



WORLD BANK GROUP
Social, Urban, Rural & Resilience

Sustainable financing and policy models for composting projects

Prepared for CCAC Municipal Solid Waste Initiative LAC Regional Workshop

April 1st 2016

Silpa Kaza

Urban Development Specialist, World Bank

Topics for today's presentation

Number	Topic
1	World Bank's work
2	Background and approach for composting report
3	Market conditions
4	Key financing mechanisms
5	Enabling policies and guidelines
6	National and regional case studies

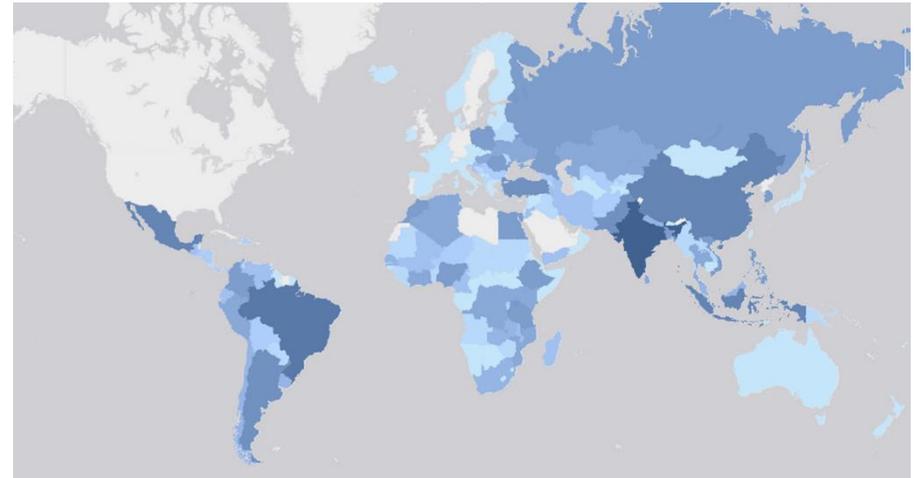
1 World Bank's work

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

2 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**

3 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

4 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 influences 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**

5 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

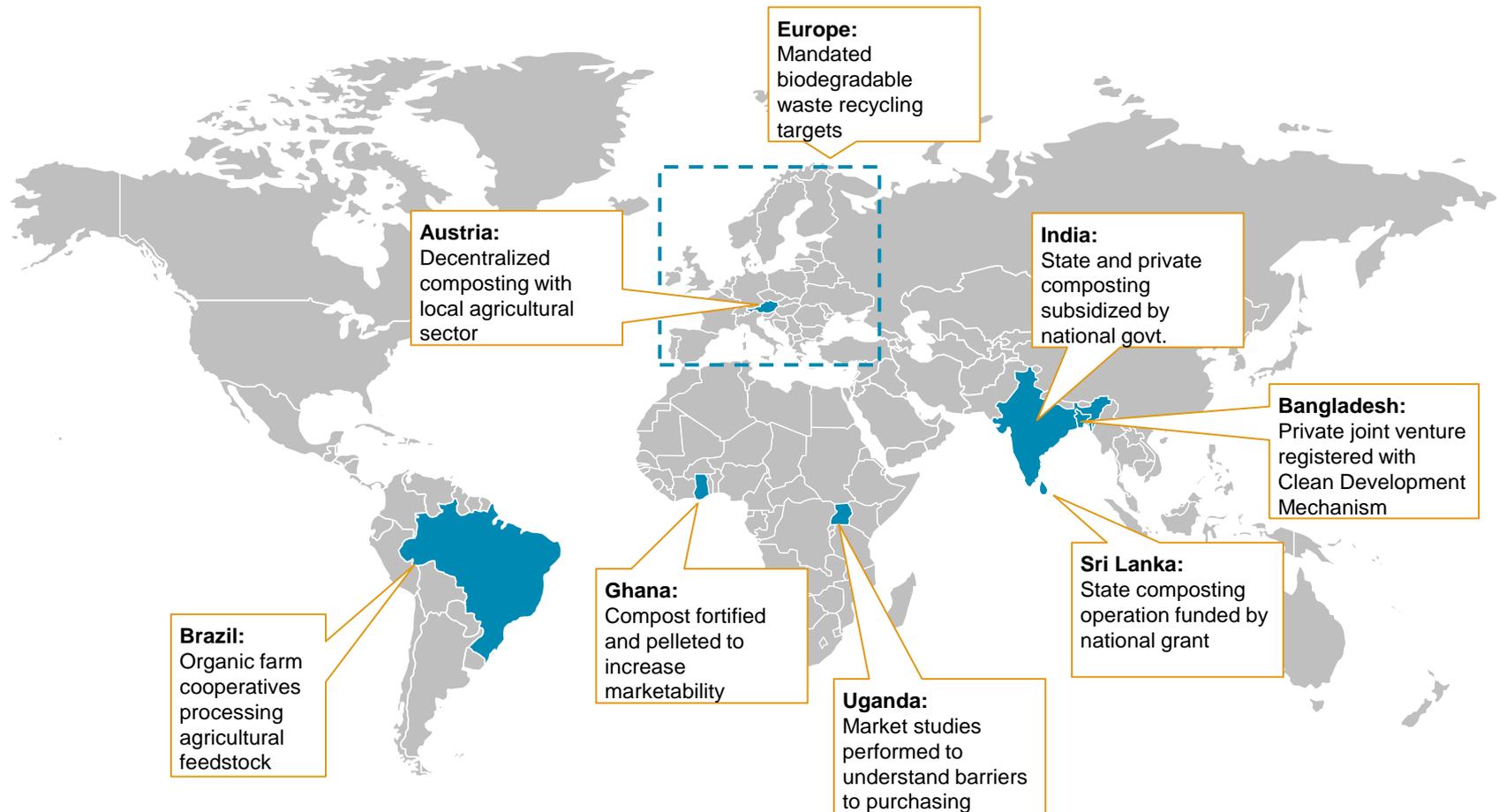
Competing policies

- **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

6 On-the-ground studies highlight a variety of feasible composting models in 7 countries and 1 region





WORLD BANK GROUP
Social, Urban, Rural & Resilience

Thank you

Silpa Kaza
skaza@worldbank.org



WORLD BANK GROUP
Social, Urban, Rural & Resilience

Financing Landfill Gas Systems in Developing Contexts

Prepared for CCAC Municipal Solid Waste Initiative LAC Regional Workshop

1 April 2016

Claire Markgraf

Low Carbon Cities Specialist, World Bank

Financing Landfill Gas (LFG) Systems in Developing Contexts

Background

- Methane (CH₄) 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**

Change in Methane Emissions by Country Income Group (1990-2010)		
	Total thousand MtCO ₂ e (2010)	Percent Change (1990-2010)
World	7,515,150	+16.9
Low Income Countries (LICs)	494,111	+8.4 ←
Middle Income Countries (MICs)	4,901,207	+35.8 ←
High Income Countries (HICs)	2,119,832	-10.2

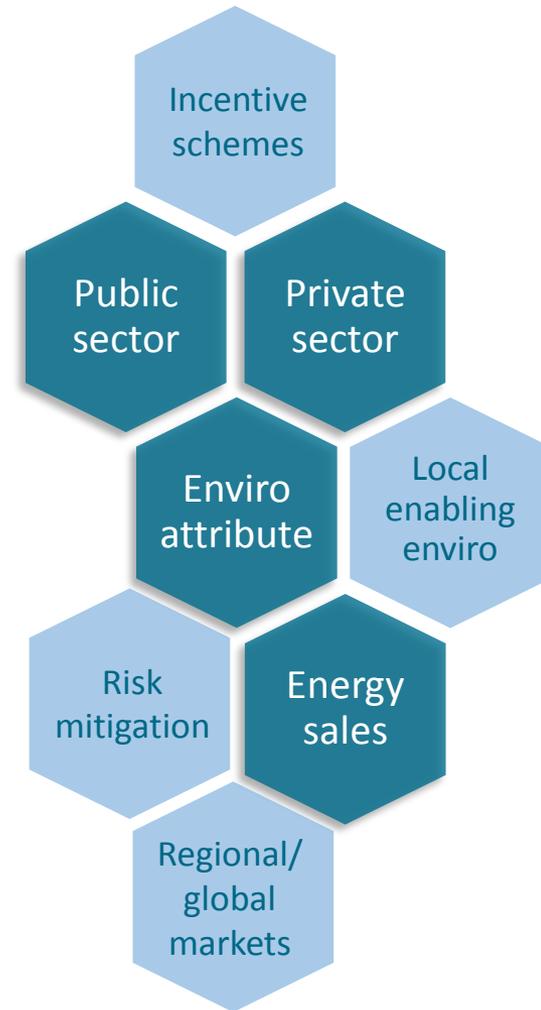
Source: World Bank World Development Indicators (2014)

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.



3 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)

Basic principals of infrastructure finance – e.g. importance of clear & consistently applied law, stable political environment – remain key

4 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

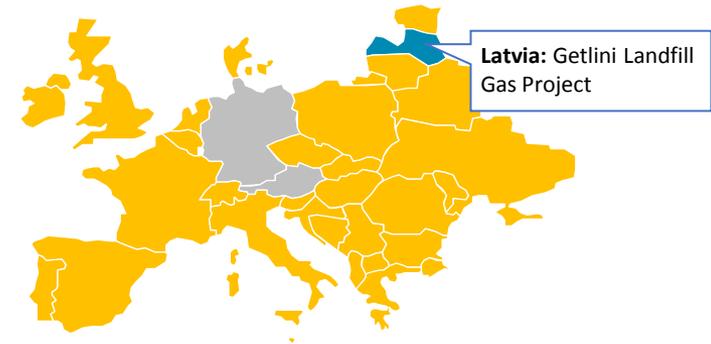
Risk Mitigation

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

5 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



WORLD BANK GROUP
Social, Urban, Rural & Resilience

Thank you

Claire Markgraf
cmarkgraf@worldbank.org