

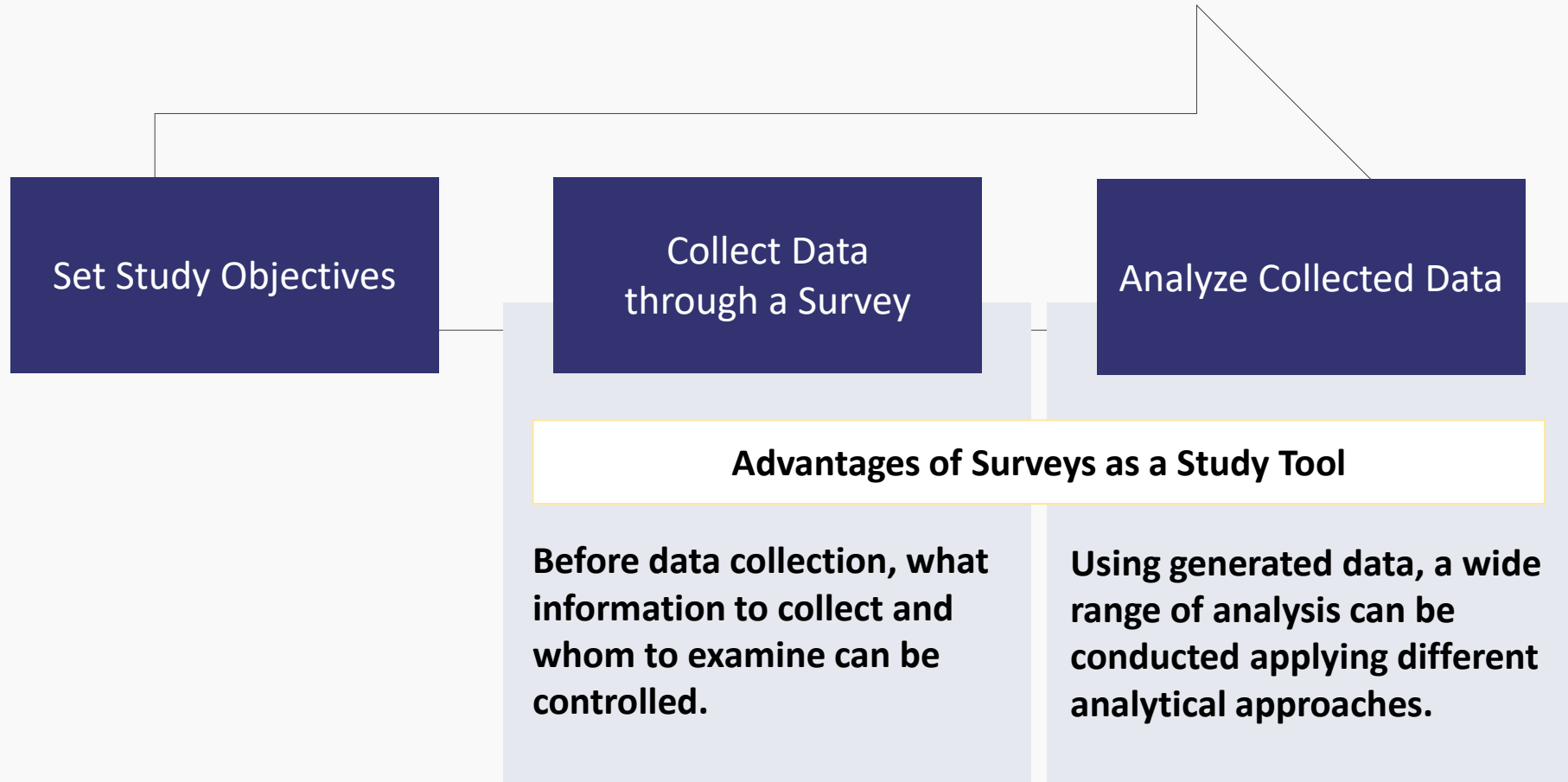


Design and Implementation of Survey-based Studies in the Energy Sector

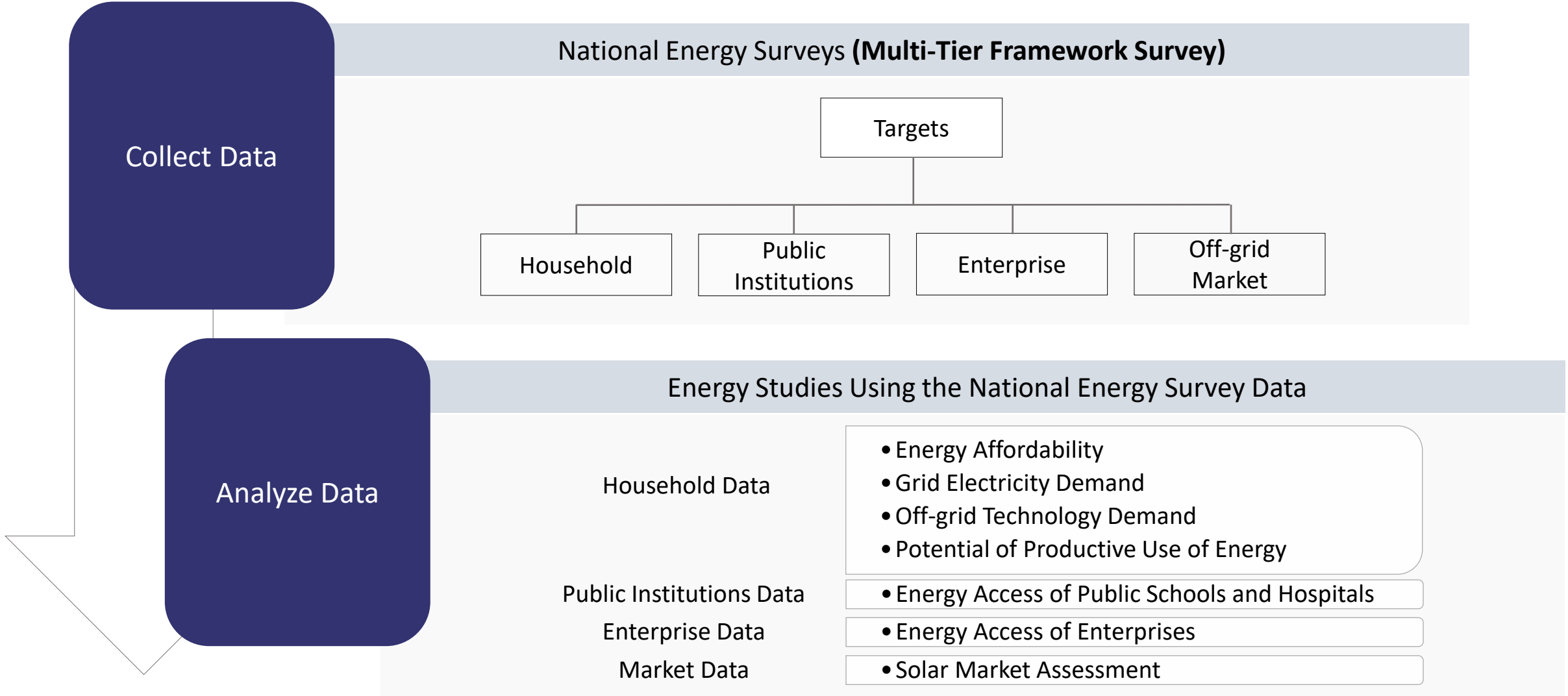
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Survey is an effective tool for studies.

General Procedure of Survey-based Studies



Key energy studies have been conducted using surveys.



The Multi-Tier Framework and the national energy survey

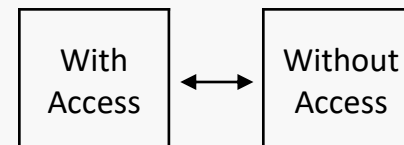
- **The Multi-Tier Framework (MTF) survey is a comprehensive national energy survey** grounded in the MTF, implemented in more than 25 countries since 2016.
- The MTF is an exhaustive assessment method to measure access to electricity and clean cooking.
- The MTF approach considers *multiple attributes of energy supply and evaluates energy access at six different levels, Tier 0 to Tier5*, going beyond the traditional binary measurement of access (having access or not).

Attributes to Measure Energy Access Based on the MTF

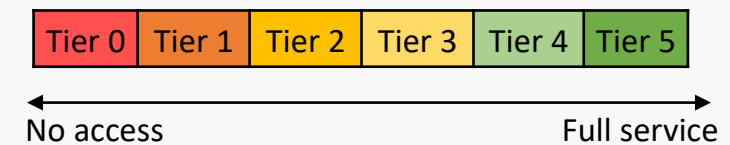
Electricity Access Attributes	Clean Cooking Access Attributes
Capacity (ability to power appliances)	Exposure (exposure to stove emission)
Availability - All-day, Evening (available hours of electricity)	Convenience (convenience of fuel and stove preparation)
Reliability (connection reliability)	Availability (fuel availability)
Quality (voltage quality)	Affordability (cooking fuel affordability)
Formality (formality of connection)	Safety (stove safety)
Safety (safety of electricity)	

Energy Access Measurement

Traditional Approach



Multi-Tier Framework



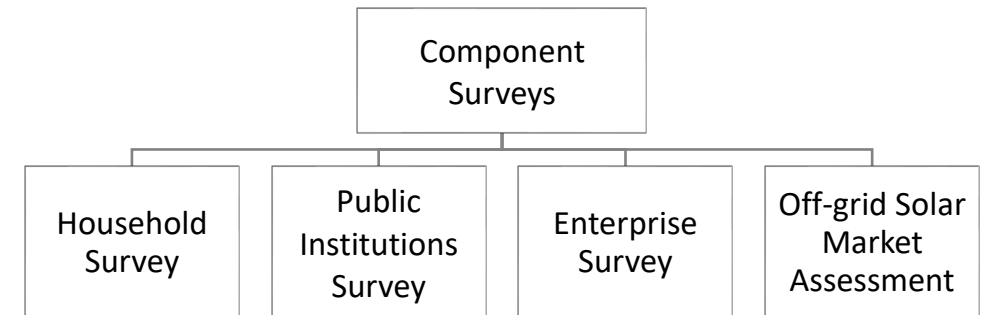
Multi-Tier Framework Survey

- The MTF survey captures key attributes of energy supply based on the Framework and enables a comprehensive analysis of access to electricity and clean cooking.

MTF Survey Questions Capturing Key Attributes of Access to Electricity and Clean Cooking

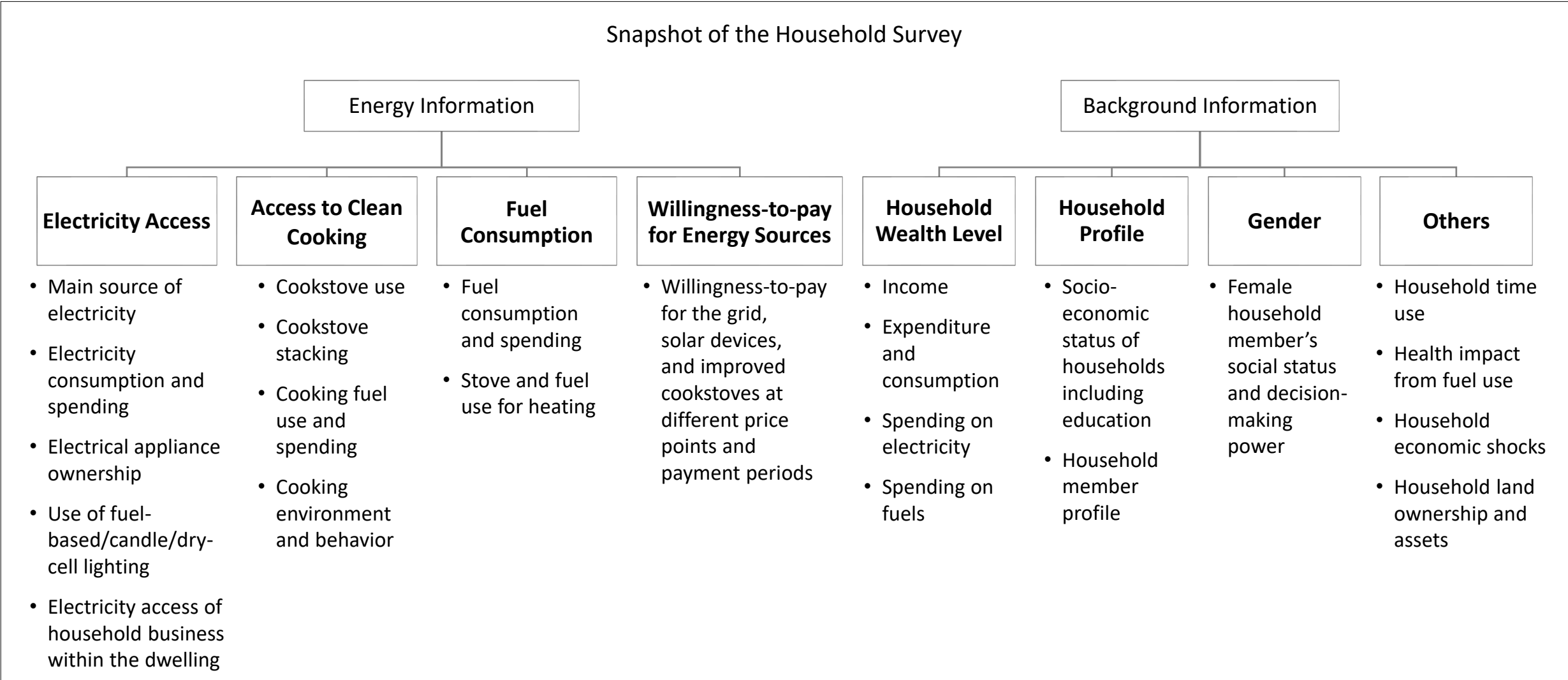
Attributes of Energy Access		Questions in the MTF Survey on Each Attribute
Electricity	Availability	<ul style="list-style-type: none"> How many hours do you receive electricity from your main electricity source <i>each day and night</i>? (max 24 hours)
	Connection Reliability	<ul style="list-style-type: none"> How many unscheduled outages occur in a typical week? What is the total duration of all the unscheduled outages in a typical week?
	Affordability	<ul style="list-style-type: none"> In a typical month, how much do you spend on electricity? Household expenditure and consumption to estimate wealth level
Clean Cooking	Exposure to Pollutants from Cooking Activities	<ul style="list-style-type: none"> In the last 12 months, what cookstove did your household use for preparing meals? Where did you normally cook with the stove? What exhaust system in working condition do you use with the stove?
	Cooking Fuel Availability	<ul style="list-style-type: none"> In the last 12 months, how often was your cooking fuel available?

Multi-Tier Framework Survey

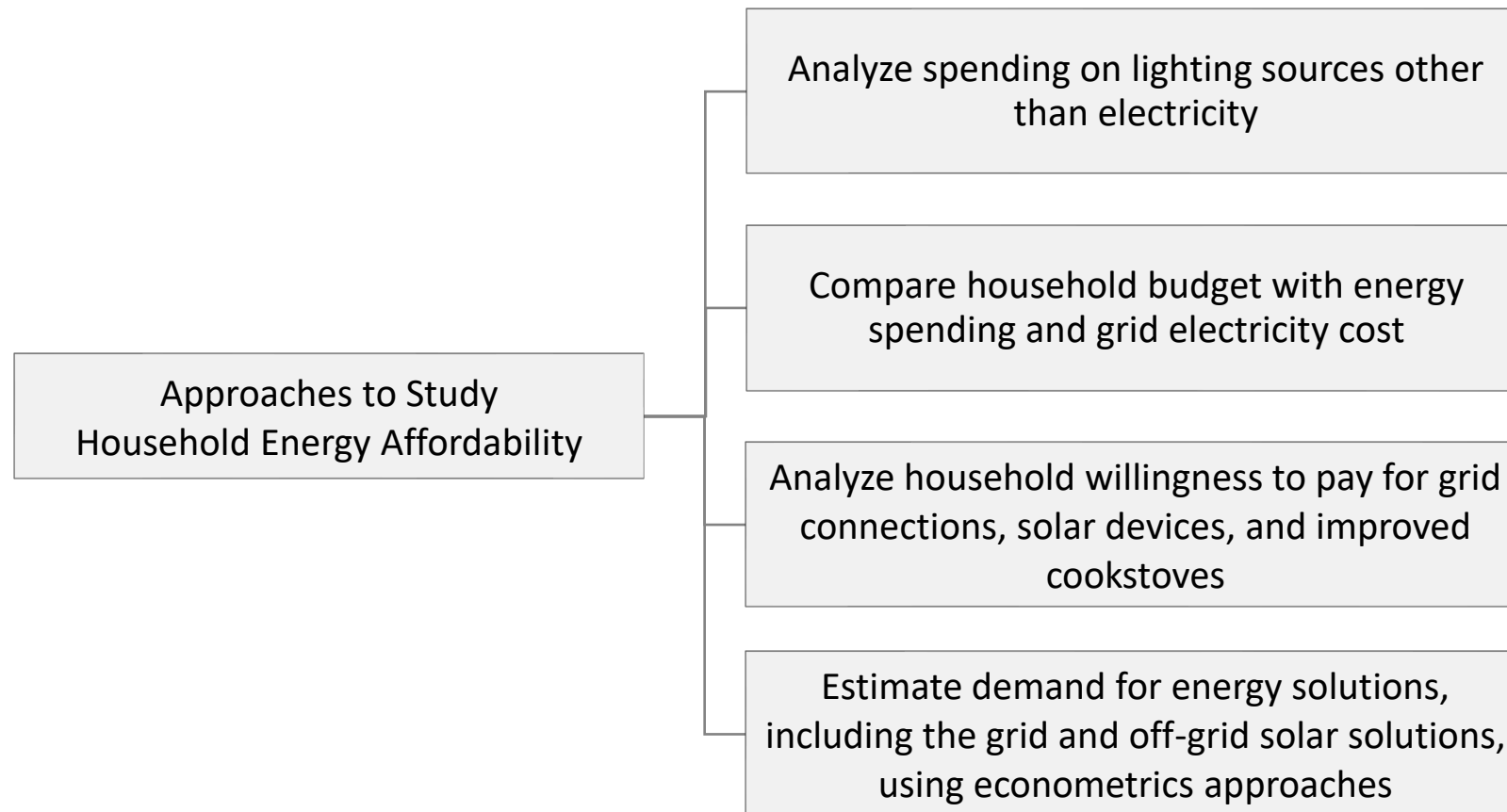


The household survey collects data on energy and background information that allows disaggregated analysis.

Snapshot of the Household Survey



With the survey data, household energy affordability can be analyzed with different approaches.



Implications from the enterprise energy survey

Enterprise Survey Implications

Electricity Access

- Main power source
- Quality of electricity supply
- Impact of electricity service quality on revenue and profit
- Impact of electricity service quality on overall business operations/expansion

Electricity Consumption

- Appliance ownership and use

Back-up Power Source

- Share of enterprises using a diesel generator as a back-up power source
- Expenditure on back-up sources such as diesel generators
- Impact of expenditures from using back-up sources on enterprise productivity and profitability

Affordability

- Willingness-to-pay for the grid and off-grid solar products

Climate

- Carbon emissions estimation from using diesel generators

Survey-based off-grid market assessment: studying markets for off-grid electricity and clean cooking solutions

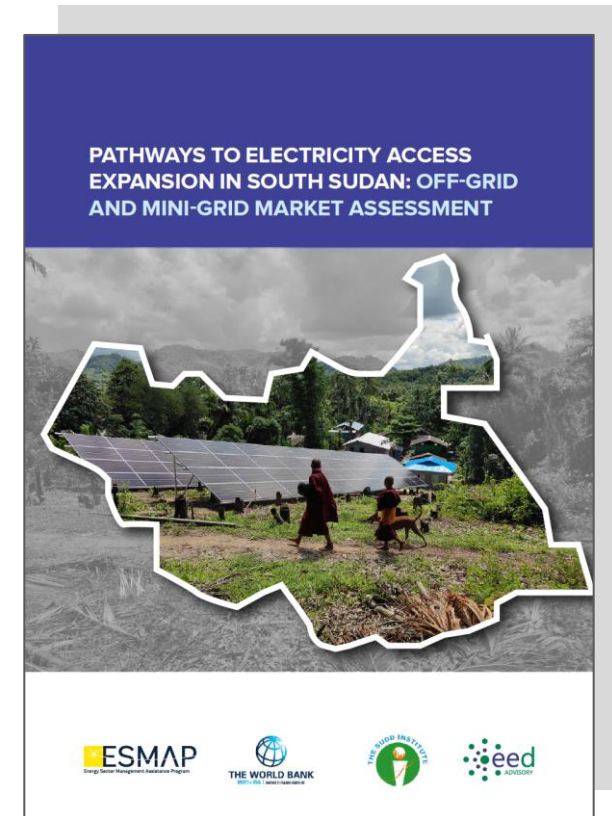
Supply-side Study

- Qualitative surveys (ex. Key Informant Interview)
- Implications from the survey:
 - Challenges of providing off-grid energy solutions and clean cooking solutions from the supply side
 - Local financing markets for standalone solar and mini-grid services
 - Review of enabling environment and public/donor-led initiatives
 - Barriers and opportunities to scale up the standalone solar and mini-grid markets

Demand-side Study

- Household survey
- Implications from the survey:
 - Household's off-grid and clean cooking technologies and their use
 - Expenditure on lighting sources including dry cell battery, kerosene, and candle
 - Expenditure and time spent on cooking fuels
 - Satisfaction with off-grid energy solutions

▼ *Off-grid Market Assessment in South Sudan*



Challenges in implementing a national energy survey

Complexities in designing and implementing a national survey

- Without proper sound design, data analysis results will be skewed and biased. Convincing governments of the survey approach is challenging.

Discrepancies in timelines between the survey and the project operation cycle

- Operation teams need the MTF survey data to design projects and facilitate sector dialogue within a tight timeline, consuming a significant amount of time and resources.

Challenges of tracking energy progress in a sustainable manner

- Even after establishing the baseline of energy access through the MTF survey, there is no sustainable way to track progress.

Struggling with data analysis after finishing the survey

- High-quality data does not always lead to accurate interpretation and analysis of the data.

The MTF team collaborates with partners to address these challenges.

Complexities in designing and implementing a national survey

- MTF team has ample experiences and expertise in designing and implementing the nationwide energy surveys.
- MTF team has collaborated with the Living Standard Measurement Study (LSMS) team.

Discrepancies in timelines between the survey and the project operation cycle

- Streamlining throughout the MTF survey process will shorten the survey cycle and save costs (within 9 months).

Challenges of tracking energy progress in a sustainable manner

- Capacity building activity for the national statistical office and ministry to improve the national energy statistical system.

Struggling with data analysis after finishing the survey

- Development of the methodology to investigate various energy issues, including: 1) affordability, 2) PUE, 3) market assessment for cooking, and the off-grid energy sector.

Discussion & Q&A