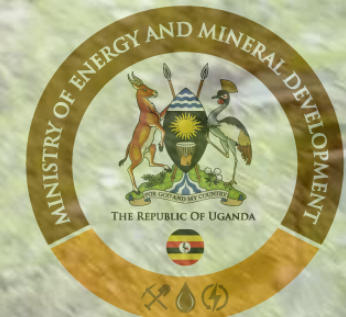


AFRICA ELECTRICITY SYMPOSIUM 2025



THE IMPACT OF SUBSIDIES ON CLEAN COOKING IN UGANDA: THE CASE OF COOKING TARIFF AND LIQUIFIED PETROLEUM GAS STARTER KITS

Michael Kyanzi



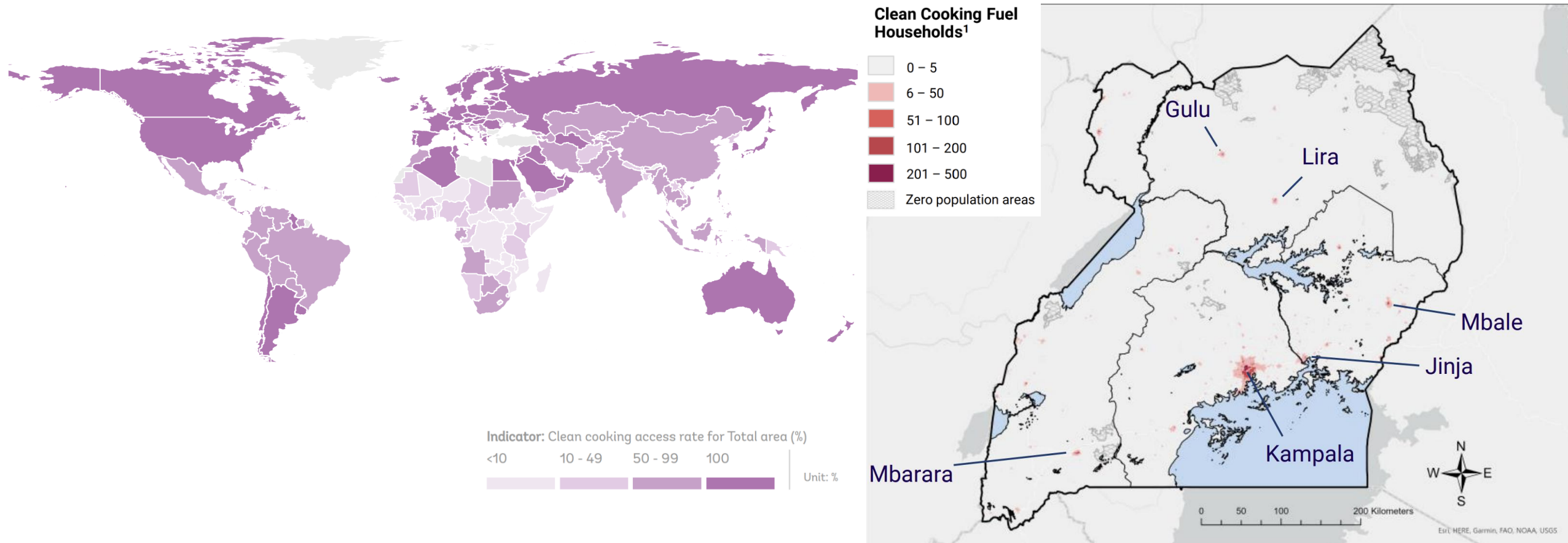
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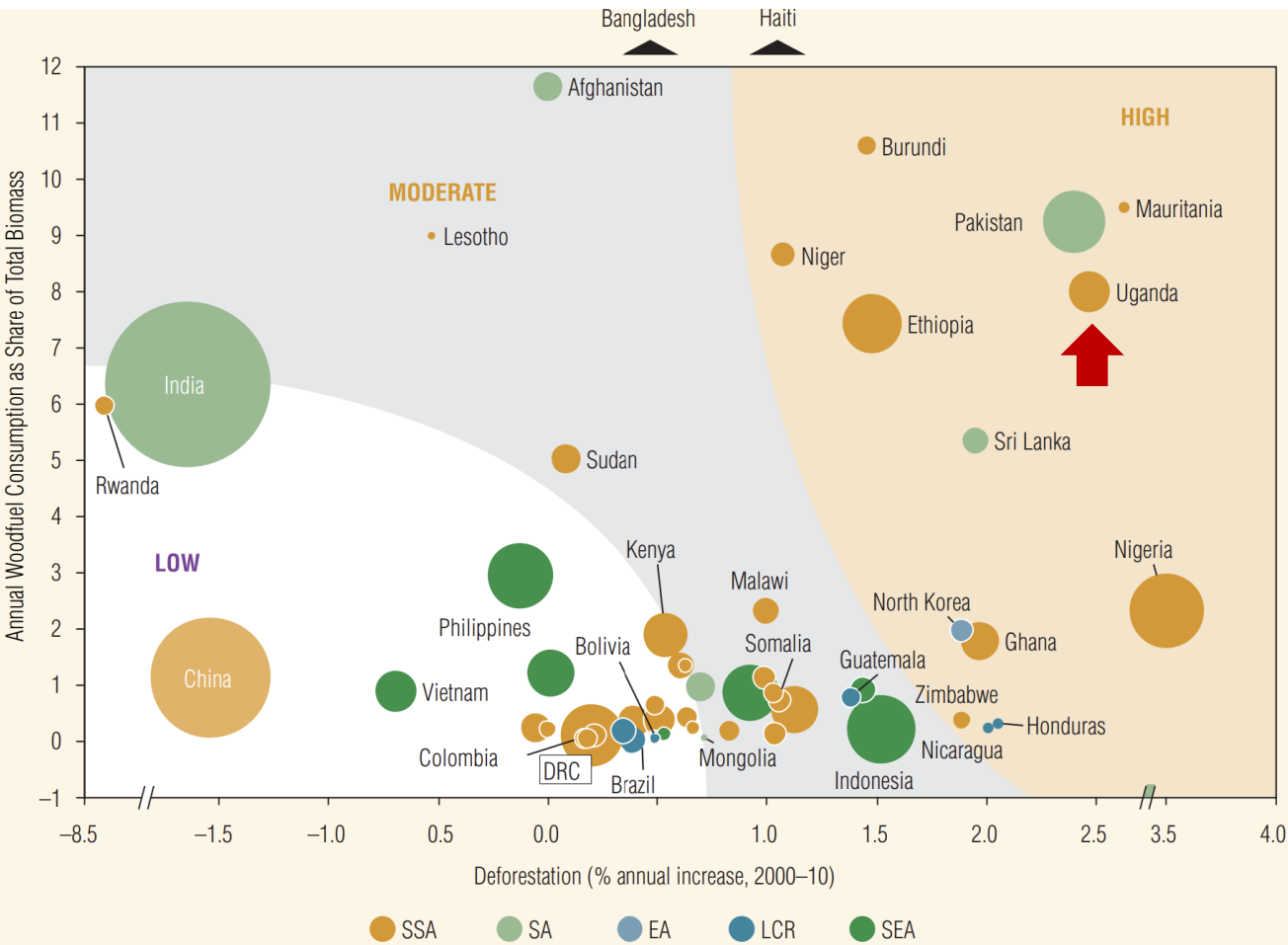
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1. Context
 - ➔ Access to Clean Cooking and Electricity in Uganda
 - ➔ Clean Cooking **Subsidies** in Uganda
2. The Problem
3. Methods, Data and Sources
4. Findings and Conclusions
 - ➔ Results
5. Conclusion and Recommendations
6. References

Introduction/ Context: Clean Cooking in Uganda



Global Solid-Fuel Cooking Biomass Pressure Map & HH Use for Clean Cooking Fuel



Sources: FAO deforestation data; global cooking fuel-use data drawing on WHO, DHS, MICS, LSMS and national survey data; Task Team analysis.
Notes: Bubble size reflects total metric tons of woodfuel. Biomass is defined as above-ground biomass. Woodfuel includes charcoal and firewood.

Consequences

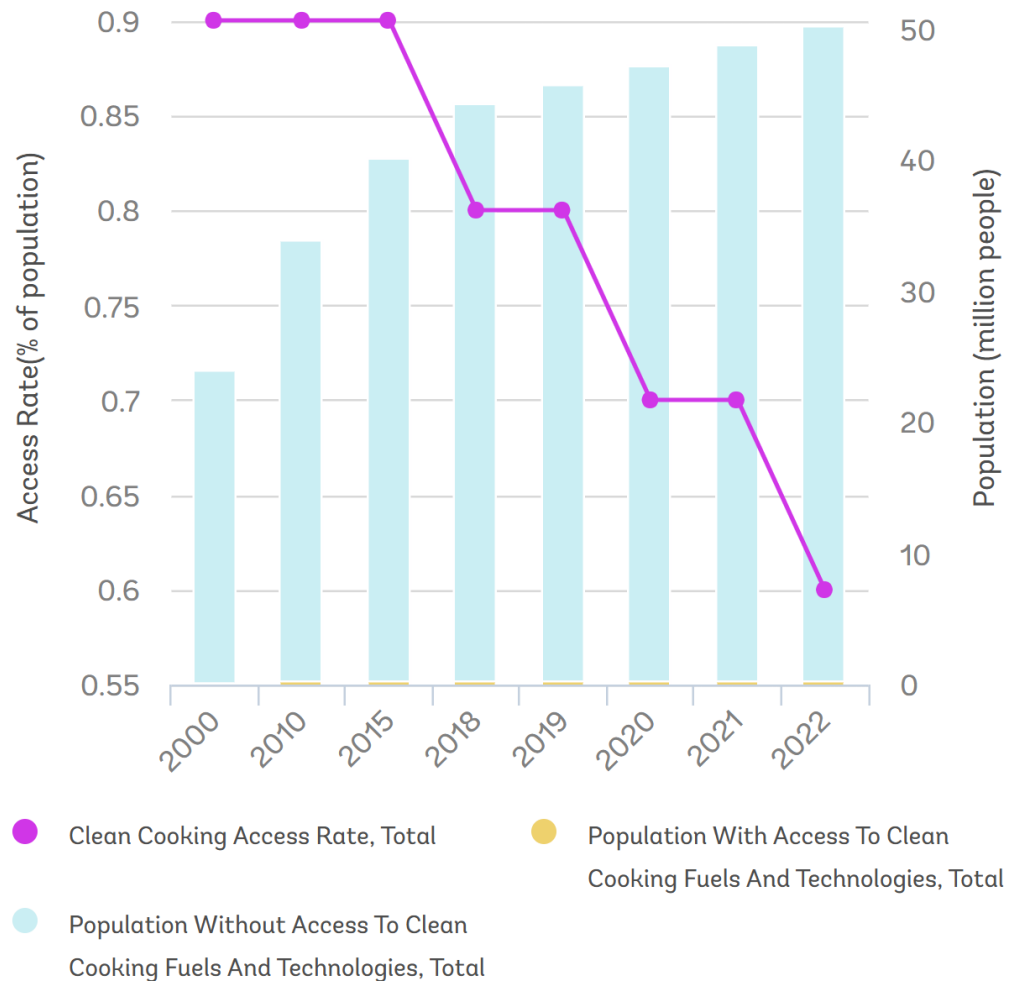
- Public health issues,
 - Deforestation and
 - Climate change problems from burning wood and other solid fuels.
- Source: ESMAP (2024)



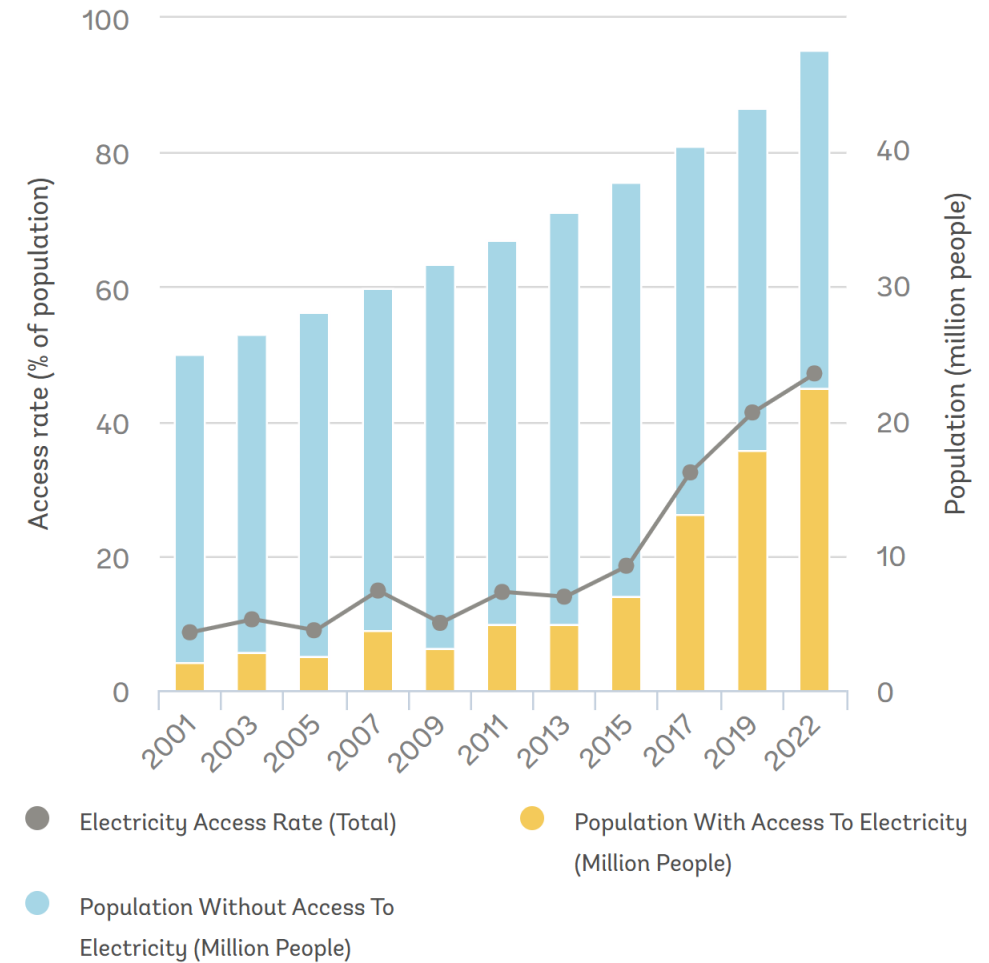
Context: Clean Cooking and Electricity Access-Uganda



Access to Clean Cooking, 2000-2022

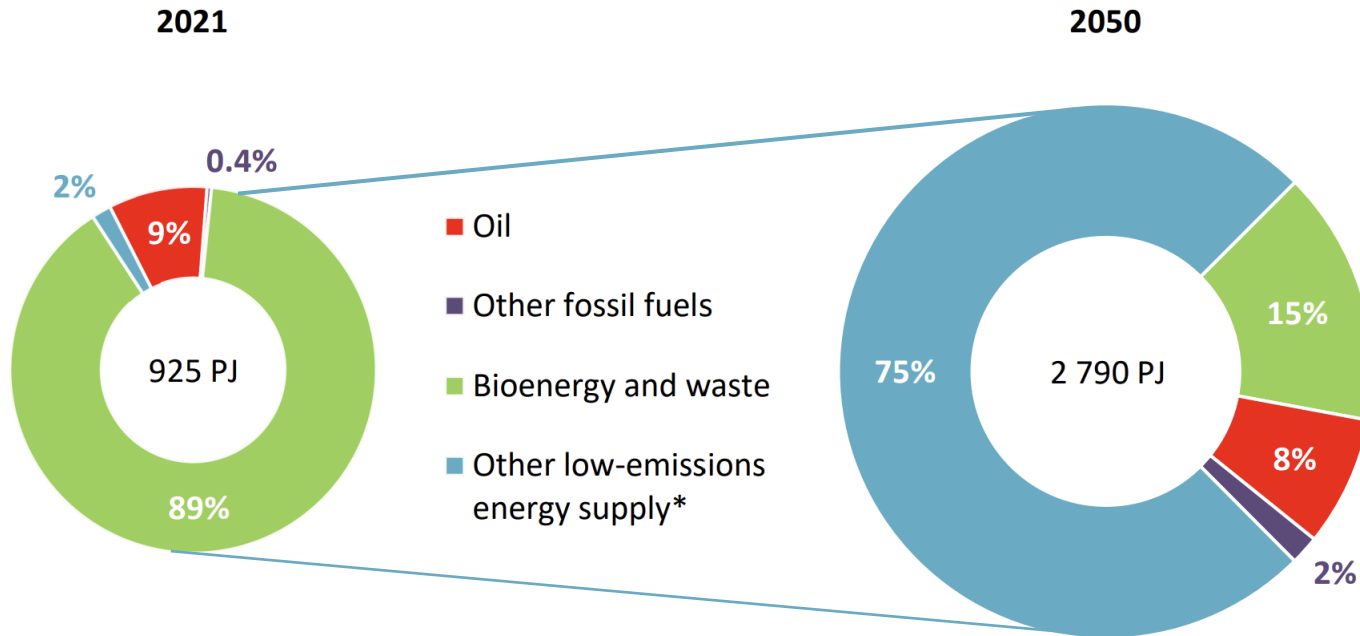


Access to Electricity, 2000-2022



Source: ESMAP

Uganda's Energy Transition Plan



Source: IEA

1. Electricity Tariff: – Cross Subsidy

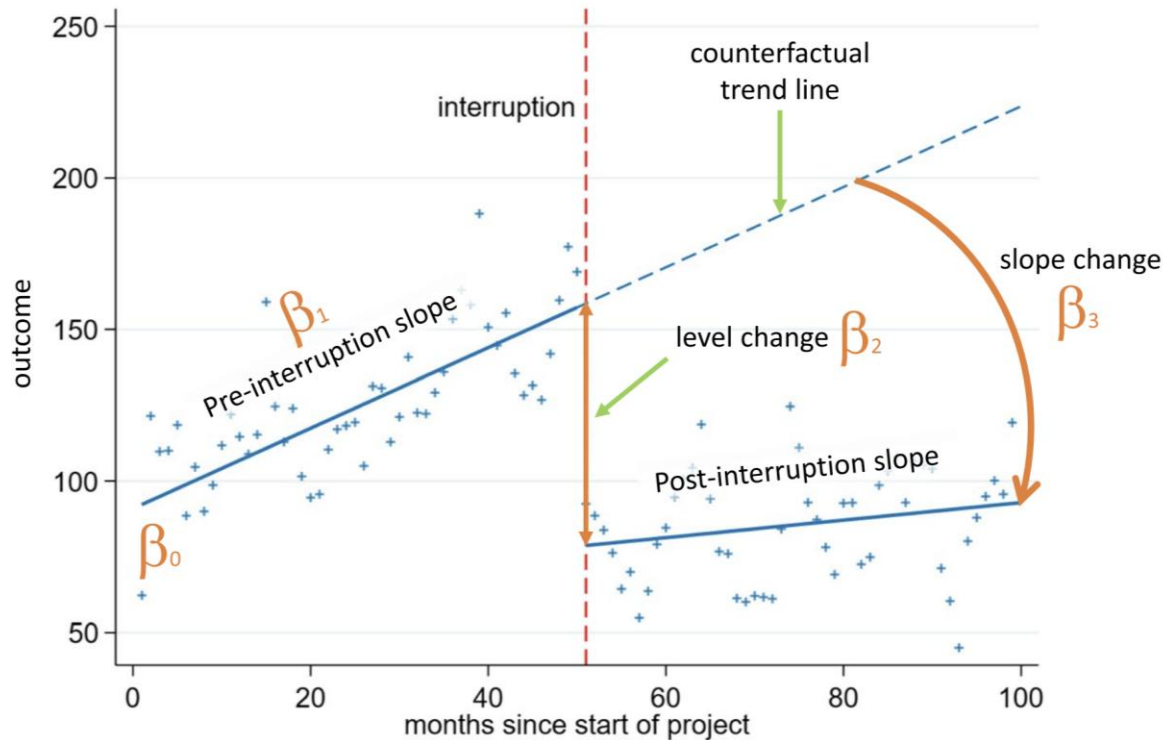
- ➔ Lower Tariff **UGX 412 per Unit (Approx: USD\$0.11)** [80th -150th KWh units of electricity per month]
- ➔ Standard Tariff of **UGX 775.5 per kWh (USD\$ 0.21)**
- ➔ Cost of Gov't Subsidy: UGX 50 billion (approx. **USD\$ 13.7 M**)

2. LPG Starter Kits:

- ➔ 200,000 Kits [13 kg Cylinder with accessories] **Annually**
- ➔ Beneficiary upfront cost:: UGX 100,000 (Approx **USD\$: 27.4**)

Research Question: Are the Subsidies Effective? If so are they sustainable?

Interrupted Time Series Analysis (ITS)



(Turner et al. 2021)

Data: Secondary Data: >12 years Time Series Data: 2013 Q3- 2025 Q1

Data Sources:

- Uganda Revenue Authority (URA)
- Electricity Regulatory Authority (ERA)
- Min of Energy and Mineral Dev't (MEMD)
- Uganda Bureau of Statistics (UBOS)

Data Processing: Cleaned and Collapsed: 47 Observations (Qtrs)

- Electricity Cross-Subsidy: Pre-intervention 34, and Post: 13
- LPG Analysis: Pre-intervention: 36, Post: 11

Analytics: STATA 18 MP
Using the Paris-Winsten Regression

Economic Model: Estimation (General and Specific) ITS Model



General ITS Time Series Model

$$Y_t = \beta_0 + \beta_1 T_t + \beta_2 D_t + \beta_3 T_t * D_t + \beta_4 X_t + \varepsilon_t \quad (1)$$

Where

Y:	Domestic electricity demand /LPG demand
T:	Time (slope/trend) variable
D:	level-change dummy variable
T*D:	The interaction (slope-change) variable of time and intervention
X:	Other Variables that may affect Y
ε	Error term and t is time scope in quarters
$\beta_0 \dots \beta_4$:	Coefficients to be estimated

Specific Disaggregated ITS Time Series Model

$$Y1_t = \beta_0 + \beta_1 T1_t + \beta_2 D1_t + \beta_3 T1_t * D1_t + \varepsilon1_t \quad (2a)$$

$$Z1_t = \beta_0 + \beta_1 T1_t + \beta_2 D1_t + \beta_3 T1_t * D1_t + \varepsilon2_t \quad (2b)$$

$$Y2_t = \beta_0 + \beta_1 T2_t + \beta_2 D2_t + \beta_3 T2_t * D2_t + \varepsilon3_t \quad (2c)$$

$$Z2_t = \beta_0 + \beta_1 T2_t + \beta_2 D2_t + \beta_3 T2_t * D2_t + \varepsilon3_t \quad (2d)$$

$$Y2_t = \beta_0 + \beta_1 Y1_t + \varepsilon5_t \quad (2e)$$

Where:

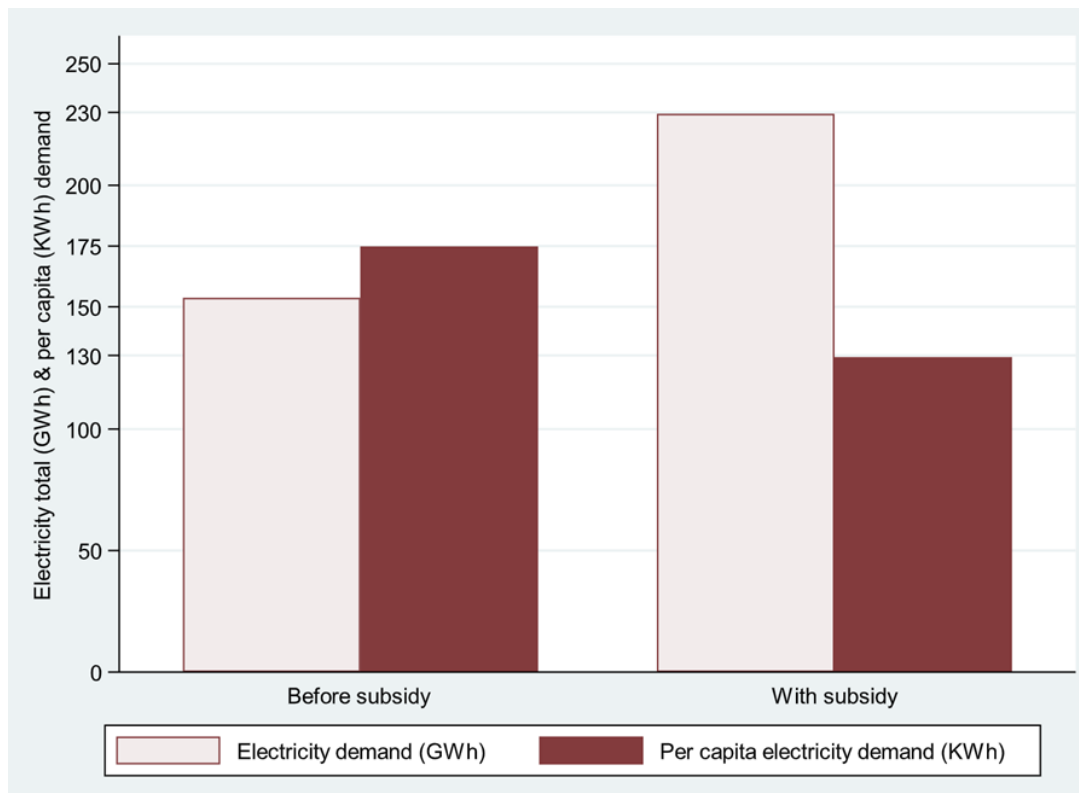
Y1:	Electricity Total Demand
Z1:	Per Capita Electricity Demand
Y2:	LPG Total Demand
Z2:	Per Capita LPG Demand
Y2t (2e):	LPG a Substitute or Complement

Results: Descriptives (Electricity and LPG)

Unclassified

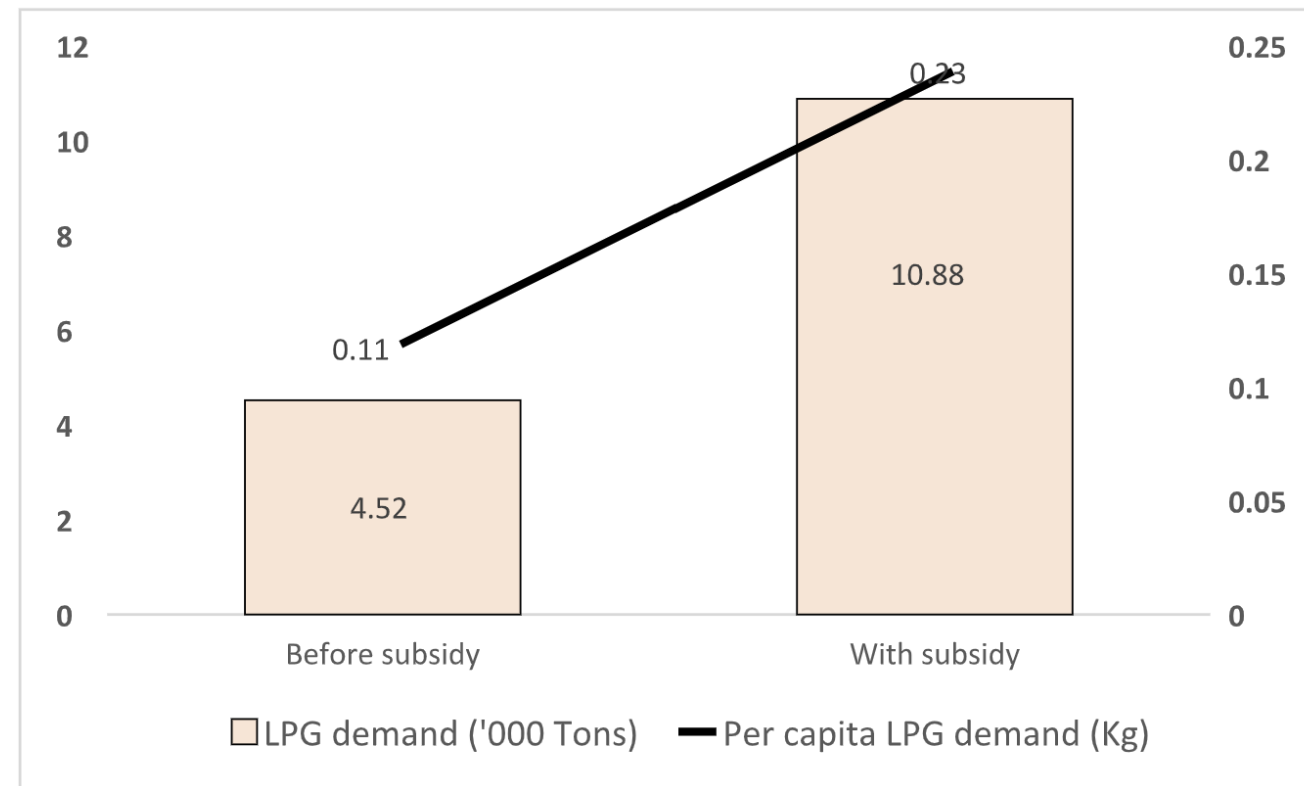


Electricity Demand before and with a Subsidy



Authors: own Results

LPG Demand before and with a Subsidy



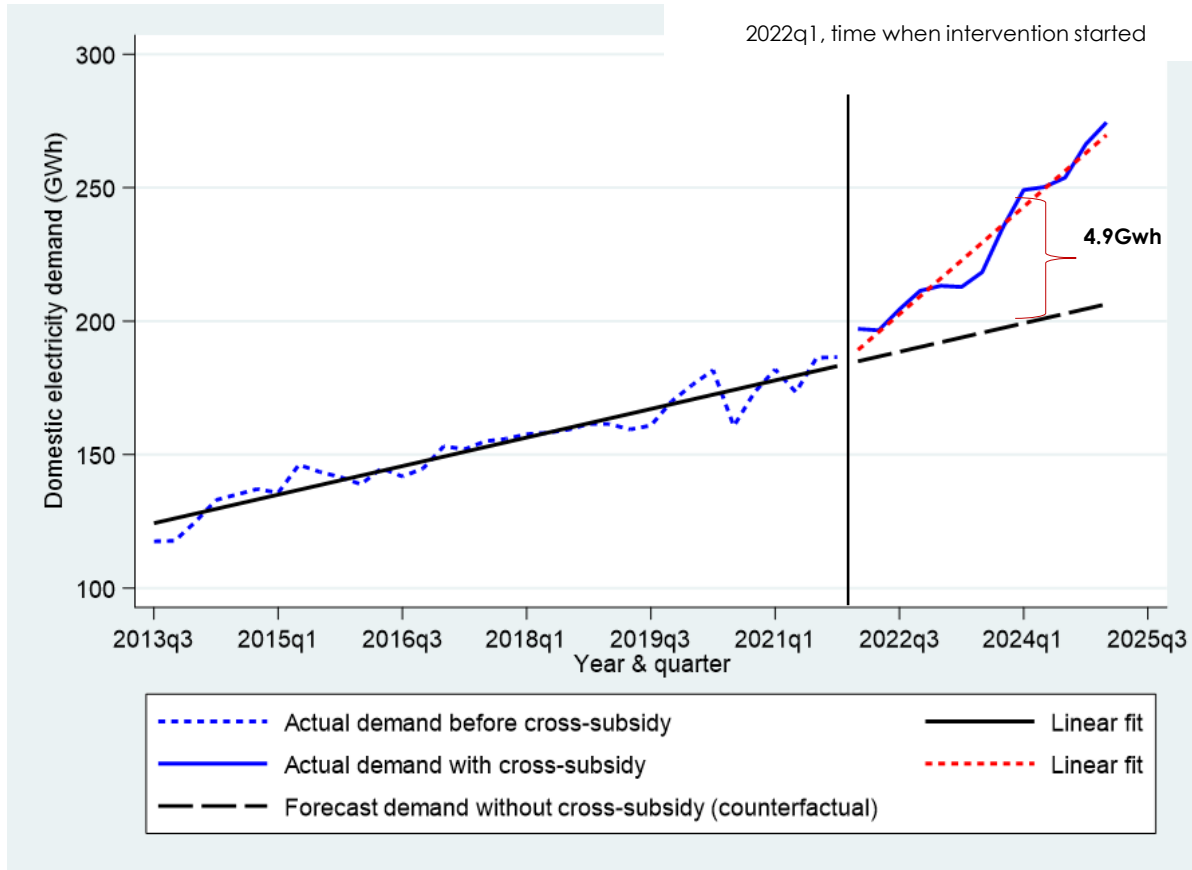
Authors: own Results

Unclassified

Empirical Results 1: Effects of Cooking Tariff Cross-Subsidy on HH Electricity Demand



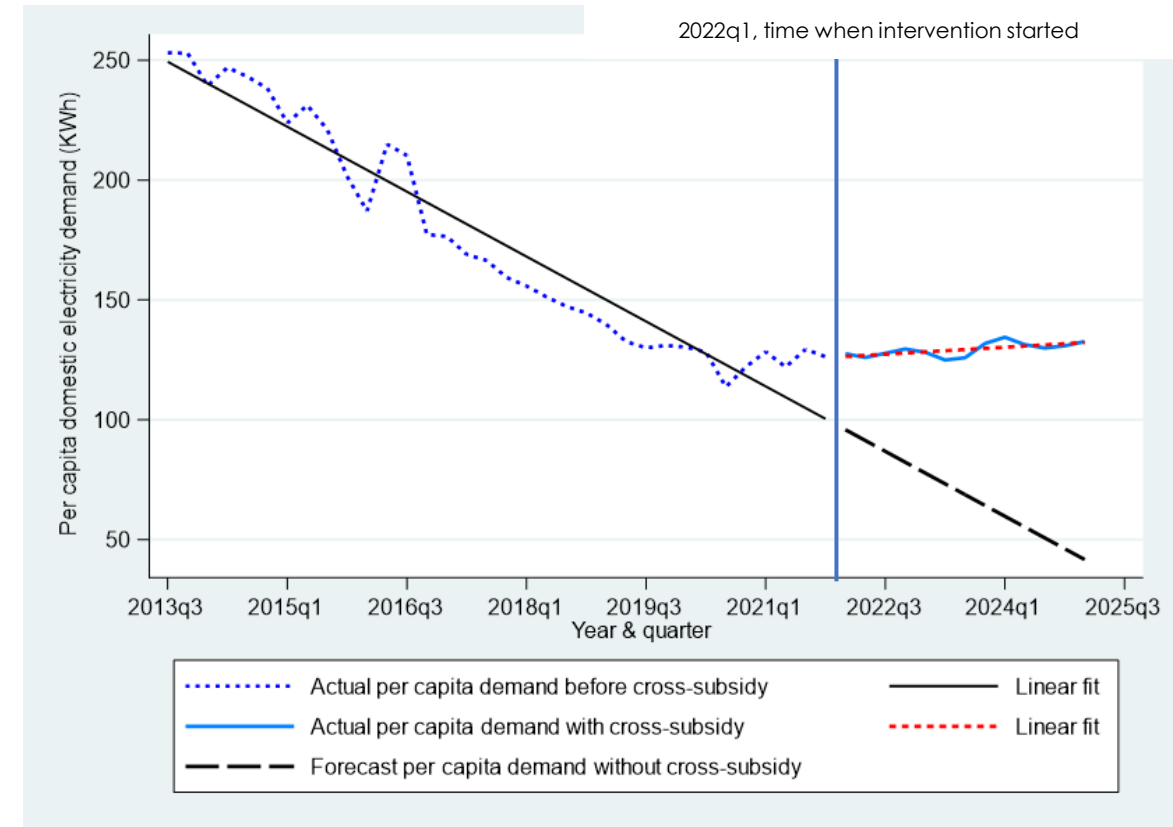
Household electricity demand before, with and without cross-subsidy



Authors: own Results

Overall: HH Demand increased by (Pre: 1.8 Post: 4.9 GWh)

Household per-capita electricity demand before, with and without cross-subsidy



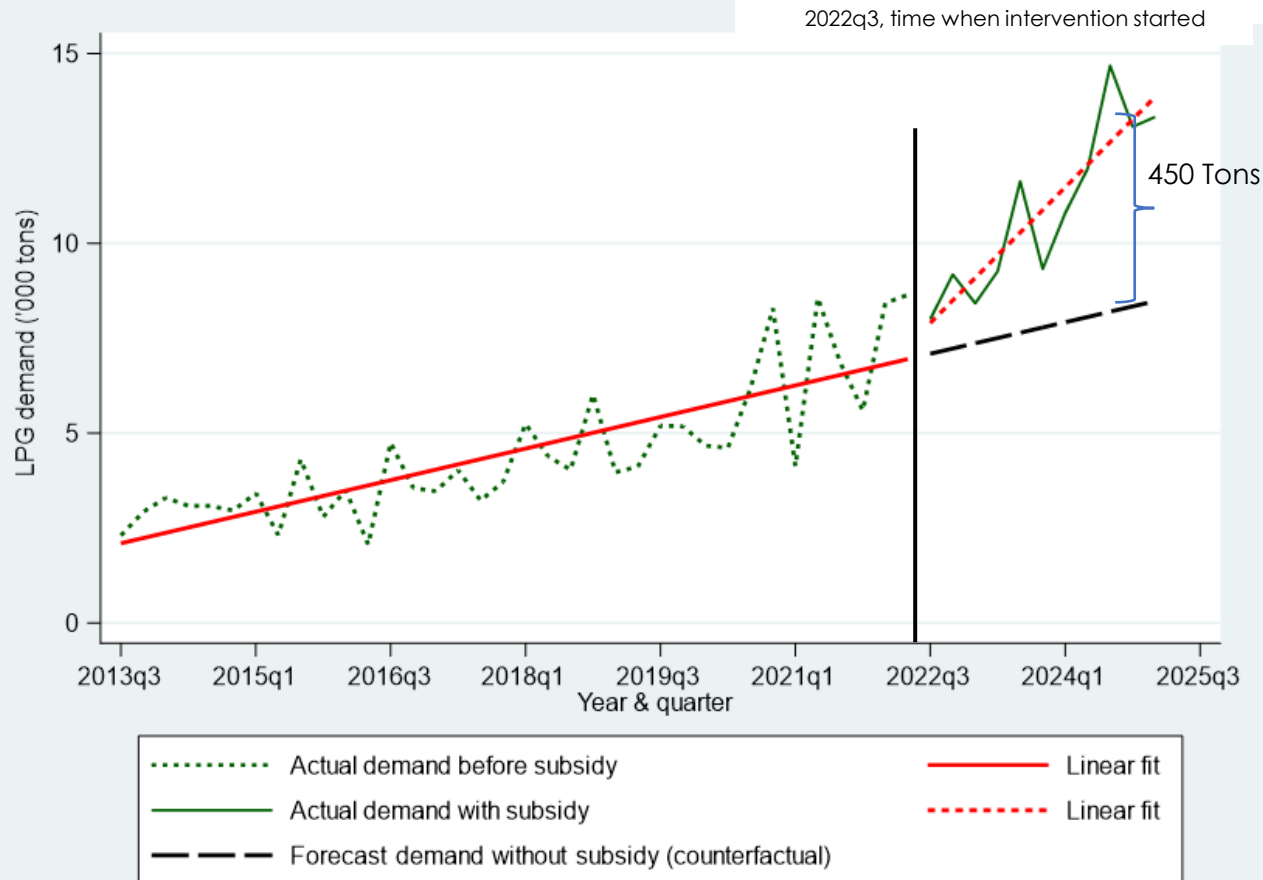
Authors: own Results

Per capita: HH Demand Pre: Decreased by **4.27 kWh** Post: increased **5.87 kWh**—**Not clear if sustainable!!**

Empirical Results 2: Effect of distribution of free LPG starter kit on LPG demand



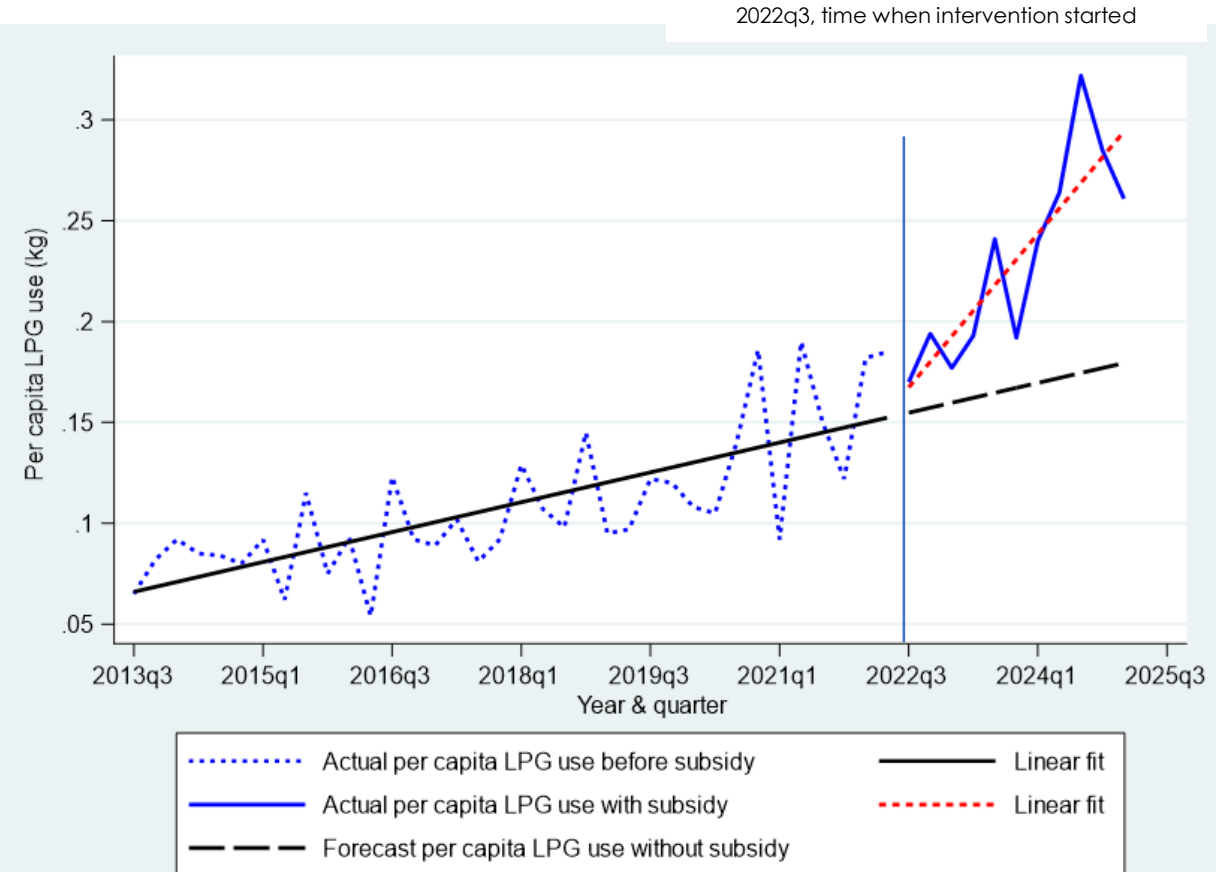
LPG demand before, with and without LPG starter kit subsidy



Authors: own Results

Pre: 140 Tons **Post:** 450 Tons (Statistically Sig)

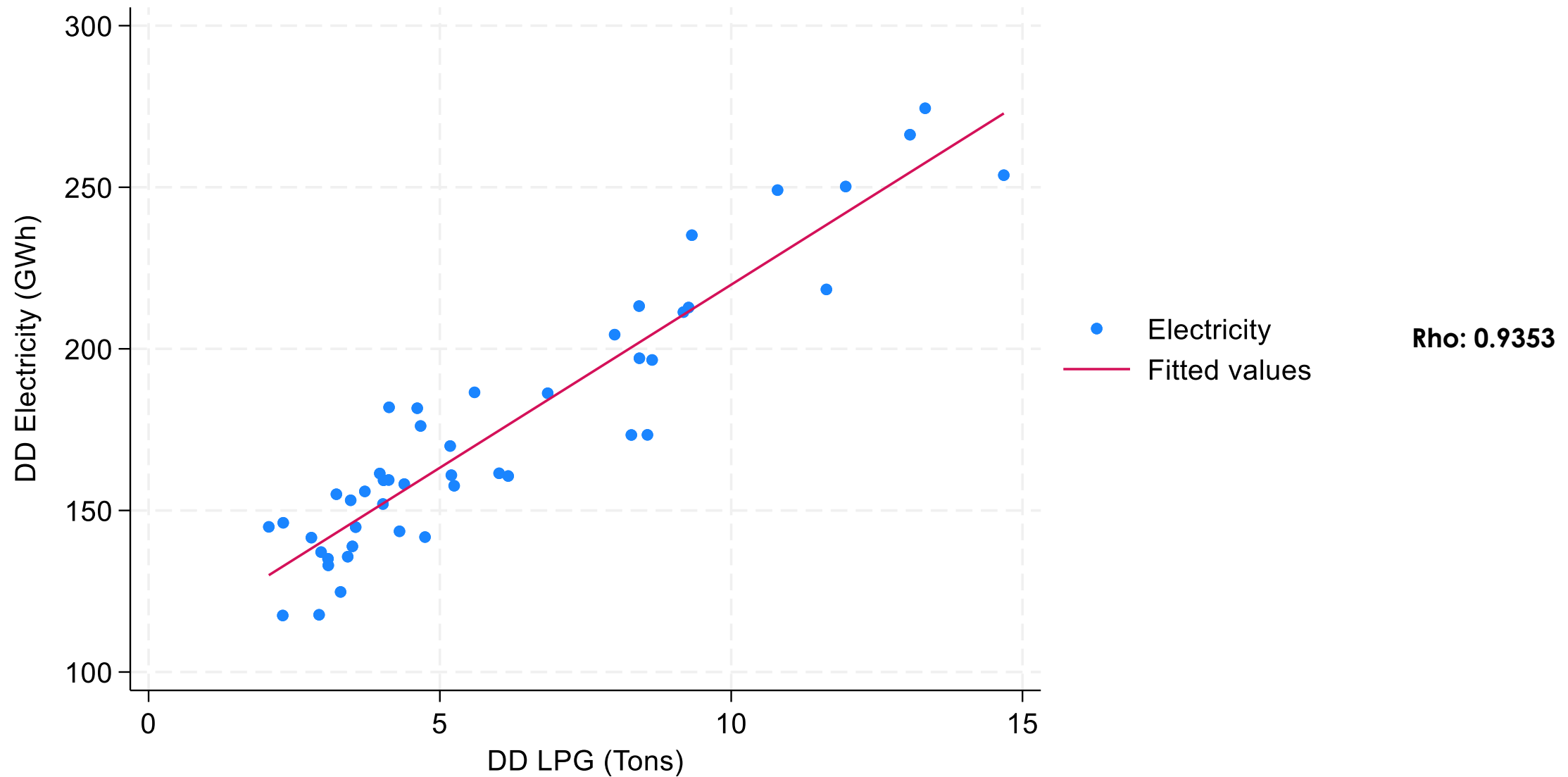
Per-capita LPG demand before, with and without LPG starter kit subsidy



Authors: own Results

Pre: about 0.002 **Post:** 0.01 Kg (Statistically Sig)

Empirical Result 3: Is Electricity (a Substitute or Complement) to LPG in Uganda



Conclusions and Recommendations

- Provide all domestic electricity consumers with at least **100 kWh** per month.
- **Eliminate upfront costs:** These lead to **self-selection** favouring the **well-to-do** recipients
- Adjust from medium size (**13 kg**) Gas cylinders to smaller (**6 kg**)
- **Free** LPG starter kits and gas refill every month- (lessons from India).
- **Jointly roll out** both subsidies: Since LPG and Electricity are complements





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Thank You!



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