

CODEC Co Designing
Energy
Communities



MATHARE **ENERGY STORIES**

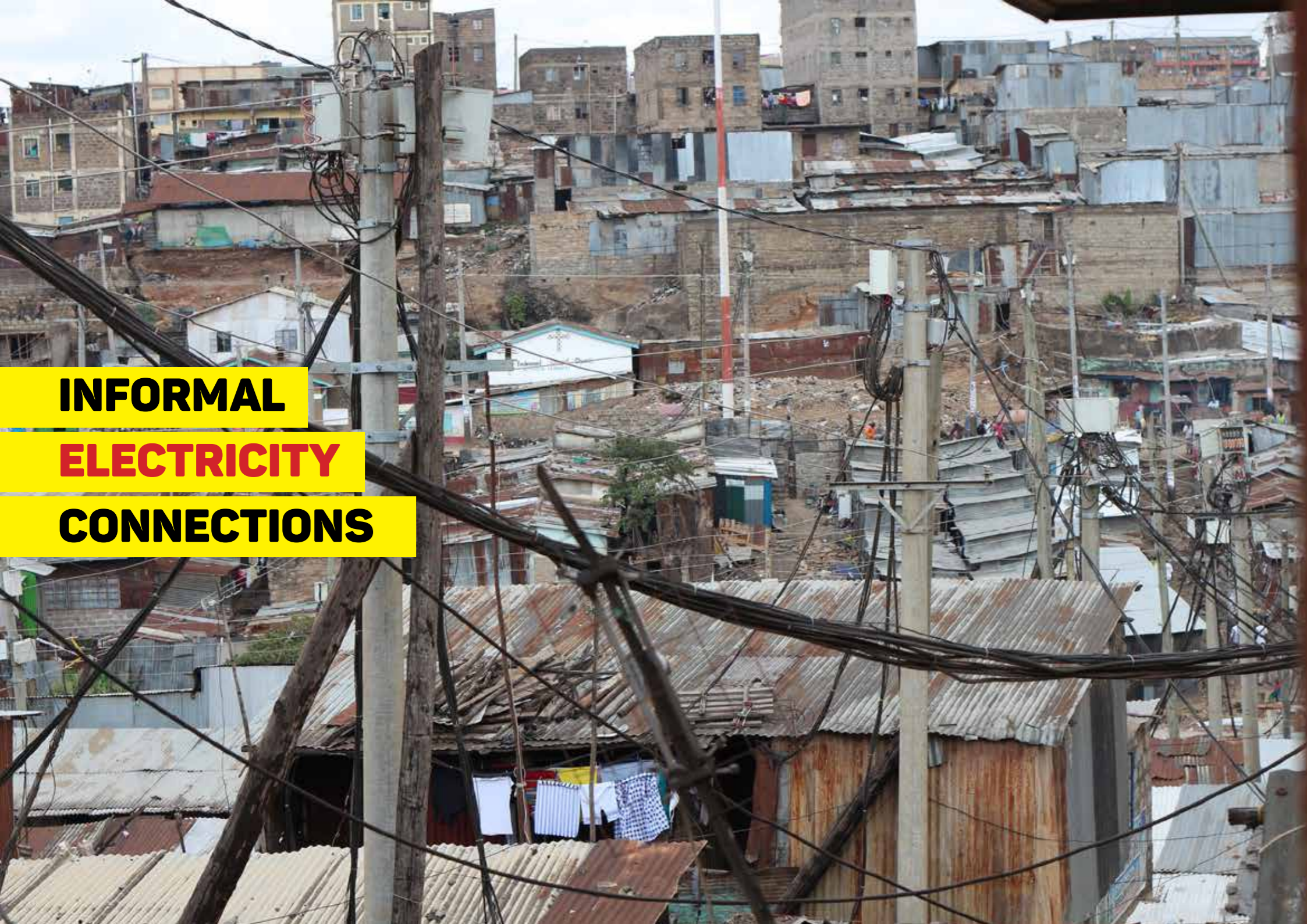
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INTRODUCTION

Mathare informal settlement (also known as Mathare slum) is located approximately 5.5 Km from Nairobi's Central Business District. It is a compact settlement made up of 13 villages, housing a population of 80,309 residents according to the 2009 national census. The colonial planning of Nairobi was intended to protect the ruling class, contributing to the growth of settlements such as Mathare. Starting from 1920s, villages of native African communities near Nairobi were displaced from their ancestral land, forcing them to settle in Mathare. As the settlement grew in the 1940's and 50s, it became a centre for activism against the colonial authority, prompting the colonial government to raze down the settlement several times. Each time, the locals rebuilt their dwellings.

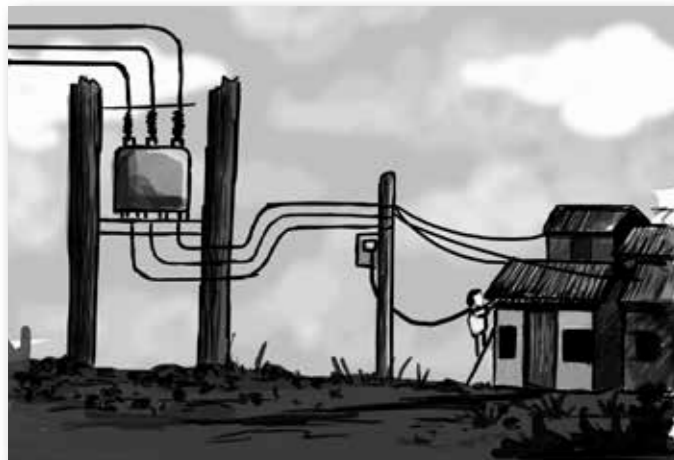
When the country gained independence in 1963, Mathare residents demanded for basic services. However, the new government failed to recognize the legitimacy of the settlement and continued with demolitions. In response, the residents formed leadership structures, land buying companies, and even started providing for themselves basic infrastructure and social services. And this is where the energy stories come in: Mathare residents have found ingenious ways (legal or otherwise) to meet their household energy needs. Nevertheless, sustainable energy access remains a challenge in the settlement. As researchers, we hope that by telling these energy stories with the residents, we can enhance dialogue towards more inclusive policies as well as socio-technical innovations that will improve livelihoods in the settlement.



INFORMAL ELECTRICITY CONNECTIONS

INFORMAL ELECTRICITY CONNECTIONS: How residents self-connect to the grid

A study in 2011 by Slum Dwellers International (SDI) and other collaborators established that only 9% of residents in Mathare have a formal, metered electricity connection. A further 68% of residents tap into the electricity grid informally, while 22% have no electricity at all. Young men within the settlement have mastered the craft of informal connections and are on hand to connect households at a minimal monthly charge.



A tricky business, Johnnie taps into the main grid to harness electricity. For a start, he connects about 2 households at no charge to attract customers...



In one part of the slum, Mama Kamau, who has legal connection from the National Utility provider has experienced a power outage and wonders why...



Mama Akinyi on the other hand has never had an electricity connection and is considering an upgrade from using candles.



Due to power overload, the power transformers sometime short circuit and Johnnie has to join hands with fellow informal electricity providers to rally the Utility provider to fix the issue...



Some utility company workers understand what happens on ground, and they use this as an opportunity to make a quick buck from the informal connectors.



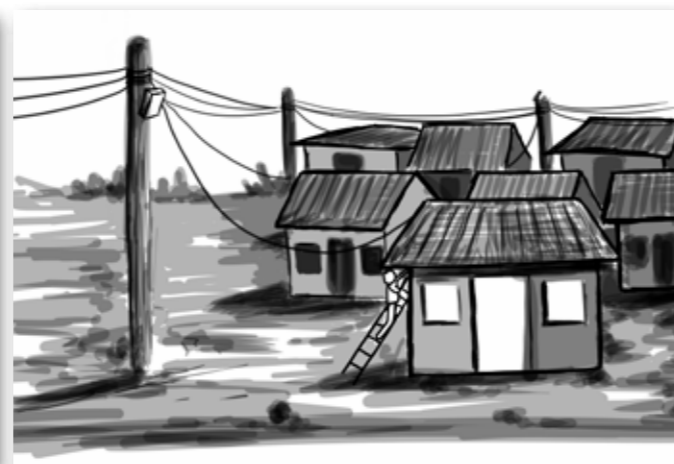
After negotiations with the utility company worker, they reach an agreement and power is restored after parting with a 'fee'.



After Mama Akinyi gets Johnnie's contacts from the neighbours and the requirements for connection, she gives him a call and agrees to meet at his shop



After negotiations, Johnnie and mama Akinyi come to an agreement and Johnnie advises her on what to buy and what time he will come to do the connection...



Johnnie visits Mama Akinyi and connects her house to the National utility provider's power transformer nearby...



**PHILIP'S
BIOGAS
PROJECT**

PHILIP'S BIOGAS PROJECT:

Sustaining community solutions requires community involvement

Funding agencies and researchers have over the years taken interest in solving livelihood challenges in Mathare. This has led to a number of community projects that have faced varying degrees of success. In the example of Philip's biogas project, a technocrat (renamed as Philip) from a multi-national corporation took steps to construct a biogas plant in Mathare. The plant functioned well for some time but was eventually decommissioned due to lack of biowaste and pressure to re-allocate the land for other uses.



With plans of lighting up the children's playing ground, Phillips decides to tour Mathare to have a feel of the location.



On his walk around Mathare, he comes across a pile of cow dung collected in a heap to form manure.



He later comes across a local farmer tending to his cattle...



Having no space to implement his plans, Philip approaches the village elders who, after discussions, allocate him a parcel of land to develop the plant.



Phillips sets up the bio gas plant that fuels the community cooking point.



Residents would walk to the edge of the village to use the community cooking centre. There was no charge incurred to use the facility, since the cow dung was supplied freely by the local farmer. However, some residents were shy to use the facility because their neighbours would know what they will be having for dinner...



Having walked around the settlement and seeing their way of life, Philip gets interested in the available energy options they utilize for cooking



Phillips then conducts a feasibility study and looks at the prices of charcoal, kerosene and LPG gas, which are the commonly used options by the residents.



Having seen the cow dung, he thinks that a biogas plant would make a good project for the community as a cheaper and cleaner fuel for collective community cooking centre.



One day the local farmer who supplied the dung got a new job



So he sold off his cows as he had little time to balance between work and farming, yet it is his cows that were the key to the success of the biogas plant...



Without the availability of cow dung, the bio gas plant was unfortunately closed and the space reallocated for other use.

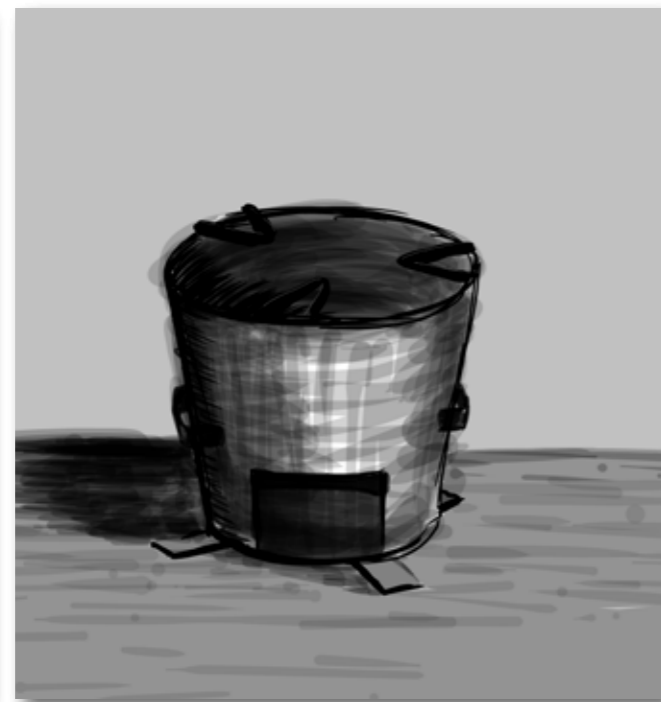


**THE
SAWDUST
JIKO**

THE SAWDUST JIKO:
Ingenuity in the face of necessity

In early 2018, the national government of Kenya banned the wanton logging of trees over environmental concerns. This meant that the supply of charcoal was severely affected, resulting in an increase in its pricing. In Mathare, the increase in the price of charcoal has led to creative options such as the 'sawdust' cookstove (jiko) that is a retrofit of existing stoves.

Because purchasing charcoal on a daily basis is turning out to be an expensive affair for residents of Mathare, they have developed ingenious ways to get through. One of this is by the use of saw dust jikos which are effective, energy and cost efficient. This is how they make the saw dust jiko.



Since buying a saw dust jiko was expensive, the residents purchase normal jiko that will act as the frame for the energy efficient saw dust alternative

The normal jiko is then modified by removing the fire box/ fuel grate, the air inlet latch and then flattening the base by bending out the legs/ stands.

Saw dust is then purchased from the local carpenters at about ksh. 200 per gunny sack which can last a household anywhere from 3 days

Using two pipes, one placed vertically through the metal cladding and the other horizontally through the air inlet. Saw dust is then packed around these pipes and compacted in layers with water until a rigid structure is formed. The pipes are then removed to leave a hollow space to act as the fuel and air inlet.

Using a single piece of wood of about 5cm diameter and 30cm length, the stove can burn for up to 6 hours and is considered economically viable and energy efficient. The residents prefer it to a charcoal jiko as it does not emit as much smoke.

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