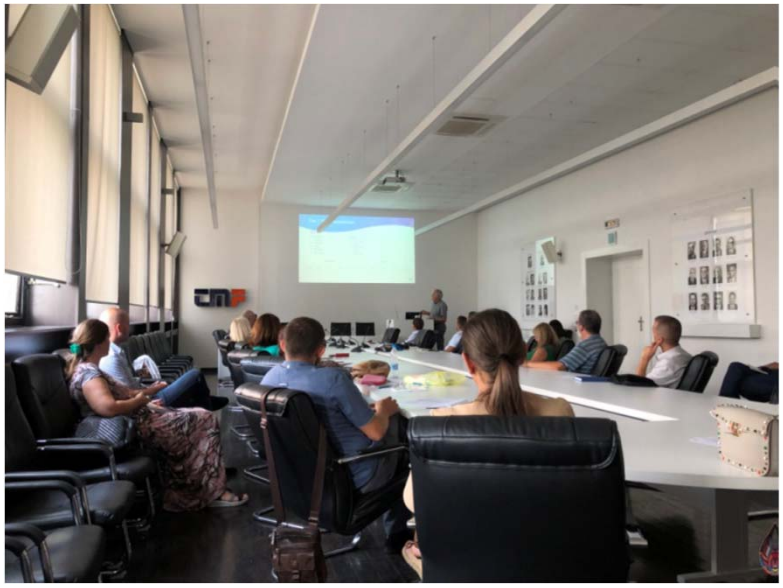

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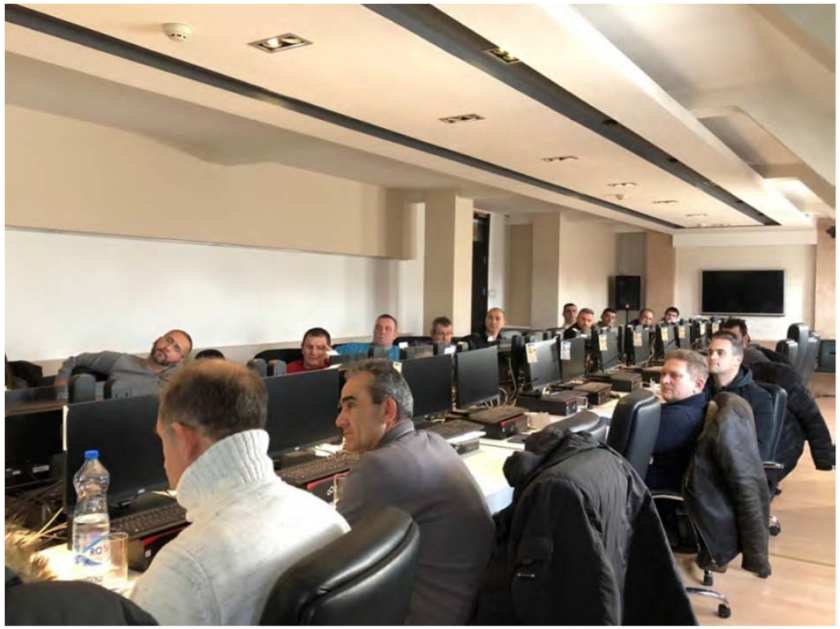

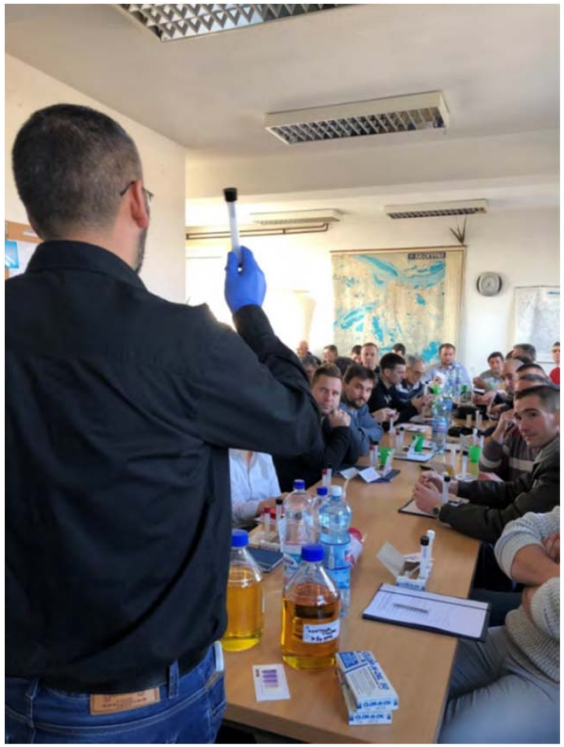

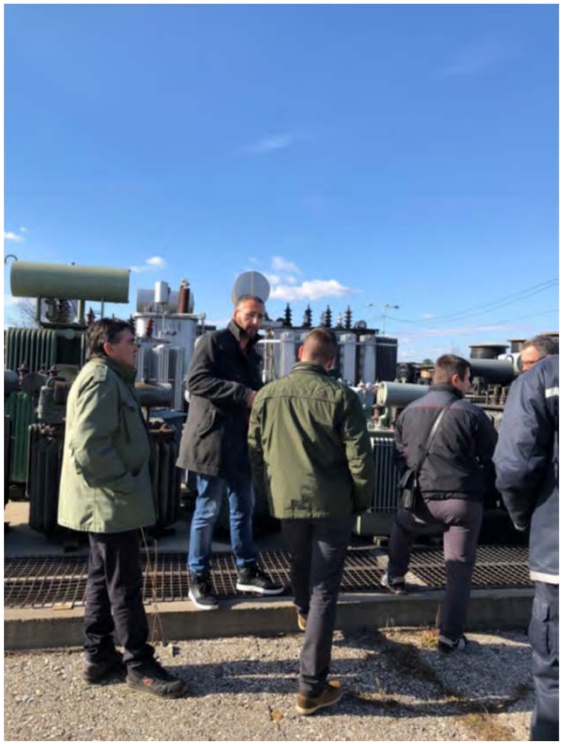

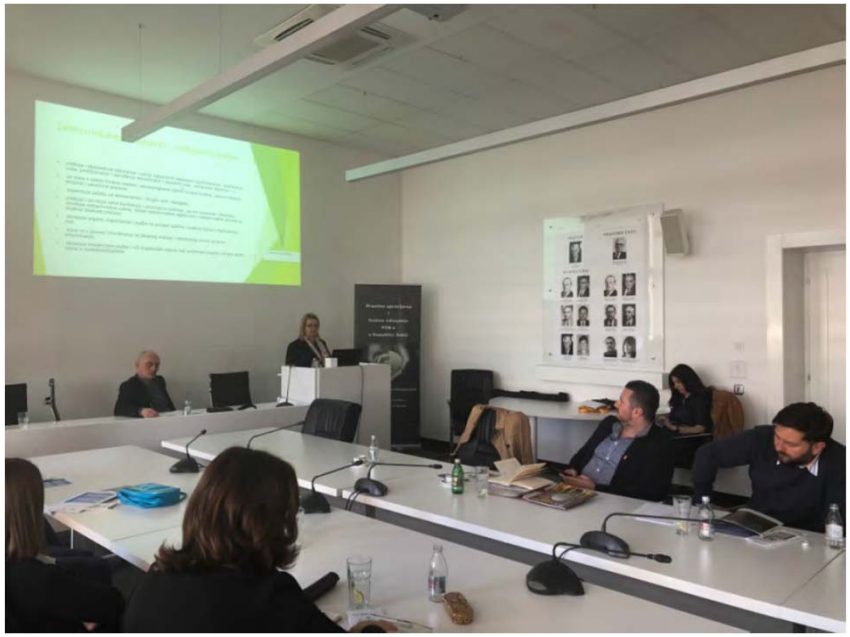

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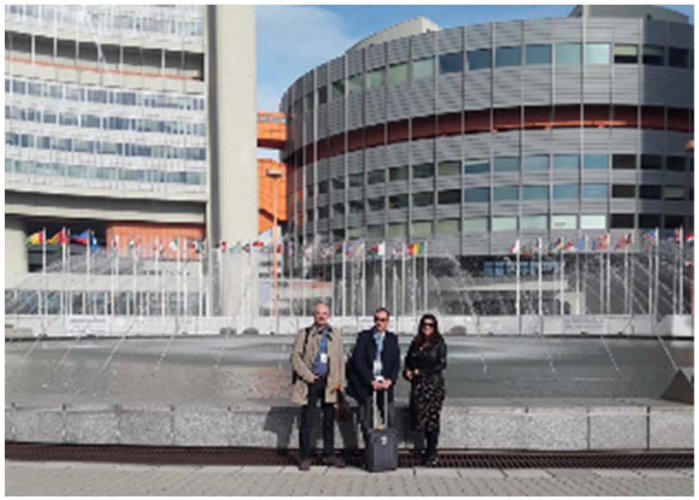

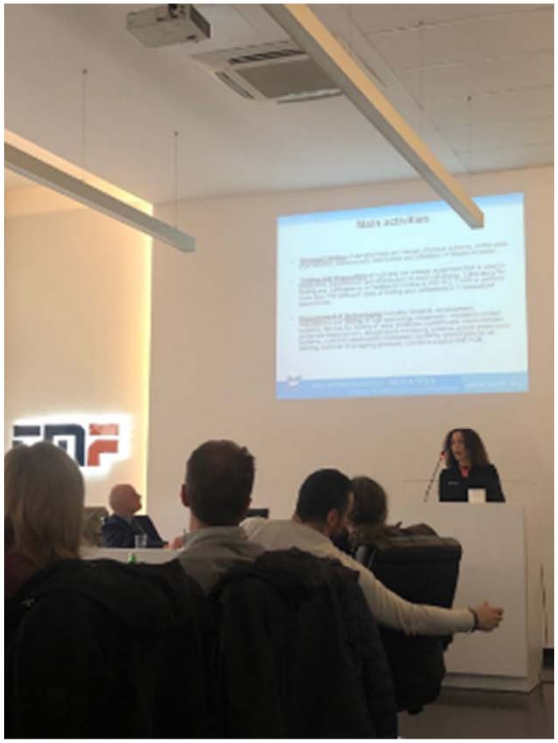

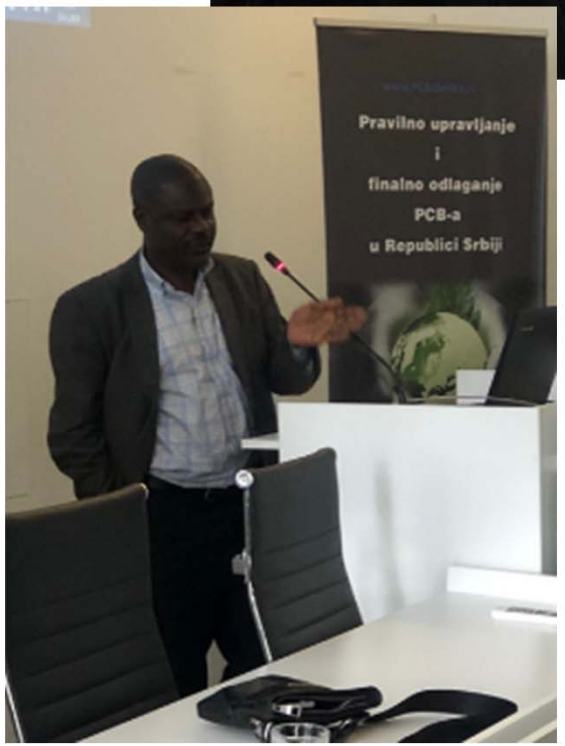

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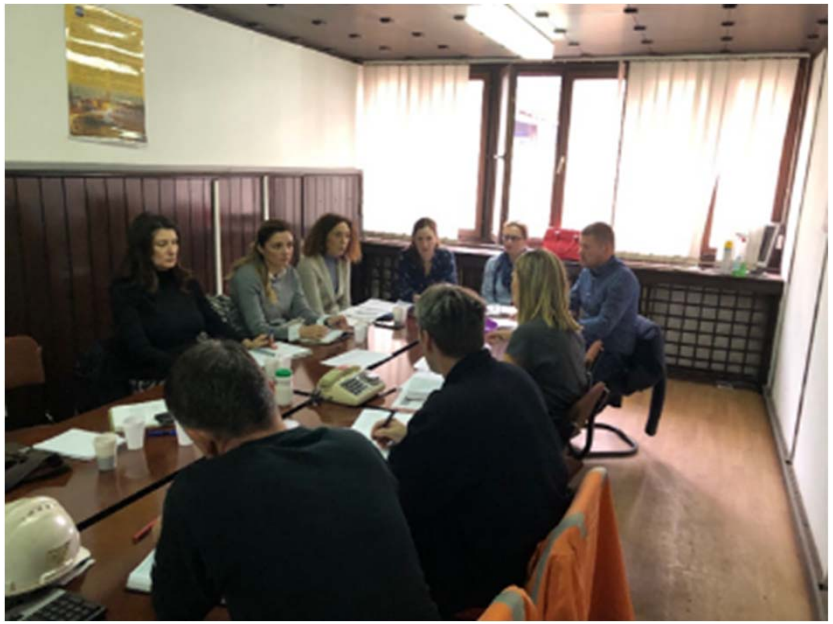

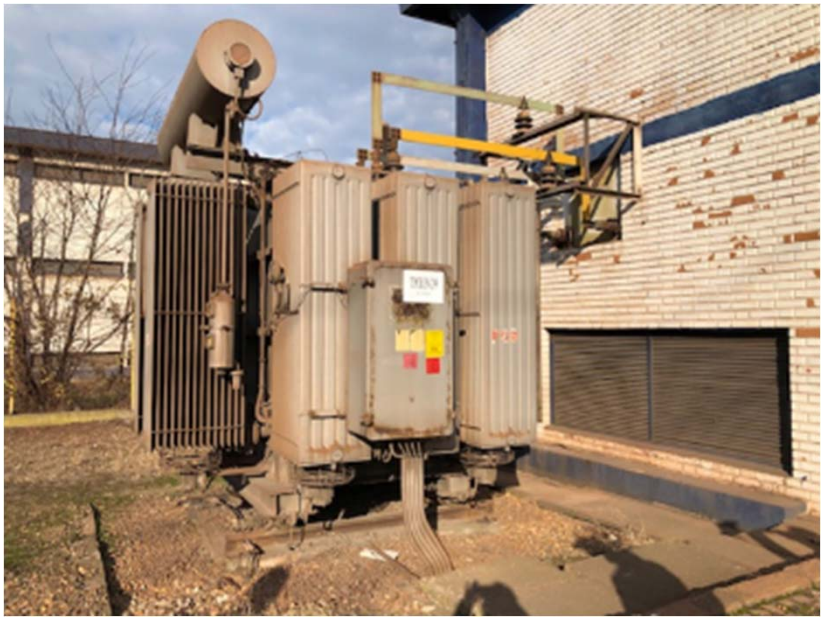

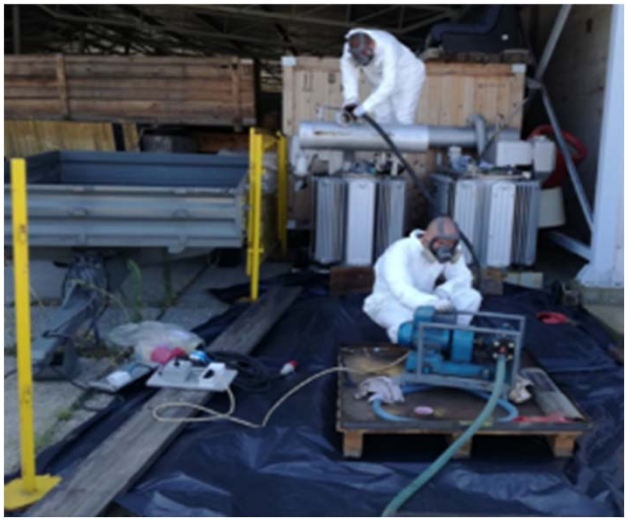

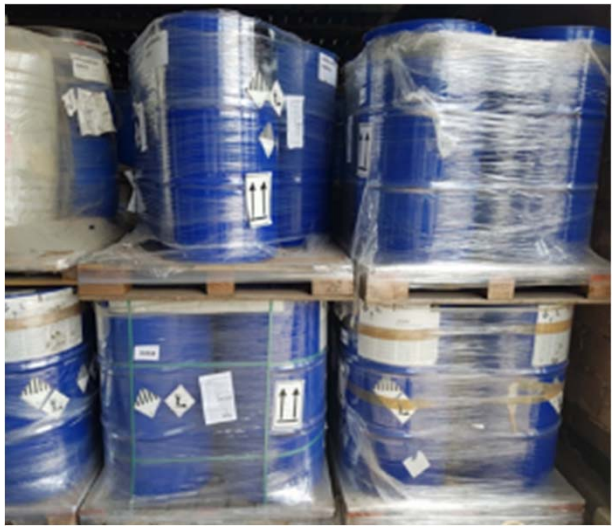

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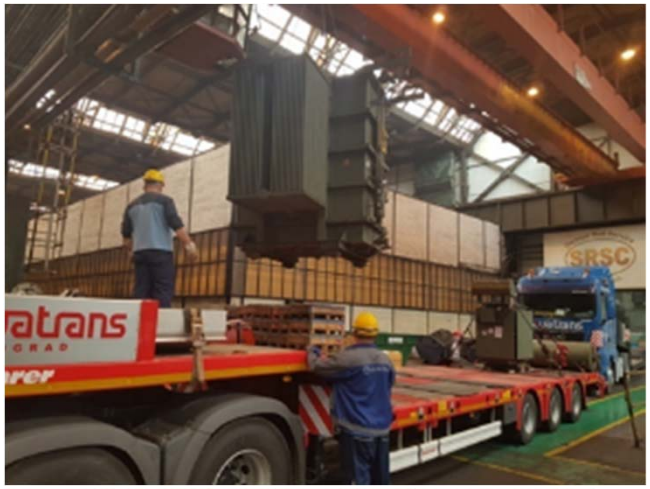

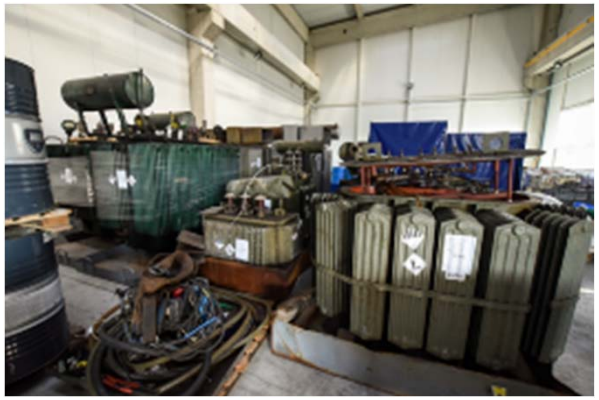

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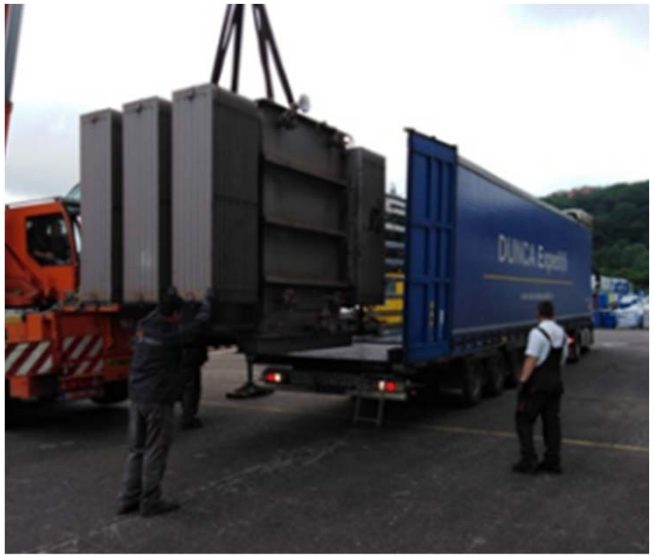

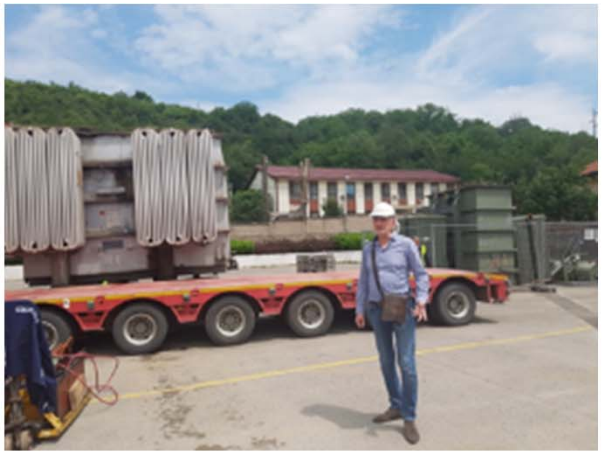

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Final extension of PCB Project in 2023

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Activities for extension in 2023 – in progress:

- Expand disposal and decontamination of PCB – approx. 110 tons taken over from 2022
- PCB in open applications and unintentional PCB – Survey of school indoor air
- Railroad wooden cross-ties – Analytical survey on PCB content
- Detailed inventory on indoor air and wooden cross-ties
- PCB database regularly updated
- Visits to Incinerator facility in Vienna, Austrian EPA and UNIDO – study visits and exchange of experience
- Study visit and training at UNITAR in Geneva
- Recommendation on disposal of PCB contaminated railway wooden cross-ties
- Strengthening/development of a Knowledge Management platform for information and experience sharing; dissemination of materials, technical tools, manuals, guidelines; etc. that are products of the project

Thank you