

Climate MRV for Africa – Phase 2

MRV of Mitigation Actions

Mitigation Opportunities in the Waste Sector



NIRAS
Lead partner

GreenStream

TÜVRheinland[®]
Precisely Right.

camco
clean energy

Project of the European Commission DG Climate Action

EuropeAid/136245/DH/SER/MULTI

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Team Leader and Key Experts

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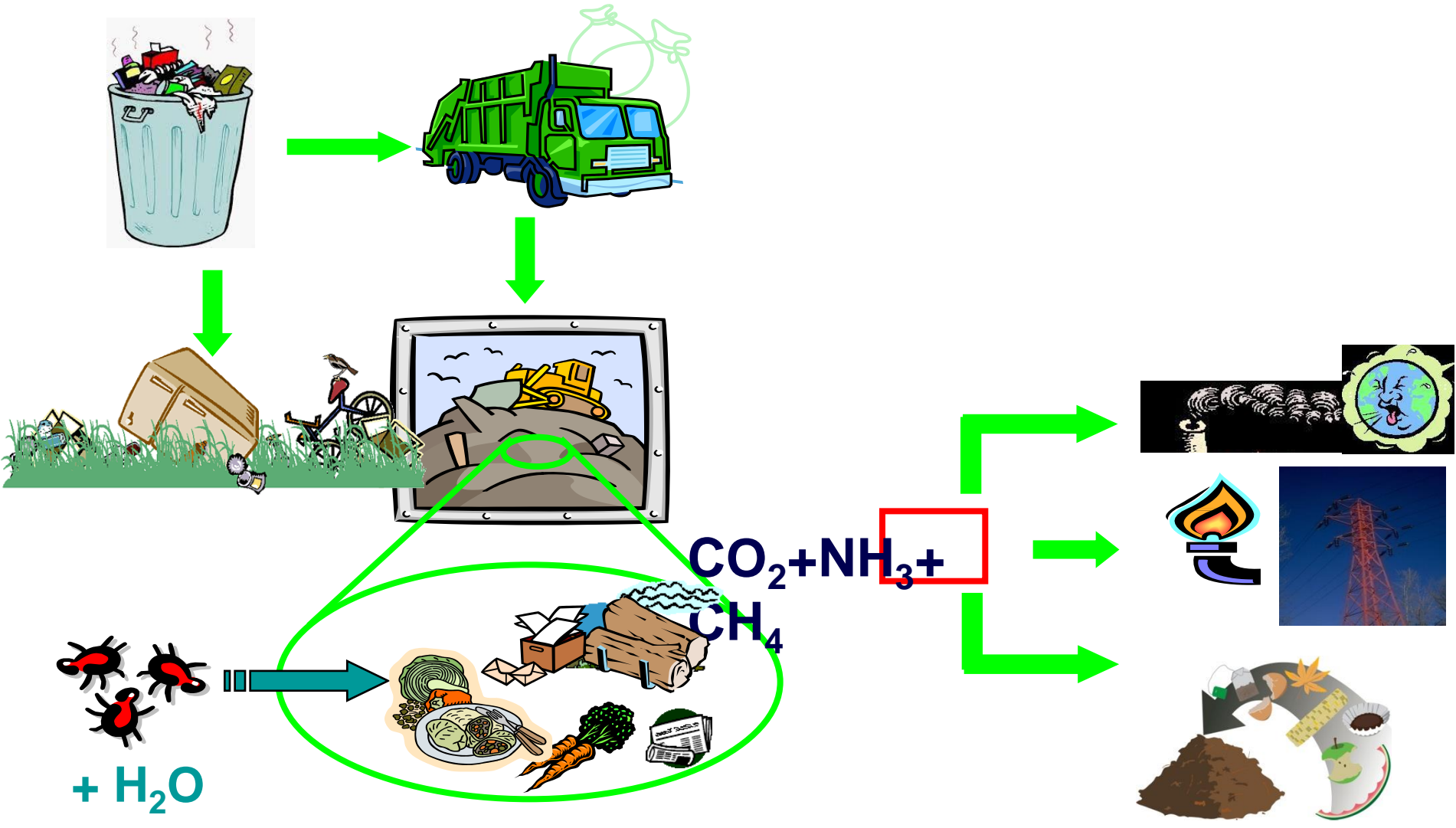
Agenda

- Methane Formation in Landfills
- Baseline Scenario
- Mitigation Opportunities in SWDS



Methane Formation & Baseline

Methane Formation in Landfills



Mitigation Opportunities in SWDS

Mitigation Technologies for Emissions from SWDS

- Gas Capture and Flaring
- Gas Capture and Power Generation
- Incineration with Energy Recovery
- Gasification
- Anaerobic Digestion with Biogas Collection
- Composting
- RDF production and Co-firing in Cement Kilns
- Landfill Aeration

Implied EF from Different Technologies

- Examples from Egypt

Technology	Emission Reduction Potential (tCO ₂ e/ton waste)
Incineration with energy recovery (IER)	0.23
Anaerobic Digestion (AD)	0.40
Composting	0.11
Co-firing in Cement Kilns (CFC)	0.40
Recycling	
PET	1.76
Paper	0.72
Glass	0.25
Textiles	3.38

These values are strongly dependent on the waste composition!!!

Gas Capture and Flaring and/or Utilization

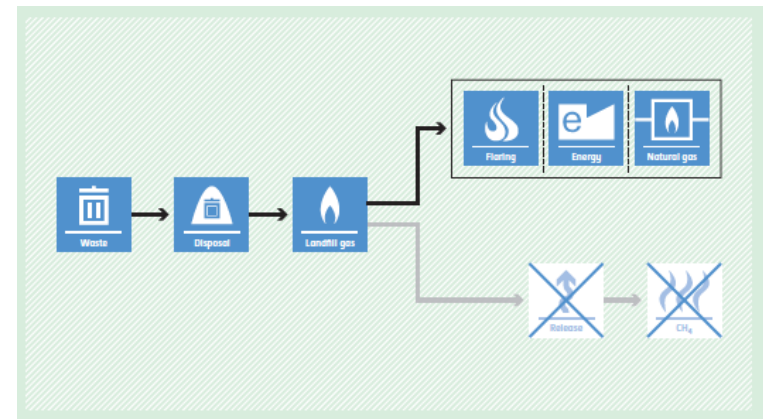
Baseline Scenario

Landfill gas from the landfill site is released to the atmosphere



Mitigation Scenario

Landfill gas is captured and flared and/or used to produce energy (electricity or thermal) and/or used to supply consumers through NG pipelines



Monitor:

- Amount of flared/utilized gas
- Amount of waste disposed



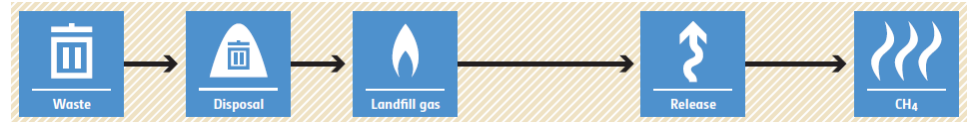
Composting

Baseline Scenario

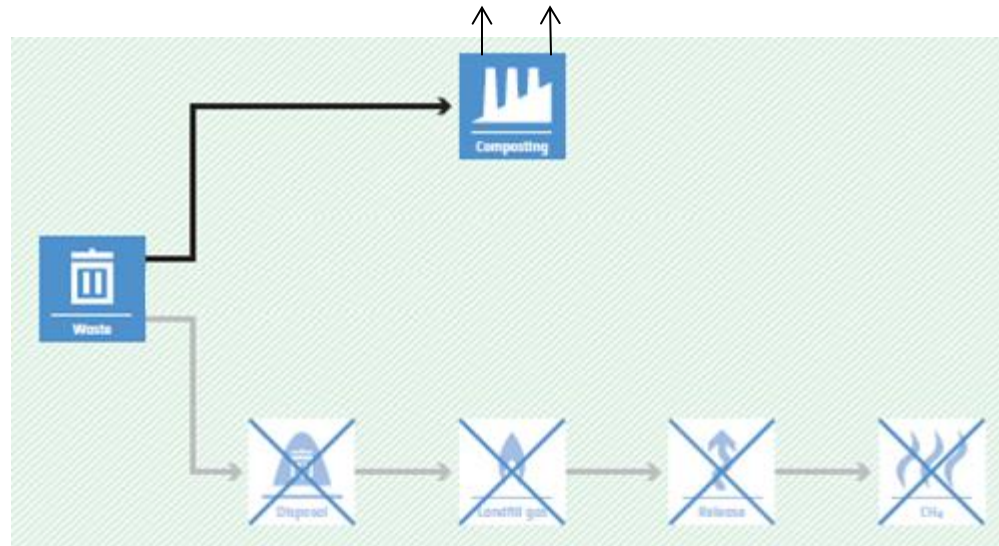
Landfill gas from the landfill site is released to the atmosphere

Mitigation Scenario

Aerobic treatment of waste to produce compost



CH₄ N₂O



Monitor:

- Amount of flared/utilized gas
- Amount of waste disposed



RDF Production and Use

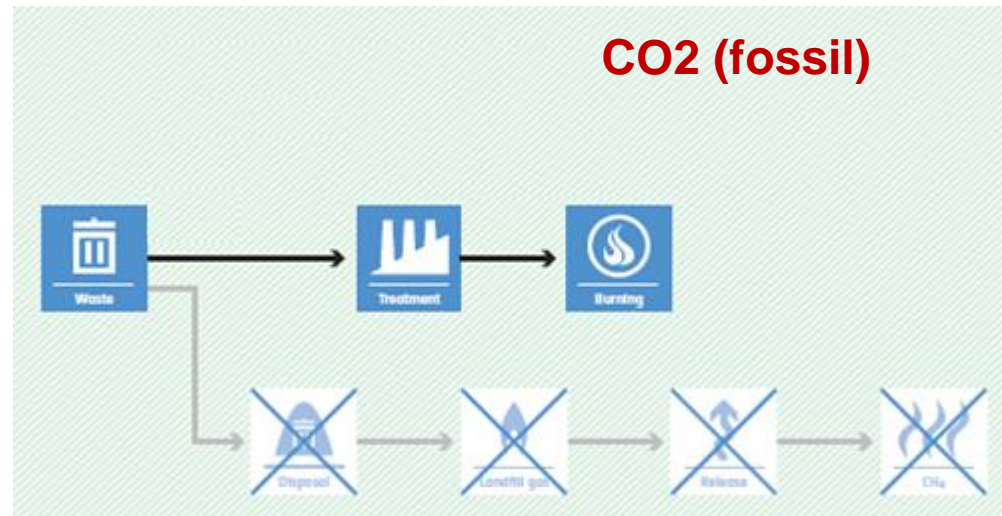
Baseline Scenario

Landfill gas from the landfill site is released to the atmosphere



Mitigation Scenario

Mechanical/thermal treatment process to produce Refuse-Derived Fuel (RDF) and its use



Monitor:

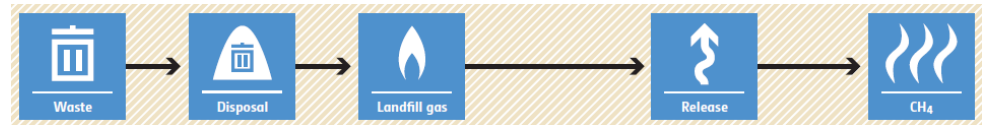
- Amount of flared/utilized gas
- Amount of waste disposed



Gasification

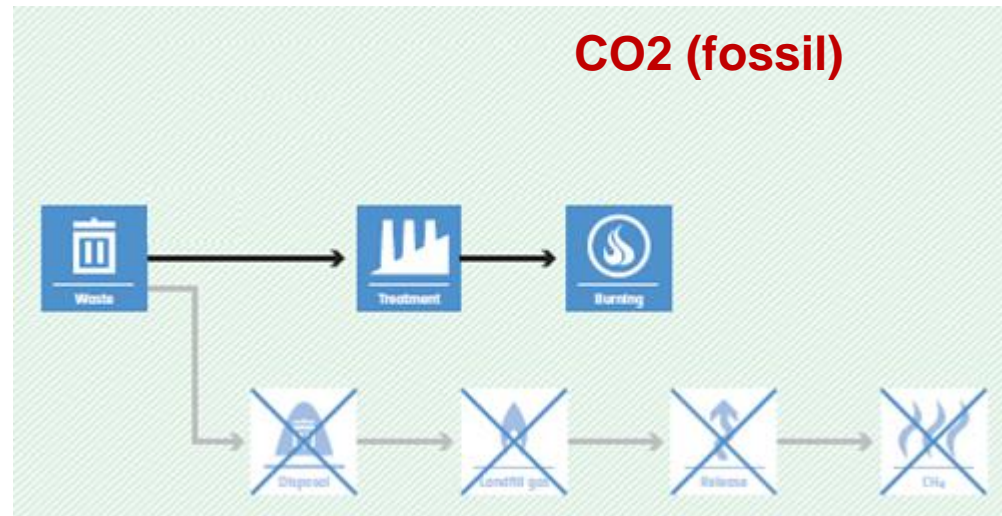
Baseline Scenario

Landfill gas from the landfill site is released to the atmosphere



Mitigation Scenario

Gasification to produce syngas which may be used to generate electricity and/or heat



Monitor:

- Amount of flared/utilized gas
- Amount of waste disposed



Incineration with Energy Recovery

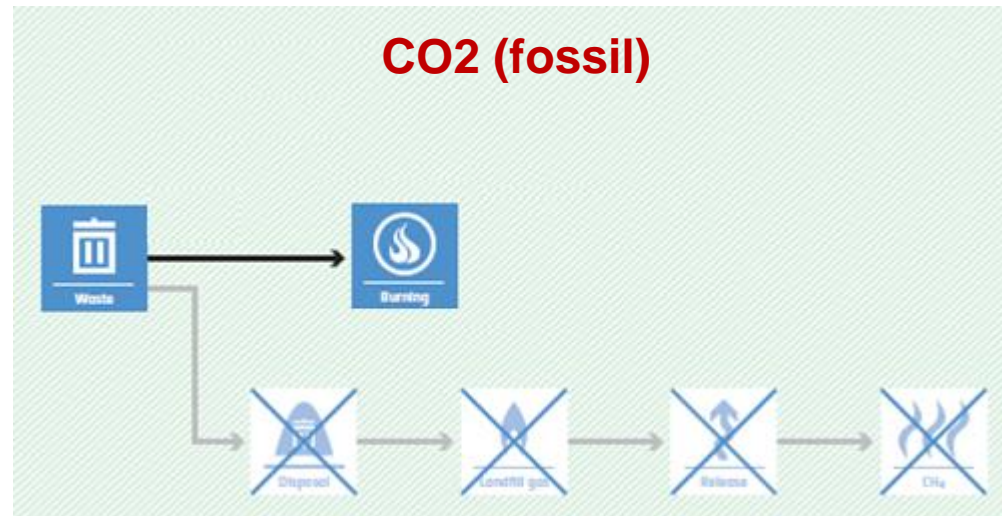
Baseline Scenario

Landfill gas from the landfill site is released to the atmosphere



Mitigation Scenario

Incineration of waste for energy generation, electricity and/or heat)



Monitor:

- Amount of flared/utilized gas
- Amount of waste disposed



Anaerobic Digestion

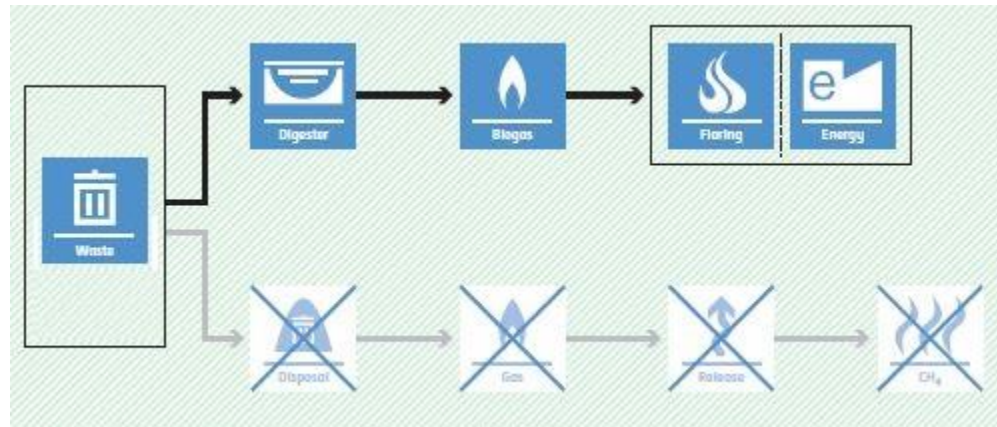
Baseline Scenario

Landfill gas from the landfill site is released to the atmosphere



Mitigation Scenario

Anaerobic digestion with biogas collection and flaring and/or its use



Monitor:

- Amount of flared/utilized gas
- Amount of waste disposed



Landfill Aeration

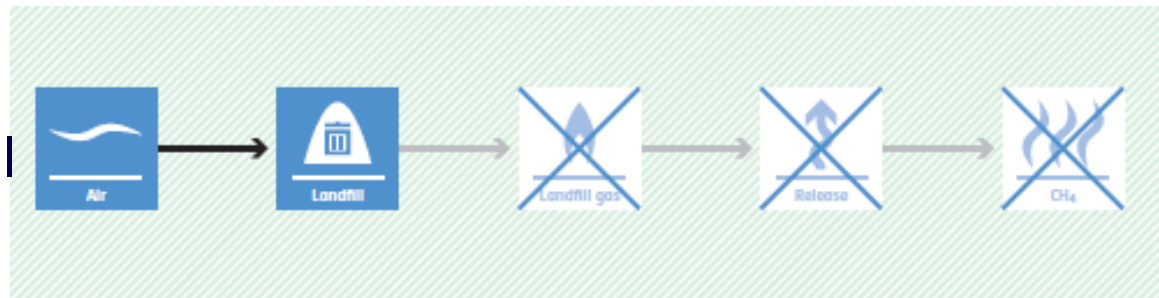
Baseline Scenario

Landfill gas from the landfill site is released to the atmosphere



Mitigation Scenario

In-situ aeration of the closed landfill or the closed landfill cell reduces GHG emissions



Monitor:

- Amount of flared/utilized gas
- Amount of waste disposed



Thank you!

Amr Osama Abdel-Aziz, Assen Gasharov, Mike Bess and Laura Lahti