Financing Solid Waste Management - Prospects and Challenges

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Presentation in brief

- Briefly about CDIA
- Urban challenges
- Solid waste management and climate change
- Planning and financing urban infrastructure projects
- Informal economy
- Integrated planning
The CDIA partnership established in 2007 is jointly managed by ADB and GIZ and financially supported by ADB, BMZ, Sida, Government of Austria and the Shanghai Municipal Government.

**Mandate:** To assist medium sized Asian cities to bridge the gap between development plans and financing of their urban infrastructure investments, with emphasis on:

- Urban environmental improvement
- Urban poverty reduction
- Climate change mitigation or adaptation
- Improved governance
CDIA Focus Areas

Infrastructure Investment Project Cycle

City Development Plan/Strategy

Up-stream

Infrastructure Investment Programming

Pre-Feasibility Studies/Project structuring

CDIA Focus Areas

Down-stream

Feasibility Study

Financing Arrangements

Project Implementation

Operation & Maintenance

Infrastructure Investment Project Cycle

Urban Transport 32%

Urban Renewal 19%

Wastewater 14%

Flood & Drainage 13%

Solid Waste 12%

Water Supply 8%

Slum Upgrading 4%

Energy Efficiency 2%
Urbanization, land use and solid waste
In 2030, 1 billion additional people in Asia need infrastructure and basic services.

Developing Asia’s share of CO₂ emissions for energy consumption increases from 30% in 2006 to 43% by 2030.

Cities provide 80% of the economic base, but generate 75% of the GHG emissions.

Estimated urban environmental infrastructure investment need in the Asia-Pacific region is $100 billion per year.
Urban challenges – how to prioritize?

- Flooding
- Waste
- Pollution
- Traffic
- Congestion
- Transport
- Slums
- Overcrowding
SWM and climate change

Annual Greenhouse Gas Emissions by Sector

- Industrial processes: 16.8%
- Power stations: 21.3%
- Transportation fuels: 14.0%
- Waste disposal and treatment: 3.4%
- Agricultural byproducts: 12.5%
- Land use and biomass burning: 10.0%
- Fossil fuel retrieval, processing, and distribution: 11.3%
- Residential, commercial, and other sources: 10.3%

Carbon Dioxide (72% of total)
- 20.6%
- 19.2%
- 12.9%

Methane (18% of total)
- 40.0%
- 29.6%
- 18.1%

Nitrous Oxide (9% of total)
- 62.0%
- 26.0%
- 1.1%
SWM and climate change

Example: Sweden

SUMMARY 1998-2008

- Hazardous waste
- Landfilling
- Biological treatment
- Material recovery
- Incineration with energy recovery
SWM and climate change

‘Don’t tell me where your priorities are. Show where you spend your money and I’ll tell you where they are.’

Example: Sweden (2008)
Source: Sweco
Investing in CCM and SWM

Landfill gas production during several decades!

Some financial challenges:  
- Reasonable expectations of landfill gas yield  
- Maintenance of landfill gas extraction system  
- Long term arrangements for disposal and energy distribution

Source: Sweco
Investing in CCM and SWM

Biogas for heat, power or renewable vehicle fuel
Appropriate technology?
Investing in SWM and CCM
Investing in SWM and CCM

Economic Impacts of Carbon Finance on Adjara Project

- Project with electricity and CERs incomes (PS3): 10.56%
- Project with CERs income, enclosed flaring system (PS2): 9.52%
- Project with CERs income, open flaring system (PS1): 8.48%
- Project with electricity income and no CERs income (BS2): 8.51%
- Project without electricity and CERs incomes (BS1): 7.53%

Source.: SWECO, Sweden 2007
Planning urban infrastructure projects

The project should be

- set within broader planning, development framework of city /region
- **technically feasible** – due diligence
- **financially viable** - cost recovery, FIRR, willingness to pay, charging capacity
- **economically sustainable** - acceptable economic rate of return i.e., social costs and benefits
- **environmentally sustainable**
- backed by **sound, transparent institutional and governance arrangements** – for efficient planning, financing, regulation of design, construction, operation of project
Planning urban infrastructure projects

• Identification of problems and how they relate
• Master planning, GIS tools
• Suggested projects, combination of
  - technical solutions
  - financial instruments
  - regulatory framework and enforcement
  - capacity building
  - institutional reform
• Enhancing project formulation, ‘integrated, inclusive and sustainable project’ i.e., taking account of the technical, financial, economic, social and environmental issues
• Supported by appropriate, efficient, accountable institutional and governance structures
Planning urban infrastructure projects

GIS in project design and communication

Transport mode distribution per area

- Private vehicle
- Public transport
- Walking

Source: Sweco
Planning urban infrastructure projects

**GRAPH 1: CAPITAL INVESTMENT REQUIRED VERSUS EXPENDITURE LIMIT**

- Total Capital Investment (own source)
- Existing Expenditures
- Expenditure Ceiling

**GRAPH 2: LOANS REQUIRED VERSUS DEBT SERVICE CAPACITY**

- New Loans: Annual Debt Service
- Existing Annual Debt Service
- Estimated Max Debt Service
1) Maximize conventional finance
   • User charges, at full cost incl. overhead
   • Tax collection
   • In kind contributions

2) Explore how to leverage the community and the private sector

3) Seek special national/ international financing
   • Micro-finance
   • Global Partnership for Out-put Based Aid (GPOBA)
   • Funds from ADB or other development banks
   • Development agencies (GIZ, DIFID, JICA..)
   • Climate funds (ACCCRN, Rockefeller)
Financing partners

Citynet

Networking & capacity development

Commitment and governance

Incentive finance credit enhancement

Leveraging finance

Private sector finance

Multilateral Development Banks

Bilateral donors

CDIA

Project development

Project structuring

Planning & PFS

Cities Alliance etc
Some financing sources and mechanisms

1. **Private sector participation (PPP)** - via enabling mechanisms such as Special Purpose Vehicles (SPVs)

2. **Debt** - combination of municipal bonds model of North America and municipal banks model of Western Europe
   - Municipal development funds
   - Pooled financing
   - Credit enhanced/risk mitigation financing

3. **Financing through land use (control)**

4. **Multilateral Banks**
   - Long tenor, low interest loans
   - Specialized funds, usually with sector focus
Some financing sources and mechanisms

Private sector participation (PSP)

- Can bring in **capital and expertise**

- Focus on **operation**, not overall responsibility for planning, monitoring etc.

- Open, competitive bidding

- Clarity on tasks, risks and cost recovery

- **Various forms of PPP** – contracting, concession (BOO, BOT), franchising, open competition/free subscription
Some financing sources and mechanisms

**Multilateral Bank Financing**

Long tenor, low interest loans; Specialized funds to assist in capital market access

- Urban Financing Partnership Facility (UFPF), ADB
- Carbon market program, ADB
- Sector focused (e.g. Carbon Market Initiative Funds, Clean Energy Partnership Facility, CC Fund), ADB
- Public Private Infrastructure Advisory Facility (PPIAF), WB and 15 donors
- Sector focused (e.g. Global Environmental Facility, Special CC Fund, Clean Technology Fund)
The role of the poor
Constraints to funding of pro-poor SWM projects

- Lack of capacity to address the concerns of the poor
- Lack of integrated, holistic solid waste management plans
- Lack of capacity at LGU level in community project development, financing and implementation and operation
- Local governments limited financing abilities: decentralization without funding
- Difficulty for ADB etc to engage directly with cities as clients
- Too many players in a holistic SWM system
  - No structures for encouraging private service of the poor
  - No structures for community participation
- Pro-poor urban infrastructure regarded as being
  - Too small investments – to high transaction costs
  - Complex and multi-sectoral
  - High risk – small or no revenues
Example pro-poor investment

Housing and Settlement Upgrading - Indonesia

ADB loan 2072/2073-IN0: Neighborhood Upgrading/Shelter Sector Project

Water supply

Community toilets

Solid waste collection

Footpaths
Informal economy in SWM

Example from Jakarta, Indonesia (1988)

- Waste production 21,000 m$^3$ per day
- 25% recovered by ca 37,000 scavengers.
- Saves the city $270,000 - 300,000 per month.
- Ca 80 factories use recovered material (plastic, paper, glass, metal)
- Recycling rates for glass and paper are 60 - 80%.
- Waste paper collected by scavengers comprises 90% of the secondary raw material
- Delivered 378,000 tonnes of waste paper per year to paper factories save 6 million trees
- Ca $48.5 million per year are made with solid waste recycling only, compared with the $0.5 million paid in garbage collection fees.

Source: Oepen, 1993
Sustainable and affordable solutions
Some important considerations in SWM in India

- People must accept value of waste collection services
- Fee collection crucial for economical viability
- Biological waste treatment (composting, biogas) is suitable
- Source segregation is good but can be improved
- Public awareness and institutional strengthening are important factors for sustainability
- Access to accurate data basis for planning and implementation
- Landfills must be developed for safe waste disposal
- Informal and formal systems can be combined

Source: Hand in Hand and Sweco
SWM systems
Old/conventional SWM systems

Households

Dumping
Burning
Burying

Dumpsite

Scavenging

Recyclables

Junkshops

Emissions
Integrated and cost-efficient SWM system

Households

Backyard compost

Bio-Man

Compost

MRF

LGU truck

Waste Treatment Facility

Sorting area

Sanitary Landfill

Composting

Recyclables

Junkshops

Recyclable/compostable waste

Mixed waste
Community-based collection
Material Recovery Facility (MRF) in Surigao, Philippines
Biological waste treatment
Composting Plant in Surigao, Philippines

Estimated soil production ca 50 tons per year
Sanitary landfill
Waste treatment plant, Surigao, Philippines
Financing options
Waste treatment plant, Surigao, Philippines

1. Environmental infrastructure credit line to the Philippines (15 MUSD available) – Swedish International Development Cooperation Agency (Sida) through Development Bank (DBP) of the Philippines

2. Mindanao Basic Urban Services Sector Program (MBUSSP) – ADB

3. Landbank of the Philippines
Integrated solutions in sustainable cities
Integrated resource management

Production of Biogas from digested Waste and Wastewater Sludge

- Organic waste from restaurants, food shops
- Wastewater treatment
- Biogas reactor
- Digested sludge - soil improvement
- Manure from agriculture
- Treated wastewater - irrigation
- Small scale prod. of heat / power
- Biogas - vehicle fuel

Synergies between WATER & SEWAGE, WASTE and ENERGY

Source: Sweco
THANK YOU
Something to discuss

• Do you think your institution is fit for sustainable SWM?
  Institutional setup, governance and need for capacity building, political stability, long-term visions/leadership pledge

• Are you discussing the best/most appropriate technical solutions?
  • high-tech/low-tech
  • centralized/de-centralized
  • labor-intensive
  • high/low investment
  • integrated solutions

• Have you approached partners for cooperation?
  LGU, national/provincial G, private sector, NGOs, CBOs and residents

• Is the SWM cost-efficient and sustainably financed?
  Charges/taxes, cross-subsidy, informal economy, PPP, donors, financial viability