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CVC in Waste Recycling

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***On this page:** A look into a hypothetical plastic recycling project in a developing country to demonstrate practical challenges and concrete opportunities of CVC. Read more below, visit the [Guidelines on Innovative Revenues for Infrastructure](#) section or check the [Content Outline](#).*

Worked Example 5: Waste Recycling

Driven by rapid urbanization and growing populations, 353 million tonnes of plastic waste generated in 2019.¹ Only 9% of the plastic waste is recycled while 50% was landfilled, 22% was disposed in the environment and 19% was incinerated.

Therefore, solid waste management is important for the protection of public health, safety and environmental quality. Even though awareness of waste management is increasing, local governments face obstacles such as affordability, scarce urban land for landfill and other challenges associated with the development and maintenance of an adequate waste collection and disposal infrastructure.

This Worked Example looks at a hypothetical plastic recycling project in a developing country which is a collaboration between the public and private sectors

Project scope: With a goal to increase waste recycling and advance a circular economy, local government, private sector, and communities joined together to develop an environmentally friendly plastic road-building project. The project will reuse plastic waste and reduce plastic waste ending up in the ocean, which is a critical environmental problem. The result of the project will be a highly resistant plastic waste road that is more durable and stronger than typical roads.

Identifying CVC opportunities in waste recycling:

Core services: The project will help reduce the amount of waste going to landfill and tipping fee to be paid by the local government.

Commercial potential and demand: There is strong demand for innovative solutions and CVC opportunities to reduce and recycle waste and find potential end use of plastic that are socially and environmentally sustainable. There is also strong demand for government to save costs and reduce public spending on solid waste management including tipping fees and landfill requirements as land near urban centre becomes increasingly costly and scarce.²

Beneficiary and stakeholder needs mapping:

Groups	Description	Need	CVC Opportunities	Saving
Users	Households benefiting from better solid waste management	Reduce pollution related to plastic waste	N/A (core revenue)	Reduced cost relating to waste management
Stakeholders	Government seeking to reduce solid waste management cost	Reduce budget on tipping fee	Increase recycle rate, sales of recycled waste, find other innovative commercial use for recyclable waste	Reduced amount of waste going to landfill resulting in reduction in budget for tipping fees
Stakeholders	Transport agency/local government which need to spend significant budget on road pavement annually	Find more cost-effective solutions to road construction	The government can reduce plastic waste by using plastic waste in paving road	Lower cost of road pavement resulting in reduced budget on road construction

Assessing the policy, legal, institutional readiness in the country

Areas	Assessment	Level
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Policy and planning

- Government sets clear and ambitious national target and roadmap to reduce waste.
- The government is open to innovative ideas with private sector collaboration to achieve the target.

Legal Framework

- The legal framework on solid waste management and plastic waste management has been introduced.
- Government provides flexibility in the legal framework to implement innovative solutions to support plastic waste management.

Institutional readiness

- The private sector has a strong role to play to introduce CVC in waste recycling as technology owner.

High opportunity:

Policy, legal and institutional framework are supportive and allow for CVC to be considered in the project.

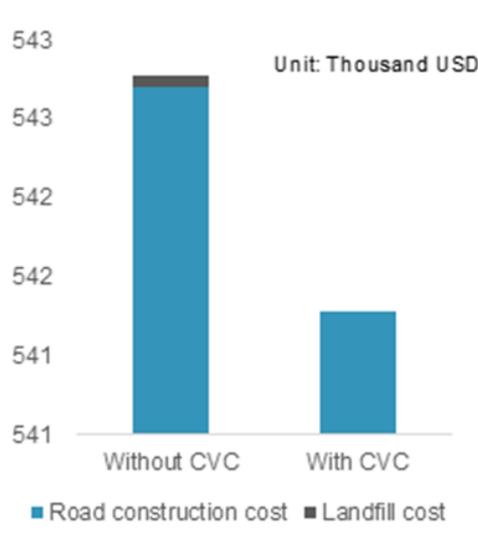
Next Step:

Identify and analyse CVC in feasibility stage.

Technical design: Additional facilities related to waste sorting, recycling, and processing of plastic waste are needed to collect plastic waste that can be used for paving roads. Plastic waste needs to be mixed with asphalt in a mixer belonging to a private company. For each road, the amount of plastic required for the physical road space will need to be designed at the planning stage.

Commercial feasibility: Based on a hypothetical financial assessment, CVC will result in cost saving in tipping fee for the local government from the reduced amount of waste that needs to be transferred to landfill. From the perspective of the government agency responsible for road construction, the use of plastics in paving roads can lead to lower road construction budgets as the life of the plastic road doubles that of roads paved by typical bitumen and upgrading/repaving costs are not required for plastic paved road. In addition, there could be additional benefits from reducing environmental costs from direct leakage of post-consumer waste plastics into the environment.³

Revenue Category	Revenue Item	Expense Items	Net Cost Saving ⁴
A. Core Services - Saving			
User Fee	Saving in tipping fee from reduced waste	<ul style="list-style-type: none">• No additional capex or O&M	<ul style="list-style-type: none">• Saving of 20 USD per ton in avoided tipping fee
B. CVC - Saving			
Asset use optimization	Saving from using plastic to pave road instead of bitumen	<ul style="list-style-type: none">• Construction cost for paving road using plastic waste	<ul style="list-style-type: none">• Saving of 788 USD per kilometer in avoided road pavement cost



Implementation: The CVC is piloted through a partnership between a private company or technology owner and the local government, waste collectors and local communities.

Risks of the project: Government needs to set the standard requirements to ensure the road paving quality and carefully assess the negative environmental impacts of plastic roads such as the release of microplastics, photo-degradation and the release of fumes if heated beyond recommended temperatures.

Footnote 1: The Organisation for Economic Co-operation and Development (OECD), [Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options](#), February 2022

Footnote 2: [Can plastic debris help pave the way to a more sustainable future?](#)

Footnote 3: The Organisation for Economic Co-operation and Development (OECD), [Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options](#), February 2022

Footnote 4: The Worked Examples is hypothetical project business cases and include hypothetical financial assessments with key project information.

Related Content

- [Selected World Bank Tools](#)

Additional Resources

- [Climate-Smart PPPs](#)
- [Finance Structures for PPP](#)

The [Guidelines on Innovative Revenues for Infrastructure \(IRI\)](#) is intended to be a living document and will be reviewed at regular intervals. They have not been prepared with any specific transaction in mind and are meant to serve only as general guidance. It is therefore critical that the Guidelines be reviewed and adapted for specific transactions.

To find more, visit the [Innovative Revenues for Infrastructure](#) section and the [Content Outline](#), or [Download the Full Report](#). For [feedback](#) on the content of this section of the website or suggestions for links or materials that could be included, please contact the Public-Private Partnership Resource Center at ppp@worldbank.org.

