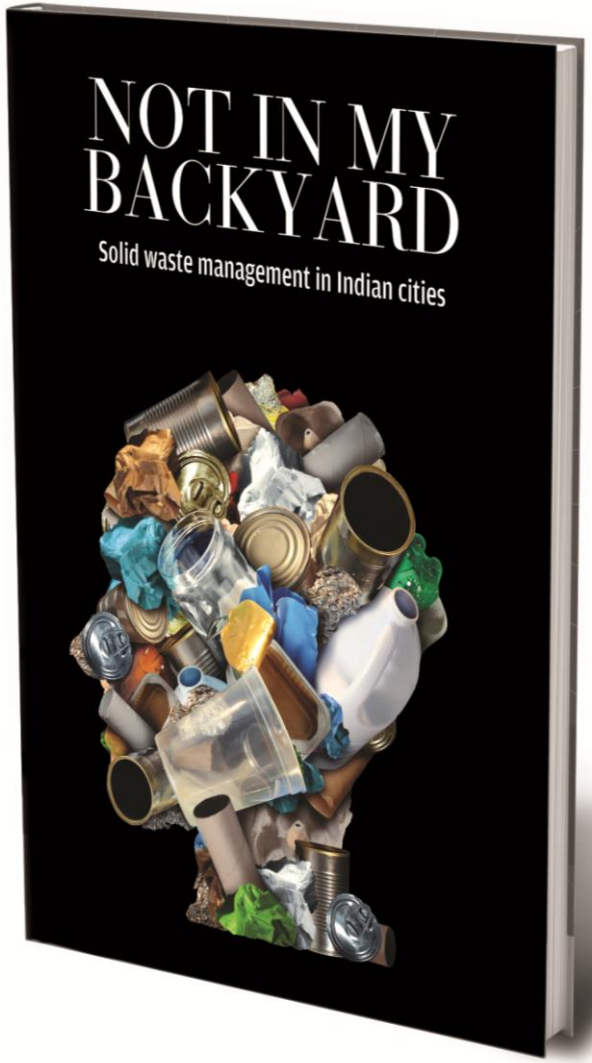


Not in my backyard

In whose backyard then?

Setting the agenda for garbage-free India

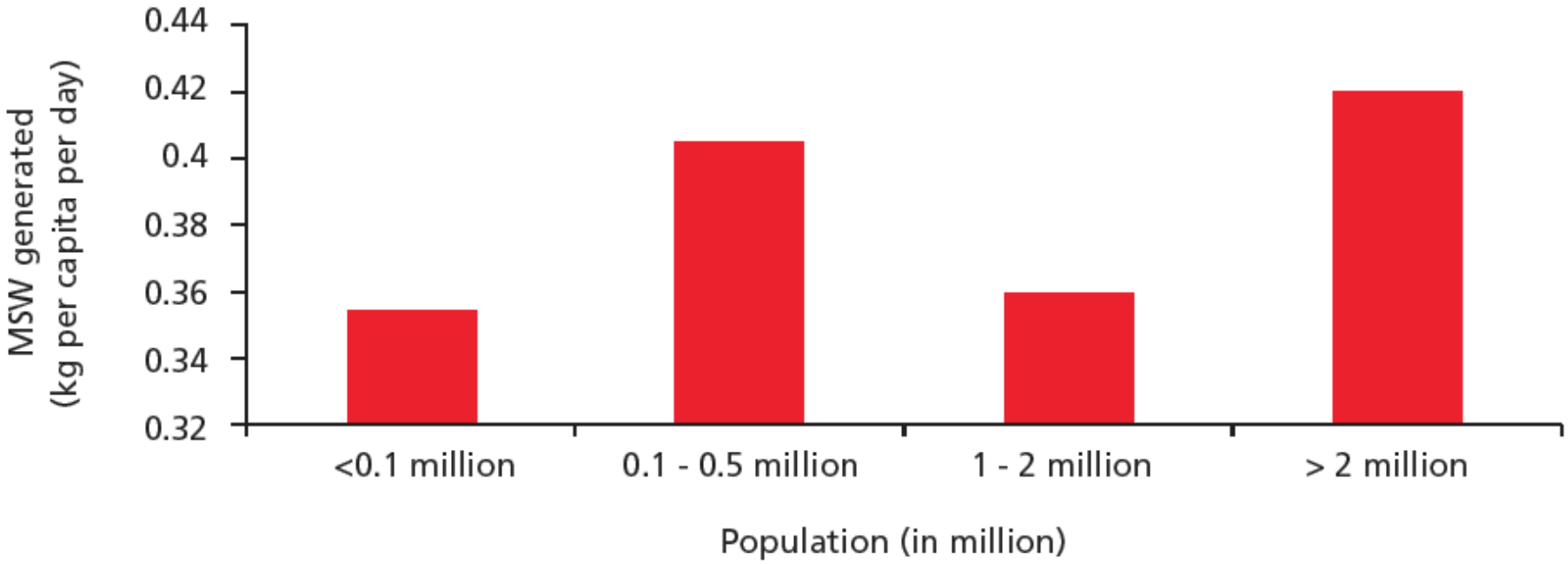
Centre for Science and Environment

How much waste is generated?

- **No real idea. Only guesstimate**
- Data on generation of solid waste is not based on measurement, but estimated
- Thumb-rule is:
  - **Small cities: 0.3 kg/capita/day**
  - **Big cities: 0.5-0.6 kg/capita/day**
- But what is clear is that per capita waste generation is growing across country
- **Waste generation is linked to wealth –** *As we grow more wealthy, we generate more waste. The richest cities and states in India are generate most waste*

PER CAPITA WASTE GENERATION—NEERI-CPCB (2008)

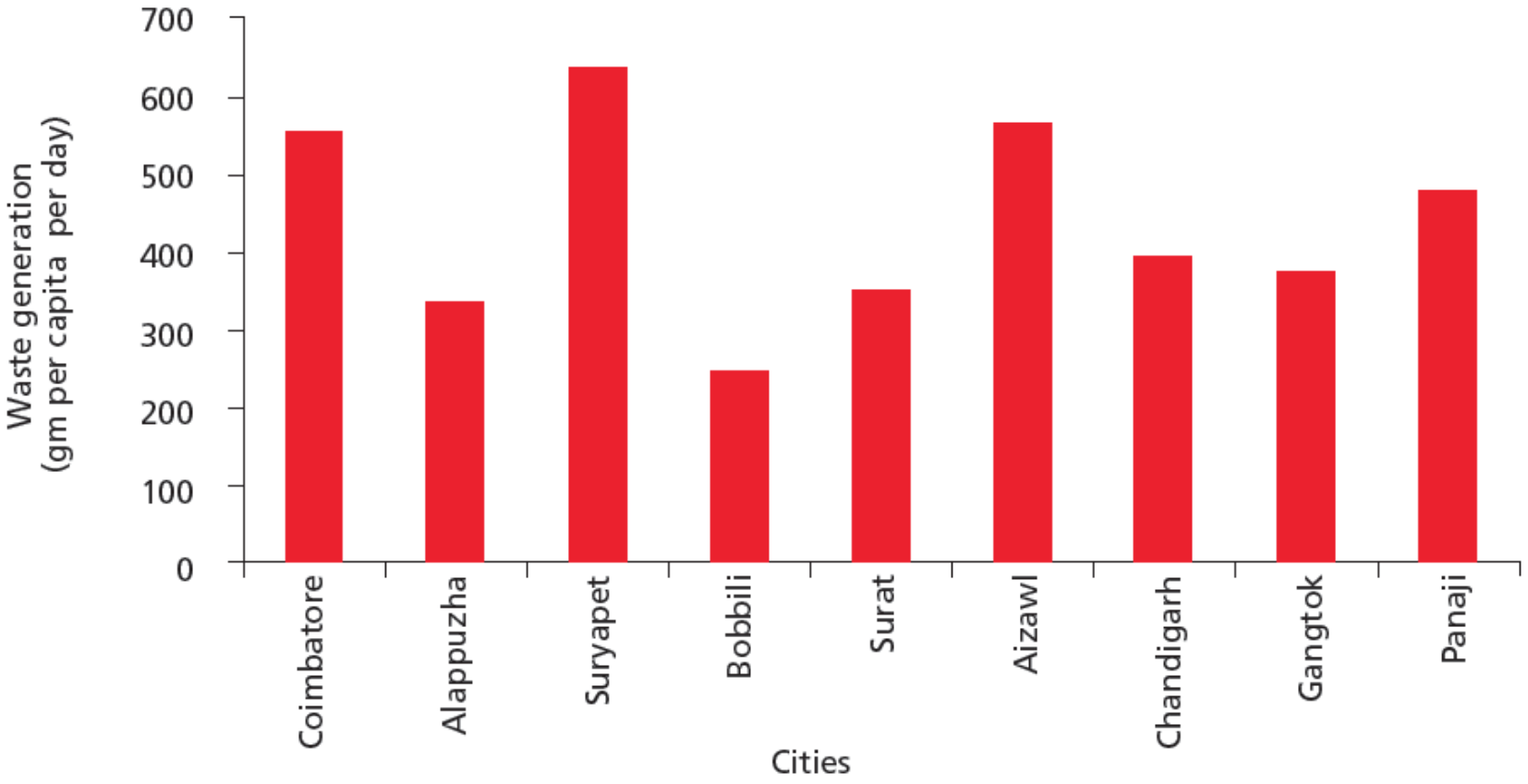
The assessment paper presented a more staggered relationship between per capita waste generation and the population of an urban centre



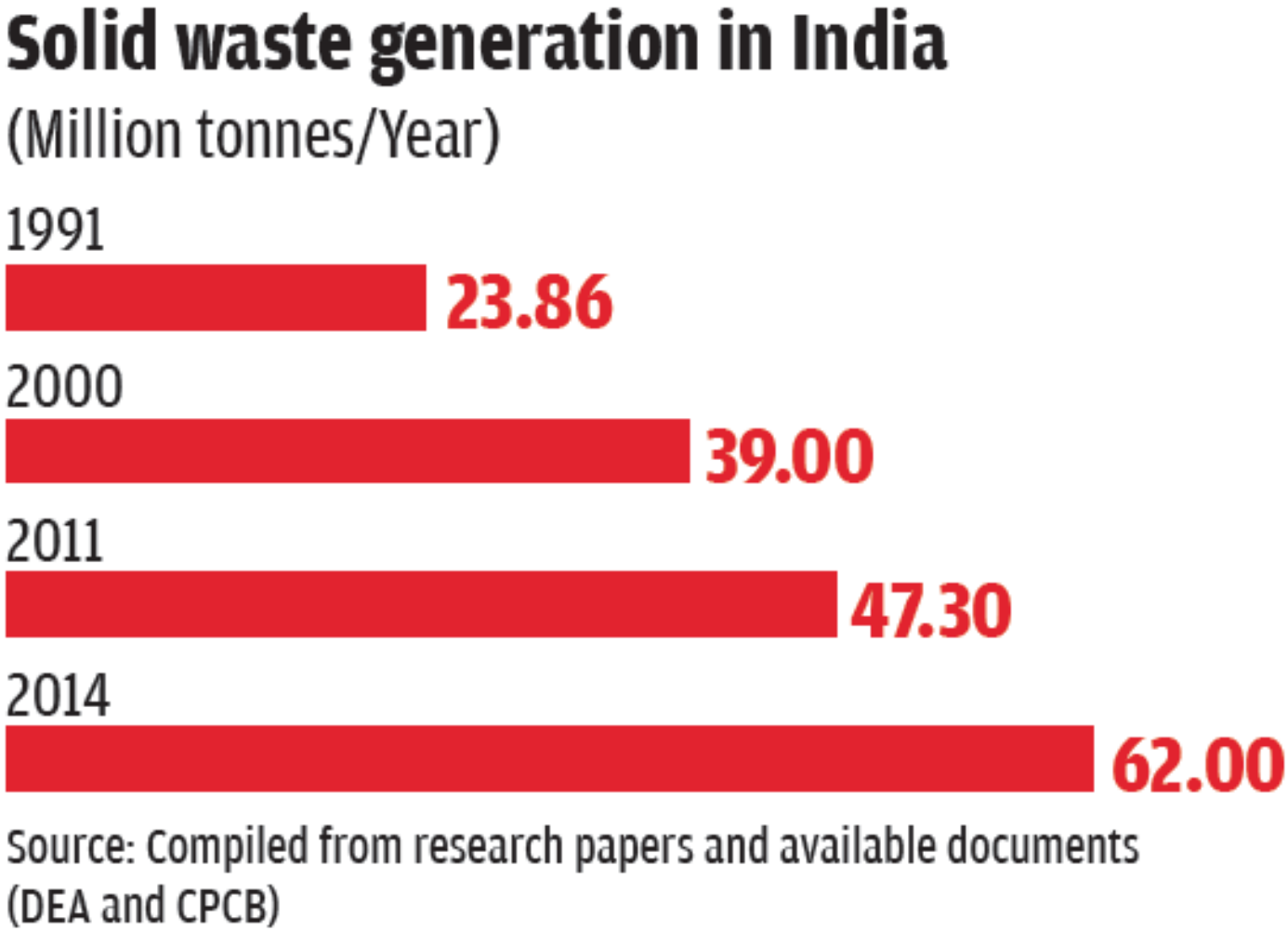
Source: Sunil Kumar *et al.* 2008, 'Assessment of the status of municipal solid waste management in metro cities, state capitals, class I cities, and class II towns in India: An insight', *Elsevier*, Waste Management 29 (2009) pp 883–895

PER CAPITA WASTE IN CITIES SURVEYED BY CSE

Per capita waste generation was generally found proportional to the population of a city



Source: CSE survey, 2014-15

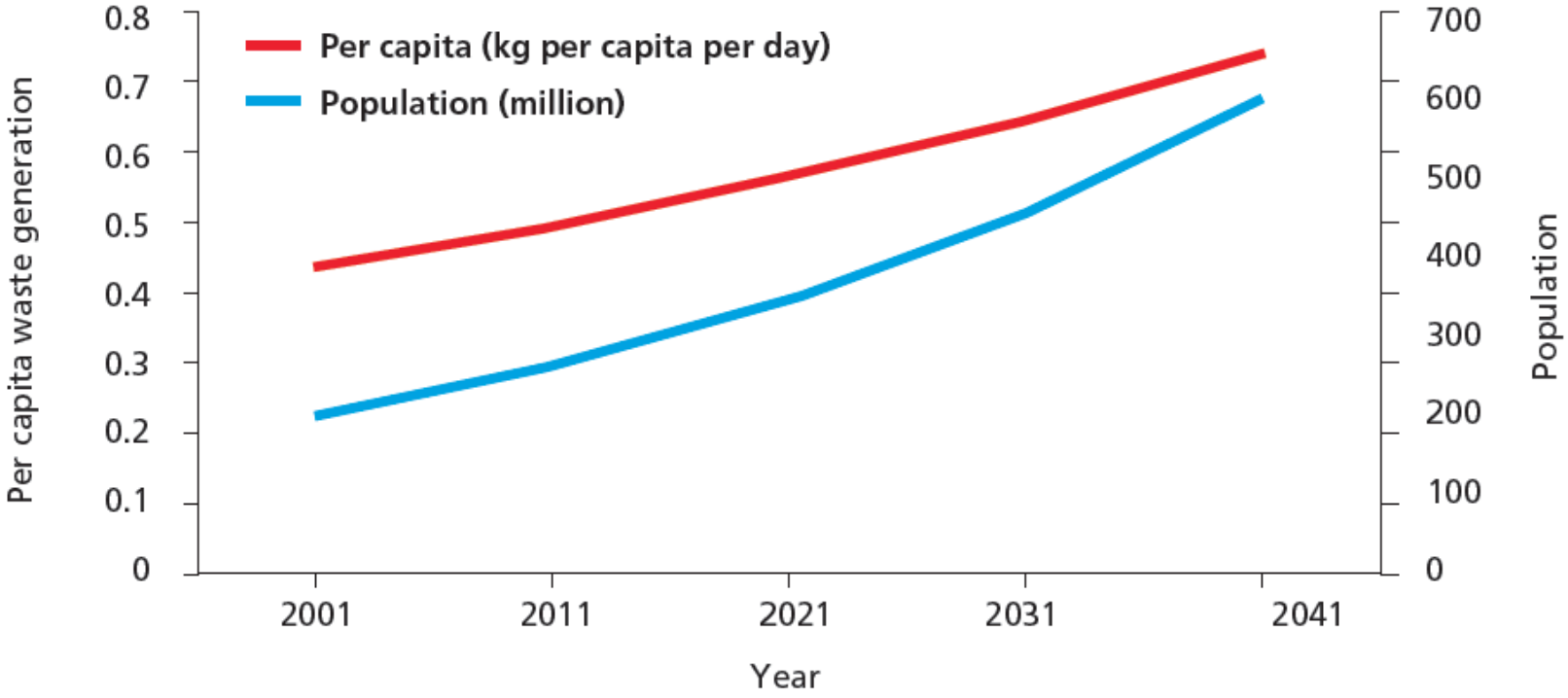


Waste generation growth is outpacing population growth by 2-3 times

And this will increase…rich more waste

PER CAPITA WASTE GENERATION AND PREDICTIONS

Waste generation and urban population are both expected to grow at a steady rate



Source: Report on Sustainable Solid Waste Management in India, 2012, Columbia University, USA

Composition: today and tomorrow

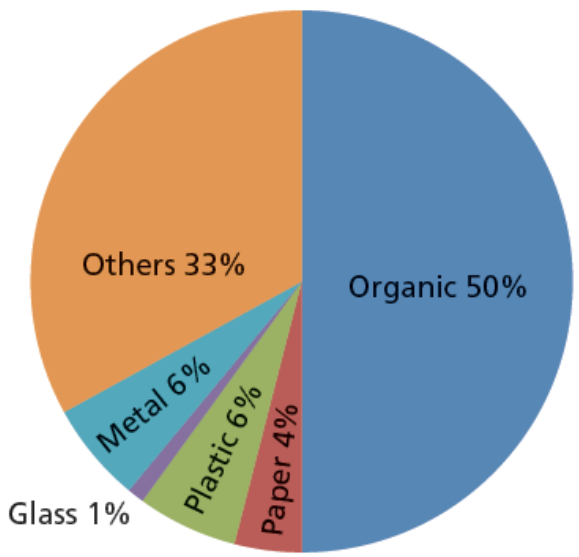
- Critical question
- Determines what will be the ‘method’ of waste management
- **Again**
- We have broad idea that our waste is mainly organic and so biodegradable and so high in energy
- But will also change (**is changing**)

Composition changes with wealth

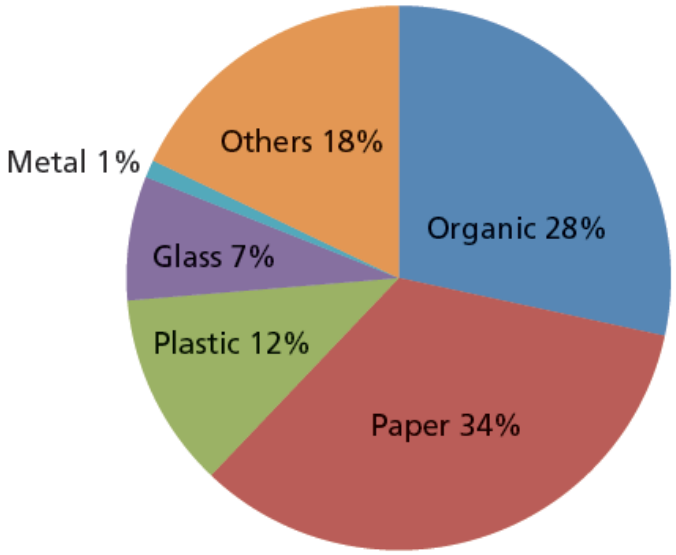
COMPOSITION OF WASTE

Half of the waste in South Asia is organic, while the organic fraction is less than one-third in OECD countries

South Asia

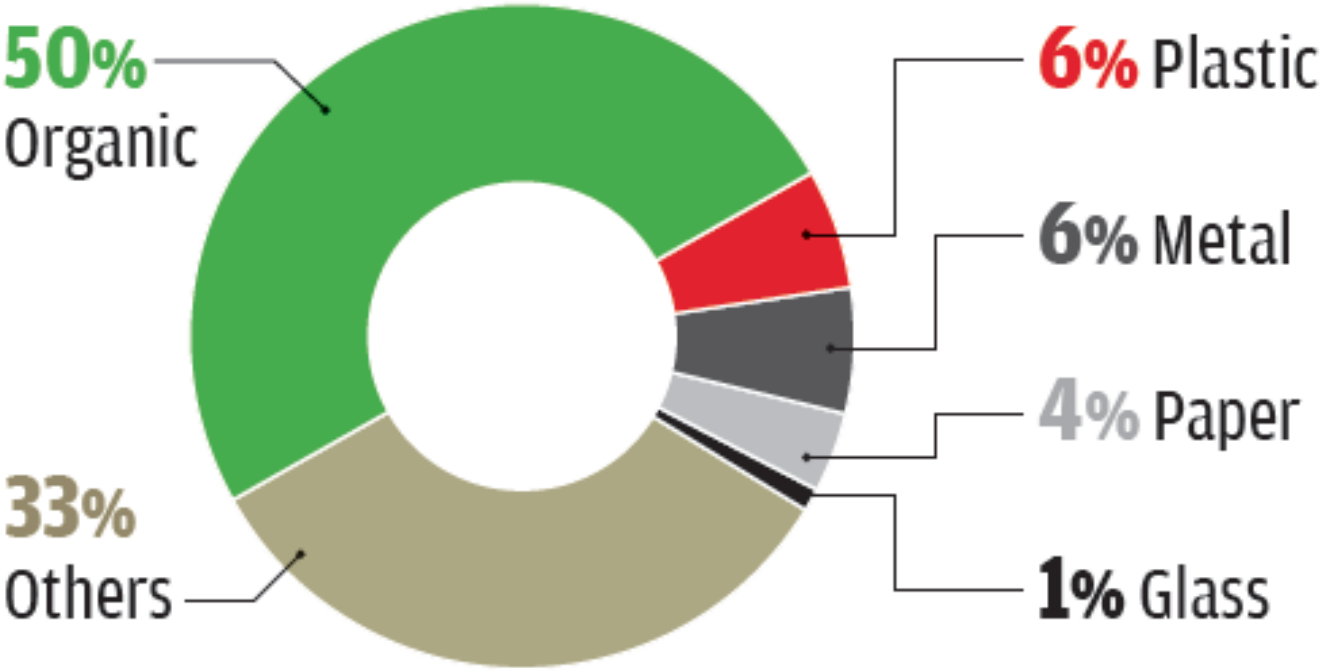


OECD countries



Source: *What a Waste*, 2012, World Bank paper

Composition of waste in India



Source: What a Waste, 2012, World Bank

This is a misleading picture as composition is estimated at landfills. But we know much of the plastic, paper, glass, metals etc. is already collected by informal waste collectors and does not make it to landfills

Status of waste management

- Poor; sign of human settlement is waste
- Growing health crisis – dengue is urban mosquito – thrives in our waste
- Most cities do not have collection; let alone disposal or processing
- “Clean” cities sweep and dump but do not process waste
- **Problem remains**

2016: CPCB (approx)

- 52 million tonnes annually
- 0.144 million tonnes daily

- Of this roughly 30 per cent is ‘handled’ – collected, transported, dumped in landfills or processed

Status of Waste Management: South

- Andhra, Karnataka, Kerala, Tamil Nadu and Telangana
- Daily waste generation- **36,400 TPD (approx) – 25% of All India waste generation**
- Collection is higher: 91% as against 70% AI
- Treatment is (marginally) higher: 37% as against 30% AI
- Long road still. Question is what road will you take? **Must take?**

Our unclean cities & mountains of waste

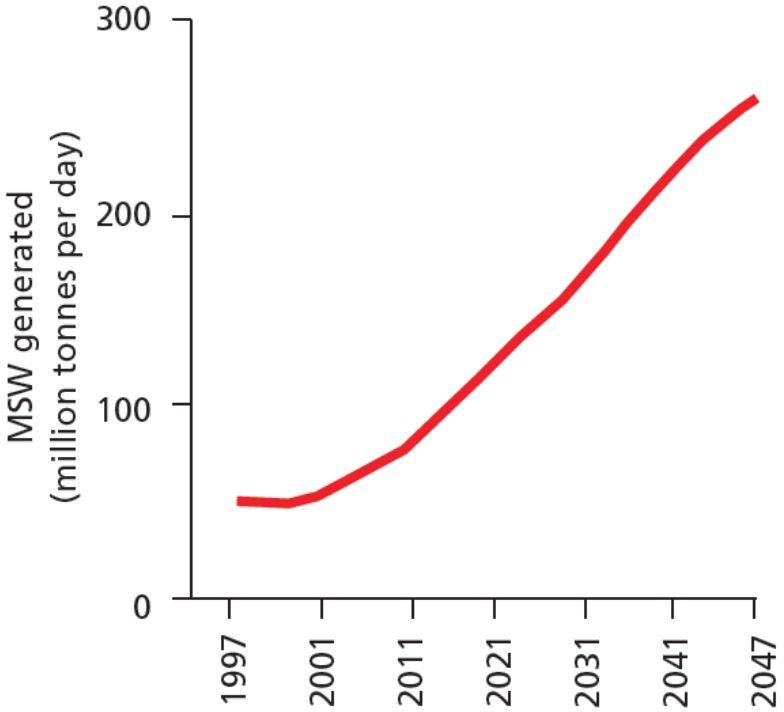
- **Two big issues:** How to improve **cleanliness** of our cities and how do **we dispose** what we collect?

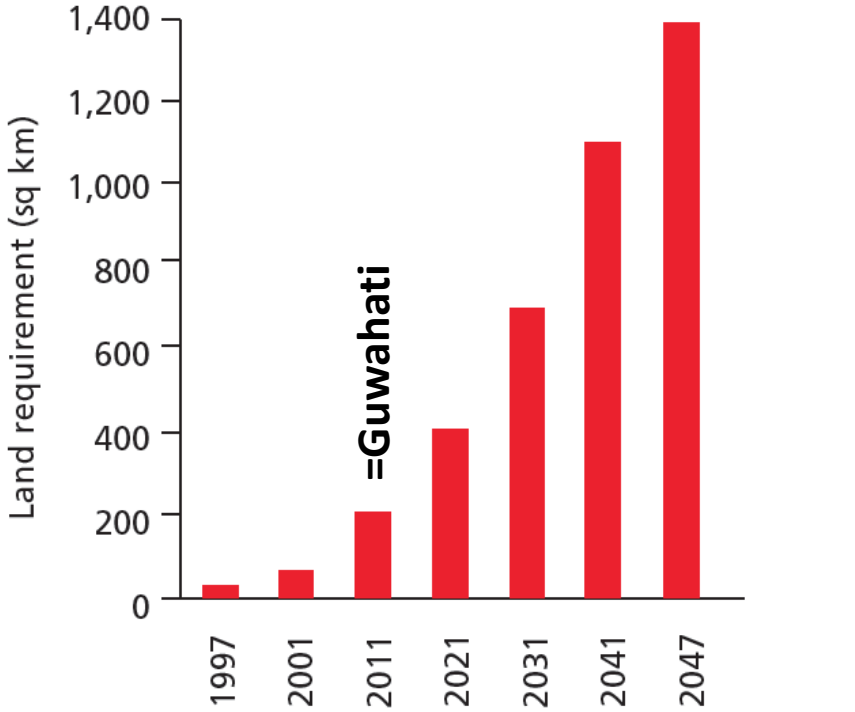
Not happening yet

- Not-in-my-backyard means conventional waste disposal by landfill is being contested
- Silver-bullet of burning waste-energy not working
- Municipal capacity weak; funds limited and dream of ‘outsourcing’ not simple

SOLID WASTE GENERATION AND LANDFILL REQUIREMENTS

There has been an exponential increase in the volume of MSW and, therefore, the area of land needed to dispose it





Source: DEA 2009, *Position paper on solid waste management sector in India*, Department of Economic Affairs, Ministry of Finance, New Delhi

Agenda 1: Do not focus on technology

- Ultimate waste dream is to find quick answer – waste up in smoke or even better that it can make energy
- But in last 15 years sold white elephants
- **Waste-to-Energy** projects closed or closing
- RDF
- Direct incineration to energy
- Not working…**but still building**

‘Sold’ quick fix

- W-T-E plants closing. **Why?**
- Reason is quality of waste received by plants or pollution
- Reason is contracts for waste are based on how much waste is ‘tipped’ at plant
- No incentive to segregate
- ’**Sorting**’ at plant does not work if waste is mixed – everything from plastic to construction waste

Global experience: 2 approaches

- **W-T-E works** if waste is segregated so that fuel generated is of high quality and plants can get paid for energy (**segregated waste**)

- **W-T-E works** if emission standards are stringent; monitoring systems are credible so that plants do not pollute (***more the unmixed waste, more stringent the standards need to be and higher the cost of plant***)

2016 standards better; but not enough. Even then question is viability

COMPARISON OF INDIAN AND GERMAN/EUROPEAN STANDARDS

European standards for waste-to-energy plants are more stringent and exhaustive

Contaminant	EU standards (mg/m³)	MSW Rules 2000 (mg/Nm³)	SWM Rules 2016 (mg/Nm³)
Organic substances (C-total)	10		20
CO	50		100
HCl	10	50	50
HF	1		4
SO_2	50	100	200
NO_x	200	450	400
SPM	10	150	50
Hg	0.03		0.05
Cd, Tl	0.05		0.05
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V, Sn	0.5		0.5
Dioxins and furans	0.1 ng TEQ		0.1 ng TEQ
Minimum temperature	850 centigrade		
Retention time	More than 2 seconds		
Reference value for flue gas oxygen content	11 per cent by volume		
Reference value for flue gas oxygen content for waste pyrolysis/gasification/waste oil	3 per cent by volume		

Source: Seventeenth Ordinance of the German Federal Immission Control Act (BMU, 2009); MSW (M&H) Rules, 2000 and SWM Rules 2016

Agenda 2: segregate, segregate..

- Only if waste is segregated **at source** can it be processed and reused and recycled
- Only then can waste become a resource
- Biggest hurdle today in waste management
- How to enforce segregation; how to make it work?
- Not just when waste is collected but when it is transported and processed

Operationalize segregation

- Two ways:
- **Alappuzha-way**: municipality does not collect waste because of NIMBY and so households have to segregate and compost/biogas
- **Panjim-way**: municipality collects biodegradable waste everyday; non-biodegradable twice a week; promotes community compost
- **Any other way**: But segregate at source essential. Then transport and process segregated streams of waste (**do not first sort and then mix**)

Agenda 3: Re-design MSW contracts

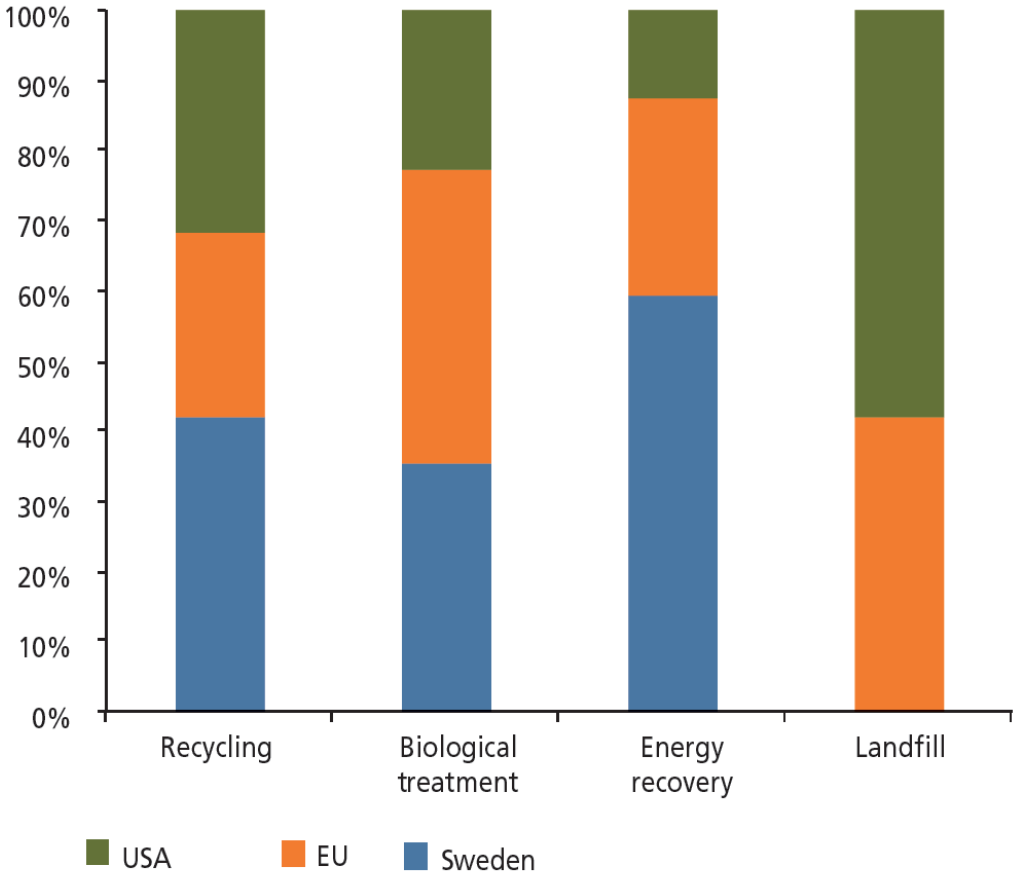
- All contracts for municipal waste management provide perverse incentive to transport more waste, not less
- Agencies are paid ‘tipping’ fee based on how much MSW is brought to landfill site
- Pay instead based on how much waste is **segregated; recycled and processed** – not how much is collected or transported

Agenda 4: Impose landfill tax

- Zero landfill has to be objective of waste management
- Impose landfill tax – waste that is brought to landfill pays cost of land and its ‘misuse’
- High charge – has to be disincentive
- Countries use provision this to move towards waste-recycling and reuse

TREATMENT TECHNOLOGIES UTILISED IN SWEDEN, EU AND USA (2010)

While EU and USA still rely on landfills, Sweden has moved on



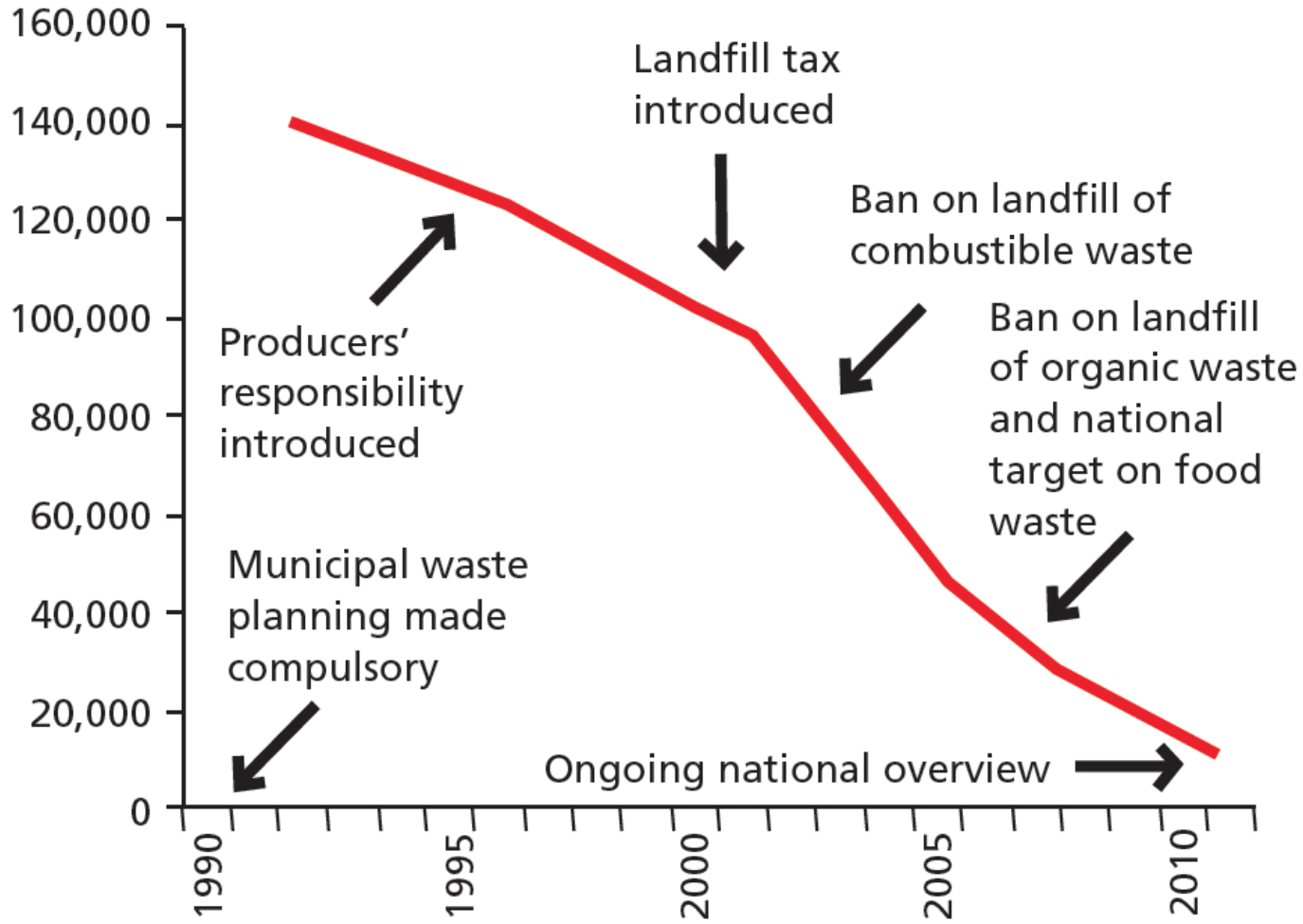
Source: Personal Communication with Ylva Reinhard, Swedish Environmental Protection Agency on 9 March, 2016

Global learning is that landfills not solution

But then need laws to change this

PATHWAY TO RESOURCE RECOVERY?

A slew of measures helped Sweden bring down mountains of waste



Source: Personal communication with Ylva Reinhard, Swedish Environmental Protection Agency on 9 March 2016

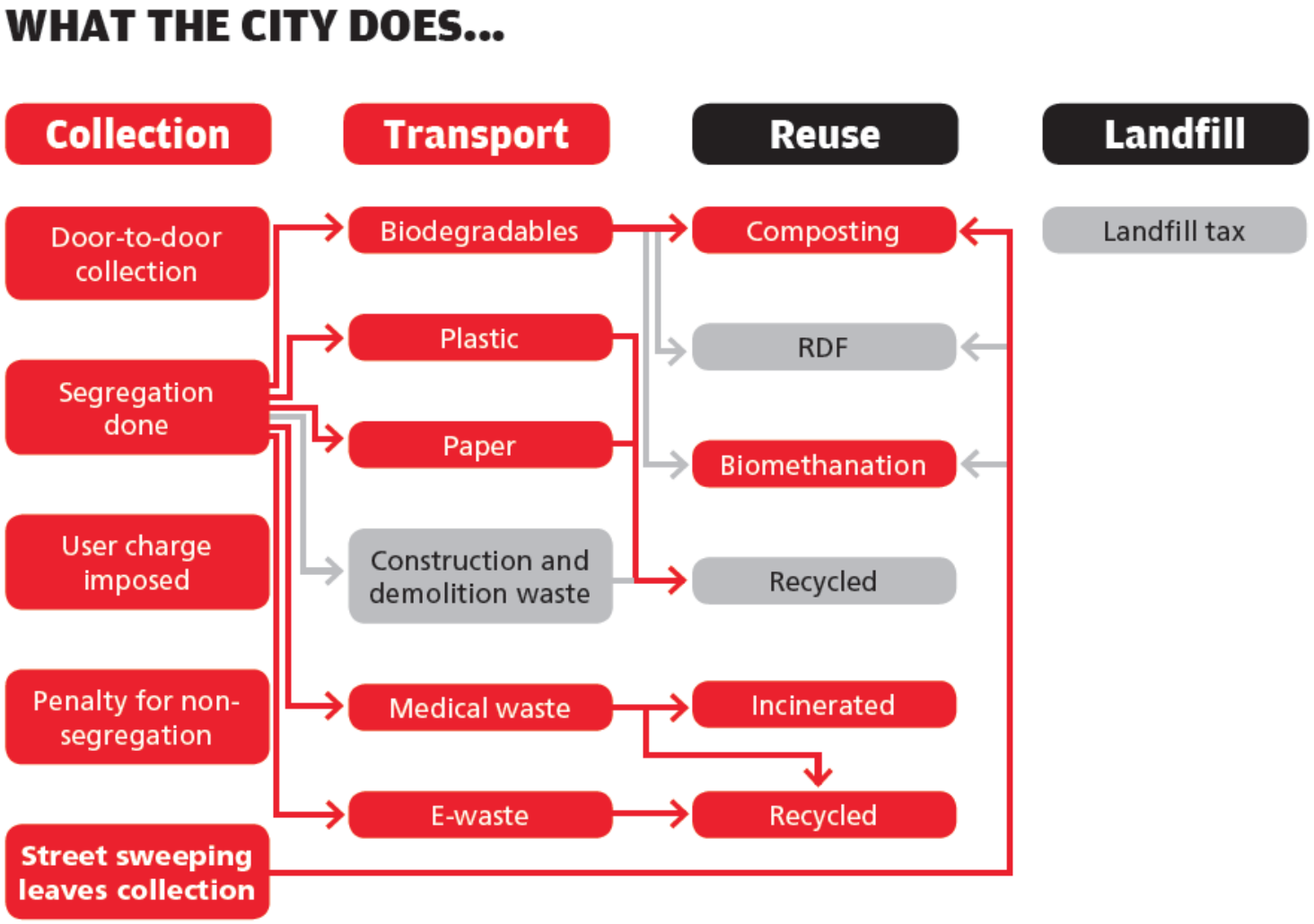
Agenda 5: Recognize informal sector

- The reason we have not completely drowned in our waste is because **the poor** collect it and then process it
- We do not **recognize** this contribution
- We do not even **measure** this contribution
- We certainly do not **promote** it or **reward it** in municipal bylaws etc
- The issue is how to work with massive and well-organized informal waste collection and processing sector without ‘formalizing’ and destroying it

Agenda 6: Celebrate NIMBY

- When the poor say **not-in-my-backyard** nobody listens
- When the middle-class says **not-in-my-backyard** then somebody listens
- But poor are getting more politically aware (as they must). They will insist also **not-in-my-backyard**
- **Celebrate this**

What the city must do…our rating



THE GOOD, BAD AND SMELLY

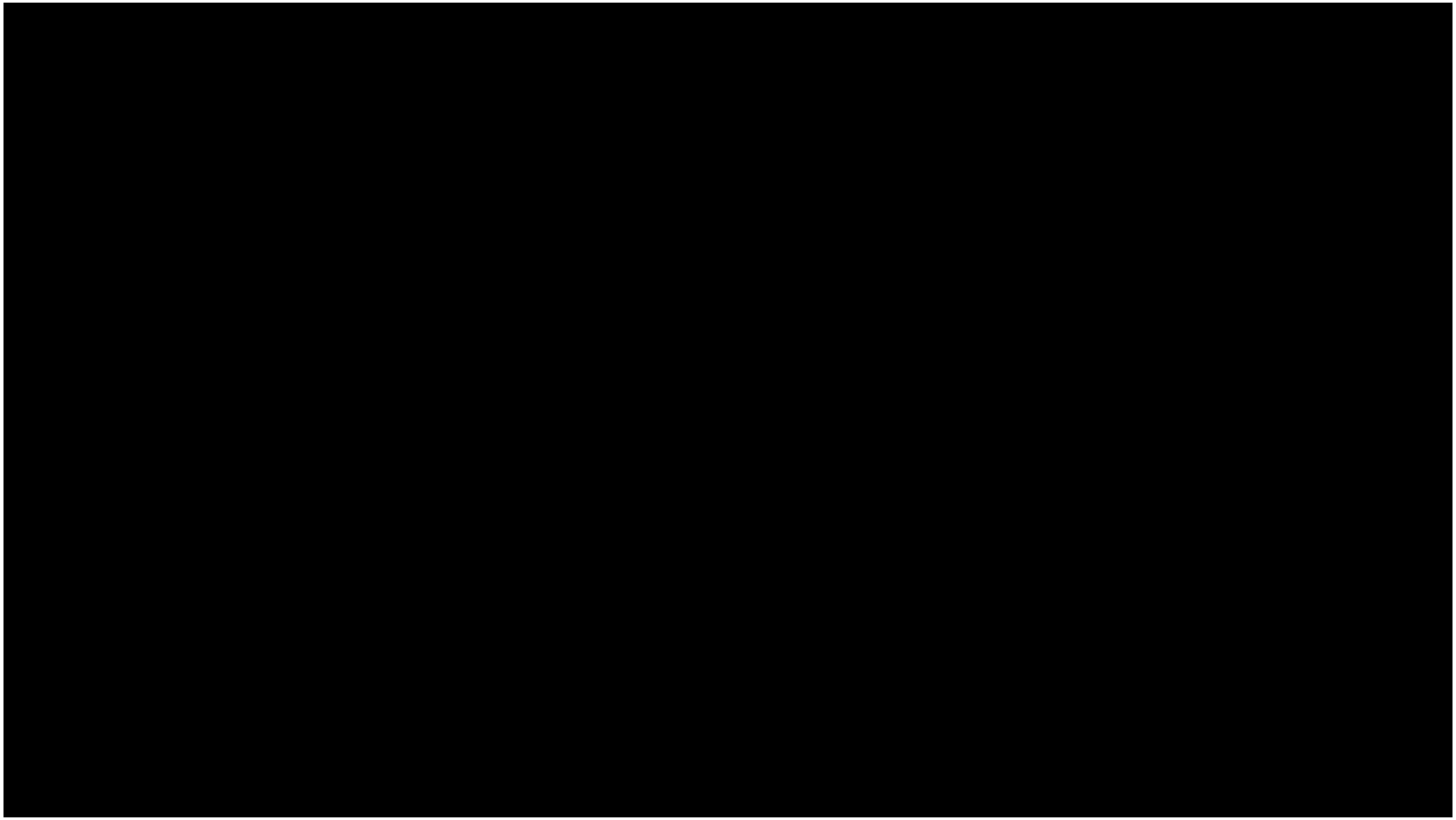
CSE rankings of cities based on their solid waste management system

Group	City
Group 1 Best: Segregation, processing and recycling of waste. Zero-landfill cities	Alleppey, Kerala
	Bobilli, Andhra Pradesh
	Panaji, Goa
	Mysuru, Karnataka
Group 2 Second-best: Clean cities; some segregation and some processing	Aizawl, Mizoram
	Pune, Maharashtra
	Surat, Gujarat
	Suryapet, Telangana
Group 3 Third-best: Have worked on cleaning the city but not on how to process and recycle the waste	Agartala
	Bengaluru
	Chandigarh
	Delhi
	Gangtok
	Shimla

Source: CSE survey, 2014-15

Good News: We know how to clean our cities and eliminate landfills

- **Mysore:** *D2D collection of segregated waste, no tipping fees, private sector makes money by selling compost*



Good News: We know how to clean our cities and eliminate landfills

- **Panjim:** *D2D collection of segregated waste, then reuses, recycles; bin free, zero landfill policy*

Good News: We know how to clean our cities and eliminate landfills

- **Alappuzha:** *No D2D collection. Segregation, compost & biogas at households*

Alappuzha: Awarded, **recognized as model for country**

Model

- Replicable
- **NIMBY – PNIMBY**
- Makes households responsible – segregation that works
- Uses informal but organised sector for disposal of non-biodegradables
- Already used by MoUD to change its criterion for assessment for cleanest city

Every backyard is a frontyard

- because….**if it is not in my backyard. Then it is in my front-yard**
- This is how we must manage our waste – turn it into a resource
- **Not use and throw, but use and use and use**