

BNCFF | BLUE PRINTS SERIES

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The Blue Natural Capital Financing Facility (BNCFF) supports the development of sound, investable Blue Natural Capital (BNC) projects with clear ecosystem service benefits, multiple income streams and appropriate risk-return profiles.

This Blue Prints Series outlines the business models and illustrates the investment structure of a selected number of Nature-based Solution (NbS) projects. See [here](#) for other Blue Prints.

WASTE AND ENERGY INFRASTRUCTURE LINKED TO MANGROVE RESTORATION

Blue Print builds upon the efforts of Biothermica Technologies Inc. & Bioénergie Haiti



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Problem and practice so far

In many small islands developing state (SIDS) coastal cities lack appropriate waste collection and treatment as well as reliable electricity and sustainable energy for heating. Charcoal from local wood, including mangrove wood, is predominantly used for heating and cooking by businesses and households, thus heavily degrading and destroying natural areas. Large-scale deforestation is causing erosion and wild garbage disposal is clogging up the drainage systems leading to regular flooding and discharge of the waste into the mangrove areas and the ocean. The city hosts the largest mangrove site of the surrounding islands, comprising 6300 ha with a severe loss rate of 17%¹. Many nations have bans on mangrove cutting in place but the regulation is not enforced due to lack of funds and poverty of the local population. This situation has adverse effects on the economic development and tourism and is emblematic of many cities in least developing countries, especially SIDS.

¹ Area of loss over the period 1996-2016 based on the [Mangrove Restoration](https://www.oceanwealth.org/) | (oceanwealth.org) website.

Blue Natural Capital solution

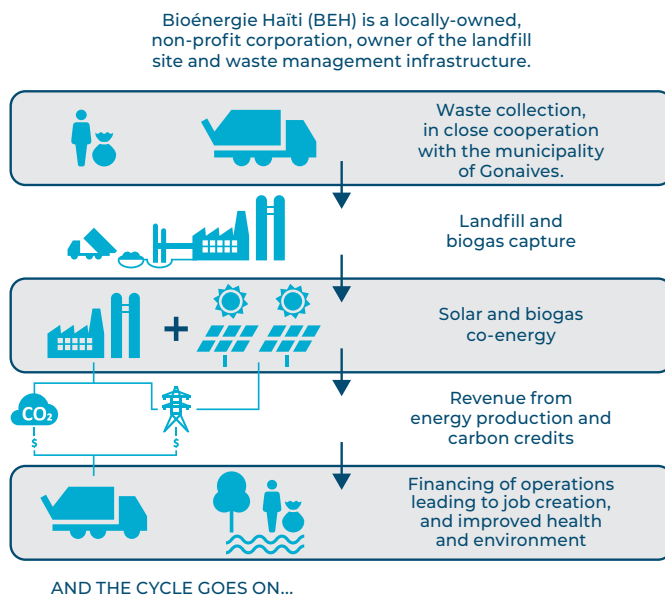
The solution is an integrated waste to bioenergy supply project that directly solves the waste problem, generates non intermittent energy and reduces deforestation, protects the mangrove areas and the health of the ocean, which in return fosters tourism. The project consists of two phases:

The first phase is the installation of a waste collection and state-of-the-art managed landfill site with collection and flaring of the landfill gas operated by a local NGO organised by the developer. This phase also includes the establishment of a 15 MW solar power plant next to the landfill site and the production of renewable electricity.

The second phase includes the installation of a landfill-gas-to-energy plant coupled to the solar plant to produce non-intermittent electricity, production of bottled landfill biogas to substitute mangrove wood for cooking, and the extension of the solar power plant for a combined renewable energy production of 30 MW.

The innovation is that parts of the revenues from the sale of electricity and the sale of carbon credits from

the waste and energy project will be channelled into the protection and restoration efforts of the nearby mangroves. The waste management project generates employment for 600 people, many of them low-skilled workers, and offers alternative livelihoods to mangrove charcoal production or agriculture on mangrove cleared land.



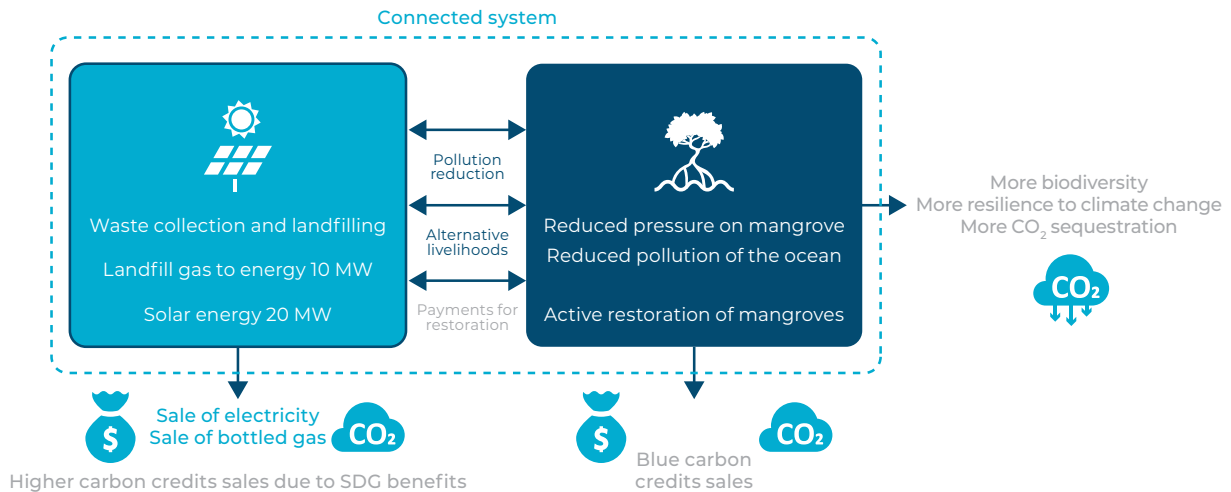
BNC business model

The waste to energy and the solar energy projects have a standalone business model and rationale. The project revenues consist of the sale of electricity (electricity billing tied to telecommunication invoicing), the sale of bottled landfill biogas and the sale of carbon credits from the landfill gas flaring and renewable energy production components. The carbon credits will be sold through Art. 6.4 of the Paris Agreement or the voluntary carbon market and the developer already has purchase indications. With the start of phase two, the developer will make an annual contribution to the protection efforts of the mangroves led by an experienced local NGO, which will increase over time in line with the profitability of the project.

This private cross-subsidisation for restoration and conservation efforts is relatively novel. The motivation of the project developer to integrate the mangrove into the design of the waste and energy project

is largely tied to corporate social responsibility reasons and making the project more attractive for financiers and carbon credit buyers. By integrating biodiversity and related resilience benefits into the project, the developer will enhance the chances to access blended finance from the climate finance donor community and attract carbon buyers that are looking for multiple climate and sustainability benefits. On top of this, the mangrove protection has the potential to generate blue carbon credits over time, further increasing funding for conservation.

The project integrates the concept of looking at infrastructure needs and nature as a connected system, that can be mutually reinforcing. Doing this at a time where we enter the UN Decade of Ecosystem Restoration (2020-2030), where biodiversity is increasingly integrated into the lending decisions by development banks and private financiers, is an attractive and timely approach.



Blue impacts and safeguards

The combined positive impacts of the connected waste to energy/renewable energy and mangrove restoration projects include:

- Creation of 600 jobs over the coming 10 years, integration of gender equality in the project, provision of alternative livelihoods for people living of nearby mangroves;
- Reduction of 5 million tCO₂e over 25 years, installation of 30 MW clean and renewable energy;
- Further increased CO₂e sequestration and avoided CO₂e emissions due to regeneration and the conservation of the mangroves;
- Improvement of air quality, water quality, improvement of sanitary conditions and public health;
- Protection of ecosystems in one of the largest mangroves of the region, reduced ocean pollution due to better waste management;
- Production of bottled gas can replace mangrove wood use for cooking and heating.

Blue stakeholder roles and needs

The main stakeholders include:

- An experienced foreign landfill gas to energy and carbon capture infrastructure company with a proven strong track record as the main project developer;
- Local non-profit, gender focused, community organization, which has been established to manage the waste collection and landfilling activities, all assets related to the waste collections belong to the community organization;
- Municipality, which has granted the use of land for the landfill and solar energy park to the community organization for several decades and contributes human resources to the project;
- Experienced local NGO managing other marine protected areas, and which will guide the mangrove restoration efforts;
- Communities living in and off the mangrove areas (wood collection and rice production).

Blue investment structure

The project has an infrastructure investment need of 70 million USD. It is implemented in three phases (a preparation phase and two infrastructure phases), each with its own financial setup. The financing plan is a blended project finance structure, blending public with private funding, combined with a political risk guarantee to partially secure the equity investment.

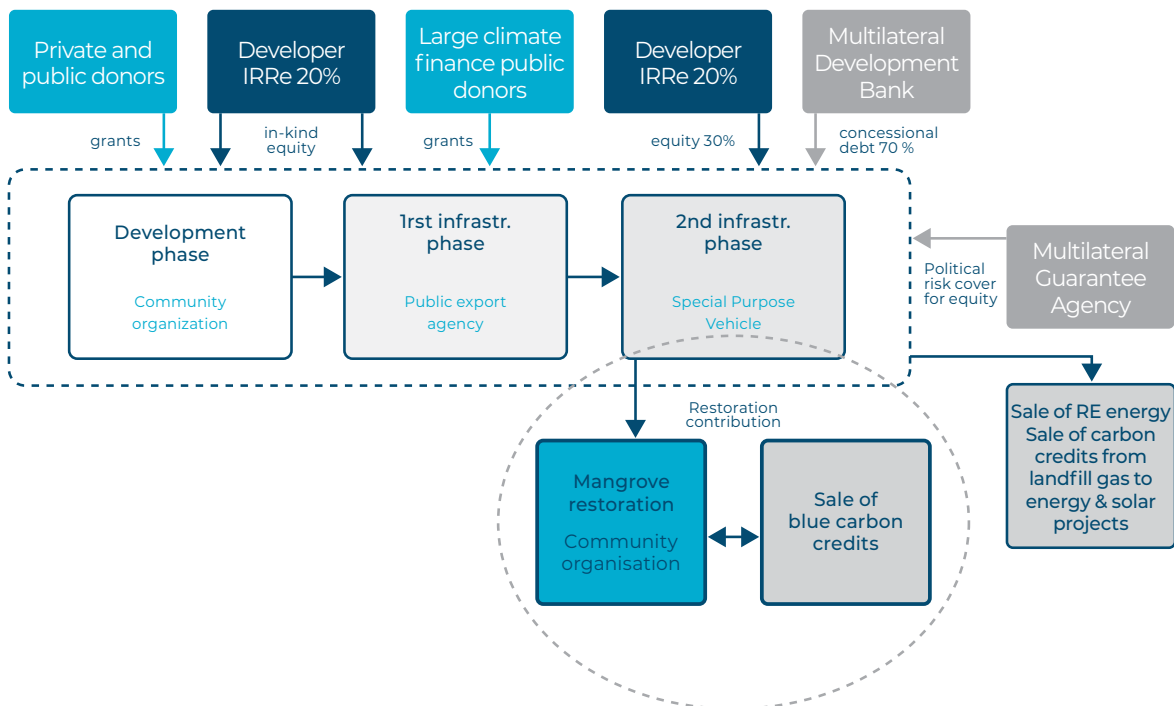
Development phase: planning, studies, setting up the community organization, training, first waste collection efforts and equipment (bins, vehicles): Use of developer’s private equity, donations from foreign companies, and public climate finance contributions from the home country of the foreign project developer.

First infrastructure phase: waste collection and transfer station, construction and operation of the landfill site, and of a 15 MW solar plant: 20 million USD from public grants from large (multilateral) donor international climate finance budgets and private donations for landfill construction and waste management operations (as least developed

country). The international donor grants will be channelled by a public entity. 20 million USD from 25 years concessional loan from a development bank, private equity from the project developer, debt/equity ratio of 70 %, total return on investment 20 % for the initial solar park.

Second infrastructure phase: landfill biogas to energy generation and solar park extension, together 15 MW: 30 million USD from 25 years concessional loan from a development bank, private equity from the project developer, political risk guarantee for the private equity, debt/equity ratio of 70%, total equity return on investment 20%; sale of carbon credits with advance payments from landfill gas combustion and energy generation to finance the part of the project activities for the waste management.

The above graph illustrates the blue investment structure, showing financing of the waste to energy and solar energy infrastructure project as well as the blue ecosystem restoration and protection project.



Blue scalability and replicability

Scalability exists in at least two sites on the island itself, and opportunities exist in the region as well as on a global scale. The model can be applied everywhere where the interlinkages of waste management, energy needs, and ecosystem restoration potential exist. The feasibility hinges on effective waste collection, the quality of the waste and biogas, the management of the electricity transmission system, the ability to pay for electricity

of the targeted customer base and the willingness of the waste to energy operator to make the system link to ecosystem restoration. The replicability also depends on the ability to raise donor funding to help prepare such projects, especially in locations where no structured waste collection is present at the start of the project and where mangroves are subject to various pressures.

Practical tips

Develop and finance the project in stages with having recourse to appropriate blended finance for each individual stage. Have a clear land tenure situation, biogas rights and power purchase agreement. It is important to have a

project developer who has a good track record in developing and putting together the technical and financial package. Approach investors who value the sustainable development benefits.

To learn more about this project in Haiti:
<https://www.bioenergiehaiti.org/>



Bioénergie Haiti



Fondation Bioénergie



Terre des Jeunes Transnational

Since its launch in 2018, the BNCFF has become a global brand name in Ocean Impact Finance. After screening over a hundred proposals, it is presently supporting 8 blue Nature-based Solutions pioneer projects with grant funding.

<https://bluenaturalcapital.org/supported-projects/>

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