

# UNIVERSIDADE E D U A R D O MONDLANE

**Rethinking energy transitions in** 

# ACROSS CITIES LIKE DAR ES SALAAM, ELECTRICITY PROVISION AND USE IS VERY HETEROGENEOUS.

# THIS MUST BE ACKNOWLEDGED BY POLICY MAKERS TO PRODUCTIVELY APPROACH PLACE-BASED USER

### **Southern cities:**

# urban & infrastructural heterogeneity in Dar es Salaam

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#### ACKNOWLEDGEMENTS AND FUNDING

This research was supported by the Dutch Research Organization NWO under its WOTRO Science for Global Development programme. The authors thank NWO, Dr. Daniel Msangi at the collaborating Ardhi University in Dar es Salaam, field research assistants as well as the members of the Community of Practice meetings and all interview respondents for the fruitful discussions.





TO THE PUBLICATION

# REQUIREMENTS AND CAPACITIES.

### BACKGROUND

In rapidly growing African cities such as Dar es Salaam in Tanzania, existing policies that largely focus on ensuring access to conventional electricity grids face a number of challenges, including rising electricity demands, affordability and reliability.

Users and various non-conventional service providers thus engage in forms of coproduction of electricity through financing grid components, organizing community access to meters, or establishing back-up power facilities. The "Coping with Urban and Infrastructural Heterogeneity in Tanzania and Mozambique" (Urban-HIT) research project aimed to understand how these actors on the ground are already dealing with existing challenges by co-producing electricity services.

## **GOAL AND RESEARCH QUESTION**

The goal of this research is to create a bottom-up understanding of the heterogeneous forms of electricity services across the city: how are they coproduced, by whom, and where? And how are they governed? Disregarding these alternative channels will risk the opportunity to tap from potentials of the ongoing heterogeneous development.

# A TYPOLOGY OF ELECTRICITY PROVISION AND USE

In order to understand electricity constellations across Dar es Salaam, we have analyzed how key delivery channels (figure 1) are co-produced and how they function in a variety of diverse neighborhoods. These were selected to represent a diversity across key variables. We took into account settlement variables such as the built environment, history, socio-economic status and urban functions, as well as socio-technical features such as the physical connectivity and social accessibility to electricity grids, reliability of supply, and demand growth.



#### FIELD WORK IMPRESSIONS



Transformer station in a densely populated neighborhood.



Recognizing and upscaling heterogeneity could potentially mitigate the grid's long-term viability challenge. At the same time, we need to understand and curb social, economic and environmental externalities that the co-production of alternatives poses in order to achieve universalization of reliable and affordable electricity access.

# METHODOLOGY

The researchers conducted in-depth, qualitative studies of neighborhoods across the city, between 2018 and 2022. We observed user practices and institutional features by gathering data on technical features of electricity grids, field visits to selected wards, participatory observation (including visual documentation through photographs) and informal discussions with residents. In addition, semi-structured interviews were conducted with a broad range of stakeholders, including utility companies, regulatory authorities, government, community leaders and non-state actors. Additional workshops with key stakeholders were essential in consolidating the research.

### FINDINGS

The key contribution of our study is a typological approach towards urban and infrastructural heterogeneity that aims to systematically apply intraurban comparative and multi-scalar perspectives in an individual city. Applying this approach to the case of Dar es Salaam, we have demonstrated that heterogeneous urban electricity constellations are shaped by spatially distinct constellations in each neighborhood.

## FIGURE 1

FIGURE 2

Existing socio-technical channels of electricity provision and use in Dar es Salaam



The case study wards in Dar es Salaam and their constellations of service delivery channels.

Small solar lantern as an alternative to the grid.



Larger solar PV application in a suburb of Dar es Salaam.

Our typology provides an analytical framework that captures the variety of socio-technical constellations occurring within the city and across different neighborhoods. This provides a useful conceptualization of the status quo from which urban energy transitions take place.

# POLICY RECOMMENDATIONS

1. Each neighbourhood has different characteristics and experiences of coping with electricity related challenged. Therefore, local government authorities should be more closely involved in energy policy making processes where they can bring in theie knowledge on environmental and land use effects.

2. Locally generated knowledge on the limitations of grids and alternative channels needs to be communicated at every level to broader strategies such as the SDGs.

3. The willingness of large-scale and wealthy users to pay for reliable energy provisions could be more systematically integrated into the overall energy planning.

4.For cross-financing electricity among the poor uses, the social tariff system needs to be rethought in relation to the widespread subscriber-retailer practices.