



ASIA CLEAN ENERGY FORUM 2024

Deep Dive Workshop:
**Electrifying Cooking – Innovative Approaches and
Business Models for Asia and the Pacific**

5 JUNE 2024

Modern eCooking; leveraging a decade of Asian electricity access gains, including mini-grids and off-grid generation and recent developments on accessing carbon finance for eCooking

S Batchelor



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Cooking sector

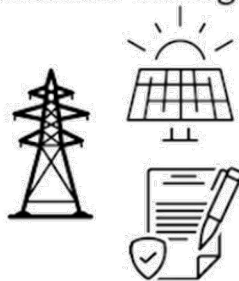


Pre 2018

Mutual
Neglect



Modern energy sector



Policy
discussion

Evidence

Context
changes

2022

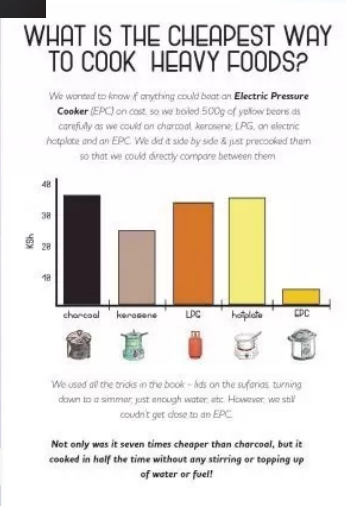
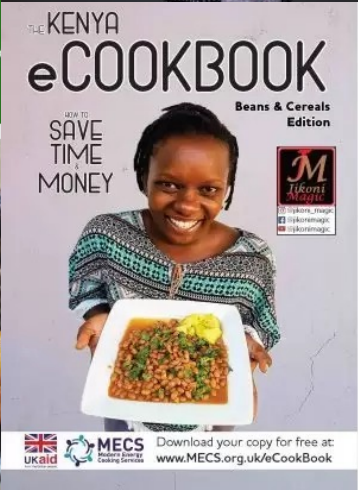
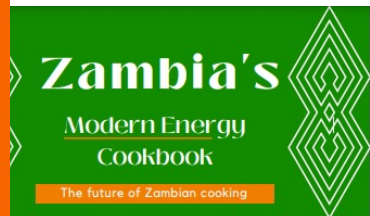
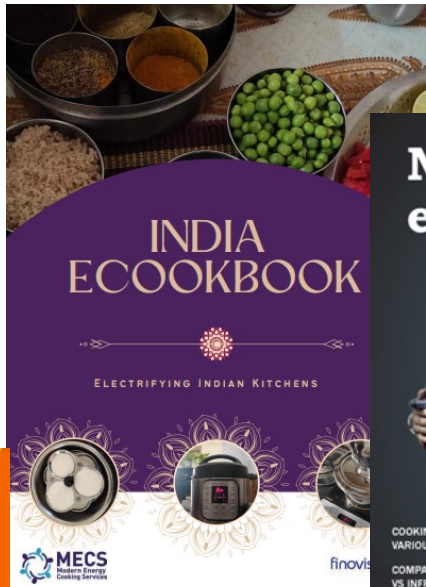
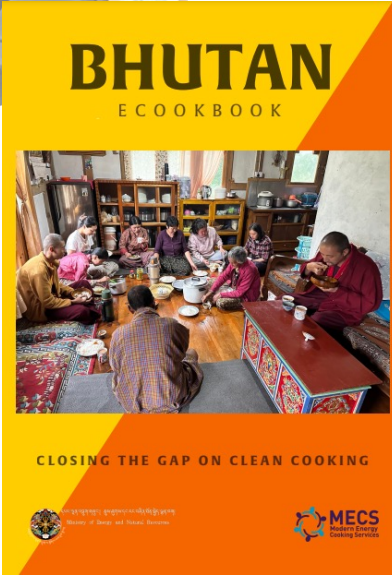
Mutual Support



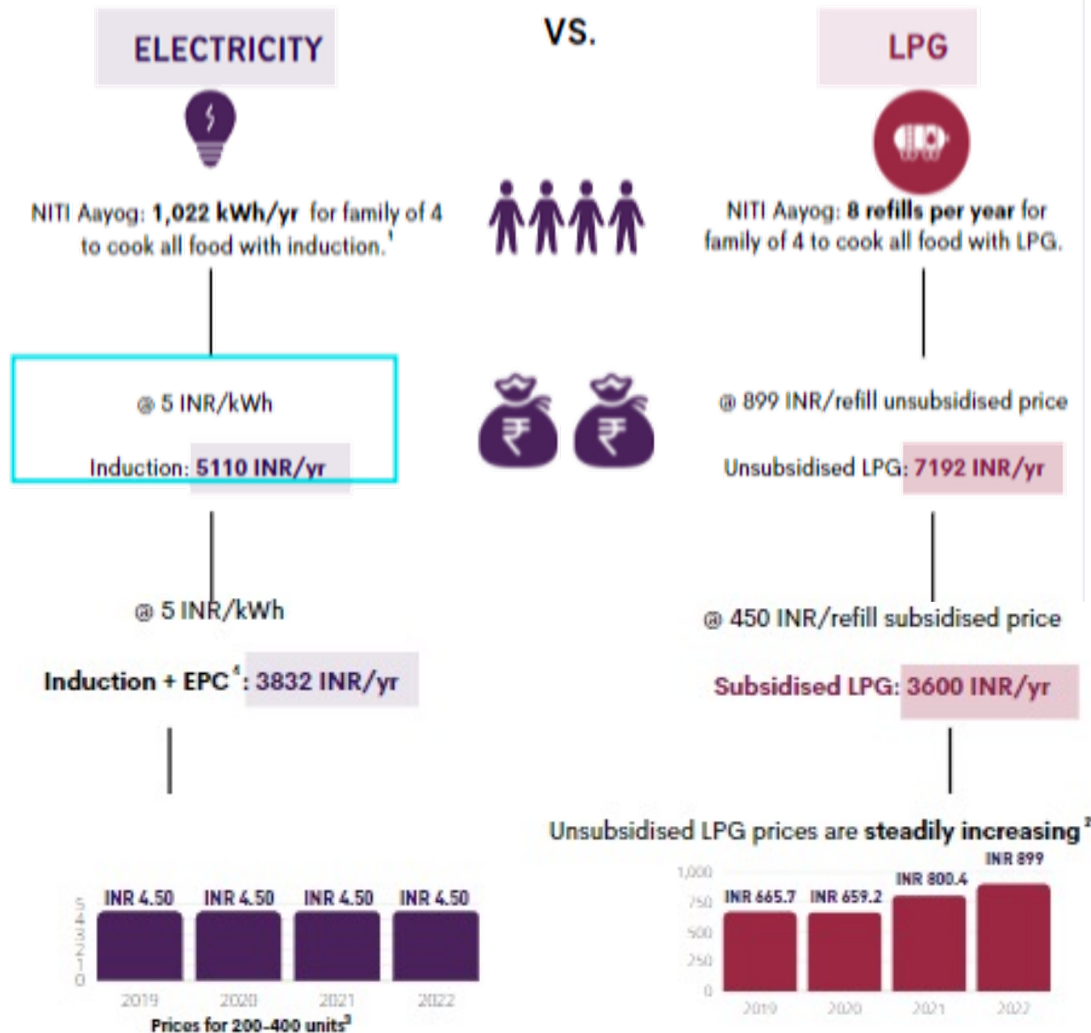
Integrated Planning of modern energy inclusive of cooking



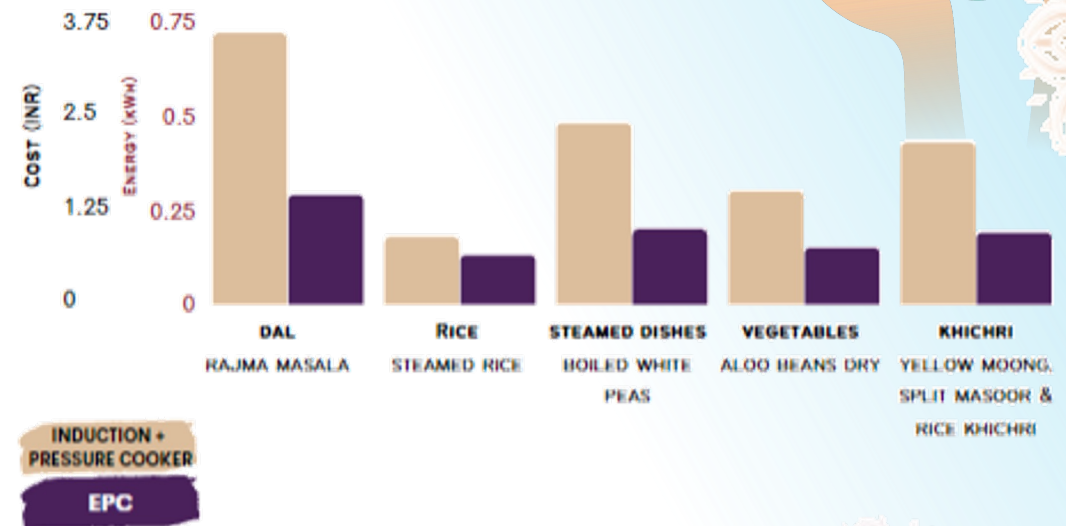
Culture, modern habits, taste and cost



TYPICAL COSTS OF COOKING



.....and cost



50%

Average cost saving with EPC

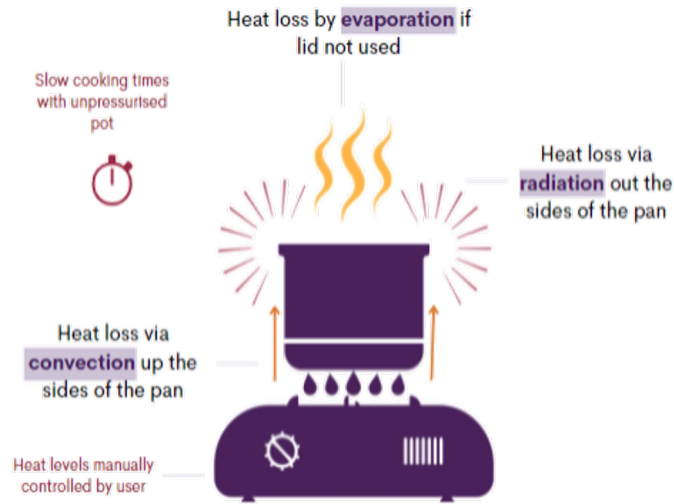
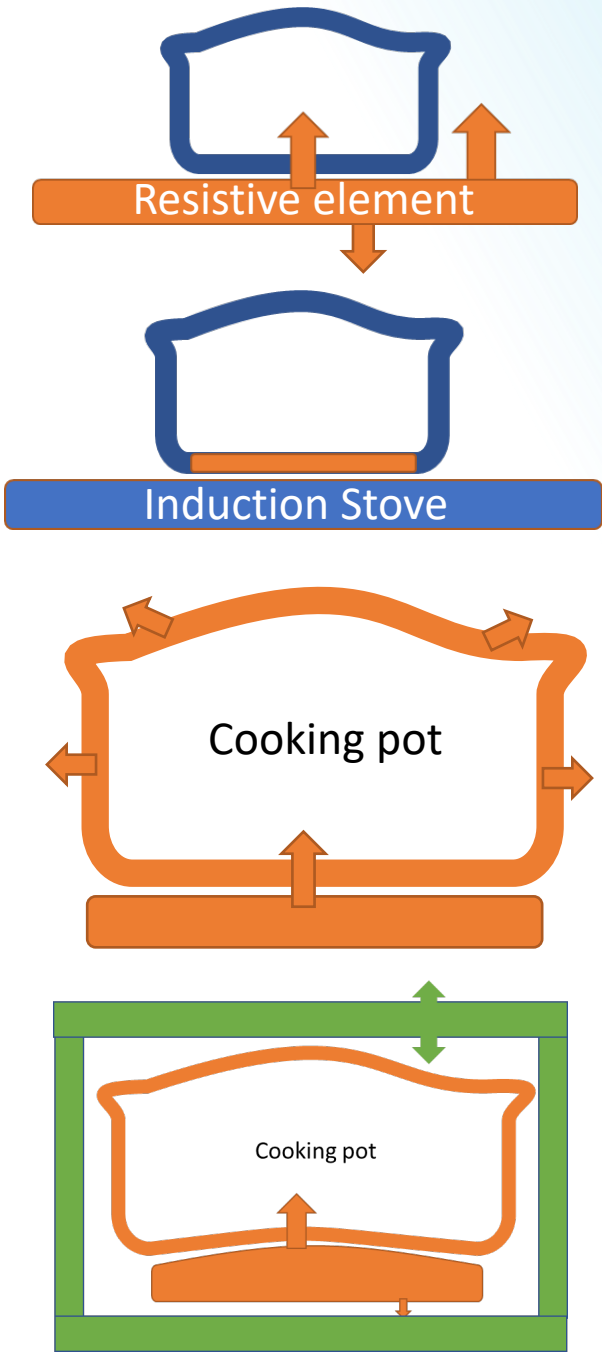


Table 8 Energy consumption relative to hotplate (based on median values)

Device	Energy used expressed as proportion of energy used by Hotplate (%)
Modern hobs	
Induction	83%
Infrared	92%
Insulated and automated devices	
Rice cooker	77%
Frying pan	83%
Curry cooker	75%
Pressurised device	
EPC	48%



Energy Efficiency

Global electric Cooking Coalition (GeCCo)

Niche to Norm



Engagement Group Members to date



Electric cooking - from niche technology to mainstream living



RENEWABLES-BASED ELECTRIC COOKING

Climate commitments and finance



The challenge of integrated planning

- Local transformers and household connections
- Proportion of Renewable Generation
- Not waiting until 99% access
- Leveraging investment

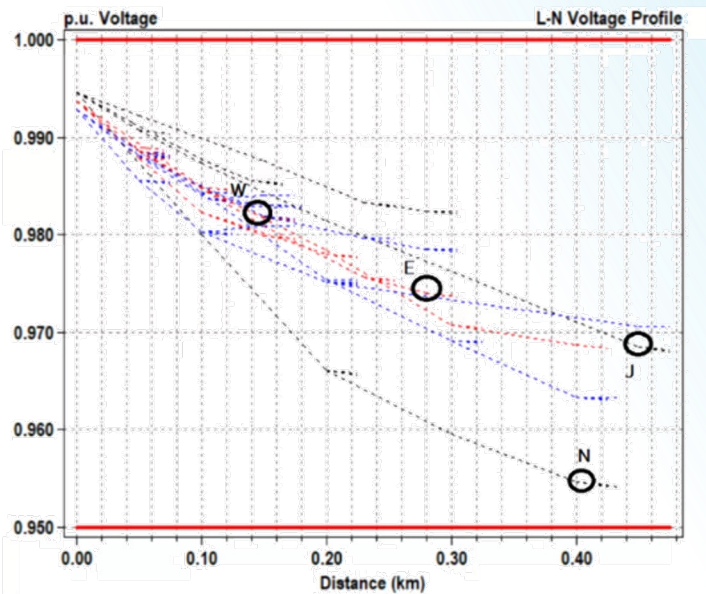
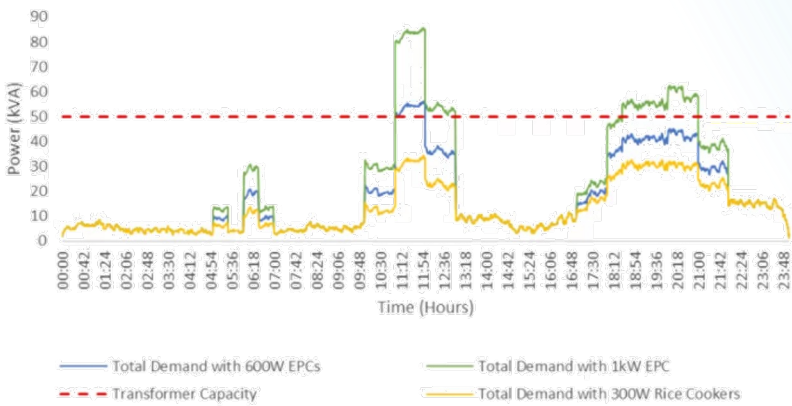
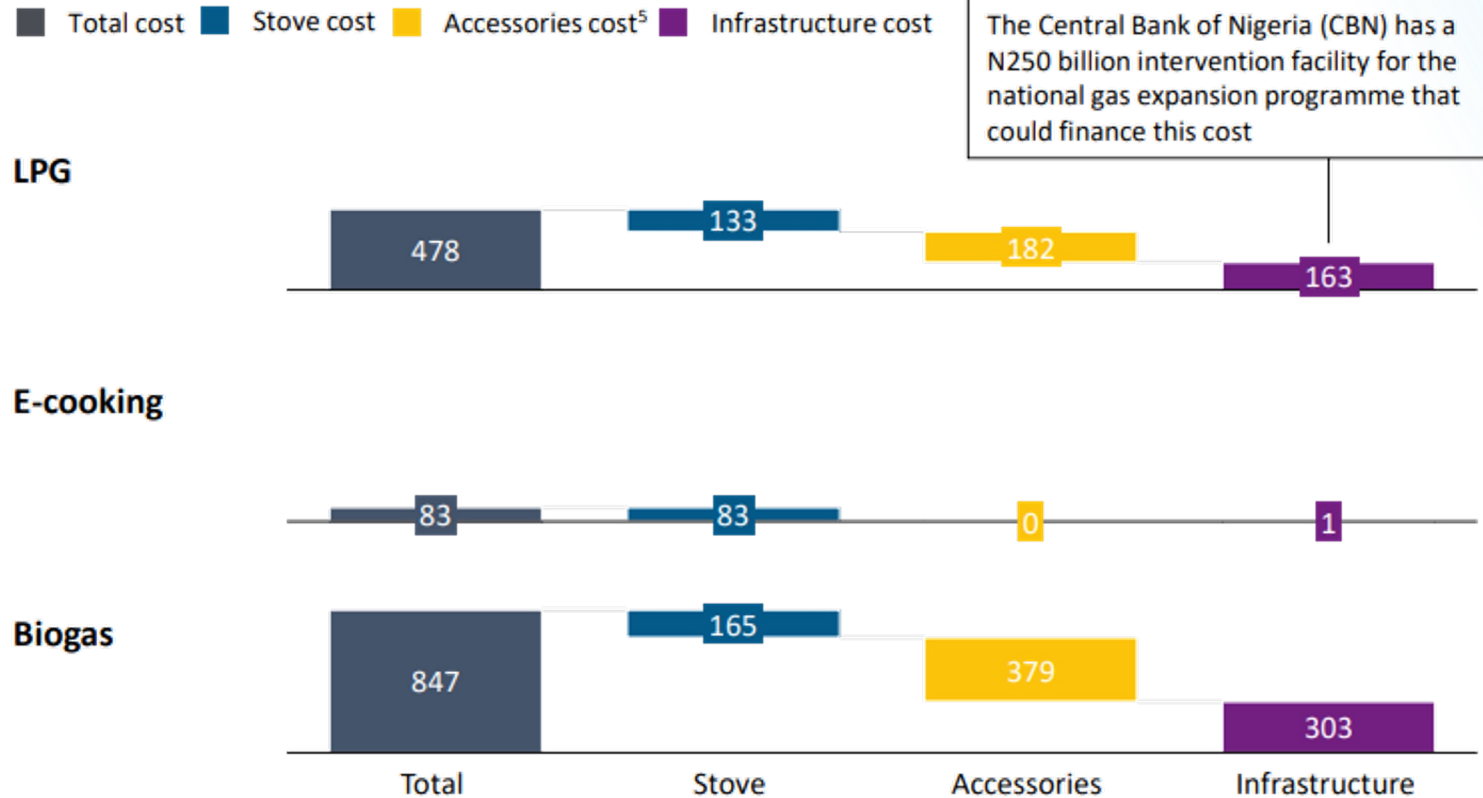


Figure 3. Voltage Profiles within LV network after introduction of 1kW EPCs.



The challenge of integrated planning 2

Investment required to realise clean cooking opportunity in Nigeria in 2030¹, USD Mn

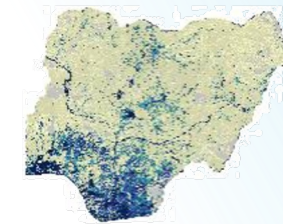


Geospatial model output: Clean cooking opportunity (2030)

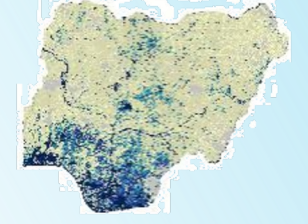
% of HHs in settlement

0-25 25-50 50-100 >100 Clean cooking Unpopulated

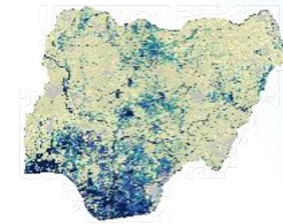
LPG



E-cooking



Biogas



	Rural	Urban	Total
HHs access-constrained from CC ¹	23.6mn	13.1mn	36.6mn
HHs with LPG opportunity	1.5mn	2.2mn	3.7mn
HHs with e-cooking opportunity	1.3mn	2.1mn	3.5mn
HHs with biogas opportunity	2.0mn	2.3mn	4.3mn

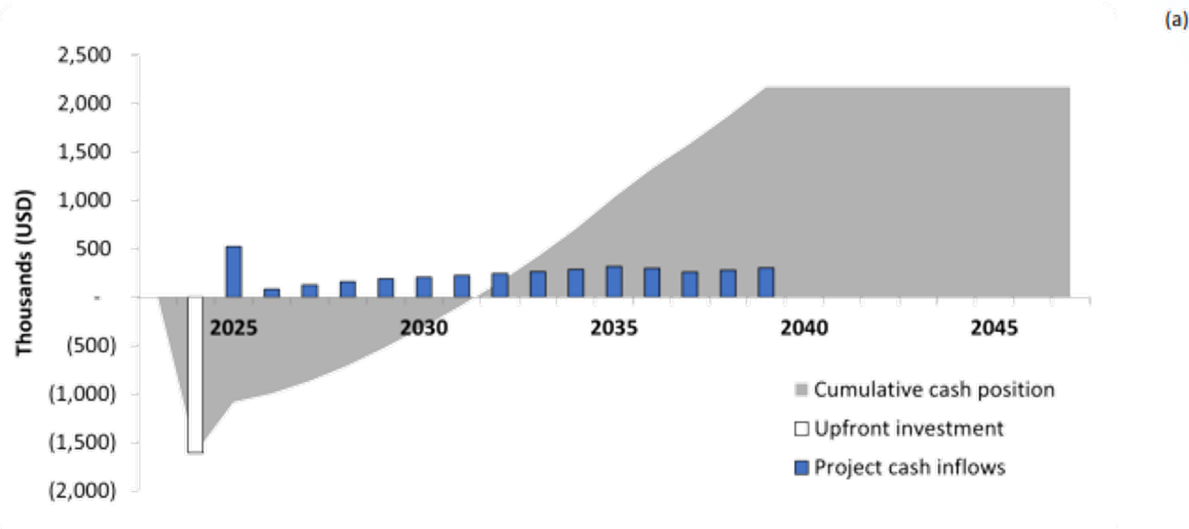
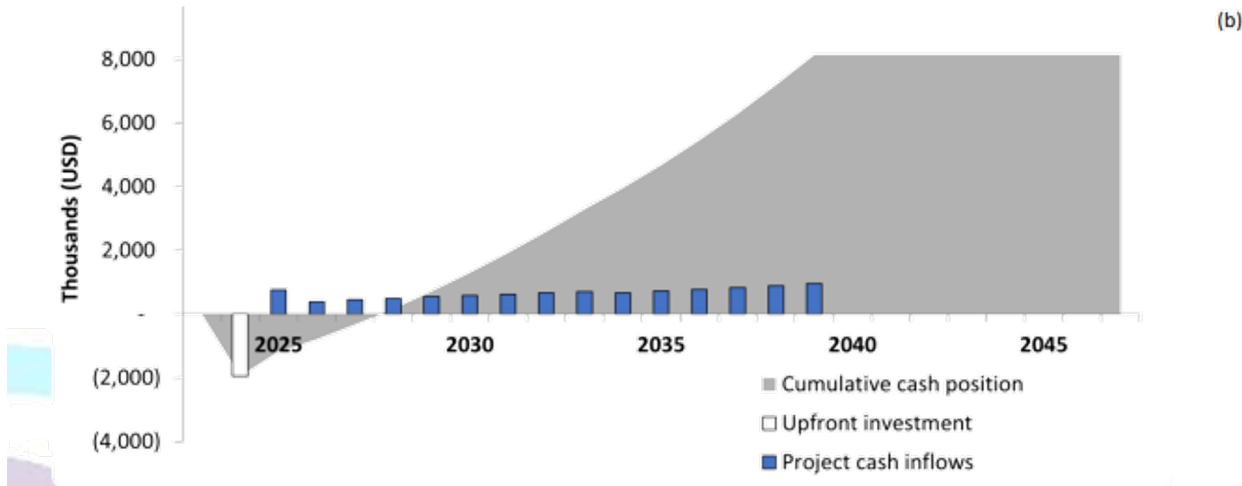


Figure 4.3: Cashflow analysis and payback period for Project 1 (a) without eCooking (b) with eCooking. Developer 1, 2023 [1].



Mini Grids

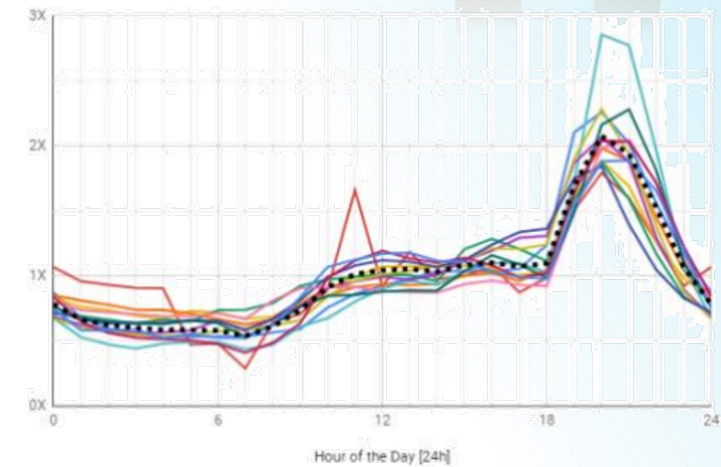


Figure 4.2: Average normalised daily load profiles of mini-grids in Project 1 context. Developer 1, 2023 [1].

Stand alone systems



Image credit left: Kachione LLC
Right.: An eWant 5L electric pressure cooker (EPC) connected to two 280W solar panels connected in parallel such that the current is doubled for the same voltage



Indian Oil Corporation thermal storage solar cooker (left) ([link](#)) & Calpoly: Insulated Solar Electric Cooker (ISEC) with phase change materials (right) ([link](#))



Carbon Finance

Carbon finance – Voluntary Carbon Market

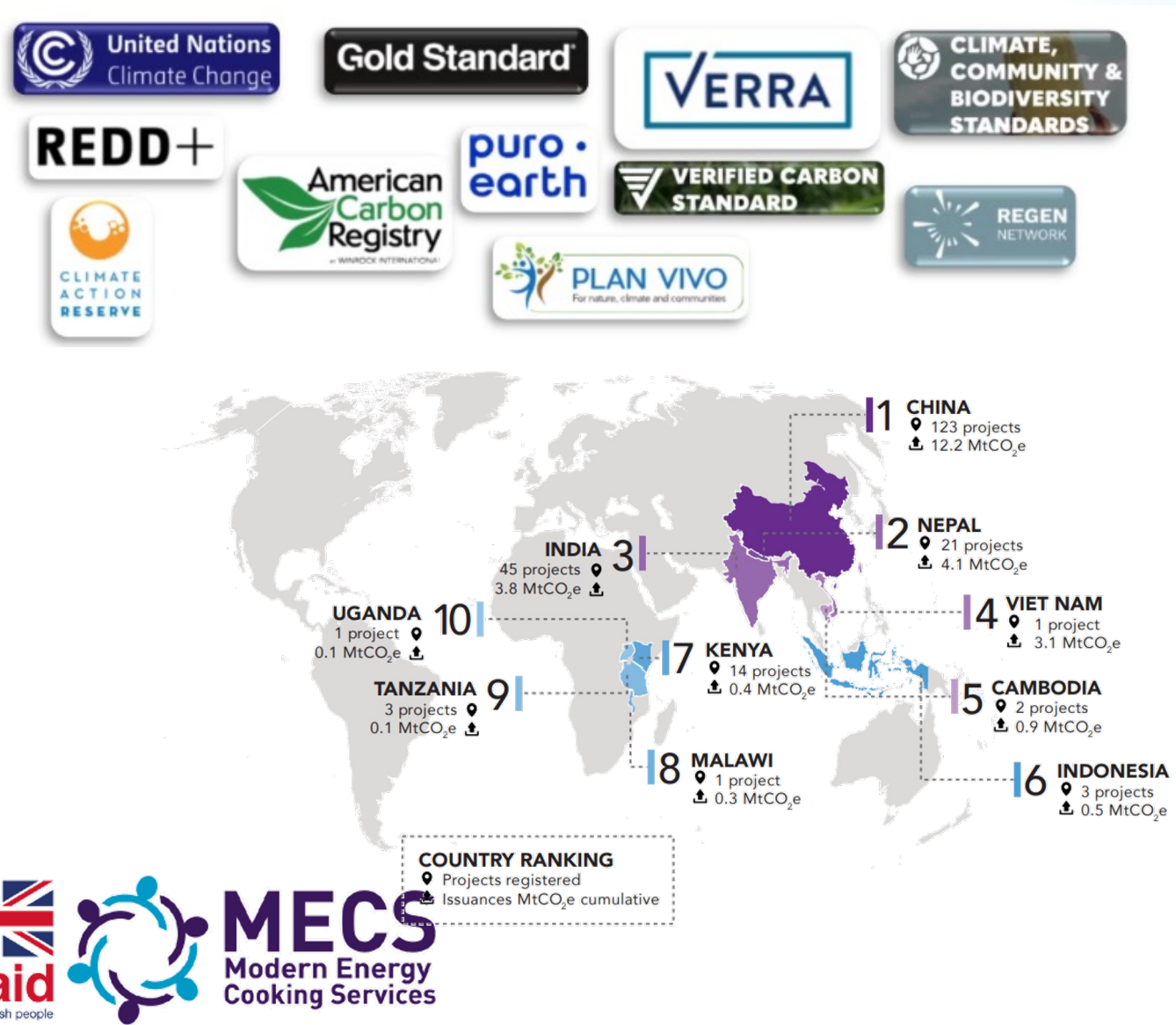
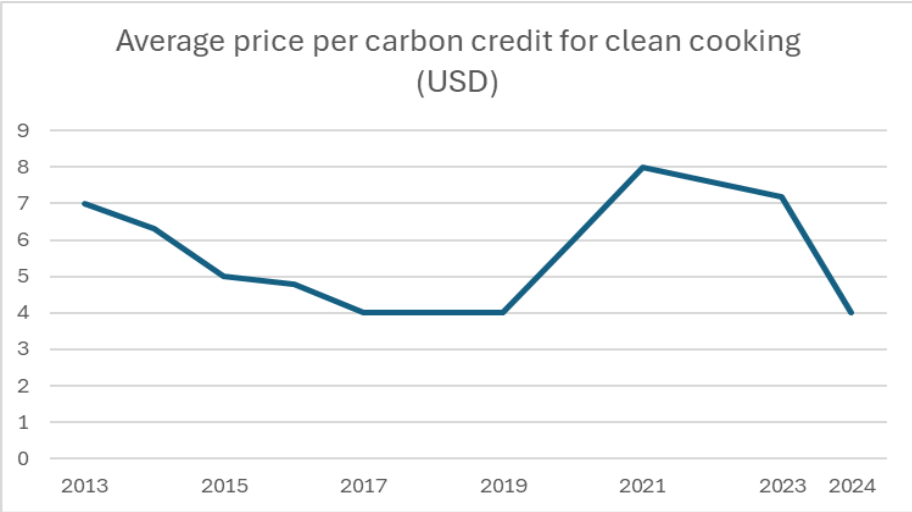


Figure 6: Just five countries are responsible for 95 percent of global issuances from clean cooking (in purple).



Carbon Finance - 2024 a turbulent year for cooking

undermining climate action and long-term SDG financing. Here we conduct a comprehensive, quantitative, quality assessment of offsets by comparing five cookstove methodologies with published literature and our own analysis. We find misalignment, in order of importance, with fraction of non-renewable biomass, firewood–charcoal conversion, stove adoption, stove usage, fuel consumption, stacking (using multiple stoves), rebound and emission factors. Additionality, leakage, permanence and overlapping claims require more research. We estimate that our project sample is over-credited 9.2 times. Gold Standard’s metered methodology, which directly monitors fuel use, is most aligned with our estimates (1.5 times over-credited) and has the largest potential for emission abatement and health benefit. We provide recommendations to align methodologies with current science and SDG progress.



Pervasive over-crediting from cookstove offset methodologies

[Annelise Gill-Wiehl](#)✉, [Daniel M. Kammen](#) & [Barbara K. Haya](#)

Nature Sustainability **7**, 191–202 (2024) | [Cite this article](#)

Carbon finance – Over-crediting due to high fNRB?

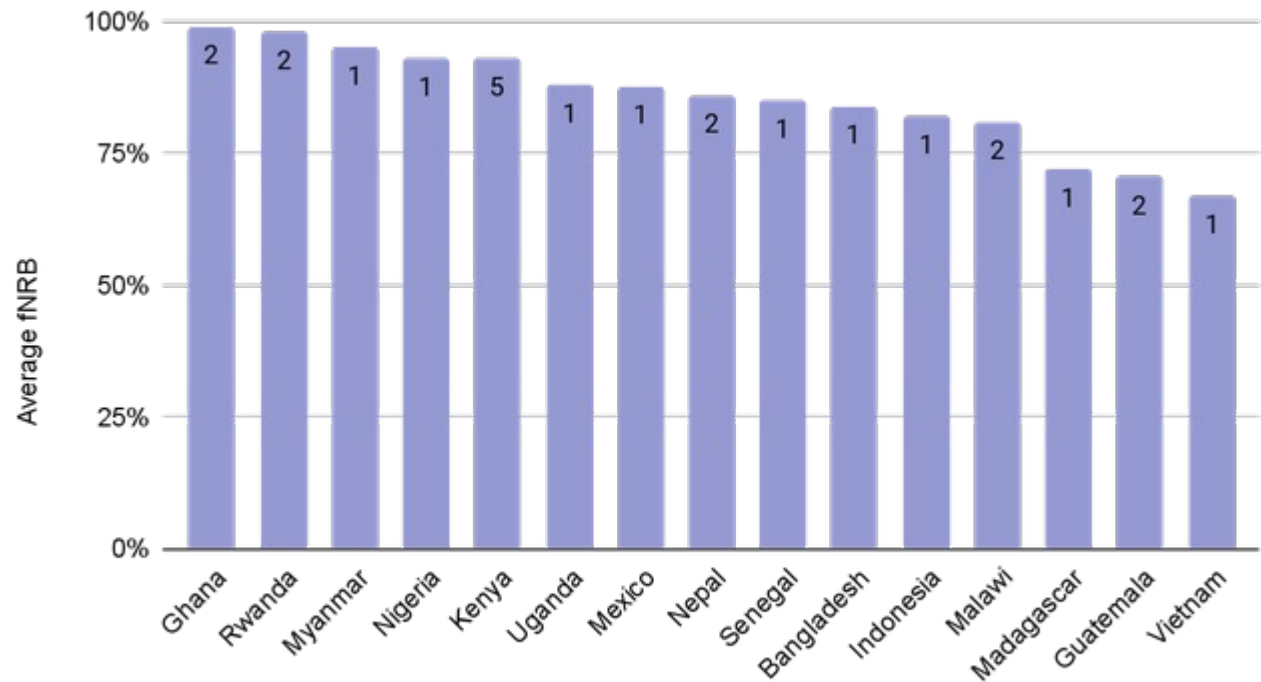


Figure 3. Average national fNRB as reported by projects from 24 projects rated by BeZero Carbon. Number of projects per country is listed within the column labels.



Carbon finance – Its expensive to register.

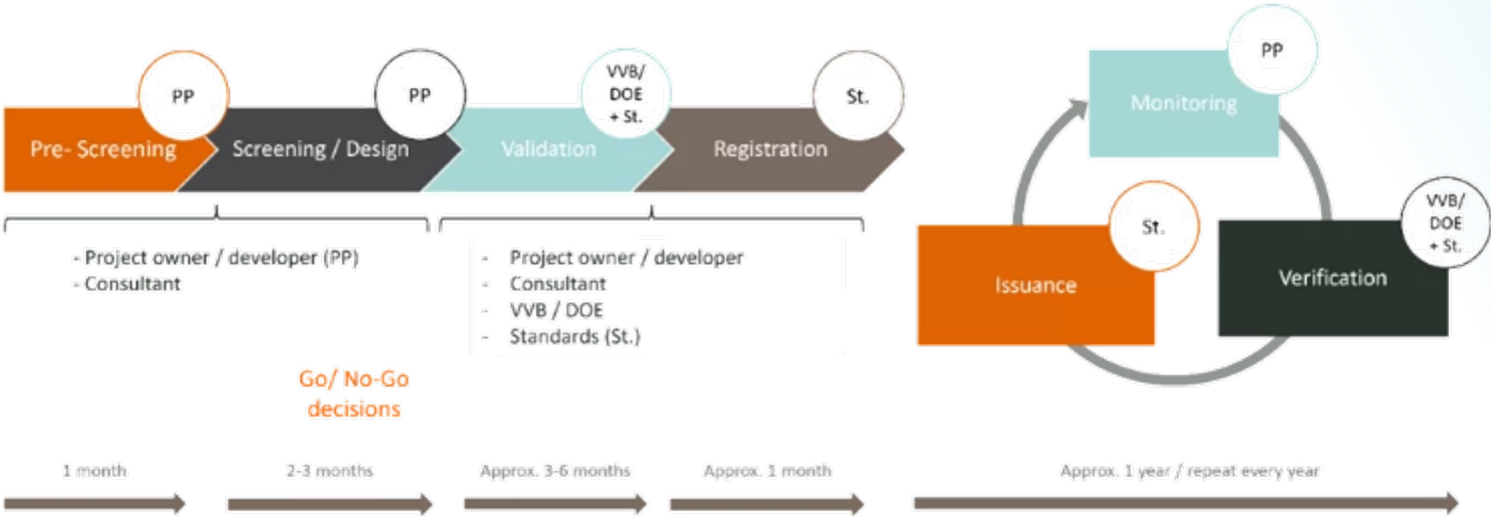


Figure 2. Project Cycle (image credit: Nexus for Development, 2023).



Carbon finance – Its expensive to register.



Responsibility: Project developer Auditor Carbon standard

Cost: All costs provided are indicative only. Actual costs will depend on the scale of the project, its location, and the applied methodology.

Time: The time needed for each step is indicative only. Actual time will depend on the complexity of the project.



Responsibility:

Cost: US\$ 5,000 – 10,000

Time: ~3 months

Responsibility:

Cost: US\$ 50,000 – 75,000 (upfront)

Time: ~6 months

Responsibility:

Cost: US\$ 10,000 – 20,000 (upfront)

Time: 3-6 months

Responsibility:

Cost: US\$ 3,000 – 5,000 (upfront)

Time: ~2 months

Responsibility:

Cost: US\$ 30,000 – 50,000 (recurring)

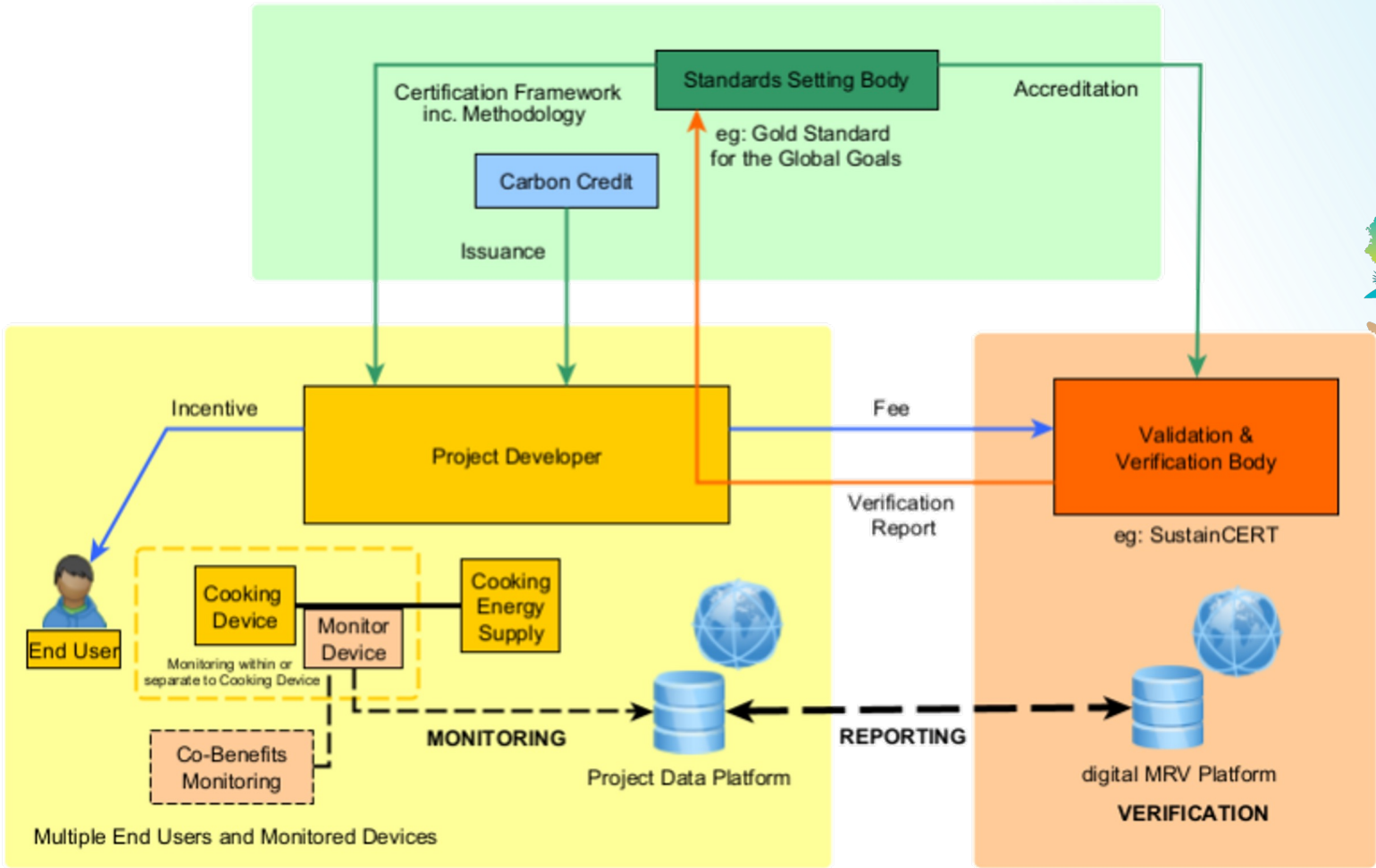
Time: ~6 months

Responsibility:

Cost: Varies depending on issuance volume

Time: ~1 month

Carbon finance – Digital Monitoring – actual use.



Carbon finance – Live tracking



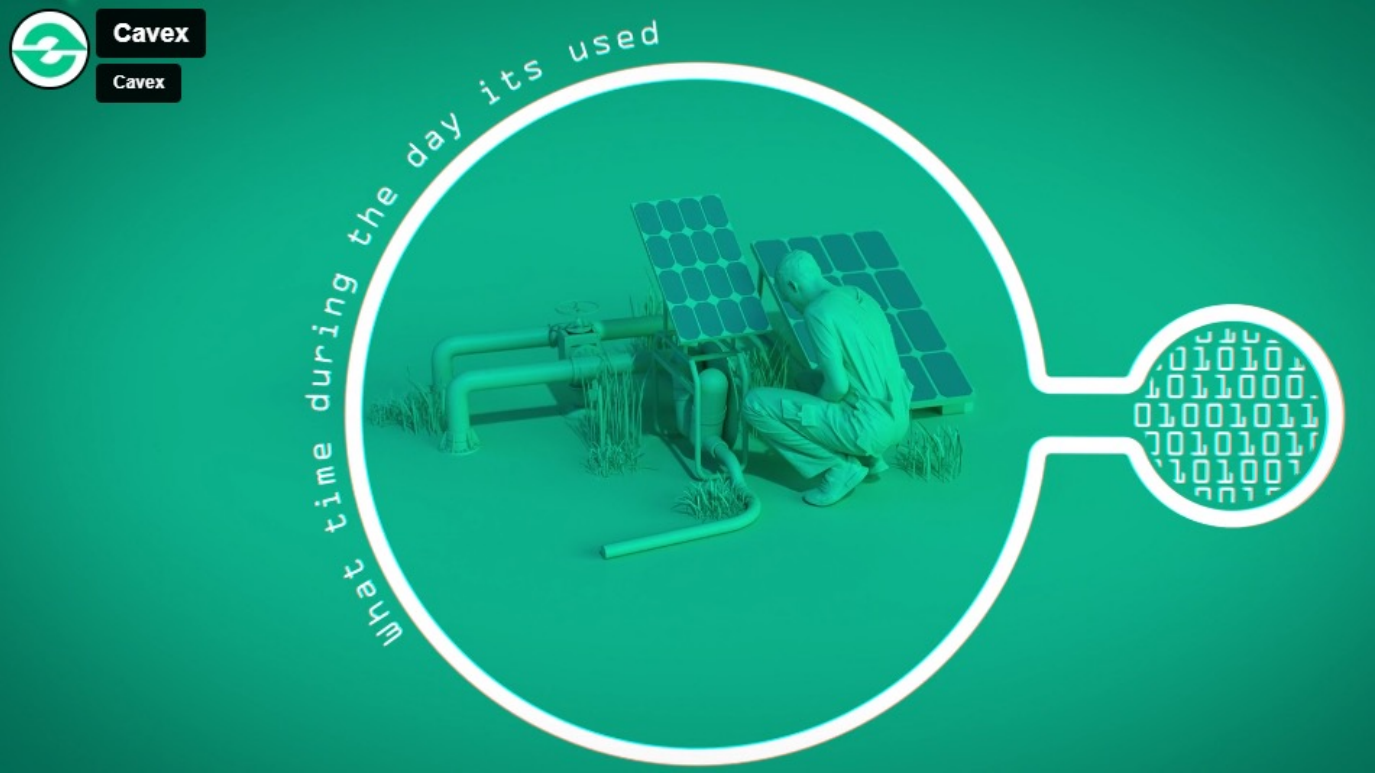
Carbon finance – Cook to earn.



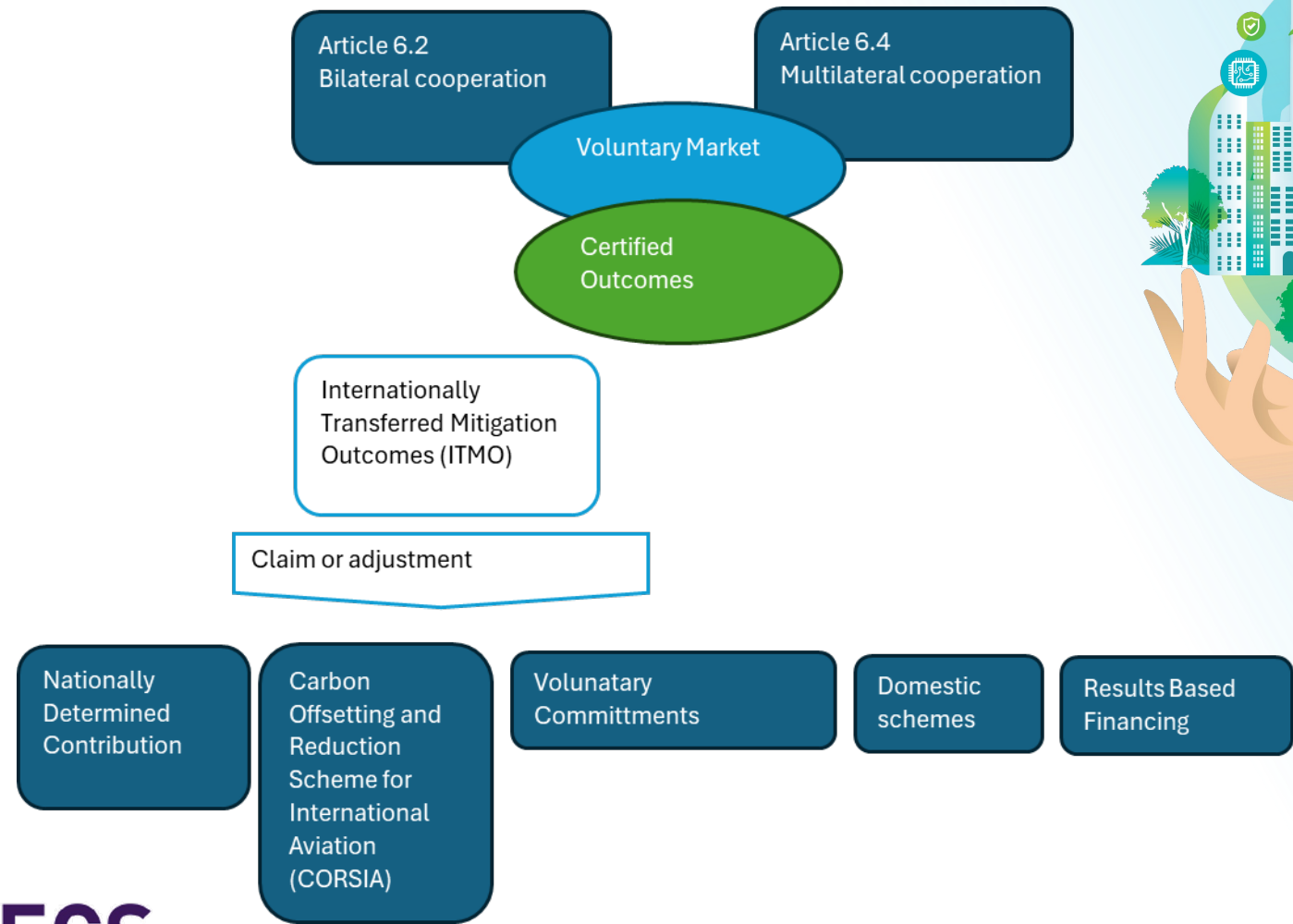
*Capped to 5 kWhr per day



Carbon finance – New platforms.



Carbon finance – Article 6 – formalising the flows.





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MECS
Modern Energy
Cooking Services



References

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