

CURRENT STATUS OF MINI-GRID OPERATIONS IN MYANMAR AND CAMBODIA

Preliminary Results of the Mini-grid Operator Survey

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This presentation contains **preliminary results** for selected metrics from the raw data. Global Facility on Mini-grid prioritized calculation and review of these metrics in order to provide a preview of the full **analysis**. • A full report and data **will be** submitted next year.

MINI-GRID OPERATOR SURVEY IN FIVE COUNTRIES

Countries: Myanmar, Cambodia, Nepal, India, and Niger

Survey Preparation

- Sampling Frame
- Survey Questionnaire
- CAPI program

Survey Implementation

- **Cambodia:** June-October, 2017 (Completed)
- **Myanmar:** August-November, 2017 (Completed)
- **Nepal:** Currently in the stage of data collection
- **India:** Prep. Phase
- **Niger:** Prep. Phase

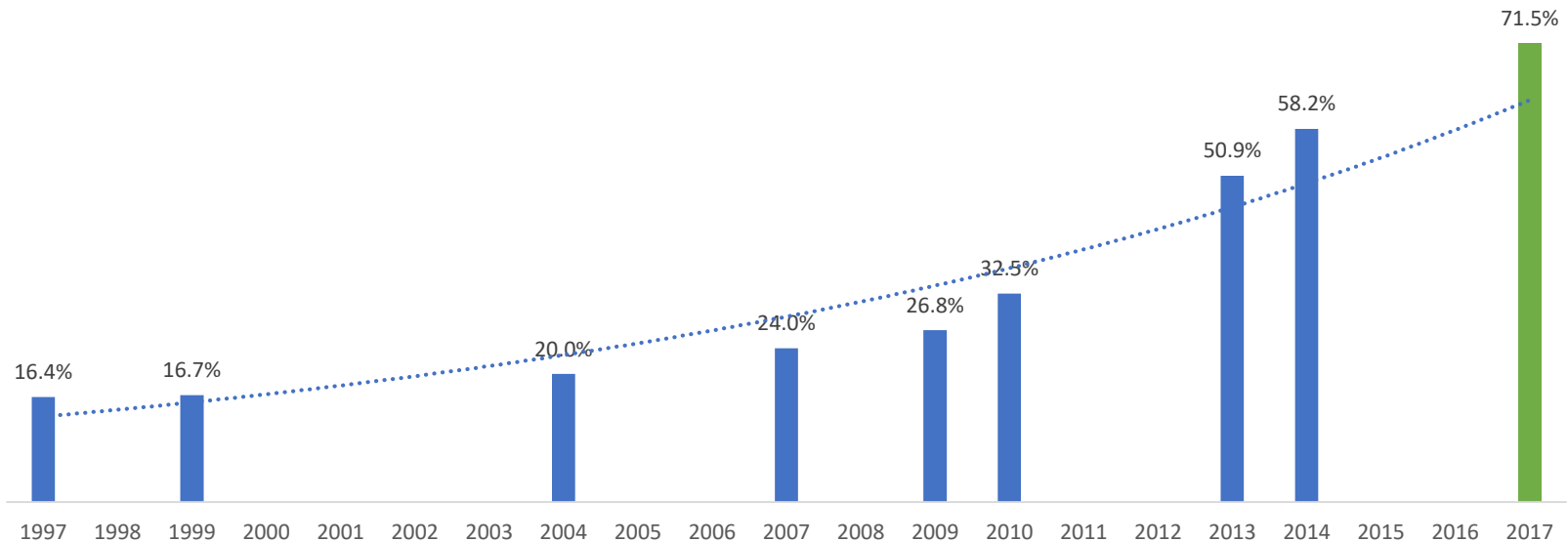
MYANMAR AND CAMBODIA



	Land area (sq. km)	Population	Population Density (ppl/sq.km)	Share of Households living in Urban areas (%)
Cambodia	176,520	15,762,370	89.3	21%
Myanmar	653,540	52,885,223	80.9	35%

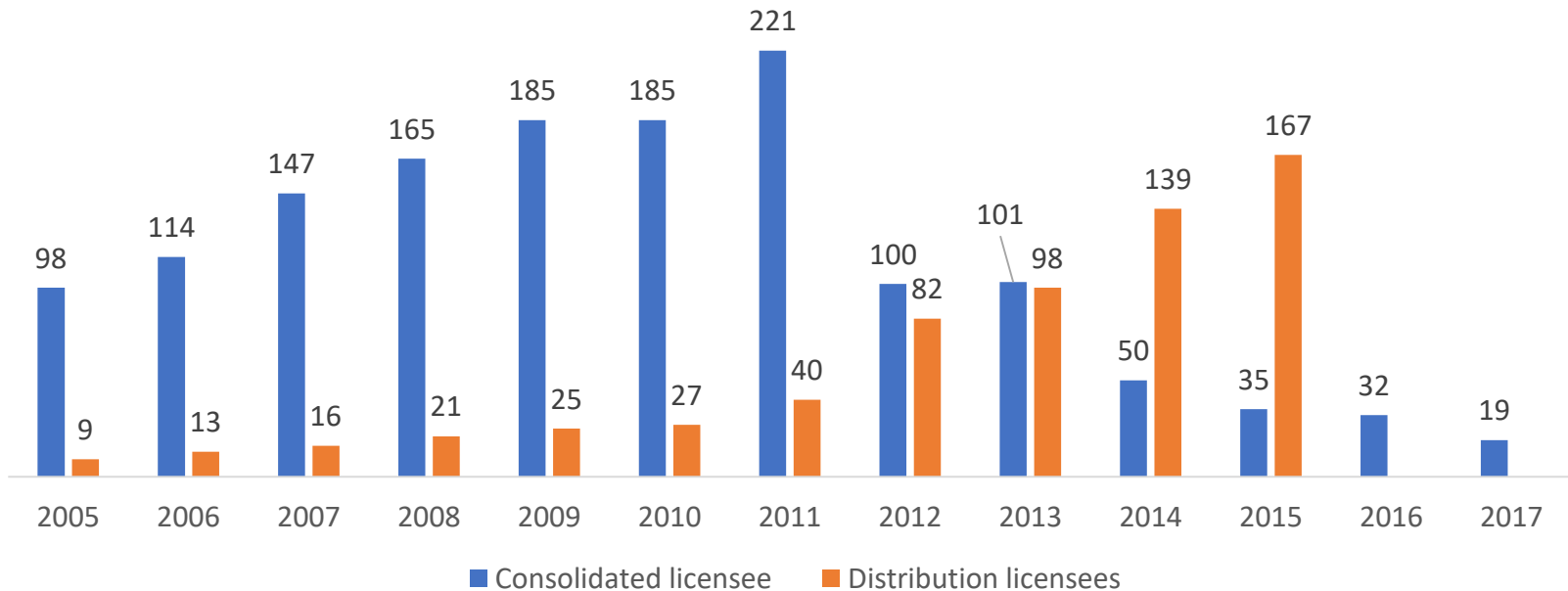
ELECTRIFICATION RATE IN CAMBODIA HAS INCREASED SIGNIFICANTLY, MAINLY DRIVEN BY PRIVATE SECTOR

Government of Cambodia has rapidly expanded the electric grid: 71.5% of Cambodian households are connected to the grid electricity based on Multi-tier energy access Tracking Framework (MTF) survey in 2017.



Note: The graph was formulated using CSES datasets available between 1997-2014 and MTF data in 2017.

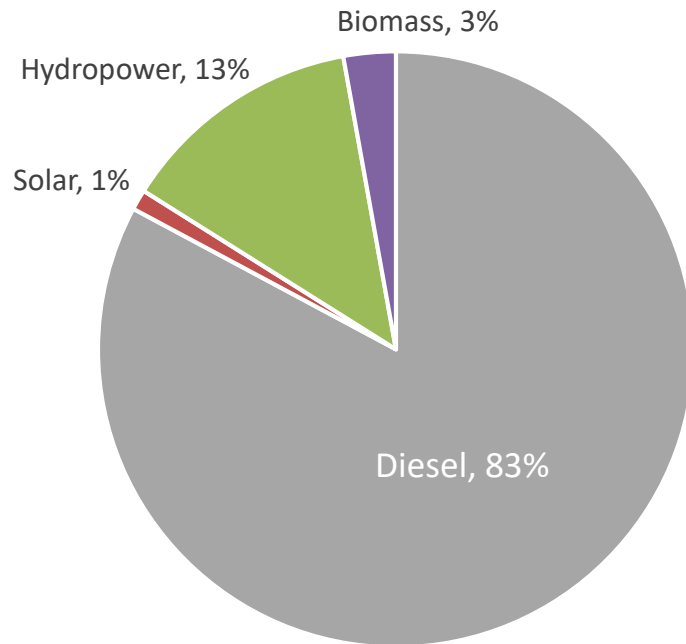
CONSOLIDATED LICENSEES IN CAMBODIA HAVE BECOME DISTRIBUTION LICENSEES WHEN AN ISOLATED SYSTEM IS CONNECTED TO THE MAIN GRID



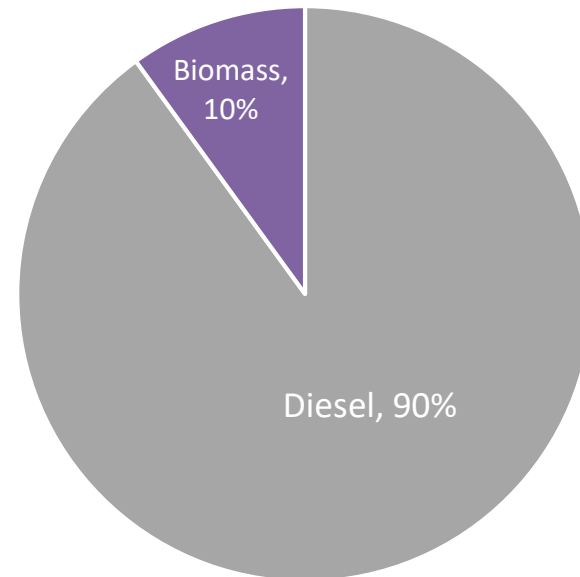
- As the national grid arrives the villages, the consolidated licensees have converted into the distribution licensees.
- Consolidated License: Generation + Distribution
- Distribution License: Only Distribution

* Number of distribution licensees in 2016 and 2017 is missing for now.

DIESEL IS MOST PREVALENT SOURCE FOR MINI-GRID OPERATIONS



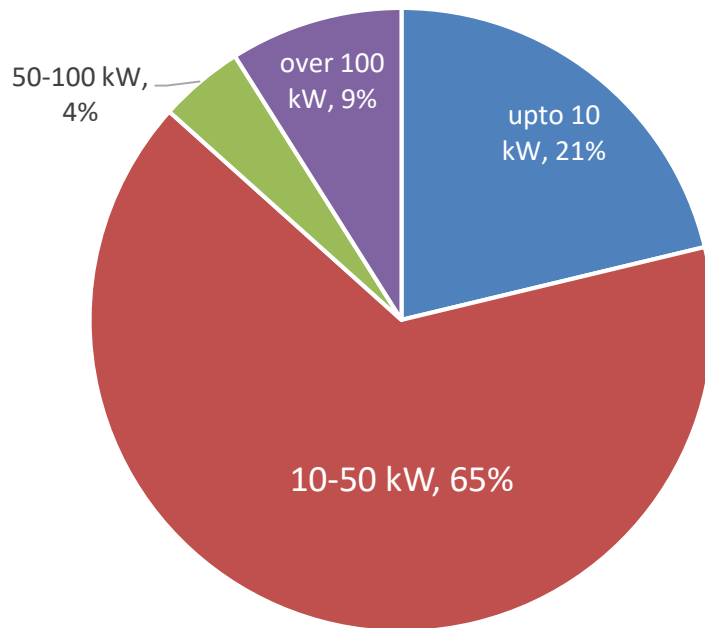
Myanmar (N=811)



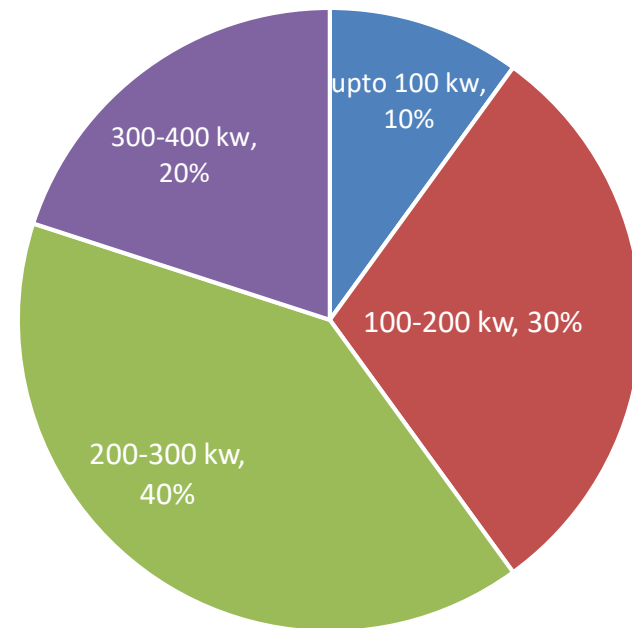
Cambodia (N=10)

AVERAGE GENERATION CAPACITY IN CAMBODIA IS LARGER THAN MYANMAR

Myanmar (N=804)

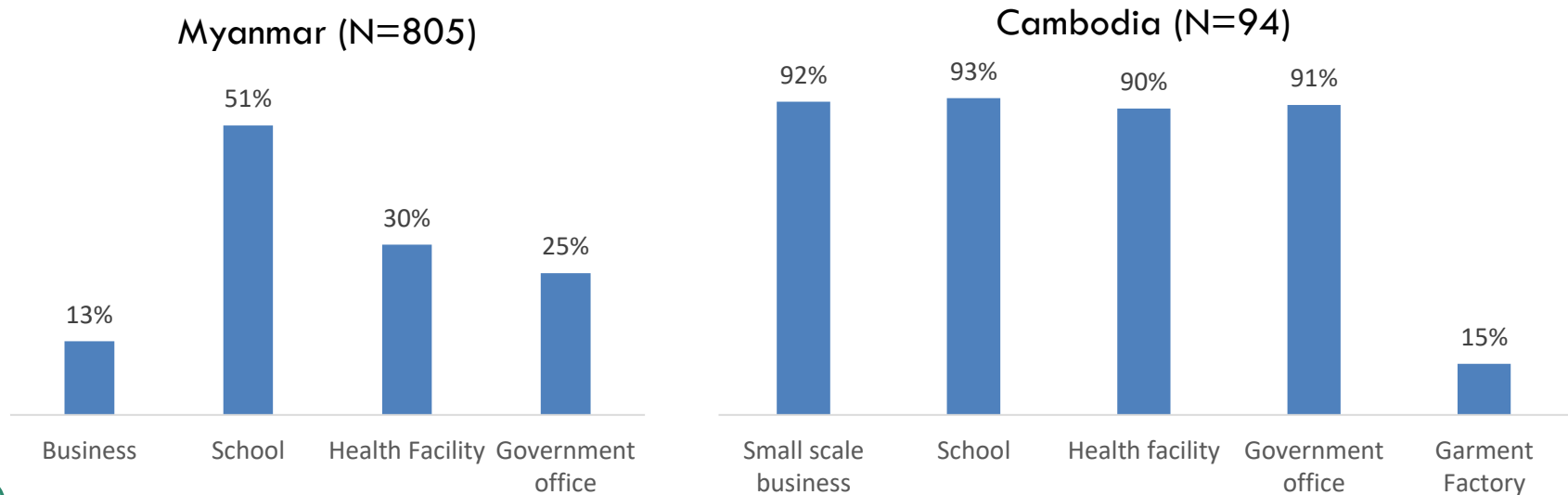


Cambodia (N=9)



CAMBODIAN OPERATORS SERVE FOR MORE AND DIVERSE CUSTOMERS

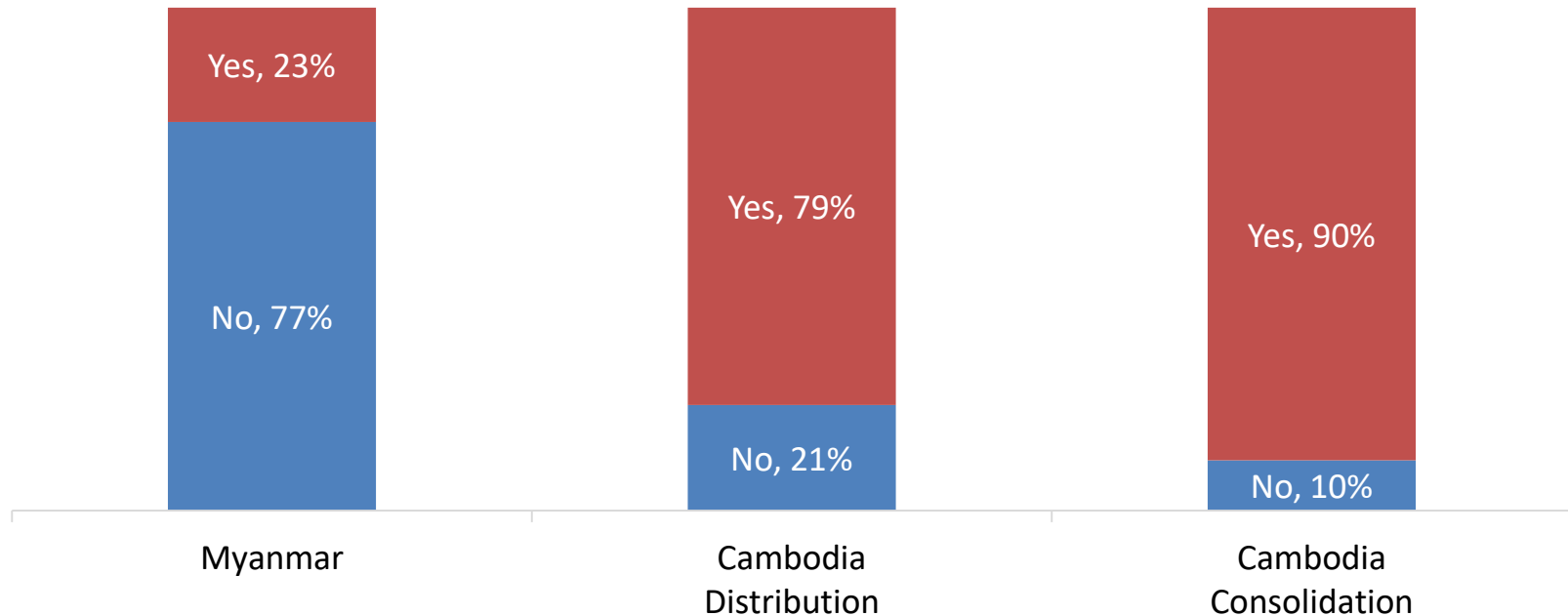
1 Type of Customers served



2 Number of Customers served

	Myanmar	Cambodia
Residential Customer	234	3843
Business	43	152
School	2	4
Health facility	2	2
Government office	8	4

77% OF MINI-GRID OPERATORS IN MYANMAR DO NOT HAVE A PLAN TO INCREASE CUSTOMERS

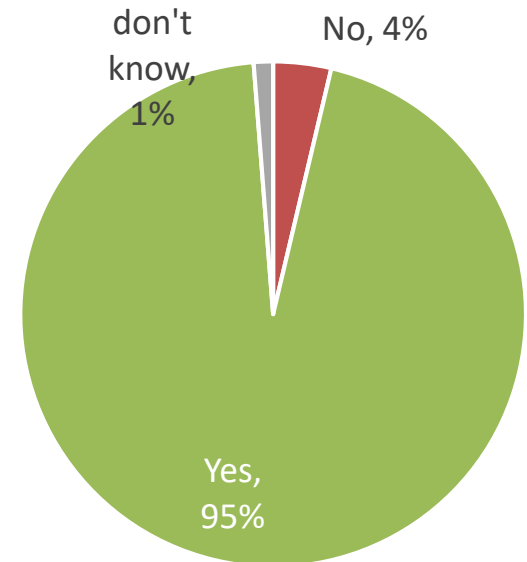
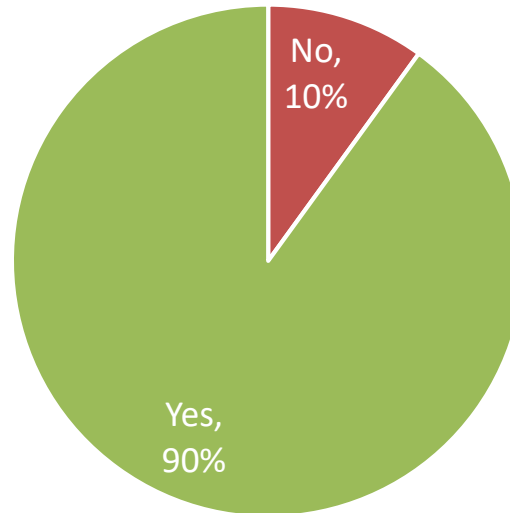
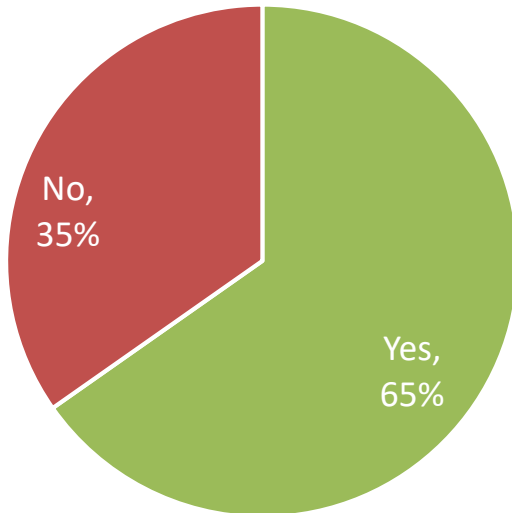


MORE OPERATORS FROM CAMBODIA REPORTED THAT IT IS PROFITABLE

Myanmar
(N=805)

Cambodia- Consolidated Licensee
(N=10)

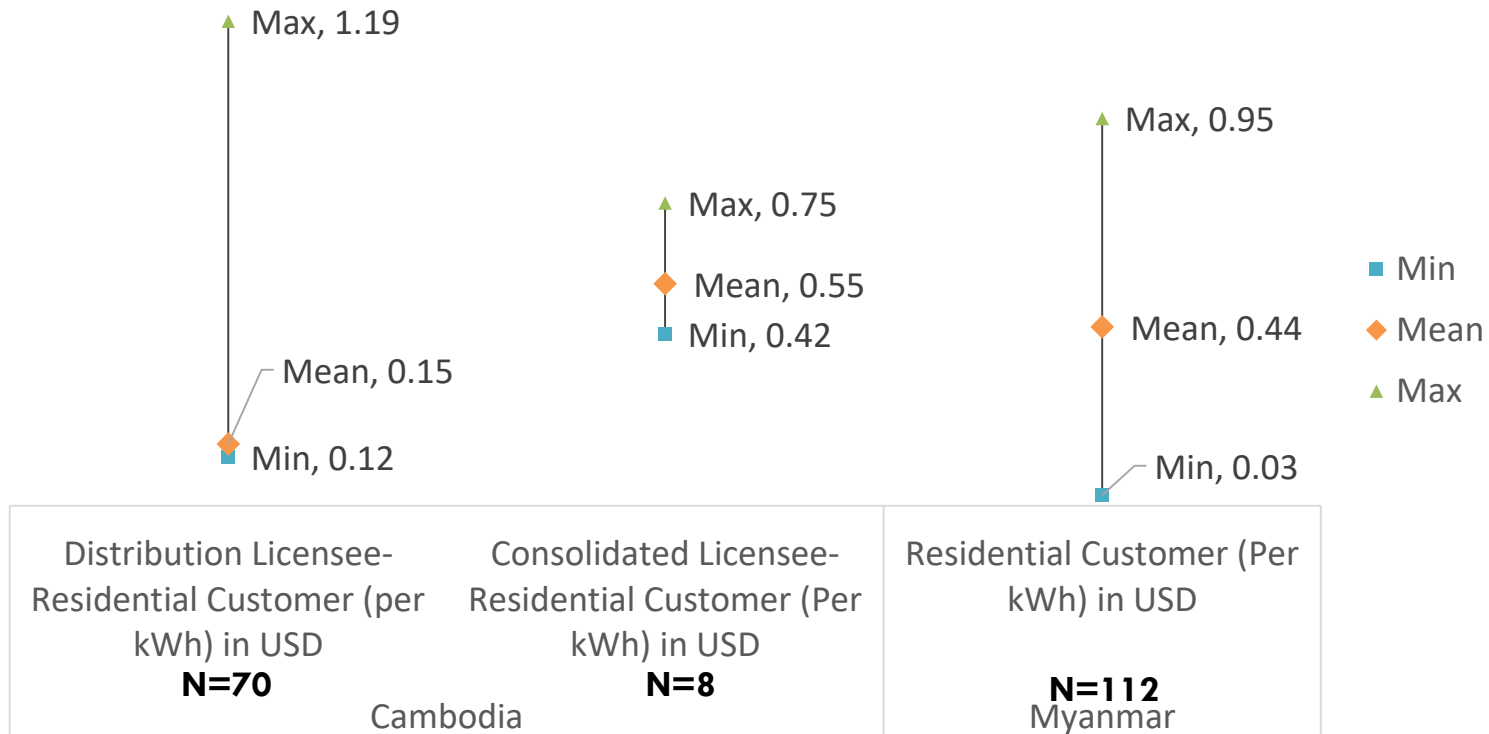
Cambodia- Distribution Licensee
(N=87)



- 65% of mini-grid operators in Myanmar answered that their operation is profitable while more than 90% of operations in Cambodia are profitable.
- Further investigation on their profitability will be carried out.

* "Do you make a profit from operating the mini-grid?"

TARIFF FOR ELECTRICITY SERVICE (PER KWH)

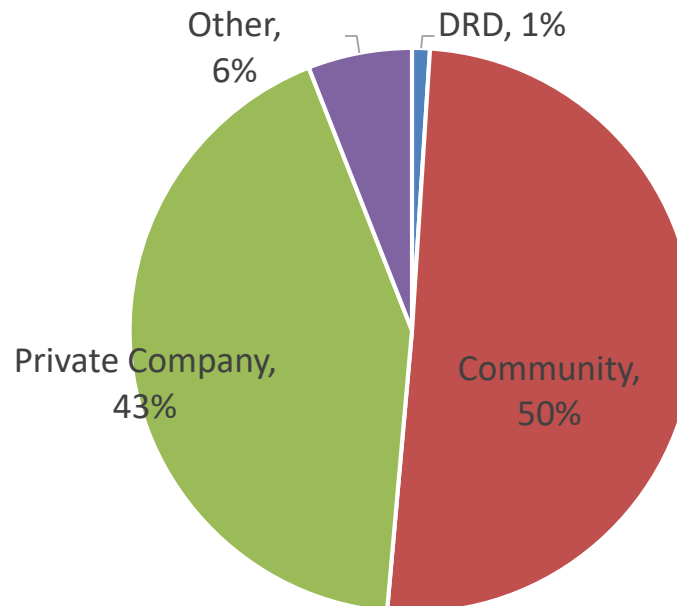


HOW IS THE TARIFF DETERMINED?

Cambodia- Electricity Authority of Cambodia set electricity price incorporating generation cost and certain percentage of profit.

Myanmar

- Mainly determined by either Community or Private sector

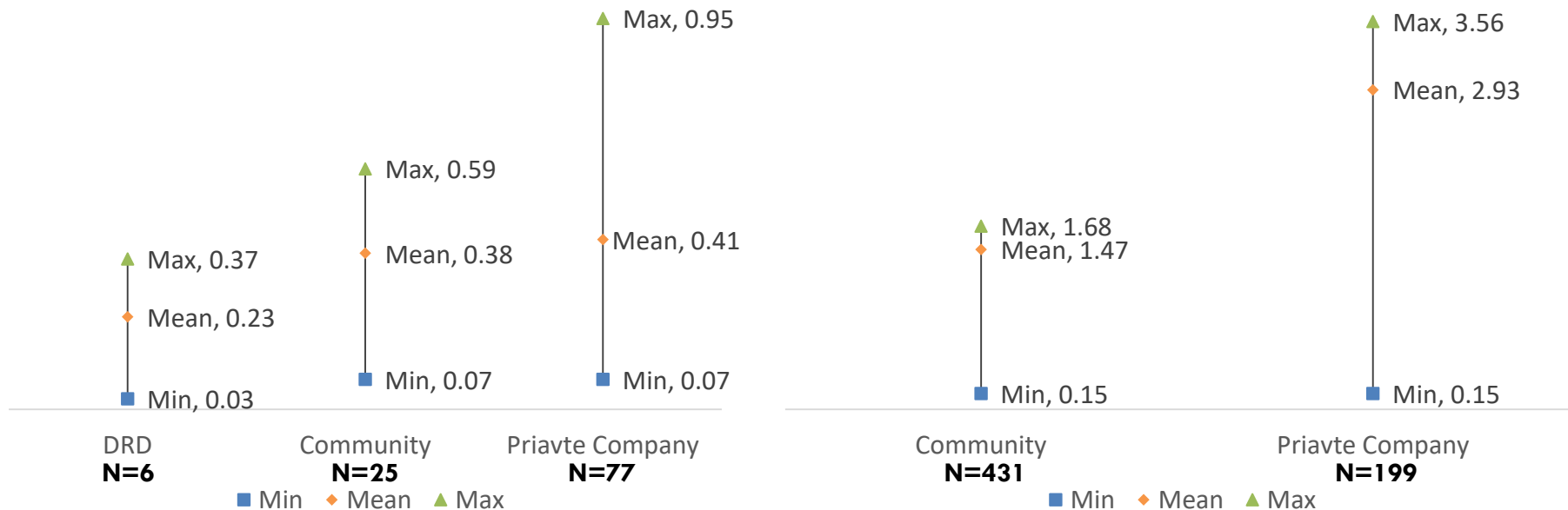


* Other, specify: It is written in Burmese and currently in the process of translating.

PRIVATE COMPANY'S ELECTRICITY TARIFF IS HIGHER THAN COMMUNITY BASED TARIFF

Per kWh

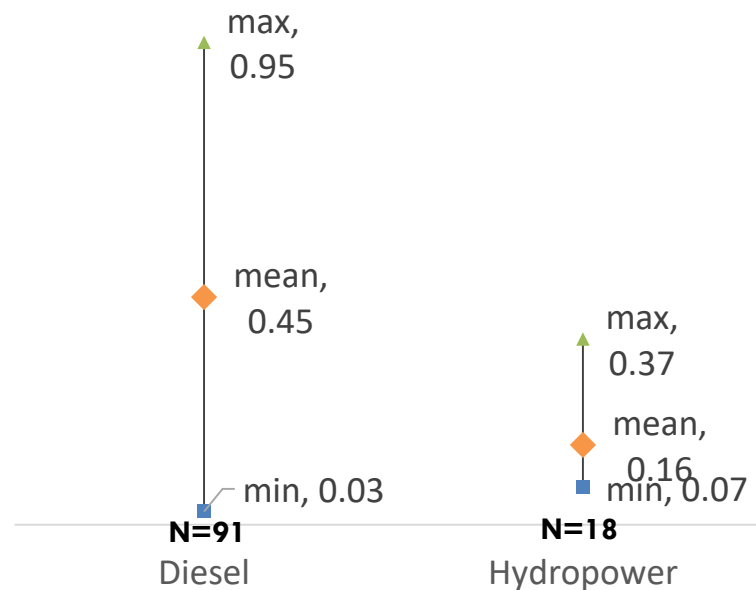
Flat Fee per Month



- However, the difference in electricity tariff does not only attribute to the decision making process. More private company runs diesel generator for electricity supply which would be a reason of higher electricity tariff.

ELECTRICITY TARIFF OF HYDRO-BASED OPERATION IS LOWER THAN DIESEL-BASED ONE

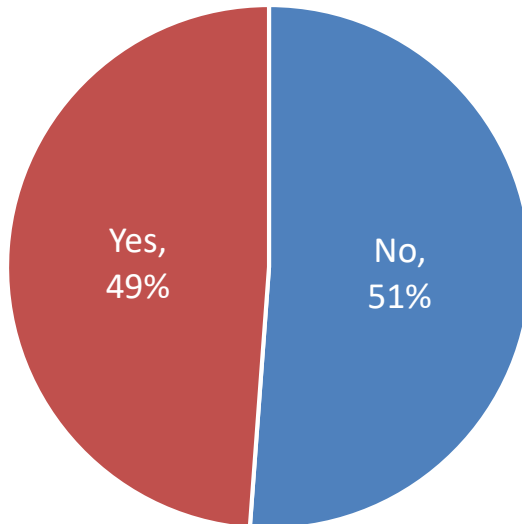
USD Per kWh By Source of Generation



MAJOR ISSUES WITH REVENUE

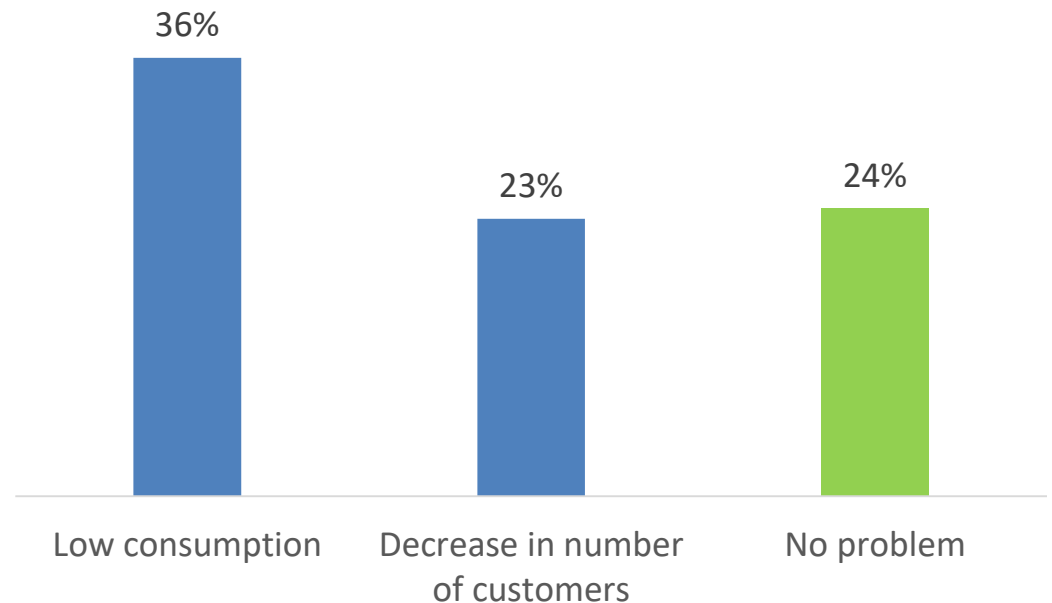
Myanmar: System breakdown

Does System breakdown make a negative impact on your revenue?



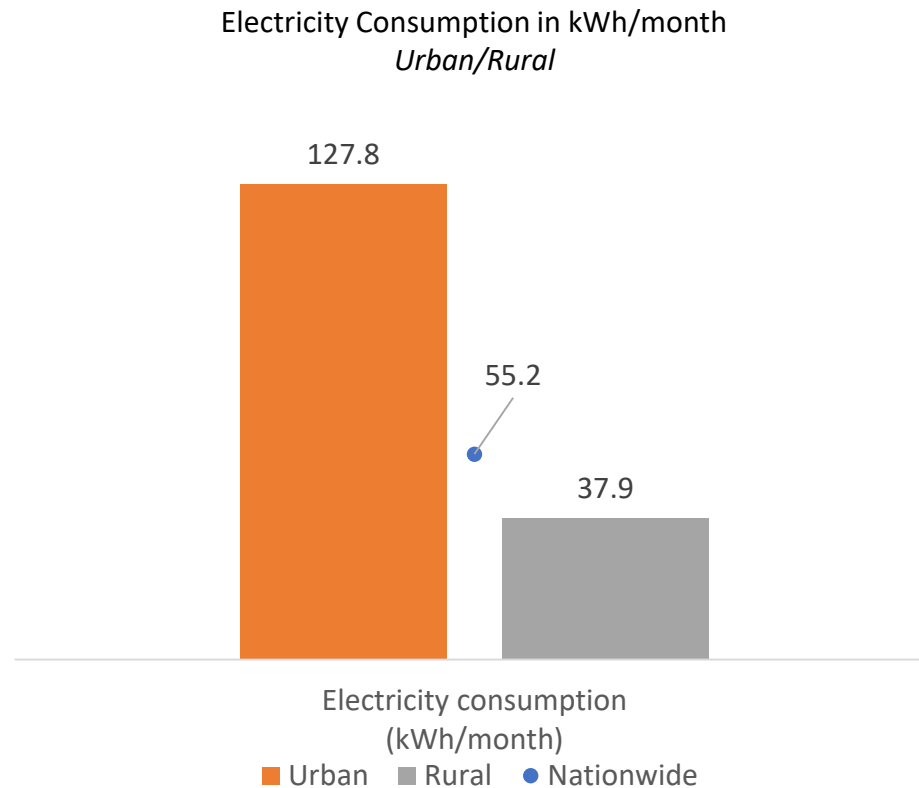
- Due to the system breakdown, the operators in Myanmar cannot provide sufficient electricity service to customers.

Cambodia: Low Consumption



- Cambodian operators' main concern is low consumption and decrease in number of customers (e.g. Migration)
- A quarter of operators reported that they don't have any problem with revenue.

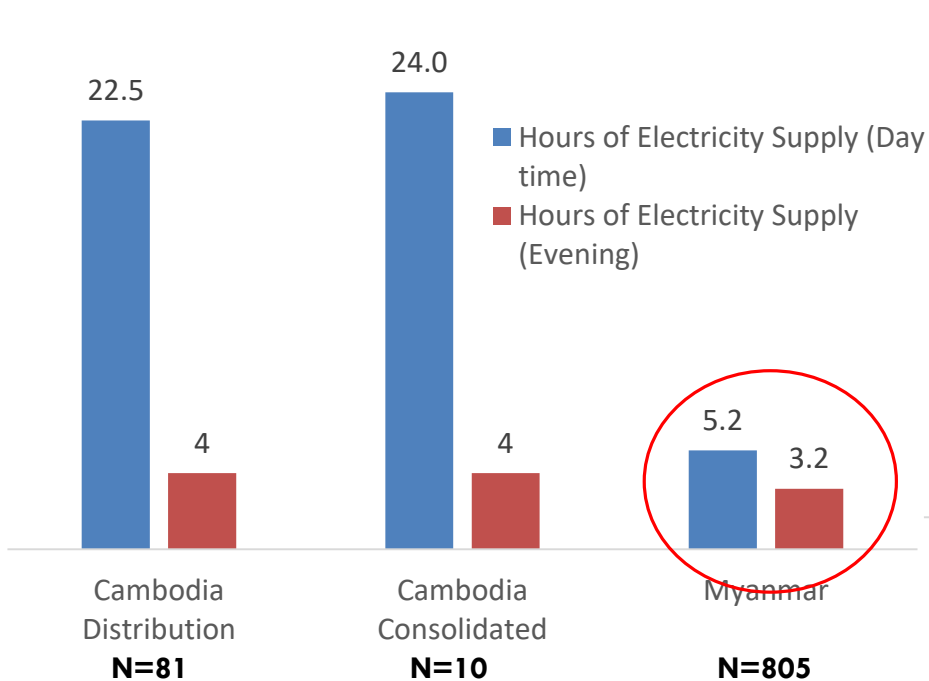
ELECTRICITY CONSUMPTION OF RURAL HOUSEHOLDS IS ONLY 25-30% OF URBAN HOUSEHOLDS.



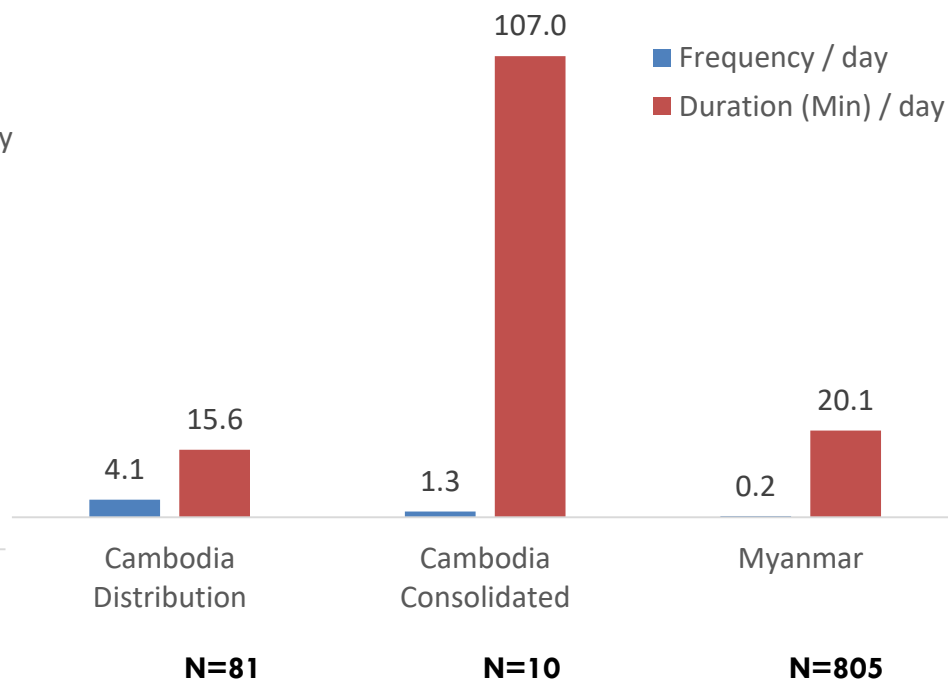
* Source: 2017 Multi-tier energy access Tracking Framework Survey in Cambodia

QUALITY OF ELECTRICITY SUPPLY

Hours of Electricity Supply during Daytime (24 hrs) and Evening (4 hrs)

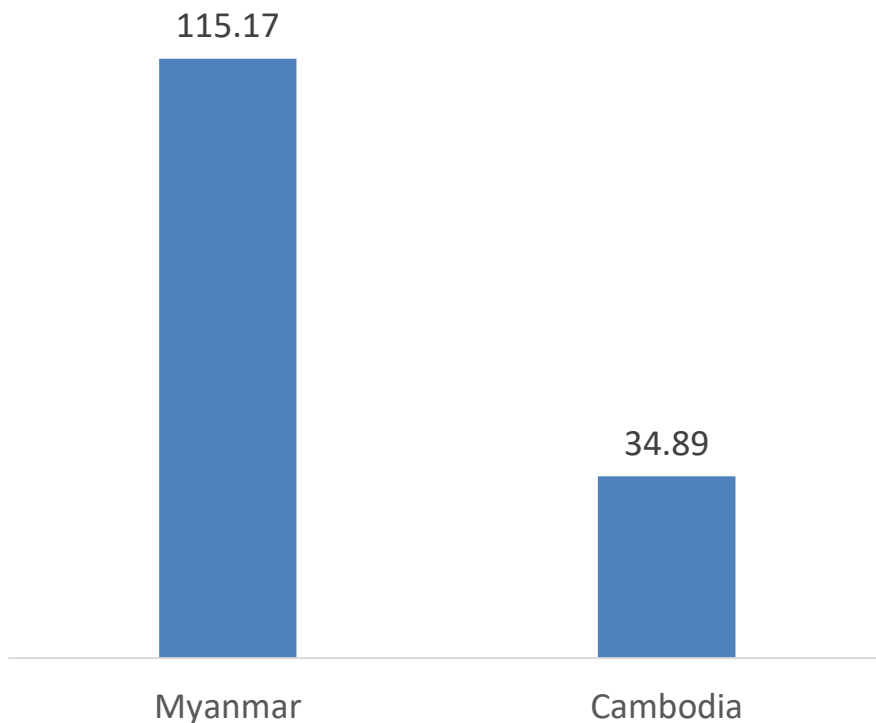


Frequency and Duration of Outages

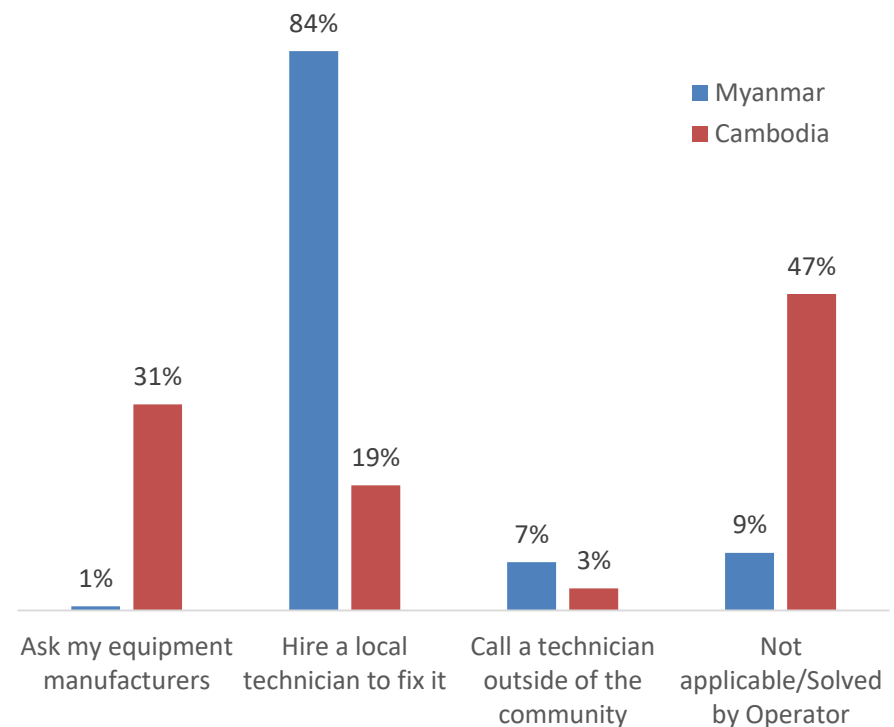


IT TAKES 115 HOURS TO FIX TECHNICAL PROBLEM IN MYANMAR WHILE 35 HOURS IN CAMBODIA ON AVERAGE

How long did it take to fix the problem? (Hrs)

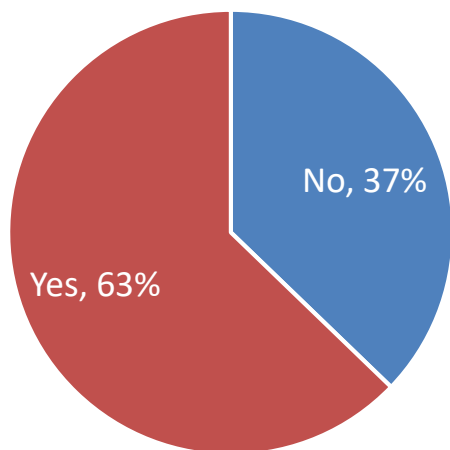


How to cope with the technical problems



WHEN THE NATIONAL GRID ARRIVES?

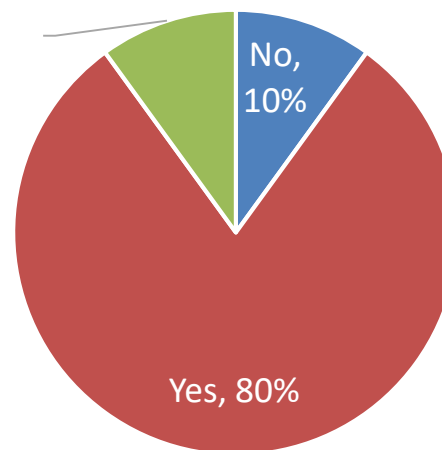
Myanmar: I will abandon my mini-grid operation



- 63% of mini-grid operators answered that they will stop operating when the national grid arrives.
- None of consolidated licensees reported that they will stop operating.

Cambodia: I will keep my distribution licensee

Don't know, 10%



- 80% of the consolidated licensees will convert their licensee into the distribution license.