

# **Opportunities and challenges for GHG reductions in the waste sector**

*Mokokwe K.*

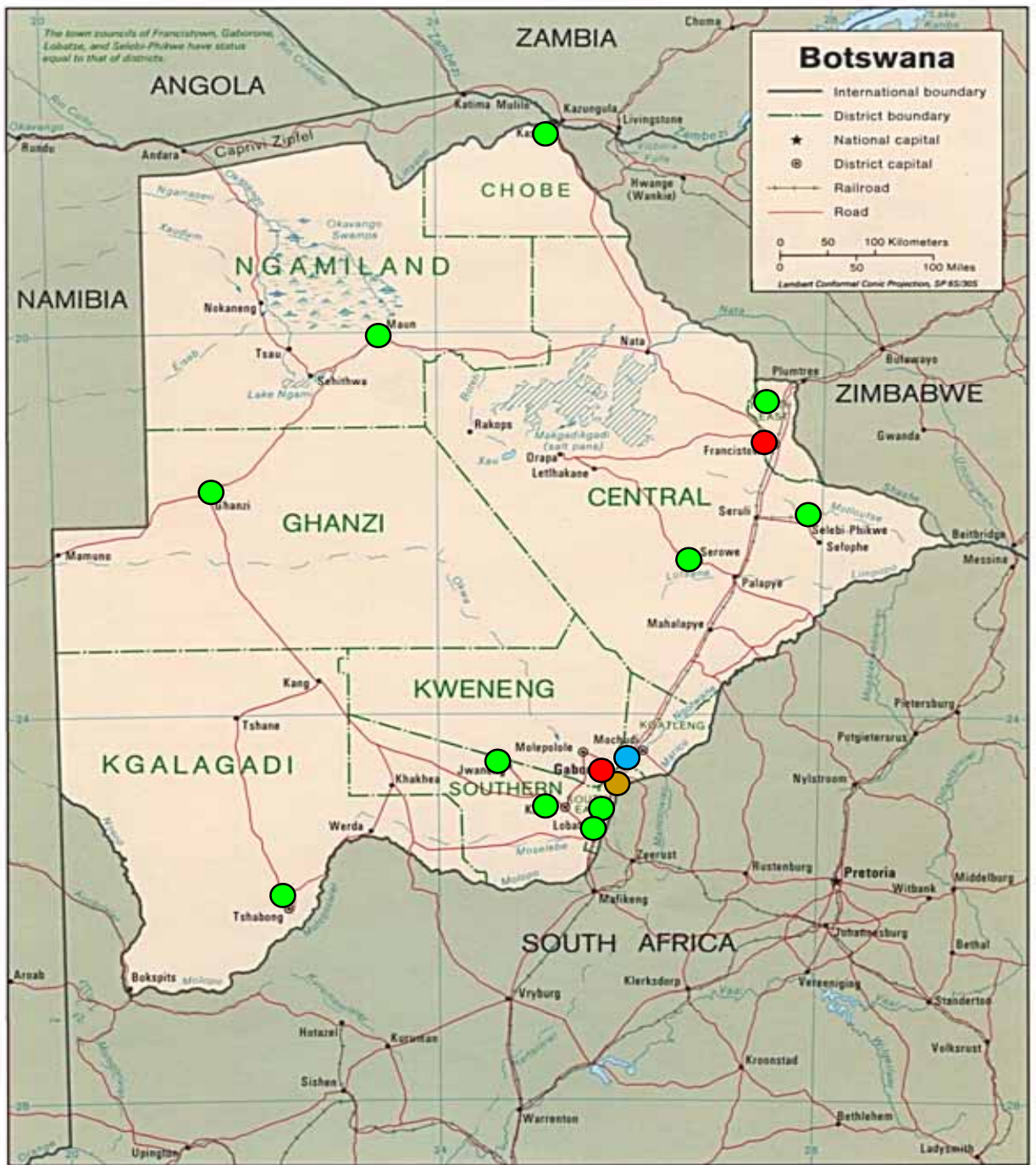
Dept of Waste Mgmt & Pollution  
Control

# OUTLINE

- Sources of GHG
- Regulation, Operation & Maintenance
- Opportunities
- Challenges
- Conclusions and recommendations

# Regulation, O & M

- Policy and regulation – DWMPC (MEWT)
- Solid waste collection & disposal – LAs
- Waste water transfer & disposal - WUC



### Botswana

— International boundary  
 - - - District boundary  
 ★ National capital  
 ⊙ District capital  
 —+— Railroad  
 — Road

0 50 100 Kilometers  
 0 50 100 Miles  
 Lambert Conformal Conic Projection, SP 83-305

● GS < 6 500 t/a

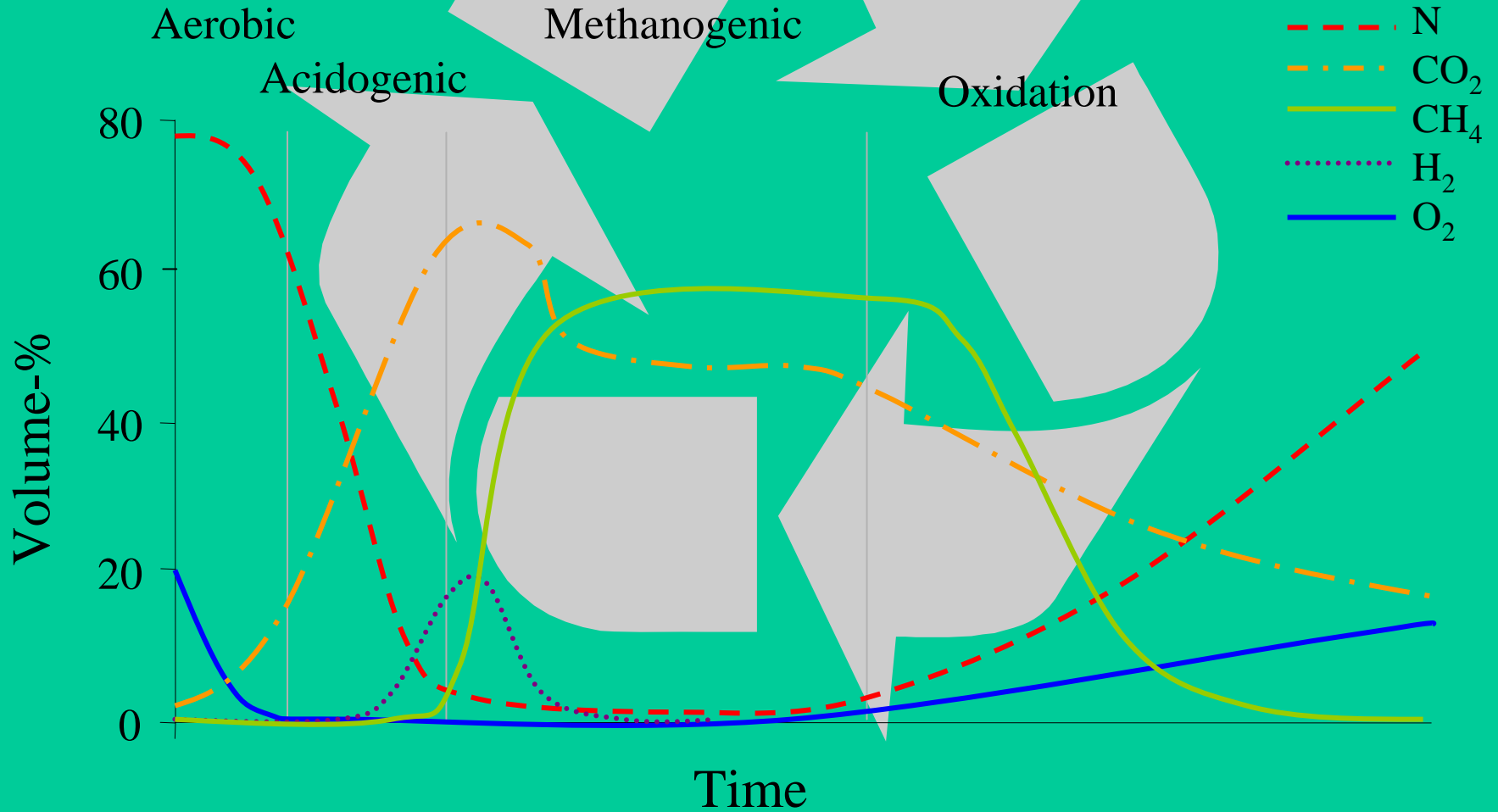
● GM 6 500 – 65 000 t/a

● GL > 65 000 t/a

● GL - closed



# Gas composition in different phases



# Wastewater Treatment

- About 80 WWTF
  - 90% being sewage ponds
- Remaining 10%
  - Trickling filters
  - Rotational Biological Contractors
  - Activated Sludge
  - Petro system

# WWTF cont.

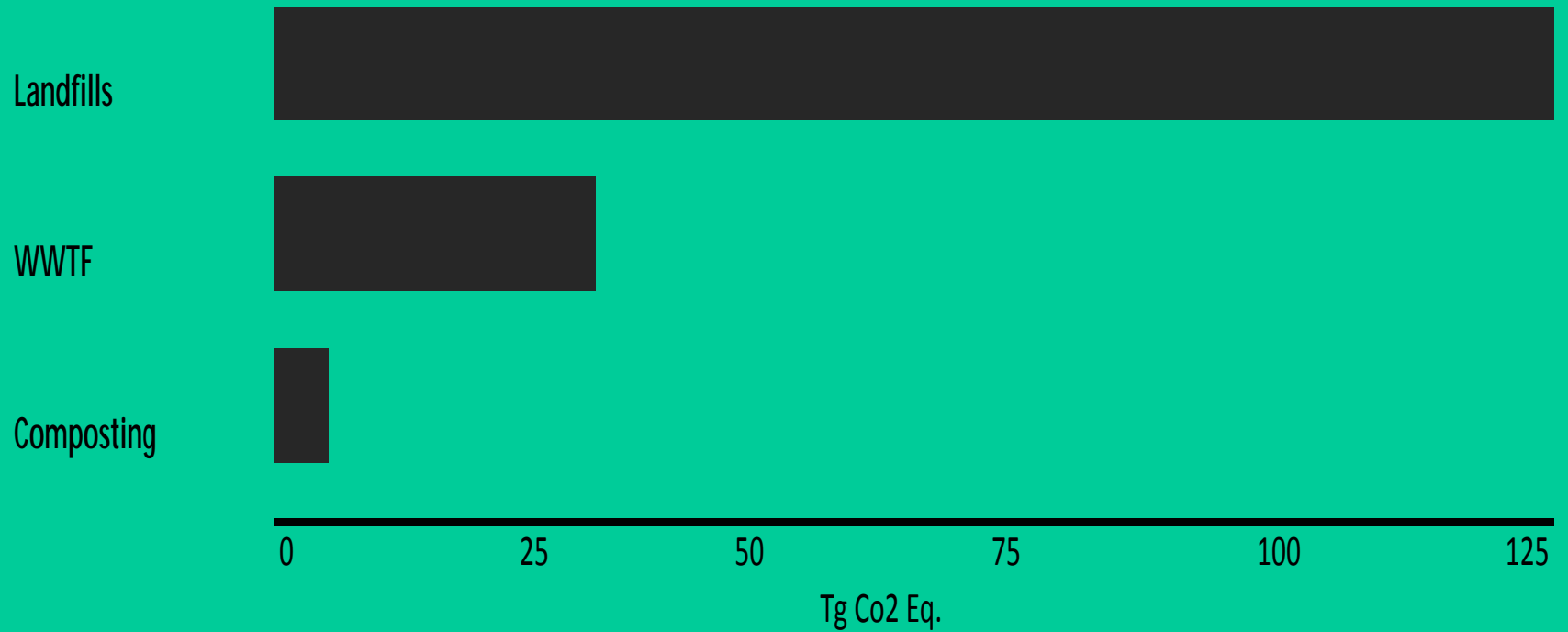
- Generation of CH<sub>4</sub> and N<sub>2</sub>O
- CH<sub>4</sub> proportional to BOD and COD

# Medical waste incinerators

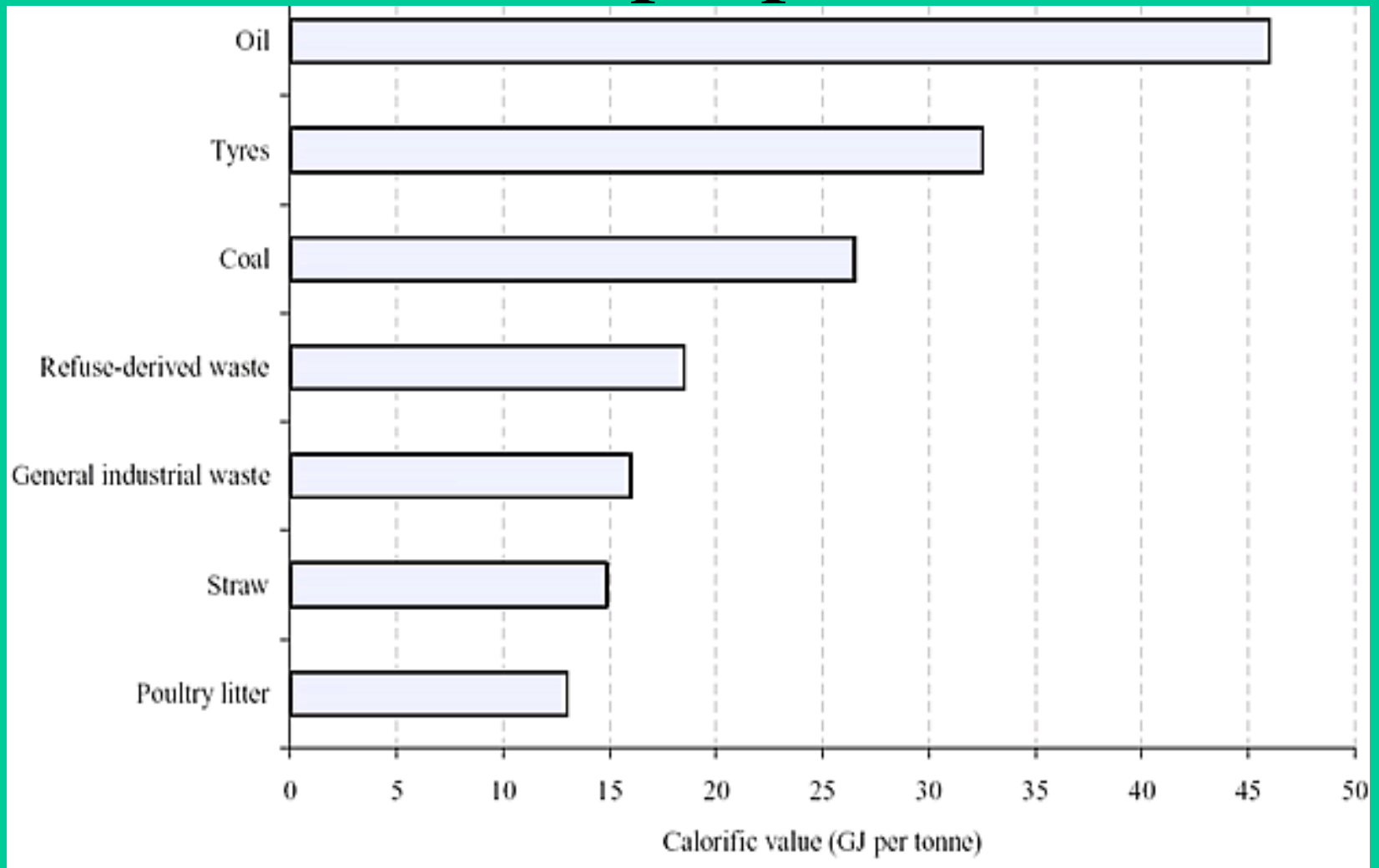
- Installed at most health facilities
- Also at landfill sites
- Discharge of CO<sub>2</sub>



# GHG sources in US 2009



# Thermal properties



# Favorable conditions

- Political support
- Independent Power Producer (IPP)
- Methane recovery equipment installed in some facilities

# Challenges

- Unsupportive policies
  - Direct appointments
  - Cost recovery
  - Power supply monopoly
- Many players handling waste issues.
  - Eg. Regional landfill managed by KDC, 80% of waste deposited comes from GC & SED
- Poor waste management practices
  - Inadequate collection, poor maintenance, etc.

# Challenges cont.

- Lack of expertise
- Lack of funding

# Conclusions

- Sources of GHGs: Landfill, WWTFs, incineration, meat processing and farming facilities
- Opportunities
  - Composting
  - Incineration coupled with generation of electricity
  - Methane recovery

# Recommendations

- Review of conflicting policies and legislation
- Coordination of institutions dealing with waste
- Capacity building- Training of local consultants and contractors
- Improve operation and maintenance of facilities