

Conference on Decentralised Wastewater Management in Asia

Meeting urban sanitation challenges at scale

Financing Session



International
Water Association

Wednesday 21st November : 1330 - 1500

Improving financial analysis in sanitation planning: lessons from Dhaka

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Population Estimate	Land Area: Square Miles	Density	Land Area: Km2	Density
15,414,000	134	115,000	347	44,400



Existing sanitation situation in Dhaka

Sewerage

< 20% of population connected to sewerage (although expected to increase with the implementation of large World Bank funded scheme)

Majority of the population

Approx. 50% use either pour flush or WC connected to pit/septic tank or direct discharge into open drain or waterbody

Sanitation in slums

> 30% of the population in slums (4 million people) use pits, hanging latrines or practice 'open' defecation



Outcome 4: Strengthened capacity of DCC and DWASA to effectively service the urban poor

4.1 Support DCC in developing a comprehensive sanitation plan for Mirpur zone with a population of 500,000 - large enough to represent a city wide plan.

4.1.1 Set out an integrated sanitation strategy for a representative area of Mirpur to include:

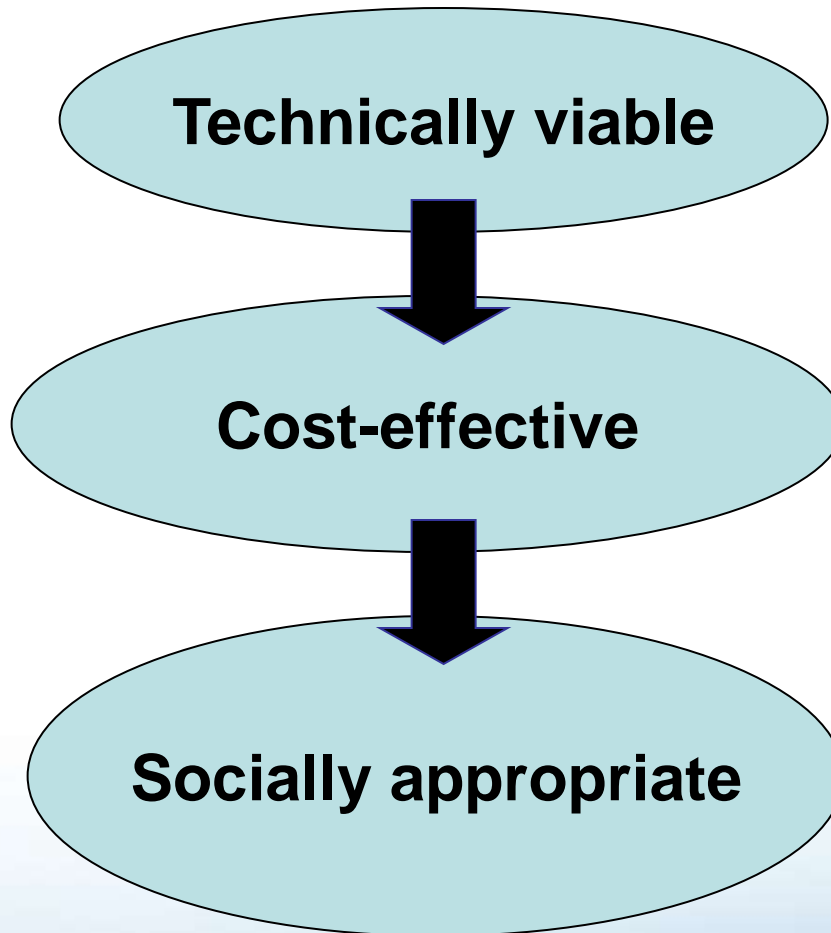
- faecal sludge management system
- revenues, costs, net subsidy (if any) required to maintain the system



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Process of technology selection



Consideration of physical parameters

Consideration of investment and operational costs

Consideration of factors relating to affordability and acceptability



Type of Sanitation System

On-site sanitation
(household or
communal)

Decentralised
sewerage

Centralised
sewerage

Desludging

Small-scale
wastewater treatment

Large-scale
wastewater treatment

Cost data

CAPEX

OPEX

CapManEX

**Financial analysis
& life cycle
assessment**

**Scenario
analysis**

**CAPEX / OPEX
total and per
household**

**NET PRESENT
VALUE**

**INFORMATION FOR TARIFF
SETTING AND SUBSIDY**





Financial modelling – expenditure categories

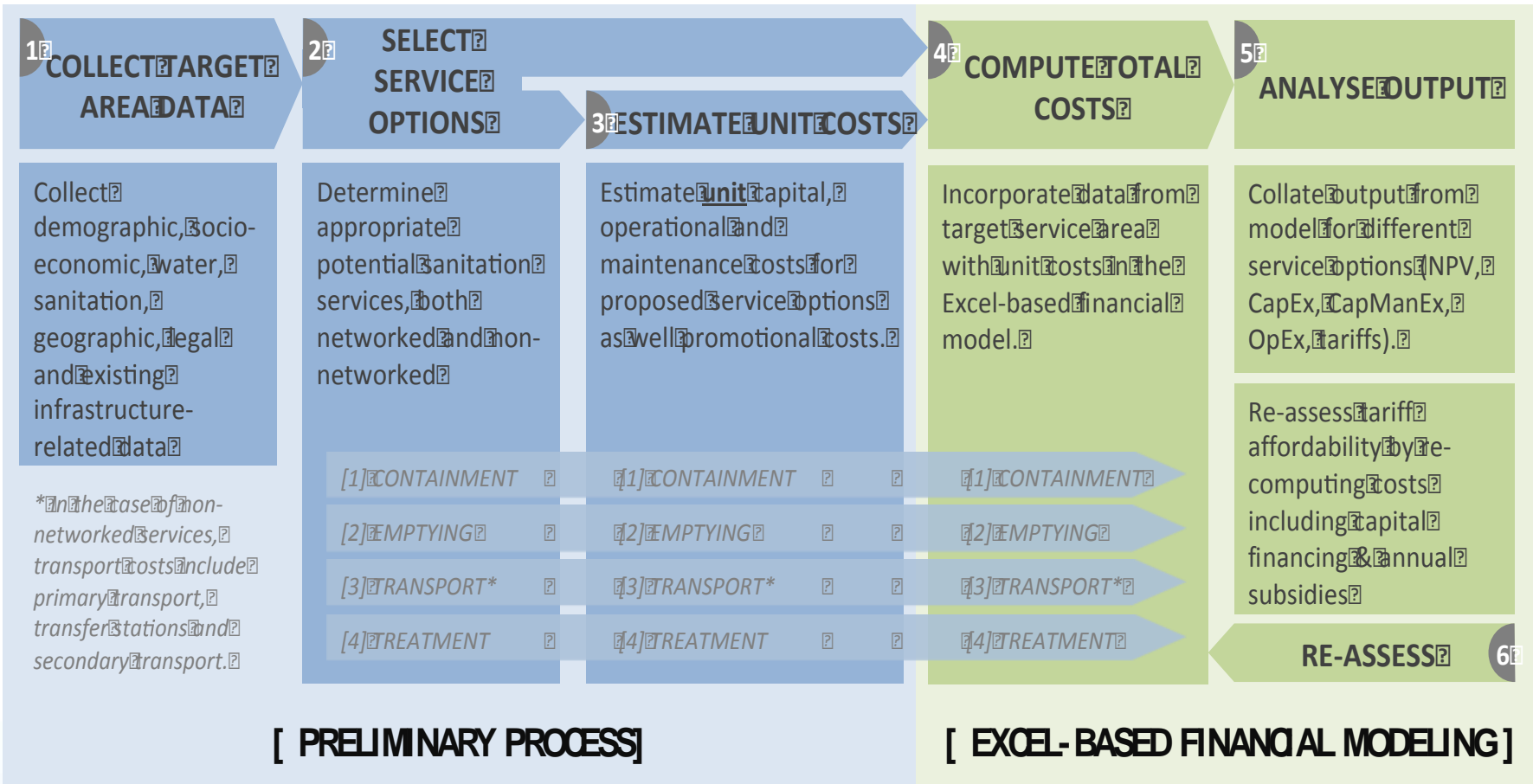
- * **Capital expenditure** (CAPEX) is the money required at the beginning of a project to finance or purchase materials, land, labor and any other costs related to construction and project implementation.
- * **Operational and maintenance expenditure** (OPEX) is the money that is required to sustain a facility or activity (including labor, fuel, and all other operation and maintenance costs).
- * **Capital maintenance expenditure** (CapManEx) investment requirements to for infrequent but larger scale rehabilitation of assets

Note :

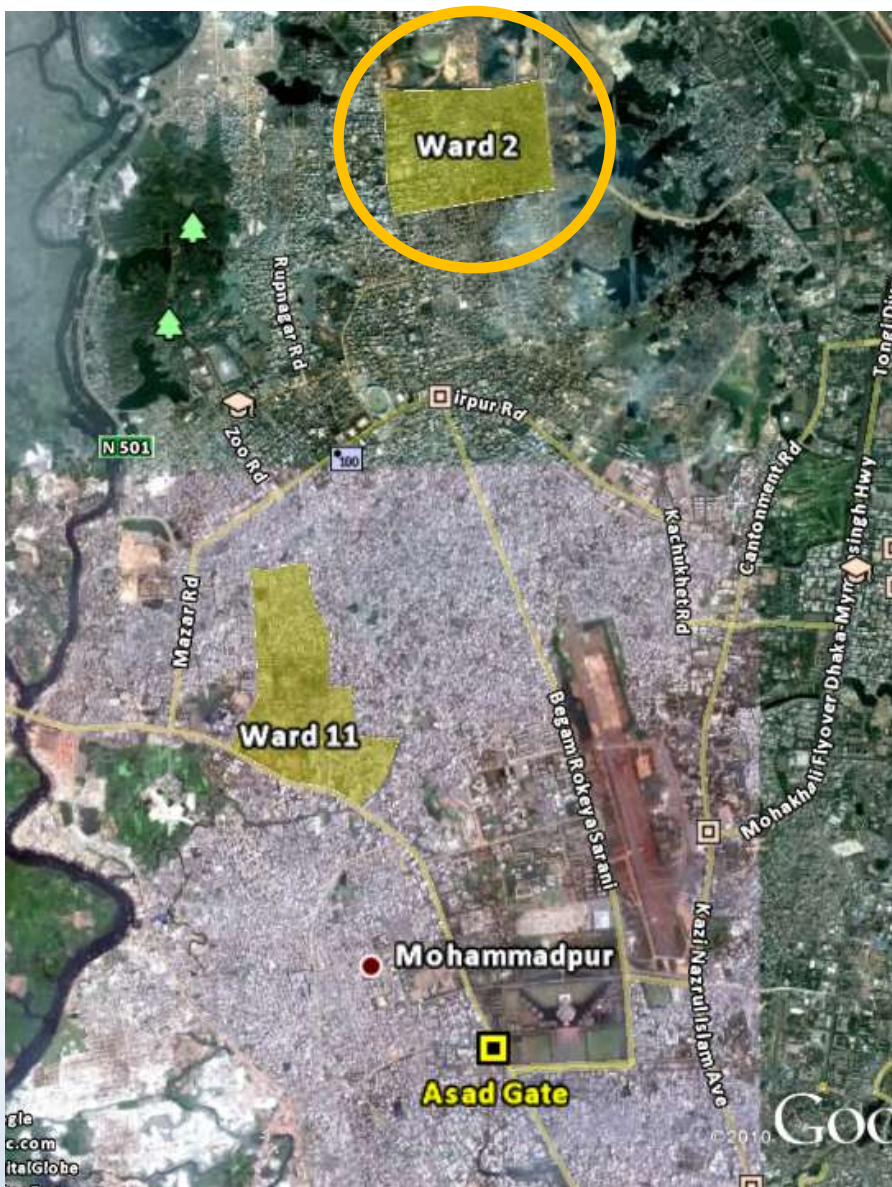
- 1) Costs for toilet facilities not included in the analysis.
- 2) “Software” costs also not included



Summary of Financial Planning Process



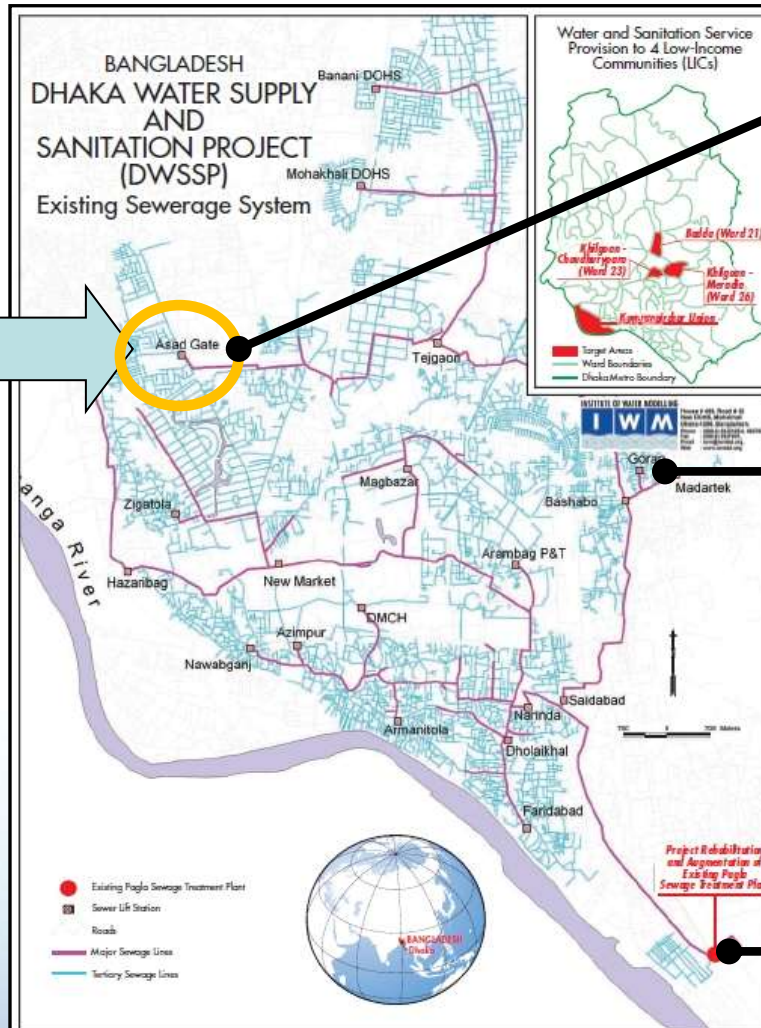
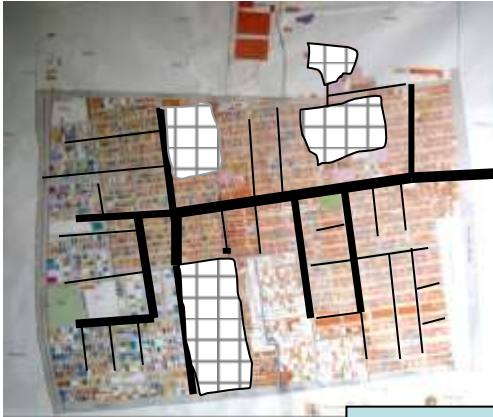
Ward 2 - Mirpur



- Area is generally well planned and divided into blocks with reasonable access.
- Area is generally flat and low-lying
- Majority of the buildings are one-storey buildings (approx. 20% multi-storey)
- Majority of the population are poor or either extremely poor
- All households connected to DWASA water supply system
- Pour-flush toilets the main type of toilet facility.
- In slum area, pit latrines shared by multiple families and prone to flooding
- One refugee camp for populations of Pakistani origin with communal toilet



Technology options - centralized system



**Asad gate
Pumping station**

**Dasherbandi
WWTW**

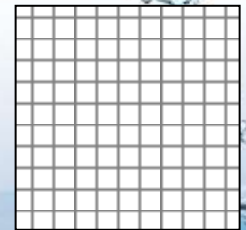
**Pagla
WWTW**



Technology options - decentralized system



On-site sanitation
with desludging



Small-bore
sewerage

Scenarios - Service options selected for Ward 2

Option A
Conventional
Sewerage
& WSPs

Option B
Series of
Simplified &
Conventional
Sewerage &
WSPs

Option C
Simplified
Sewerage,
ABRs &
Drying Beds

Option D
ABRs,
Vacuum
Tankers &
Drying Beds



For LIC –
proposed
solution :

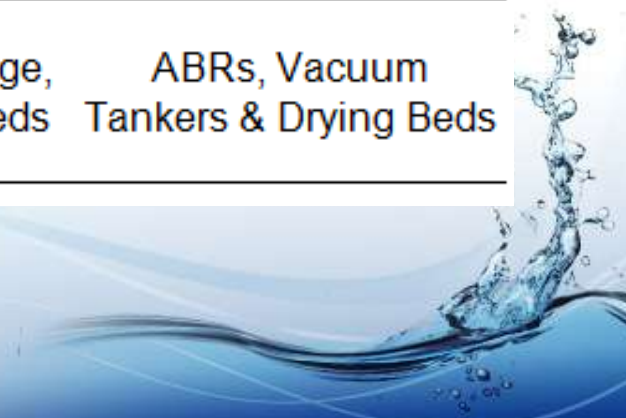
Communal
latrine with large
septic tank with
desluding with
Vacutug.



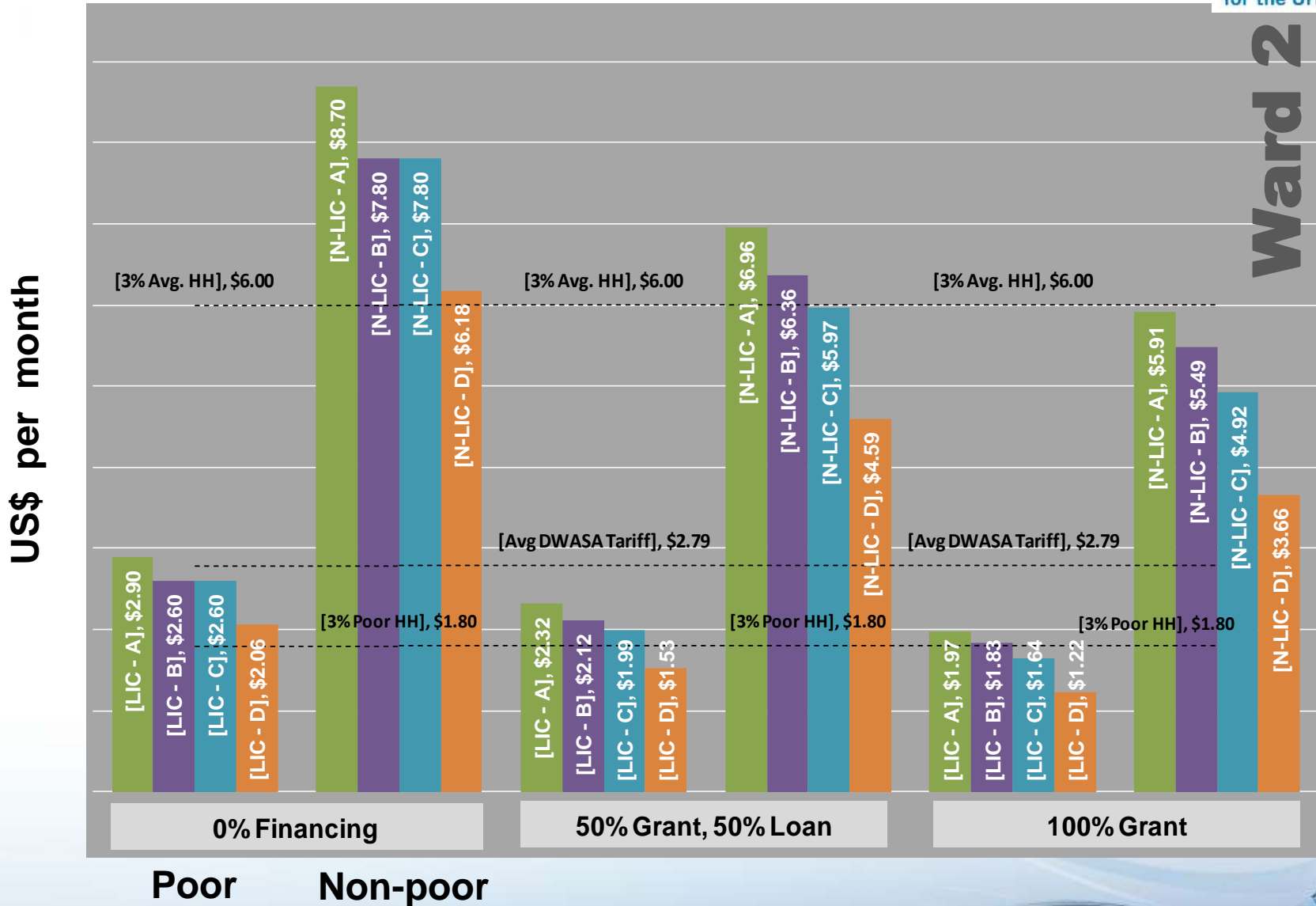
Results of financial analysis

Option	Expenditure (Millions US\$)					Service Fees (US\$/month)	
	Total (Y0 - Y30)	CapEx (Y0)	CapEx (Y0 - Y30)	CapManEx (Y0 - Y30)	OpEx (Y0 - Y30)	LIC	Non-LIC
A	278	20	51	51	176	2.90	8.70
B	255	16	34	41	180	2.60	7.80
C	266	20	88	56	111	2.60	7.80
D	190	18	87	44	58	2.06	6.18

Option A	Option B	Option C	Option D
Conventional Sewerage & WSPs	Series of Simplified & Conventional Sewerage & WSPs	Simplified Sewerage, ABRs & Drying Beds	ABRs, Vacuum Tankers & Drying Beds



Affordability of sanitation options with various levels of subsidy



All options need subsidy to be affordable

- 1) **Financial life cycle analysis enables a comparison of different technical options in terms of :**
 - **initial capital investment**
 - **longer term financial requirements (operational, capital maintenance and replacement costs)**

- 2) **Financial modelling of different financing scenarios enables an assessment of :**
 - **financing requirements**
 - **service charges**

- 3) **Main limitation is availability of unit cost data for model input**



Acknowledgements



Australian Government

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Dhaka Water Supply and Sewerage Authority

Dhaka South City Corporation

