Laguna de Bay Region/Philippines
Investment Environment and Opportunities
OUTLINE OF PRESENTATION

- Context – Laguna de Bay Region and LLDA
- Environmental Challenges and Climate Change Impacts
- Laguna de Bay Spatial Development Master Plan
- Sample Menu of Proposed Projects
- Laguna de Bay Water Cube Project
  - A Business Development Case
  - Scope
  - Project Benefits and Strategic Alignment
  - Financing Options
  - Legal Compliance
  - Project Financials
- Recommendation
Laguna de Bay Region, Philippines
Introduction to Laguna de Bay

- Largest lake in the Philippines, one of the largest in Southeast Asia

- 24 sub-watersheds including 24 major river systems traversing 66 LGUs in 5 provinces including Metro Manila, of which 28 immediately surround the lake

- Multiple uses with greatest potentials as source of domestic water supply

- Only one outlet – Napindan Channel, discharging to Manila Bay via Pasig River

The Laguna Lake Development Authority (LLDA) was created through Congressional act in 1966 for the sustainable management and protection of the Lake with re
Multiple Use Resource

- Drinking Water
- Fisheries
- Transport Route
- Flood Waters Reservoir
- Hydro-electric Power Generation
- Irrigation & Other Agricultural Uses
- Eco-tourism and Recreation
- Industrial Cooling
Pollution of Laguna de Bay

Estimated BOD Load for Laguna de Bay
Year 2005 Data

Domestic 58,276 MT 77%
Forest 654 MT 1%
Agriculture 8,516 MT 11%
Industry 8,555 MT 11%

Total BOD Load for 2005 = 71,107 MT
Total BOD Load for 2006 = 76,002 MT

Average BOD Load (2005-06) = 73,554 MT
About 20-30% of households are not serviced by Water districts, or Rural Waterworks Associations
Informal Settlements

- 10,440 households in the West Bay Area
- 4,800 households in Brgy Sinalhan, Sta Rosa, Laguna
- 6,800 households in Brgy Malabon, Binan, Laguna
Areas affected by Ondoy / Ketsana

104 people in Laguna Bay region died, flood water reached 20 feet in some areas. 900 barangays in NCR and 24 sites in Laguna Lakeshore were affected. Overall The damage to property was estimated to be P6 billion, including P4.1 billion in damage to infrastructure, P1.9 billion in damage to schools, and P882.525 million in damage to agriculture.
Images of Ondoy/Ketsana
Deforestation / Denudation of Upstream Areas

The most denuded upland areas are Marikina Watershed, Tanay Watershed, and Sta Rosa Watershed.

Studies record at least 3.8 m of silt on the Laguna de Bay lakeside.

Shallowing of the lake limiting its waterholding capacity.
Bathymmetry - varying depths of lake
Key Features of LLDA’s New Masterplan

- Adoption of Sustainable Development principles
  - balance between ecology and economic;
  - Harmonizes various strategies directed towards protection, preservation, conservation, utilization, and restoration

- Thrusts on poverty alleviation, job creation, health and education, justice, good governace, “environmental protection”, and “biodiversity conservation”

- Multi-stakeholder approach – participatory, public-private partnership, conducive to conflict mgmt

- Market-oriented instruments and mechanisms to shape or to influence behavior of private firms and private households, and PPP approach
Strategies:

Coastal ecosystem zone

URBAN ecosystem zone

UPLAND Ecosystem Zone

Social mobilization

Land uses and land use management

Integrated and interactive governance

Capacity building and Institutional support
Proposed Projects

- Around 50 proposed projects, 19 priority projects including big ticket environmental and water-related infrastructure development projects
- Indicative total amount of P300B ($7.143B), around P70B ($1.7B) for priority projects
- Funding possibilities
  - Public-Private Partnership
  - 100% private initiative with public incentives
  - Loans and grants
  - Market-based Instruments – User fees etc.
Watershed Rehabilitation

Lumban Delta

Circa 1970s
Fortification and Stabilization of River Embankments using Gabions and Ripraps
Sabo Dam

-Cascade Micro Dam

**Fig 3. Typical Section of Micro-Mini Impounding Dam**

**Fig 3. Typical Section of Improvised Sabo Dam**
Sewage Treatment Plants

Construction of model STPs in two sub-watersheds

20% reduction in domestic pollution in each sub-watershed

 Courtesy of Manila Water Company Inc.
DEVELOPING NATURAL WASTEWATER TREATMENT SYSTEMS AROUND LAGUNA LAKE
Shoreland

• Re-engineer settlements to be disaster-resilient and climate-change adaptive: with solar panels and rainwater harvesting

• Informal settlements have to be transformed into safe, livable, sociable, health-friendly communities

• Focus on Safer Locations for Settlements

• Concept of “Eco-villages” as closed loop production communities
Flood Control and Lake Rehab

- Dredging of river mouths and tributaries has to be integrated and synchronized with dredging of Pasig River and its outlet to Manila Bay
- Construction of Marikina Dam
Regional Sanitary Landfill Systems

Kalayaan Sanitary Landfill, Laguna
Hydro-electric, Solar & Wind Power

Caliraya-Botocan-Kalayaan Hydro-electric Power Plant
Laguna Province
Ferry boat system can enhance tourism and speed up flow of goods and people, but has to be harmonized with fishpen aquaculture.
• Ecotourism as “no-alteration-type” of tourism is only one form, with limited economic opportunities from a “cult following” or very discriminating clientele.
• Other forms of tourism are pre-packaged “coach tours”
Fisherman’s Wharf

- Pakil
- Pangil
- Those with Relative clean lakeshore
The Laguna de Bay Water$^3$ Project

(Water Supply and Waste Water Treatment for Un-served Areas in the Laguna de Bay Region)
Project Summary

Intended to be a PPP project for a Water Supply Concession with a Waste Water Treatment programme for unserved areas mainly in the province of Laguna.

To address the growing water deficit through evaluation of the viability and profitability of creating a water treatment facility in Calauan, Laguna with a capacity of producing 200 MLD.

To create a more comprehensive water protection strategy for the Laguna de Bay through the construction and operation of Waste Water Treatment facilities.
Project Scope

Project Components:

a. Water Supply Facility

The project proposes to provide tap water to serve the water requirements around Laguna Lake that do not have water districts, and/or those areas that are not yet fully served by their own WDs.

**Target:** 36 municipalities

**Population:** 1.05 M

**Projected Water Production:** 210,406,215L per day (based on 200L per day capita water demand)

**Capacity of the WTP:** 200,000 m³ per day or 200 MLD

**Location:** LLDA Complex, Brgy. Bangyas, Calauan, Laguna

**Total Area:** 5.0 hectares
Financing Options

Through Public-Private Partnership (PPP)

As part of the re-engineering effort, LLDA intends to pursue infrastructure development projects through the PPP approach through either the following tracks:

**Track 1:** Establish an initially wholly owned subsidiary, Laguna de Bay Development Corporation (LBDC), as a vehicle to carry on infrastructure project development and market these projects to the private sector or other investors. As an entry point, LLDA plans to pilot test the viability of LBDC by prototyping one water supply and sewerage and sanitation project development. If the results show success, LLDA will seek the approval for establishing LBDC on a permanent basis. LBDC when formed will enable the Authority to fulfill one of the most important covenants of its Charter (R.A. 4850 as amended).

**Track 2:** Proceed directly to joint-venture arrangement with interested and capable private sector investor in water supply and sanitation project under the PPP modality.
Financing Options

Alternative Modalities

a. Bond financing
b. Credit enhancement
c. Co-financing through joint venture and partnership with private sector and/or other government corporations and LGUs
## Financials

### Financial Summary

Investment cost is estimated to amount to **Php6.582B ($167M)** excluding the cost of land with an estimated equivalent of Php25M and cost of raw water abstraction to Php1/cubic meter/day

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (Php)</th>
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<tbody>
<tr>
<td><strong>I. WATER SUPPLY</strong></td>
<td></td>
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<tr>
<td>Raw water storage</td>
<td>147,645,000.00</td>
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<tr>
<td>Intake works</td>
<td>32,197,500.00</td>
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<tr>
<td>Raw water pipeline</td>
<td>576,225,000.00</td>
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<td>Clear water pipeline</td>
<td>4,105,125,000.00</td>
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<td><strong>Sub-total</strong></td>
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<td><strong>II. WASTEWATER TREATMENT FACILITY</strong></td>
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<td>WWTF</td>
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<td>Sewer Pipeline</td>
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<tr>
<td>Pump Station</td>
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<td>Hauling Truck</td>
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<td><strong>Sub-total</strong></td>
<td>1,125,172,413.79</td>
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<td><strong>TOTAL INVESTMENT COST</strong></td>
<td>6,582,839,913.79 ($167M)</td>
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</tbody>
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1. Based on 2001 SDLBE Study
2. Php13M/MLD for 80MLD
3. Php3.3M/2.9km for 23 kms
4. Php1.5M/unit for 6 units
5. Php5M/truck for 10 trucks
# Sensitivity Analysis

<table>
<thead>
<tr>
<th>Financial Indicator</th>
<th>Decrease revenue by 10%, cost is constant</th>
<th>Increase cost by 10%, revenue is constant</th>
<th>Decrease revenue by 20%, cost is constant</th>
<th>Increase cost by 20%, revenue is constant</th>
<th>Increase cost by 20%, decrease revenue by 20%</th>
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<tbody>
<tr>
<td>NPV (@10%), Php</td>
<td>1,449,290,051.99</td>
<td>2,306,693,800.22</td>
<td>308,942,543.29</td>
<td>2,023,750,039.75</td>
<td>(256,944,977.63)</td>
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<td>FIRR</td>
<td>13%</td>
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<td>ROI</td>
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Thank you!