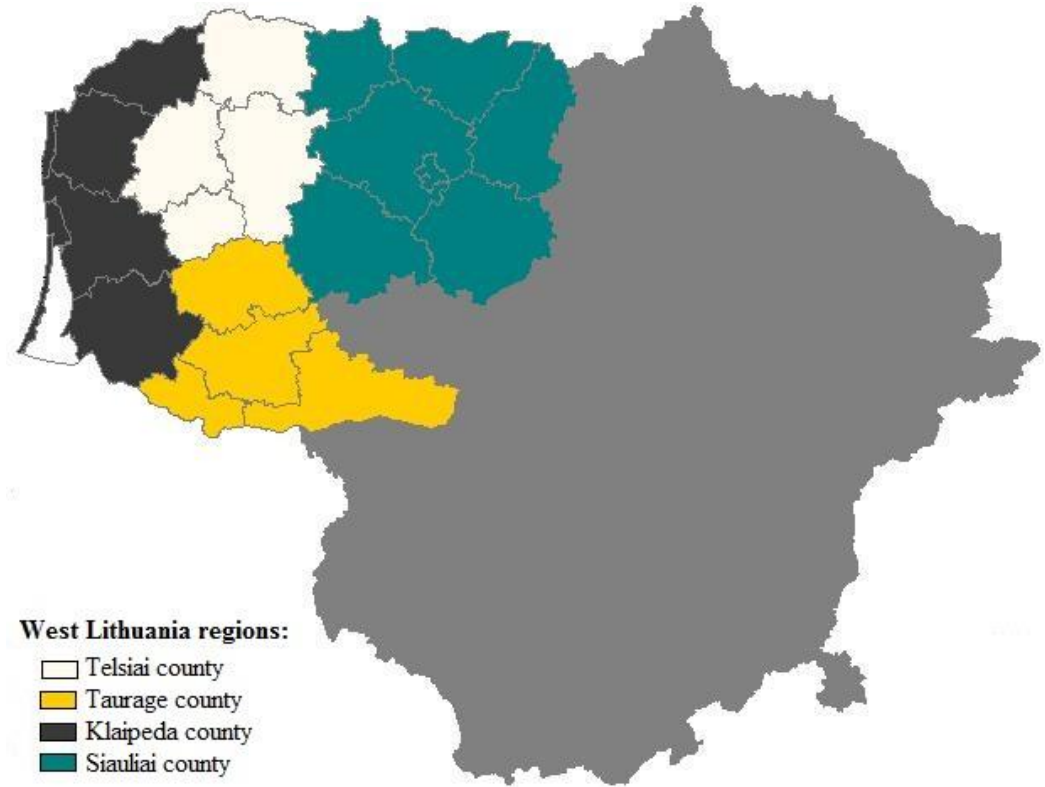




Lithuanian Legal aspects of sludge utilization

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May, 2014

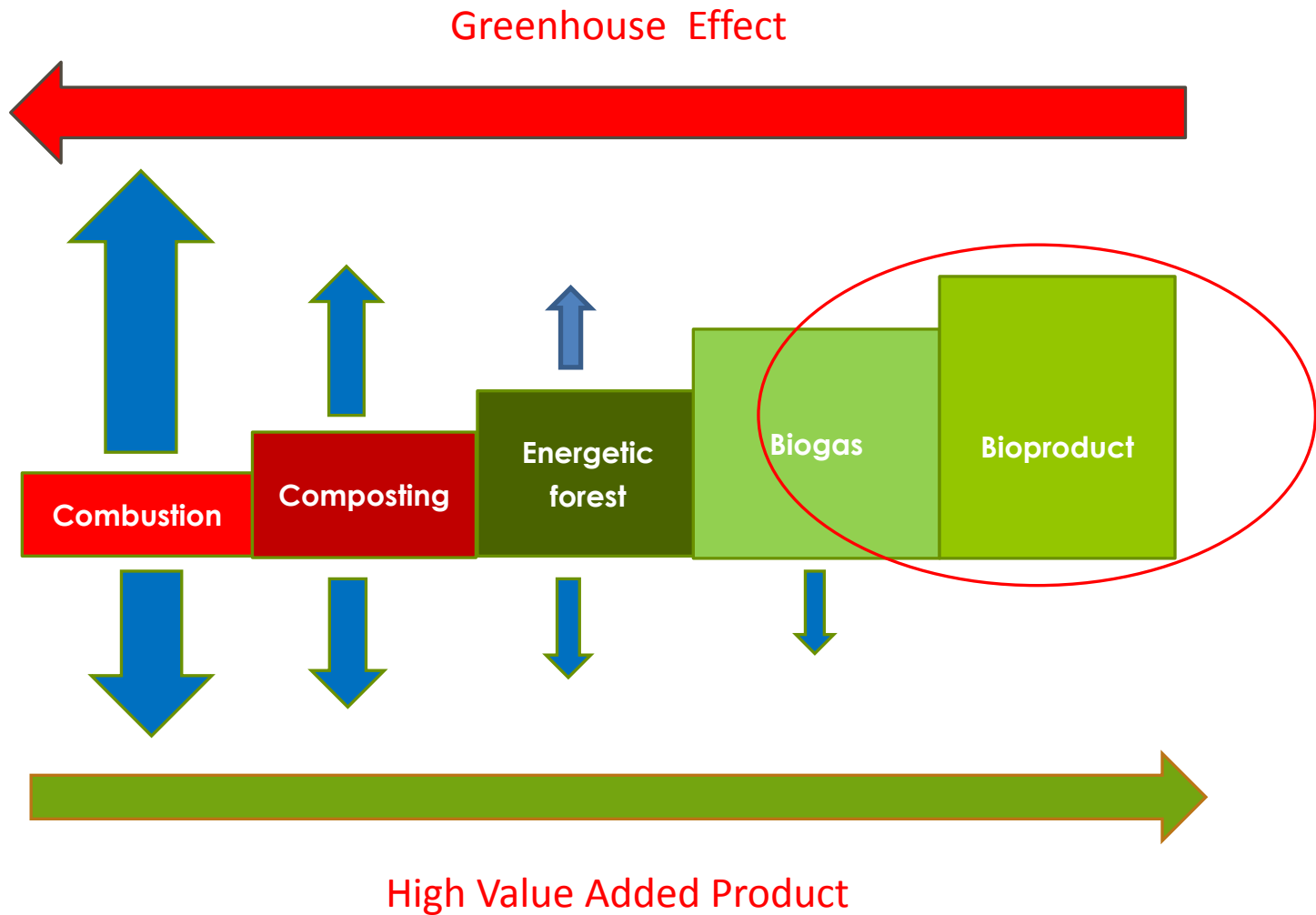
Statistics



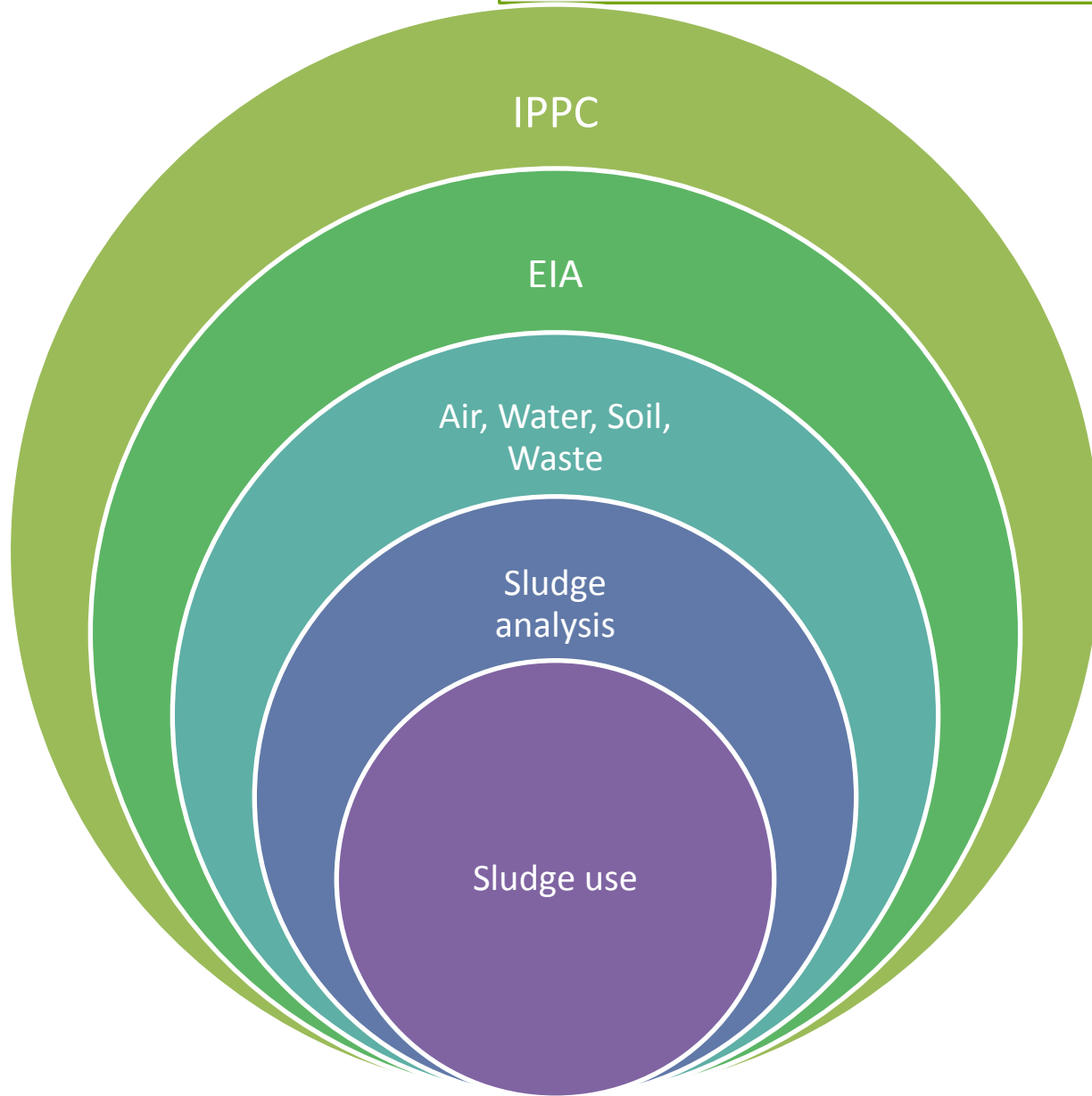
Population: ~ 1 mln. Inhabitants;
Area: 22510 km² (34,5 % of country)
In total - 22 municipalities;
2013 – about 30 mln. m³ sewage;
2012 – about 53 thousand tones of sludge
2011 – about 17kg sludge/ per capita

1. Sludge is a wastewater treatment by-product (waste code is 190805).
2. Sewage sludge management - an international problem to be addressed through the support of the European Union and the country's budget.
3. Lithuanian Strategic Waste Management Plan, approved by the Government in 2007. October 31. Resolution No. 1224 emphasized, that in order to create a cost-effective municipal waste water treatment sludge management system, the necessary municipal sewage sludge management capabilities should be developed.
4. Nowadays distribution of sludge disposal techniques in Lithuania:
 - 57,4% - at sludge sites
 - 21,6% - other methods (mostly export)
 - 20,1% - using for agriculture
 - 0,9% - at landfills

HIERARCHY OF USE



LAW SYSTEM



LEGAL REQUIREMENTS

- European Council Directive (86/278/EEC) for the use of sewage sludge in agriculture.

The thresholds laid down in that directive (values in mg / kg DM):

Cd 20-40; **Cr** - ; **Cu** 1000-1750; **Ni** 300-400;
Pb 750-1200; **Zn** 2500-4000; **Hg** 16-25

- Regulation 2009/29/EC for Sustainable Biofuel Production with two main criteria- sustainable use of land and GHG reduction
- Climate change policy until 2050. A Roadmap for Moving to a Competitive Low Carbon Economy in 2050. 7th Kyoto protocol, the second period of responsibility 2013-2017(20). Until 2015 in line with 48 article the total amount of a biodegradable waste removal shouldn't exceed 253900t/m. 49 article – the requirement to avoid any sewage plant's sludge to accumulate at the sites.
- Approval of Resolution (No Xi-2375, 2012) of National Climate Change Strategy of Management Policy. Developed countries – 25-40%, developing countries-15-30% until 2020. Lithuanian commitment for GHG reduction – 8%

LEGAL REQUIREMENTS

- Sewage sludge application rates LAND 20-2005;
- Construction Technical Regulation STR 2.02.05:2004 “Sewage treatment plant. The main provisions” - the sludge management concepts as well as a definition of sludge are given.
- Wastewater treatment facilities and sludge management facility security zone - Resolutions No 343 and the 1640 version (1992 No 22-652, 2004 No 21-642)
- Lithuania Biofuel, Biofuels for Transport and Bio-lubricants Law No. IX-1999 is biofuel, biofuels and bio-oil production and use of legal conditions and defines biofuels, biofuels and bio-oil concept.
- 2004-2010 Program of Biofuel Production and Promoting the Use (currently there are 16 biogas plants)

LEGAL REQUIREMENTS

- Law of the RL on Renewable Energy (last amendment 17th of January 2013)
- Rules for the Provision of Services of Public Interest (No 1-215,2009) with last amendment 21st of November 2011.
- Approval of the Amendment of the Order of the Minister of the Environment 2001 29 June No 349 of the normative document LAND 20-2001 of “Sewage sludge for fertilization requirements” - enter into force in 1st of July 2014.
- Approval of the Order of Technical Requirements for Composting, Technical Starters and Stabilates (biostabilised biodegradable waste) Quality and Use, 26th of September., 2012, No D1-778 – enter into force in 1st of January 2013.
- Lithuanian Hygiene Standard HN 60:2004 “Dangerous chemicals the maximum allowable concentration in the soil.”

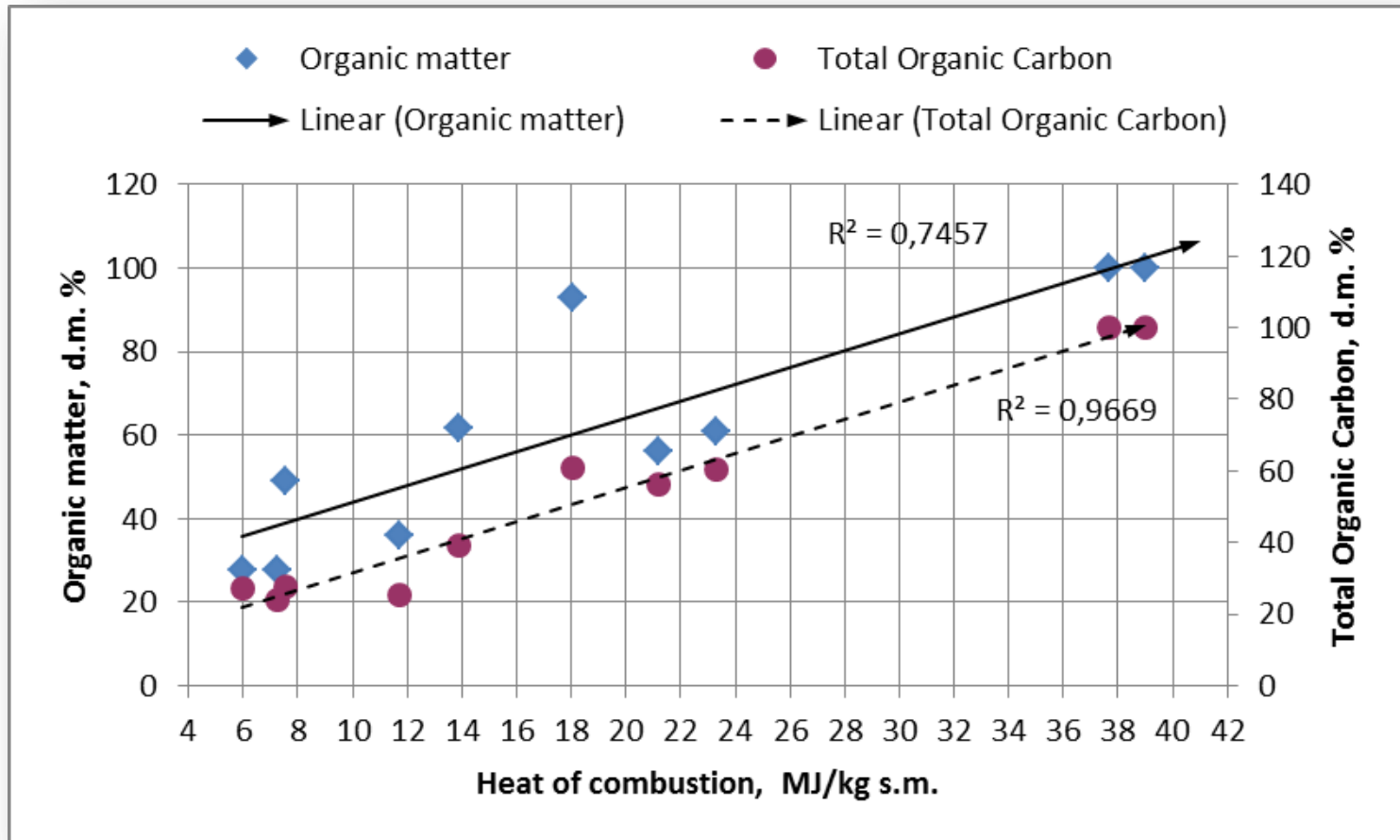
Microbiological parameters of technical compost, technical starters and stabilates

Microbiological parameters, mg/kg d. m.		Technical compost, technical starters
1		2
Salmonella in five 25 g of samples		Not found
E. Coli	Colony-forming units	<3 CFU/g

- The enterobacteria units is estimated by LST ISO 6579-2003 method

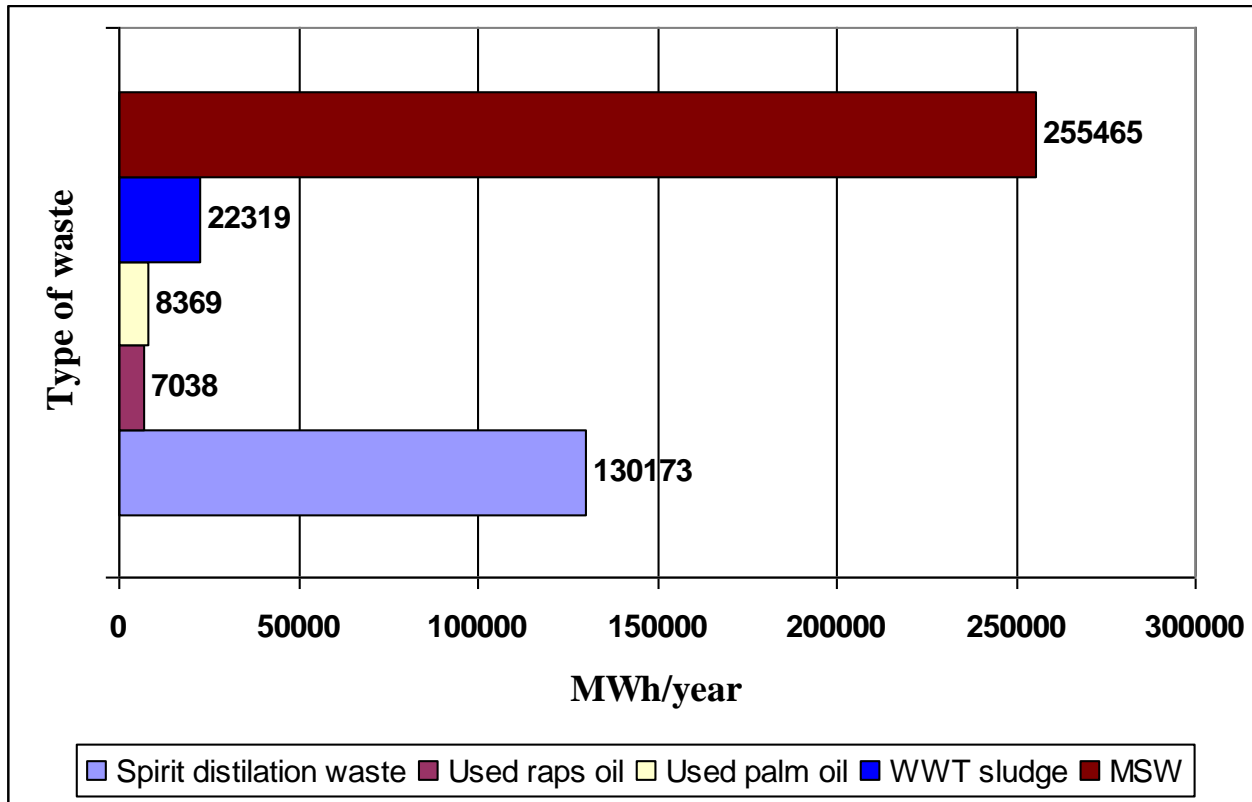
Energetic value

Heat of combustion, organic matter and total organic carbon
(for sewage sludge 12-15 MJ/kg)



Comparison

Potential energy in different wastes

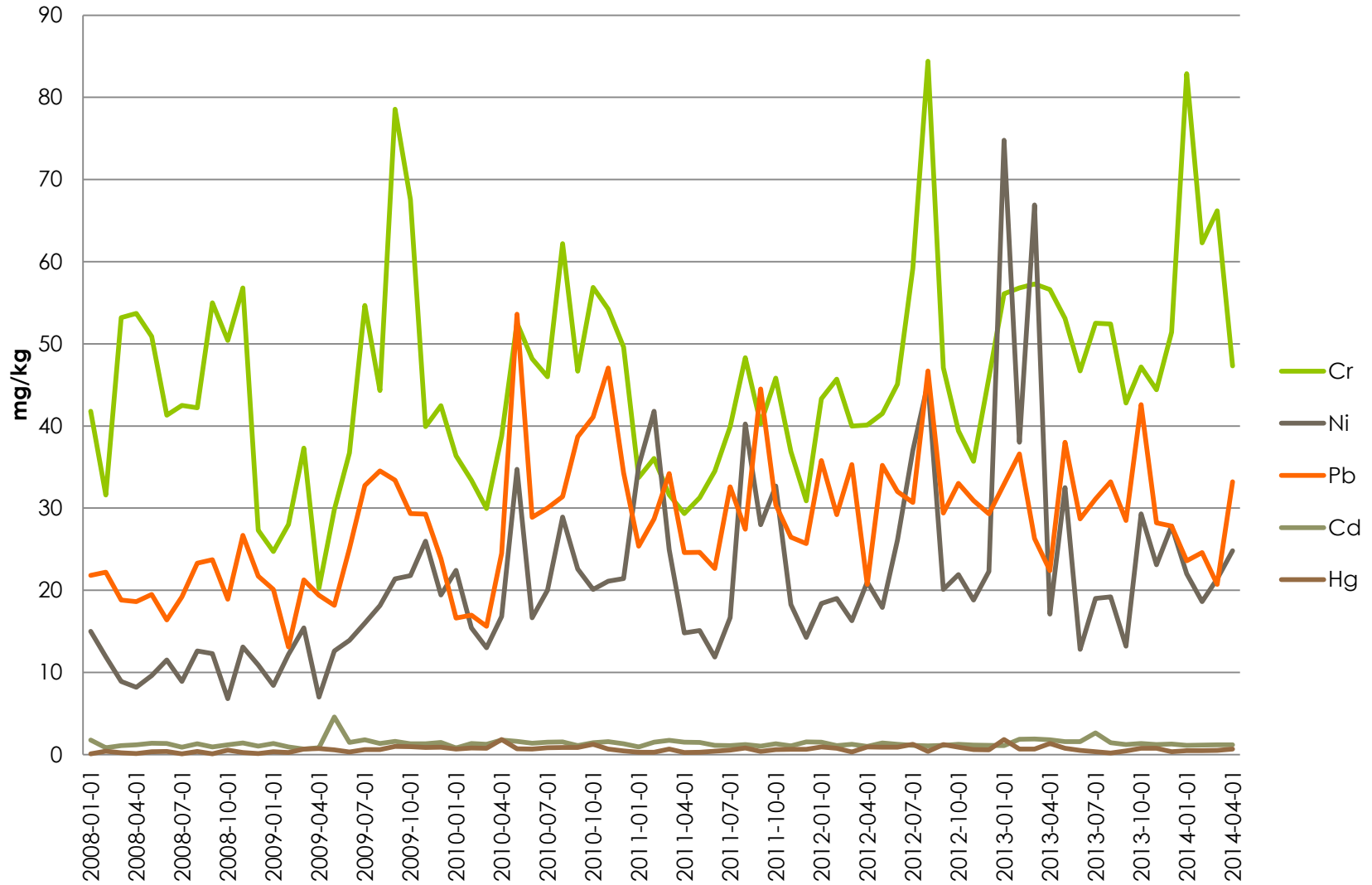


Type of waste	toe
Spirit distillation waste	11193
Used raps oil	605
Used palm oil	720
WWT sludge	1919
MSW	21966

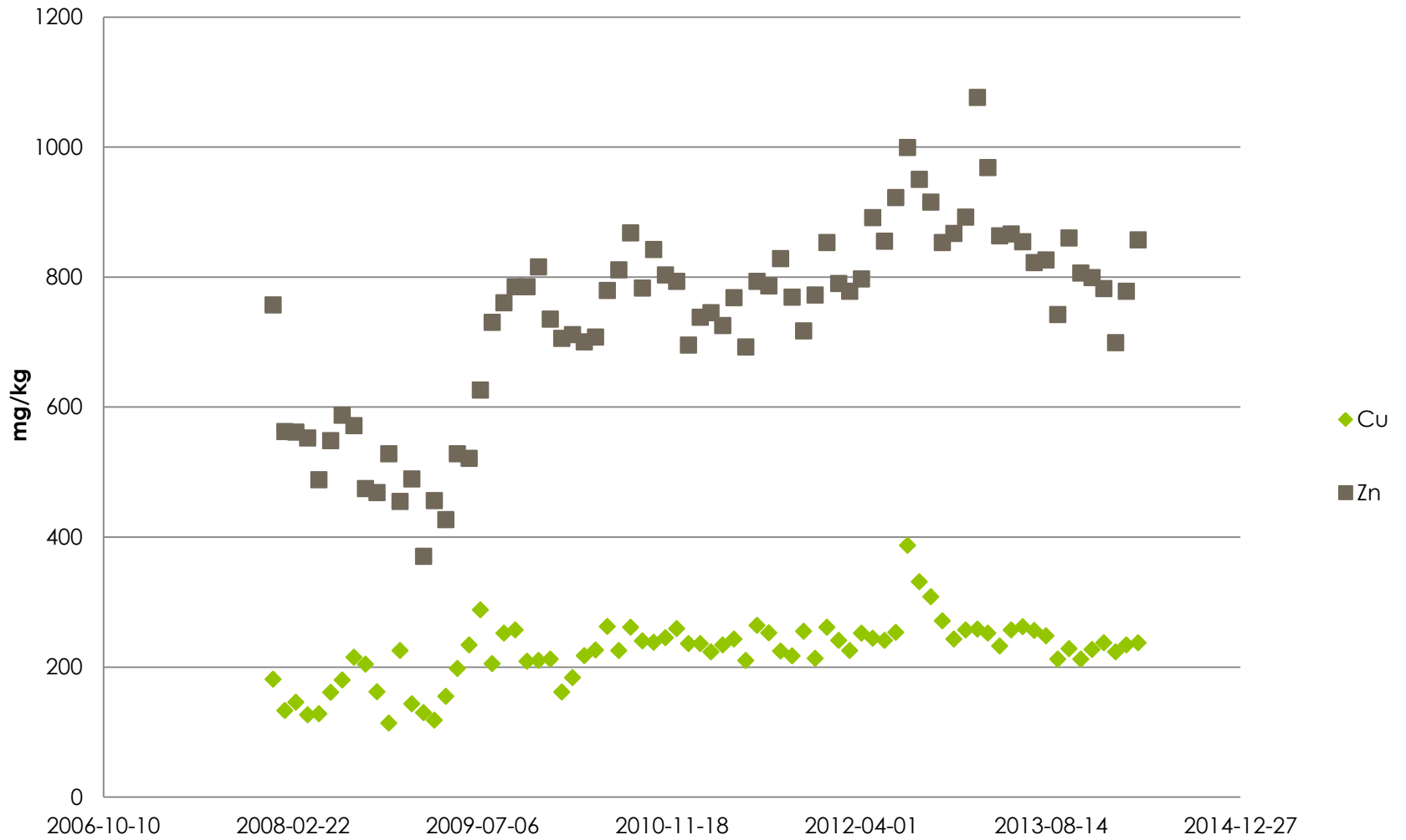
Equipment



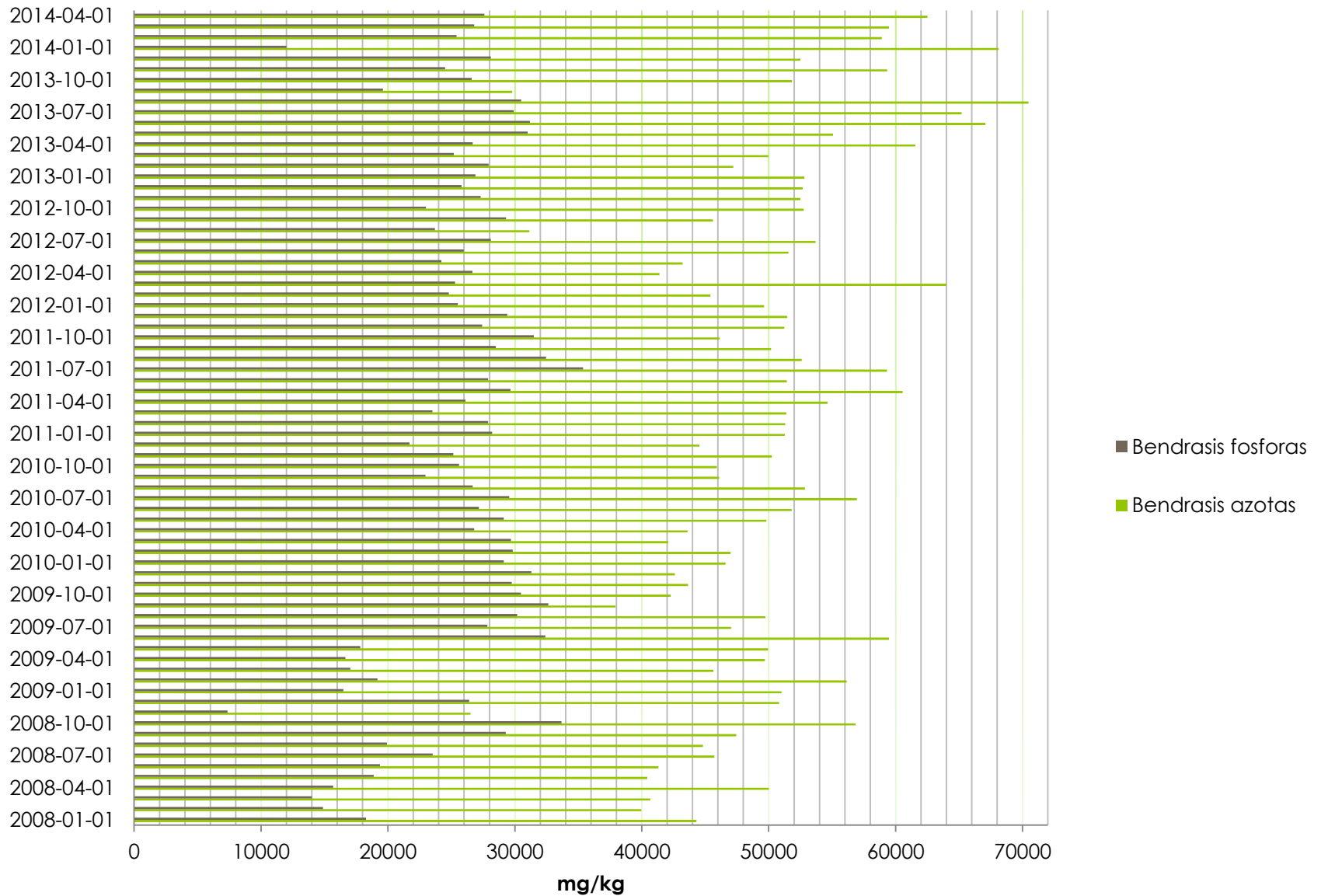
Heavy metals



Heavy metals



Nutrients



Conclusions

- Biodegradable waste utilization should be organized in line with IPPC and others legal requirements and follow industrial symbiosis principles
- Waste utilization hierarchy is one of the main reference point for searching the best solution of waste usage
- Production of high value products is a big challenge for waste utilization industry
- Accredited analysis methods of sludge properties are needed for the strict sludge control before further utilization
- Sewage sludge energetic value could be applied for biofuel purposes (biogas, RDF and etc.)

Conclusions

- Lithuanian sewage sludge's contamination level by heavy metals is allowed to use sludge for agriculture. The amount of nitrogen and phosphorus are suitable for soil as fertilizer
- Lithuanian practical cases analysis have been shown that European Union financial support and opportunity for international cooperation are essential factors of successful sludge use in Lithuania
- Research, business and administration common efforts of sludge utilization in line with Triplex Helix principle are the guarantee of sludge as raw material implementation
- Environmental education and awareness leading to public participation in societal innovation is an important part in the field of sludge utilization.