spark+
Financing the
Cooking Energy Transition

INVESTMENT CASE STUDY / ENVIROFIT GHANA

ENVIROFIT
GHANA COOKSTOVES

Unlocking Article 6.2 Carbon Finance for Clean Cooking in Ghana

THE INVESTMENT

Project debt linked to contracted carbon outcomes, making high-efficiency cookstoves more affordable for Ghanaian households.

USD 4m	60,000	Ghana
Initial Spark+ financing	Stoves in phase one	Project location

SPARK+ AFRICA FUND / ENABLING QAPITAL

THE INVESTMENT AT A GLANCE

Linking carbon revenues to clean cooking access

An early Article 6.2 cookstove transaction backed by international carbon transfers and local production.

USD 4m	180k	Article 6.2
Spark+ initial debt	**Stove program target**	**Carbon mechanism**
First 60,000 stoves	Across project phases	Ghana–Switzerland

Envirofit Ghana cookstove project

In a groundbreaking initiative, Spark+ Africa Fund ("Spark+"), a clean cooking sector-specialized debt fund managed by Enabling Qapital, has facilitated one of the world's first carbon finance transactions which leverages the bilateral cooperation mechanism defined under Article 6.2 of the Paris Agreement. This innovative project aims to distribute 180,000 high-efficiency cookstoves in Ghana, reducing carbon emissions while improving lives in local communities.

CORE INVESTMENT RATIONALE

A contracted international carbon offtake creates a financing pathway for upfront stove subsidies and project investment.

Background on the Clean Cooking Challenge in Ghana

In Ghana, health, wellness, and livelihoods are negatively impacted by the reliance on traditional biomass fuels. According to the World Bank, firewood and charcoal remain the primary cooking fuels for approximately 4.5 million households. While clean cooking fuels remain scarce in rural areas, with over 95% of households relying on polluting fuels, wood and charcoal use continue to dominate. This heavy reliance on traditional fuels has several key negative social and environmental impacts.

Health Risks: The use of biomass fuels contributes to indoor air pollution, which is a major health risk, particularly for women and children who are often the primary users of cooking fuels. This can lead to respiratory diseases and other health complications, and globally traditional cooking fuels are responsible for more premature deaths than HIV, malaria, and tuberculosis, combined (NIHR, IEA).

Environmental Impact: The continued use of non-renewable biomass contributes to deforestation and environmental degradation, exacerbating climate change and reducing biodiversity. Globally, forests nearly the size of Ireland were lost in 2023 alone (the Hindu).

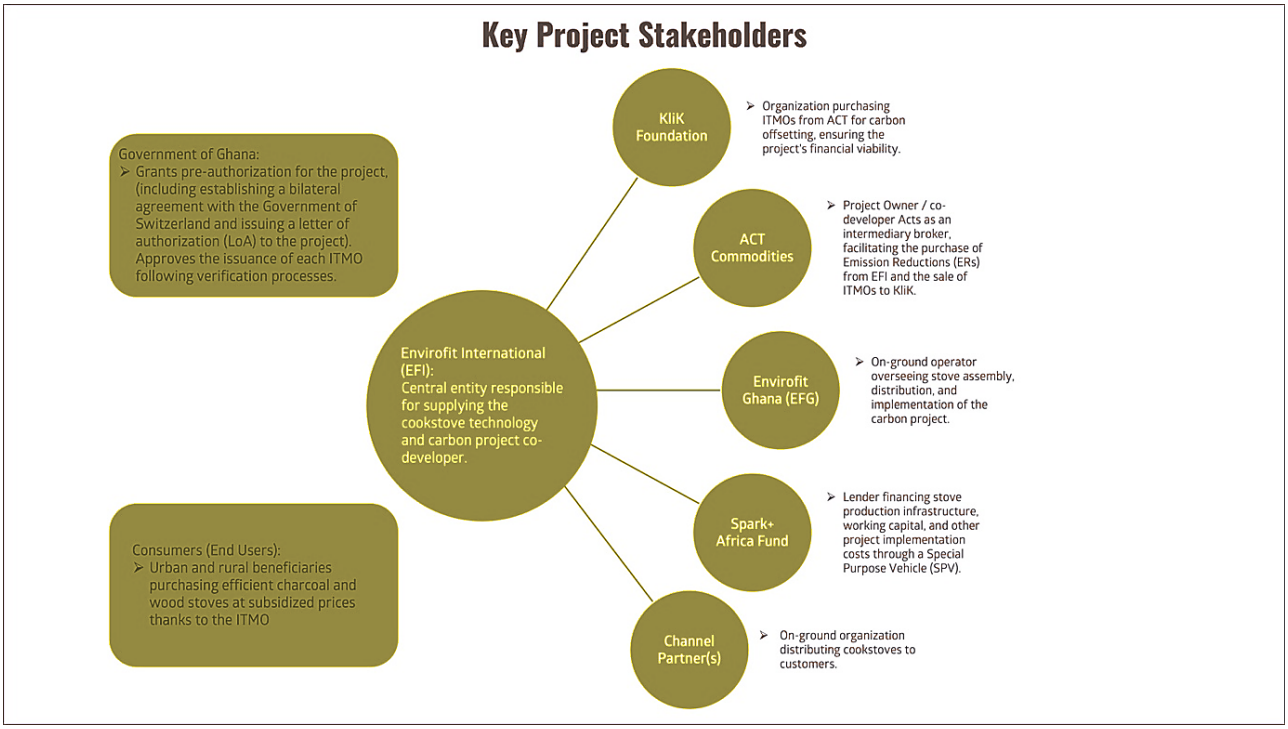
Climate Impact: This practice leads to increased greenhouse gas emissions, as the burning of biomass releases carbon dioxide and other pollutants into the atmosphere. Moreover, deforestation reduces the earth's capacity to absorb carbon dioxide, further intensifying the climate crisis. On a global basis, traditional cooking fuels are responsible for roughly as much greenhouse gas emissions as the aviation or shipping industries (Environment Energy Leader, Equal Times, Columbia Climate School).

Despite the impacts, households in Ghana and across Africa and the rest of the developing world face economic constraints that limit their ability to transition to cleaner cooking solutions. The affordability of clean cookstoves is a critical factor in their adoption.

Notwithstanding the challenges, the market potential for clean cooking solutions in Ghana is significant. Low competition in the sector presents an opportunity for innovative solutions to meet the needs of consumers who are ready to adopt alternatives. A 2022 survey indicated a high interest in purchasing clean cookstoves, with 95% of participating farmers expressing an interest in purchasing the Envirofit cookstove at a subsidized price. This suggests that with the right awareness and financial mechanisms, there is vast potential for increasing adoption of clean cooking.

Project Overview

The “EFI Cookstove Project” was jointly developed by Envirofit International (“EFI”) and ACT Commodities (“ACT”).

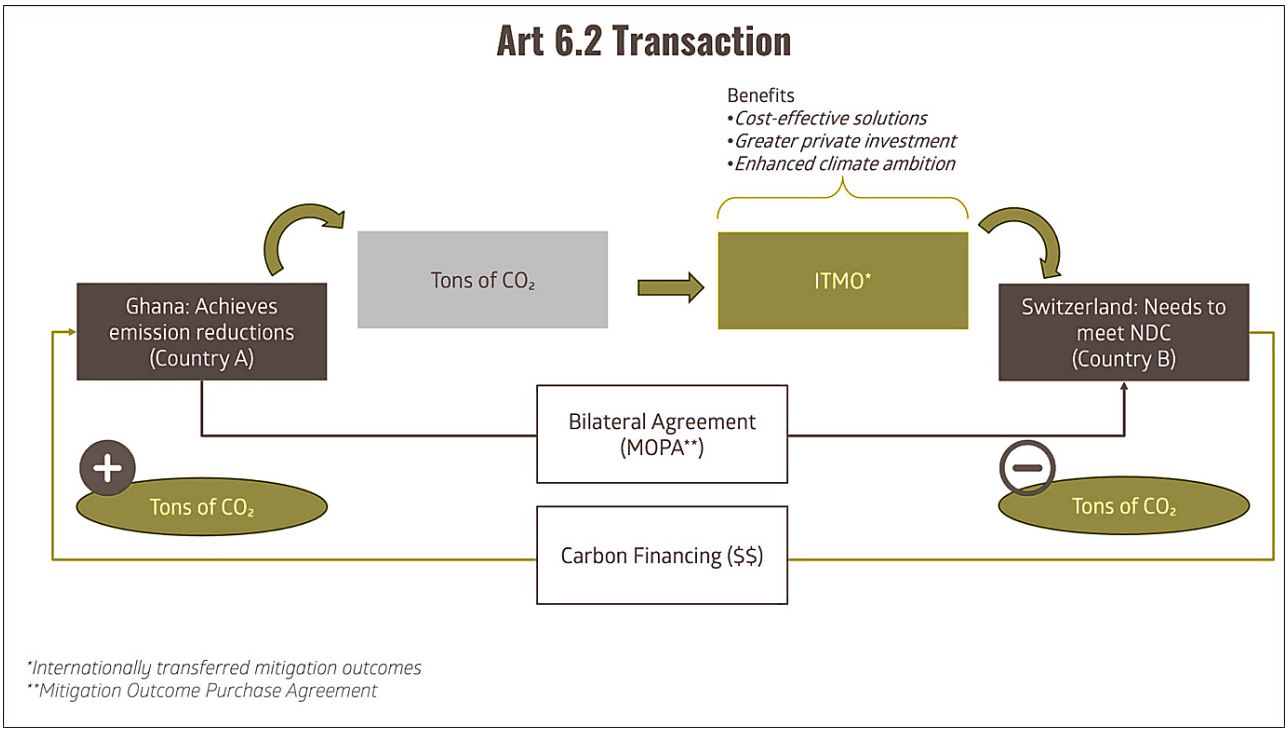


Project stakeholders and responsibilities — original case study diagram

ACT helps organizations achieve their climate action goals, no matter how ambitious. Since its founding in 2009, they have become a reliable partner for high-impact climate projects that generate carbon credits, energy efficiency projects and certificates, and experts in renewable electricity and gas markets, renewable fuels, and emission allowances. ACT is the registered project entity in this program.

Envirofit is a Social Benefit Corporation dedicated to improving clean energy access for the ‘next billion’. Beginning in 2009, under the Clean Development Mechanism, Envirofit (with its investors) pioneered the concept of using future carbon offsets to pre-finance an up-front subsidy to incentivise the wide-spread adoption of clean cooking technology – which would not otherwise be affordable to this customer segment. As a leading global designer and manufacturer of clean and efficient cookstoves, EFI established a production facility in Ghana. Envirofit’s local affiliate, Envirofit Ghana (“EFG”) and partners will sell and distribute 180,000 high-efficiency charcoal and wood cookstoves to rural and semi-rural Ghanian customers.

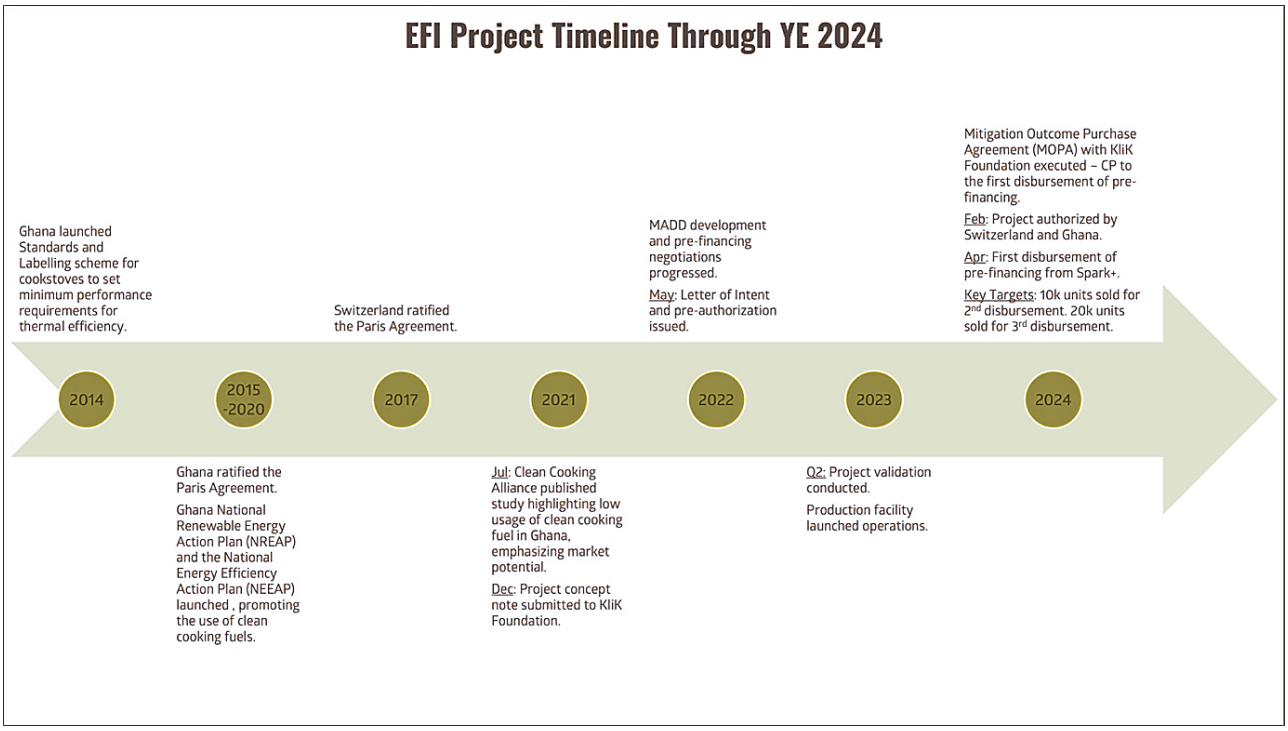
Spark+ has provided an initial USD 4 million in debt financing for the 60,000 stove first phase of the project. The stoves distributed will generate emission reductions to be converted and sold in the form of Internationally Transferred Mitigation Outcomes (“ITMOs”) to KliK Foundation (“KliK”), the organization designated to offset the carbon emissions generated through the use of automotive fuels in Switzerland.



Bilateral Article 6.2 transaction mechanics — original case study diagram

In addition to enabling the uptake of clean cooking solutions among low-income households, thereby improving health outcomes and reducing reliance on traditional biomass, the project has established a local production facility to produce cookstoves, which has created jobs and built local capacity.

The project relies on a robust monitoring process to assess the use and performance of the cookstoves. In contrast with some less rigorous projects, the EFI Cookstove Project has been carefully designed to prevent the risk of over-crediting using EFI's newly developed state-of-the-art usage and performance monitoring strategy. Surveys and kitchen performance tests will be conducted at higher frequency than industry average with a customized and comprehensive sensor-based methodology to monitor stove usage and fuel savings, and more conservative assumptions (including fraction of non-renewable biomass) are being utilized.

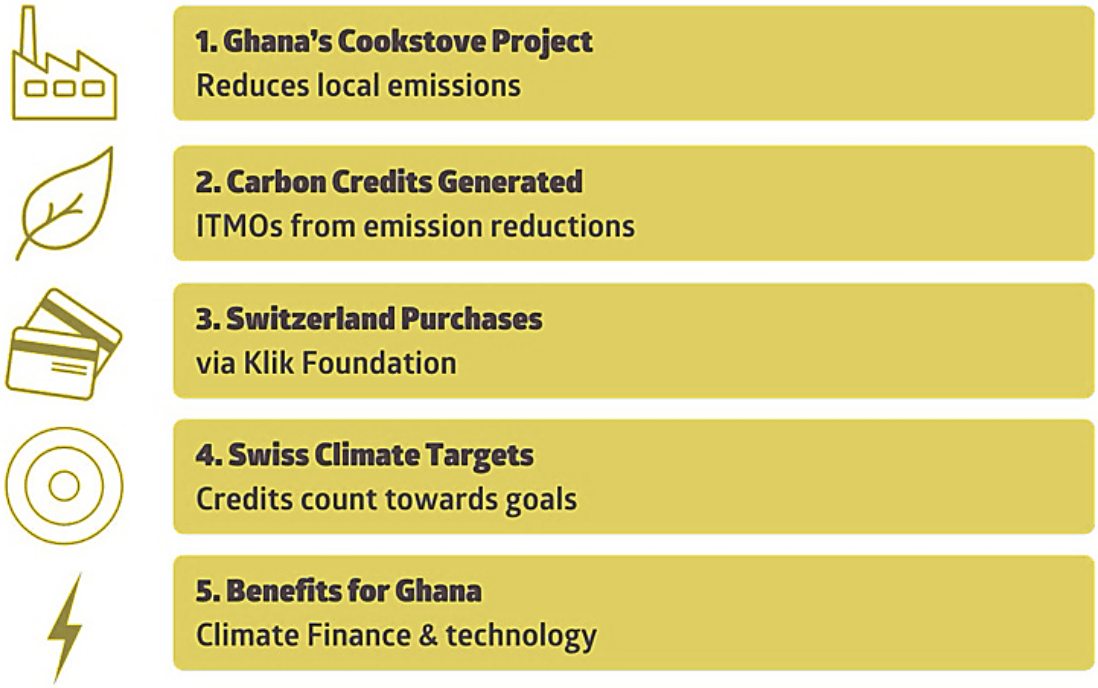


Project development timeline through 2024 — original case study diagram

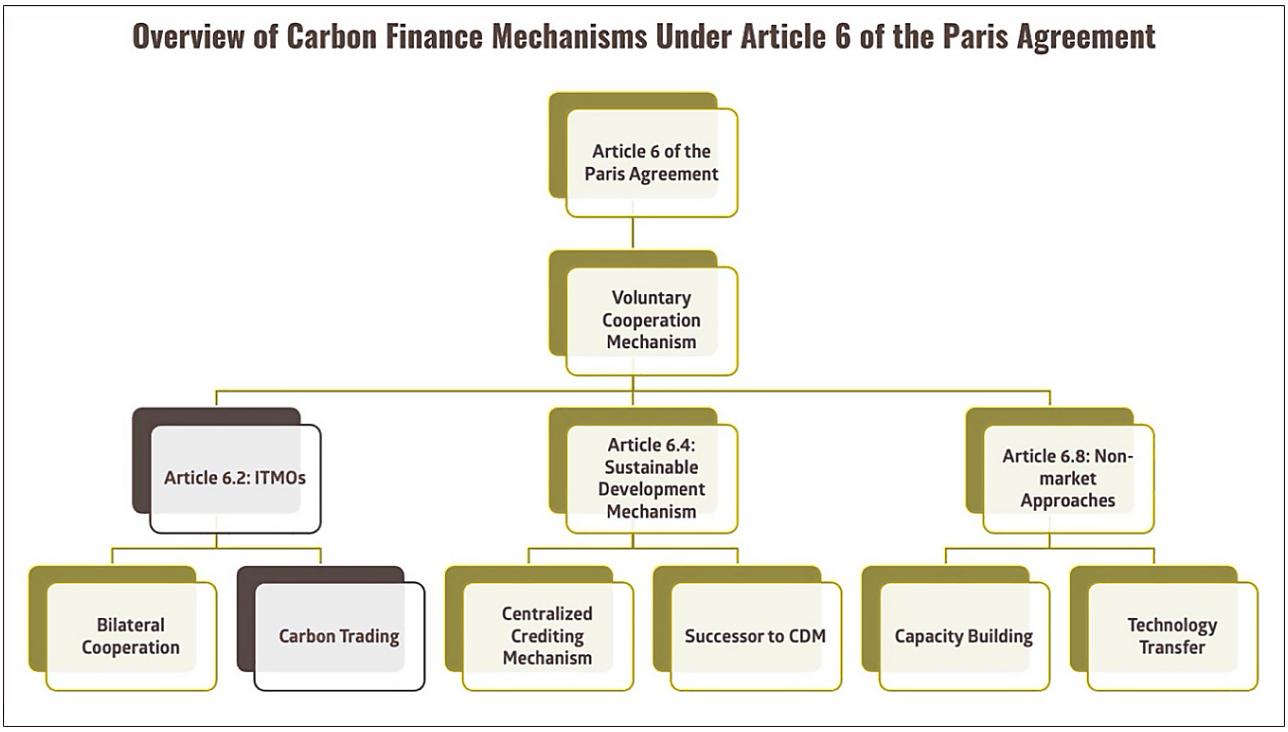
03 / CASE STUDY

Key Innovation: Carbon Finance via Bilateral Cooperation under the Paris Agreement

The EFI Cookstove Project represents the first cookstove project benefiting from carbon finance generated under a bilateral agreement under Article 6.2 of the Paris Agreement, which allows countries to cooperate in achieving their respective climate goals. Here's how it works:



Five-step overview of the Article 6.2 arrangement — original case study graphic



Framework for Article 6 cooperation — original case study diagram

Internationally Transferred Mitigation Outcomes (ITMOs) are a key component of Article 6 of the Paris Agreement, which provides a framework for voluntary cooperation between countries to achieve their climate targets. Article 6 recognizes that countries may need to collaborate to meet their Nationally Determined Contributions ("NDCs") and introduces three mechanisms to facilitate such cooperation: Article 6.2, Article 6.4, and Article 6.8. ITMOs, under Article 6.2, are one of these mechanisms and represent a new market-based approach to carbon trading that aims to enhance the global effort to reduce greenhouse gas emissions.

What are ITMOs?

ITMOs are essentially carbon credits or emission reductions that can be transferred from one country to another to help meet their respective climate commitments under the Paris Agreement. Unlike traditional carbon credits issued under the Voluntary Carbon Market or the Clean Development Mechanism (CDM) of the Kyoto Protocol, ITMOs are specifically designed for use under the Paris Agreement's framework. This allows for the accounting of emission reductions in one country's NDC while recognizing the transfer of the environmental benefit to another. ITMOs are unique in their:

Mechanism: ITMOs allow a country that has overachieved its targets to transfer the excess reductions to another country that needs them to meet its own target.

Accounting: The transaction must be transparent, with both countries adjusting their national GHG inventories accordingly—a process known as "corresponding adjustments." This ensures that emission reductions are not counted twice.

Flexibility: ITMOs offer flexibility in how countries can achieve their climate goals, enabling cost-effective solutions and potentially mobilizing greater private sector investment in climate mitigation projects.

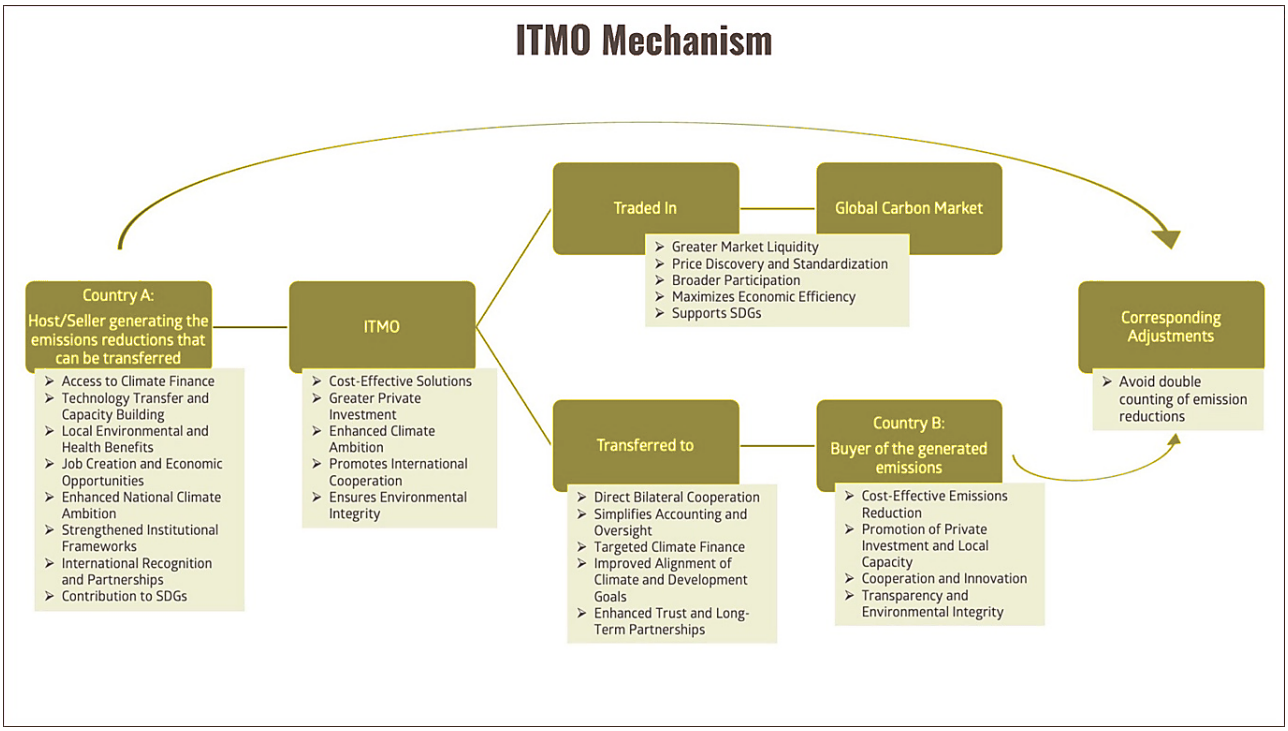
How ITMOs fit within the Paris Agreement

Article 6 is often seen as one of the most complex and innovative aspects of the Paris Agreement because it introduces mechanisms that can harness market and non-market approaches to enhance global climate action. ITMO projects can:

Promote ambition: By enabling countries to trade emission reductions, ITMO projects can drive greater ambition in climate policies. Countries that can reduce emissions more cost effectively can sell their excess reductions to countries where reductions are more expensive, leading to cost-efficient global emission reduction.

Encourage innovation: The potential financial benefits of transferring ITMOs can incentivize countries and private entities to invest in innovative, scalable, and high-impact climate solutions, such as the EFI Clean Cookstove Project in Ghana.

Ensure environmental integrity: Article 6 emphasizes environmental integrity, transparency, and sustainable development. The rules governing ITMOs ensure that emission reductions are real, verifiable, and additional (i.e., they would not have occurred without the project).



Internationally transferred mitigation outcome (ITMO) mechanics — original case study diagram

Why ITMOs are important for Climate Finance and Mitigation

ITMOs represent a significant evolution in international carbon and climate finance markets. They provide several benefits critical for scaling up global climate action:

The mobilize climate finance: ITMOs can attract private investment by creating a reliable market for carbon credits. For example, in the EFI Cookstove Project, the sale of ITMOs provides a financial return to investors, making it possible to mobilize funds that would otherwise be unavailable.

They enhance mitigation efforts: By facilitating international cooperation and trading of emission reductions, ITMOs help countries achieve their NDCs in a cost-effective manner. This, in turn, promotes more ambitious climate targets and accelerates the global transition to low-carbon economies.

They support sustainable development: ITMO projects are typically designed to achieve co-benefits such as poverty alleviation, health improvements, and economic development. In the case of the EFI Cookstove Project, this means not only reducing GHG emissions but also improving health outcomes for low-income households and creating local economic opportunities.

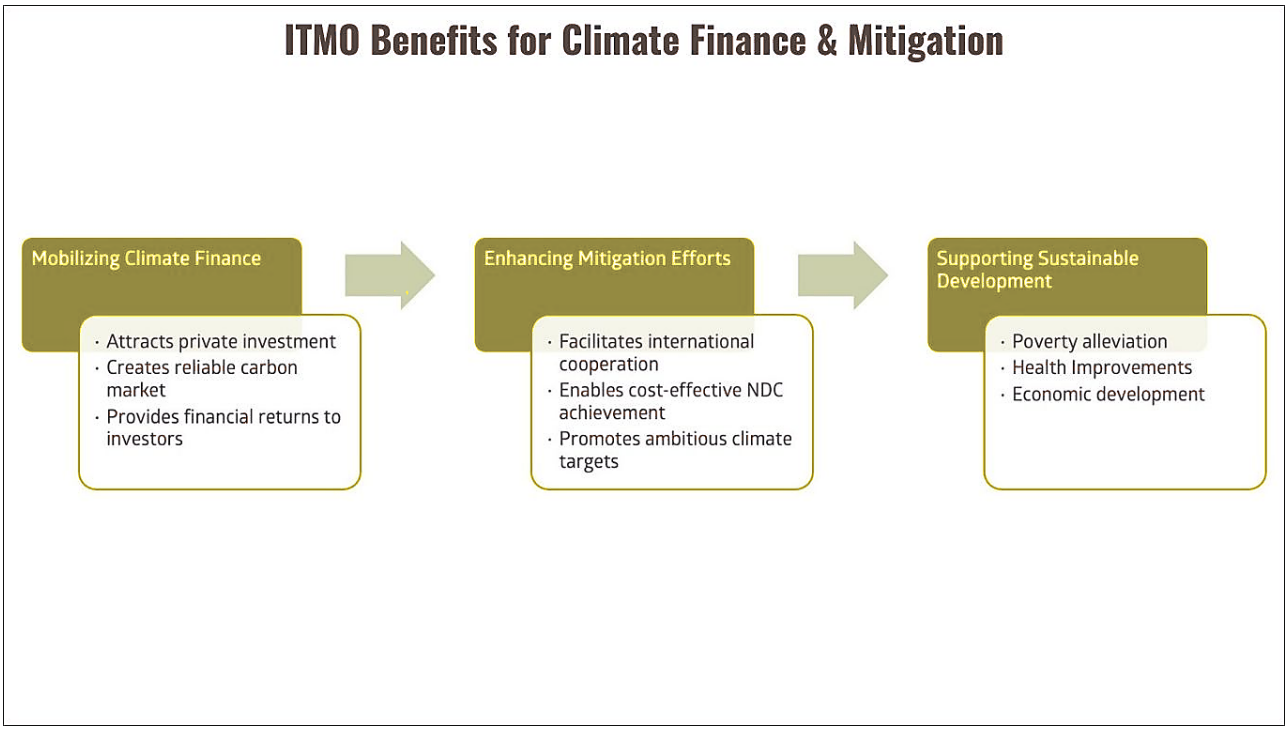
Differences between ITMOs and other Carbon Credit Mechanisms

While ITMOs share some similarities with earlier carbon credit mechanisms such as the CDM, there are some key differences such as:

Double Counting Avoidance: Unlike CDM credits, which did not require adjustments in national inventories, ITMOs require both countries involved in a transfer to make corresponding adjustments to their GHG inventories, thereby avoiding double counting of emission reductions.

Broader Scope: ITMOs can cover a wider range of activities and sectors, as the Paris Agreement's scope is more comprehensive than that of the Kyoto Protocol, which primarily targeted industrialized countries.

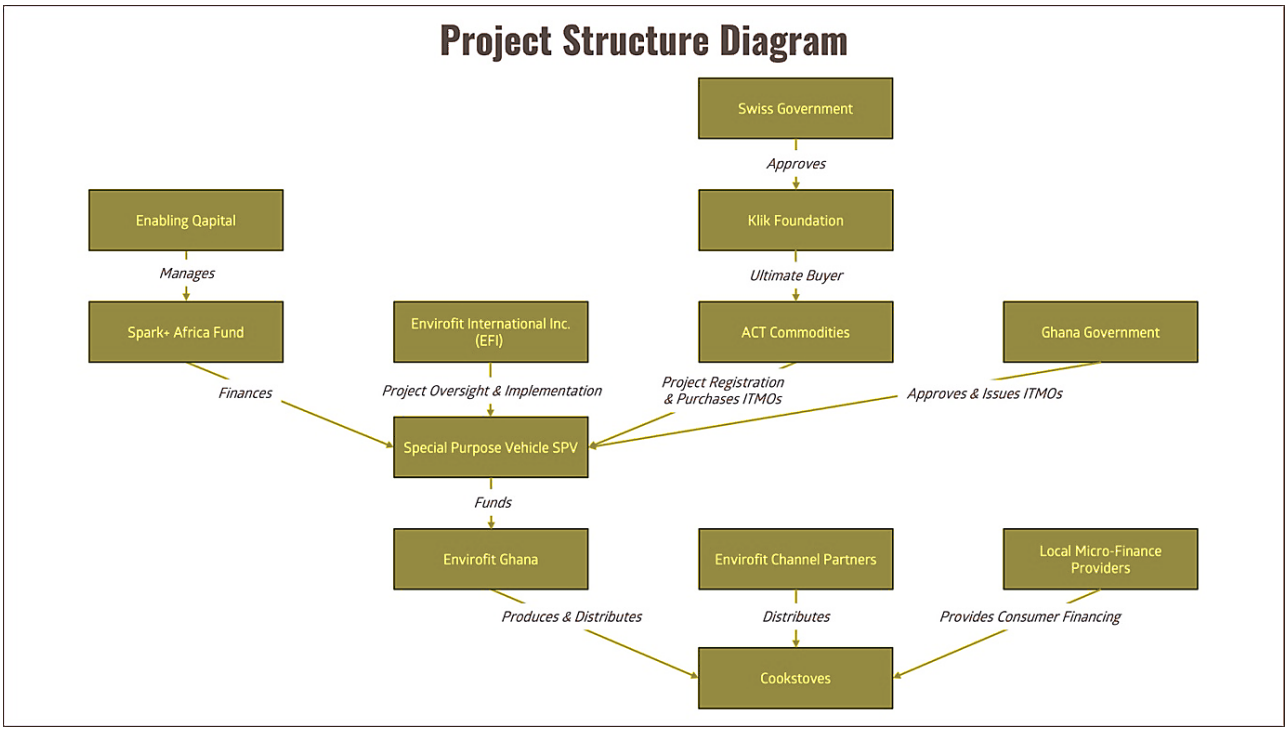
Bilateral Agreements: ITMO transactions often rely on bilateral agreements between countries, providing more flexibility and allowing countries to tailor the transactions to their specific circumstances and regulatory environments.



Climate finance and mitigation benefits — original case study graphic

04 / CASE STUDY

Project Structure



EFI project structure and funding relationships — original case study diagram

Total Project Cost: The total investment required for the initial phase of the EFI Cookstove Project was approximately USD 4 million. This funding financed the setup of a local production facility, procurement of materials, distribution of cookstoves, program management and monitoring and supporting operational expenses.

Funding Sources: The project was financed through a combination of debt from Spark+, as well as equity from EFI, ensuring that EFI retains a portion of the financial risk in the successful execution and management of the project.

Revenue Sources: A key component of the financial model is the Mitigation Outcome Purchase Agreement ("MOPA") signed between KliK and ACT, and a 'back-to-back' MOPA between ACT and EFI. These agreements ensure the sale and conversion of emission reductions generated by the project into ITMOs issued by the Ghanian government and provide a guaranteed revenue stream to repay the debt, in addition to a smaller share of revenue derived from customer receipts for the subsidized purchase price of the stoves.

Cost Structure: A significant portion of the expenses will be incurred upfront as fixed costs, including those related to the production facility setup, equipment importation, and initial distribution efforts. Thereafter, ongoing operational costs will include maintenance, monitoring, and administrative expenses.

Expected Returns: The expected return on investment will be influenced by the number of ITMOs generated by the project, which is contingent on the thermal efficiency of the stoves, the number of stoves in operation each year, and the levels of usage of the operating stoves, in addition to other key assumptions in the MADD and mitigation outcome calculation methodology.

Risk Mitigation: The financing structure includes variable payments and incentives tied to the achievement of project targets, which helps mitigate execution risks. In addition, extensive feasibility studies and strategic planning, leveraging the extensive experience of EFI in similar projects around the world, before the financing was provided by Spark+, further de-risked the business case.

Long-term Financial Sustainability: The project was designed to be financially sustainable in the long term, with the potential for scaling up operations and expanding the distribution of cookstoves beyond the first phase of 60,000 units. This could lead to additional revenue streams from future carbon credit sales under the same MOPA which covers 180,000 stoves in total.

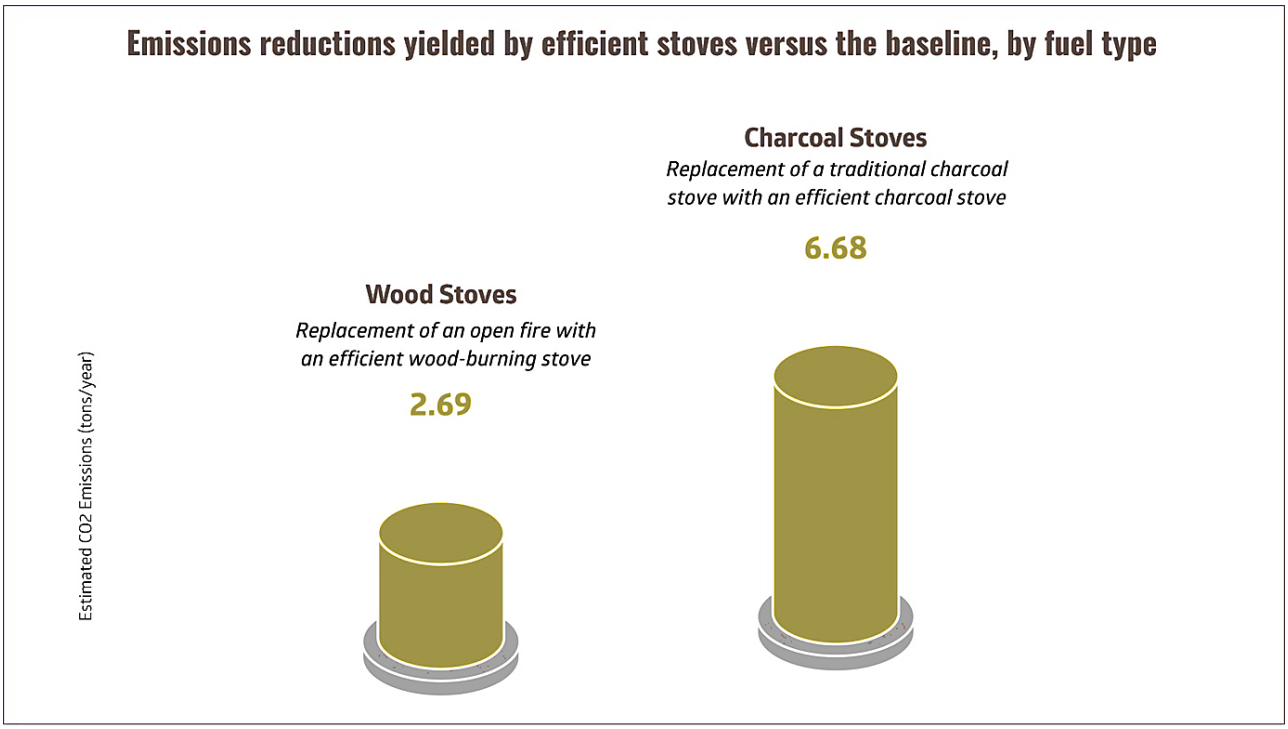
In summary, the financial model of the EFI Cookstove Project is to leverage debt via a Special Purpose Vehicle, secure revenue primarily through ITMO sales, and ensure long-term sustainability through careful management of costs and risks. The expected returns are closely tied to the performance of the deployed cookstoves, with a focus on achieving measurable environmental and social impact.

By providing a clear, market-based framework for countries to collaborate on climate mitigation, Article 6.2 of the Paris Agreement can play a critical role in scaling up global climate action. It will not only offer financial incentives to drive emission reductions, but also ensure that these reductions are transparent, accountable, and environmentally sound. The EFI Cookstove Project in Ghana exemplifies the innovative use of ITMOs to achieve multiple benefits—environmental, social, and economic—while setting a precedent for future climate finance initiatives.

05 / CASE STUDY

Social and Environmental Impact

The cookstoves adopted by customers as part of the EFI Cookstove Project reduce smoke and toxic emissions by as much as 80% and cooking fuel costs by as much as 60%. As many as 10,000 deaths each year in Ghana are attributed to air quality issues.



Illustrative emissions reductions by stove and fuel type — original case study chart

The EFI Cookstove Project delivers multiple benefits:

Environment and climate: Reduction of carbon emissions and deforestation.

Health: Improved indoor air quality for households.

Economic: Job creation in stove assembly and distribution.

Gender: Reduced time and effort for women in fuel collection and cooking.

It achieves these benefits through a combination of factors, including:

Innovative Financing: Leverages the sale of Article 6.2-based ITMOs.

High-Quality Cookstoves: EFI's stoves exceed Ghana's efficiency standards.

Local Production: Facility set up in Ghana, generating both employment and technology transfer.

Strong Partnerships: Collaboration with local partners for distribution.

06 / CASE STUDY

Challenges and Solutions

The EFI Cookstove Project, while promising, faces several challenges that could impact its success. However, strategic mitigants are in place to address these issues.

Market Acceptance

Challenge: Ensuring market acceptance of the improved cookstoves.

Solution: Envirofit and its partners conducted extensive surveys confirming demand and price acceptance. Partnerships with local organizations and community leaders were established to enhance outreach and build trust.

Affordability:

Challenge: Making cookstoves accessible to low-income households.

Solution: Stoves are offered to customers at a 65-70% discount to (unsubsidized) standard retail pricing, with additional financing options available. Subsidized costs and flexible payment plans ensure affordability.

Implementation

Challenge: Ensuring efficient project execution and delivery of cookstoves.

Solution: Performance-based milestones for project execution serve as benchmarks for assessing progress and accountability, allowing for timely strategy adjustments.

EFI Cookstove Project participants have proactively identified and addressed potential challenges through strategic decision-making, ensuring the project's viability and impact in promoting sustainable cooking practices. By focusing on market acceptance, affordability, and efficient implementation, the project is well-positioned to remain economically viable, while achieving its goals through contributions to broader climate and development objectives.

07 / CASE STUDY

Looking Ahead

The pioneering EFI Cookstove Project paves the way for future Article 6.2 transactions, demonstrating how international cooperation can accelerate climate action and sustainable development. Spark+ Africa Fund, managed by impact asset manager Enabling Qapital, is proud to be at the forefront of innovative climate finance.

The project demonstrates significant potential for scaling and replication by addressing key challenges to adoption of clean cooking solutions, while contributing to broader sustainable development goals. Some of the key scalability factors include:

However, challenges remain, and must be mitigated carefully for similar projects to be successfully designed and implemented:

Overall, despite the inevitable associated risks and challenges, the EFI Cookstove Project serves as a promising model for improving health outcomes, reducing gender disparities in energy access, and contributing to global climate goals, and one which should be viewed as a template for further replication in Ghana and beyond.

Conclusion

The Spark+-financed EFI Cookstove Project in Ghana is a good example of how innovative climate finance mechanisms can lead to sustainable development. By distributing cleaner and more efficient cookstoves, the project not only contributes to a reduction in greenhouse gas emissions but also enhances the health and well-being of communities that rely on traditional cooking methods. The economic benefits, including job creation and local capacity building, further underscore the project's multifaceted impact.

As a pioneering initiative and one of the first under Article 6.2 of the Paris Agreement, this project sets a precedent for future climate finance transactions. It demonstrates the potential for innovative mechanisms to facilitate international cooperation in achieving emission reduction targets while fostering sustainable development by providing the basis for investors and lenders, such as the EQ-managed Spark+ Africa Fund, to underwrite a project with risk-adjusted returns. In addition, the project generated significant co-benefits along the entire value chain including employment creation, improved household health and technology transfer. The successful implementation of this project should inspire others to create similar initiatives in Africa and around the world, paving the way for a more robust and collaborative approach to climate action leveraging private capital markets.

Together, we can drive meaningful change and create a lasting impact in the fight against climate change and towards sustainable development in Africa and beyond.