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Municipal Solid Waste Management in India

The Waste-to-Energy Experience

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Indo-German Environment Partnership

igep

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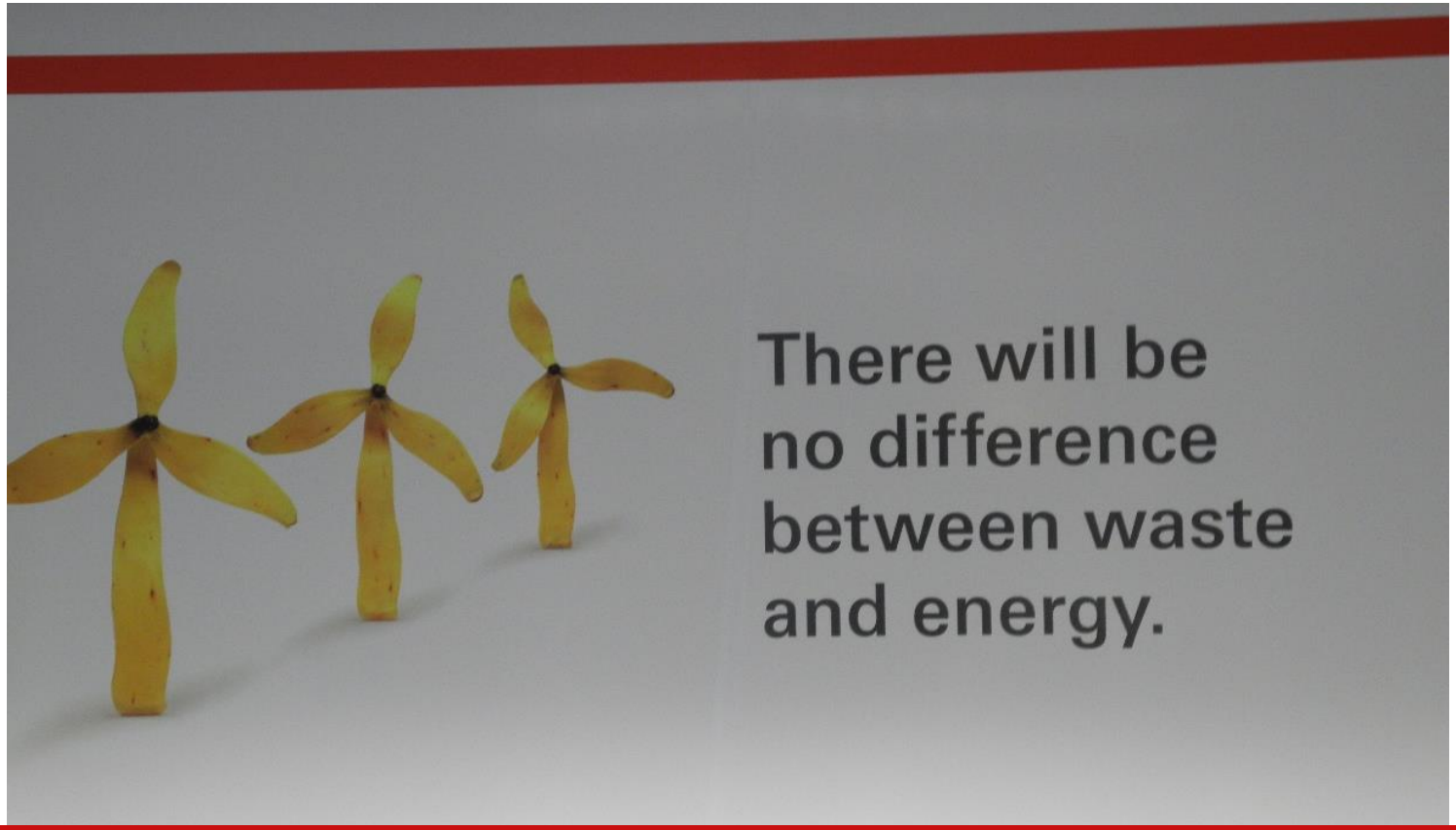


We can clean our cities by scientificaly disposing of solid waste and generating electricity and at the same time contributing to energy security (Statement, Government of India, 2014)

India – a Subcontinent with severe Solid Waste Problems

Population: 1.3 billion
18% of world's population

Land area: 329 million ha
2.4% of the world's geogr. area

Towns and villages: **475 urban agglomerations, 7,935 towns, 641,000 villages**

Per Capita Availability of Land
0.89 ha (1959); **0.27 ha** (2007-08)
(Germany 0.43 ha)

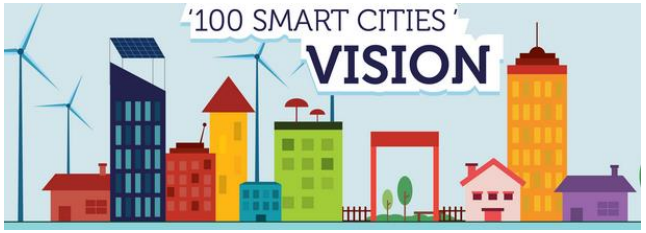
Waste Statistics from India

Waste Generation:

- 2013: 133, 670 TPD
- 2021: 276, 342 TPD
- 2031: 450, 132 TPD

Collection Rate: 68%

Treatment Rate: 19% of the total waste



Treatment Facilities:

- 279 Conventional Composting and 138 Vermicomposting
- 172 Biomethnation Facilities
- 29 RDF facilities
- 8 WTE plants

Source: Planning Commission Report on WTE, 2014

Reasons for deficiency in waste management in India (1)

- **Urbanisation** is happening at a faster pace and on a bigger scale. The systems and concepts applied don't consider this rapid changes of life style, waste quantities and qualities.
- Working in the waste sector is not the most **attractive job opportunity** (compared to IT, banks etc). As a consequence the umber of qualified professionals working in the sector is low.
- The entire **financing system** of SWM in India is weak. There are no cost covering systems in place.
- Very **limited data** are available and standards as orientation are only partially in place

Reasons for deficiency in waste management in India (2)

- **Investments** in MSWM are not always done on the basis of a sound financial, social or technical feasibility study. **Reluctance** by the companies to invest in the sector
- There is a widening gap between “waste is a nuisance” and “gold in the garbage of Indian cities”. The **myth of waste-to-energy** as a business case is presently one of the driving subjects
- There are a good number of bad examples and only a limited number of successful showcases which could be used as “**light houses**”
- There is a strong **mistrust** by NGO and civil society towards WtE plants and effective environmental surveillance/monitoring

Situation in Germany in 1990 – and in India today

- Increasing amounts of waste
- No space for new landfills
- Increasing costs
- Export to distant regions creates political problems
- Environment impacts

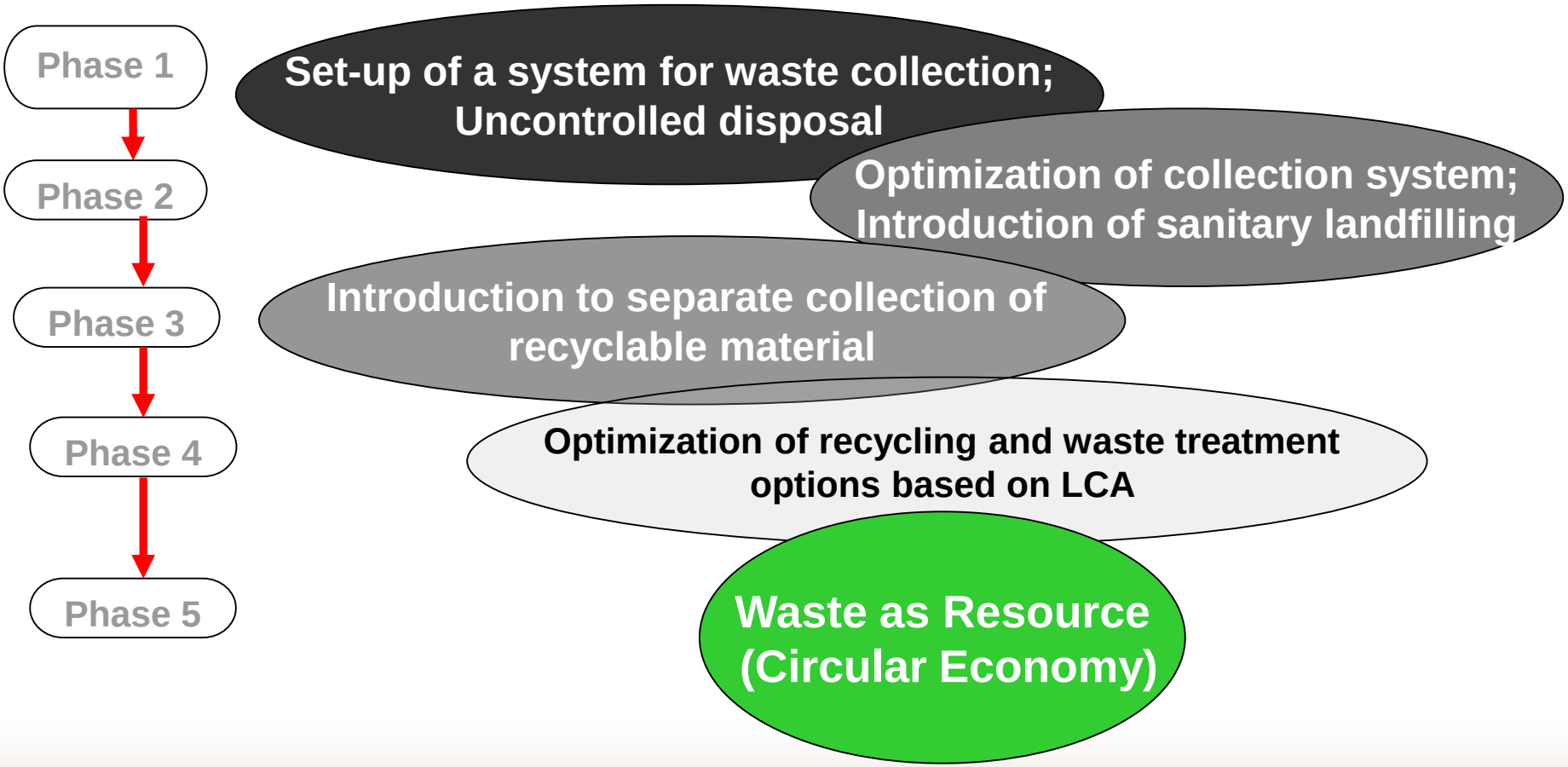
Dumping of waste not a solution

but

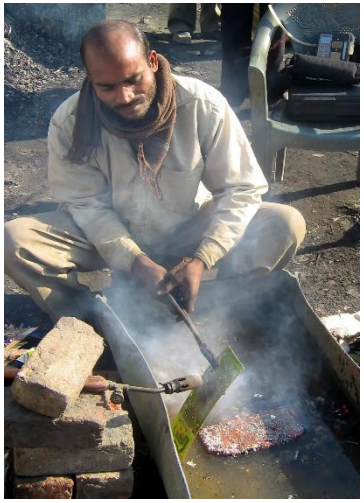
Opposition against thermal waste treatment

Phases of Municipal Waste Management

Where does India, Mexico and Germany stand?



The importance of the informal sector



At least 80% of municipal solid waste in India is handled by the informal sector

Landfilling today – incineration tomorrow?

Current Status of MSW landfills

Every city has it's own open dump – land issues, environmental degradation, economic impactsare high on the poltical agenda

Uncontrolled dumping is the most common practice

It is a challenge to transport collected waste in mega cities to landfill sites due to traffic problems

No comprehensive plans at state level on how to manage SW in a geographical/regional context

Current Status of RDF and Waste Incineration

- Isolated agreements / missing transparency
- Unclear financial consequences and business models between partners
- Limited reliability of waste data
- Source segregation important

History of WTE in India

- First WTE plant in Delhi: start in 1987, closed in 1990
- Hyderabad WTE Plant: 1999, closed in 2005
- Lucknow WTE plant: start 2003, closed in 2005
- Vijayawada WTE plant: 2003, closed in 2007

„New Generation“ of WTE plants:

- AP Cluster Plant in Karimnagar commissioned in 2011
- OKHLA-Timarpur commissioned in 2011 (2050 TPD)
- Pune commissioned in 2012 (650 TPD)

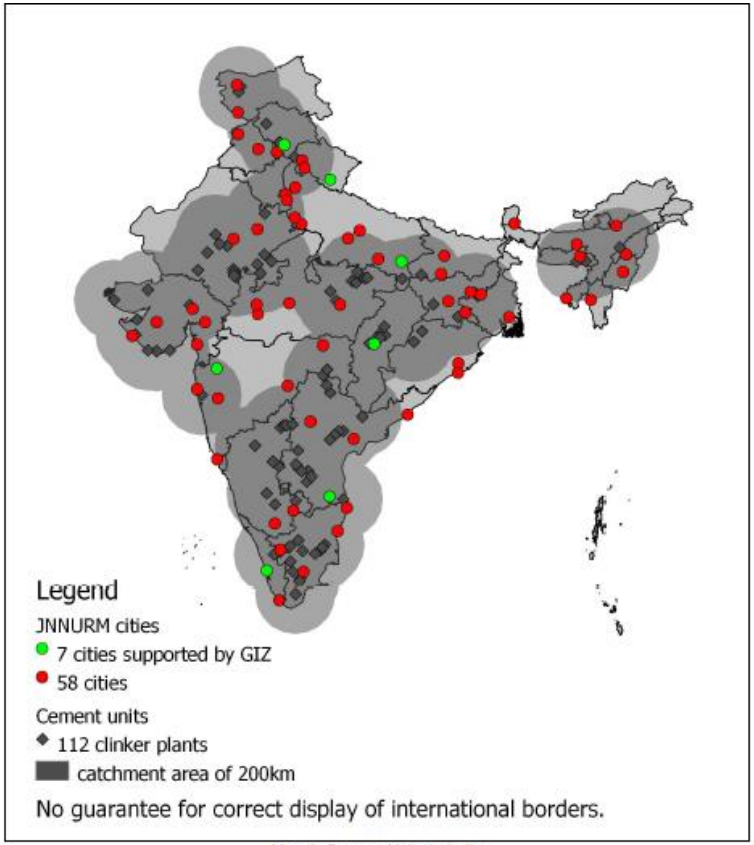
The dilemma of standards: Comparison of incineration standards in India & Germany

Contaminant	17. BImSchV1 (mg/m3)	MSW rules 2000 (mg/m3)	MSW draft rules 2015
Org. subst. (C-total.)	10	-	20
CO	50	-	50
HCL	10	50	50
HF	1	-	4
SO2	50	100	200
NOx	200	450	400
Dioxin and furans	0.1 ng TEQ	-	0.1 ng TEQ
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
Min temperature	850 centigrade	-	950 centigrade
Retention time	More than 2 seconds	-	More than 2 seconds
Ref value for flue gas oxygen content	11% by volume	-	11% by volume

Source: 17th Ordinance of the German Federal Immission Control Act (BMU, 2009), MSW (M&H) Rules, 2000 MoEF, GoI and Draft SWM rules, 2015, MoEFCC, GoI

Co-processing of MSW in cement plants – first experiences

- Guidelines for Co-processing of hazardous waste only but strong interest by the Government to includes MSW
- Nashik was selected for trial burns by Holcim, CPCB and GIZ
- Calorific value of dry waste ranges from 1800 - 2500 kcal. For highly segregation plastic waste, calorific value increases to > 5000 kcal.
- Appropriate cost sharing models needs to be developed suitable to local conditions
- Ideal distance to explore co-processing options with a Cement Plant is within 200km distance



Map 1: Cement Units in India

NAMAs to contribute to a better SWM in India

- Indo- German Bilateral Cooperation Project with Ministry of Environment, Forests & Climate Change (MoEFCC).
- 4 years duration (September 2013 – August 2017)

The Indian Government uses NAMAs as one option for mitigation of greenhouse gases and technical support is provided through a NAMA coordination cell in the MoEFCC

GHG Emissions from MSW

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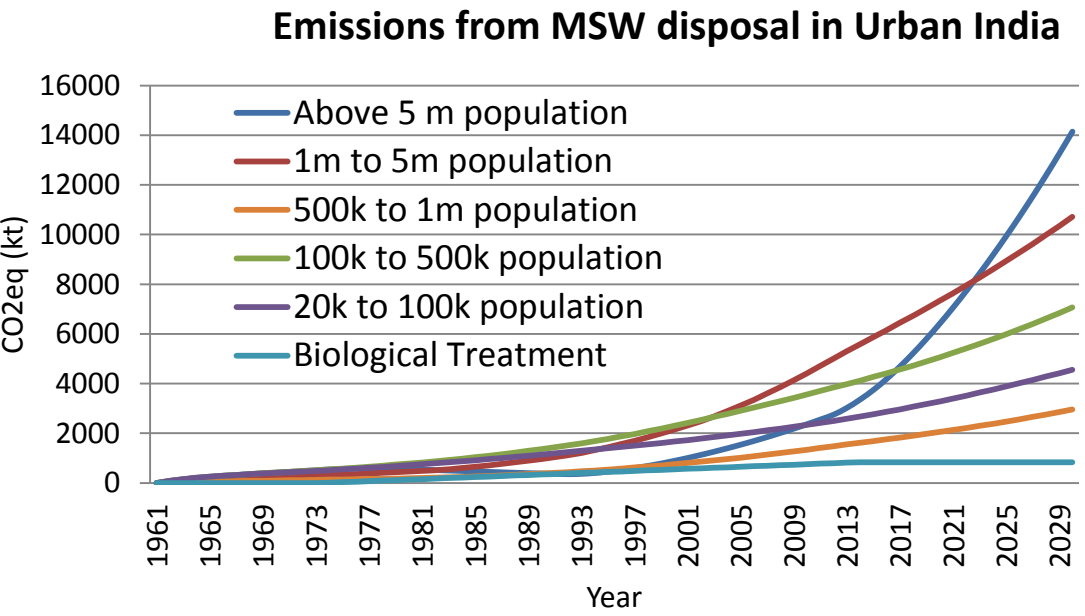
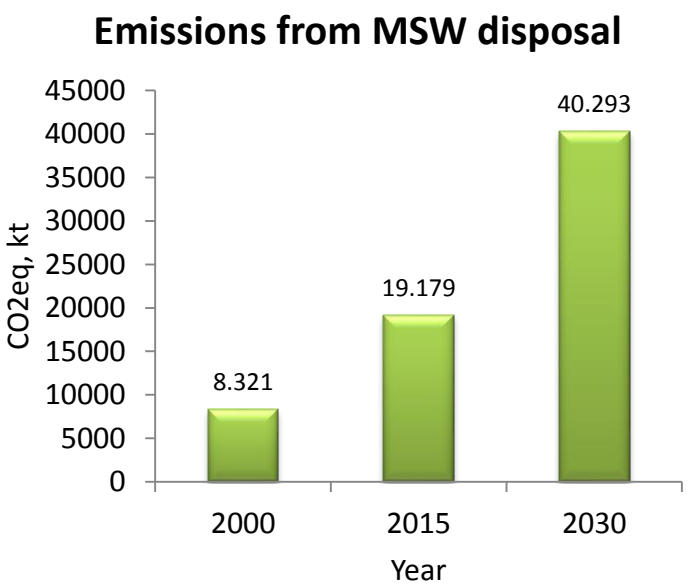
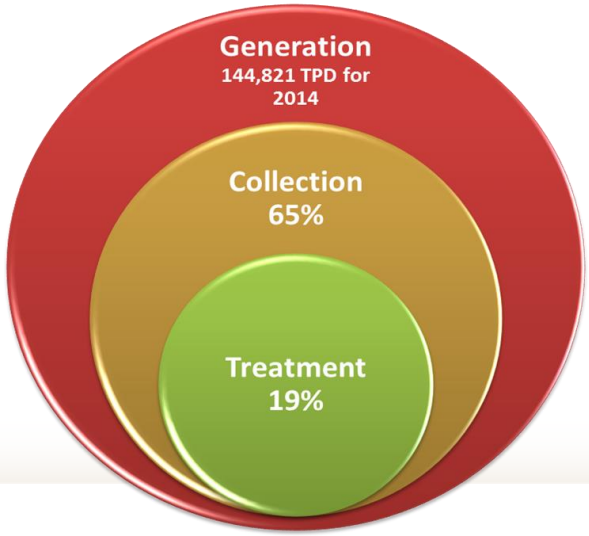






- GHG emissions from solid waste disposal to be doubled by 2030
- Cities with >1 million population will contribute >50% of total emission by 2030

Waste NAMA Options

Technology based mitigation actions

- Refuse Derive Fuel (RDF) for co processing in Cement Plants.
- Composting and Vermi Composting
- Biomethanation

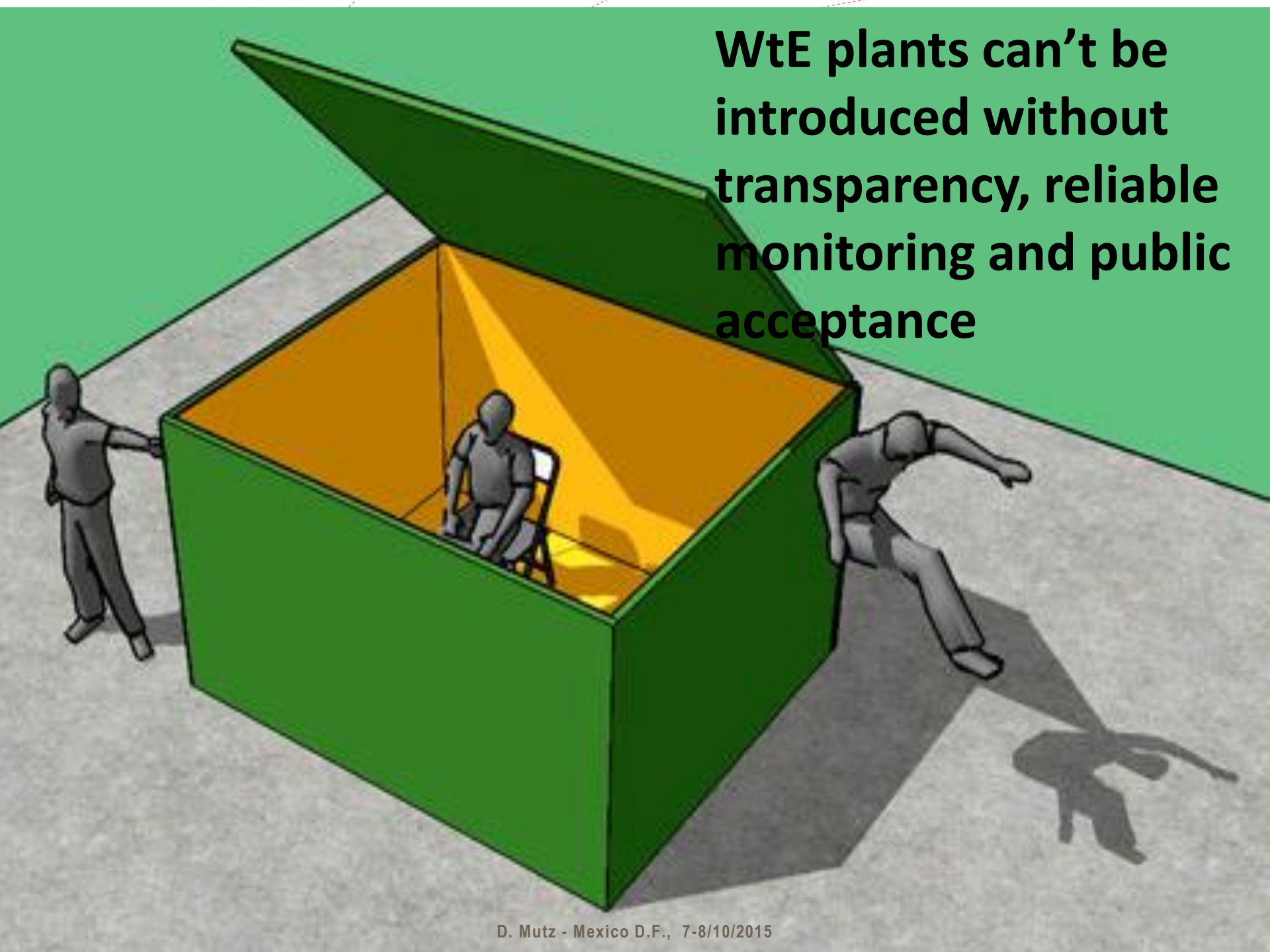
Policy Based Instruments

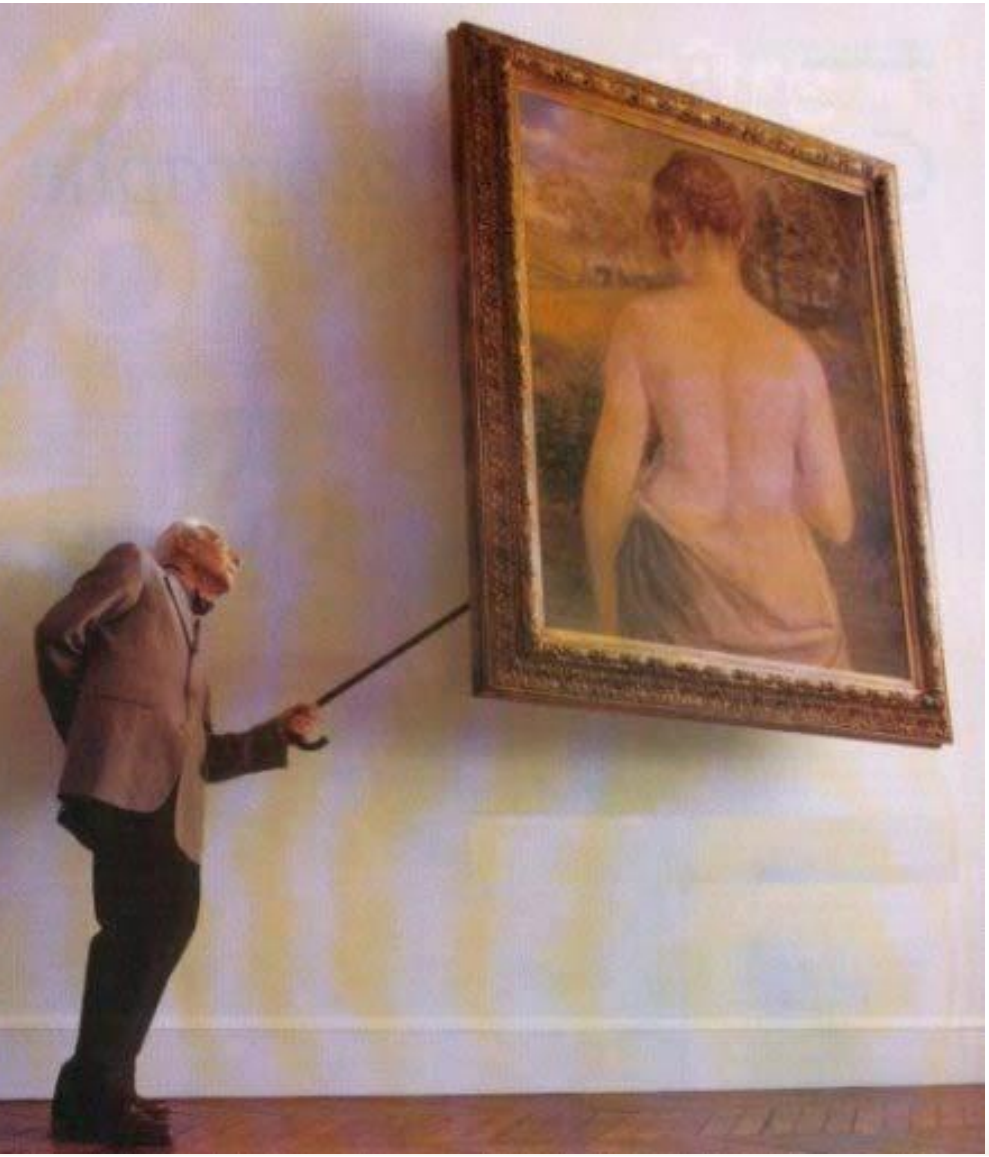
- Fiscal incentives for scientific waste processing and disposal of MSW.
- Enforcement of mandatory segregation of waste

Main lessons learnt


Waste management in metropolitan areas is complex and challenging.
There is not only one solution for waste treatment


Our life style influences waste management


WtE plants can’t be introduced without transparency, reliable monitoring and public acceptance



Waste-to-Energy – more than technology choice

Success depence also on a robust financial, legal and environmental sound system **and on experts qualified to manage and operate it**


The beautiful side of India
Thanks for your attention
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