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## **SOLID WASTE CONTAINING PERSISTENT ORGANIC POLLUTANTS IN SERBIA: FROM PRECAUTIONARY MEASURES TO THE FINAL TREATMENT**

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### Abstract

Sustainable solid waste management (SWM) need more dedicated actions for environmental and human health protection. Many factors impact sustainable SWM, the link among environment, society and economy are of great importance in this respect. The European Commission strives for sustainable waste management aiming for a more circular economy.

Solid waste containing persistent organic pollutants (POPs) is of special concern, since POPs - i.e. chemicals listed on Stockholm Convention – are toxic and persistent and of high risk for humans and the environment and need to be managed and phased out globally. Since 2015 in total 26 substances are listed.

Serbia and other countries having ratified the Convention agreed to manage POPs chemicals, or products containing POPs chemicals. Therefore, the objective of this investigation was to identify critical issues in the Serbian solid waste management and POPs management, in order to assure the life cycle management of POPs and products containing these chemicals including prevention and final destruction.

Data were collected in cooperation with the Serbian competent authorities, mainly custom, ministries in charge, Serbian environmental protection agency, chambers of commerce among others. One part of the POPs inventory were the compilation of data on POPs in

waste. Five POPs groups were assessed: Polychlorinated biphenyls (PCBs), POPs pesticides, dioxins, and two new listed industrial POPs: Polybrominated diphenyl ethers (PBDEs) and perfluorooctane sulfonate (PFOS) and its precursors. The information presented in this study are the result of our assessment. Considering the amount of solid waste containing POPs led us to identify possibilities for preventive actions within SWM in order to reduce or minimise releases of POPs into the environment, prepare comparative insight in Serbian regulations transposed from particular EU legislative frames, possibilities to propose actions necessary for treatment of POPs containing waste, and procedures necessary for particular waste management.

Results of socio-economical assessment for the POPs in solid waste demonstrated that the adverse impact is multidimensional and multispectral. It was concluded that the total costs of POPs are considerably larger than the costs of treatment but also includes health cost, environmental costs (effects on ecosystem services) and negative effects on economy. Considering all these direct and external costs highlight the real burden of POPs for society.

Furthermore, it need be stressed that there is no destruction capacity in Serbia, and that there are no landfills or underground storages for hazardous waste. Due to the lack of treatment or disposal plants for hazardous waste in Serbia, the only option at the moment to manage POPs waste is to keep it in temporary storages and when conditions are created (primarily financial) POPs waste should be exported for destruction in hazardous waste incinerators.

Meanwhile it needs to be assured that any POPs management activity does not negatively impact recycling flows and disturb progresses towards a more circular economy in Serbia.

Keywords: POPs, solid waste, socio-economic analysis, circular economy, management