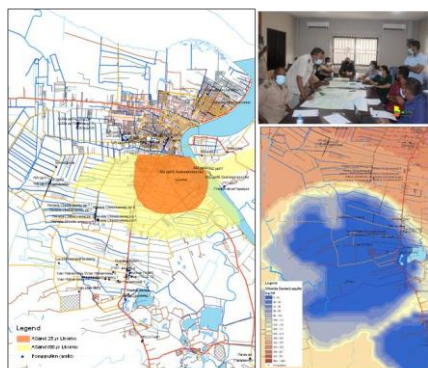


The United Nations Environment Programme (UNEP) on behalf of the Climate Technology Centre and Network (CTCN)

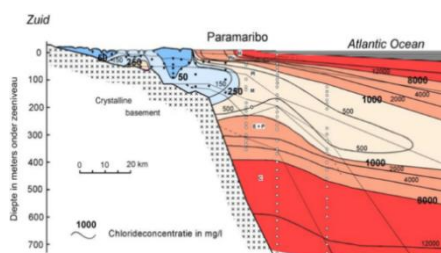
Cost Analysis & Benchmarking Funding Analysis

Approved. OK for payment



Consultancy services for

Enhance the resilience of Suriname's water supply system by modelling drought risks and developing a roadmap of prioritized alternatives for aquifer recharge



Acronym: *ARADIS*

Climate Technology Centre and Network (CTCN)

RFP Number: 3100006085
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1 Global Cost Analysis MAR System

global cost analysis has been conducted for the Managed Aquifer Recharge (MAR) system, covering both the development of the wellfield and the water treatment facilities. A pilot site was selected in Hanover, where MAR is implemented through river bank filtration, as this technology was identified by the SWG as the most suitable and accepted MAR approach. In this system, aquifer recharge occurs naturally through infiltration from the adjacent surface water body, meaning that no separate treatment is required for injection or aquifer replenishment.

Based on the results of the geophysical survey, a preliminary wellfield design was developed, which subsequently informed the conceptual design of the abstraction wells serving as the intake source. For drinking water production, a wellfield is designed consisting of 20 production wells, each with a capacity of 15 m³/h, resulting in a total production capacity of 300 m³/h. The associated treatment facilities are therefore designed for potable water production following abstraction from the MAR system.

The cost estimate is conceptual and is based on calculations presented in the *Business Plan for the Coastal Region* (Suriname Water Supply Master Plan, GT10043-202005_A, reference page 50, dated 4 July 2011). The selected reference scenario concerns the expansion of the Houttuin production plant, for which the investment costs were estimated at USD 14 million for a production capacity of 350 m³/h. This reference scenario was subsequently interpolated to estimate the costs of the production facilities for the MAR system, with a design capacity of 300 m³/h. See Table 1-1 for an overview of the global cost analysis.

Table 1-1 Global Cost Analysis MAR System

Enhance the resilience of Suriname's water supply system by modelling drought risks and developing a roadmap of prioritized alternatives for aquifer recharge							
	Location(s):	Hanover - District Para			Exchange Rate US\$ 1 : SRD 38.70		
	Prepared: 12/11/2025	Location Treatment Plant:			Capacity Scenario:		
Work	Alternative (Option):	Intake source: 20 Production wells of 15 m3/h each			300 m3/h		
#	New built	Aeration, Rapid Sand Filtration & Chlorination					
ID #	PROJECT COMPONENT - SYSTEM PART	Specification(s)	Amount	Unit	Unit Price	Cost(s) [SRD]	Cost(s) [USD]
					[SRD]	[SRD]	[USD]
A	EXPLORTATION AND GENERAL PREPARATION						
	Acquiring of Land and Exploration	purchasing of land and exploration drilling	1	LS	92,880,000.00	92,880,000.00	\$ 2,400,000.00
	General Preparations	Engineering and Surveying	1	LS	46,440,000.00	46,440,000.00	\$ 1,200,000.00
B	DEVELOPMENT PRODUCTION FIELD						
	Drilling and Completion	Drilling of 20 shallow wells	20	piece	3,096,000.00	61,920,000.00	\$ 1,600,000.00
C	TREATMENT PLANT						
	Filtration & Constuction Treatment Facilities	Rapid sand filtration, shell/calcite filtration, Chlorination	1	LS	162,540,000.00	162,540,000.00	\$ 4,200,000.00
D	ELECTRIFICATION						
	Electrical power	Powerhouse and Electrical Equipment	1	LS	46,440,000.00	46,440,000.00	\$ 1,200,000.00
E	HOUSING AND SUSTAINABILITY						
	Buildings	Office, Warehouse and Maintenace building	1	LS	21,672,000.00	21,672,000.00	\$ 560,000.00
SUMMARY							
ID #	PROJECT COMPONENT - SYSTEM PART	TRANSFERED FROM COMPONENT			[SRD]	[SRD]	[USD]
A	EXPLORTATION AND GENERAL PREPARATION	TRANSFERED FROM A				139,320,000.00	\$ 3,600,000.00
B	DEVELOPMENT PRODUCTION FIELD	TRANSFERED FROM B				61,920,000.00	\$ 1,600,000.00
C	TREATMENT PLANT	TRANSFERED FROM C				162,540,000.00	\$ 4,200,000.00
D	ELECTRIFICATION	TRANSFERED FROM D				46,440,000.00	\$ 1,200,000.00
E	HOUSING AND SUSTAINABILITY	TRANSFERED FROM E				21,672,000.00	\$ 560,000.00
	SUB-TOTAL MOBILISATIONS AND LOGISTICS					139,320,000.00	\$ 3,600,000.00
	SUB-TOTAL MATERIALS	(Material Costs; MC)		MC		292,572,000.00	\$ 7,560,000.00
	SUB-TOTAL LABOR	Water supply & Constructions		15% (of MC, estimated)		43,885,800.00	\$ 1,134,000.00
	SUB-TOTAL EQUIPMENT INCL. SPECIAL LOGISTICS	Special Drill machine/Excavator etc.		10% (of MC, estimated)		29,257,200.00	\$ 756,000.00
	SUB-TOTAL PROJECT COSTS PRIOR TO PROFIT AND RISKS	(Tocal Costs Before Profit; TCBP)		TCBP		505,035,000.00	\$ 13,050,000.00
	PROVISIONAL SUM	Including tests on existing system + Drilling survey		10% (of TCBP, estim.)		50,503,500.00	\$ 1,305,000.00
	UNFORSEEN			7% (of TCBP, estim.)		35,352,450.00	\$ 913,500.00
						[SRD]	[USD]
	TOTAL PROJECT SUM (CONSTRUCTION excl. Design, Supervision & Management Costs)					590,890,950.00	\$ 15,268,500.00
	CONSULTANCY COSTS (ASSESSMENT, SURVEYS, DESIGN & PREPARATION)			3%		17,726,728.50	\$ 458,055.00
	SUPERVISION COSTS (TENDER GUIDANCE & ADVICE, SUPERVISION)			7%		41,362,366.50	\$ 1,068,795.00
	PROJECT MANAGEMENT			5%		29,544,547.50	\$ 763,425.00
	TOTAL PROJECT BUDGET INCL. CONSTULANCY, SUPERVISION & MANAGEMENT COSTS					679,524,592.50	\$ 17,558,775.00

2 Funding options

2.1 Green Climate Fund (GCF)

The Green Climate Fund is currently the world's largest dedicated multilateral climate fund, mandated to support developing countries in achieving a paradigm shift toward low-emission, climate-resilient development pathways. GCF finances both mitigation and adaptation projects and can deploy a mix of financial instruments – including grants, concessional debt, guarantees, and equity – to leverage additional finance. GCF could be a prime source of grant funding (potentially blended with concessional loan elements) given the project's clear mitigation benefits (diesel fuel displacement reduces CO₂ emissions) and sustainable development impacts (energy access for an underserved community).

To seek GCF funding, an accredited entity (which could be a multilateral entity like UNDP, IDB or a regional entity) would need to prepare a Concept Note and then a full Funding Proposal in cooperation with Suriname's NDA and project stakeholders. Key requirements include: a detailed climate rationale (quantifying emission reductions) demonstration of project sustainability and scalability, and adherence to GCF's environmental and social safeguards.

GCF often expects co-financing. However, it can provide a significant grant portion if the project has strong climate merits. The Simplified Approval Process (SAP) might be an option if the total request is up to \$10 million and the project is deemed low-risk, which can streamline the application. Suriname government would need to issue a formal NDA no-objection letter for the project. Given GCF's rigorous review, preparatory funding (e.g. GCF Project Preparation Facility grants) might be used to conduct feasibility studies, environmental impact assessments, and stakeholder consultations to strengthen the proposal.

2.2 Global Environment Facility (GEF)

The Global Environment Facility is another major source of climate-related grants. GEF funds projects in its focal areas, one of which is Climate Change Mitigation. GEF grants are typically smaller than GCF (often a few million USD) but are meant to catalyze larger projects through co-financing.

Accessing GEF funding requires working through a GEF Implementing Agency (such as UNDP, UNEP, the World Bank, or regional banks like IDB which is a GEF agency). The government, through its GEF Operational Focal Point, would endorse the project idea. The process starts with a Project Identification Form (PIF) submission outlining the project concept, which GEF's council must approve. The PIF must highlight the project's incremental climate benefit (why grant money is needed, e.g. to make the project viable and achieve emissions reductions beyond a baseline scenario) and include a co-financing plan. GEF strongly emphasizes co-financing; typically, total project financing is many times the GEF grant amount.

2.3 NAMA Facility (Mitigation Action Facility)

The NAMA Facility (recently rebranded as the Mitigation Action Facility) is a funding program originally set up by Germany and the UK (with other donors joining) to support ambitious climate mitigation

projects in developing countries. It specifically targets Nationally Appropriate Mitigation Actions (NAMAs) or similar country-led mitigation initiatives.

The NAMA Facility offers a combination of grant financing, technical assistance, and in some cases concessional loans through its implementing partners. The funding is used to implement the NAMA. For example, capital expenditure for renewable energy installations, support for policy or regulatory changes, and capacity building for sustaining the outcomes. The Facility's focus is on projects that are innovative, replicable, and can spur public-private partnerships.

The NAMA Facility runs competitive calls for proposals (Calls for NAMA Support Projects) periodically. To apply, Suriname (typically through a ministry or an entity like a development bank or international agency as the NAMA Support Organization) would submit a Outline of the project during a call. The outline must demonstrate the ambition (significant emissions reduction and transformation of the sector), the project's preparedness (e.g. feasibility studies done, political support assured), and how the NAMA Facility funds will leverage other financing and private sector involvement. Only the most robust proposals globally are selected for detailed appraisal. If selected, the project enters a detailed preparation phase to develop a full project proposal with the NAMA Facility's team.

Crucially, the proposal should emphasize how the project is a pilot that can be scaled up and how it engages the private sector (the NAMA Facility likes to see, for example, that a private operator might co-invest or that the groundwork is laid for future private investments). In the design, one objective is enabling private sector participation in rural electrification by making the business model viable. This matches the Facility's goals.

In terms of requirements, aside from the climate mitigation rationale, the proposal must include a plan for financial sustainability (e.g. will tariffs, subsidies, or carbon finance keep the system running after grant funds are spent?) and MRV (Measurement, Reporting, Verification) of results (both emissions and co-benefits). It also requires backing from the national government (letters of support).

2.4 Inter-American Development Bank (IDB)

The Inter-American Development Bank is one of the principal sources of development financing for countries in Latin America and the Caribbean. IDB provides a mix of financial instruments to support projects that strengthen climate resilience, improve infrastructure, and advance sustainable development. IDB financing can cover both capital expenditure and institutional or policy-strengthening components, making it suitable for integrated projects that combine physical works with capacity building or regulatory improvements.

To access IDB financing, the government must formally request support through its Ministry of Finance. Once a project is entered into the IDB pipeline, the Bank conducts a structured preparation process that includes technical, economic, financial, environmental, and social assessments. Climate-related projects must also articulate alignment with IDB's Climate Change Sector Framework, demonstrate contributions to national climate goals, and quantify relevant climate mitigation or adaptation benefits.

IDB also offers grant-based Technical Cooperation (TC) programs that can support early-stage activities such as feasibility studies, data assessments, design work, institutional strengthening, and pilot initiatives. These grants are often used to prepare a project for subsequent investment financing. In addition, IDB can

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mobilize co-financing from other development partners such as the European Union, the Green Climate Fund, and bilateral donors helping close funding gaps and reduce the government's borrowing burden.

Key requirements for IDB support generally include: a clearly defined development objective; evidence of economic and social benefits; compliance with the IDB Environmental and Social Performance Standards; a realistic implementation plan; and commitment from relevant national institutions. Once approved by the IDB Board of Directors, financing is governed by detailed execution arrangements and supervision protocols to ensure transparency, safeguards compliance, and timely delivery of results.

2.5 Caribbean Development Bank (CDB)

The Caribbean Development Bank provides development financing with a strong focus on enhancing resilience, reducing poverty, and supporting sustainable infrastructure across the Caribbean region. CDB offers a range of financial instruments to support projects that address climate vulnerability, improve basic services, and strengthen institutional capacity. Its programming places particular emphasis on climate adaptation, water and energy security, disaster risk reduction, and community development.

CDB financing is typically accessed through sovereign channels, requiring a formal request from the government and subsequent alignment with national development priorities. Once a project is identified, CDB undertakes a comprehensive appraisal process, evaluating technical feasibility, cost-effectiveness, environmental and social risks, economic returns, and resilience co-benefits. Projects must demonstrate strong development impact, particularly for vulnerable populations, and adhere to CDB's Environmental and Social Safeguard Policy and procurement guidelines.

In addition to its lending operations, CDB administers grant-based facilities such as the Basic Needs Trust Fund (BNTF) and several climate-related funding windows supported by international partners. These grant facilities can finance community-level infrastructure, institutional strengthening, capacity building, and early-stage technical work that prepares larger investment projects. CDB also participates in regional climate initiatives and can mobilize resources from development partners to blend with its own financing and reduce overall project cost.

Accessing CDB resources generally requires: strong alignment with CDB's strategic outcomes; evidence of socio-economic benefits; integration of climate resilience into project design; and readiness of national institutions to implement and maintain the investment. Once approved, CDB financing is released under structured supervision arrangements to ensure compliance, timely execution, and achievement of development results.

2.6 Adaptation Fund (AF)

The Adaptation Fund finances projects that help developing countries adapt to the impacts of climate change. Suriname can access the Adaptation Fund either via a National Implementing Entity (NIE) if one is accredited (as far as known, Suriname does not have an accredited NIE) or through a Multilateral Implementing Entity like UNDP. The proposal process involves developing a detailed project proposal with strong emphasis on climate change impacts, vulnerabilities, and how the project's activities directly address those. One would need to document the climate threats (e.g. flooding of diesel supplies, droughts affecting river transport, increased temperatures affecting health and agriculture) and then show how, for instance, solar-powered water pumps or refrigeration help the community adapt.

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Given the focus of the project is more on mitigation, the AF might be considered a secondary option – perhaps to fund a complementary component (such as climate-resilient agriculture supported by the energy supply).

2.7 European Union (EU) Climate Funds

The EU, often through its international cooperation instruments, funds sustainable energy projects in developing countries. In Latin America and the Caribbean, the EU has mechanisms like the Latin America Investment Facility (LAIF) – now integrated into the EU's Global Gateway / NDICI programs – which provide investment grants to blend with development bank loans.

The EU (through LACIF or a related Caribbean program) could be approached to provide a grant that complements loans from IDB or others, specifically to cover the gap between what users can afford and the cost of a high-quality renewable system. Application: Typically, such funding is coordinated with an MDB-led project (e.g. IDB or CDB). The requirements generally involve demonstrating development impact (energy access to X households, socio-economic benefits) and climate alignment (CO₂ savings, climate resilience). The fact that an existing EU-backed project has successfully piloted solar mini-grids in Suriname will be a strong precedent to cite.

2.8 Bilateral funding options

Apart from the major multilateral funds, various bilateral programs offer grants or mixed grant-loan financing for climate and development projects. Some relevant ones include:

- a. **Germany's International Climate Initiative (IKI)** provides grants for climate projects worldwide (often through competitive calls focused on innovation and scalability).
- b. **Japan's Joint Crediting Mechanism (JCM)** funds low-carbon technology projects in partner countries, in exchange for sharing the resulting carbon credits. (Suriname is not currently a JCM partner, but exploring a partnership could open a funding avenue where Japan funds part of the project and counts the emissions reduction toward its goals).
- c. **The Netherlands**, given its historical ties with Suriname, sometimes supports development projects. While the Netherlands doesn't have a dedicated climate fund for Suriname per se, Dutch development organizations or the Dutch government might be interested in supporting a renewable energy project in Suriname as a showcase of climate cooperation (particularly if there's a water management or adaptation angle, given Dutch expertise in those areas).
- d. **France (Agence Française de Développement - AFD)**: AFD finances many renewable energy and grid projects in developing countries, often as soft loans but sometimes mixed with grants. Notably, AFD has been involved in Suriname's power sector – it financed a project to connect communities in the eastern part of Suriname (Marowijne region) to the national grid, improving supply in that area. Engaging AFD would require going through

diplomatic/government channels, as they align support with government requests. They would look for things like the project's contribution to development, climate mitigation and potentially involvement of French expertise or technology. This is not strictly required, but often part of bilateral considerations.

- e. **Global Energy Alliance for People and Planet (GEAPP):** This is a philanthropic alliance (Rockefeller Foundation, IKEA Foundation, Bezos Earth Fund, etc.) launched in recent years to accelerate investment in distributed renewable energy solutions in developing countries. GEAPP specifically targets projects that expand energy access and reduce carbon emissions with innovative business models. They often work by giving grants or results-based finance, and by partnering with MDBs to de-risk projects. To access such support, one would typically network with the Alliance's regional representatives or through partner organizations (like mini-grid developers that have relationships with GEAPP). The requirement is to show transformational impact on the ground and potential for scale/replication. A strong narrative around improving livelihoods of an indigenous community while preserving Suriname's rainforest carbon sink (by providing clean energy and reducing the need for diesel and fuel transport) could attract philanthropic climate funding.
- f. **OPEC Fund for International Development (OFID):** OFID (now often just called the OPEC Fund) provides development loans to low-and middle-income countries, funded by OPEC member states. Energy access is one of its priority areas. For instance, OFID has funded rural electrification and energy projects in various countries (the search result snippet indicated OFID loans for energy in Nepal and elsewhere). Suriname could approach OFID for a loan to cover part of the project. OFID loans are typically at lower interest than market and can be long-term. They often require a sovereign guarantee (i.e. government takes the loan) and a clear implementation plan. OFID might also offer grant components for project support.
- g. **Climate Investment Funds (CIF) / Clean Technology Fund:** The CIF (run by the World Bank) had programs like the Scaling-Up Renewable Energy Program (SREP) for low-income countries and the Clean Technology Fund for middle-income countries. Suriname wasn't originally a part of those programs, but going forward, CIF is evolving into new programs (like on energy storage, renewable integration, etc.). If any of these funding windows are open to small countries, Suriname could try to access them (often via MDBs like IDB or World Bank as implementing agencies). These funds usually provide highly concessional loans or grants for demonstrating renewable technologies.

Two opportunities deserve particular attention. The first involves carbon credits, which are highly relevant and can generate funding directly for projects. This aligns closely with the priorities of the client, the Ministry of Oil, Gas and Environment. The second relates to the projected revenues from the anticipated oil and gas boom, which are expected to be substantial. These revenues could create significant opportunities for investment in the groundwater sector.

3 Benchmarking of funding options

The following table presents a comparison of the objectives of the different funding sources, the extent to which this project aligns with these objectives, and the relative ease of organizing the financing.

Table 3-1 Overview and comparison of funding options

Funding Option	Fit with Project Objectives	Ease of Access
Green Climate Fund (GCF)	Strong alignment with national mitigation targets, diesel displacement, and renewable energy access. Clear climate rationale and co-benefits for resilience.	Requires accredited entity, NDA endorsement, detailed climate justification, and co-financing. SAP may reduce complexity if request is under USD 10m.
Global Environment Facility (GEF)	Supports climate mitigation, energy access, and capacity strengthening. Also aligns with enabling-environment improvements.	Requires PIF approval and co-financing. Grants are smaller, with processes typically 1–2 years through a GEF agency.
NAMA Facility (Mitigation Action Facility)	Supports ambitious mitigation actions, sector transformation, and scalable models with private-sector engagement.	Highly competitive global calls. Requires strong readiness, high ambition, and demonstration of transformational impact.
Inter-American Development Bank (IDB)	Direct alignment with climate resilience, sustainable infrastructure, institutional strengthening, and renewable energy objectives.	Access through sovereign request. Structured but predictable appraisal. Technical Cooperation grants can facilitate preparation.
Caribbean Development Bank (CDB)	Emphasizes climate adaptation, energy/water security, and community resilience—well aligned with the project's objectives.	Typically easier than large climate funds. Grant windows (such as BNTF) can complement loan financing.
Adaptation Fund (AF)	Primarily adaptation-focused; suitable for resilience and vulnerability-reduction components.	Requires NIE or MIE (likely UNDP). Must strongly frame adaptation justification. Overall simpler than GCF.
EU Climate Funds (LACIF / Global Gateway / NDICI)	EU supports renewable energy and climate mitigation in Suriname and the region. Past successes increase alignment.	Usually accessed through MDB partnerships. Useful as co-financing to close viability gaps.
Other Bilateral / Philanthropic (IKI, AFD, GEAPP, OFID, etc.)	Many programs support renewable energy, innovation, and climate resilience. GEAPP particularly aligns with distributed clean energy.	Some sources rely on competitive calls (IKI), others on government engagement (AFD/OFID). Philanthropic sources tend to be faster and more flexible.

Based on the analysis presented above, the different funding options can be benchmarked using a scoring scale from 1 to 5, where 1 represents a very weak fit or highly challenging access conditions, and 5 represents an excellent fit with project objectives or comparatively easy access. Each option is evaluated along two dimensions namely its alignment with the project's objectives and its relative ease of access. The combined results of this assessment are presented in the table below.

Table 3-2 Funding options score table

Funding Option	Fit (1-5)	Access (1-5)	Total Score (1–10)
Green Climate Fund (GCF)	5	2	7
Global Environment Facility (GEF)	4	3	7
NAMA Facility (Mitigation Action Facility)	4	1	5
Inter-American Development Bank (IDB)	4	4	8
Caribbean Development Bank (CDB)	4	4	8
Adaptation Fund (AF)	3	3	6
EU Climate Funds (LACIF / Global Gateway)	5	4	9
Other Bilateral & Philanthropic (IKI, AFD, GEAPP, OFID, etc.)	4	3	7

4 Colophon

Client	: The United Nations Environment Programme (UNEP) on behalf of the Climate Technology Centre and Network (CTCN)
Beneficiary	: Government of the Republic of Suriname; Ministry of Spatial Planning and Environment
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