Nigeria: Overview and Customer Profiles
Prepared for NoMAP
29 November 2018

Outline

Overview

OVERVIEW || ACCESS TO ELECTRICITY

About 61 percent of households in ten target Nigerian states have access to electricity. [1]
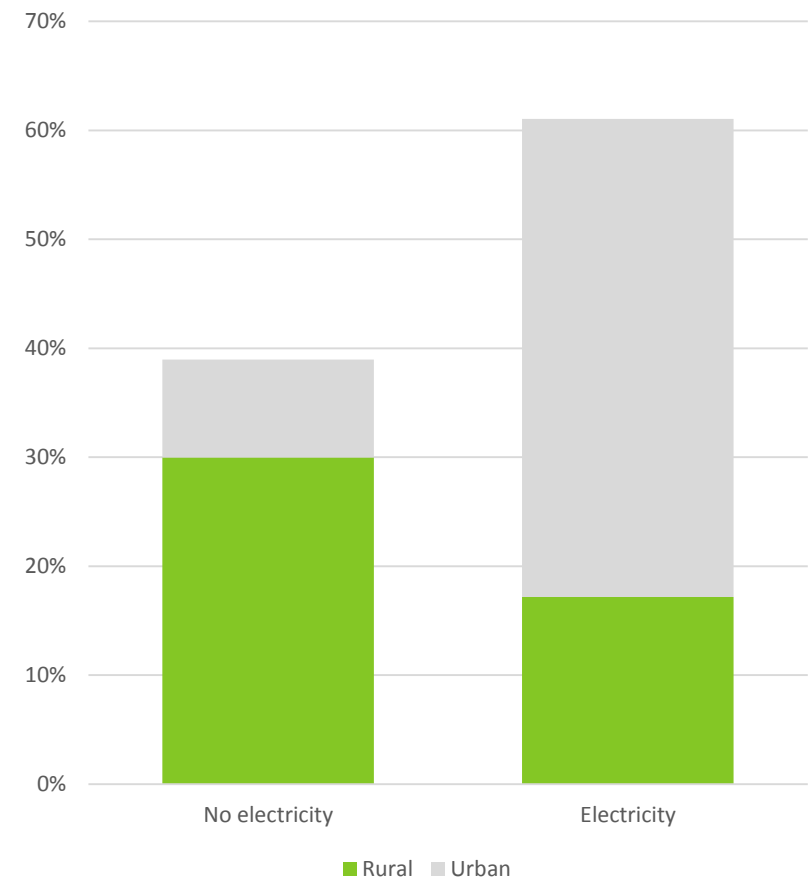
1 Over two-thirds of grid-connected households are urban in the ten target states.

2 About 77 percent of off-grid households in the ten target states are rural.

Household access to electricity by urban/rural in ten Nigerian states

Legend: ■ Rural ■ Urban

X-axis categories: No electricity, Electricity
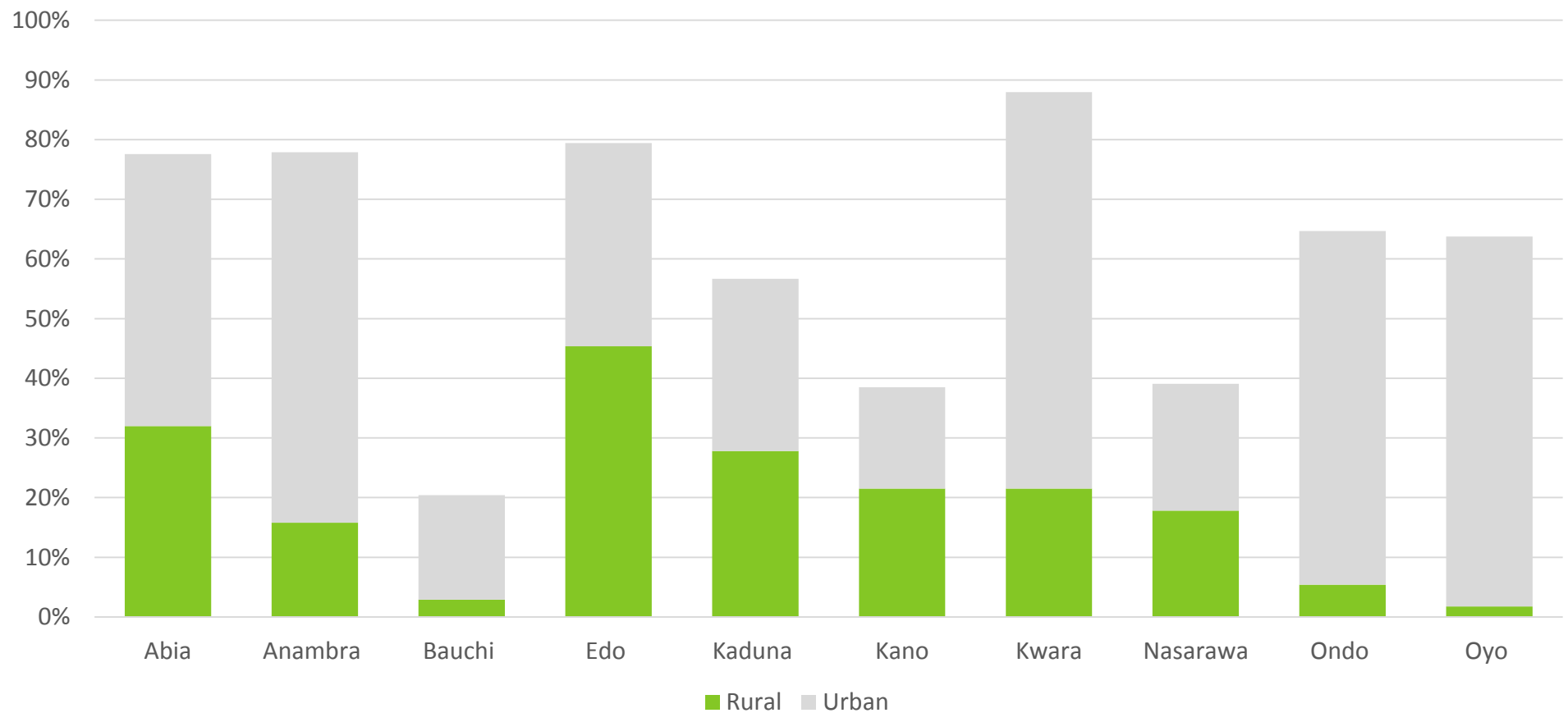
Y-axis: 0% to 70%

Note 1: Nigerian states include Abia, Anambra, Bauchi, Edo, Kaduna, Kano, Kwara, Nasarawa, Ondo, and Oyo. See appendices for detailed breakdowns of each state.
Source: Fraym

OVERVIEW || ACCESS TO ELECTRICITY

## In most states, households that have access to electricity are mainly in urban areas.

Household access to electricity by state and urban/rural

■ Rural ■ Urban

Source: Fraym

OVERVIEW || ACCESS TO ELECTRICITY

80 percent of grid-connected households have six or fewer hours of electricity per day.
On average, grid-connected households have electricity for only four hours per day.

Percent of households with daily average hours of electricity in ten Nigerian states [1][2]
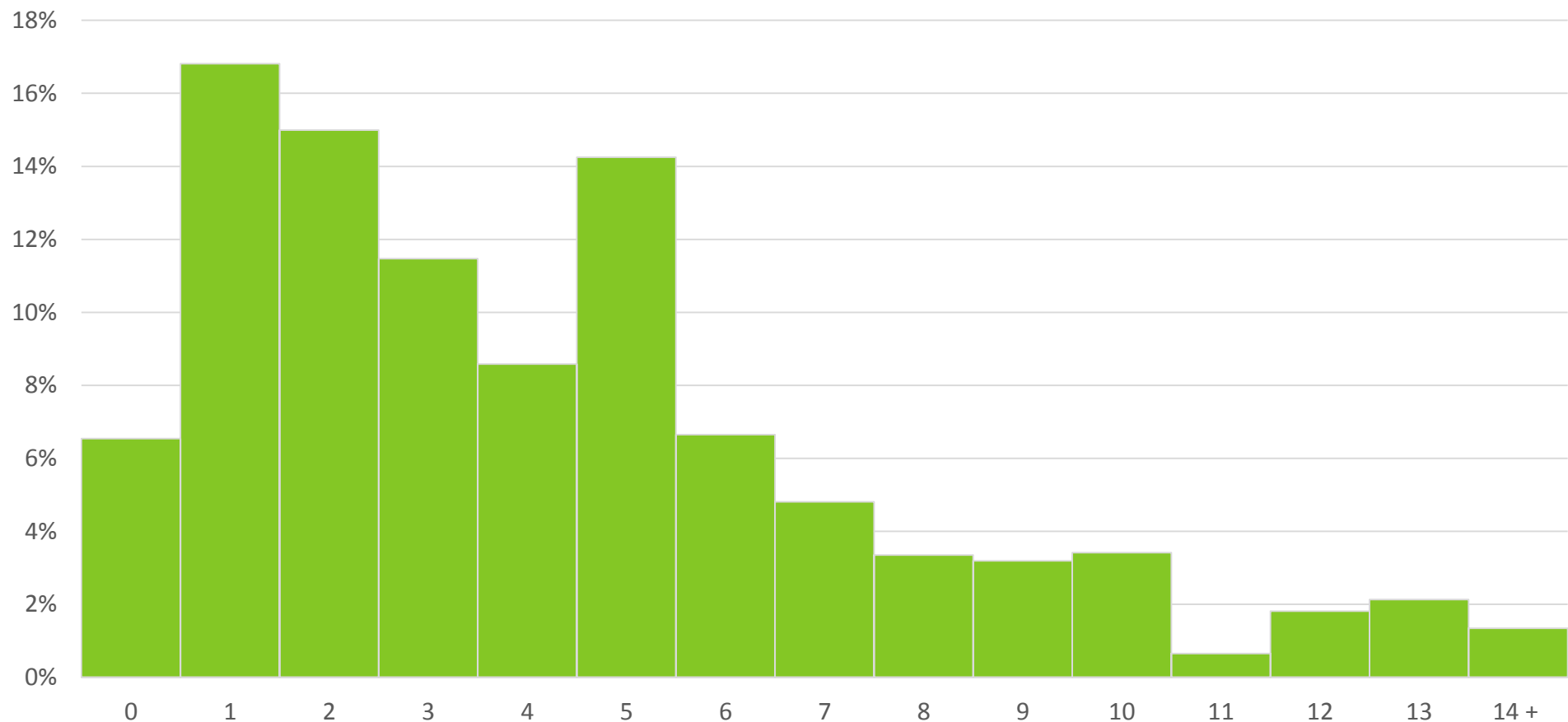
Note 1: Nigerian states include Abia, Anambra, Bauchi, Edo, Kaduna, Kano, Kwara, Nasarawa, Ondo, and Oyo.
Note 2: Average daily hours of electricity was derived from the question: "How many hours of electricity have you had over the past 7 days?"
Source: Fraym

OVERVIEW || ACCESS TO ELECTRICITY

Across the target states, grid reliability is an issue for grid-connected households. Only households in Bauchi and Nasarawa have more than 5 hours of electricity per day on average.

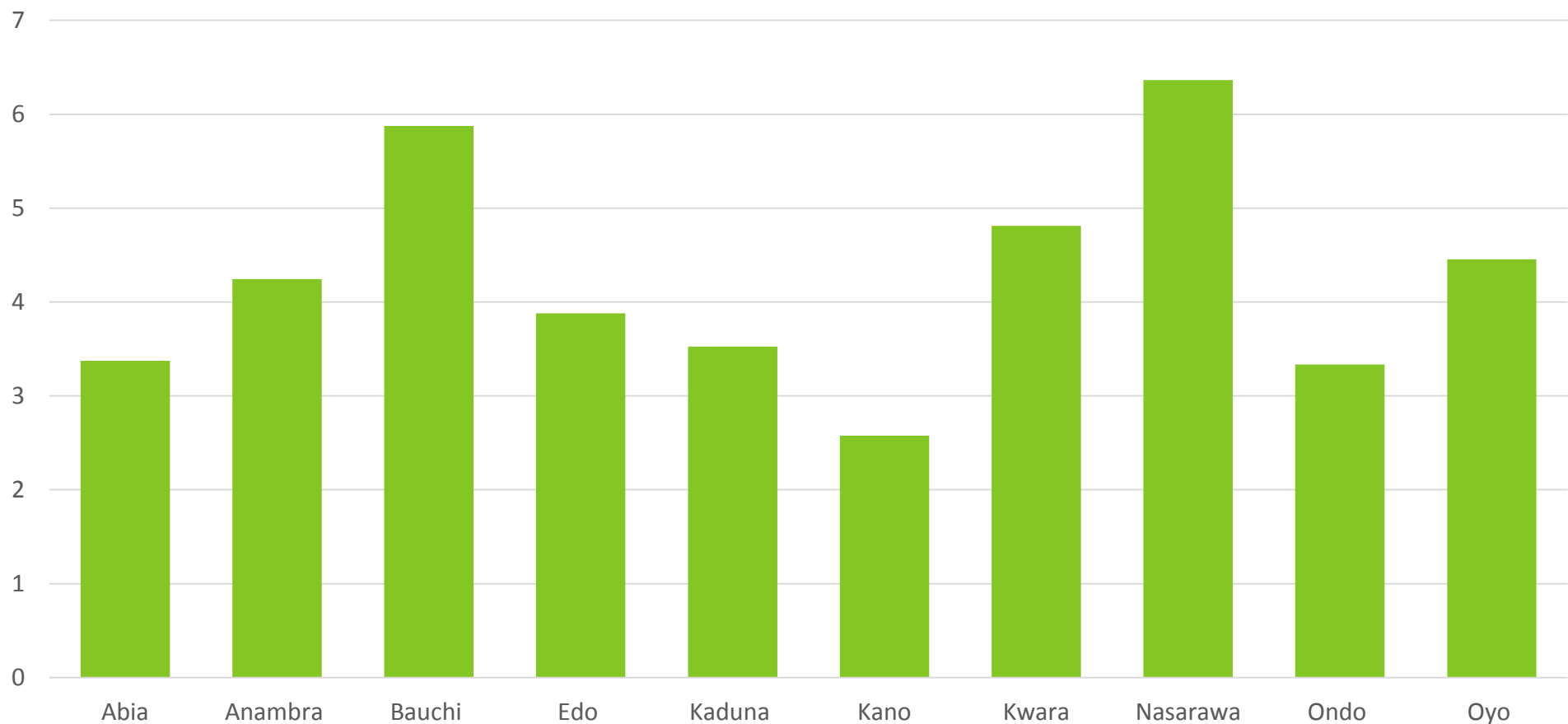**Average daily hours of electricity by state** [1]

Note 1: Average daily hours of electricity was derived from the question: "How many hours of electricity have you had over the past 7 days?"
Source: Fraym

OVERVIEW || SOURCE OF LIGHTING

After electricity, torch and kerosene are the main sources of lighting in the target states.

Main source of household lighting in ten Nigerian states [1]
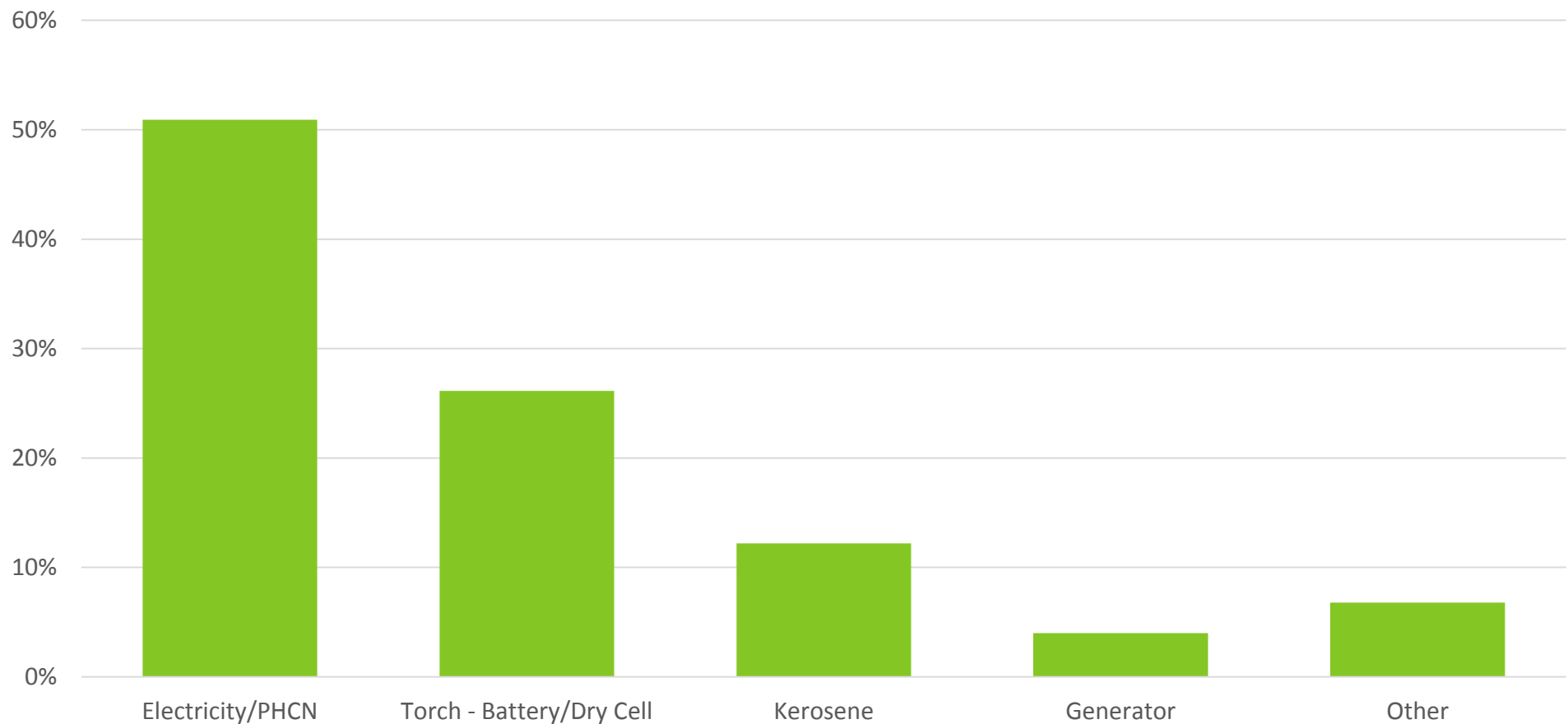
Note 1: Nigerian states include Abia, Anambra, Bauchi, Edo, Kaduna, Kano, Kwara, Nasarawa, Ondo, and Oyo.
Note 2: Other lighting sources include collecting firewood, purchasing firewood, using candles, using grass, and other methods.
Source: Fraym

OVERVIEW || SOURCE OF LIGHTING DURING BLACKOUTS

During blackouts, the main source of lighting for grid-connected households in the target states is a rechargeable lamp.

Main source of household lighting during blackouts in ten Nigerian states [1]
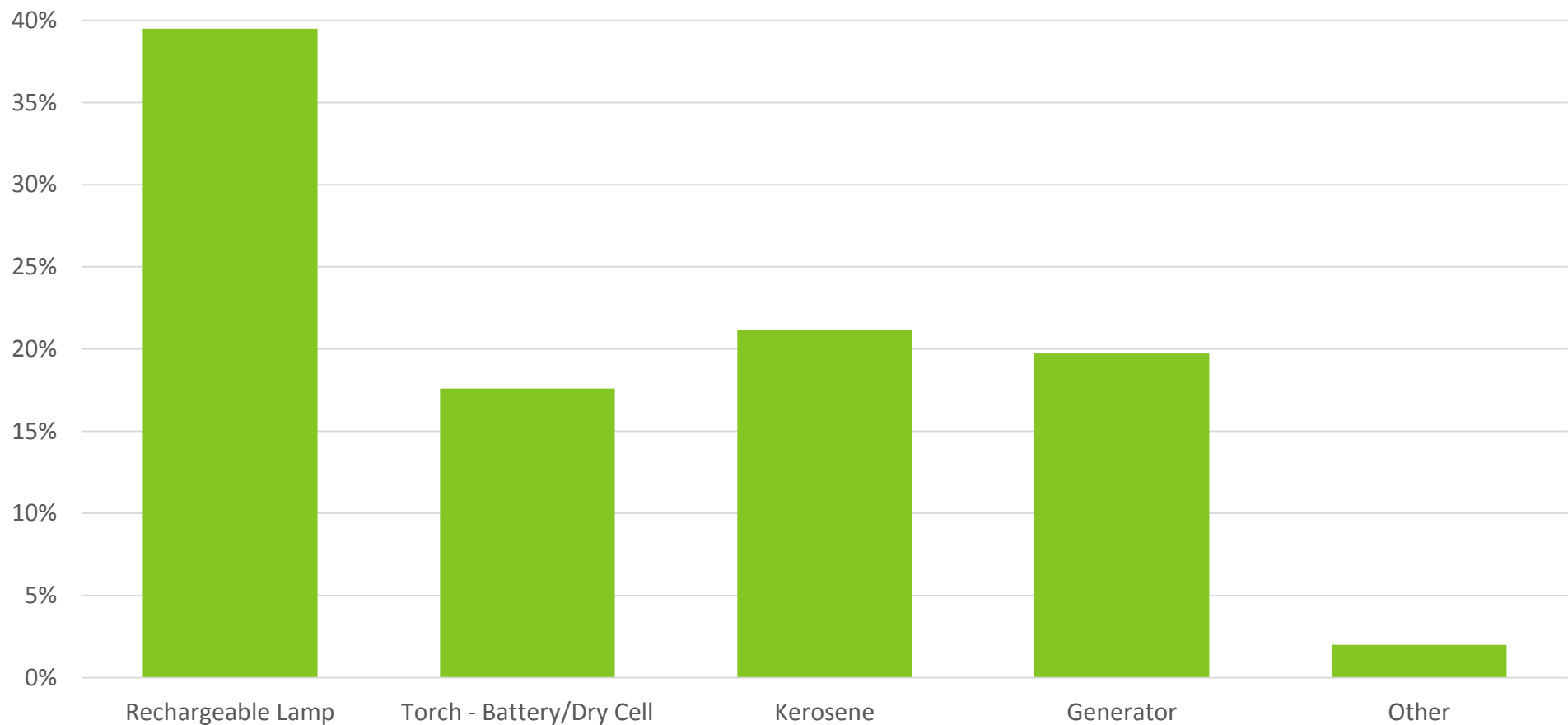
Note 1: Nigerian states include Abia, Anambra, Bauchi, Edo, Kaduna, Kano, Kwara, Nasarawa, Ondo, and Oyo.
Note 2: Other lighting sources include using candles, using firewood, and other methods.
Source: Fraym

OVERVIEW || GENERATOR OWNERSHIP

30 percent of households in these ten states report owning a generator.

1 Almost half of all households own a generator in Abia, Anambra, and Nasarawa states, the highest of the ten states.

2 Less than five percent of households own a generator in Bauchi state, the least of the ten states.

Household generator ownership by state

OVERVIEW || HOUSEHOLD ASSET OWNERSHIP BY STATE
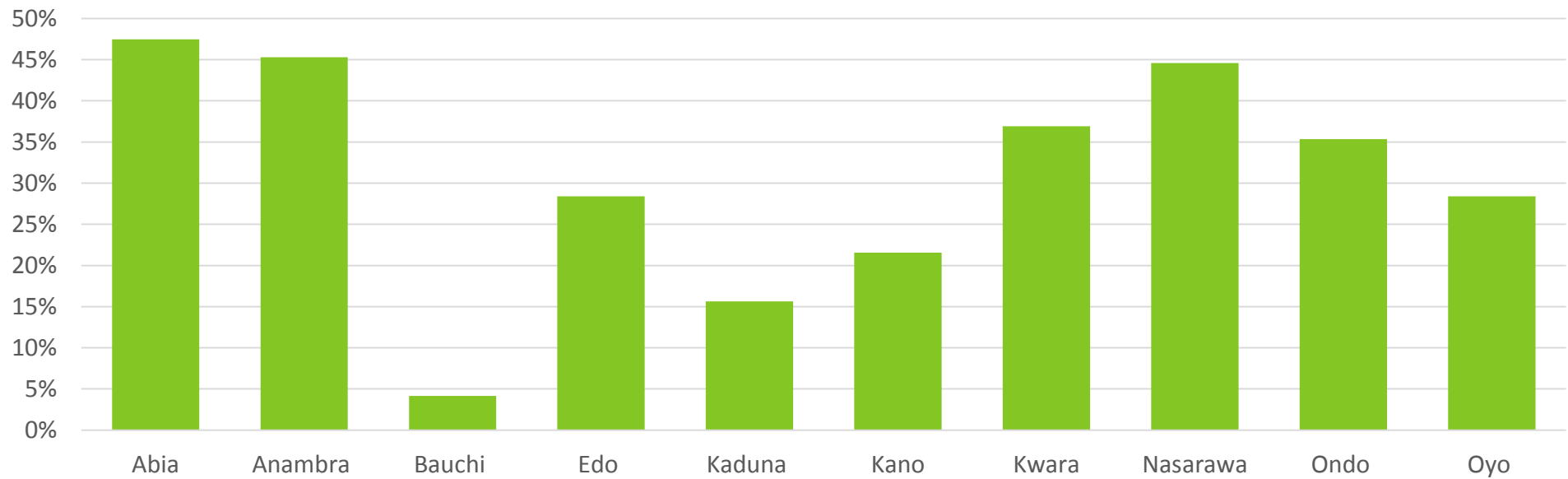
State		Generator	Refrigerator	Stove [1]	Washer	A/C	Television	Computer	Mobile phone
Abia	**On-grid**	**47%**	**43%**	**80%**	**2%**	**7%**	**78%**	**12%**	**91%**
	Off-grid	45%	49%	61%	9%	9%	54%	0%	88%
Anambra	**On-grid**	**47%**	**38%**	**91%**	**0%**	**1%**	**84%**	**2%**	**96%**
	Off-grid	37%	7%	84%	0%	2%	31%	0%	87%
Bauchi	**On-grid**	**18%**	**34%**	**44%**	**0%**	**1%**	**62%**	**7%**	**92%**
	Off-grid	0%	0%	9%	0%	0%	0%	0%	65%
Edo	**On-grid**	**26%**	**45%**	**67%**	**0%**	**1%**	**79%**	**4%**	**90%**
	Off-grid	37%	0%	20%	0%	0%	47%	0%	95%
Kaduna	**On-grid**	**17%**	**9%**	**66%**	**0%**	**0%**	**55%**	**0%**	**89%**
	Off-grid	13%	0%	20%	0%	0%	18%	0%	78%
Kano	**On-grid**	**41%**	**5%**	**30%**	**0%**	**2%**	**41%**	**2%**	**90%**
	Off-grid	9%	0%	3%	0%	0%	9%	0%	64%
Kwara	**On-grid**	**39%**	**31%**	**85%**	**3%**	**0%**	**76%**	**12%**	**90%**
	Off-grid	23%	0%	39%	0%	0%	16%	0%	85%
Nasarawa	**On-grid**	**42%**	**14%**	**56%**	**0%**	**0%**	**55%**	**0%**	**94%**
	Off-grid	46%	10%	32%	0%	0%	44%	0%	77%
Ondo	**On-grid**	**35%**	**17%**	**98%**	**2%**	**0%**	**43%**	**6%**	**45%**
	Off-grid	35%	2%	74%	0%	0%	26%	0%	80%
Oyo	**On-grid**	**29%**	**19%**	**81%**	**2%**	**1%**	**66%**	**6%**	**75%**
	Off-grid	26%	2%	36%	0%	0%	30%	3%	69%

Note 1: Stove includes gas and electric stoves.
Source: Fraym

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OVERVIEW || MOBILE PHONE DETAILS BY STATE

In the target states, about 40% of households own an internet-enabled phone and around 10% use mobile banking. On-grid households tend to have higher ownership and usage.

| State			Internet-enabled phone	Mobile banking
Abia	On-grid		57%	31%
	Off-grid		37%	27%
Anambra	On-grid		51%	6%
	Off-grid		32%	3%
Bauchi	On-grid		43%	33%
	Off-grid		7%	4%
Edo	On-grid		58%	28%
	Off-grid		29%	4%
Kaduna	On-grid		60%	20%
	Off-grid		30%	3%
Kano	On-grid		36%	8%
	Off-grid		13%	0%
Kwara	On-grid		48%	6%
	Off-grid		27%	0%
Nasarawa	On-grid		55%	4%
	Off-grid		45%	5%
Ondo	On-grid		26%	2%
	Off-grid		38%	0%
Oyo	On-grid		57%	23%
	Off-grid		22%	1%

Source: Fraym

fraym

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OVERVIEW || HOUSEHOLD ANNUAL SPENDING

In most target states, on-grid households spend more than off-grid households.

1 On average, households spend about 650,000 Naira ($1,800) annually in the ten target states.

2 On-grid households spend about 700,000 Naira ($1,900) annually on average and off-grid households spend about 560,00 Naira ($1,540) annually on average in the ten target states.

Average annual household spending (2018 Naira) by state and on-grid/off-grid [1] [2]

■ On-grid ■ Off-grid
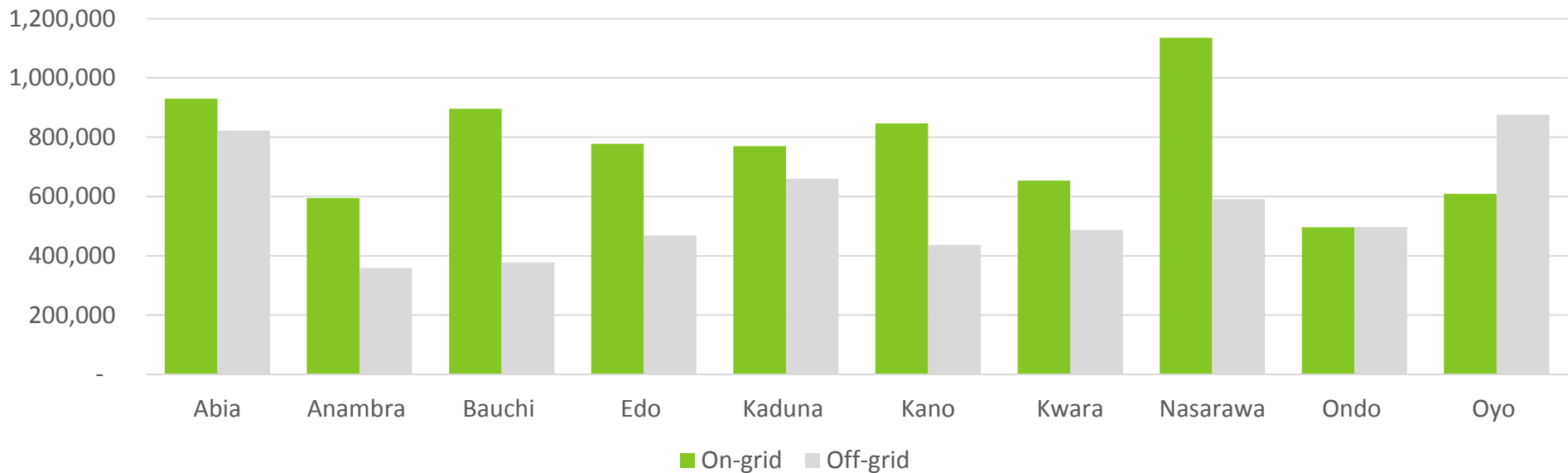
Note 1: Spending categories include food, clothing, housing, health, transportation, recreation, education, financial services, and miscellaneous.
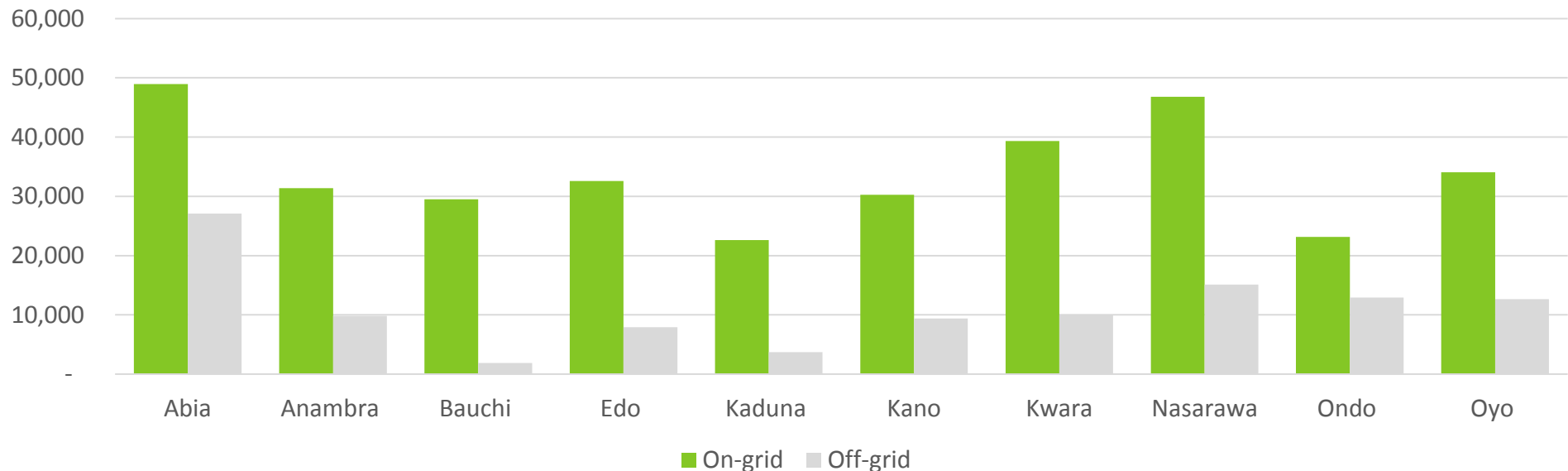**Note 2**: Currency conversion: $1 USD to 360 Naira
Source: Fraym

OVERVIEW || HOUSEHOLD ANNUAL SPENDING ON ENERGY

On-grid households on average spend more on energy than off-grid households.

1 On average, households spend 24,000 Naira ($65) on energy annually in the ten target states.

2 On-grid households spend an average of 33,000 Naira ($90) annually on energy in the ten target states. Off-grid households spend an average of 9,600 Naira ($25) annually on energy in the ten target states.

Average annual household spending (2018 Naira) on energy by state and on-grid/off-grid [1] [2]

■ On-grid ■ Off-grid

Note 1: Spending on energy includes electricity, generator, diesel, gas, solar, kerosene, charcoal, firewood, and liquid cooking fuel.
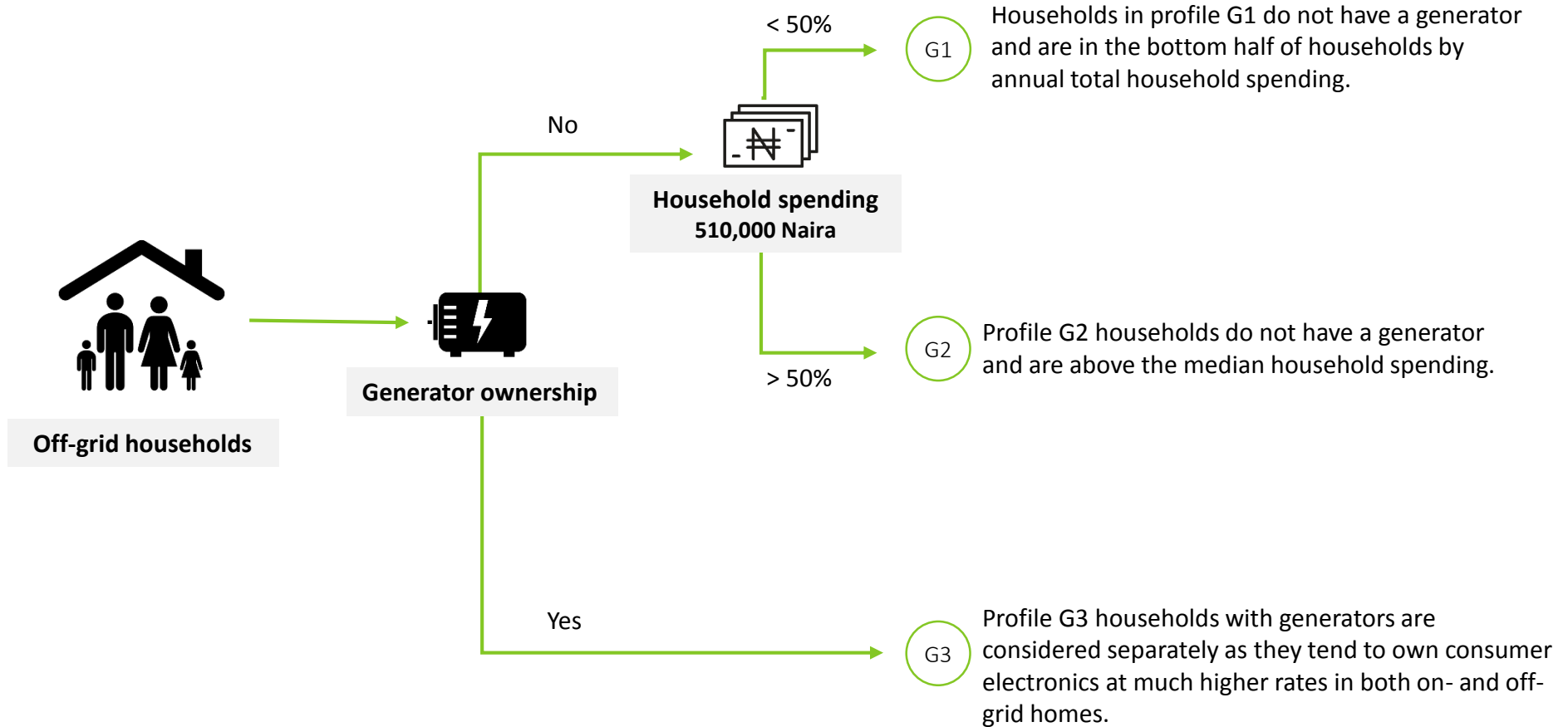**Note 2**: Currency conversion: $1 USD to 360 Naira
Source: Fraym

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Customer Profiles

CUSTOMER PROFILES || MINI-GRID COMMUNITIES

In order to estimate residential demand and willingness to pay, Fraym created three off-grid household profiles. Households are split first by whether or not they own a generator. Then, non-generator households are subset again based on whether they fall above or below the national median of total annual household spending.[1]

< 50%

G1 — Households in profile G1 do not have a generator and are in the bottom half of households by annual total household spending.

No

Household spending 510,000 Naira

G2 — Profile G2 households do not have a generator and are above the median household spending.

> 50%

Generator ownership

Off-grid households

Yes

G3 — Profile G3 households with generators are considered separately as they tend to own consumer electronics at much higher rates in both on- and off-grid homes.

Note 1: This methodology was originally developed in consultation with Odyssey.
Source: Fraym

CUSTOMER PROFILES || MINI-GRID COMMUNITIES

There are about 4 million off-grid households that fit one of the three mini-grid community profiles in the ten target states.

1. More than half of the off-grid households, around 2.4 million households, fit the G1 profile.

2. Roughly 20 percent of off-grid households, or around 0.9 million households, fit the G2 and G3 profiles each.

Total addressable market estimates for target states (using spending) [1]

Customer profile	Percent of all households	Number of households (million)	Percent of off-grid households
Profile G1 (off-grid)	22%	2.40	57%
Profile G2 (off-grid)	9%	0.92	22%
Profile G3 (off-grid)	8%	0.88	21%

Note 1: National median of total annual household spending is $1,400 (510,000 Naira).
Source: Fraym

CUSTOMER PROFILES || MINI-GRID COMMUNITIES

Off-grid households in profile G3 tend to have advanced finish housing features and educated heads of household.

	Characteristics[1]	Profile G1	Profile G2	Profile G3
Head of household education	Less than primary education	53%	33%	18%
	Completed primary	39%	51%	42%
	Completed secondary or higher	8%	16%	40%
Head of household occupation[2]	Professional	35%	42%	59%
	Clerical	7%	37%	25%
	Agriculture	6%	0%	3%
	Manual – skilled	15%	0%	7%
	Manual – unskilled	28%	20%	2%
Household characteristics	Advanced finish roof	75%	88%	94%
	Advanced finish wall	23%	30%	67%
	Advanced finish floor	44%	63%	76%

Note 1: These statistics include only off-grid households in each profile for the ten target states.
Note 2: Occupation reflects only wage/salaried employment. 86 percent of household heads did not report wage or salaried employment. Primarily, these individuals reported working on the household's agricultural plots.
Source: Fraym

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CUSTOMER PROFILES || MINI-GRID COMMUNITIES

To move from household customer profiles to community-level potential energy demand, Fraym examines asset ownership, estimates kWh usage, and interpolates off-grid demand.

1 For each profile, Fraym projects electronic appliance ownership by first comparing on-grid and off-grid asset ownership and then accounting for the relatively higher cost of mini-grid electricity compared to the national grid.[1]

2 Next, Fraym translates appliance ownership to kWh by outlining baseline annual average usage estimates for each appliance.[2]

3 To develop electricity demand by customer profile, Fraym combines baseline usage estimates with projected electronic appliance ownership.

4 Lastly, Fraym calculates total community residential demand by estimating the break-down of off-grid households into profiles G1, G2, and G3, and then applying electricity demand estimates for each customer segment.

Note 1: The projection process is tailored to reflect the behavior observed by households in each profile.
Note 2: Estimates of baseline usage were informed by literature and developed in consultation with Odyssey.
Source: Fraym

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CUSTOMER PROFILES || MINI-GRID COMMUNITIES

After identifying the customer profiles, Fraym next estimates potential energy demand. For G1 and G2 customer profiles, the off-grid households are compared to on-grid households with a similar consumption profile. Appliance ownership bundles of G1 and G2 households are deflated by 25 percent from on-grid to get the projected figure, because of the higher cost of mini-grid electricity compared to that from the national grid. Electrical lighting use is imputed directly from on-grid averages as it is generally one of the most quickly and widely adopted uses of energy in newly electrified communities. Major appliances are excluded from G1 profiles entirely. For the G3 profile (generator owners), we observe that households that are on-grid and own a generator have several energy intensive appliances and do not serve as an appropriate proxy. For G3 profiles, we assume that current energy demand will be transferred from the generator to the mini-grid without a substantive change in demand.

Electronic appliance ownership (average number of items) by off-grid customer profile and on-grid comparison groups									
	G1 Off-grid	On-grid	Projected	G2 Off-grid	On-grid	Projected	G3 Off-grid	On-grid	Projected
Fans	0.06	0.69	0.52	0.19	1.22	0.91	0.9	2.38	0.9
TV sets	0.05	0.40	0.30	0.16	0.81	0.61	0.86	1.24	0.86
Radios	0.64	0.47	0.35	0.87	0.74	0.56	0.94	0.77	0.94
Lighting [1]	0.01	0.73	0.73	0.05	0.76	0.76	0.04	0.78	0.78
Other small appliances [2]	0.23	0.73	0.55	0.69	1.75	1.31	1.71	3.01	1.71
Major appliances [3]	0.01	0.13	0	0.05	0.43	0.32	0.38	1.27	0.38

Note 1: Records whether a household reports using electricity/Power Holding Company of Nigeria as primary fuel for lighting.
Note 2: Small appliances include DVD players, satellite dishes, cassette recorders, sound systems, computers, sewing machines, and irons.
Note 3: Major appliances include electric stoves, refrigerators, freezers, air conditioners, washing machines, and microwaves.
Source: Fraym

CUSTOMER PROFILES || MINI-GRID COMMUNITIES

Fraym used US Department of Energy data to associate appliances to kWh.[1] Then, Fraym applied modest assumptions about frequency of use to calculate the total annual kWh for each appliance. These baseline usage estimates are deflated 25 percent, similar to ownership estimates, to account for the increased expense of mini-grid electricity and overall lower income of the off-grid population.

Translating appliance ownership to kWh							
	Hours/Day		Total Annual kWh		Days/Year	Total Daily kWh	
	G1 and G2	G3	G1 and G2	G3		G1 and G2	G3
Fan	6	8	76.5	102	365	0.210	0.279
TV set	1.5	2	75	100	365	0.205	0.274
Radio	1.5	2	4.5	6	365	0.012	0.016
Lighting [2]	4.5	6	26.5	39	365	0.810	1.079
Sound system (Small)	0.5	0.5	4.5	6	365	0.012	0.016
DVD player (Small)	1.5	2	2.3	3	90	0.006	0.008
Computer (Major)	1.5	2	41.3	55	365	0.113	0.151
Refrigerator (Major)	12	16	307.5	410	365	0.842	1.123
Microwave (Major)	0.25	0.25	84	112	300	0.230	0.307
Washer (Major)	1.5	2	39.8	53	104	0.109	0.145

Note 1: Source https://www.energy.gov/energysaver/estimating-appliance-and-home-electronic-energy-use
Note 2: Household lighting estimated as three 6W bulbs.
Source: Fraym

CUSTOMER PROFILES || MINI-GRID COMMUNITIES

Based on asset ownership calculations, G1 households have the lowest energy demand among the three profiles, G2 households have a higher energy demand, and G3 households have an even higher energy demand than G2 households.
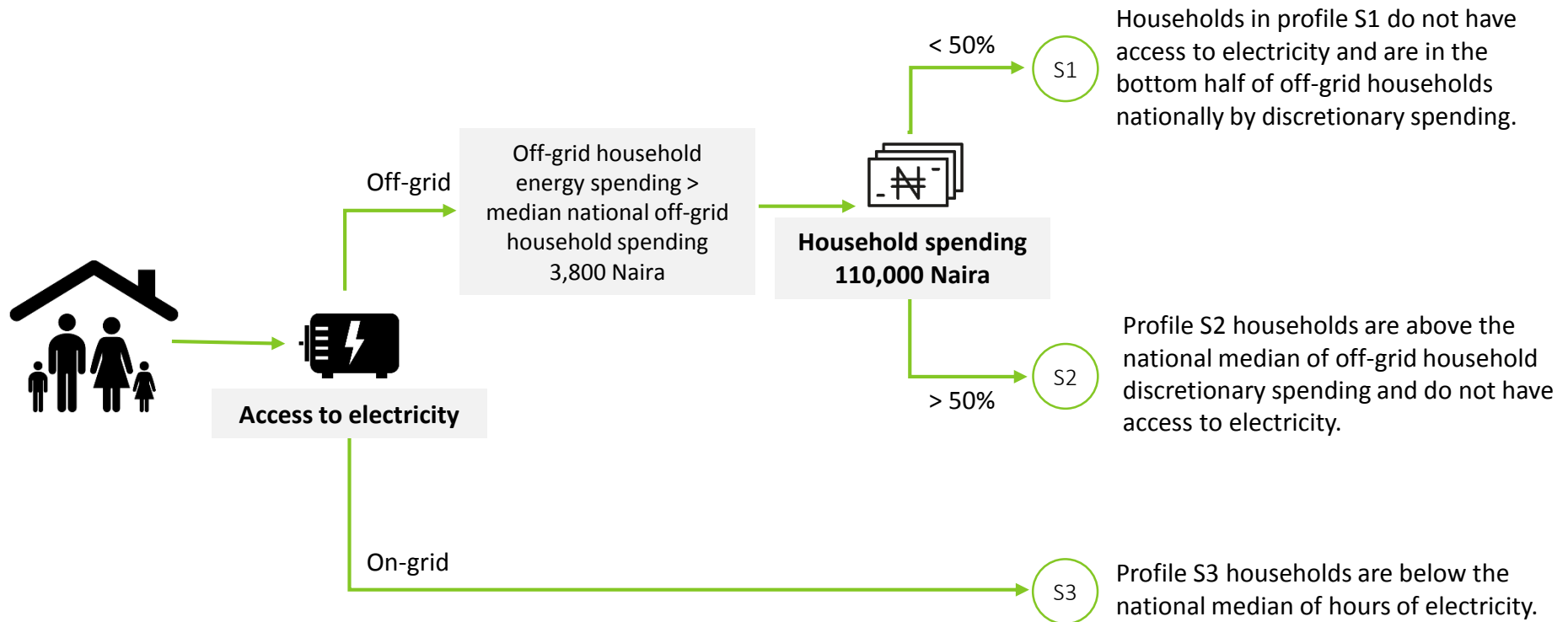
Electricity demand by customer profile

		(from slide #21)	(from slide #20)		
		Daily kWh	**Estimated ownership**	**Appliance subtotal**	
Profile G1	Fans	0.210	0.52	0.109	
	TV sets	0.205	0.30	0.061	
	Radios	0.012	0.35	0.004	
	Lighting	0.081	0.73	0.059	
	Other small appliances	0.009	0.55	0.005	
	Major appliances	0.326	0	0	**Per capita**
			Daily total	0.239	0.046
		Daily kWh	**Estimated ownership**	**Appliance subtotal**	
Profile G2	Fans	0.210	0.91	0.191	
	TV sets	0.205	0.61	0.125	
	Radios	0.012	0.56	0.007	
	Lighting	0.081	0.76	0.062	
	Other small appliances	0.009	1.31	0.012	
	Major appliances	0.326	0.32	0.104	**Per capita**
			Daily total	0.500	0.064
		Daily kWh	**Estimated ownership**	**Appliance subtotal**	
Profile G3	Fans	0.280	0.90	0.252	
	TV sets	0.274	0.86	0.236	
	Radios	0.016	0.94	0.015	
	Lighting	0.108	0.78	0.084	
	Other small appliances	0.012	1.71	0.020	
	Major appliances	0.432	0.38	0.164	**Per capita**
			Daily total	0.772	0.129

Note 1: Average off-grid household size for G1 is 5.3, G2 is 7.8, and G3 is 5.9.
Source: Fraym

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CUSTOMER PROFILES || SOLAR HOME SYSTEMS

In order to estimate residential demand and willingness to pay, Fraym created three household profiles. Households are split first by whether or not they have access to electricity. Off-grid households that fall above the median of off-grid household energy spending are subset again on whether they fall above or below the median of off-grid household discretionary spending.

Access to electricity

Off-grid

Off-grid household energy spending > median national off-grid household spending 3,800 Naira

Household spending 110,000 Naira

< 50% → S1

Households in profile S1 do not have access to electricity and are in the bottom half of off-grid households nationally by discretionary spending.

> 50% → S2

Profile S2 households are above the national median of off-grid household discretionary spending and do not have access to electricity.

On-grid → S3

Profile S3 households are below the national median of hours of electricity.

Source: Fraym

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CUSTOMER PROFILES || DISTRIBUTION OF ENERGY SPENDING

Half of off-grid households spend less than 320 Naira per month on energy, and the majority of these households rely on a torch for lighting.

1 30 percent of off-grid households do not spend anything on energy.[1] 84 percent of these households use a torch as a primary lighting source.

2 20 percent of off-grid households spend more than zero and less than 3,800 Naira annually. About 60 percent of these households use a torch as a primary lighting source.

3 Of off-grid households that spend more than 3,800 Naira annually on energy, about 40 percent use kerosene, about 35 percent of them use a torch, and about 7 percent use a generator as a primary lighting source.

Distribution of off-grid household annual energy spending (national)
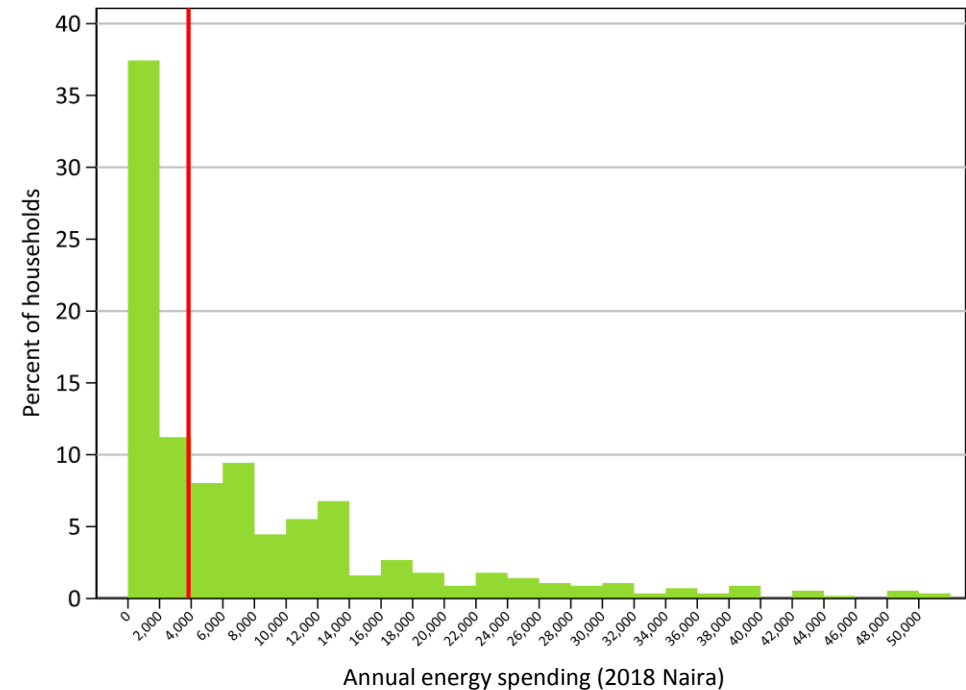
Note 1: Energy spending includes electricity, charcoal, diesel, firewood, gas, generator, solar panel, kerosene, liquid cooking fuel, and palm kernel oil.
Note 2: For the clarity of presentation, the histogram excludes seven observations that fall three standard deviations above or below the mean.
Note 3: The vertical redline indicates the national median off-grid household energy spending (3,800 Naira).
Source: Fraym

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CUSTOMER PROFILES || DISTRIBUTION OF DISCRETIONARY SPENDING

On average, off-grid households spend about 160,000 Naira annually on discretionary items.

Distribution of off-grid household annual discretionary spending (national)
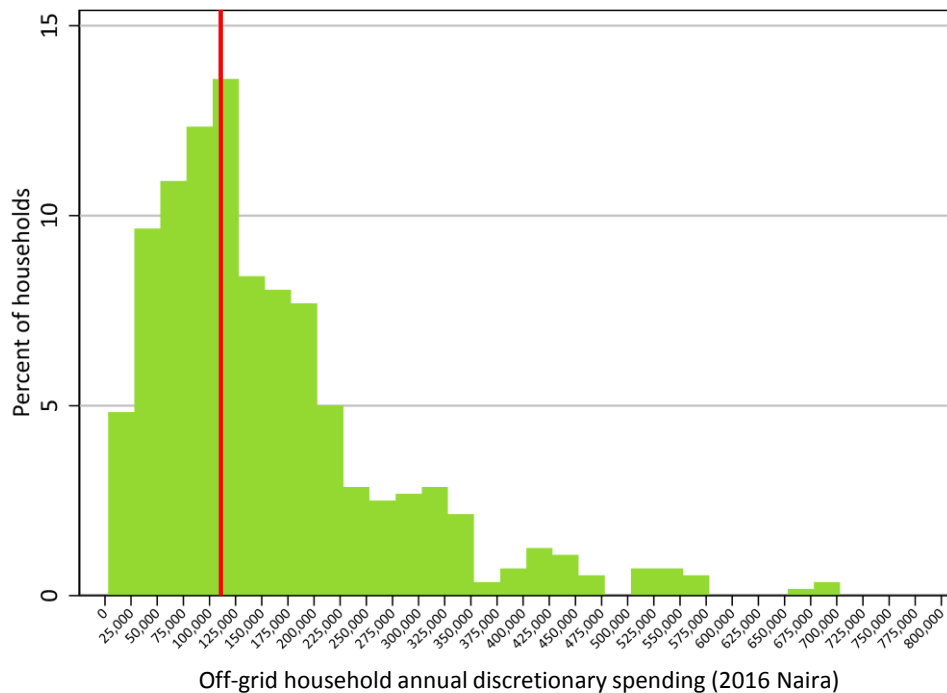
1. Discretionary spending includes annual household spending on all items other than health, education, food, and housing (including energy). Broadly, this is comprised of clothes, alcohol and tobacco, entertainment, household furnishing, restaurants, communications, transportation, personal care, and other miscellaneous items.

2. No households have zero discretionary spending.

Note 1: For the clarity of presentation, the histogram excludes ten observations that fall three standard deviations above or below the mean.
Note 2: The vertical redline indicates the median off-grid household discretionary spending (110,000 Naira).
Source: Fraym

CUSTOMER PROFILES || SOLAR HOME SYSTEMS

There are about 7 million households that fit one of the three solar home system profiles in the ten target states.

1 Profiles S1 and S2 together capture about 21 percent of all households in the ten target states.

2 Profile S3 indicates that there are grid-connected households that have unreliable access to electricity and may have a demand for solar products in the ten target states.

Total addressable market estimates for target states

Customer profile	Percent of all households	Number of households (million)
Profile S1 (off-grid)	7%	0.77
Profile S2 (off-grid)	14%	1.51
Profile S3 (on-grid)	44%	4.73

Source: Fraym

CUSTOMER PROFILES || SOLAR HOME SYSTEMS

Households in profiles S2 and S3 tend to have advanced finish housing quality and educated heads of household.

	Characteristics[1]	Profile S1	Profile S2	Profile S3
Head of household education	Less than primary education	61%	22%	31%
	Completed primary	35%	48%	26%
	Completed secondary or higher	4%	30%	43%
Head of household occupation[2]	Professional	8%	57%	39%
	Clerical	23%	27%	30%
	Agriculture	0%	0%	8%
	Manual – skilled	29%	6%	15%
	Manual – unskilled	3%	3%	0%
Household characteristics	Advanced finish roof	84%	95%	97%
	Advanced finish wall	38%	57%	80%
	Advanced finish floor	54%	69%	91%

Note 1: These statistics reflect only the ten target states.
Note 2: Occupation reflects only wage/salaried employment. 86 percent of household heads did not report wage or salaried employment. Primarily, these individuals reported working on the household's agricultural plots.
Source: Fraym

Scoring and Indicators

SCORING AND INDICATORS || MINI-GRID

In addition to the profiles and estimated electricity demand outlined in prior sections, the web platform incorporates additional indicators to score and describe mini-grid communities.

Indicators for Community Scoring	
Indicator	**Scoring Weight[1]**
Proportion of G1 households	.05
Proportion of G2 households	.05
Proportion of G3 households	.2
Estimated community residential energy demand	.5
Average community electricity access	.05
Distance to electrical grid	.05
Population density	.1

Additional Community Characteristics	
Category	**Indicator**
Infrastructure	Distance to primary road
Community size	Number of households
Violence	Recent conflict events in community
	State average exposure to acts of violence
Presence of potential anchor customers[1]	Schools
	Health clinics, hospitals, and doctors
	Commercial activities including shops and factories

Note 1: While Fraym seeks to acquire as many points of interest as possible, coverage of potential anchor customers may not be exhaustive.
Source: Fraym

SCORING AND INDICATORS || MINI-GRID

The top fifty mini-grid communities cover approximately 280,000 households and are primarily located in the southern and western target states.
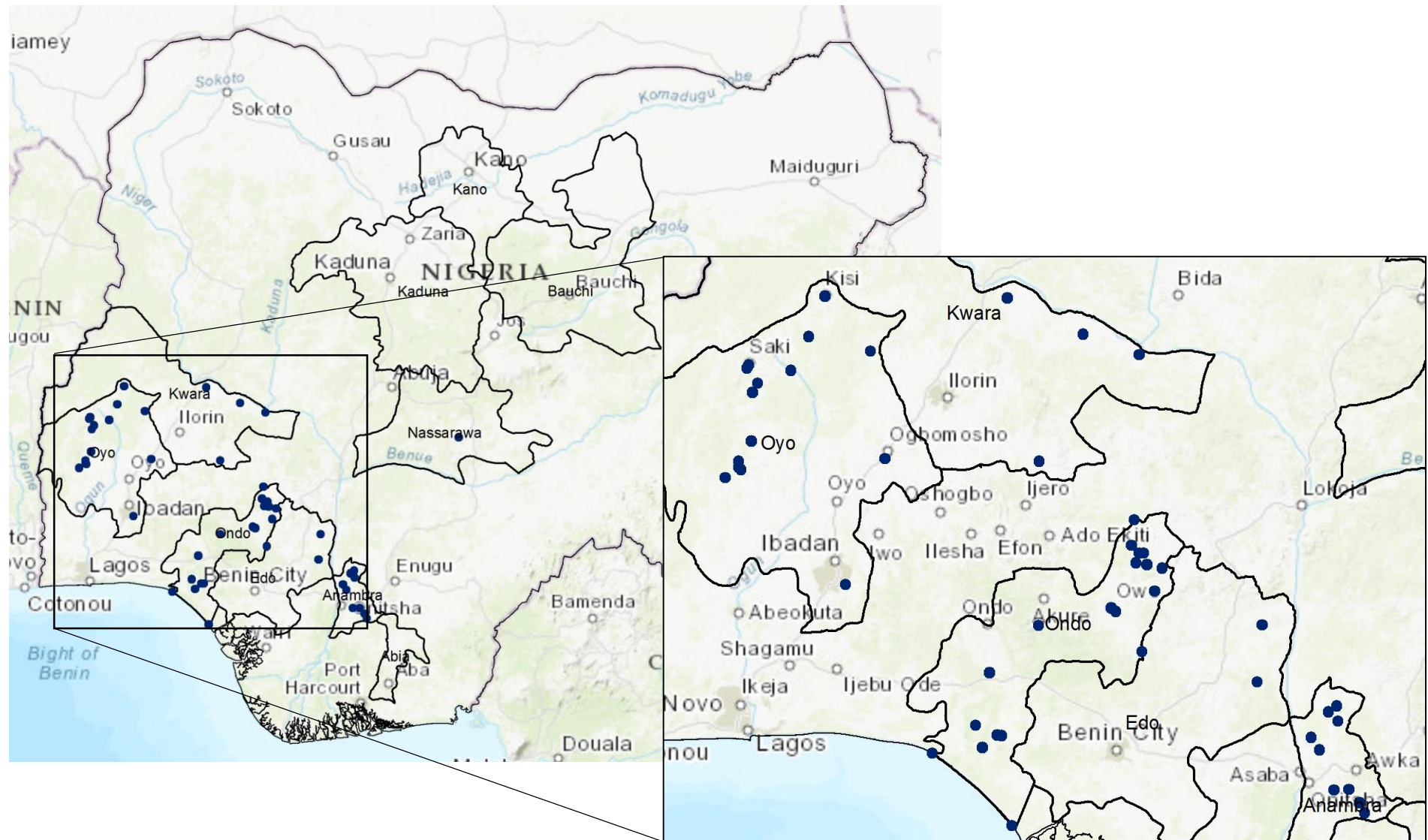
SCORING AND INDICATORS || MINI-GRID

The top 20 communities in each state cover approximately 1.1 million households. Generally, they are unevenly clustered across their respective states.
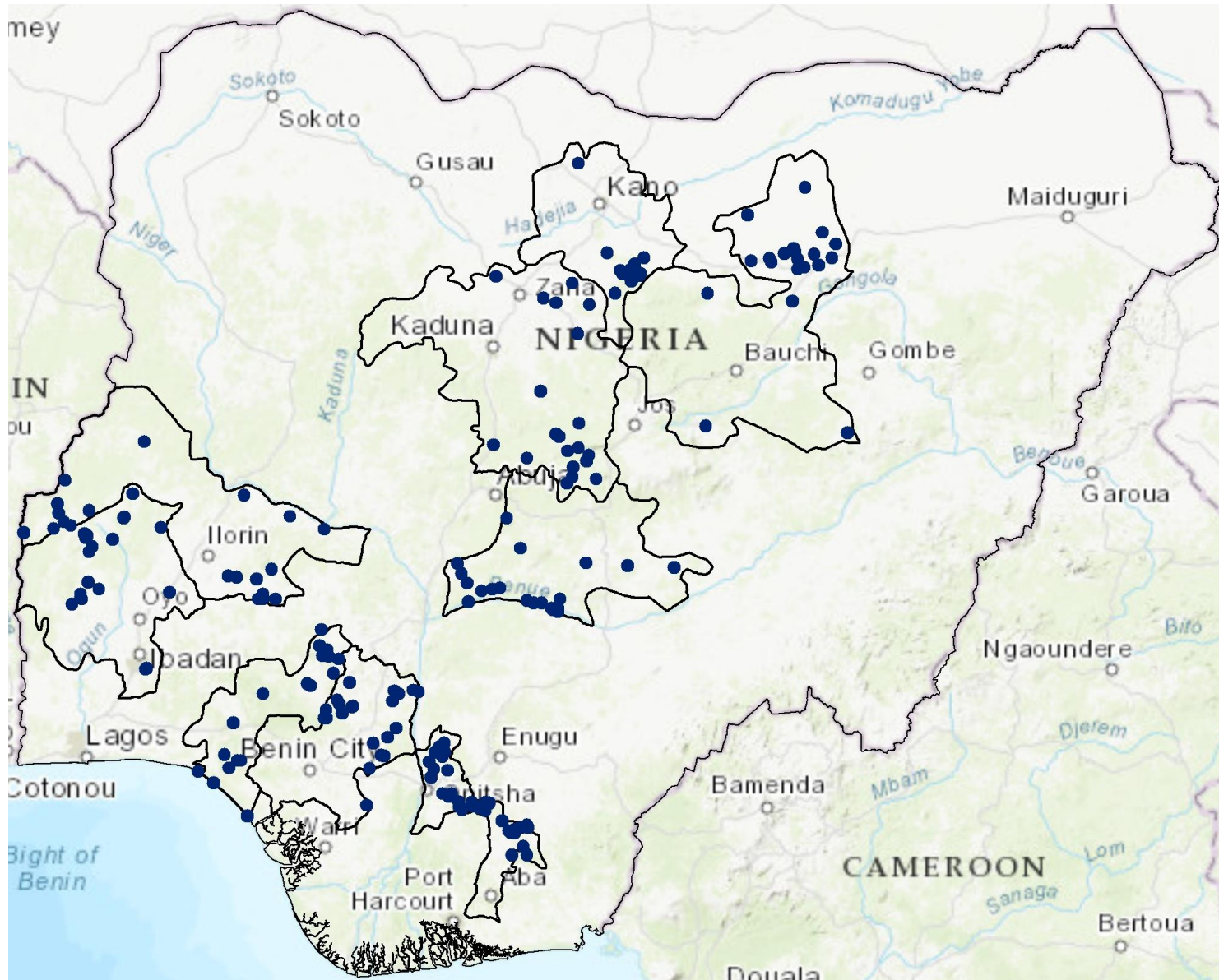
SCORING AND INDICATORS || SOLAR HOME SYSTEMS

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Indicators for Community Scoring	
Indicator	**Scoring Weight**
Proportion of S1 households	.2
Proportion of S2 households	.3
Proportion of S3 households	.1
Average community electricity access	.2
Number of households	.2

Additional Community Characteristics	
Category	**Indicator**
Spending	Proportion of households spending less than 250,000 Naira per year
Media consumption	Proportion of households that regularly listen to the radio
	Proportion of households that regularly watch television

Source: Fraym

SCORING AND INDICATORS || SOLAR HOME SYSTEMS

The top fifty solar home system communities cover approximately 570,000 households, largely concentrated in Oyo state.
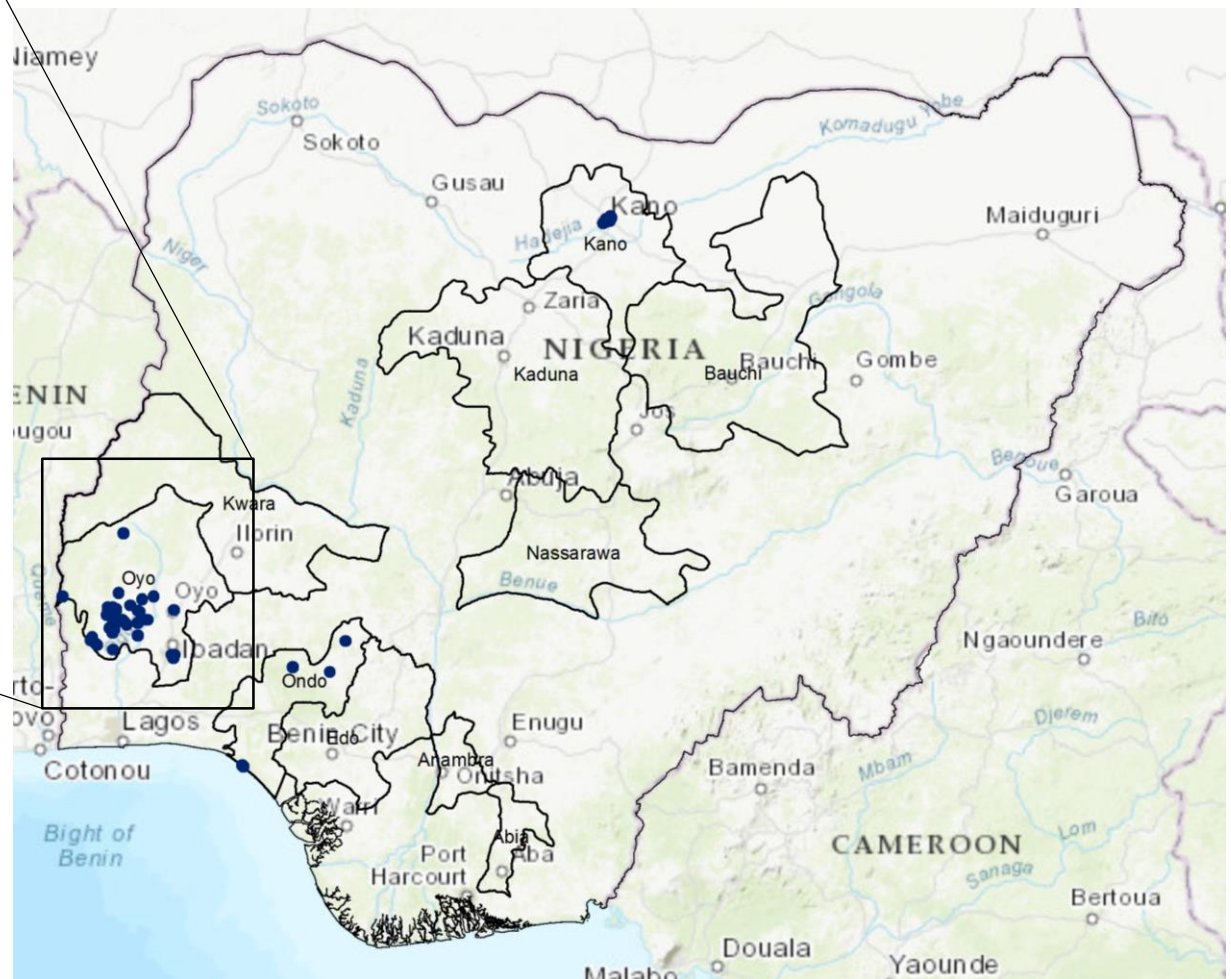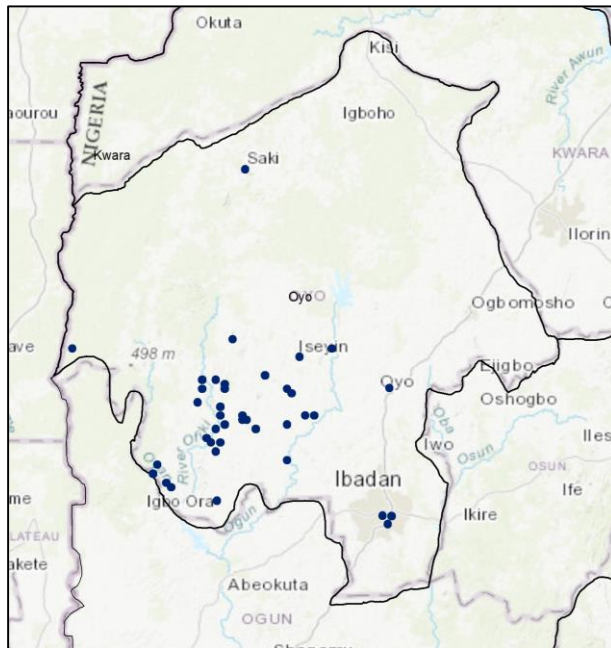
SCORING AND INDICATORS || SOLAR HOME SYSTEMS

The top 20 communities in each state together cover around 1.5 million households. In some states, like Anambra and Bauchi, these communities are dispersed. In other states, like Kano and Nasarawa, the top communities are highly concentrated.
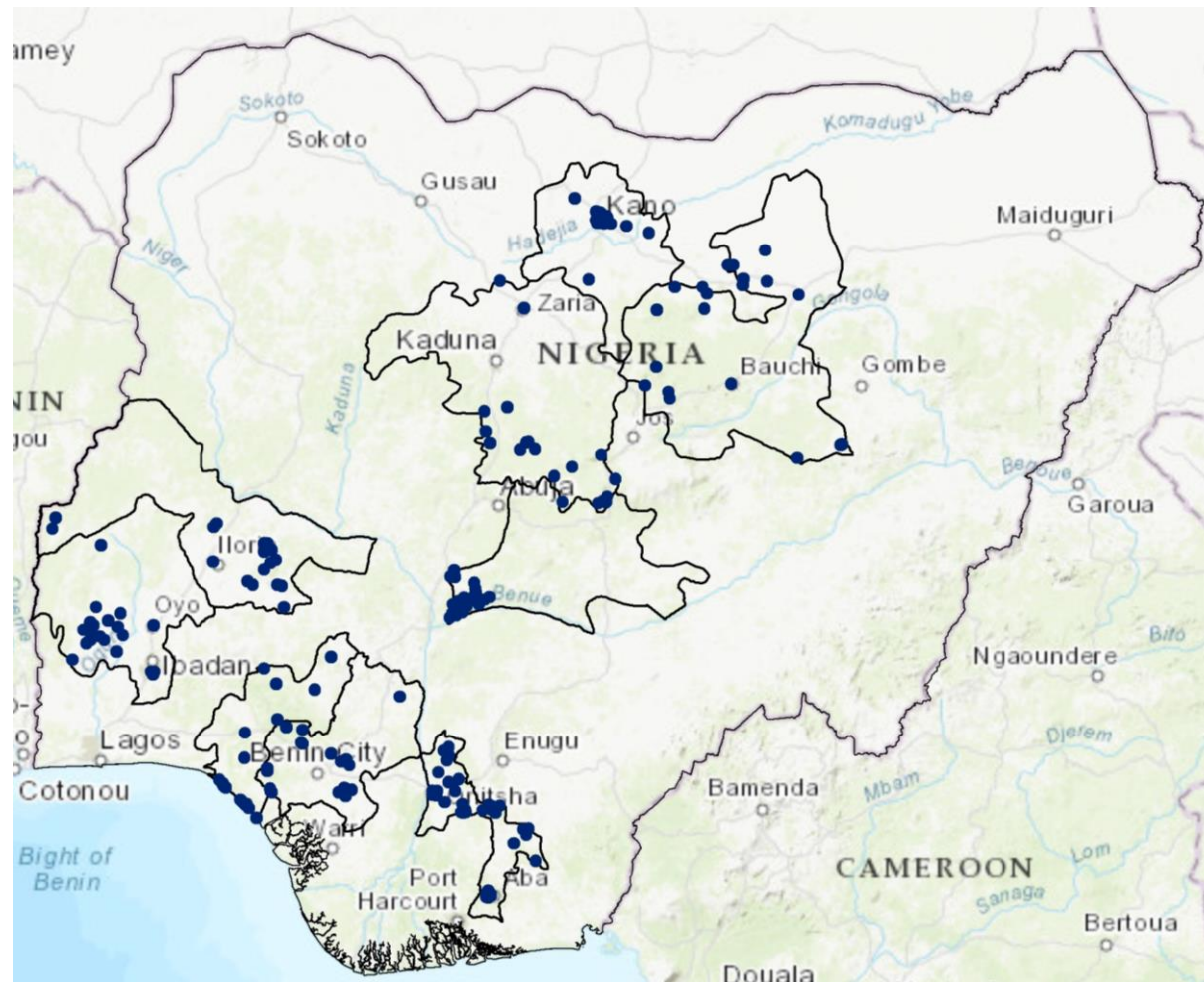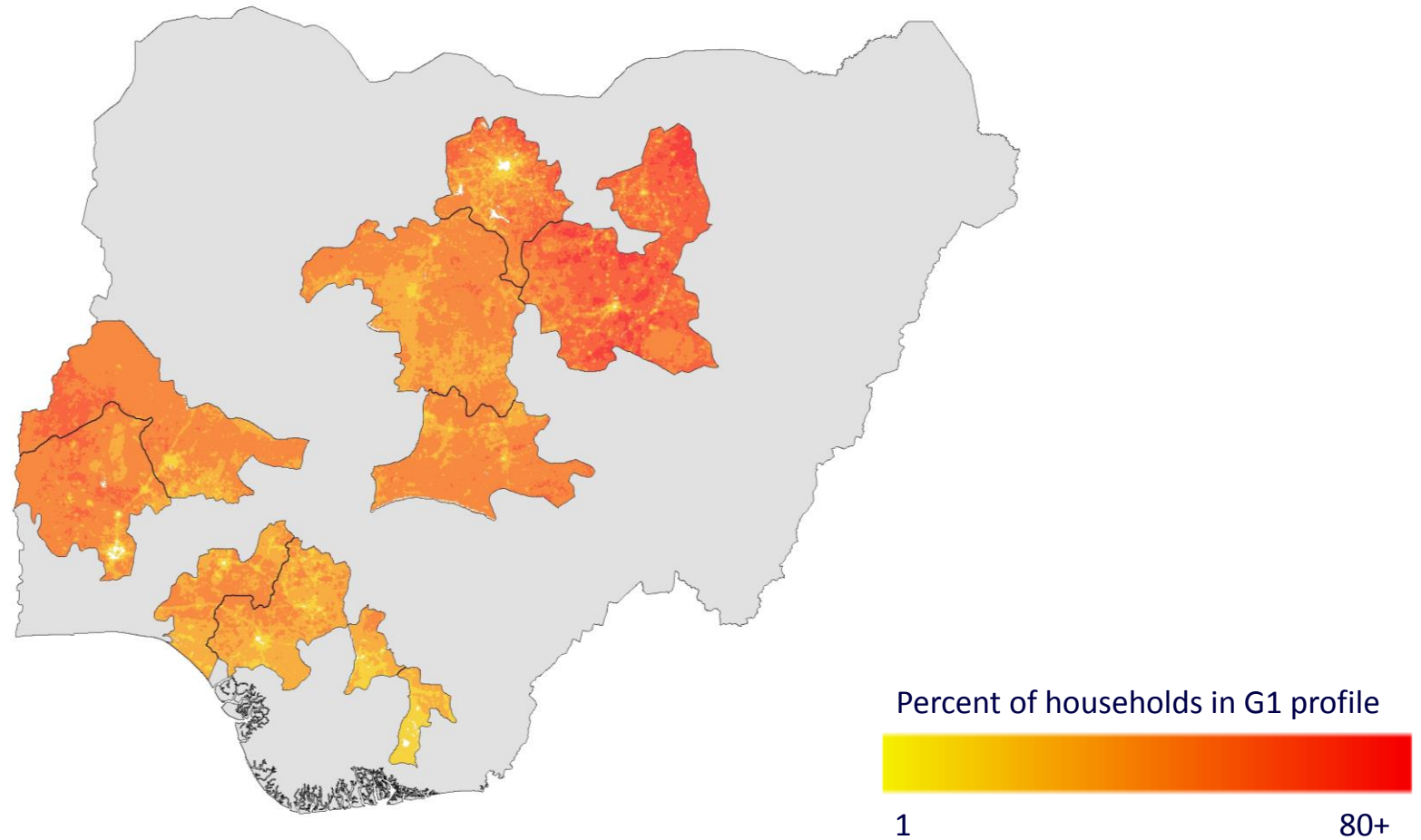
Mapping Profiles

MAPPING || MINI-GRID COMMUNITIES

Several states have high concentrations of households in the G1 profile, particularly outside major urban areas.

Percent of households in G1 profile

1   80+

Note 1: Each grid represents a 1x1 km² area. White areas indicate that no households in the grid fit the profile
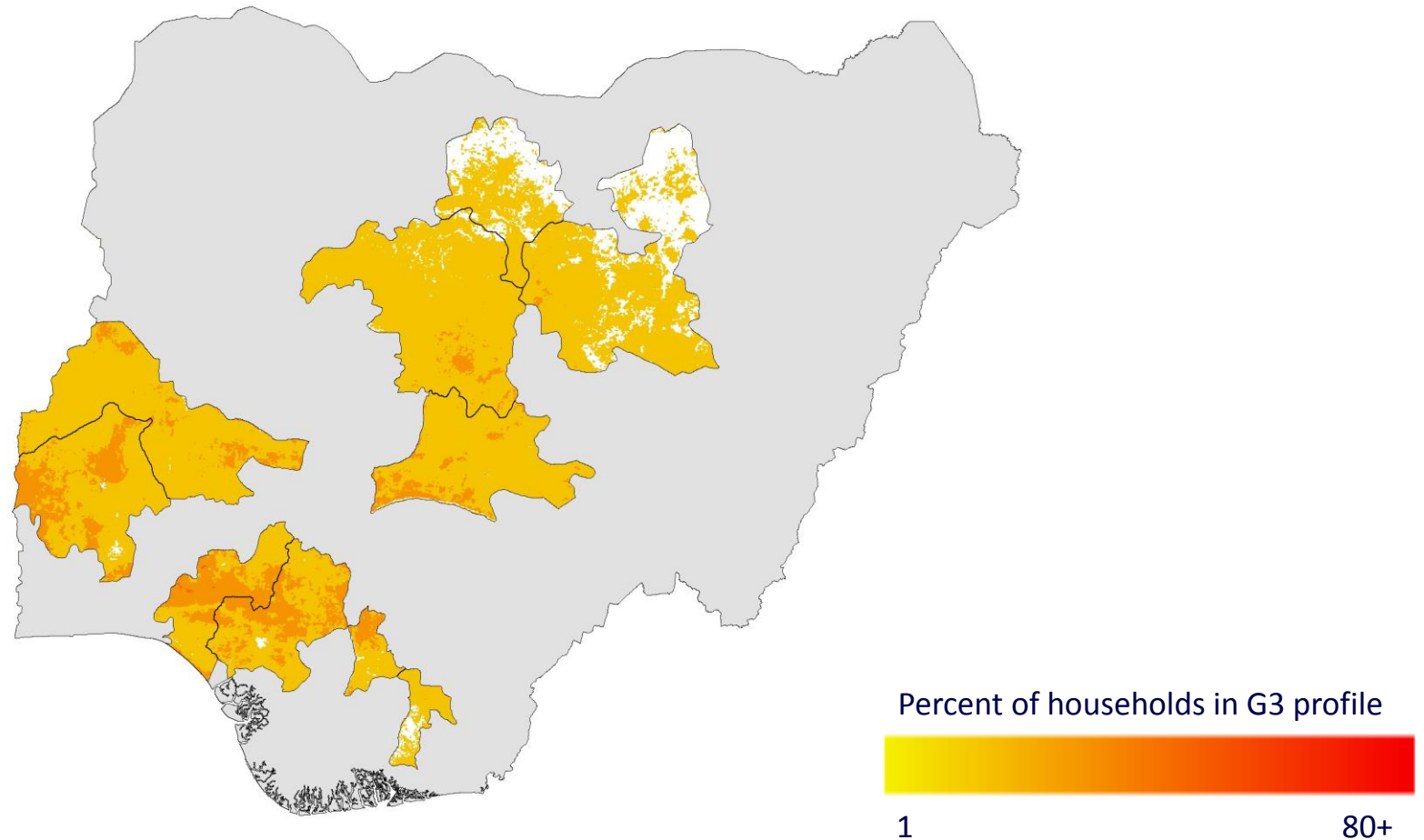**Source**: Fraym

MAPPING || MINI-GRID COMMUNITIES

Areas with high concentrations of G2 households are primarily concentrated in the central target states of Bauchi, Kano, Kaduna, and Nasarawa.

Percent of households in G2 profile

1   80+

Note 1: Each grid represents a 1x1 km² area. White areas indicate that no households in the grid fit the profile
Source: Fraym

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MAPPING || MINI-GRID COMMUNITIES

Many areas with high concentrations of G3 households are located in the southern and western target states, including Anambra, Edo, Ondo, Oyo, Kwara.
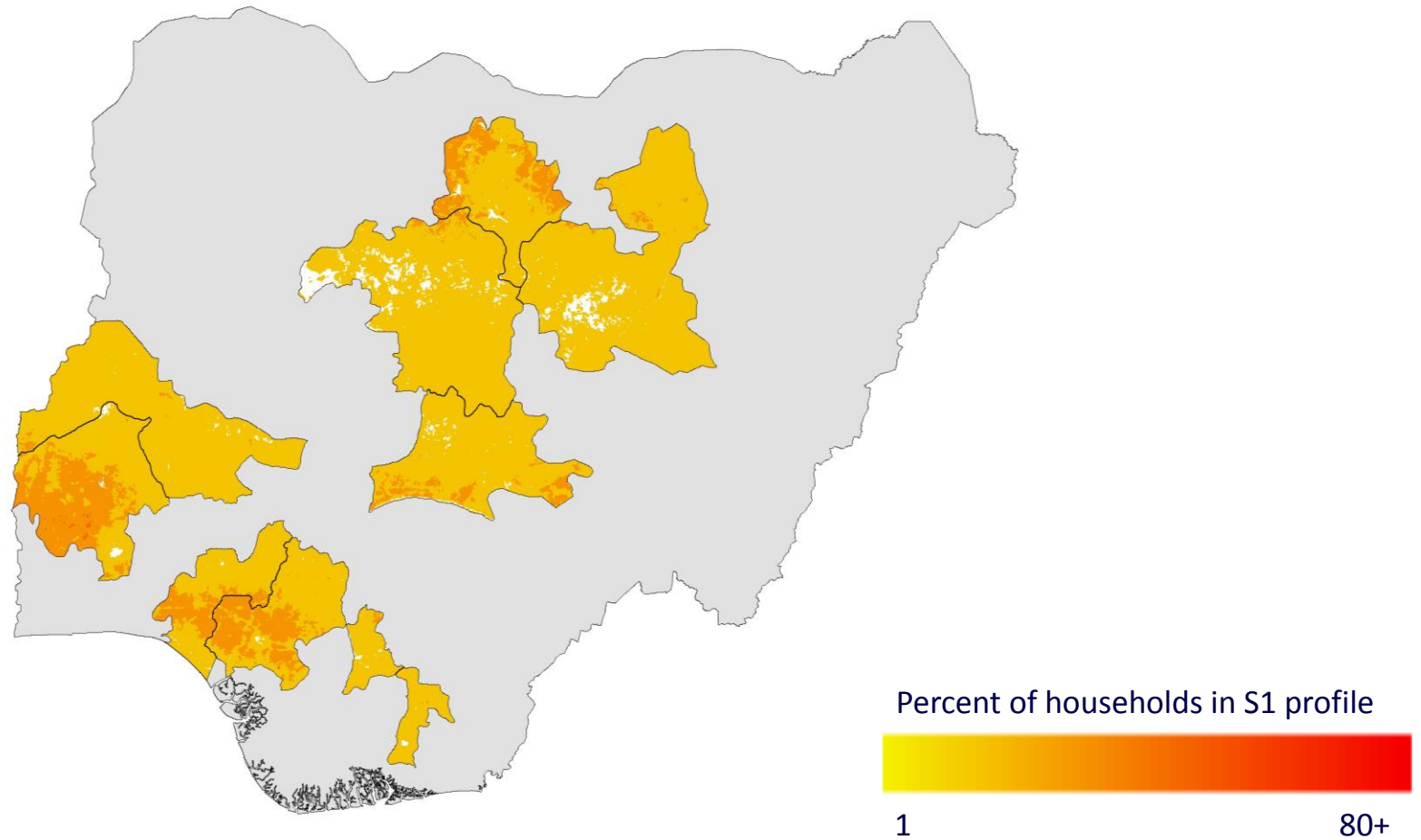

Percent of households in G3 profile

1   80+

Note 1: Each grid represents a 1x1 km² area. White areas indicate that no households in the grid fit the profile
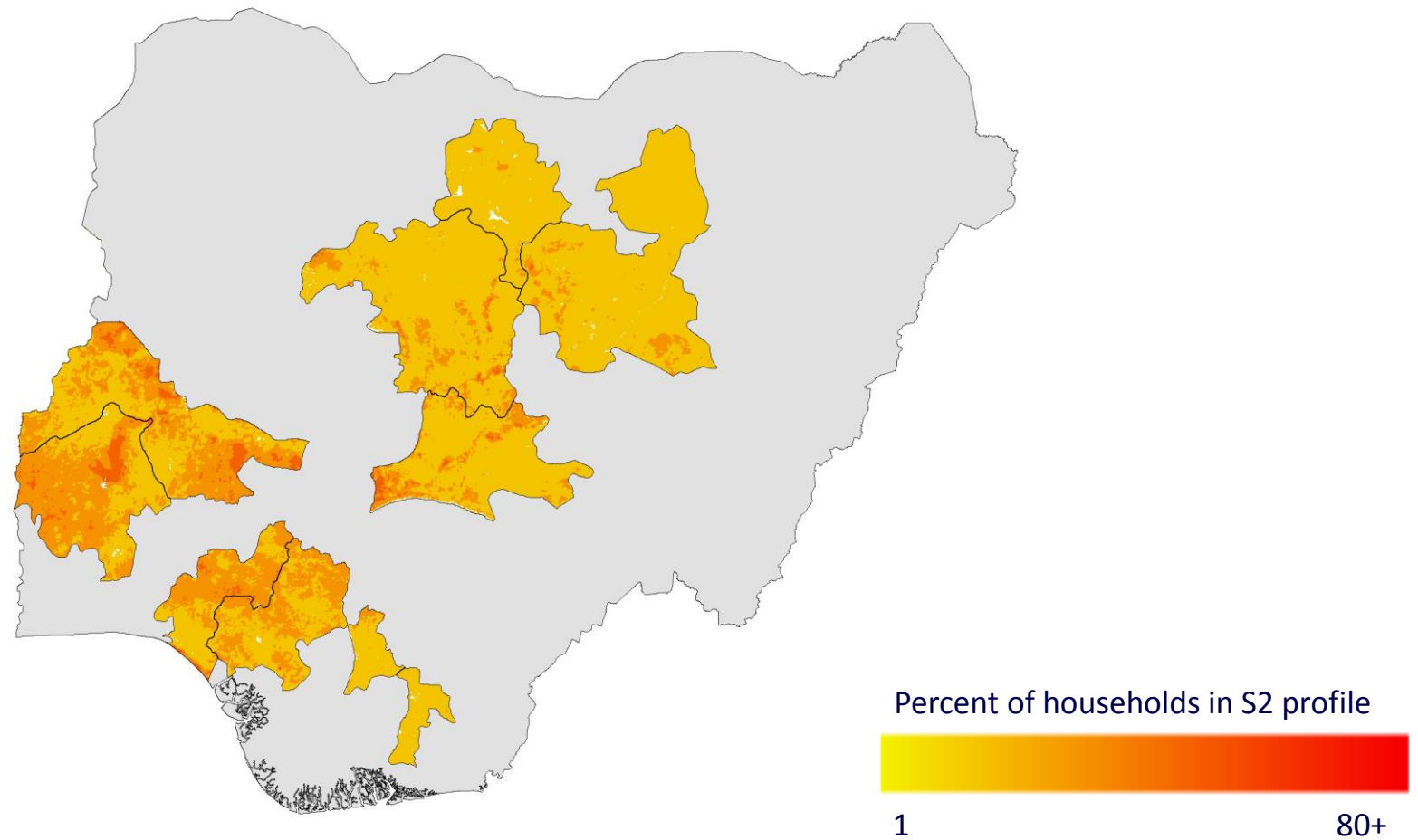**Source**: Fraym

MAPPING || SOLAR HOME SYSTEMS

Five of the target states – Oyo, Ondo, Edo, Nasarawa, and Kano – show clusters of areas with a high proportion of S1 households.

Percent of households in S1 profile

1   80+

Note 1: Each grid represents a 1x1 km² area. White areas indicate that no households in the grid fit the profile
Source: Fraym

MAPPING || SOLAR HOME SYSTEMS

Many pockets of the southern and western states have a high proportion of S2 households.

Percent of households in S2 profile

1   80+

Note 1: Each grid represents a 1x1 km² area. White areas indicate that no households in the grid fit the profile
Source: Fraym

MAPPING || SOLAR HOME SYSTEMS

The southern target states and major urban areas show high concentrations of S3, or unreliably grid-connected, households.
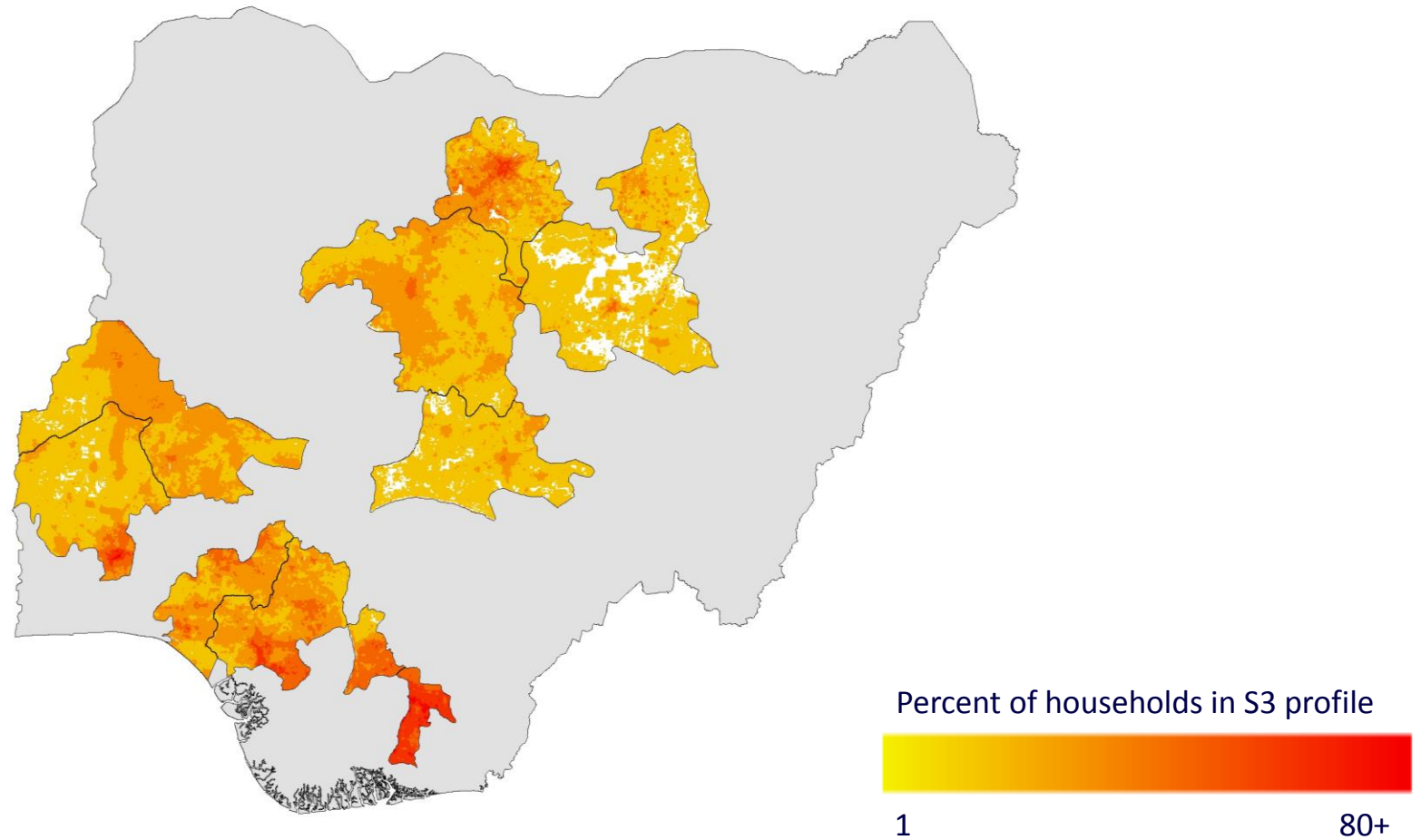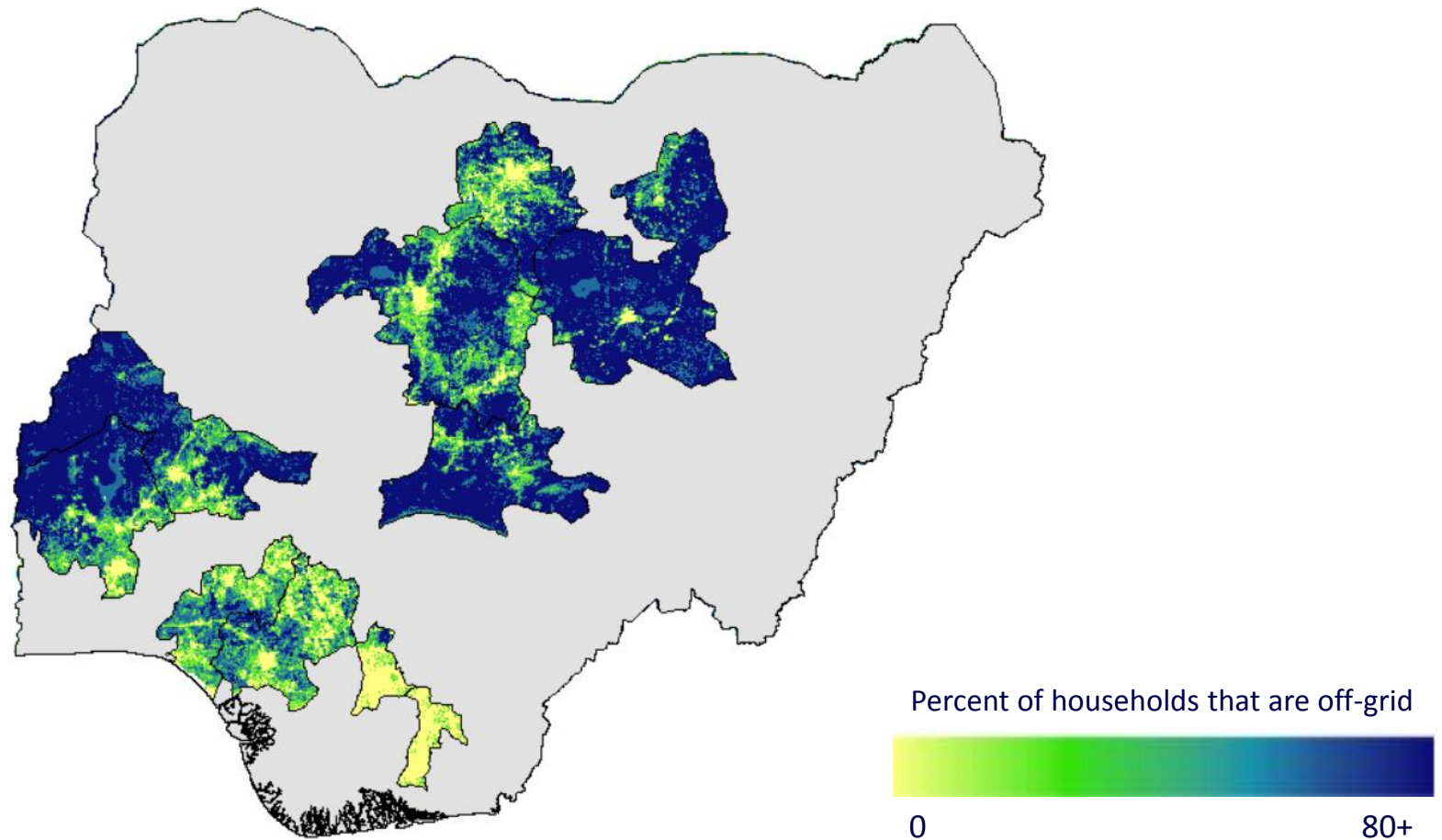

Percent of households in S3 profile

1   80+

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Supplemental Indicators

SUPPLEMENTAL INDICATORS || ELECTRICITY ACCESS

Several urban areas and southern target states, including Anambra and Abia, have a low proportion of off-grid households.


Percent of households that are off-grid

0   80+

Note 1: Each grid represents a 1x1 km² area.
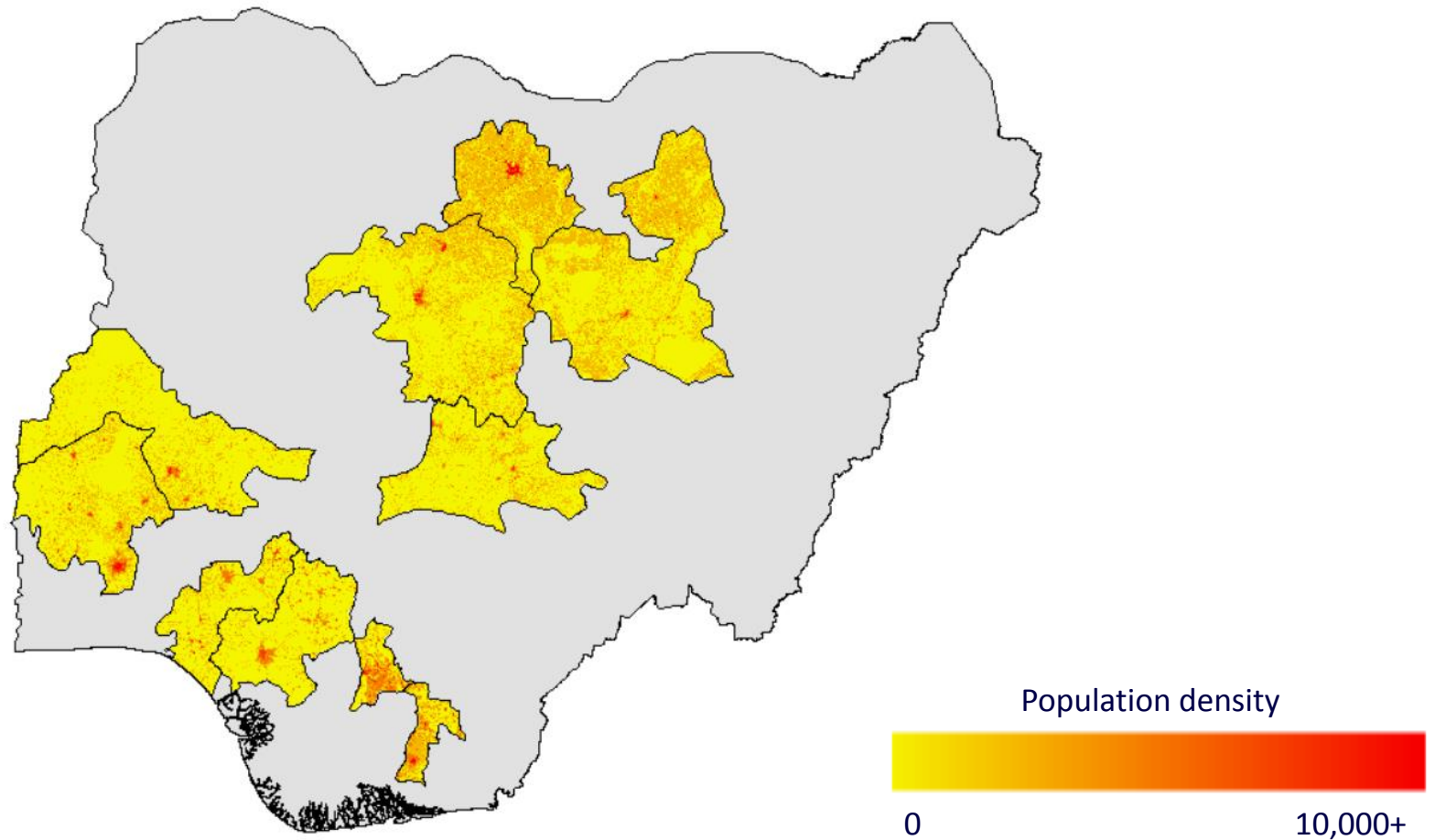Source: Fraym

SUPPLEMENTAL INDICATORS || SPENDING

There are several clusters, particularly in the northern and central target states, with a relatively high proportion of households at the bottom of the spending distribution.

Percent of households spending less than 250,000 Naira per year

0   50+
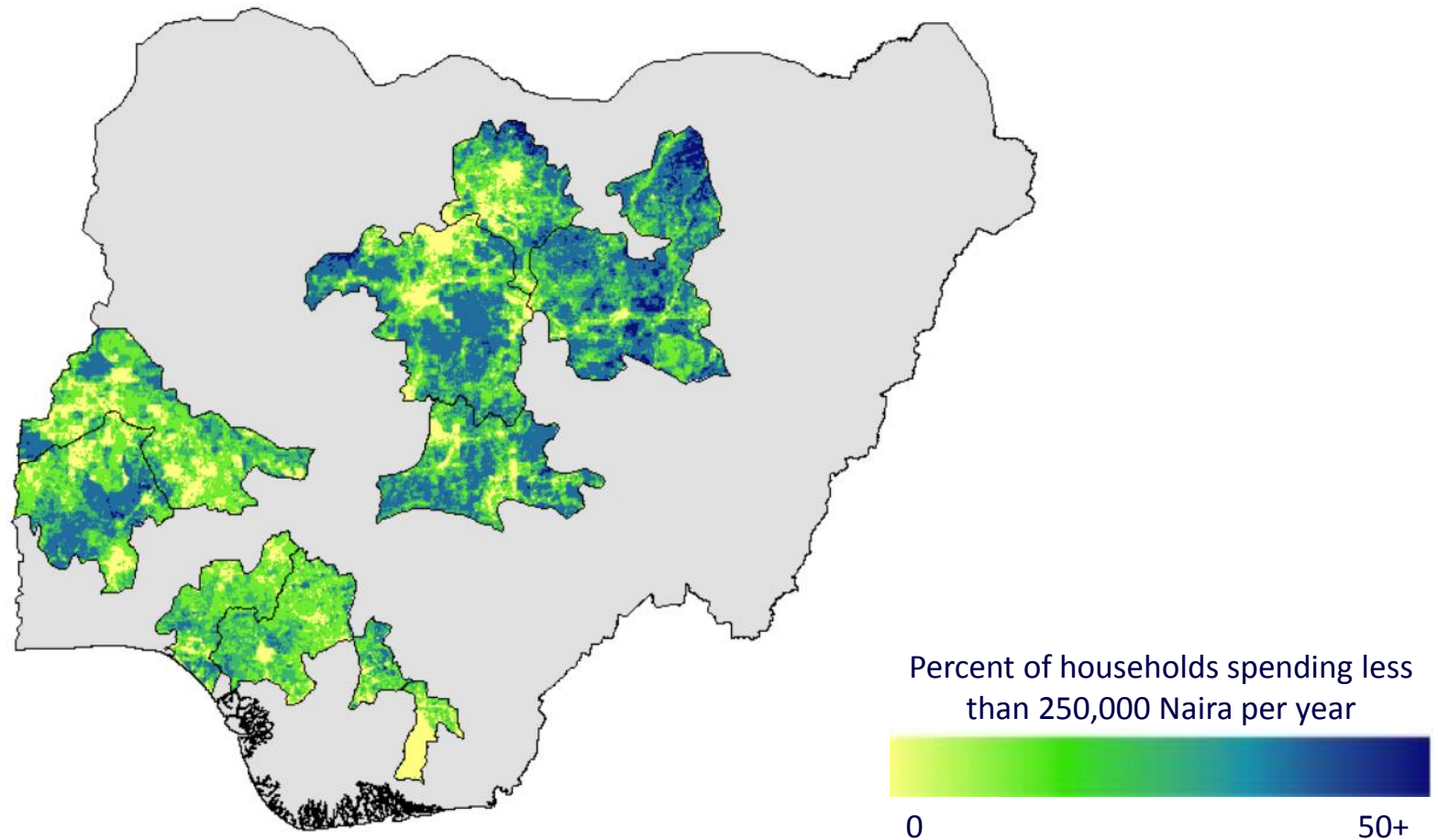
Note 1: Each grid represents a 1x1 km² area.
Source: Fraym

MAPPING || POPULATION DENSITY

In most states, areas outside urban centers have a low population density, though Kano, Abia, and Anambra have significant pockets with densities of over 50 people per square kilometer.
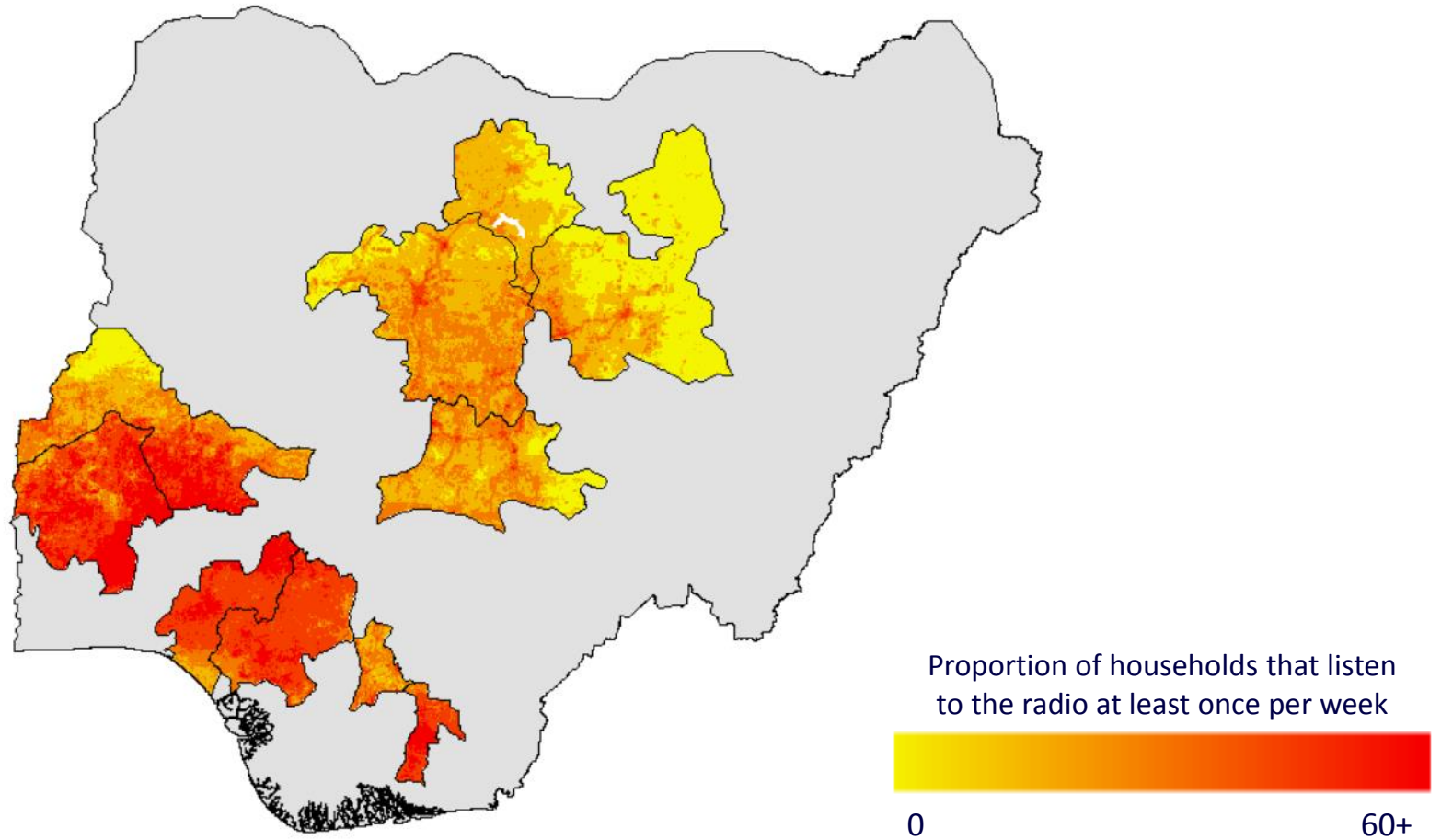

Population density

0   10,000+

Note 1: Each grid represents a 1x1 km² area.
Source: Fraym

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MAPPING || MEDIA CONSUMPTION

The southern and western target states have more areas with high concentrations of households that regularly listen to the radio.
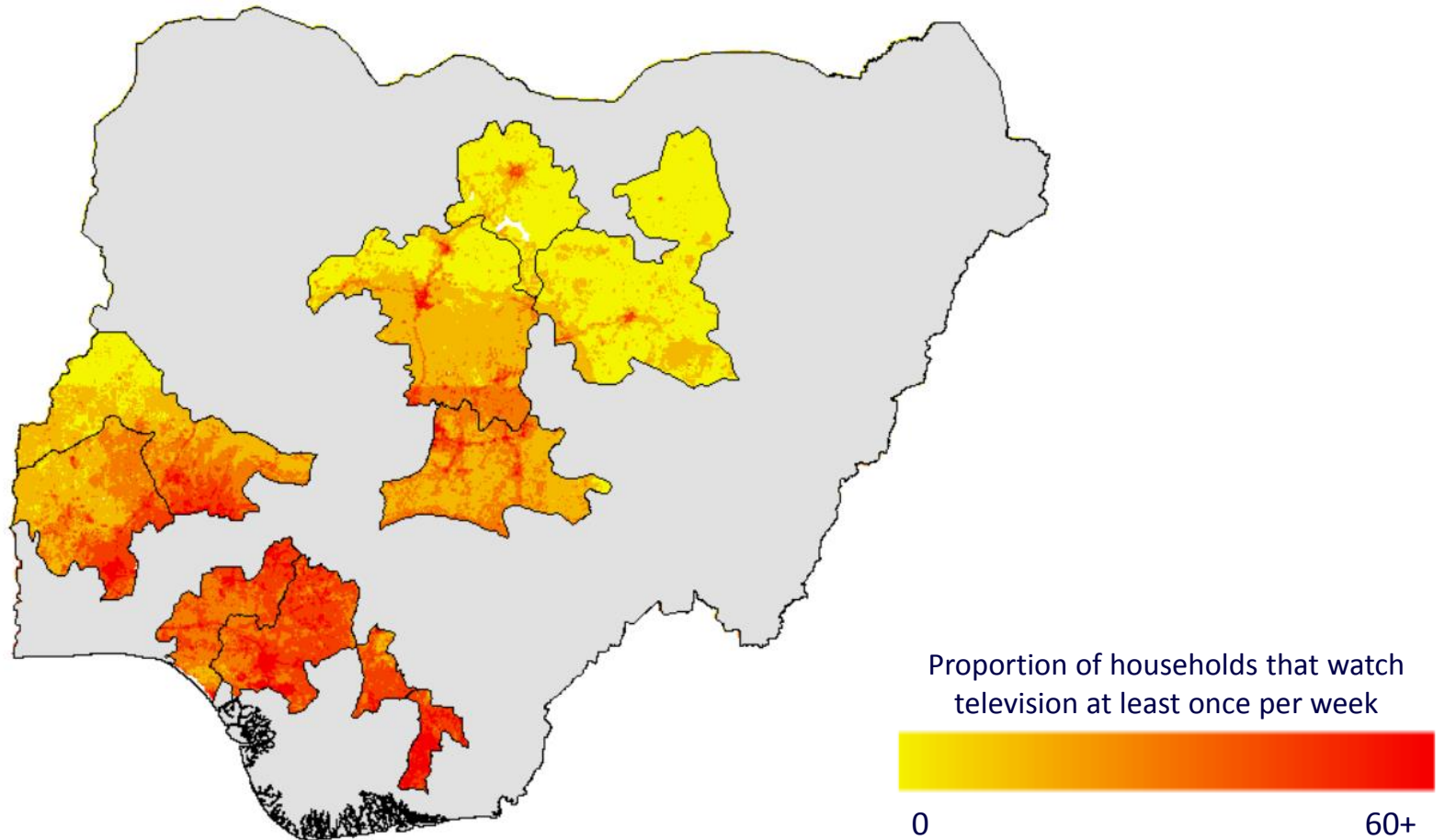
Proportion of households that listen
to the radio at least once per week

0   60+

MAPPING || MEDIA CONSUMPTION

Similarly, the southern and western target states have more areas with high concentrations of households that regularly watch television.

Proportion of households that watch television at least once per week

0   60+

Note 1: Each grid represents a 1x1 km² area.
Source: Fraym

# Appendices

APPENDIX || HOUSEHOLD CHARACTERISTICS BY STATE

State	Population	Household size	Female head of household	Average number of rooms	Advanced roof	Advanced wall	Advanced floor
Abia	3.8 million	4.3	35%	3.5	97%	96%	94%
Anambra	5.5 million	4.1	42%	3.8	99%	97%	95%
Bauchi	6.2 million	8.5	10%	4.6	74%	14%	66%
Edo	4.3 million	5.2	27%	3.8	93%	61%	69%
Kaduna	8.1 million	7.4	3%	4.8	89%	18%	73%
Kano	12.5 million	8.0	6%	3.9	83%	31%	53%
Kwara	3.1 million	4.7	20%	3.3	97%	76%	94%
Nasarawa	2.4 million	7.3	14%	5.0	91%	52%	75%
Ondo	4.6 million	3.3	54%	2.3	99%	89%	82%
Oyo	7.4 million	3.6	25%	2.4	91%	75%	81%

Source: Fraym

APPENDIX || HOUSEHOLD ASSET OWNERSHIP BY STATE

State	Refrigerator	Stove [1]	Washer	A/C	Television	Computer	Mobile phone	Internet-enabled phone	Mobile banking
Abia	45%	76%	4%	8%	73%	10%	91%	53%	30%
Anambra	31%	90%	0%	2%	73%	2%	95%	47%	6%
Bauchi	7%	16%	0%	0.3%	13%	1%	71%	15%	10%
Edo	36%	58%	0%	1%	73%	4%	91%	52%	23%
Kaduna	6%	46%	0%	0.4%	39%	0.4%	85%	46%	14%
Kano	2%	14%	0%	0.7%	21%	0.7%	75%	22%	3%
Kwara	27%	79%	3%	0%	68%	11%	90%	46%	6%
Nasarawa	11%	41%	0%	0%	48%	0%	84%	50%	4%
Ondo	12%	90%	2%	0%	37%	4%	58%	30%	2%
Oyo	13%	65%	2%	1%	53%	5%	73%	45%	15%

Note 1: Stove includes gas and electric stoves.
Source: Fraym
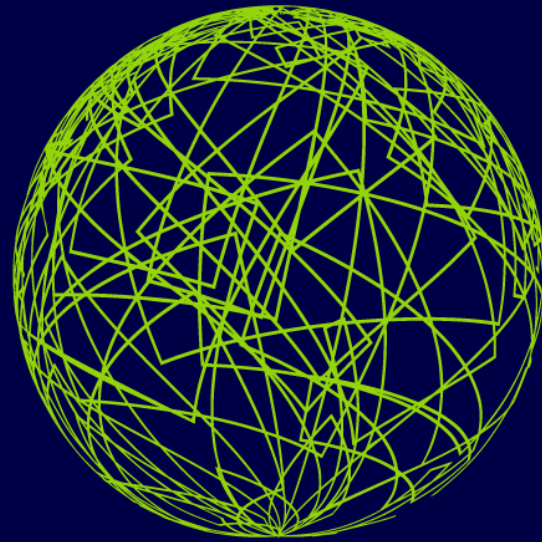
fraym

Melia Ungson

m.ungson@fraym.io