Partner search for the cooperation in waste management

Institute of Process Engineering (main page - Fakulta Strojního Inženýrství (vutbr.cz), Faculty of Mechanical Engineering, Brno University of Technology

Research areas

Activities covered by the research team are focused on the whole chain of municipal solid waste management.

The specific topics of our research can be divided into several points:

- **waste production/generation** – analysis and reconciliation of historical data, trend forecasting with regards to time (future production), correlation analysis of individual waste fractions, demographic projection, socio-economic parameters and their influence on waste production, links between different types of waste, meeting the set of targets for waste separation and recycling (with regards to EU and local government targets);

https://doi.org/10.1016/j.jclepro.2017.06.107 ;
https://doi.org/10.1016/j.jclepro.2020.121814 ;
https://doi.org/10.1016/j.jclepro.2020.123359 ;

https://doi.org/10.1007/s12649-019-00764-0 ;
https://doi.org/10.13164/mendel.2018.1.085

- **waste composition** – estimation of mixed municipal waste composition, stratification and clustering of areas, statistical evaluation of samples and results, circular economy implementation, lower heating value of waste and potential of thermal treatment;

https://doi.org/10.1007/s10100-019-00626-z ;
https://doi.org/10.3303/CET2081126 ;
https://doi.org/10.1016/j.wasman.2017.10.045

- **waste treatment options** – evaluation of the waste potential for energy and material recovery, suggestions on the optimal processing technology, analysis of emission production, the potential of produced energy utilisation (heat, electricity, biogas etc.) with regards to a specific location;

https://doi.org/10.1016/j.jclepro.2019.118003 ;
https://doi.org/10.1016/j.applthermaleng.2015.04.005 ;
https://doi.org/10.1016/j.applthermaleng.2013.04.003

- **waste logistics** – local waste transportation from population to the processing or intermediate facility (vehicle and location routing problems), waste transport on

regional and country-level (including transfer stations, railway transport), optimization for selected territories, reconciliation of waste flow data;

https://doi.org/10.1016/j.energy.2019.05.175 ;
https://doi.org/10.1016/j.jenvman.2018.05.003 ;
https://doi.org/10.13164/mendel.2019.1.015 ;
https://doi.org/10.1016/j.jclepro.2018.10.165

- **complex approach and siting of new facilities** – global optimization of waste processing infrastructure (selection of new sites), deployment of waste collection points/containers (considering various criteria).

https://doi.org/10.1016/j.energy.2020.118257 ;
https://doi.org/10.1016/j.jclepro.2020.123445 ;
https://doi.org/10.1016/j.rser.2020.110058 ;
https://doi.org/10.1016/j.jclepro.2019.118068 ;
https://doi.org/10.1016/j.jclepro.2019.05.167

All areas are often very closely linked. Each category is also supplemented by the most important publications.

Most of our approaches use the operations research techniques, game theory, statistical methods and other mathematical modelling. We will be happy to cooperate in any of the above areas. The first goal of our cooperation could be the exchange of knowledge and proposed approaches resulting in **joint publication**. We can compare the outputs of our case studies to reveal the greatest differences in population and government behaviour. If common interests in research are found, we could submit **an international project**.

For more information, please contact:

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