

'Ethno-engineering'

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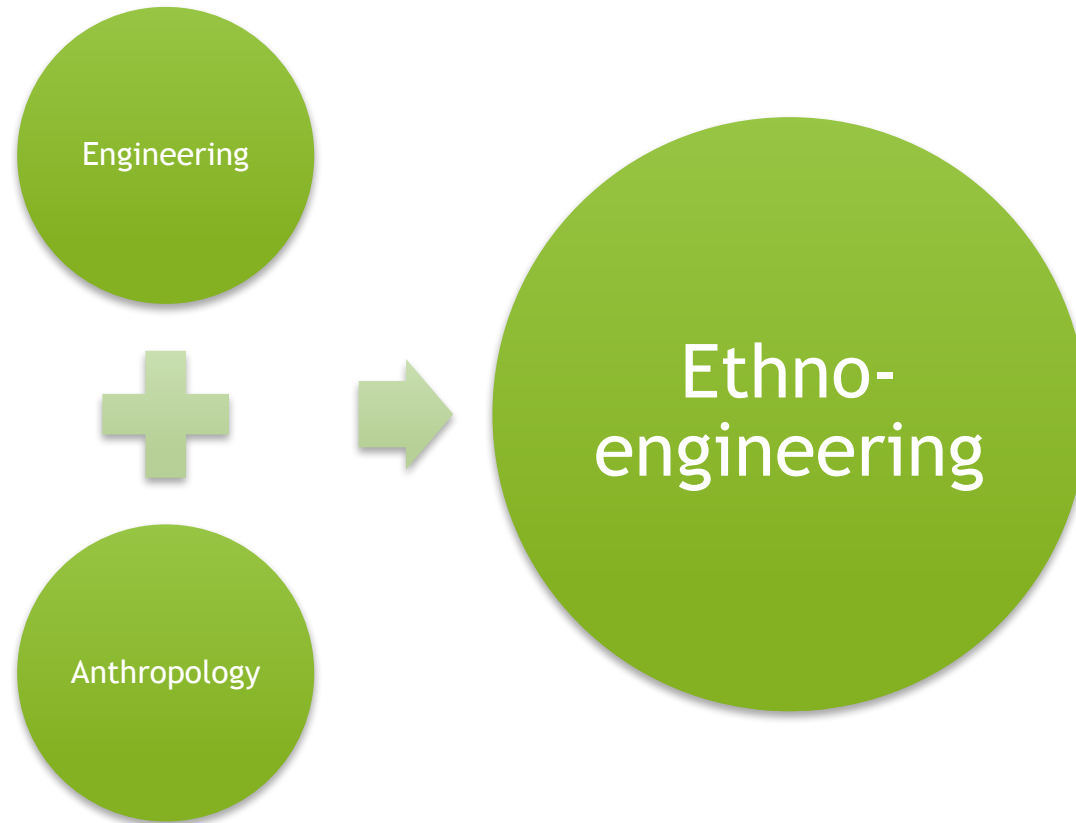
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**LOW CARBON ENERGY FOR DEVELOPMENT
NETWORK**



What is ethno-engineering?



What is ethno-engineering?

- ▶ Ethno-engineering has been used since the 90s, primarily referring to engineering practices of indigenous peoples [10], [11].
- ▶ Recently adapted to the pairing of anthropologists & engineers.
 - ▶ Integrating the two disciplinary approaches to offer a more holistic & culturally informed understanding of decentralised energy.
 - ▶ Planning more effective interventions to alleviate poverty [12].
 - ▶ Understanding and applying culturally distinctive skills and practices in a participatory development process, carefully observing the resulting changes in community practices [8], [13], [14].

Decentralised energy for development

- ▶ Energy lights dark nights, irrigates dry fields & refrigerates lifesaving vaccines, facilitating the escape from poverty [1].
- ▶ Decentralised energy technologies empower users to generate & store their own energy, making them particularly appropriate for regions with limited access to and/or unreliable centralised infrastructure [1], [2].
- ▶ Small scale renewable energy systems can offer a solution to many of the 1.3 billion without access to grid electricity and/or the 3 billion without access to clean cooking facilities at home [3], [4].
- ▶ The UN's *'Sustainable Energy for All'* has set the ambitious objective of achieving universal energy access by 2030 [1].
 - ▶ Access is increasing [5], however many initiatives soon fall into disrepair, as the technology is not adopted into daily life [6], [7].

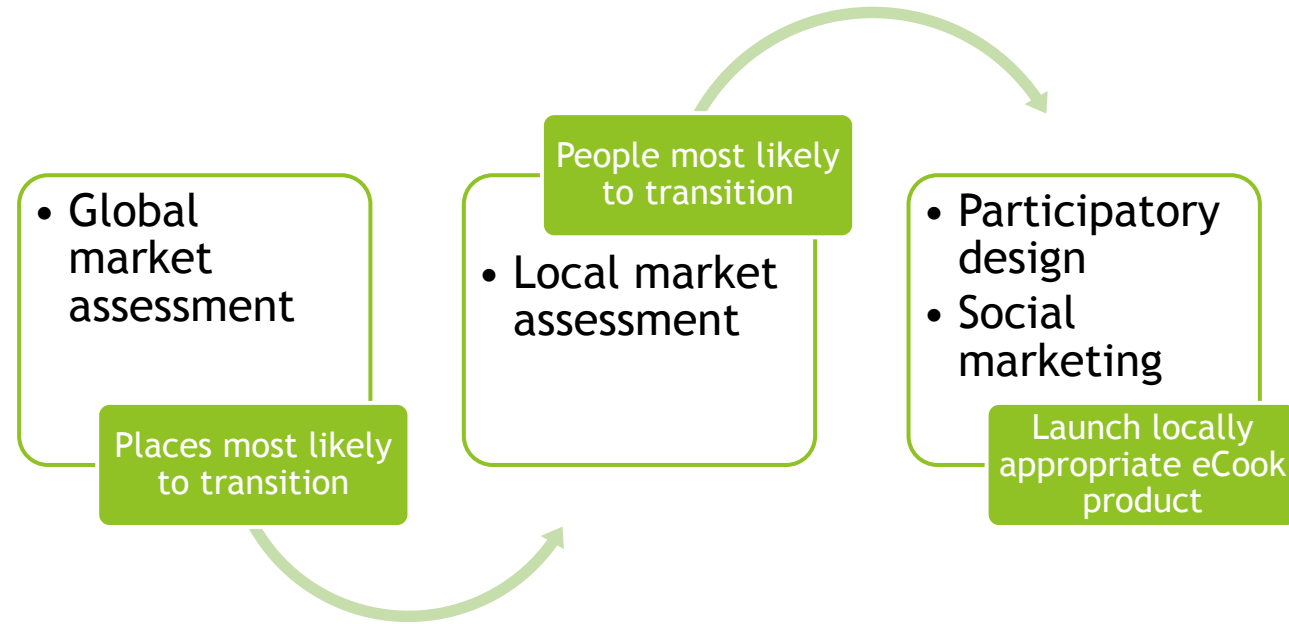
What can ethno-engineering offer?

- ▶ Ethnography and engineering may seem unlikely partners, but decentralised energy systems in a development context are a technical solution to a social problem [4], [8].
 - ▶ Ethno-engineering fuses social science with engineering to offer new perspectives on intertwined socio-technical relations.
 - ▶ Ethnography offers valuable insight into culturally distinctive processes of domestication of new technologies.
 - ▶ Engineering reveals how they physically function [4], [9].

Key attributes of ethno-engineers

- ▶ Ethno-engineers are:
 - ▶ Highly knowledgeable about the cultural practices of the people they hope to assist.
 - ▶ Willing to engage with these people in an iterative process over a long period of time.
 - ▶ Aiming to optimise positive social change with carefully targetted technological interventions.
 - ▶ Not necessarily formally trained anthropologists or engineers, but regularly employ techniques from both fields

eCook Zambia



- ▶ Fusing anthropological & engineering approaches to facilitate the domestication of solar electric cooking devices in Zambia

- ▶ Participant observation
- ▶ Cooking diaries
- ▶ Design Challenge



eCook Zambia Design Challenge

‘The prototype’



Evolution
Domestication
‘Zambianisation’



Participatory design to facilitate sustainable adoption

eCook Zambia Design Challenge

▶ **AIM**

- ▶ To facilitate the participatory design of eCook, allowing the generic concept to evolve around Zambian cooking practices.

▶ **OBJECTIVES**

- ▶ To convene representatives from local cookstove/solar lighting organisations and electrical utilities interested in adding eCook to their product lines.
- ▶ To enable Zambian cooks to guide the evolution of eCook so that it best matches their needs.
- ▶ To facilitate experimentation with potential eCook components and configurations.
- ▶ To create lasting partnerships between entrepreneurs, users and researchers that can guide the evolution of eCook in Zambia over the next 5-10 years.

eCook Zambia Design Challenge

Time	Session	CEEEZ	Cooks	Entrepreneurs	Judges	Description	Output
10:00	Opening	Speaking	Listening	Listening		Introducing eCook and the programme for the day. Explaining competitive format and technical, economic and social judging criteria.	Teams of entrepreneurs with equal balances of social, technical and business specialists.
10:15	Bake-off*	Facilitating	Cooking & giving feedback	Listening & asking questions		Cooks prepare their favourite everyday meal on their own stove and then try cooking it on the eCook prototype. Teams of entrepreneurs discuss how they could design a Zambian eCook product around the cooks' needs.	Feedback from cooks on generic eCook prototype & design specifications for Zambian eCook prototypes.
12:30	Lunch	Eating	Eating	Eating			
13:30	Prototyping	Facilitating	Listening & giving feedback	Prototyping	Judges briefing from 15:00	Entrepreneurs develop conceptual designs in response to cooks' feedback, focussing on business models, social impact and technical viability. Flip charts are available to sketch out ideas and tools/components/appliances to build prototypes where possible.	A series of designs for Zambian eCook.
16:00	Pitching	Facilitating	Pitching	Pitching	Judging	Showcasing the conceptual designs for Zambian eCook and pitching the business model.	The winning design for a Zambian eCook
16:40	Awards	Speaking	Listening	Listening		Prize giving ceremony & discussing next steps.	

► * BASED UPON UNIVERSITY OF NOTTINGHAM'S GREAT AFRICAN BAKE-OFF

Cooking diaries

- ▶ 20 HHs in each country
- ▶ 6 weeks of data collection
 - ▶ 2 weeks baseline
 - ▶ 4 weeks transitioning to electricity
- ▶ Recording what is cooked, how it is cooked and how much energy it uses
- ▶ Meal-level resolution
- ▶ Registration & exit surveys to capture user experiences
 - ▶ eCooking challenges



Cooking diaries

Cooking Diaries Registration Form

Good afternoon/afternoon. My name is Colin Rieck, from the Centre for Energy, Environment and Engineering, DASHA, London (CEE3). We are doing a project with Loughborough University (UK) on cooking practices in low income coastal lowlands (CLIC) and rural lowland and highlands (LGH) in the coastal and inland regions. This is part of an international research programme that aims to generate information from rural Africa and publishing research papers to inform modern cooking fuels.

How we can assist:

- You will be asked to complete information on your household as part of this registration process.
- You will be asked to keep a diary of all you cook and how you cook it over the next 6 weeks.
- During the first two weeks, please cook as you always do and simply record what you are doing on the data sheets.
- After two weeks, you will be asked to try cooking only with a factory in order to see how readily you can adapt, and how practical this is, if you are already cooking solely with woodfuel, we may ask you to change your practices in some ways.
- At the end of the diaries, a short walk survey will ask you how you get on.

How we will support you:

- I will visit your house and then at least once a week for a time that suits you to see how you are getting on, answer any questions you may have, and collect the data sheets. If you are able to send copies of the data sheets to us electronically using WhatsApp or equivalent, we can often receive assistance.
- If you do not own an internet phone, we will provide one for the second part of the trial.
- We will provide any additional advice that you use for cooking during the survey.

We will produce reports, guidance materials and academic papers detailing the findings from the research, which will be used to inform manufacturers and policy-makers in Zambia, Africa, and globally. Do you consent to any photos taken during the course of this study being used in such publications?
 (initials) _____

Your name will not appear in any data that shall be made publicly available and the information you provide will be solely used for research purposes. It is up to you to decide whether to take part or not, choosing not to take part will not disadvantage you in any way. If there are questions that you would prefer not to answer then we respect your right not to participate.

Do you consent to be part of this study? (initials) _____

Date: 2023-08-24 Time: 14:00

Contact No: 00254 732 25 1471

Researcher: Colin Rieck

Researcher to give the participant details of who to contact with queries for completed:
 Researcher name: Colin Rieck
 Researcher phone number: 00254 732 25 1471

CEE3
 Centre for Energy, Environment and Engineering, DASHA, London (CEE3)

Gamos UNIVERSITY OF SURREY Loughborough University







Family Touch
PETROLEUM JELLY

Big Candies

Spartite

2007 HOLIDAYS

MONTH	2007	2007	2007	2007	2007
JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Plot 1014, Shalom Road, Herry Industrial Area, Bot 30274, Canada
Tel: +866-311-247052, 241870, Fax: +866-311-243890, 243891
e-mail: usa@salton.com

salton
USE YOUR LEG

6

ELECTRIC PRESSURE COOKER

A white and orange box for a Salton electric pressure cooker. The box features the brand name 'salton' in a stylized font, the slogan 'USE YOUR LEG', and a large red circle with the number '6'. Below this, it says 'ELECTRIC PRESSURE COOKER'. On top of the box, two digital scales are placed, with their power cords plugged into the box. A black pressure cooker is partially visible in the foreground.

Participant observation





Ideas from *'Why the World Needs Anthropologists'*

- ▶ eCookBook
 - ▶ A recipe book of typical Zambian dishes listing the expected range of energy and power consumptions under various cooking scenarios
- ▶ Motivations for behaviour change
 - ▶ Environmental, political, health, convenience, reliability, independence drivers behind transitioning to eCook
- ▶ Link to cultural occasions
 - ▶ e.g. offer gift vouchers for a year of eCook use as wedding gifts
- ▶ Unintended consequences
 - ▶ Linking charcoal value chain with distribution, sales, installation and maintenance

Thanks for listening!

▶ Find out more:

▶ PV-eCook.org

▶ JonKLeary@gmail.com

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