



**WORLD BANK GROUP**  
Energy & Extractives

# Measuring Energy Access

## Progress in implementing the Multi-Tier Framework



**ESMAP**  
Energy Sector Management Assistance Program



SUSTAINABLE  
ENERGY FOR ALL

# The Universal Access Goal now Firmly Set

## SE4ALL Goals

- By 2030, ensure universal access to modern energy services.

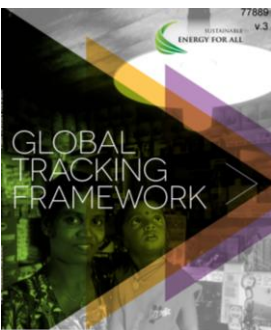
## SDG 7

- Target 7.1: 2030, ensure universal access to affordable, reliable and modern energy services

## COP 21

- Post-COP 21 – Focus on Sustainable Energy

# SE4ALL Knowledge Hub



GTF  
2013

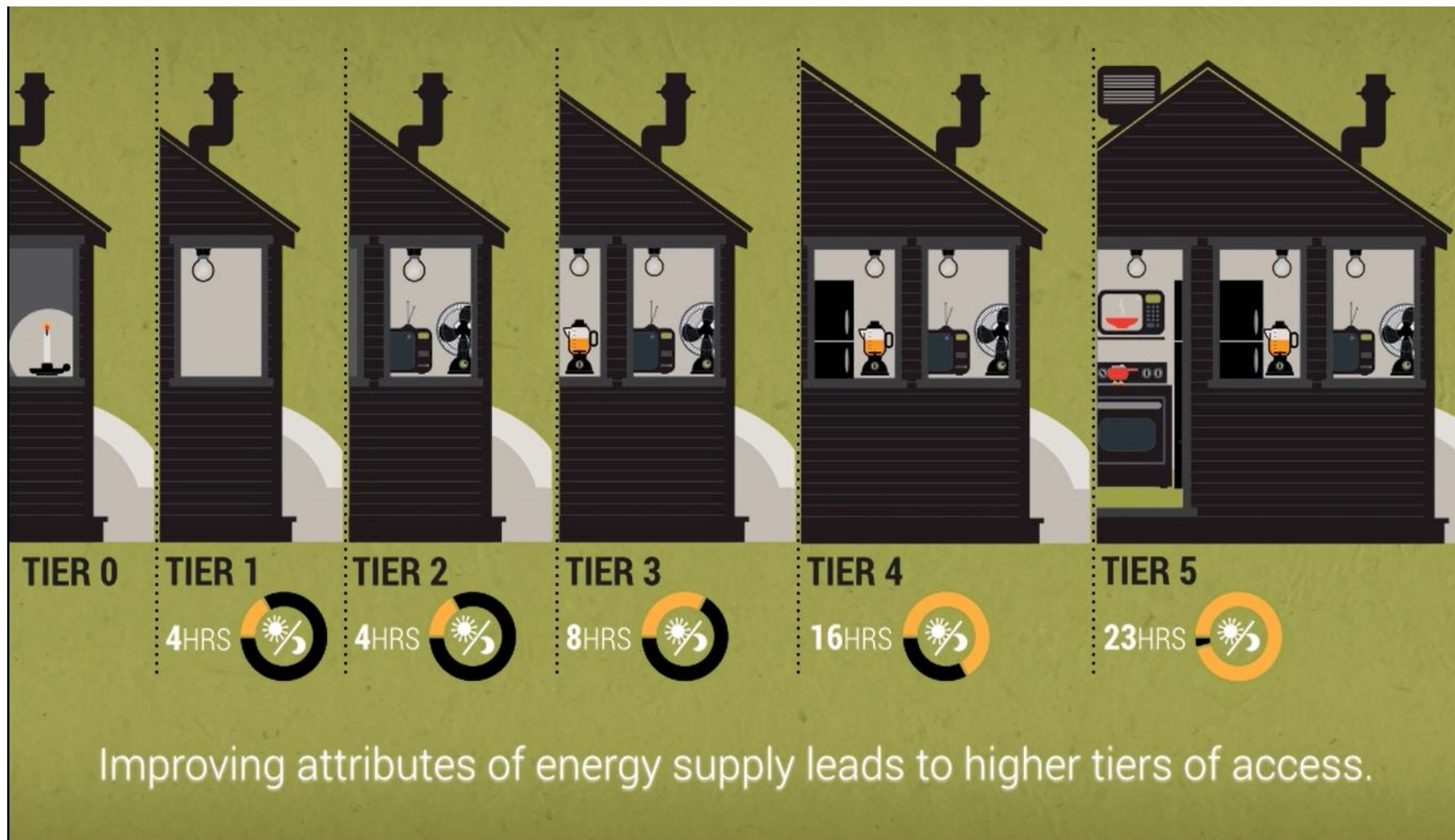
RISE  
2014

GTF  
2015

MTF  
2015

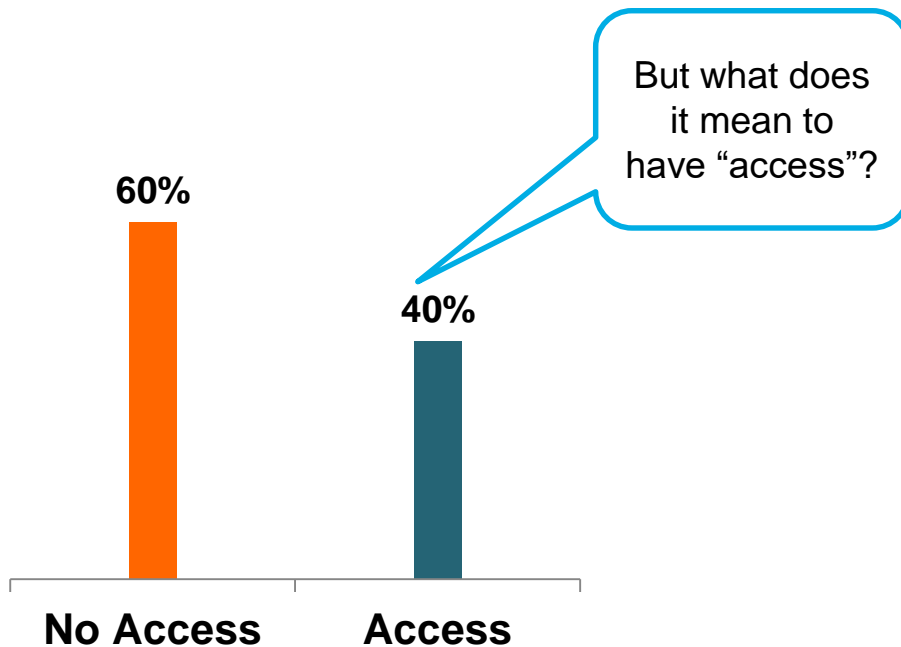
SEAR (2016)  
Energy Access  
Financing  
(2017)h

# Defining Access as a Continuum of Service Levels

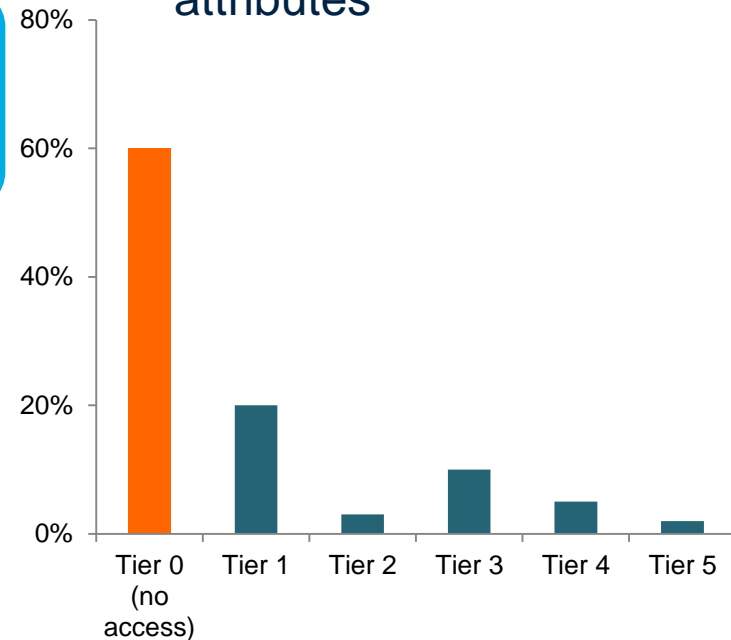


# How is Access Typically Measured?

Energy access has been measured using **binary** indicators



The MTF redefines energy **access** as a continuum of service levels, based on key attributes



# Multi-Tier Framework for Electricity

**Multi-Tier Framework for Electricity**

	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Capacity		Capacity (from 3W to above 2kW) and ability to power appliances (applicable for off-grid solutions)				
Duration - day		From at least 4 hours a day to over 23 hours a day				
Duration - evening						
Reliability					Number and duration of outages (applicable for Tier 4 & 5 only)	
Quality					Voltage problems do not affect the use of desired appliances (Tier 4&5)	
Affordability					Basic service less than 5% of a household income (Tiers 3-5)	
Legality					Service provided legally (Tier 4&5)	
Health and Safety					Absence of accidents (Tier 4&5)	

**Moving up the tiers**

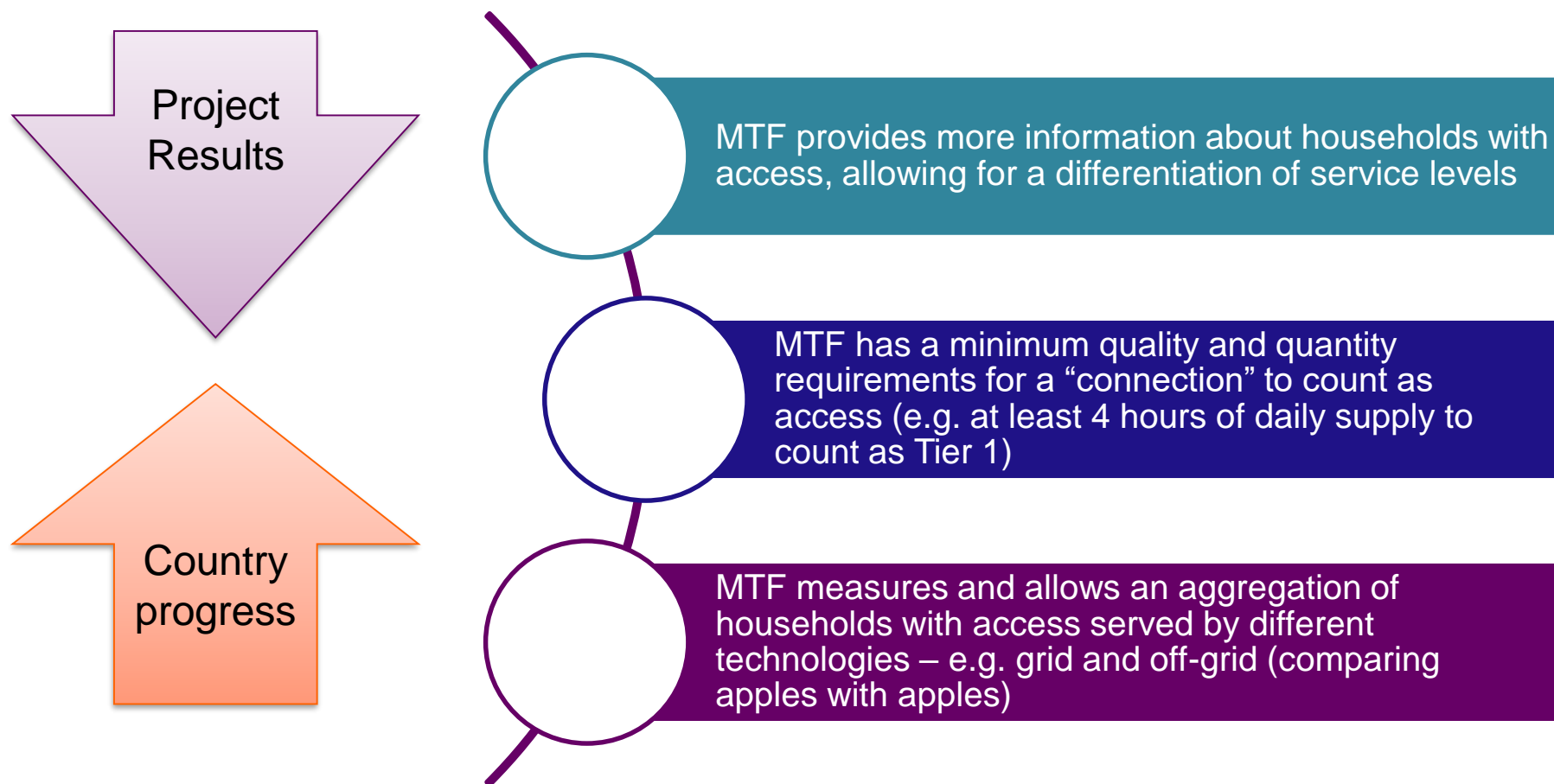


# Multi-Tier Framework for Cooking

**Multi-Tier Framework for Cooking**

	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Indoor air quality		Concentration of PM2.5 and CO; tiers aligned with WHO guidelines				
Efficiency		Tier benchmarks under development, awaiting results of ISO process				
Convenience			Stove preparation time and fuel collection and preparation (applicable from Tier 2 on)			
Safety			Absence of accidents and alignment with the ISO process (from Tier 2 on)			
Affordability					Levelized cost of cooking solution < 5% of household income	
Quality and availability of fuel					Cooking not affected by seasonal variations in fuel quality and	

# Benefits of Multi-Tier Energy Access Results






# Applying MTF – Where Are We?

## Support from more than 20 agencies in conceptualization PILOTS:

- Aug.-Sep. 2013: Kinshasa, DRC.
- Oct.-Dec. 2013: Uganda
- May 2015: Bihar, India.
- Dec 2015: Malawi

**Jun.-Dec. 2015:** MTF survey in Guinea (3,000 HH)

**Apr. 2016:** Launch of MTF Global energy access survey in 15 countries.

: This is where we are

Conceptualization and piloting

Application

2011      2012      2013      2014      2015      2016      2017      2018

UN General Assembly declares  
“Decade of Sustainable  
Energy for All” 2014-2024

The UN General Assembly declares  
“International Year of Sustainable Energy for All.”

SDG 7: “Ensure access to affordable, reliable,  
sustainable and modern energy for all”

# MTF Implementation Plan: Survey Tools

## MTF Energy Global Survey

Estimated time: 90 minutes

Nationally statistically representative  
Rural/Urban

Provides data for multi-tier Supply and Demand  
information – households and community  
module

Implemented by a local survey firm supervised by  
WB team

Need to collaborate with National Statistical  
Office

## MTF Energy module – integrated in National Surveys\*

Estimated time: 15 mins

TA and training available and funded by  
SREP/ESMAP

Key supply and demand information allowing tier  
calculation

Additional simplification of monitoring being  
tested – e.g. use of cell phone surveys

Need to collaborate with National Statistical  
Office

# Country baseline – SREP countries

## Ongoing:

**Kenya, Rwanda,  
Honduras, Ethiopia,  
Liberia, Bangladesh,**  
Myanmar

## In procurement

Niger, Nigeria,  
**Cambodia, Nepal,  
Zambia**

## Upcoming

**Uganda, Haiti,** DRC,  
India

**Second wave**

# What Information will the Surveys Provide?

## HOUSEHOLD ELECTRICITY ASSESSMENT

- **SOURCE:** including mini-grid, off-grid solution and solar lantern
- **SUPPLY CHARACTERISTICS:** duration, reliability, quality, affordability, legality, health and safety
- **DEMAND CHARACTERISTICS:** Use of appliances, energy expenditures, affordability of services

## HOUSEHOLD COOKING ASSESSMENT

- **SOURCE:** Combination of fuel/cookstove for up to 5 cookstoves
- **SUPPLY CHARACTERISTICS:** information on the fuels and physical characteristics of the cookstove (efficiency, convenience...)
- Information on cooking location to determine air pollution
- **DEMAND CHARACTERISTICS:** Cooking expenditures, affordability

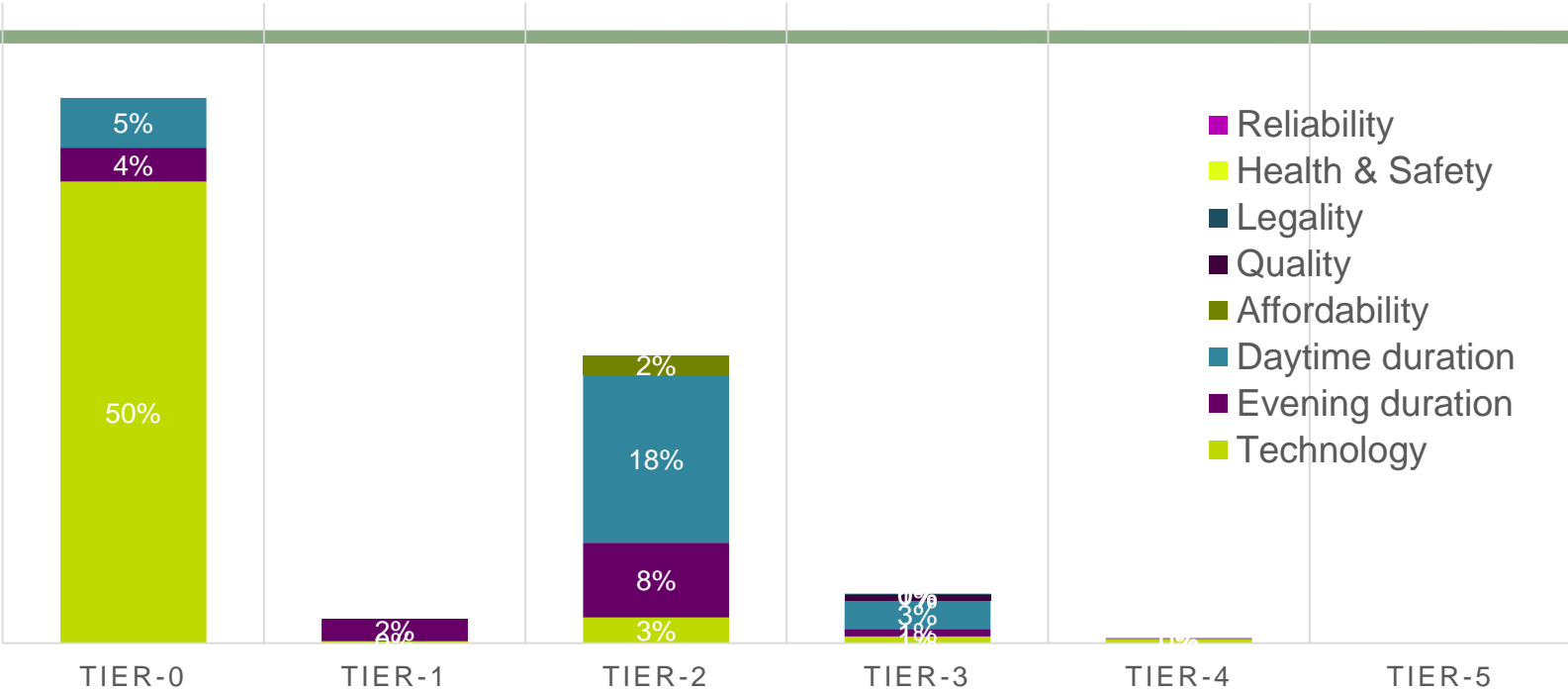
## GENDER ASPECTS

- Gender disaggregation
- Use of time by gender (collecting fuel, cooking etc)

## POVERTY AND IMPACTS

- Electricity and cooking aspects evaluated by poverty quintile
- Impacts of access on quality of life in the household

# MTF survey: Gap Analysis (Guinea example)



9% of household with connection is in **tier 0** due to the low duration in supply during day time (5%) or evening time (4%)

## Gap analysis at Glance:

18% of household with connection is in **tier 2** due to the low duration in supply during day time. 3 % of household is in **tier 2** due to technology gap (system with low capacity)

# Thank you!

For more information on the report:

<https://www.esmap.org/node/55526>

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