



Steps towards sustainable municipal solid waste management in São Paulo, Brazil

Miia Liikanen, Jouni Havukainen, Mika Horttanainen

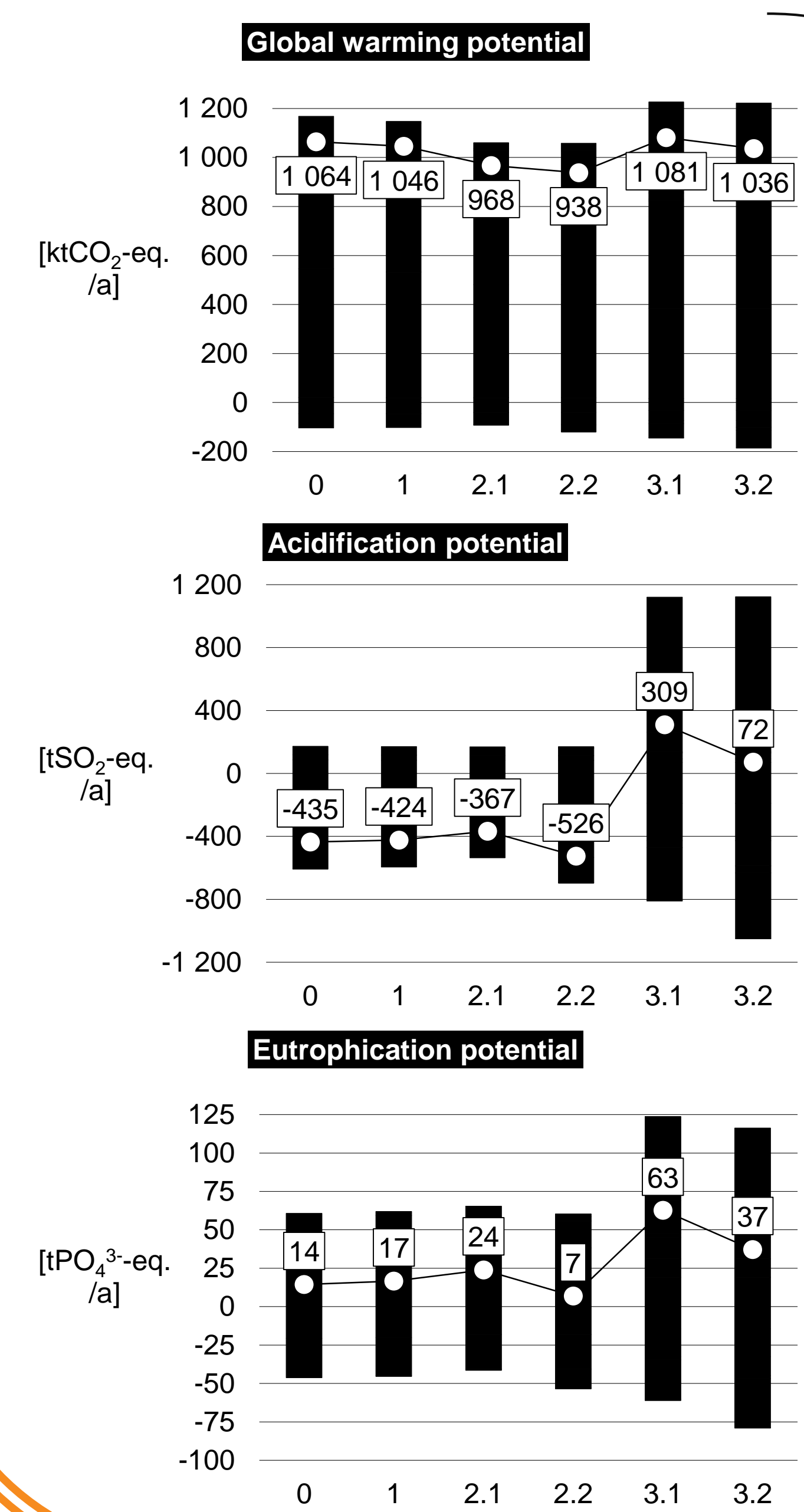
Department of Sustainability Science, LUT School of Energy Systems

Background

- Brazil is the fourth largest generator of MSW in the world
- São Paulo is the most populous city in Brazil
- Landfilling is the main treatment method for MSW in São Paulo
- ~50% of MSW is organic waste
- MSW management is contracted out to private companies
 - Ecourbis
 - Loga
- MSW management system:
 - two landfills
 - three transfer stations
 - two mechanical sorting plants
- Future plans include:
 - initiate home-composting for organic waste
 - separate collection for organic waste (composting and anaerobic digestion (AD))
 - mechanical-biological treatment (MBT) for mixed MSW



Results



- Scenario 2.2 had the lowest emissions in all impact categories
- MBT and incineration (Scenarios 3.1 and 3.2) increased the emissions due to the average electricity production in Brazil
 - 75% of production is hydropower
- Incineration generates substantially more emissions contributing to acidification and eutrophication compared to other processes
 - Other benefits: decreasing the volume of MSW landfilled

Research method

- Life cycle assessment (LCA)
- Impact categories: global warming, acidification and eutrophication potentials
- FU: the treatment of MSW generated in São Paulo city in 2015 (3.8 million tonnes)

Scenario	Mixed MSW [kt]		Organic waste [kt]			Σ [kt]
	Landfill	MBT & inc.	Home-composting	Composting plant	AD	
0	3 800	0	0	0	0	3 800
1	3 707	0	93	0	0	3 800
2.1	3 335	0	93	372	0	3 800
2.2	3 335	0	93	0	372	3 800
3.1	2 668	667	93	372	0	3 800
3.2	2 668	667	93	0	372	3 800

Conclusions

- Separate collection and treatment of source separated organic waste decreased the environmental impacts of MSW management in São Paulo
- Respectively, MBT and incineration increased the environmental impacts of MSW management
 - However, they have other benefits (decreasing the volume of MSW landfilled)

Contact information:

Miia Liikanen
 Department of Sustainability Science
 LUT School of Energy Systems
 miia.liikanen@lut.fi +358 40 586 3446