



7th AIEE Energy Symposium

Current and Future Challenges to
Energy Security

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WILLINGNESS TO PAY FOR UNINTERRUPTED ELECTRICITY
SUPPLY FROM INTERCONNECTED SOLAR MINI-GRIDS IN
SOUTHWESTERN NIGERIA

By

*Alexander Akolo, Dilinna Lucy Nwobi, and Adejumoke
Akinbusoye*

Outline

Introduction

Reviewed Literature

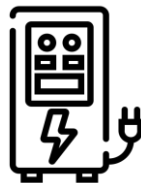
Methodology

Results

Conclusion

Introduction

- The quest for steady, reliable, and uninterrupted supply of energy
- The challenge of providing electricity access to people who live in rural areas which are far from the national grid
- Lower-cost off-grid electricity technologies
- Solar options including solar stand-alone systems and solar mini-grid



Objective



To estimate the monthly willingness to pay (WTP) amount for uninterrupted electricity supply from ISMGs and to investigate the predictors of WTP in the selected communities.

Literature review: Factors Affecting WTP for Grid Supply Alternatives

Year	Author(s)	Country	Factors Identified
2019	M. K. David & B . W. Bonaventure	DRC	Tariff
2019	D. F. Gómez-Hernández, et al.	Mexico	Reliability
2020	R. Bhandari,V. Sessa R. Adamou	Niger	Consumption, ownership
2020	M.Juanpera, P.Blechinger, L.Ferrer- Martí, M.M.Hoffmann & R.Pastor	Nigeria	Technology, Fuel source, Tarriff
2022	Bum-JoKim, Ju-HeeKim, & Seung- HoonYoo	South Korea	Carbon-neutral natural gas
2022	Ladenburga & Skotteb	Denmark	Income, age and location.

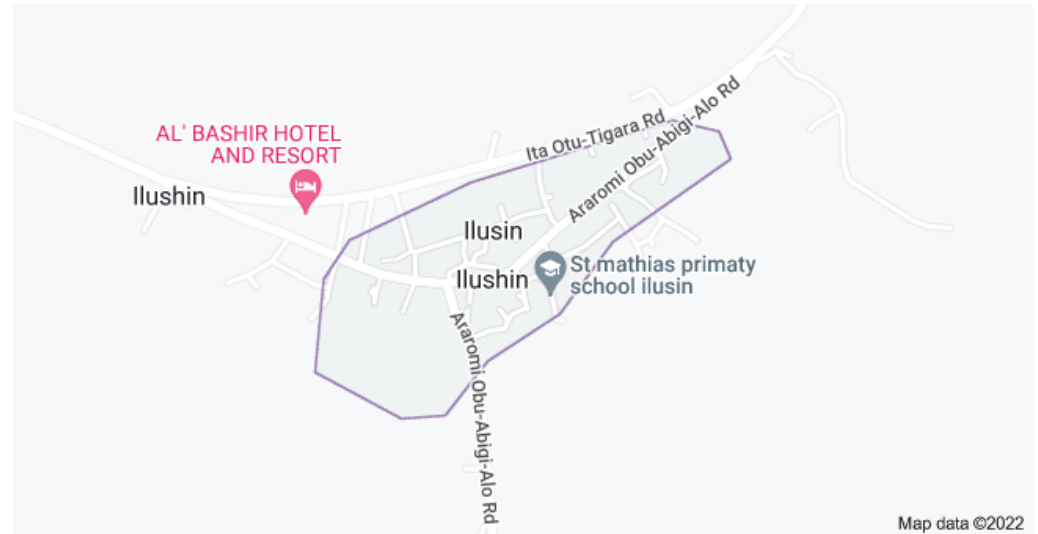
Literature on WtP amount across remote off grid communities

Year	Author(s)	Country	Amount
2017	Alam & Bhattacharyya	Bangladesh	\$3.0 (3.60kWh) to \$9.24 (33.76kWh)
2019	Dogan & Muhammad	Turkey	4.35 TL(20% of RE)- 1.68 TL (32% of RE)
2020	Mishra, Sridha, Jacob, Kandagal, & Bharadwaj	India	100 Indian rupees/ month
2020	Kühnel, et al.	South Africa	50 ZAR/month - 250 ZAR/month
2021	Danne, Meier-Sauthoff, & Musshoff	Germany	21.6 Euro/kWh monthly
2021	T. Balezentis et al	Lithuania.	0.0153 Eur/kWh - 0.0296 Eur/kWh monthly
2022	C Wen et al	Indonesia	\$1.73/month - \$4.44/month
2022	???	Nigeria	???

Data Source

Focus Group Discussions (FGDs) after purposeful sample selection:

1. *Ilushin*
2. *Bolorunduro-Efire*
3. *Ofiki*
4. *Tede*
5. *Aiyesan*
6. *Araromi-Obu*



About the study area

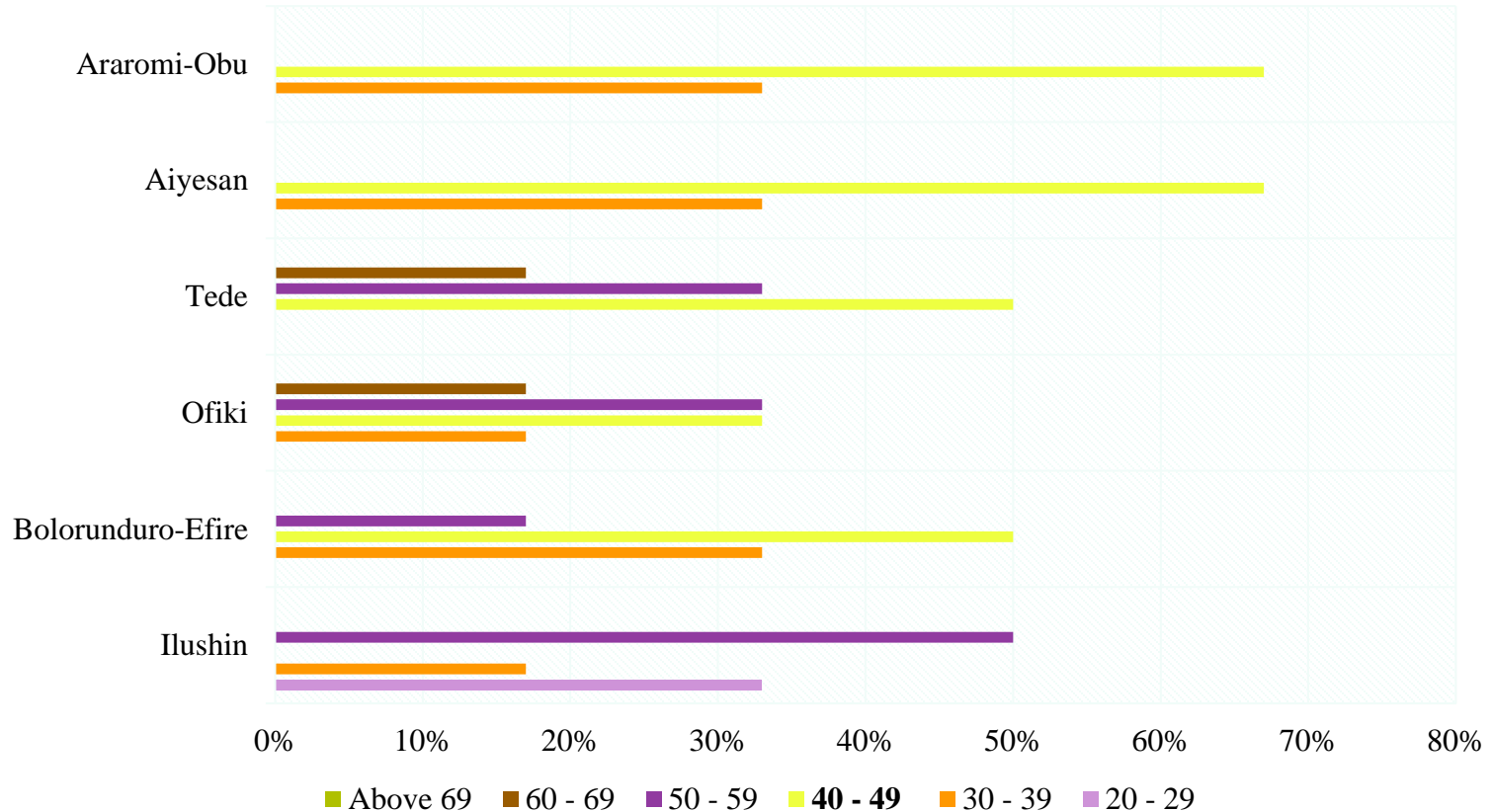
The study area was south-western Nigeria which consists of, Ogun, Oyo, Osun, states.

The area lies between longitude $2^{\circ}311$ and $6^{\circ}001$ East and Latitude $6^{\circ}211$ and $8^{\circ} 371N$ (Agboola, 1979) with a total land area of 77,818 km² and a projected population of 28million, 767million, 752million in 2002 (NPC, 1991).

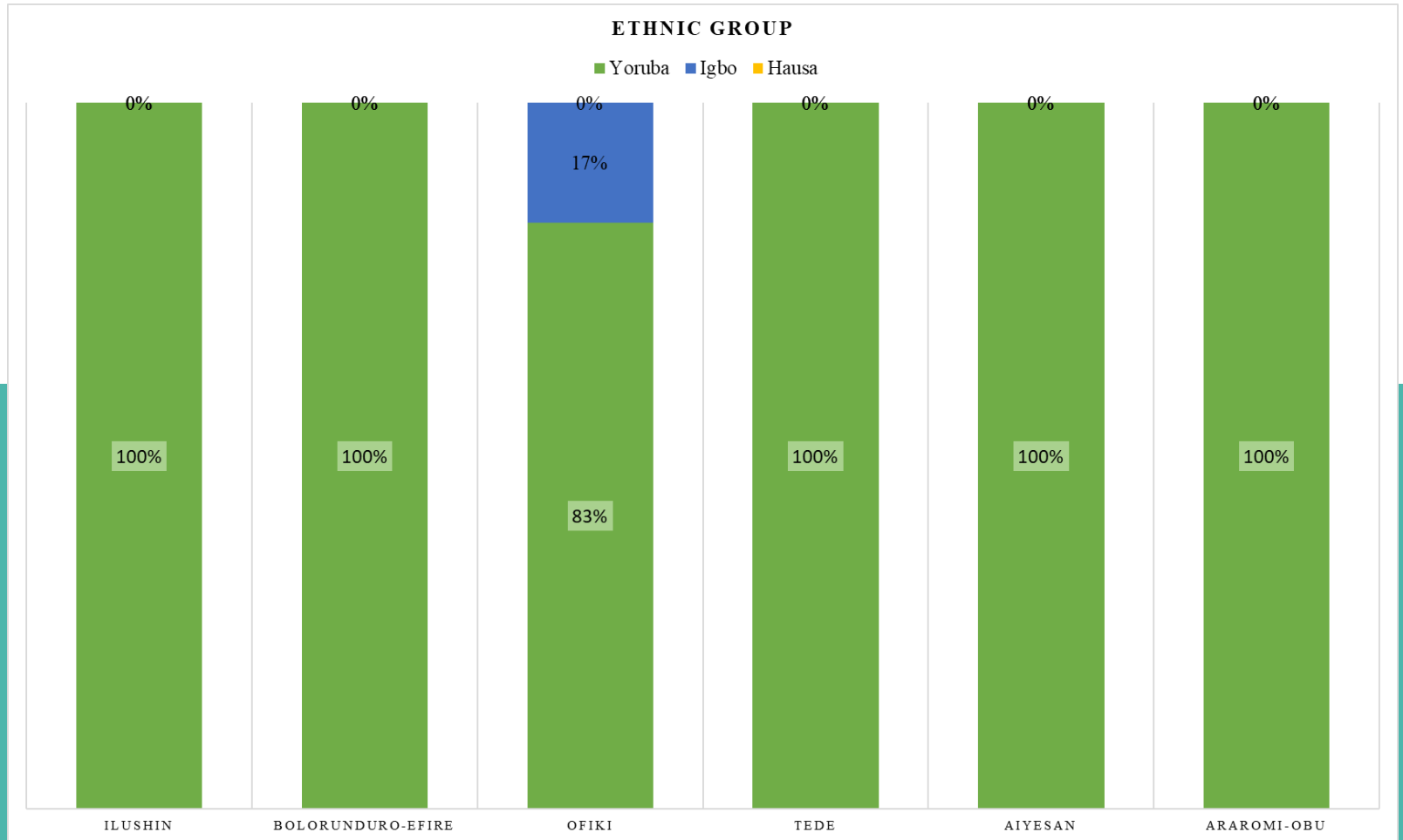
The study area is bounded in the East by Edo and Delta states, in the North by Kwara and Kogi states, in the West by the Republic of Benin

Basic Characteristics of Participants

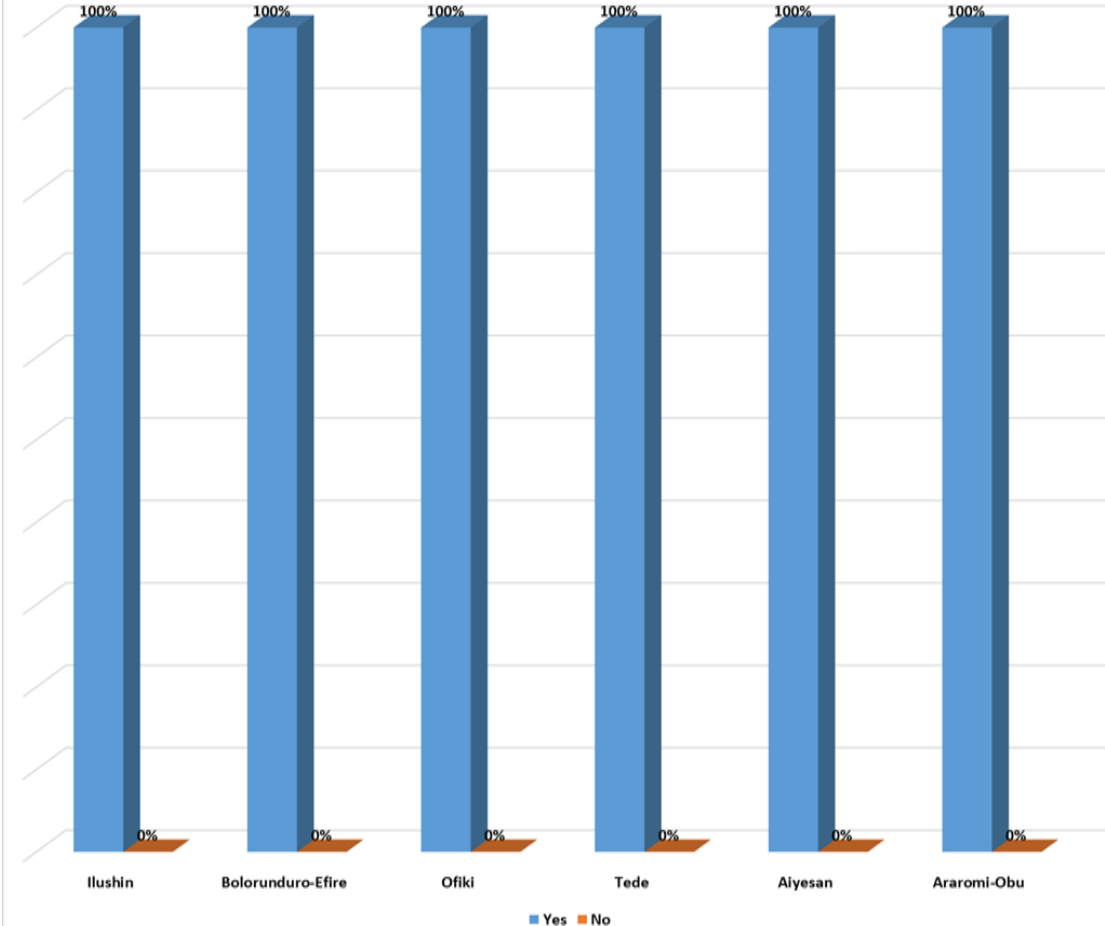
Participants' Age Group



Basic Characteristics of Participants

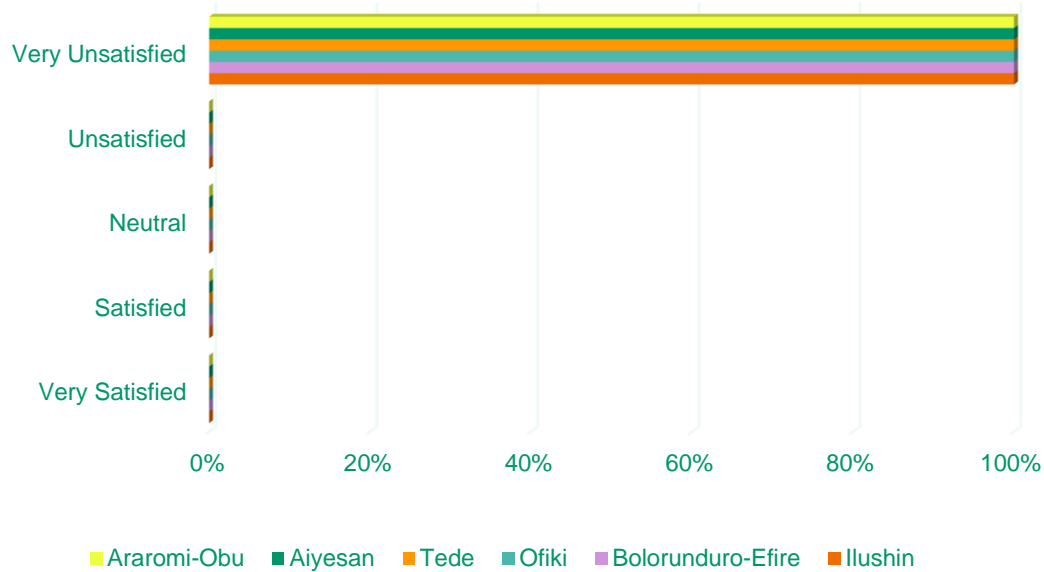


Connection to Electricity Distribution Network



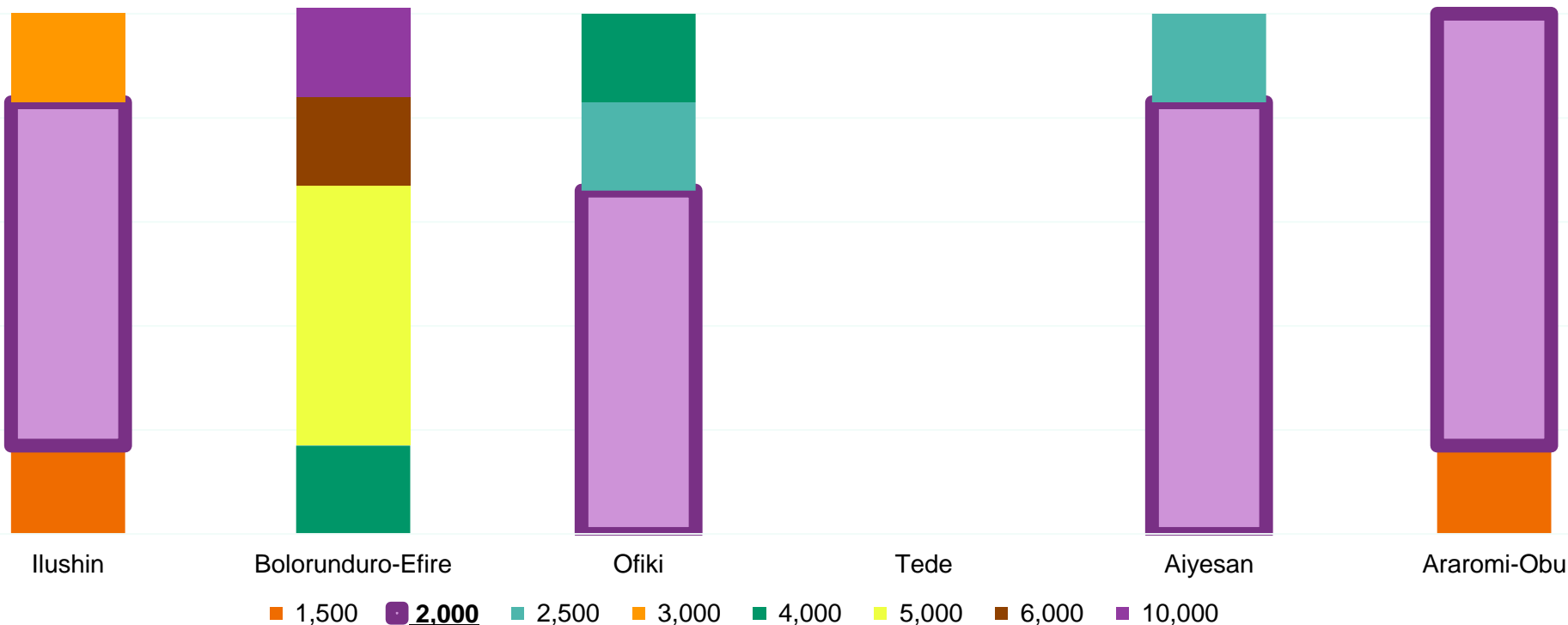
**Participants’
Connection to an
Electricity
Distribution Network**

Level of Satisfaction with the Grid electricity supply



Participants' Level of Satisfaction with Electricity Supply

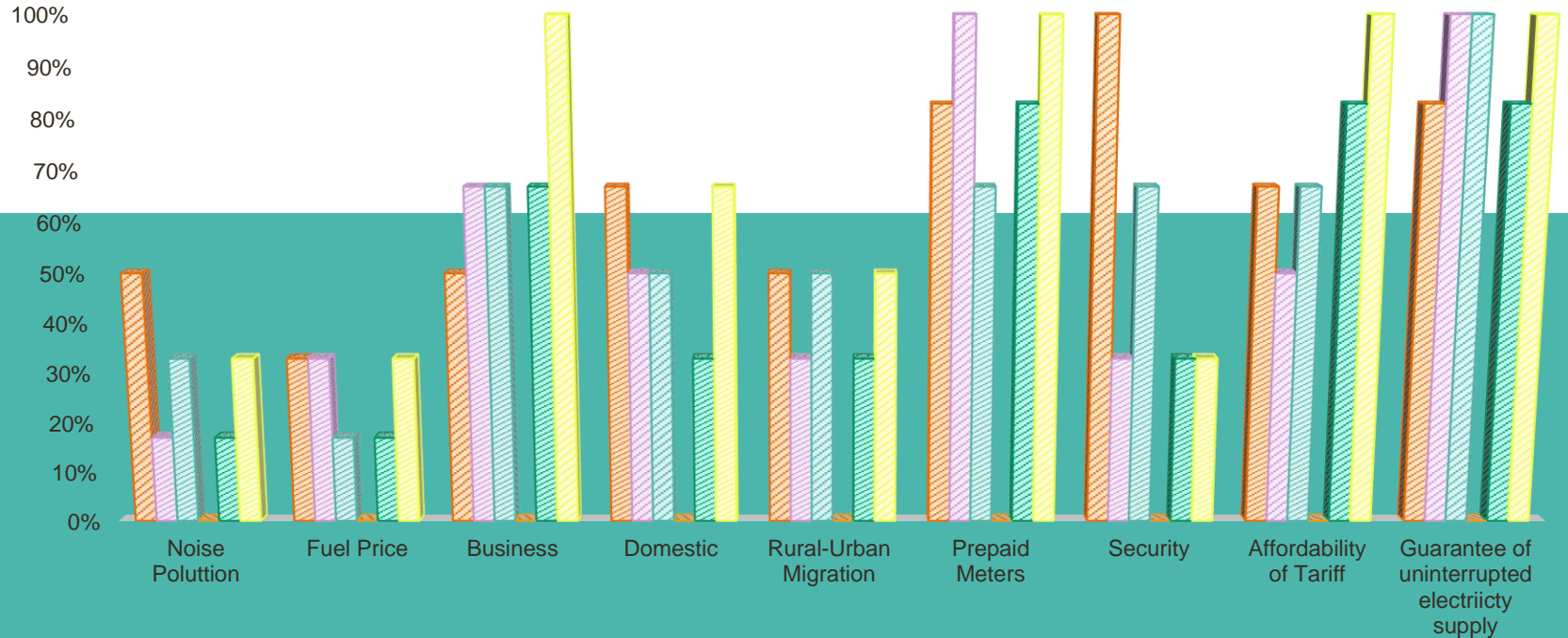
Maximum Amounts Participants are willing to pay for uninterrupted electricity supply from IMGs



Factors influencing WtP

FACTORS INFLUENCING WTP FOR UNINTERRUPTED ELECTRICITY SUPPLY

Ilushin Efire Ofiki Tede Aiyesan Araromi



Factors affecting Participants' WTP for uninterrupted electricity supply from ISMGs

1. Uninterrupted Supply

2. Installation of Prepaid Meters

3. Affordability of Tariff

4. Business Use & Domestic Use

5. Security

6. Rural-Urban Migration

7. Noise Pollution from Captive Electricity Generation

8. High Fuel Price

CONCLUSION

- Participants are willing to pay between ₦1,500 (\$3.37) to ₦10,000 (\$22.46) per month for uninterrupted electricity supply from ISMGs.
- Its predictors are the guarantee of uninterrupted electricity supply, installation of prepaid meters, affordability of the tariff, domestic and business uses, security, rural-urban migration, noise pollution from generators, and the high petrol price.

Recommendations

Benchmarking the ISMG tariff against the substitute fuel option

Flexible revenue collection to allow sunk cost recovery over short term-midterm

Understanding the peculiarities of the communities' Energy Profile

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Thank you