Sustainable financing and policy models for composting projects

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# Topics for today’s presentation

<table>
<thead>
<tr>
<th>Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>World Bank’s work</td>
</tr>
<tr>
<td>2</td>
<td>Background and approach for composting report</td>
</tr>
<tr>
<td>3</td>
<td>Market conditions</td>
</tr>
<tr>
<td>4</td>
<td>Key financing mechanisms</td>
</tr>
<tr>
<td>5</td>
<td>Enabling policies and guidelines</td>
</tr>
<tr>
<td>6</td>
<td>National and regional case studies</td>
</tr>
</tbody>
</table>
1 World Bank’s work

Objectives

• **End extreme poverty** by decreasing the percentage of people living on less than $1.90 a day to no more than 3%

• **Promote shared prosperity** by fostering the income growth of the bottom 40% for every country

What we do and where we work

• **Financial products and services**
  – Low-interest loans, zero to low-interest credits, and grants
  – Areas include education, health, public administration, infrastructure, financial and private sector development, agriculture, and environmental and natural resource management

• **Innovative knowledge sharing**
  – Policy advice, research and analysis, capacity building, and technical assistance

Solid Waste Management Projects

• Committed **$4.5 billion** since 2000 for solid waste projects
Background and approach for composting report

**Background**

- 40-65% of total waste stream in developing countries is organic
- Landfill methane emissions are an environmental threat, comprising 14% of methane emissions
- Waste management costs are up to 50% of municipal budgets
- Composting is a solution:
  - Reduces landfill and transportation costs
  - Reduces GHG emissions, increases landfill capacity, and improves the quality of soil
- However, composting is difficult to sustain and scale in low and middle income countries where best practices, capital markets, and supportive policy models are still developing
- CCAC commissioned work to feature enabling conditions for municipal composting projects

**Approach**

- On-the-ground studies in 7 countries (Austria, Bangladesh, Brazil, Ghana, India, Sri Lanka, Uganda) and 1 region (Europe) combined with desk study
- Upcoming report features
  - Key market conditions
  - Financing options
  - Enabling policy environments
  - Operational risks
Market conditions

Specific advantages of compost
- Know what **purpose compost will serve** in local market
- **Local needs differ**: soil organic matter depletion, limited landfill capacity, water contamination from chemical fertilizers

A customer group must be selected
- Many potential customers for compost (ie. farmers, residents, landscapers, public works projects, nurseries, etc)
- **Customer identification** should employ a quantitative market assessment
- Learn whether a market exists
- Provide consistent, quality product to a **limited market**

Quality product is key determining factor of success
- Compost is **reputation-sensitive**
- **Quality standards** and branding can mitigate fears
- **Certification** can occur through national accreditation body or peer evaluation
- **Quality of inputs** determines quality of outputs

Marketing and distribution should be strategic
- Composting is like any commercial product and must be **marketed properly**
- **Private firms** can expertly market and leverage distribution channels
- Products **used on-site, sold on-site or via retailers, sold in bulk**
- **Co-marketing** (policy) with fertilizers promotes purchase
Key financing mechanisms

1. Initial costs and infrastructure often require external financing support
   - Grants from national government or international organizations
   - Loans for larger or established organizations

2. Ongoing operations and maintenance should be financially self-sustaining

3. Projects are typically financed through a mix of sources

**Public sources**
- National governments can spur activity through grants and subsidies
- Local governments can levy taxes and fees, use reserves, issue bonds, or provide in-kind services
- User fees for disposal influence public mentality but may be difficult to achieve
- Carbon Emissions Credits have funded projects but markets are weak

**Private sources**
- Development banks can provide low interest loans and grants
- Commercial and municipal banks may provide loans and project financing
- Other institutions and investors (e.g., NGOs) may provide loans or purchase equity
- Public Private Partnerships distribute risk to private operators and gains efficiency
  - Contracted for discrete roles

**Operational revenues**
- Revenues should support ongoing O&M, unless long-term subsidies are in place, primarily
  - Compost sales
  - Gate fees
- Related businesses:
  - Digestion for liquid fertilizer and energy (e.g., Ecocitrus biogas facility in Brazil)
  - Recycling
  - Other: waste collection, education, vocational training, consulting
Enabling policies and guidelines

Compost guidelines and standards
- **National standards** on the production, composition, and marketing of compost
- Mechanism of enforcement
- Collaboration between multiple entities, including ministries of agriculture, environment, finance, and national and local governments
- Implementation and enforcement by local governments

Diversion targets and disposal bans
- Waste recycling and landfill diversion targets
- Disposal bans
- Source separation
- Supporting infrastructure and compliance

Competing policies
- Uneven playing field for prices
  - Subsidies for chemical fertilizers
  - Low gate fees for landfills for mechanical biological treatment
- Channeling organic feedstock to other uses
  - Feed-in tariffs for renewable energy
  - Promotion of incinerators and alternative technologies

Incentivizing policies
- Financial incentives
  - Composting subsidies
  - In-kind support (ie. land, labor)
- Market creation
  - Co-marketing with other products
On-the-ground studies highlight a variety of feasible composting models in 7 countries and 1 region:

- **Europe**: Mandated biodegradable waste recycling targets
- **Austria**: Decentralized composting with local agricultural sector
- **Brazil**: Organic farm cooperatives processing agricultural feedstock
- **Ghana**: Compost fortified and pelleted to increase marketability
- **India**: State and private composting subsidized by national govt.
- **Uganda**: Market studies performed to understand barriers to purchasing
- **Sri Lanka**: State composting operation funded by national grant
- **Bangladesh**: Private joint venture registered with Clean Development Mechanism
Thank you

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Financing Landfill Gas Systems in Developing Contexts

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Financing Landfill Gas (LFG) Systems in Developing Contexts

Background

• Methane (CH$_4$) output increasing with economic development

• Widely recognized that LFG collection and combustion can be beneficial

• High organic content of waste in developing countries and energy demand

• However, project development can be technically complex

• Downturn in global carbon markets impacting LFG project pipeline

• Successfully funding or financing LFG systems can be challenging and options are highly context-specific

<table>
<thead>
<tr>
<th>Change in Methane Emissions by Country Income Group (1990-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>World</td>
</tr>
<tr>
<td>Low Income Countries (LICs)</td>
</tr>
<tr>
<td>Middle Income Countries (MICs)</td>
</tr>
<tr>
<td>High Income Countries (HICs)</td>
</tr>
</tbody>
</table>

Source: World Bank World Development Indicators (2014)
Customized financial arrangements

Sources of funding and finance

- **No standard financial architecture** but familiar building blocks
  - Most rely on a combination of sources

- **Public funds/financing** often considered least expensive source
  - Own-source revenue, municipal bonds, inter-gov transfers, public financial intermediaries
  - Some onerous public procurement rules, lack of in-house expertise

- **Private investment** often higher cost, may bring expertise/efficiency
  - Commercial loans, equity investments, public-private partnerships

- **Sales of environmental attributes & energy sales** often bolster or back-stop overall financial package
  - Carbon finance, sales of renewable energy credits, gas/electricity/heat sales

Project goals determine appropriate sources of finance — e.g., some investors concerned with regulatory compliance, GHG mitigation above financial return.
### Key considerations for investors

#### Landfill- or location-specific factors

**Technical feasibility:** Quantity of gas available and accessible over time

**Financial feasibility:** Likelihood of signing long-term off-take agreement with utility or other buyer

- Initial studies can be conducted by non-subject matter experts.
- **Comprehensive project valuations** typically require experts and include:
  - Annual/lifetime capital and O&M costs
  - Internal Rate of Return (IRR)
  - NPV of annual/project lifetime cash flow
  - Simple payback period
  - Debt coverage ratio

#### Other major considerations:

- Historical and existing waste management practices on-site
- Availability of materials and skilled labor
- Required site preparation (capping? new leachate control system?)
- Interconnection costs
- Political, legal, regulatory environment (i.e. cost of compliance and/or cost of risk mitigation)

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**Basic principals of infrastructure finance – e.g. importance of clear & consistently applied law, stable political environment – remain key**
## Incentive Schemes and Risk Mitigation

### Incentives

Public sector financial and policy interventions are often essential to:

- **supporting LFG projects** at the margins of profitability
- leveraging **outside finance**

Key support mechanisms include:

- **Renewable energy premium pricing including feed-in-tariffs**
- **Power purchase guarantees**
- Priority access to the electrical grid and assistance with interconnection
- Direct tax benefits
- Fast-tracked permitting processes
- Credit guarantees
- Concessional loan programs

### Risk Mitigation

Key to gaining **investor confidence, keeping cost of financing down, avoiding cost over-runs**.

Most basic risk mitigation techniques are:

- Obtaining accurate gas availability estimates
- Obtaining off-take agreements
- Conservative estimates gas availability
- Warranties/performance guarantees
- Output-based payment schedule to incentivize on-time project delivery
- Political risk guarantees/insurance to hedge against policy/regulatory changes
- Fixed-price or turnkey contracts that shift some risk to contractors
- Delay guarantees (delay penalty) and/or incentives for faster delivery of project components
Case Example

Getlini Landfill – Riga, Latvia

BASICS
• Largest landfill in Latvia (est 1972) at 87 hectares
• Former dumpsite, 250k tons/year waste at project initiation, now 300-400k/year
• Now 6 Jenbacher gas engines (power 1.05 MW; heat 1.23 MW per machine)

PROJECT’S INITIATION
• 1990s - applying for accession to the EU + EU landfill directive
• New government-created corporation to manage landfill, co-owned by local city council (80%), nearby city council and Ministry of Environment (20%)

INVESTMENT
• $25.21 million total ($5 million earmarked for debt service)
• World Bank Loan ($7.95m); GEF grant ($5.12m); SIDA grant ($1.5m); Riga City Council ($6m); Getlini EKO ($4.64m)

USES FOR LANDFILL GAS
• 2-year PPA with electric utility for premium price, renegotiated and later national law
• Heat off-set costs for on-site buildings
• 2011 developed greenhouse nearby, excess heat used to 165 tons+ of tomatoes/year
Thank you

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