



A&WMA and OENIA

2015 Waste Management and GHG Reduction Conference

Toronto, Ontario, October 7, 2015

# Landfill Disposal Capacity Value using Excel Model

Tian Gou, P.Eng.  
[tgou@golder.com](mailto:tgou@golder.com)

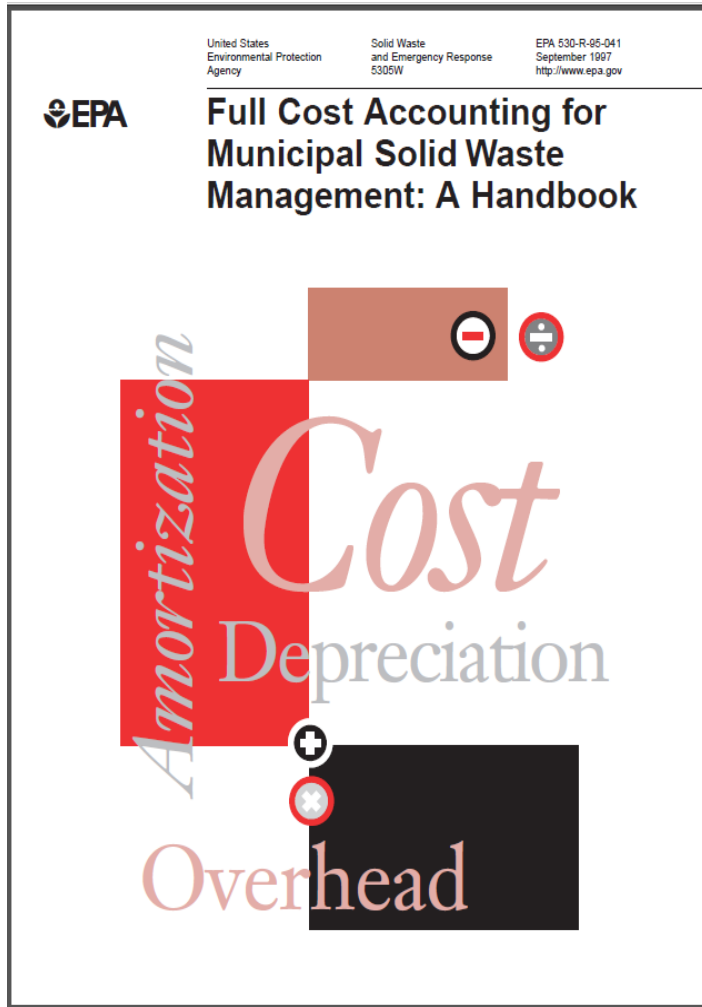




# AGENDA

- Full Cost Accounting and its application
- Methodology
- Model structure
- Sensitivity Analysis
- Limitations of the Model
- Example Model Screenshots
- Questions and Answer

# US EPA Guideline on FCA (1997)



“Whole-picture view”

“On-going basis”

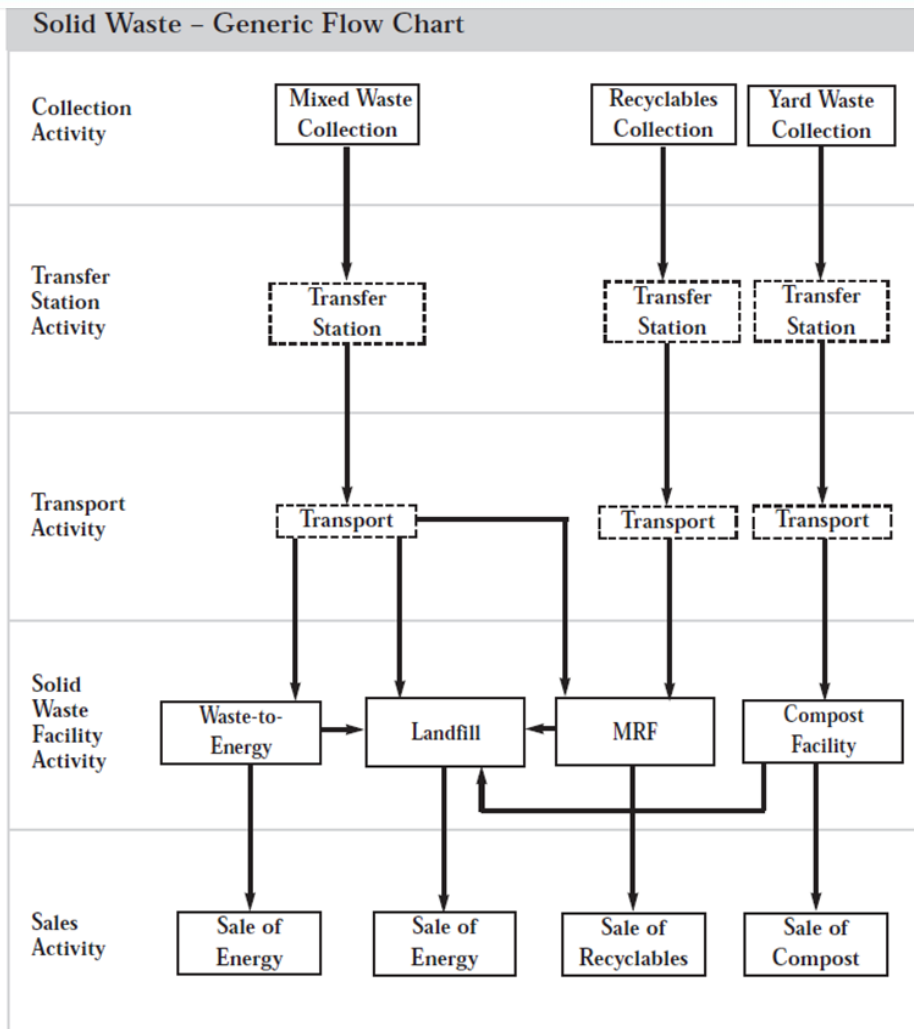


# Full Cost Accounting Principles

- US EPA Guideline (1997)
- A systematic approach for identifying, summing and reporting the actual costs of solid waste management.
  
- Three major types of direct costs:
  - Up-front costs
  - Operating costs
  - Back-end costs
  
- FCA can assess
  - Overall costs of the full municipal solid waste (MSW) services
  - One or more components of MSW services



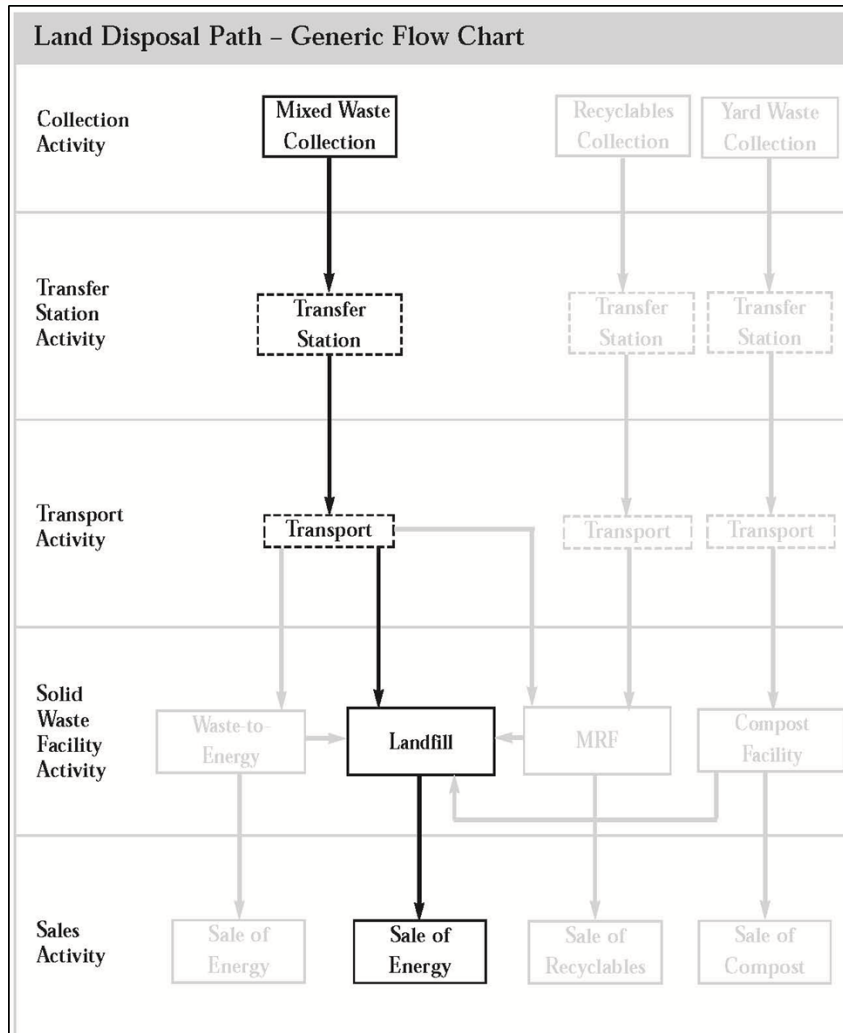
# FCA – Municipal Solid Waste Management



Source: US EPA (1997)



# FCA – Landfill Disposal Path



Source: US EPA (1997)



# Benefits of Full Cost Accounting

- Provides a true cost of landfill disposal
- Helps local governments identify inefficiency and cost saving opportunities in the landfill disposal path
- Helps local governments improve methods of evaluating privatization initiatives
- Helps local governments adjust the mix of MSW programs accordingly (if FCA analysis is performed for each MSW services)
- Makes it possible to benchmark results with municipalities with similar size and operation levels



# Methodology

- Model designed for use by municipal governments
- Cost-based approach
  - Municipality funded service to the tax-paying public on a cost recovery basis
- Break-even analysis
  - revenue received = costs.
  - tipping fee charge that could minimize the net operating cost at the end of the landfill life (i.e., end of the post closure period).
  - a **break-even cost**
    - at the year when garbage acceptance began
    - inflated and applied against the actual and forecast tonnages
    - sufficient to fund all expenditures identified for garbage disposal at the landfill





# Methodology

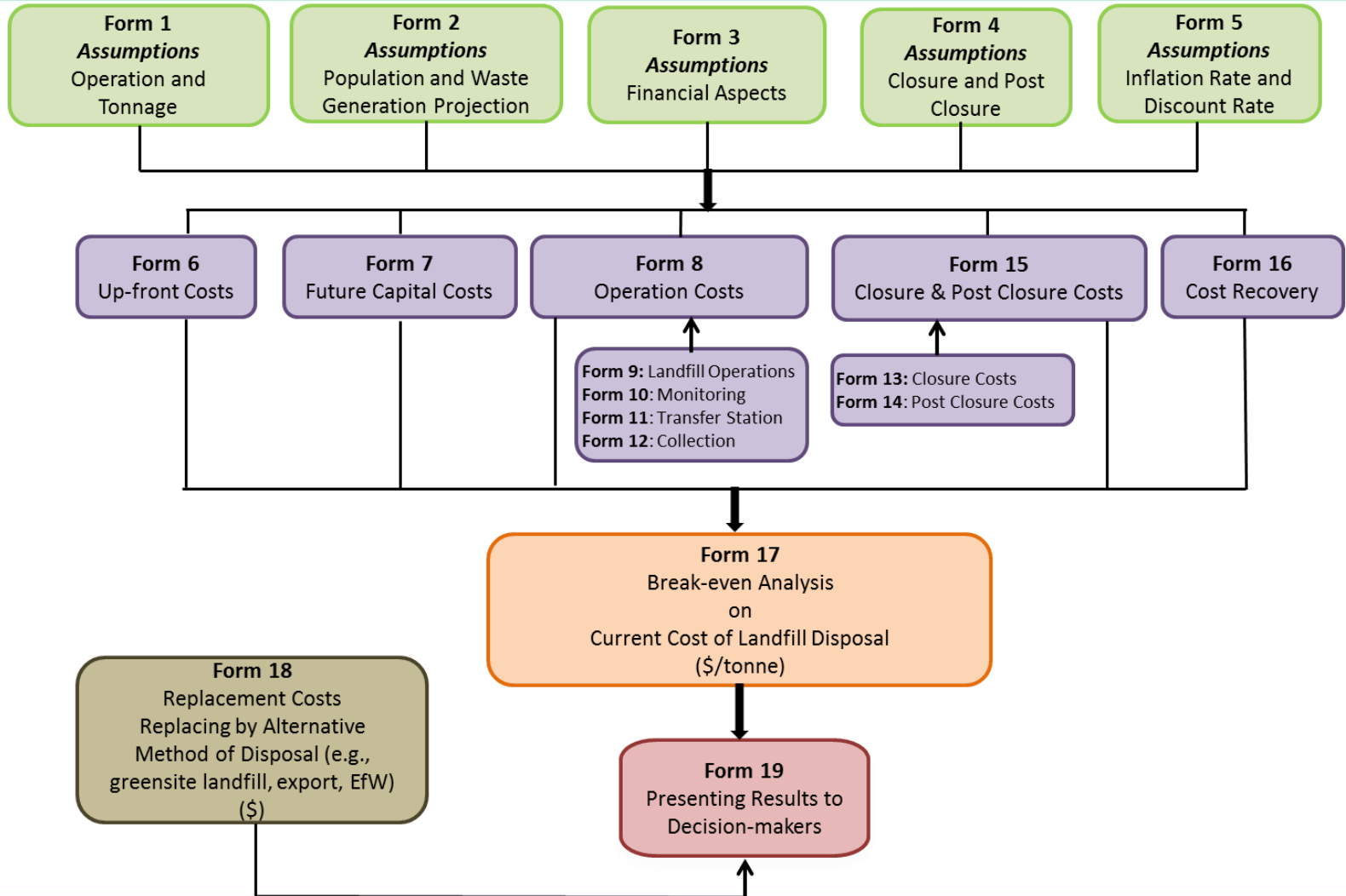
- Model base year costs
  - Obtained from accounting records
- Future costs and historical costs
  - Financial projection
  - Extrapolated based on inflation trends as posted by Statistics Canada
- Includes costs directly contributing to or supporting the disposal of garbage
  - Collection, transfer station, landfill disposal, closure and post closure
  - Cost allocation between disposal and diversion for shared infrastructures



## Golder's Model

- Providing municipalities a thorough and user-friendly electronic spreadsheet model template that:
  - Allows input of relevant and site specific cost data
  - Allows selecting from various option buttons, and drop-down menus
  - Calculates the life cycle cost of disposing of one tonne of garbage

# Methodology – Model Structure



## ■ Disposal Tonnage

- Change one of the following input parameters
  - Tonnage for Model base year
  - Diversion rate for Model base year
  - Garbage generation growth rate
  - Diversion growth rate

## ■ Cost allocation percentage

- Change one of the following input parameters
  - Current and future allocation rates to disposal
  - The onset years for future allocation rate

## ■ Contribution Items

- Excluding one of the following at a time in the break-even analysis
  - Collection
  - Transfer station
  - Landfill operations
  - Monitoring



## Limitations of the Model

- Assesses only the landfill disposal stream
- Model input does not include the following costs:
  - Opportunity costs of land
  - Remedial action costs
  - Externality costs
- Model results does not include the following:
  - Benefits/costs or levies related to waste diversion or recycling initiatives
  - Recovery of cost shortfalls from previous undercharging (if applicable)
  - Taxes
- Facility owners should not solely rely on the Model output to develop a fee structure charged at the gate of the landfill



# Excel Model – Input



# Excel Model – Input





# Excel Model – Costs



# Excel Model – Closure & Post Closure



# Excel Model – Break-even Analysis



# Excel Model – Model Output Summary



**Thank You!**



**Questions?**