CVC for Wastewater Treatment Plant

Full Description

Worked Example 1: Wastewater Treatment Plant

With growing populations and rapid urbanisation, an estimated 380 billion cubic meters of wastewater is generated annually worldwide and it is a growing concern for developing economies.[1] Wastewater generation is expected to increase by 24% by 2030 and 51% by 2050.[1] The need for improved sanitation and increased wastewater treatment coverage is vital. Despite growing demand for wastewater services, investment in wastewater has been lacking due to operational and financial constraints with low wastewater tariffs.

In some developing countries, the construction of wastewater treatment plants (WWTPs) usually relies on overseas development assistance while cashflows from the projects exert a significant burden on local governments, as such facilities usually generate low tariffs. Local governments are likely to be interested in mobilizing private investment in the wastewater sector to achieve wider coverage and expansion, to meet their respective UN SDG goals. Local governments can consider various financial mechanisms to improve the attractiveness of the project.

This Worked Example looks at a hypothetical case in wastewater treatment facility in a developing country.

Project scope: A local government is planning to develop a centralized WWTP in the capital city as a PPP. The local government will procure the private party through a bidding process. Wastewater from households in the coverage area will be treated in the WWTP with the treated water being discarded in the surrounding environment such as rivers and streams. Some wastewater will be sold as reclaimed water to industrial users.

Identifying CVC opportunities in WWTP:

Core services: The project will provide wastewater treatment services to the public.

Commercial potential and demand: The project is located in the southern area of the capital city with high economic growth and rapidly increasing wastewater. Industrial users in the area face water supply shortages which causes disruption in the manufacturing process. Hence, there is demand for reclaimed water among industrial users. Additionally, the sludge produced from wastewater treatment can be turned into compost or RDF (Refuse-Derived Fuel) for commercial purposes, as well as capturing methane for energy production and carbon credit generation.

Beneficiary and stakeholder needs mapping

Groups	Description	Need	CVC Opportunities	Revenue Streams
Users	Households benefiting from treated wastewater	Access to sanitation	N/A (core revenue)	Wastewater tariff

Water users (Industrial)	Affordable and reliable water supply	Sale of reclaimed water to industrial users (Instead of discarding treated water into rivers)	Revenue from water reclamation	
Stakeholders	Corporations wanting to reduce their carbon emissions	Buy carbon credits to reduce their carbon footprints	The project can reduce carbon emissions through methane capture	Revenue from selling carbon credits

Note: 1. Additional CVC revenues that can be explored for WWTP project include sale of biogas and electricity, sale of phosphorus as fertilisers and sale of biosolids as compost. 2. Besides CVC revenue, there are IRI opportunities such as betterment levies and development fees which involves collecting taxes and charges by the local government.

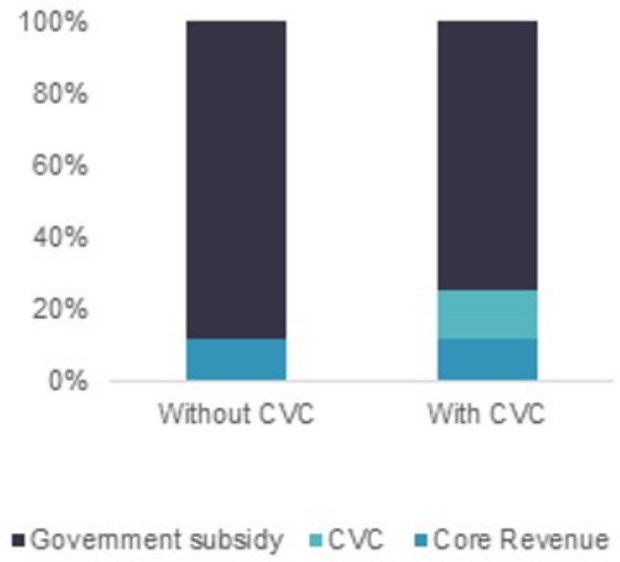
Assessing the policy, legal, institutional readiness in the country

Areas	Assessment
Policy and planning	• CVC is a still a new concept, but government is willing to consider CVC mechanism to address financial constraint of WWTP investment.
Legal Framework	• Current legal framework for PPPs is still nascent. However, government provides the flexibility to negotiate terms and conditions to make the project commercially viable.
Institutional readiness	• Project Owner has limited technical capacity to consider CVC and institutional set up for wastewater is complex which affects the policy and implementation support required for CVC.

Technical design: The identified CVC opportunities can be seamlessly integrated in the project design.

Commercial feasibility: Based on a hypothetical financial assessment, the user fee will come from a wastewater tariff paid by households. As shown in the table below, the user fee is only 12% of total revenue required to exceed the hurdle rate in the hypothetical financial assessment. This might appear quite low but it is a typical scenario given the low appetite to charge wastewater tariffs. CVC in the form of asset use optimization and leveraging climate finance will add 13% of total revenue required. The remaining 75% of required total revenue will be paid by the local government as subsidy.

Revenue Category	Revenue Item	Expense Items	Net revenue as % of total revenue[2]
A. Core Revenue			
User Fee	• Wastewater tariff	• Development cost for WWTP, interceptor sewer • O&M cost	12%
	• Connection fees	• Additional development cost for extended sewerage network • Additional O&M cost	
B. CVC			
Asset use optimization	• Revenue from water reclamation	• Additional development cost for water supply network • Additional O&M cost	3%
Leveraging climate finance	• Carbon credit	• Certification related costs	10%
C. Government subsidy			
Government subsidy	• Government subsidy	N/A	75%



Implementation: This project including CVC concept will be implemented through a PPP mechanism. Local government has the authority to procure the project though the PPP mechanism.

Risks: Price of reclaimed water needs to be competitive with piped water supply or this could create demand and revenue risk. Carbon price fluctuation can affect revenue forecast. Operational risks regarding the standard of reclaimed water and separation of pipelines for treated and piped water supply needs to be part of performance standard agreed in the contract.

Footnote 1: United Nations University, *Valuable Energy, Nutrients, and Water Lost in World's Fast-Rising Wastewater Streams*, February 2020.

Footnote 2: The Worked Examples is hypothetical project business cases and include hypothetical financial assessments with key project information.

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