Analysis of the Potential for a Waste-to-Biogas Pilot Project in the Central Market in Port Vila, Vanuatu

City Climate Finance Gap Fund

Location and Aerial view of Port Vila, Vanuatu

CURRENT CHALLENGES AND SOLUTIONS

The city of Port Vila in Vanuatu faces significant challenges in waste management, environmental sustainability, and energy utilization. With more than three-quarters of the waste ending up in landfills and an estimated 12% dumped illegally, improved waste management is key to boost Vanuatu's climate action, environmental protection, and the well-being of citizens.

At local markets, the development of effective recycling practices plays a crucial role to create a healthier environment and reduce resource wastage.

Against this backdrop, the city drew on Gap Fund support to analyse the feasibility of a waste-to-biogas pilot project at Port Vila's Central Market, including the potential of generating revenue through the sale of biogas and/or electricity to local food vendors.

SUSTAINABLE WASTE MANAGEMENT THROUGH RENEWABLE ENERGY SOLUTION

The Waste-to-Biogas Pilot Project seeks to transform organic market waste, which constitutes over 80% of waste at markets in Port Vila, into a renewable energy source. Thereby the project aims to reap economic benefits, reduce greenhouse gas emissions, increase resource preservation, and identify replication potential across Vanuatu and neighboring Pacific Islands.

Central Market at Port Vila, Vanuatu

THE GAP FUND'S SUPPORT

The Gap Fund's intervention included:

1. Analysis of existing data on waste generation from international, national, and municipal sources.
2. Technical assessment of biogas generation technologies as alternatives to the current organic waste management practice.
3. Cost-benefit analysis building on existing data and considering local biogas demand and generation potential.
4. Analysis of vendor willingness to pay for biogas, suggesting positive cashflow potential.

Sector

Waste

Project stage

Prefeasibility

Idea

Implementation

531.5 T

Yearly organic waste from Central Market

45,703 m³

Potential Biogas Generation from organic waste

89,739 kWh

Potential Net Electricity Produced per year from 50% of Biogas generated

Scenario 1
100% Biogas

Scenario 2
50% Biogas+
50%Electricity

220,800 EUR

Approximate Investment cost

THE INTERVENTION AT A GLANCE

The project's financial and economic viability was evaluated through two distinct scenarios.

Scenario 1 - "100% Biogas Production" : The pure biogas scenario 1 for the biogas plant gives an Internal Rate of Return (IRR) of 24 % and a Net Present Value (NPV) of 526,000 EUR based on a real discount rate of 3.3%. Hence, based on the financing assumptions the profitability of the scenario is rated good.

Scenario 2 - "50% Biogas and 50% Electricity Production" The biogas and electricity scenario 2 for the biogas plant gives an IRR of 17 % and a NPV of 385,000 EUR based on a real discount rate of 3.3%. Even though the profitability of scenario 2 is good, scenario 1 is preferable from a financial point of view.

ECONOMIC BENEFITS

- Resource saving
- Reduction in GHG emissions
- Reduction in leachate generation
- Reduction in amount of ocean waste
- Employment opportunities
- Health benefits for citizens

SCALE-UP POTENTIAL

Follow-up technical assistance could address economic and financial valuation gaps and assess the potential of a larger biogas portfolio in Vanuatu and neighboring Pacific Islands. This aligns with the Government's aim to establish up to 1,000 household/village biogas units and contributes to the foundations of organic waste management in Small Island Developing States. Scaling up to additional markets and locations, while considering wastewater projects, could significantly reduce GHG emissions and fossil fuel dependency, attracting international climate finance.

PROJECT CHALLENGES

- High levels of citrus waste may affect the biogas production process and the quality of the biogas produced
- The review of existing legislation and implementation of a feed-in tariff for the energy generated from biogas is key for scenario 2.
- Data gaps persist, particularly in quantifying externalities.

FINANCIAL PATHWAYS

- The proposed pilot unit in Port Vila could be financed through domestic grants or loans, or through promotional financing.
- Developing a larger portfolio of biogas projects in the region could allow Port Vila and other cities in Pacific Small Island Developing States (SIDS) to tap into resources from international financing institutions (IFIs).

NEXT STEPS:

Following the Gap Fund's intervention, these recommendations can help to bring the Waste-to-Biogas Pilot Project closer to implementation:

- Conduct a full feasibility study: Evaluate technical, economic, and environmental aspects of a biogas portfolio.
- Stakeholder engagement and capacity development: Strengthen collaboration menchanisms, involve local community and develop capacity for implementation, operation and maintenance of a pilot unit.

TA PARTNER AND BENEFICIARY

Town Planning & Infrastructure Development Division, Port Vila Municipal Council

TA IMPLEMENTED BY

COWI Consortium

COWI

THE GAP FUND IN A NUTSHELL

Since its launch in 2020, the City Climate Finance Gap Fund provides technical assistance to cities in low and middle income countries to support the early preparation of climate-smart infrastructure projects, including energy, transport, waste and nature-based solutions (NbS).

Find more about the project on: SOURCE

For additional information, please contact:
gapfund_technicalsecretariat@eib.org

Summary of the Pre-feasibility study on the Waste to Biogas Pilot Project in Port Vila, implemented by the COWI Consortium with the support of the Gap Fund in partnership with GIZ and the Municipality of Port Vila.

Federal Ministry for Economic Affairs and Climate Action
IKI INTERNATIONAL CLIMATE INITIATIVE
Federal Ministry for Economic Cooperation and Development
THE GOVERNMENT OF THE GRAND DUCHY OF LUXEMBOURG Ministry of the Environment, Climate and Sustainable Development
European Investment Bank
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
WORLD BANK GROUP