



# **Solid Waste Processing Project**

**Cost Recovery & Capturing Internal Revenue**

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# Ljupka Arsova, PMP

## Senior Environmental Engineer



**Specializes in planning and implementation of advanced SWM solutions for material and energy valorization such as anaerobic digestion and advanced technologies for processing organic and mixed solid waste**

- 12 years of international experience in solid waste management.
- Extensive experience in working with local governments in advancing their SWM programs.
- Developed, managed and implemented >20 conversion technologies projects around the world
- Education:
  - BS & MS in Environmental Science- University of Belgrade, Serbia
  - MS in Environmental Engineering- Columbia University, NYC
  - Young MS in Sustainable development- Lund University,

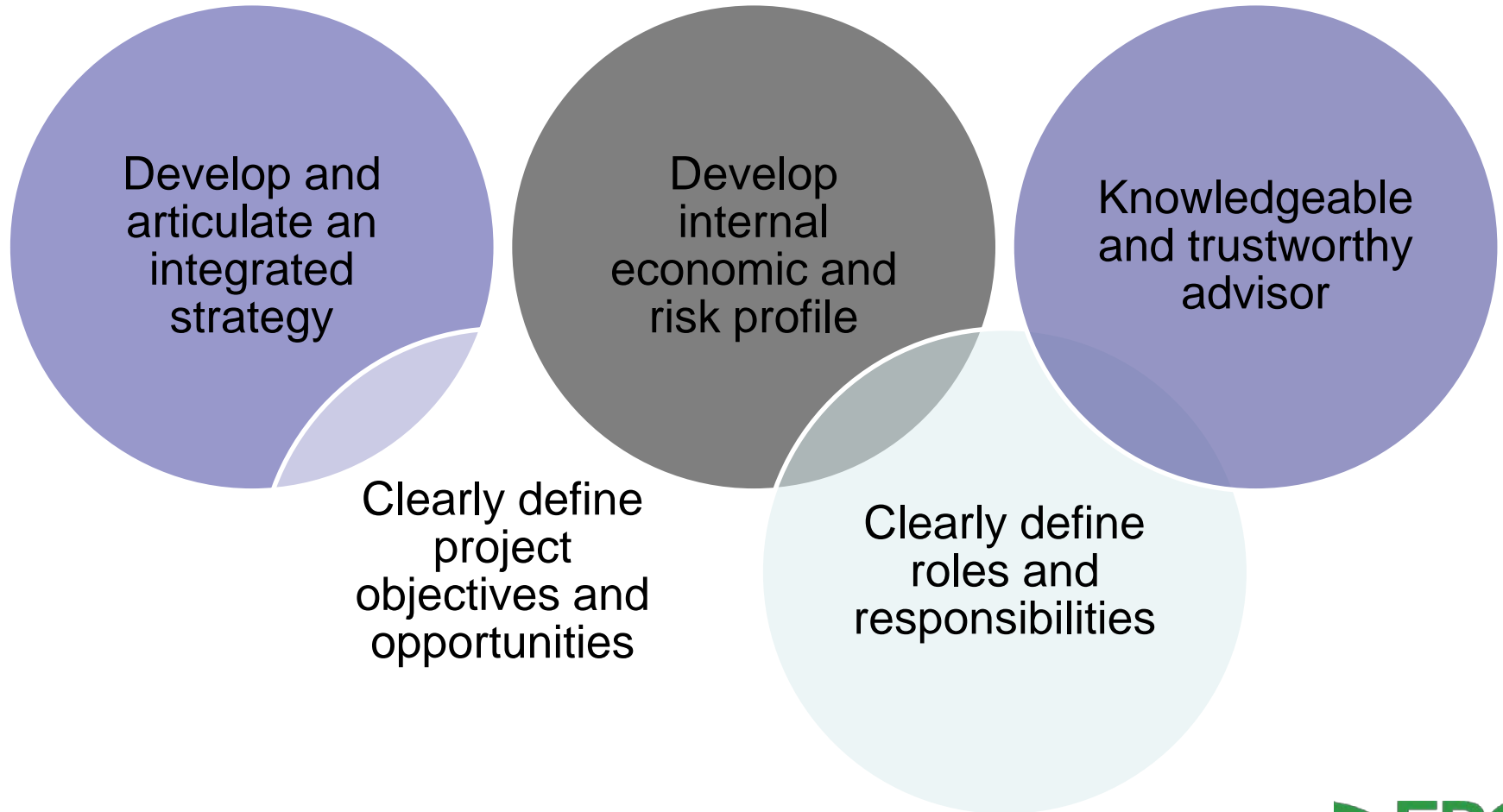
# Overview

- Focus Projects
- Project Development Strategy
- Project Building Blocks
- Sustainable Project Cost Model
- Project Costs
- Internal Revenue Sources
- Cost recovery strategies
- Summary

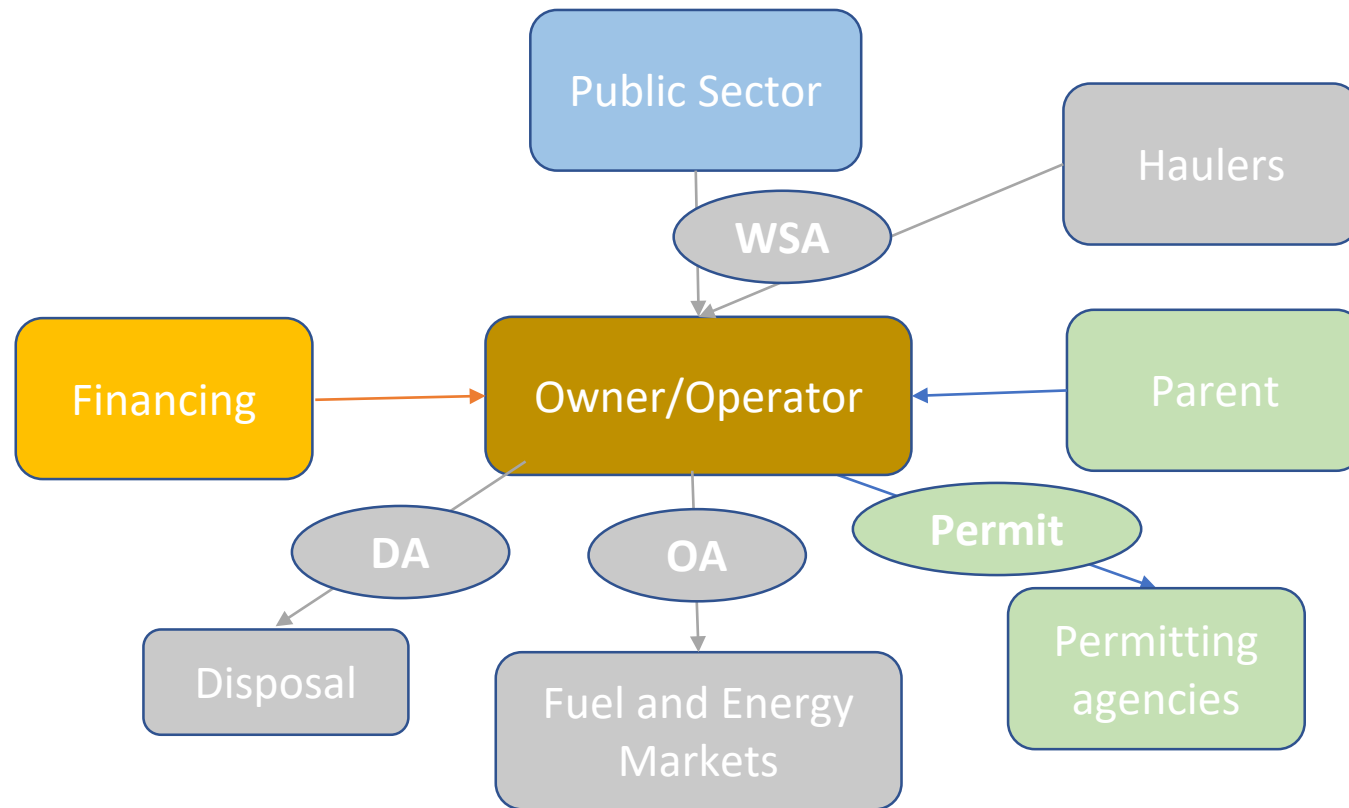
# Focus on Organic Waste Processing Facilities

- Material and/or energy recovery from organic waste
- Lowering methane emissions and generation of renewable fuel/ energy
- Type of facilities:
  - Mechanical Biological Treatment
  - Composting and Anaerobic Digestion
- Generate savings for the SWM system

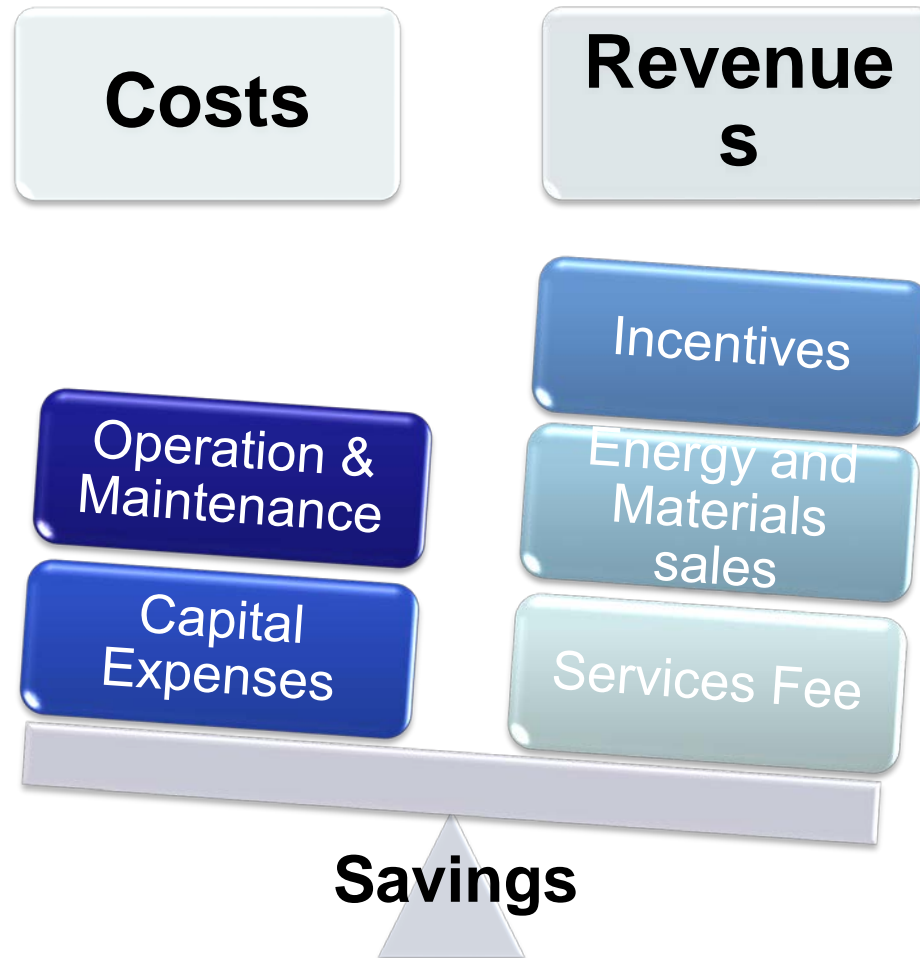
# Project Building Strategy



# Project Building Blocks



# Sustainable Project Cost Model



# Project Costs

## Development

- Feasibility
- Planning and design
- Sitting and permitting
- Impact Assessment

## Construction

- Site preparation/utility connections
- Facility buildings construction
- Equipment and installation
- Construction labor

## Operations and Maintenance

- O&M Labor
- Utilities
- Consumables
- Spare parts
- Residue hauling and disposal



# Internal Revenue Sources

- Revenue Sources
  - Tipping fees
  - Service fees
  - Electricity/ Heat sales
  - Biogas sales
  - Compost/ Fertilizer sales
  - Incentives schemes (REC & RIN's in the US, Feed-in tariff, etc.)
- The revenue generated depends on the choice of feedstock and final products markets
- Location specific

# Examples of Municipal Incentives

Project site

Tax exemption

Assist with  
permitting

Accelerated  
depreciation  
periods for  
taxation

Assure source  
separation of  
quality feedstock

Revenue  
sharing of  
product sales  
revenues

Special utility  
pricing

Limited liability

# Cost Recovery/ Saving Strategies

- Waste supply agreements (private haulers, public company)
- Service fees/tipping fees agreements
- Outputs takeoff agreements
  - Energy (electricity/ heat)
  - Biogas/ biomethane
  - Compost/digestate
- Disposal Agreement
- Central government payment guarantees
- Co-location with existing waste handling infrastructure
- Scaling of the project for economies of scale benefits

# Summary

- Understand the cost and risk you are comfortable with
- Key consideration during the planning and feasibility stage of the project development
- Sustainable SWM depends on the cost recovery system
- Maximizing all revenues is critical (energy, tipping fees, secondary products, and incentives)
- Costs savings possible if incorporated with existing waste management facilities (e.g., co-located at a landfill, upgrading a WWTP)
- Accurately predicting costs and revenues remains challenging due to few projects operating in developing countries
- Local factors vary (e.g., tipping fees, labor costs, site conditions etc.)



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