



Ricardo
Energy & Environment

Session A: Setting the scene

Asia Clean Energy Forum 2016

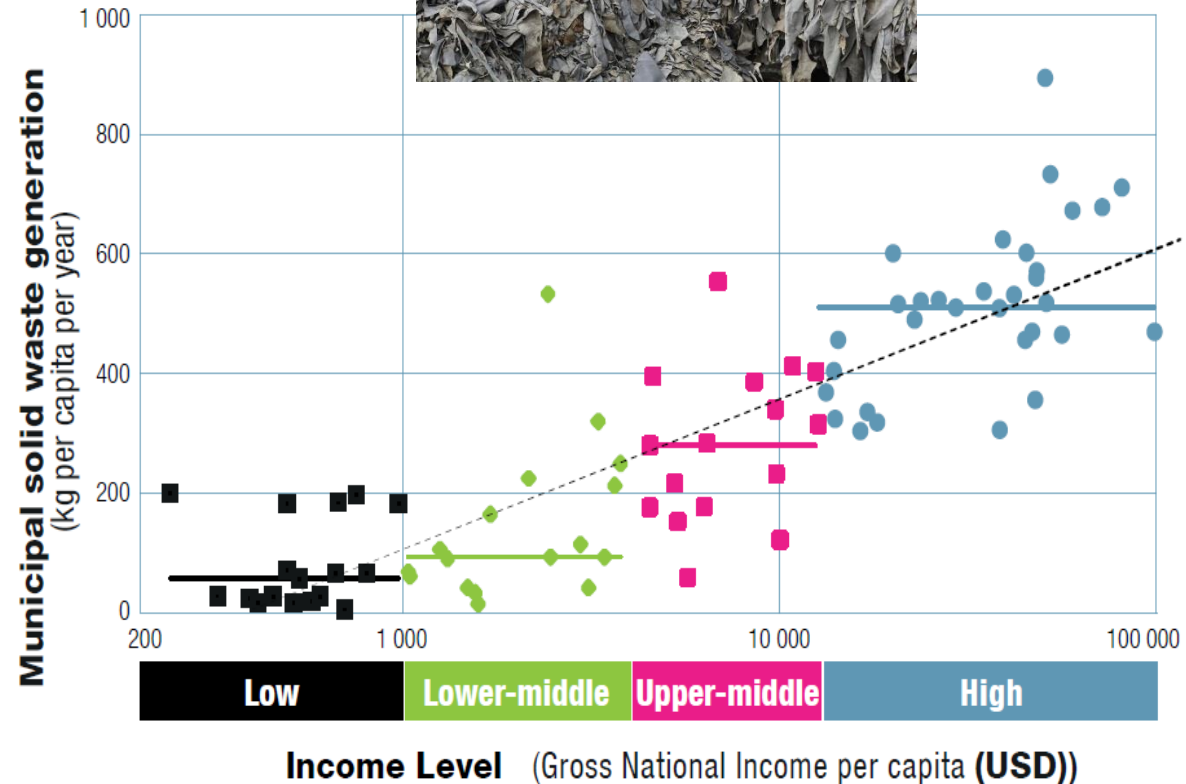
Prof Adam Read

Practice Director

7th June 2016, Manila, Philippines

A global outlook

- 7 – 10 billion tonnes per year of solid waste
 - *from urban households, commerce, industry and construction*
 - *set to increase as population and levels of consumption grow*
- Lower-income cities in Africa and Asia expected to double solid waste generation in the next 15-20 years!

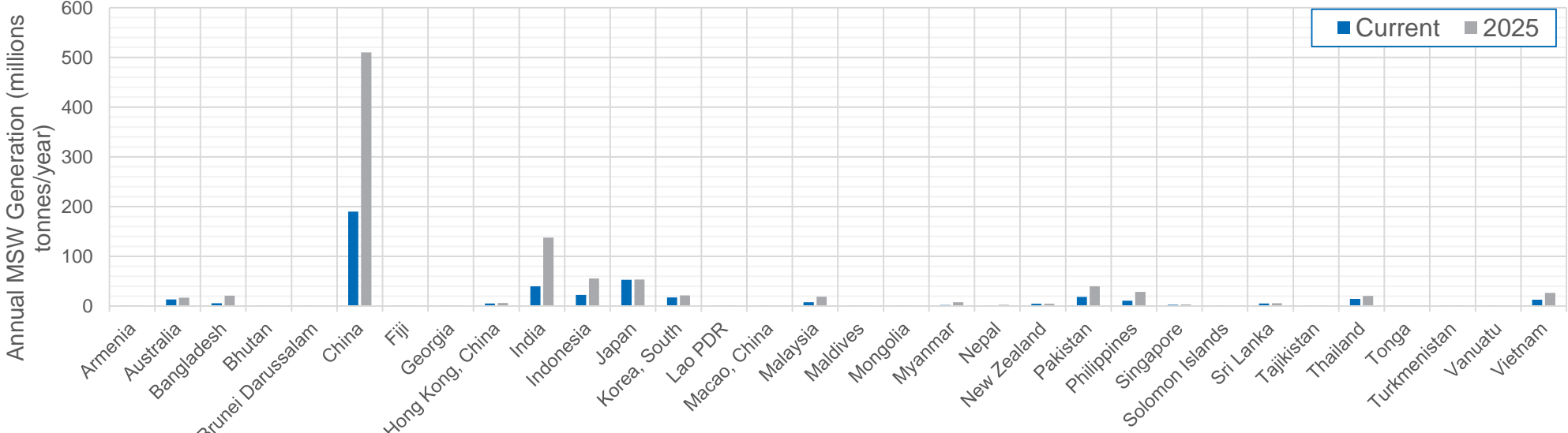


Source: ISWA/UNEP Global Waste Management Outlook

Solid waste generation in Asia



- MSW generation in ADB member countries is 430 million tonnes p.a
 - *projected to rise to 990 million tonnes p.a. by 2025*
 - *average national increases of 160%*
- Per capita waste generation in the range 0.12 to 5.1kg/capita/day
 - *projected to be 0.7 to 4kg/capita/day by 2025*
 - *for OECD members = 1.1 to 3.8kg/capita/day*



Source: *What a Waste : A Global Review of Solid Waste Management*. Urban development series; knowledge papers no. 15. World Bank, 2012

Daily waste arisings

	2000-2010 Compound Wtd Ave	2011	2012	2013	2014e	2015f	2016f	2017f
China	10.5	9.3	7.7	7.7	7.4	7.1	7.0	6.9
India	7.5	6.6	4.7	5.0	5.6	6.4	7.0	7.0
Indonesia	5.2	6.5	6.3	5.8	5.1	5.2	5.5	5.5
Malaysia	4.6	5.2	5.6	4.7	5.7	4.7	5.1	5.2
Philippines	4.8	3.6	6.8	7.2	6.0	6.5	6.5	6.3
Thailand	4.3	0.1	6.5	2.9	0.5	3.5	4.0	4.5
Vietnam	6.6	6.2	5.2	5.4	5.6	5.6	5.8	6.0

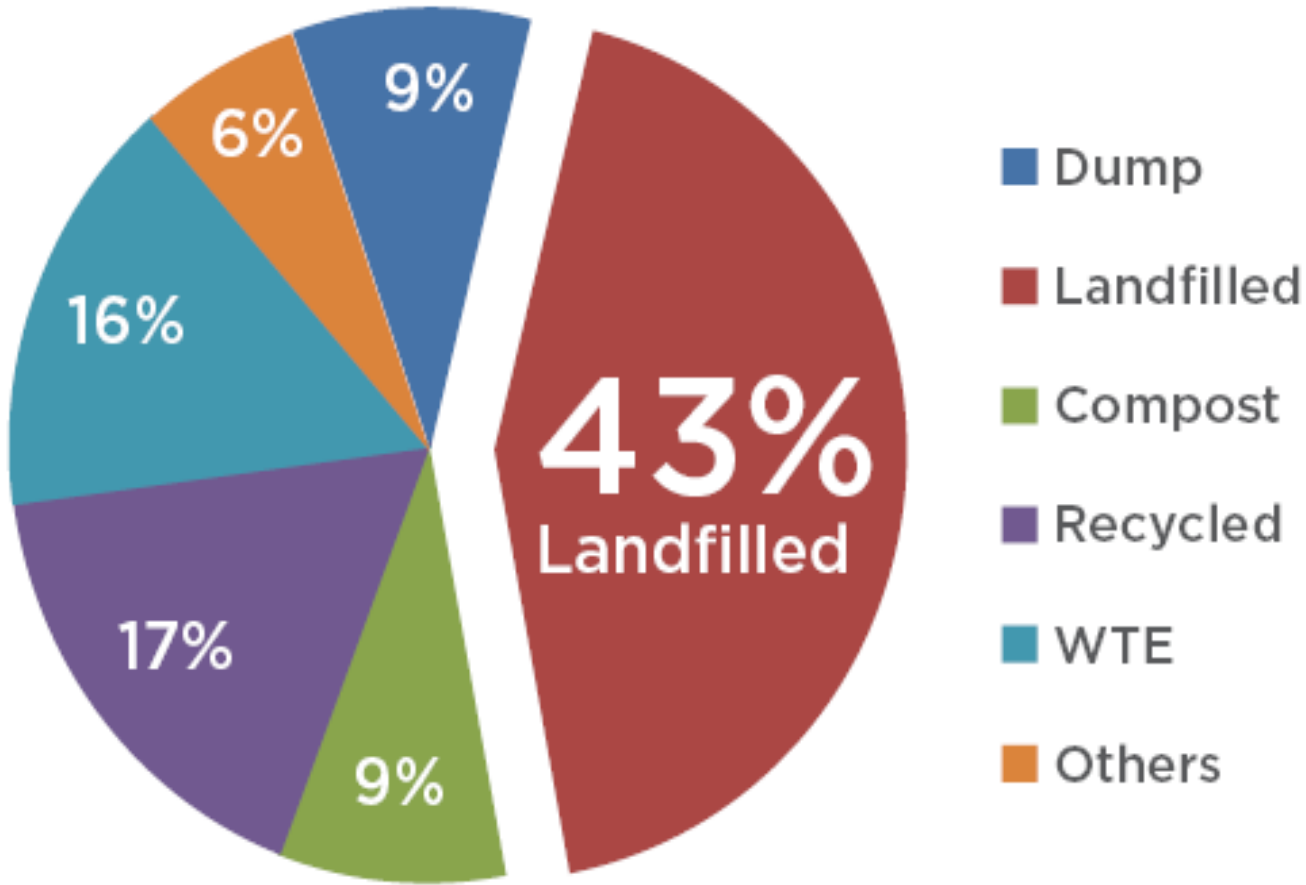
Source: Global Economic Prospects, January 2015, World Bank

Global Mega Trends

- Population growth continues!
- The world is urbanising!
 - *Cities will increase from 3.6bn people to 6.3bn in the next 40 years*
 - *Cities expect to house 2/3 of worlds people in 30 yrs*
- Putting strain on urban infrastructure resulting in poor environmental and public health
 - *AQ in China & India*
 - *Lower Life expectancy in Africa*
- Changing Consumer Behaviour (increasingly “Western”) is creating higher per capita waste generation



The global waste problem

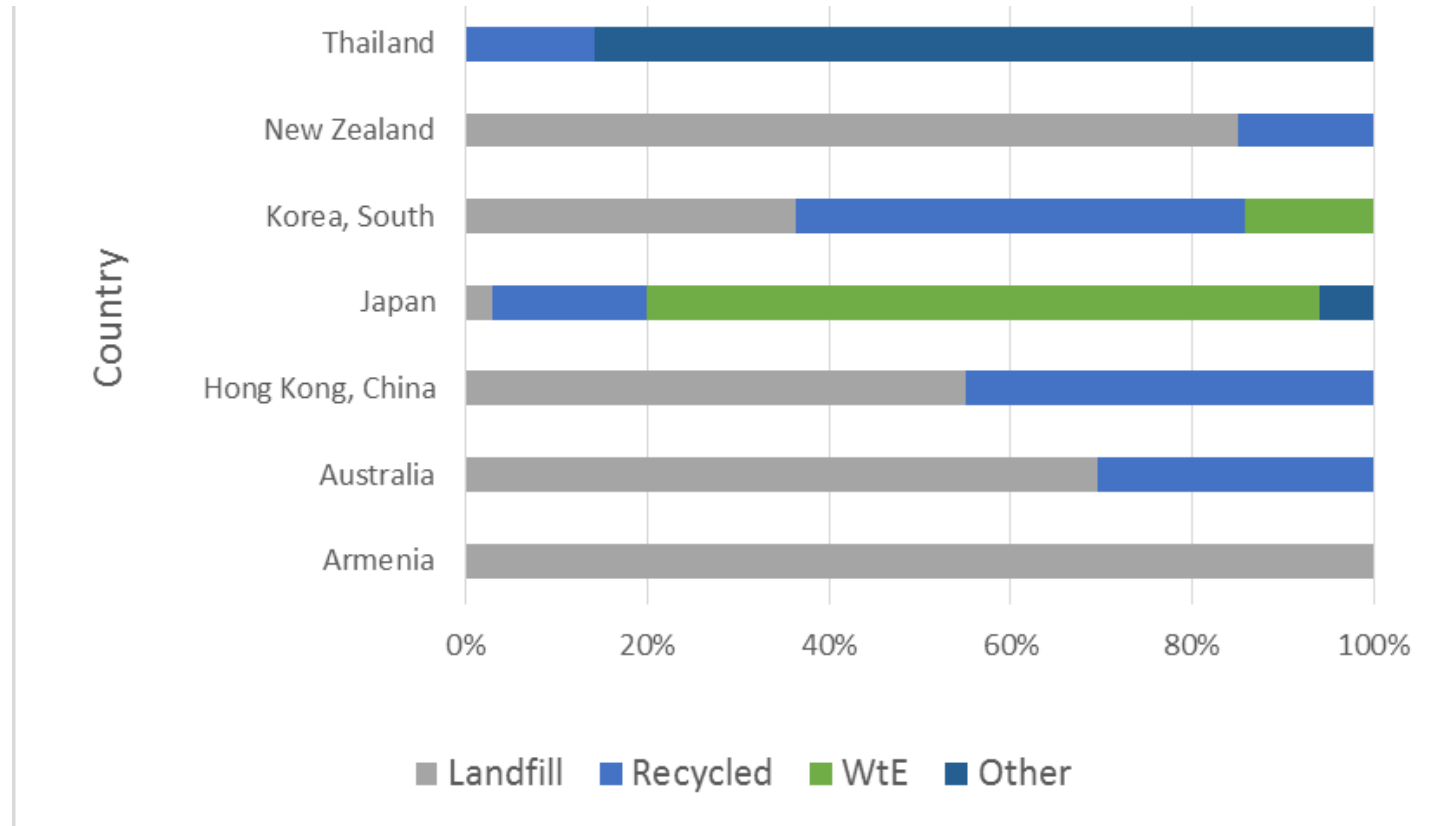


Most of the world's MSW is landfilled
(approximate, million tpy):

(Source: World Bank, 2012)

Comparing waste processing in Asia

Source: *What a Waste : A Global Review of Solid Waste Management*. Urban development series; knowledge papers no. 15. World Bank, 2012



- Limited data available for ADB member nations
 - *MSW disposal is still heavily reliant on dumping and /or landfilling*
 - *There is substantial potential for the deployment of Waste to Energy technologies*

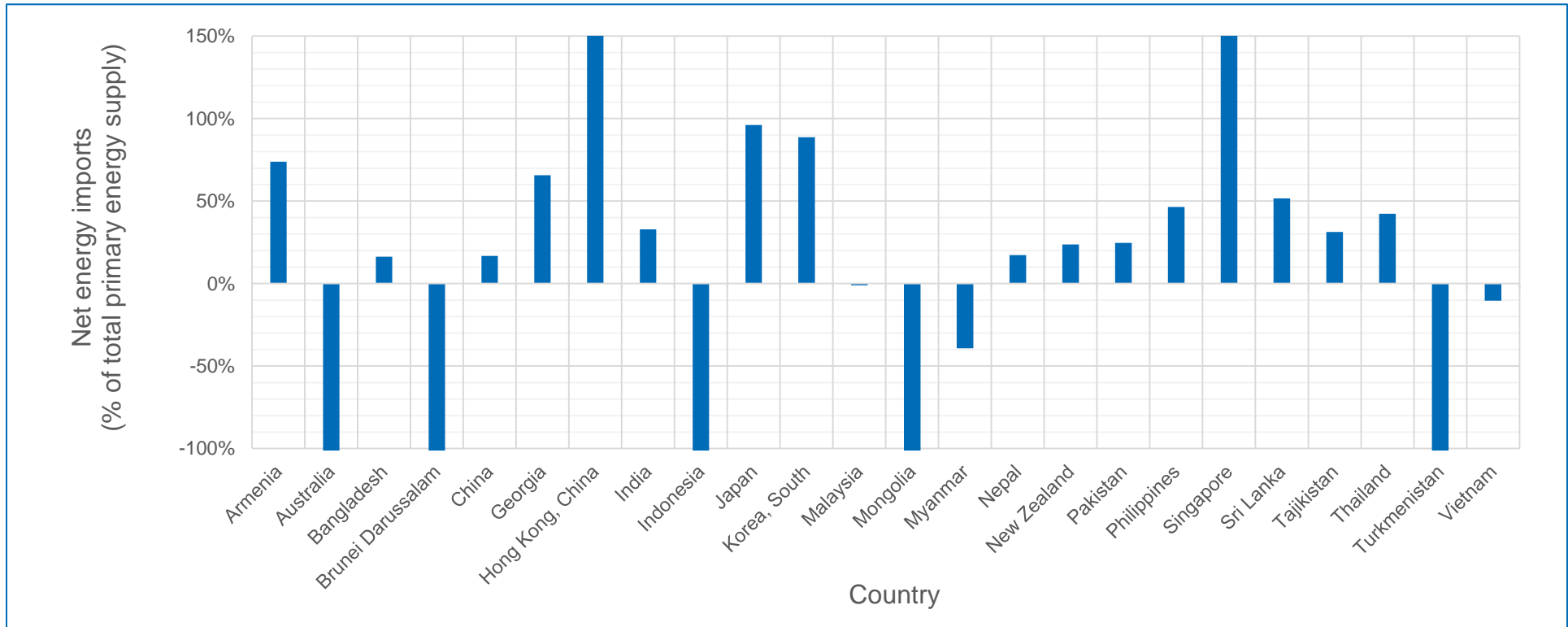
Issues with 'dumping'

- Health
 - *Leachate contamination of ground/surface water*
 - *Risk to staff/public coming into contact with waste or vermin*
- Landfill gas (methane)
 - *Fire/explosion risk*
 - *GHG emissions*
- Security
 - *Waste picking*
- Capacity
 - *Remaining capacity quickly used up*
 - *Potential for overloading leading slope instability*
- Many of the risks can be controlled through sanitary landfills
 - *Leachate collection*
 - *Ground water monitoring*
 - *Landfill gas collection and flaring/energy recovery*
 - *Cover systems*
- However, whilst this controls the risks of dumping, they **do not take advantage of opportunities presented by treating waste as a resource**

This isn't sustainable!...



On the other hand we have 'energy supply' issues in Asia



Source: Key World Energy Statistics 2015, IEA

- Many ADB member countries are dependent upon energy imports to meet demand for energy

Looking forward

*WtE facilities treat over 250 MT
globally each year!*

*Forecast to grow five fold within
10 years!!!*

But, the world is littered with failed technologies





***Moving forward needs a 'strategy'
and a plan!***

Closing the loops (materials & energy)

