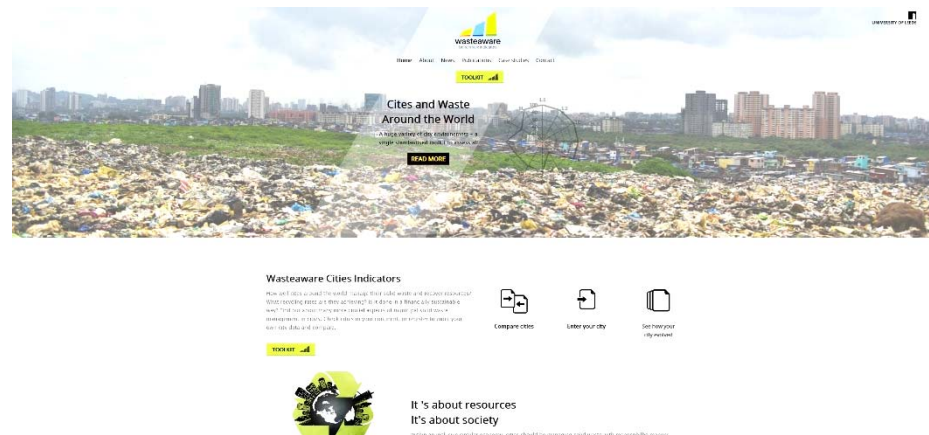


How cities manage waste all over the planet: A global overview through Wasteaware benchmark cities indicators



Dr Costas Velis



**Naxos 2018 – 6th International Conference on Sustainable
Solid Waste Management
13-16 June 2018 – Naxos, Greece**

University of Leeds: Cross-disciplinary teams and expertise

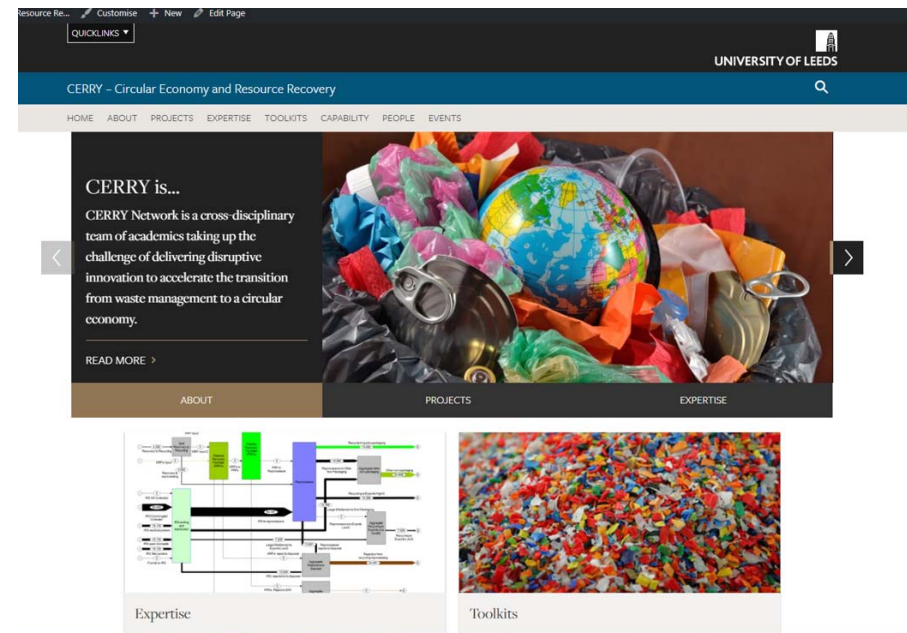


UNIVERSITY OF LEEDS



CERRY: Circular Economy & Resource Recovery

University Theme on
**Cities, Sustainable
Societies and
Infrastructure**



Future trends in waste quantities in low-income cities

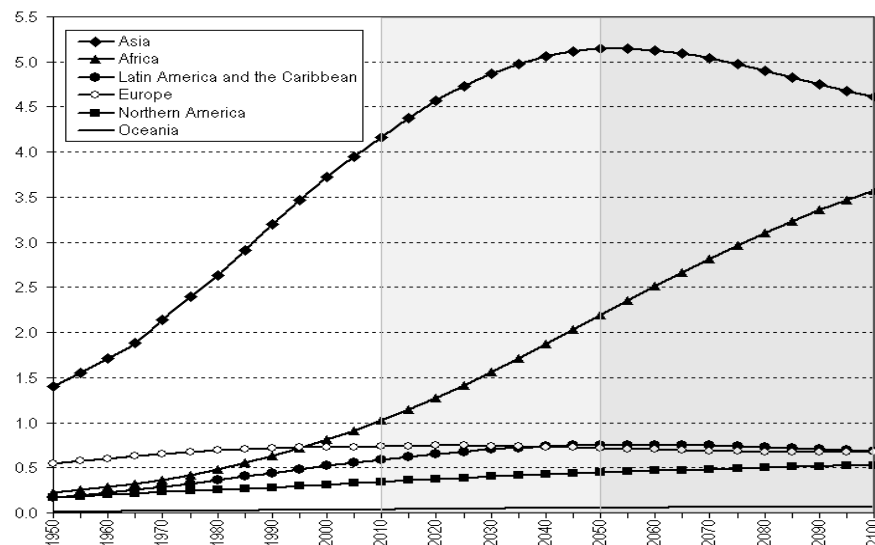


UNIVERSITY OF LEEDS

Factor 1 World population growth

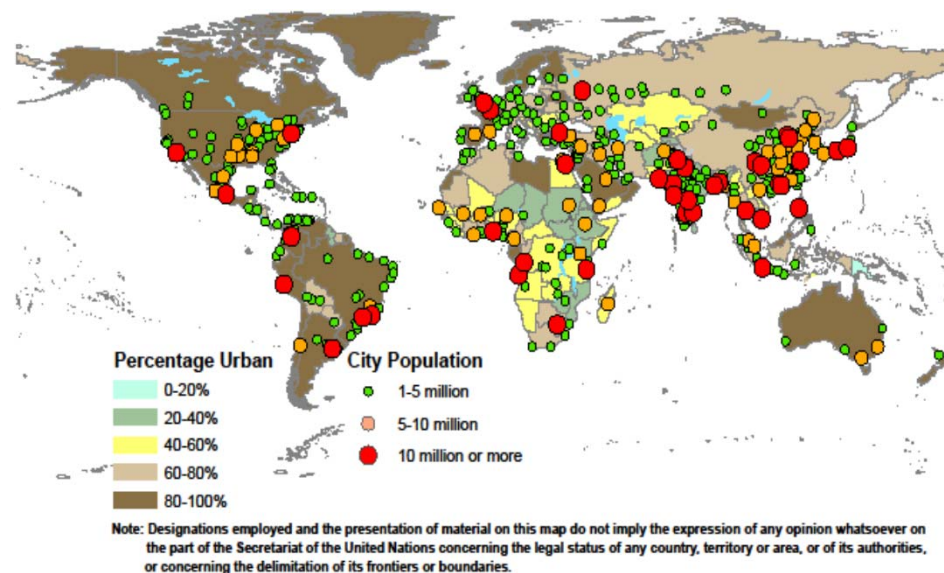
Factor 2 Urbanisation – megacities
(2030: 40 megacities – 32 in Global South)

Factor 3 Waste per capita increase with development
(GNI, GDP, HDI, etc.)



Source: United Nations, Department of Economic and Social Affairs, Population Division (2011): World Population Prospects: The 2010 Revision.

DeW

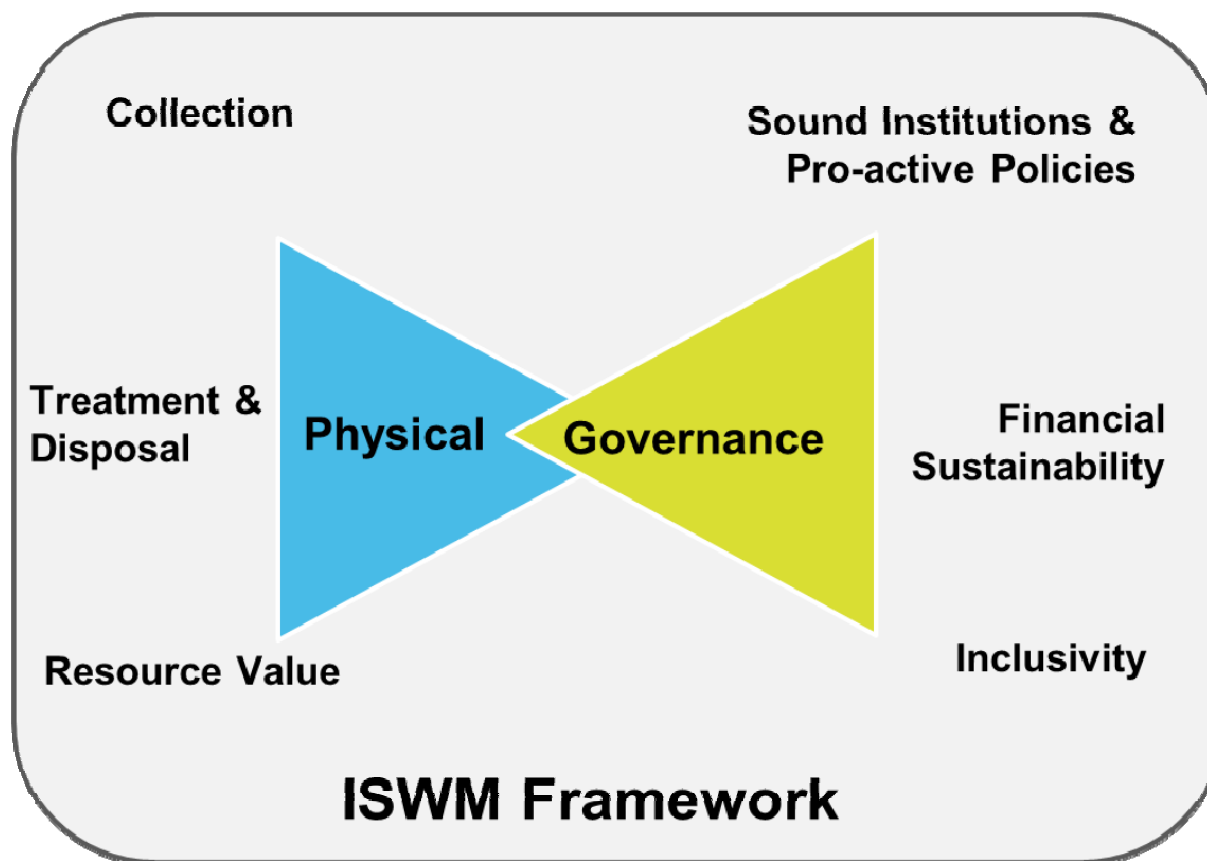


Source: United Nations, Department of Economic and Social Affairs, Population Division: World Urbanization Prospects, the 2011 and 2014 Revisions. New York, 2012, 2014

Background to indicators system



UNIVERSITY OF LEEDS



UN HABITAT
FOR A BETTER URBAN FUTURE

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

 **wasteaware**

**Imperial College
London**

D&W



UNIVERSITY OF LEEDS

Acknowledgements of co-developers: refer to the paper



Waste Management

Volume 35, January 2015, Pages 329-342



‘Wasteaware’ benchmark indicators for integrated sustainable waste management in cities

David C. Wilson ^a  , Ljiljana Rodic ^b, Michael J. Cowing ^c, Costas A. Velis ^d, Andrew D. Whiteman ^e, Anne Scheinberg ^f, Recaredo Vilches ^a, Darragh Masterson ^a, Joachim Stretz ^g, Barbara Oelz ^h

 **Show more**

<https://doi.org/10.1016/j.wasman.2014.10.006>

[Get rights and content](#)

Wasteaware: Physical indicators: an example



UNIVERSITY OF LEEDS

No.	Category	Indicator	Results
1	Public health – Waste collection	Collection coverage	82%
1Q		Quality of waste collection service	M/H
2	Environmental control – waste treatment and disposal	Controlled disposal	0%
2Q		Environmental quality of waste treatment and disposal	L/M
3	3Rs – reduce, reuse and recycling	Recycling rate	< 5%
3Q		Quality of 3Rs provision	L/M

Coverage: both physical and governance aspects

Indicators comprise: 4 quantitative + 8 composite qualitative

Global applicability: both 'South' & 'North'

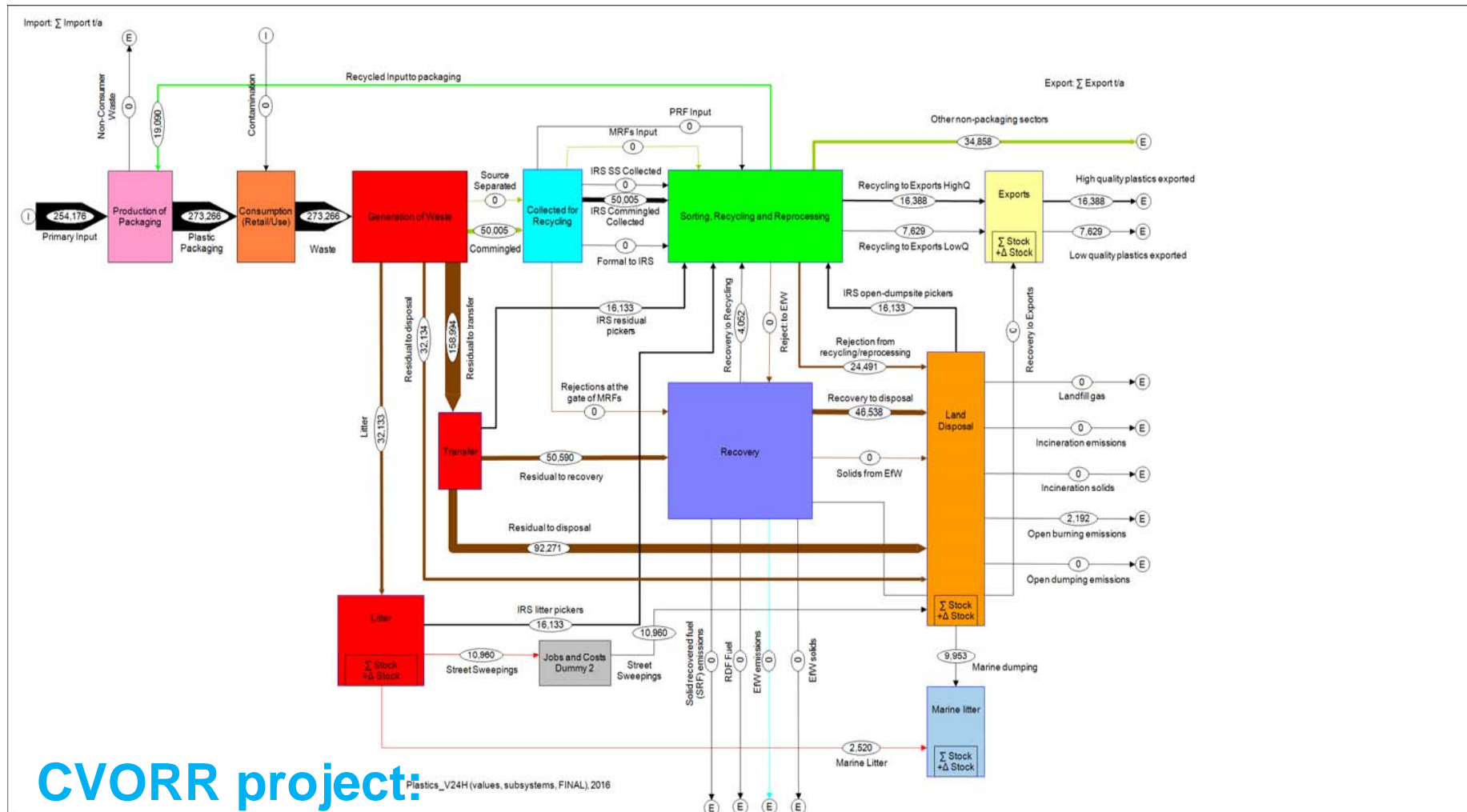
Visualise relative performance: using 'Traffic lights' system

Ready to use: tested in 50 cities in all 6 inhabited continents

New standardised MFA for cities covering informal recycling sector



UNIVERSITY OF LEEDS



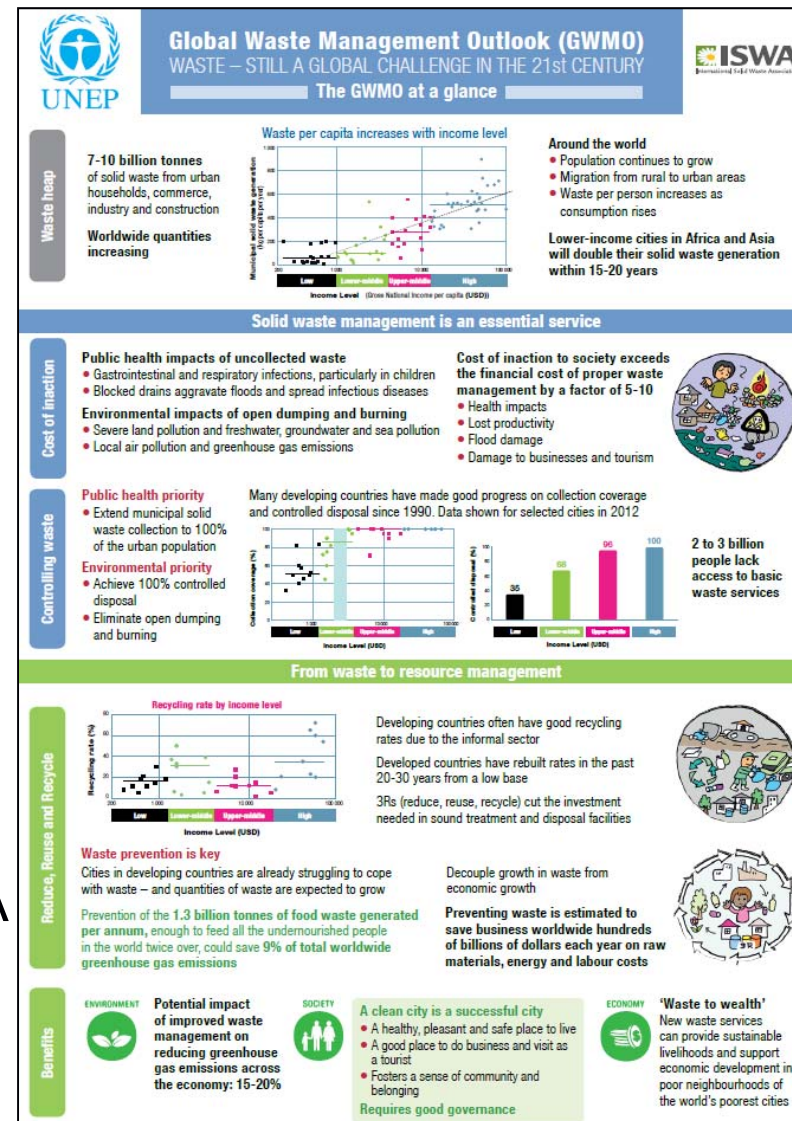
Complex Value Optimisation for Resource Recovery

Acceptability – application to date



UNIVERSITY OF LEEDS

- **Comprehensive** benchmarking system
- **Standardised** methodology
- **World-wide coverage:** accommodates for low income country realities
- **Awards:** Academic paper wins 2015 ISWA Publication Award and CIWM 2014-15 James Jackson Medal for major contributions to solid waste management.
- **Adopted by:** Data in UNEP/ ISWA Global Waste Management Outlook



Adopted by Population Reference Bureau: World Population Data Sheet



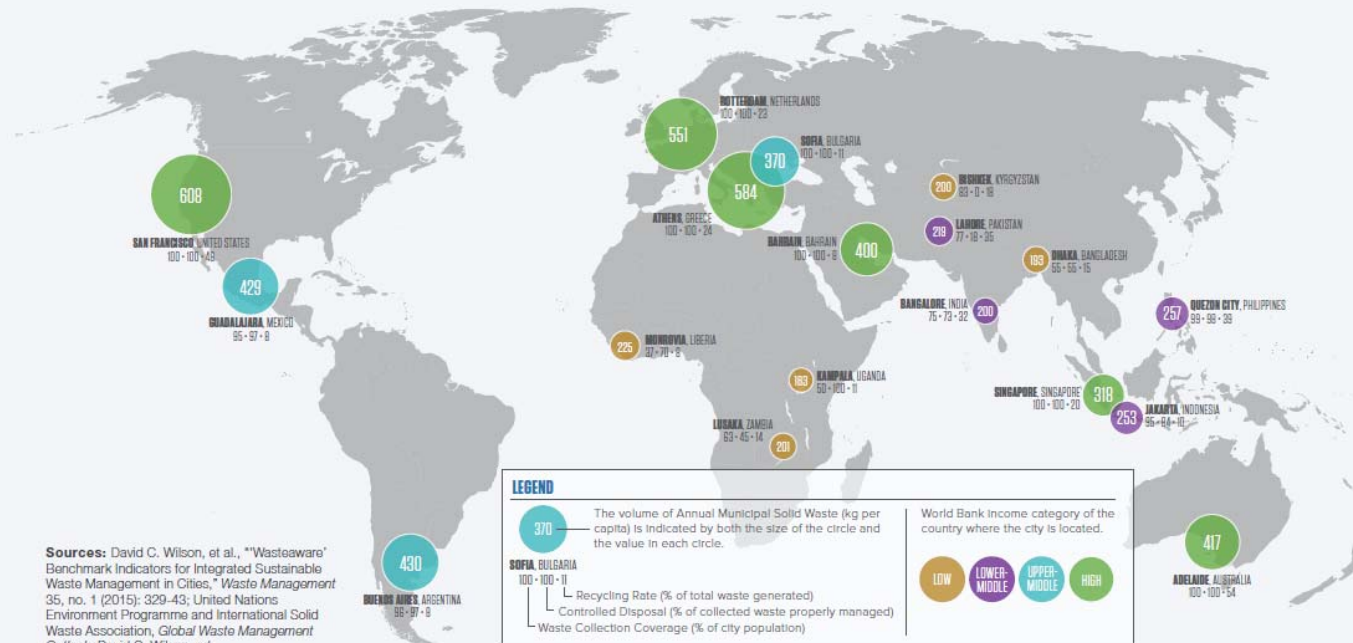
UNIVERSITY OF LEEDS

WORLD POPULATION HIGHLIGHTS

FOCUS ON HUMAN NEEDS AND SUSTAINABLE RESOURCES

Municipal Waste Volumes per Capita Rise With Income

Proper municipal waste disposal is a public health and environmental priority as urban populations grow. City residents without regular refuse collection services risk exposure to contaminants that spread into soil, streets, and water. Uncontrolled dumpsites taint water tables and release airborne toxins as unsorted refuse is burned. Global municipal waste data show that per capita volumes tend to rise with average income levels but negative impacts lessen as wealthier cities improve waste processing systems. While some cities in lower-income countries have expanded collection coverage, many still lag in proper waste processing—or controlled disposal. Collection in Lahore, Pakistan covers 77 percent of the population but only 18 percent of collections go to a controlled disposal facility. Lusaka, Zambia has 63 percent coverage and a 45 percent rate of controlled disposal. Recycling rates reach relatively high levels in some lower-income countries, often due to informal recycling networks.



Sources: David C. Wilson, et al., "Wasteaware" Benchmark Indicators for Integrated Sustainable Waste Management in Cities," *Waste Management* 35, no. 1 (2015): 329-43; United Nations Environment Programme and International Solid Waste Association, *Global Waste Management Outlook*, David C. Wilson, ed.

Wasteaware: benchmark cities indicators: Web-portal about to be launched



UNIVERSITY OF LEEDS



Wasteaware Cities Indicators

How well cities around the world manage their solid waste and recover resources? What recycling rates are they achieving? Is it done in a financially sustainable way? Find out about many more crucial aspects of municipal solid waste management in cities. Check cities in your continent, or register to enter your own city data and compare.

TOOLKIT



Compare cities



Enter your city



See how your city evolved



It's about resources
It's about society

Within an inclusive circular economy, cities should be managing solid waste with a resourceful manner.

EPSRC

Engineering and Physical Sciences
Research Council



UNIVERSITY OF LEEDS



Basic reporting customisable interface



UNIVERSITY OF LEEDS

Year

Continent

GNI/capita (USD)

MSW per capita

Recycling rate (%)

City population

Graph type

Cities

Latest

All

All

All

All

All

Radar chart

Select cities

Athens (GAA) ✕

Bahrain ✕

Buenos Aires ✕

Delhi ✕

Nairobi ✕

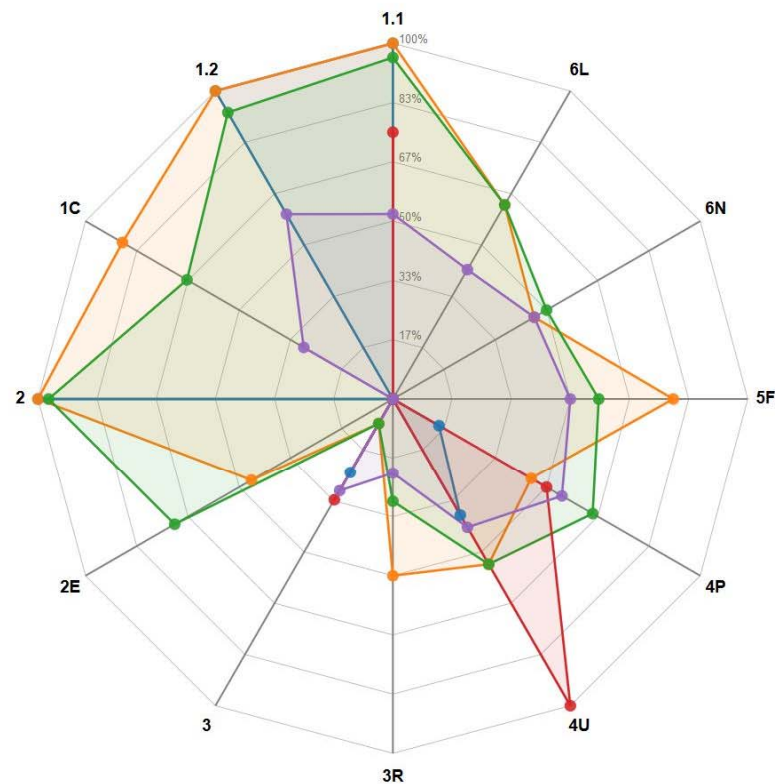


Chart options

SELECT REPORT FIELDS

☒ Fill graph area

SAVE GRAPH AS PNG

Cities

- Athens (GAA) (2011)
- Bahrain (2008)
- Buenos Aires (2010)
- Delhi (2009)
- Nairobi (2012)

Traffic-light' colour coding for each indicator



UNIVERSITY OF LEEDS

		Performance				
		Low	Low-Medium	Medium	Medium-High	High
Physical components	Benchmark indicator	Buenos Aires	Nairobi	Rotterdam		
Public health – waste collection	1.1 Waste collection coverage (% households)	96	52	100		
	1.2 Waste captured by solid waste management and recycling system (% wt.)	93	60	100		
	1C Quality of waste collection and street cleaning service (%)	67	29	92		
Environmental control – disposal	2 Control treatment and/or disposal (% wt.)	97	0	100		
	2E Quality of environmental protection in waste treatment and disposal	71	0	100		
	3 Recycling rate (% wt.)	8	30	23		
Resource value – 3Rs: reduce, reuse, recycling	3R Quality of 3Rs – reduce, reuse, recycle (%)	29	21	71		
Governance factors	Benchmark indicator	Buenos Aires	Nairobi	Rotterdam		
Degree of user and provider inclusivity	4U Degree of user inclusivity (%)	54	42	88		
	4P Degree of provider inclusivity (%)	65	55	90		
Degree of financial sustainability	5F Degree of financial sustainability (%)	58	50	100		
Sound institutions and proactive policies	6N Adequacy of national framework for solid waste management (SWM) (%)	50	46	92		
	6L Degree of local institutional coherence (%)	63	42	96		

Cities dataset: Economic development vs. population



UNIVERSITY OF LEEDS

Athens (GAA) ✕

Bahrain ✕

Buenos Aires ✕

Jakarta ✕

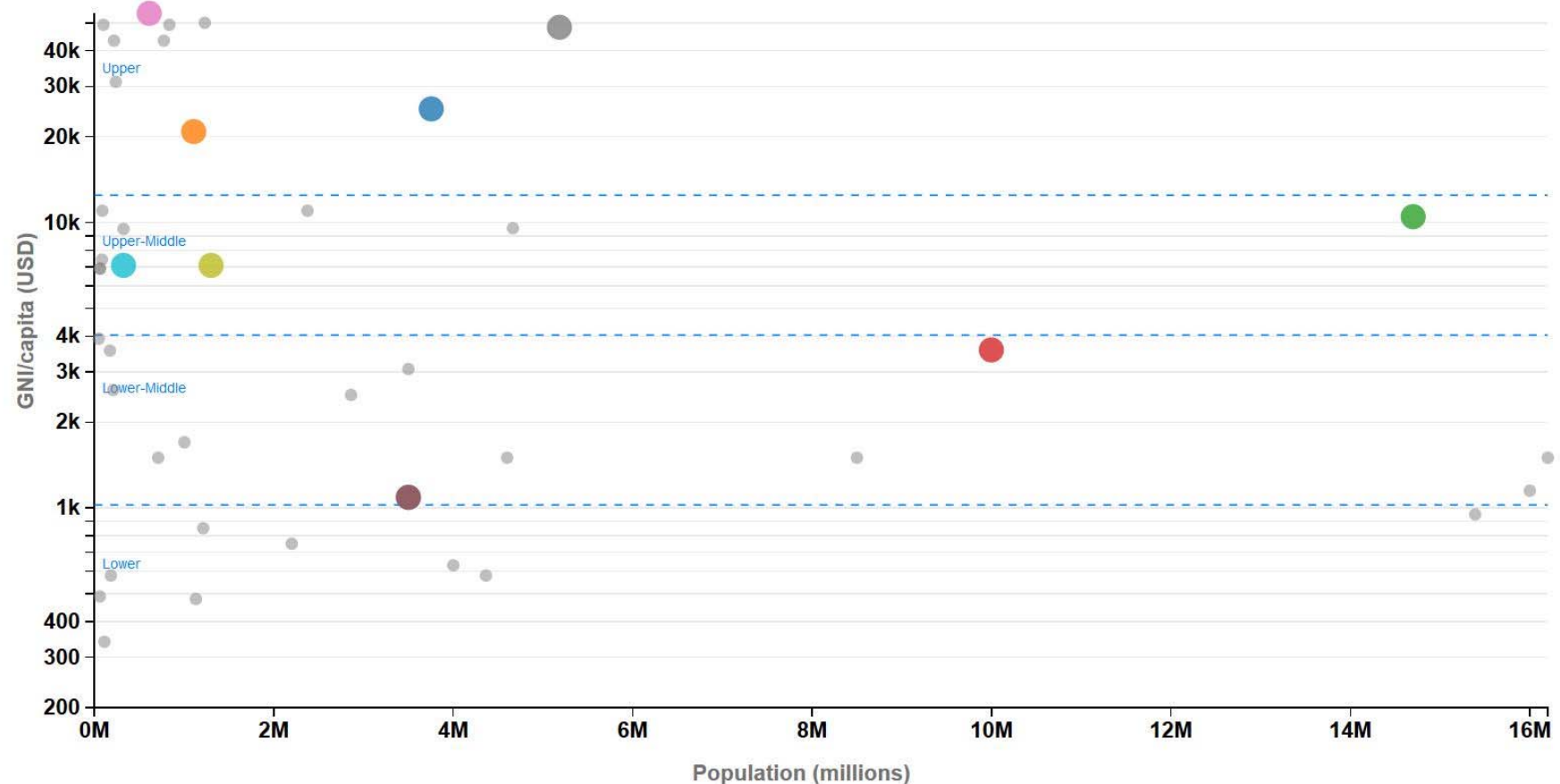
Nairobi ✕

Nairobi ✕

Rotterdam ✕

Singapore ✕

Sofia ✕



Waste collection coverage



UNIVERSITY OF LEEDS

Athens (GAA) ✕

Bahrain ✕

Buenos Aires ✕

Jakarta ✕

Nairobi ✕

Nairobi ✕

Rotterdam ✕

Singapore ✕

Sofia ✕

Varna ✕

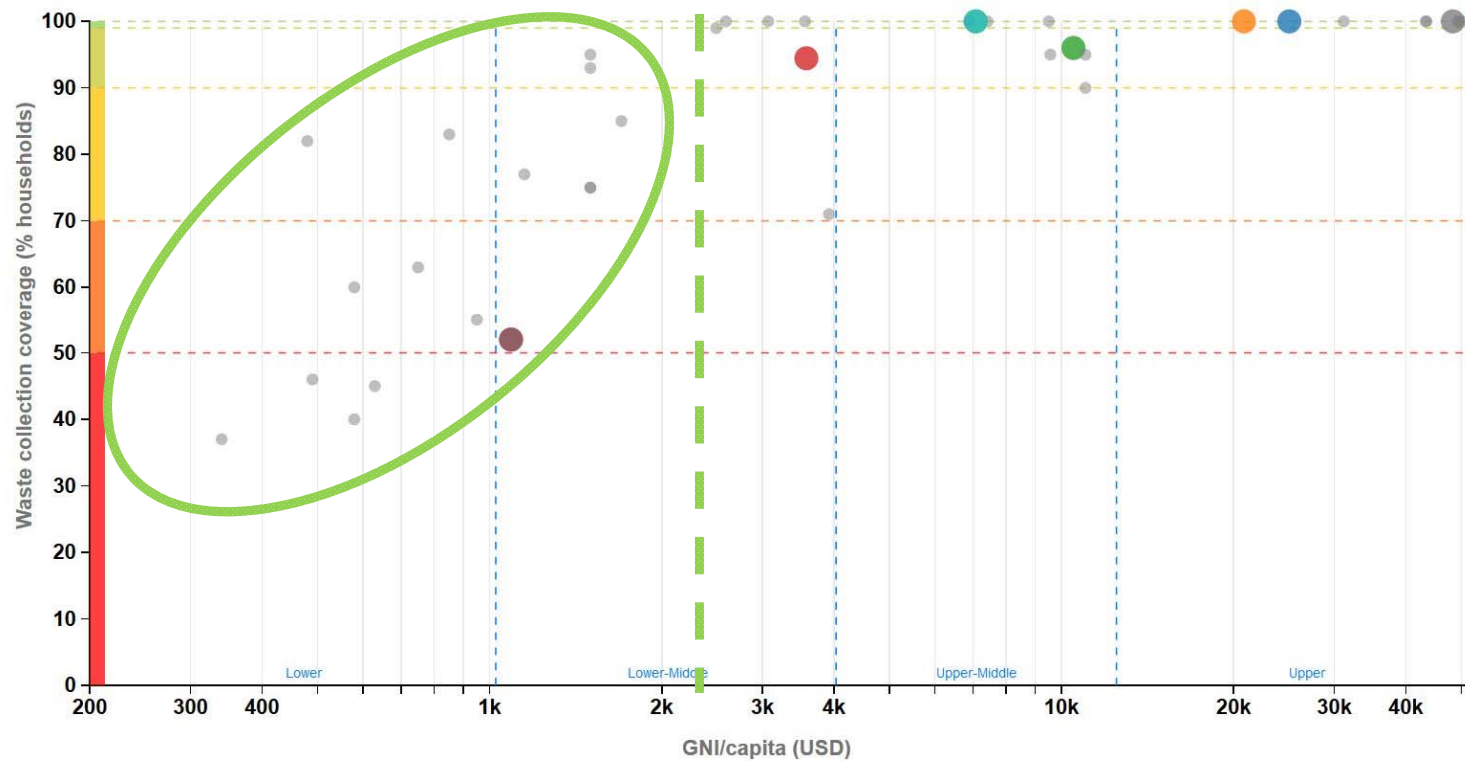


Chart options

X axis values

GNI/capita (USD)

Y axis values

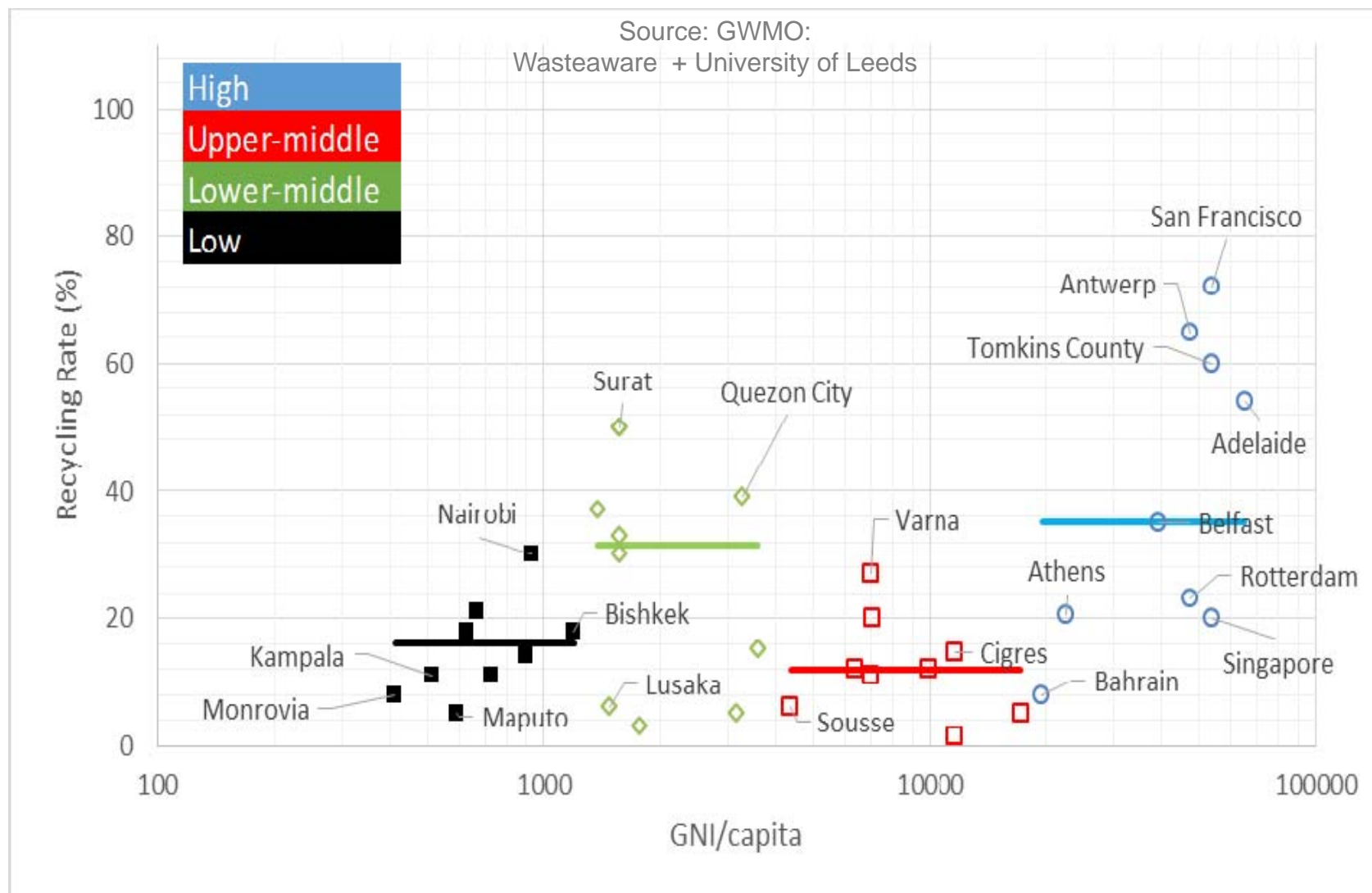
Waste collection coverage

SAVE GRAPH AS PNG

Cities MSW recycling performance



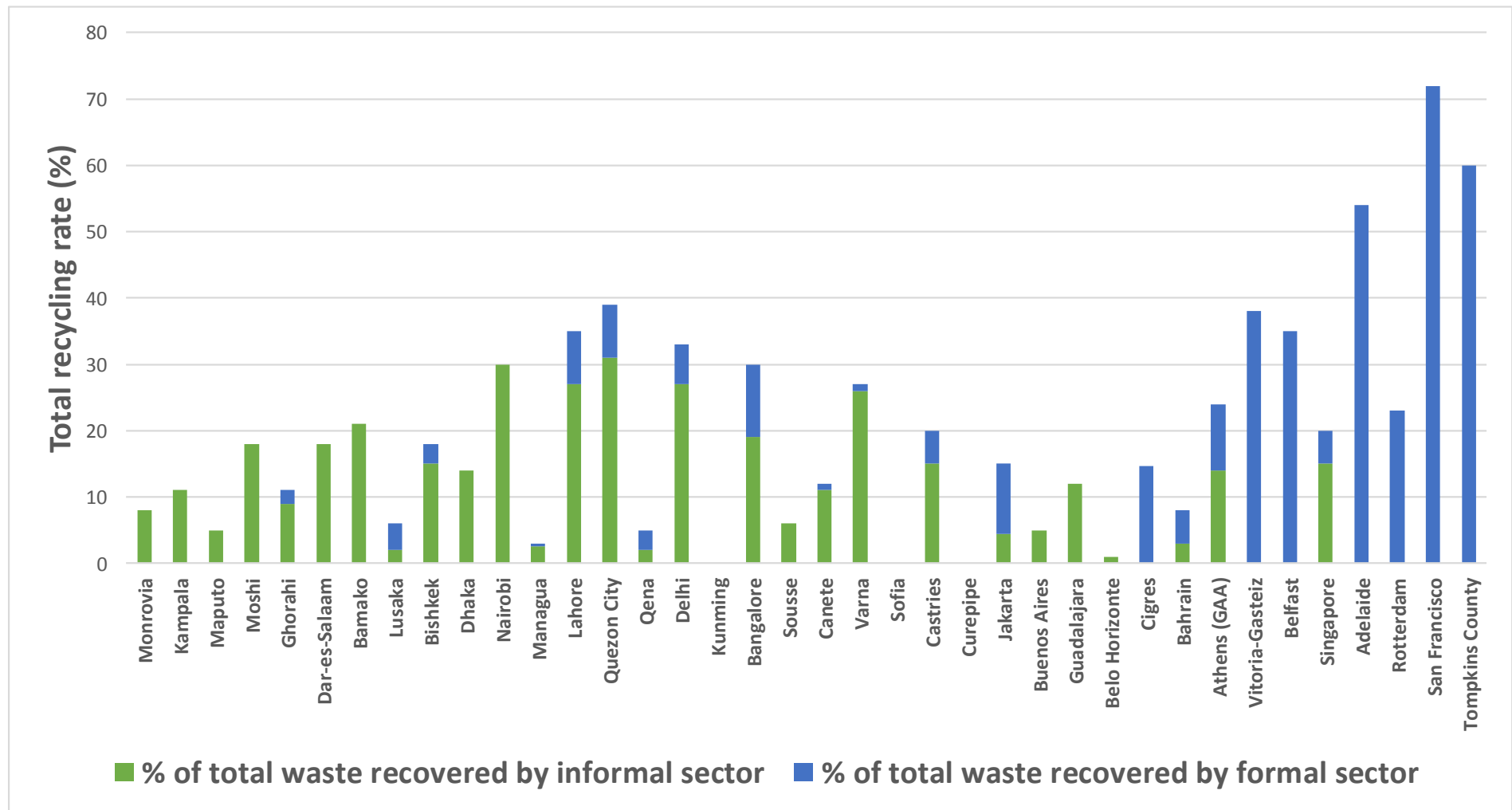
UNIVERSITY OF LEEDS



Wasteaware: informal recycling dominates around the world...



UNIVERSITY OF LEEDS



Recycling quality



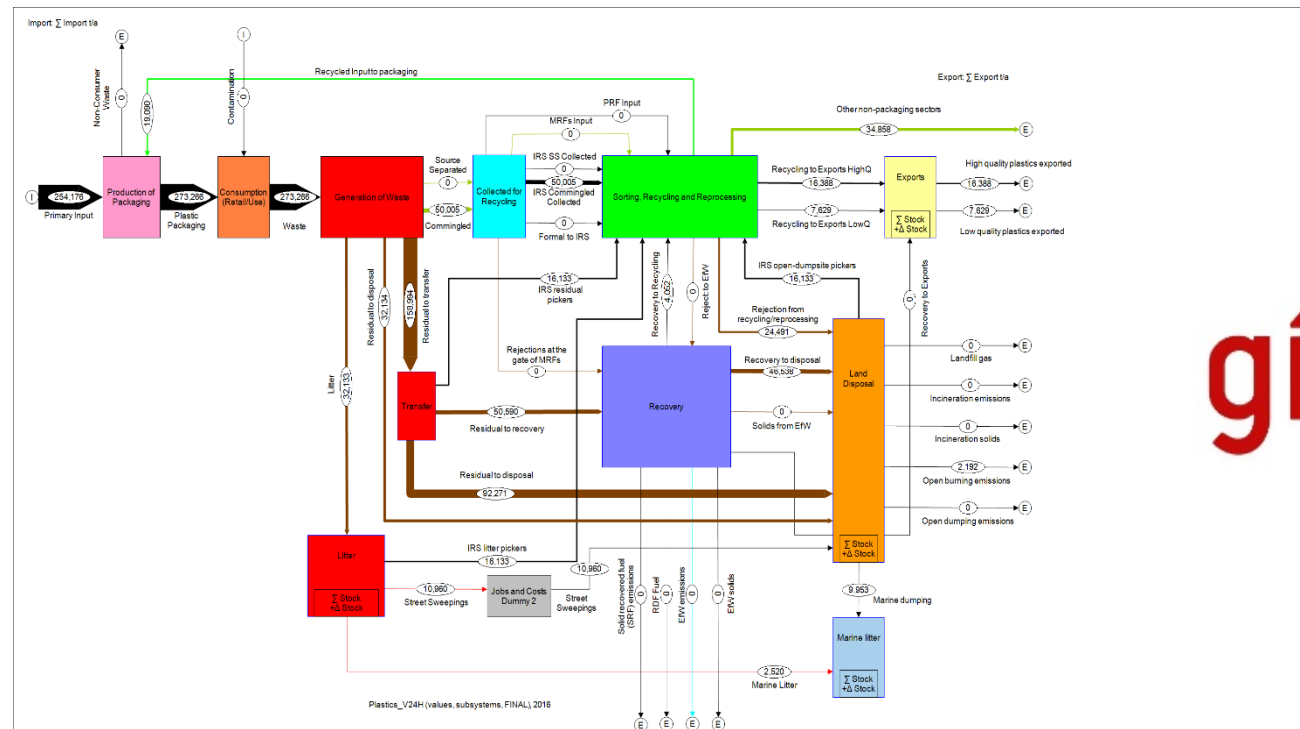
UNIVERSITY OF LEEDS



Forthcoming tool to be developed



UNIVERSITY OF LEEDS



giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

NEW!

Waste Flow Diagrams: Solid waste to marine litter in cities



Thank you for listening!



Dr Costas Velis

c.velis@leeds.ac.uk

