

Für Mensch & Umwelt

Umwelt 
Bundesamt

Connective Cities Dialogue Event, Hamburg 03/12/2019

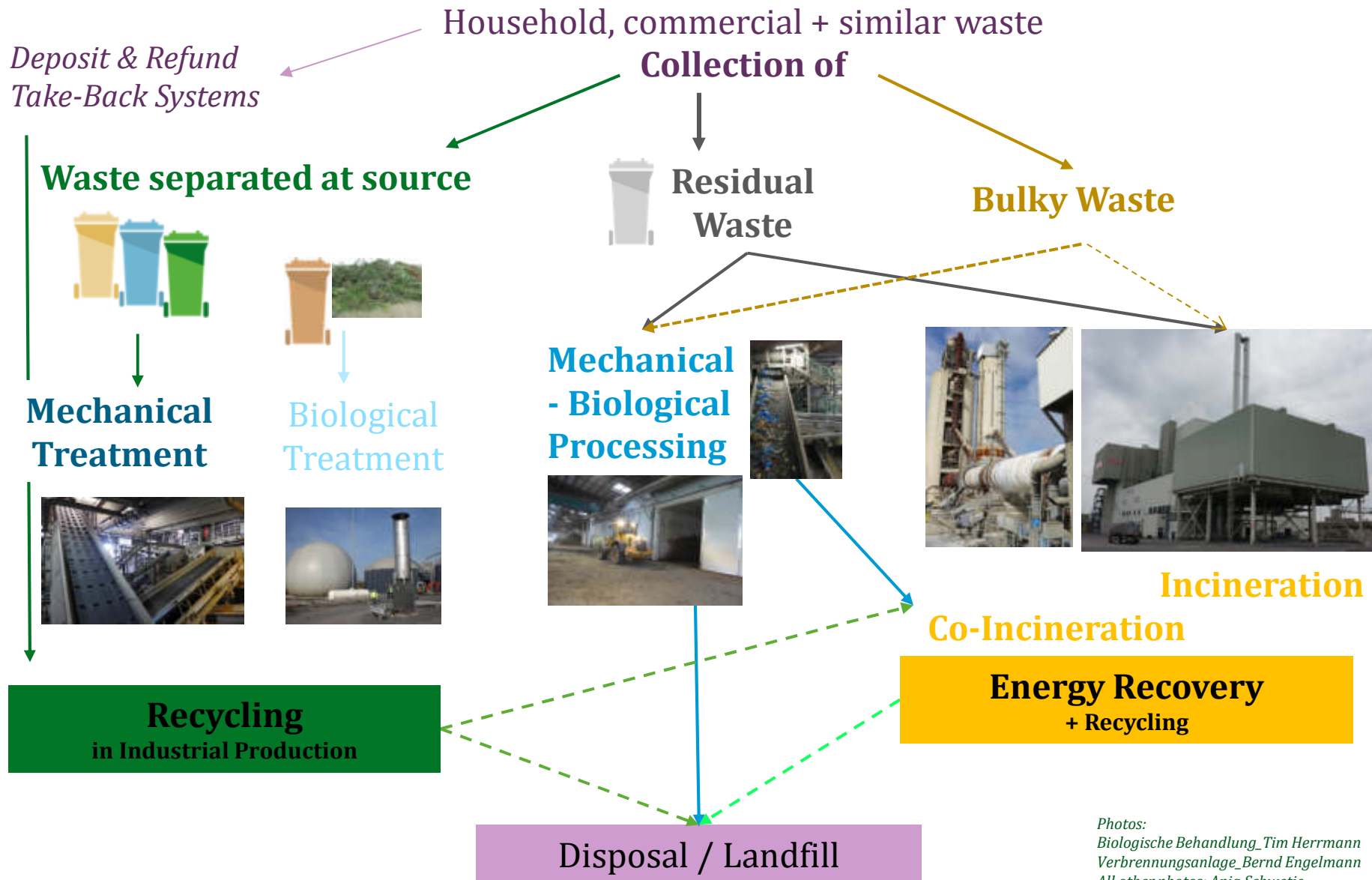
Plastic Waste: The Contribution of Municipal Waste Management Systems: An International Perspective

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(Plastic containing) Waste Collection and Management

Refill & Re-use



Photos:
 Biologische Behandlung_Tim Herrmann
 Verbrennungsanlage_Bernd Engelmann
 All other photos: Anja Schwetje

Plastic Waste Re-use + Recovery

Re-use ➡ Same Product

Mechanical Treatment ➡ Recyclat, Re-granulate

Dry or wet process separating heterogenous (plastic) waste into recyclable uniform (plastic) waste streams

Globally widely applied

Spreading of contamination, problematic additives possible

Chemical / feed stock recycling ➡ Monomere

(Thermo)chemical process converting plastic polymers into their monomers or basic chemical constituents by gasification, pyrolysis, depolymerisation, solvolysis...

Input requires uniform plastic types, quality requirements have to be defined

Currently the ecological advantages, economic feasibility and robustness of technological application at industrial scale are not proven

Energy recovery ➡ Energy content

Thermal process converting material into energy and providing a sink for contamination

Technological application at industrial scale is proven

Refused-derived fuel has specific quality requirements and, amongst others, derives from mechanical treatment processes of residual waste or reject from mechanical recycling

Some Plastic (Waste) Facts

- **Plastic is a synthetic (man-made) polymer with different structure and properties:**
 - **Thermoplastic:** polyethylenterephthalate (PET), polyethylene (PE), polystyrene (PS), polypropylene (PP), polycarbonate (PC), polyamide (PA), polyvinyl chloride (PVC), ABS....
 - **Duroplastic:** Epoxy resin etc.
 - **Elastomer:** Synthetic rubber etc.
 - Sorting and treatment according to type is required for recycling
- **Plastic includes additives to optimize its properties, for example:**
 - **Plasticizer:** phthalate (DEHP, DOP), DEHTP (DEHT, DOTP), DINCH, adipate esters etc.
 - **Stabilizers:** anti-oxidants, flame retardants, etc.
 - **Fillers or Colorants....**
 - Health hazards associated with some additives
 - Dispersion of additives through the recycling chain
- **Plastic recycling is a low temperature process**
 - Contamination from usage or waste collection is an issue

Plastic Waste Recycling – What are you aiming for?

Plastic waste recycling requires manufacturing structures and markets
Plastic waste recycling must meet environmental and quality standards!

HIGH-END



LOW-END



Photo: Anja Schwetje

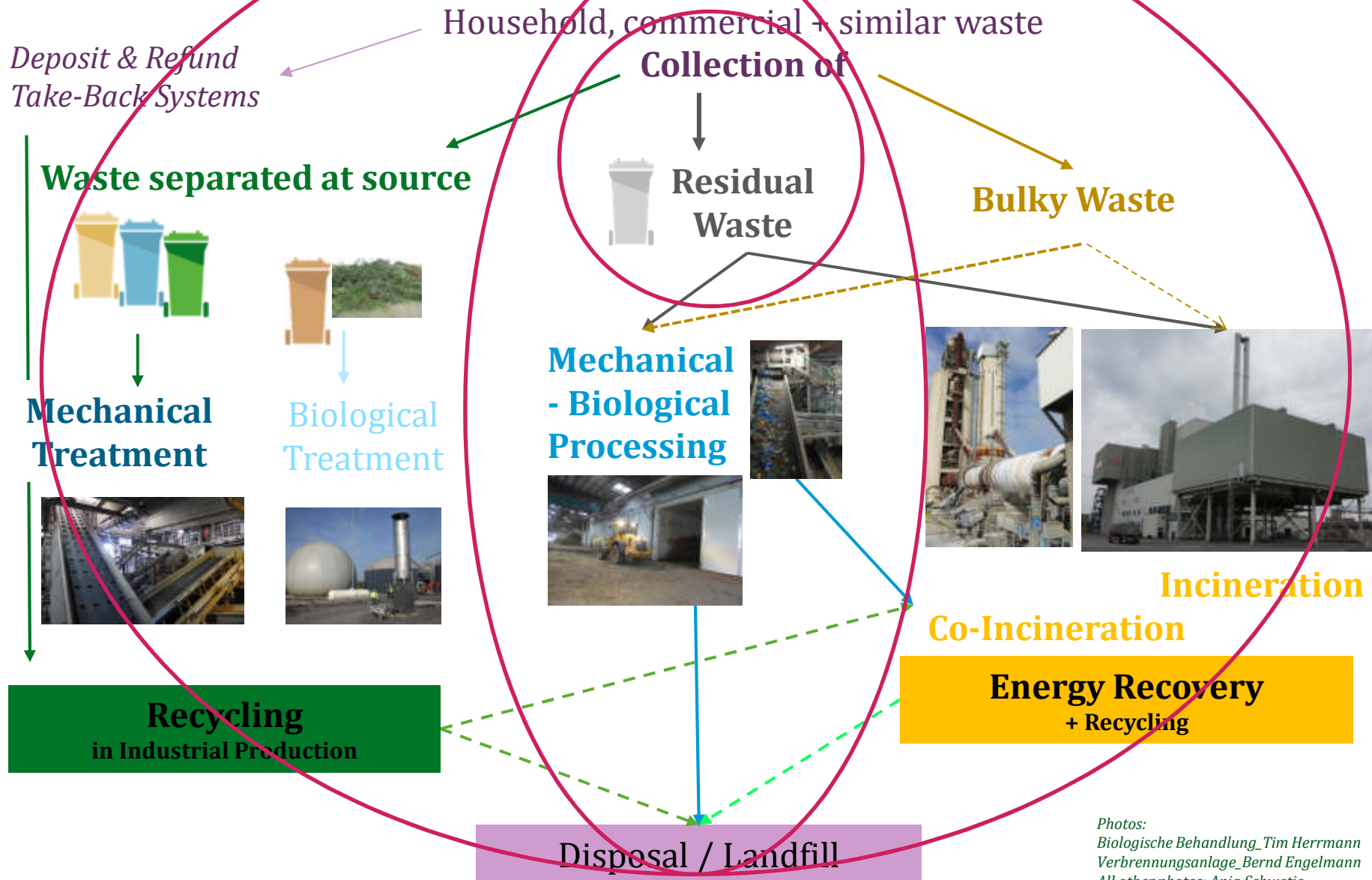


Consider that recycled material
might end up as waste again after time/usage

Consider prevention from behaviour/consumption changes to ban

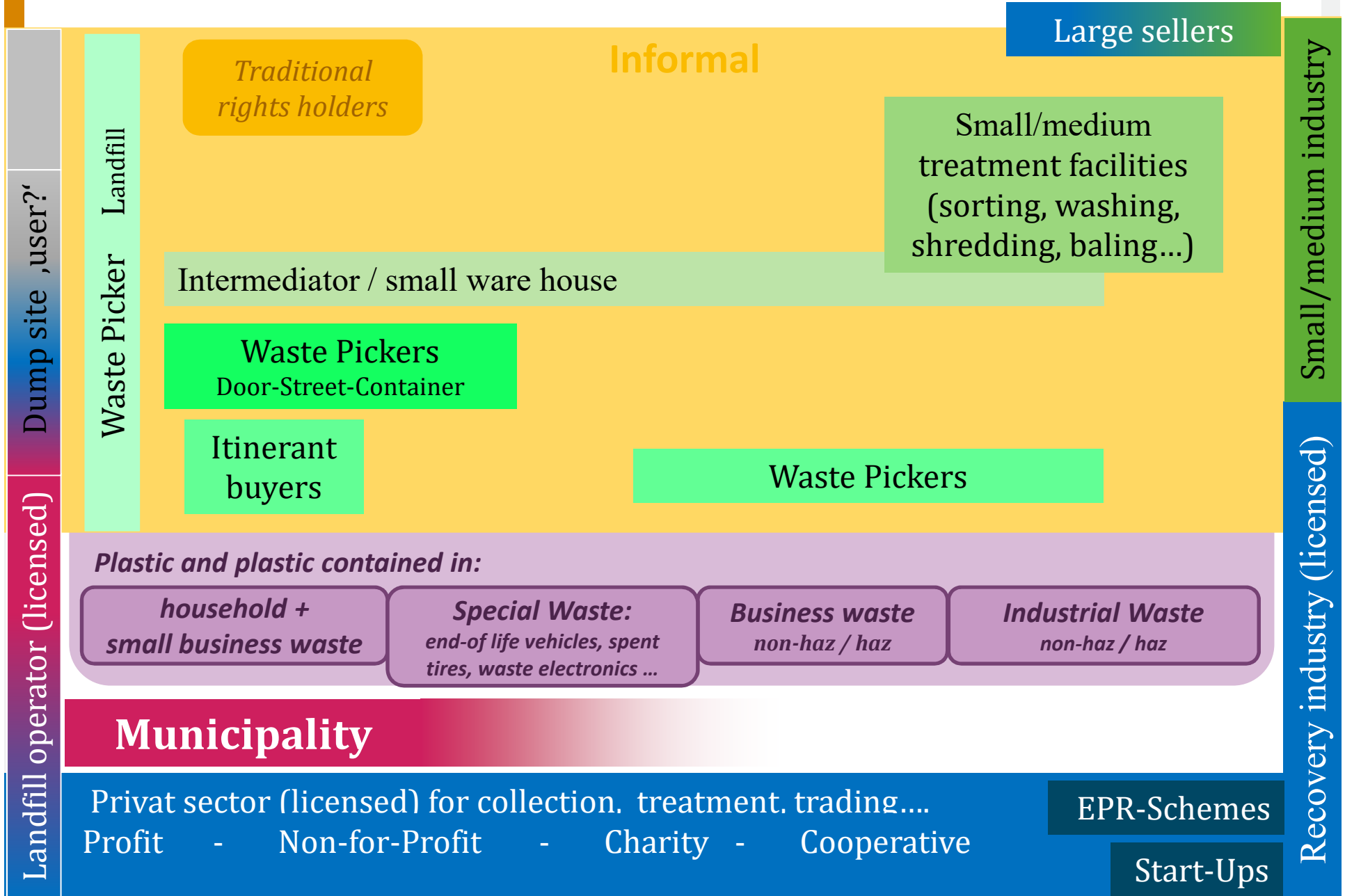
(Plastic containing) Waste Management Responsibilities?

Refill & Re-use

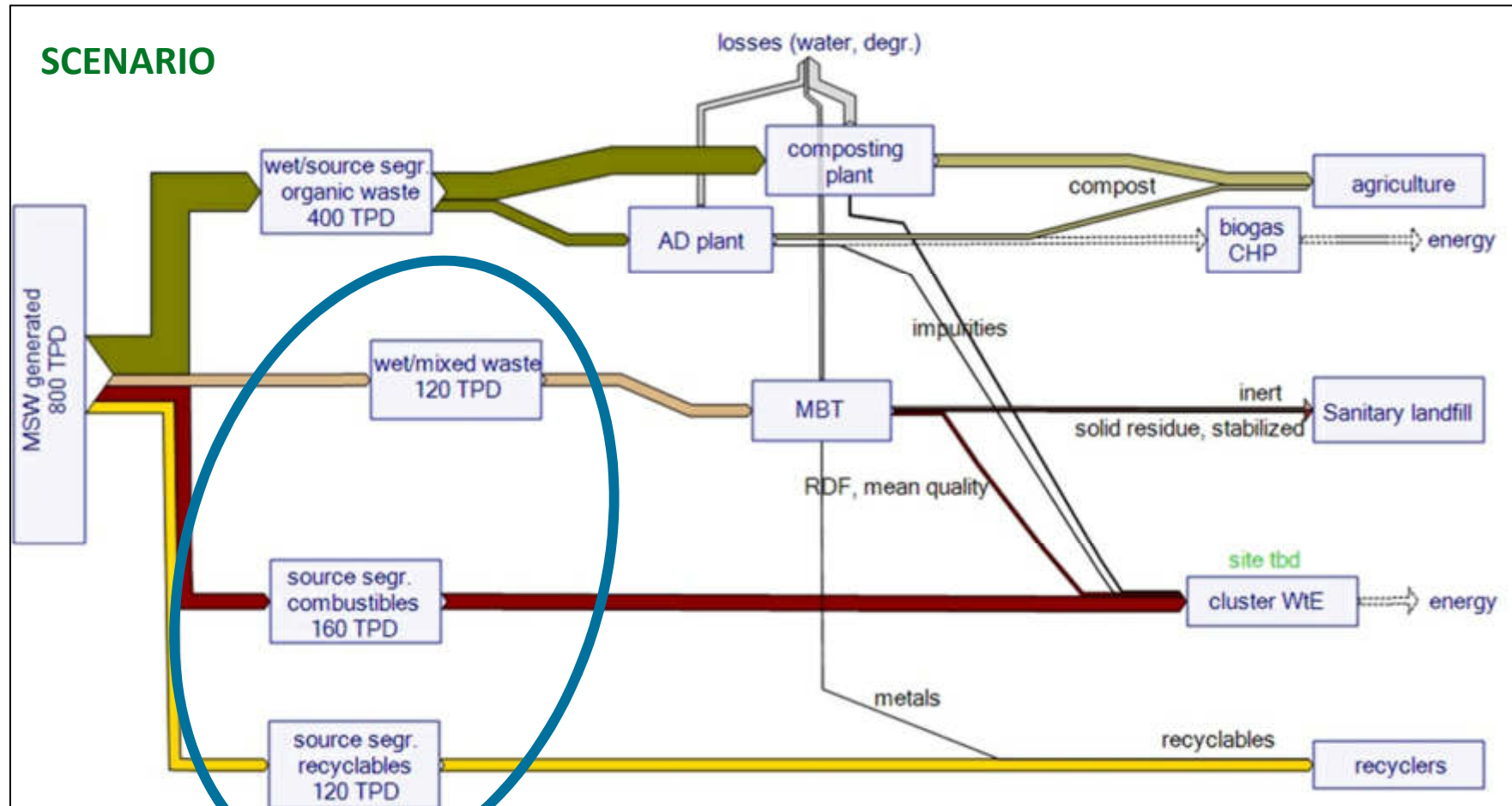
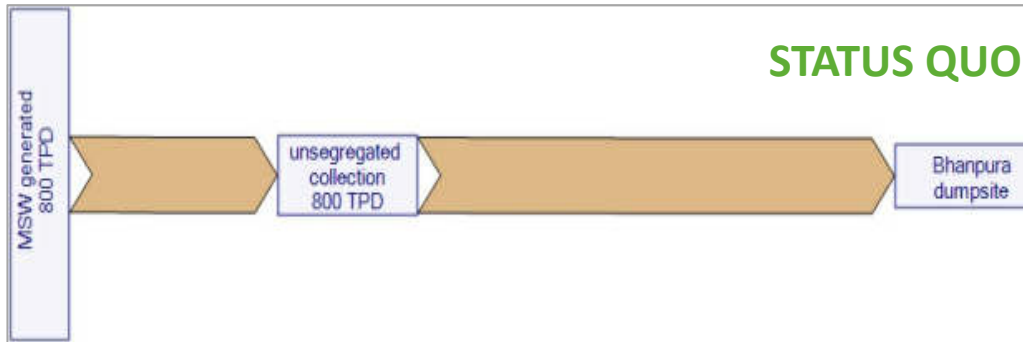


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Stakeholder in (Plastic) Waste Management

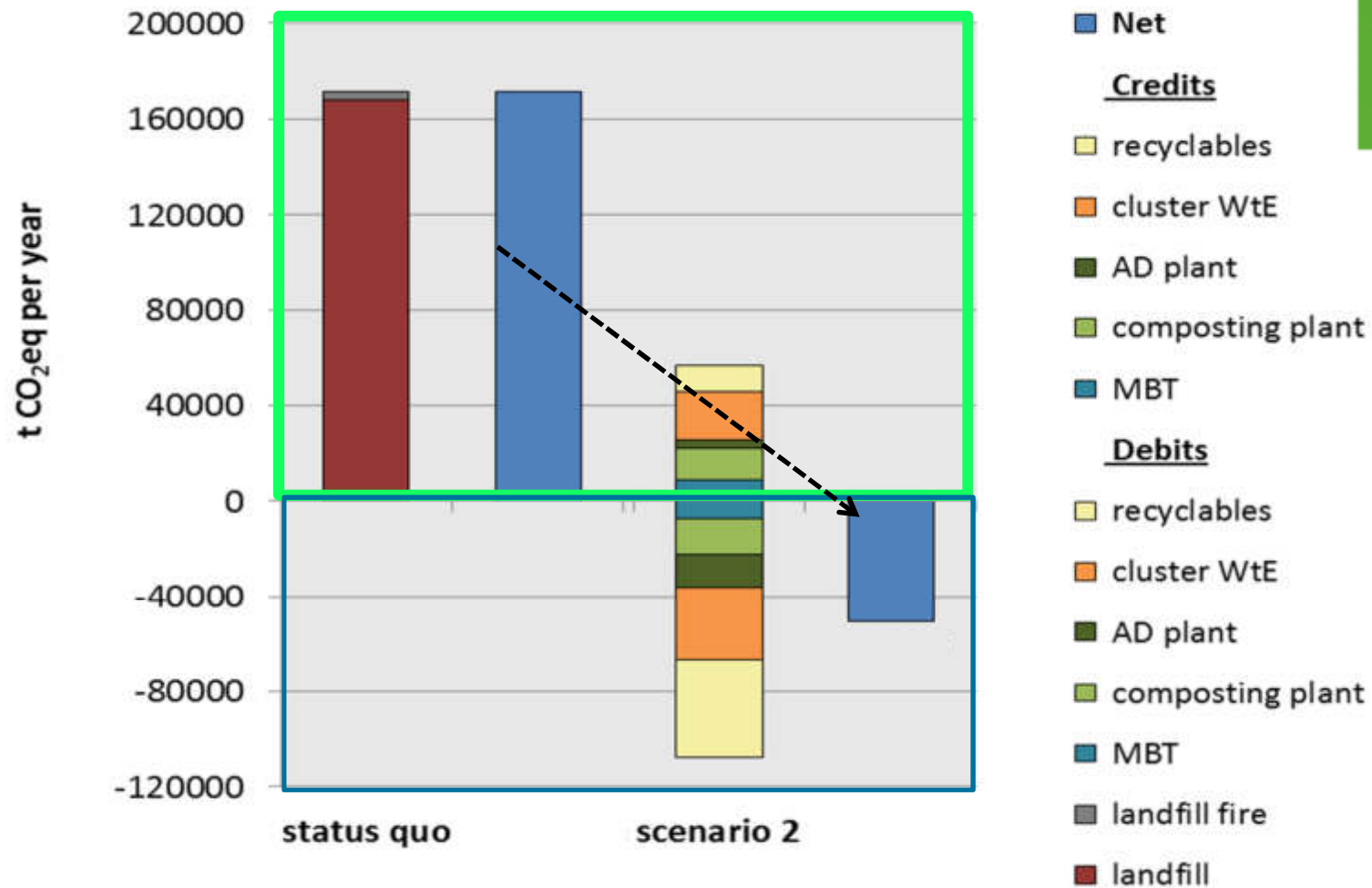


Climate Mitigation Potential BHOPAL / INDIA Waste Management



Source: <https://www.umweltbundesamt.de/en/publikationen/resource-climate-protection-through-integrated>

Climate Mitigation Potential BHOPAL / INDIA - GHG results



What is your aim in (plastic) waste management and is it feasible?

- **Improved collection** to prevent littering or open burning?
- **Introduction of separate collection** of all types or only of ,valuable‘ plastic waste?
- **Improve plastic recycling** to introduce circular waste economy?
- **Separate plastic waste from remaining mixed waste** to increase energy recovery?
- **Generate revenue from sales** of separately collected plastic waste?
- **Improve municipal capacity** and performance?
- **Formalize or out-source** plastic waste collection / management?
- ???

Which conditions do you face / can you address or influence?

National / General Framework

- Waste: perception and attributed importance in society and politics?
- Strategic decisions, legal requirements and clear responsibilities in waste management?
- Enabling framework (municipal law, energy scheme, Extended Producer Responsibility (EPR), bans, incentives and subsidies, financial and programmatic support, access to finance)?
- Education and expertise in the waste / industrial sector?
- Licensing, control and enforcement by public administration?

➤ **Public awareness and participation?**

Municipal Sphere

Rural Sphere

• **Limits in area and responsibility?**

**Citizen –
Waste Generator**

- **Organisation, finance of waste management?**
- **Role, level of independence and capacity?**

• **Engagement of/with private sector?**

- **Type of engagement and profit margin?**
- **Resources, skills, equipment?**

Private Sector / industrial Sphere

**EPR /
Take-back
Schemes**

• **Coordination with / reliance on informal or voluntary activities?**

- **Type of engagement and margin?**
- **Resources, skills, equipment?**

Informal Sector Sphere

**Thank you very much
for your attention!**

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