

Supplementary Material:

Material Implications of Rural Electrification – A methodological framework to assess in-use stocks of off-grid solar products and EEE in rural households in Bangladesh

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1. S1: Selection of SHS bundles distributed by Grameen Shakti in Bangladesh in 2016

Grameen Shakti installed over 1 million Solar Home Systems in Bangladesh. It is the biggest distributor of Solar Home Systems in Bangladesh. As Bangladesh is the biggest market for SHS, it is probable, that Grameen Shakti is the biggest off-grid solar distributor of the world. For more information, please visit www.gshakti.org

Exchange Rate for Taka into US Dollar retrieved from xe.com 1 USD = 80 Taka (accessed: 10.03.2017)

| System Capacity [W _p] | Possible Loads | Equipment to be supplied by Grameen Shakti | Package Price in cash [Taka / USD]* |
|-----------------------------------|--|--|-------------------------------------|
| 10 | 2 x 2.5 Watt LED tube light, mobile phone charging | A 10 Watt panel, 2 x 2.5 Watt LED tube light, a 15 Ah battery, a charge controller, a frame and cables | 6000 / 75 |
| 20 | 3 x 3 Watt LED tube light, mobile phone charging and a 15" LCD/LED TV | A 20 Watt panel, 3 x 3 Watt LED light, a 20/30 Ah battery, a charge controller, a frame and cables | 10000 / 125 |
| 40/42 | 3 x 3 Watt LED tube light, mobile phone charging and a 15" LCD/LED TV | A 40/42 Watt panel, 3 x 3 Watt LED tube light, a 40/45 Ah battery, a charge controller, a frame and cables | 17000 / 212 |
| 75 | 6 x 3 Watt LED tube light, mobile phone charging, a 12 Watt fan and a 15" LCD/LED TV | A 75 Watt panel, 6 x 3 Watt LED tube light, a 80 Ah battery, a charge controller, a frame and cables | 26500 / 330 |
| 130 | 7 x 3 Watt LED tube light, mobile phone charging two 12 Watt fans and a 15" LCD/LED TV | A 130 Watt panel, 7 x 3 Watt LED tube light, a 130Ah battery, a charge controller, a frame and cables | 39000 / 485 |

2. S2: Verbal Description of the attribution of Tier Status (Supply Simple 2015)

The following information was retrieved from the supplementary information of Groh et al. (2016) "What are we measuring? An empirical analysis of household electricity access metrics in rural Bangladesh" (<http://www.sciencedirect.com/science/article/pii/S0973082615001027>)

Tier 0: A household has no access to electricity or uses dry cell batteries as its main source, or it has less than 1W of capacity or less than 4h of electricity supply per day, or less than 2h per night.

Tier 1: A household that does not fall under the category of tier 0 and with a capacity between 1W-50W or a colored TV or fan that causes tripping or is not allowed to be used. A household that has a solar lantern as primary source or an illegal connection. Or a household that has access to a minigrid, a SHS or rechargeable batteries as the main source of electricity in combination with electricity expenditure higher or equal than 10% of the household's total income. Or a household with an unmetered access to a diesel generator where the diesel expenditure is more than 10% of its total income or a metered access to the grid where the monthly tariff is equal or higher than 10% of its total income.

Tier 2: A household that does not fall under the category of tier 0 or 1 with a total capacity between 51W and 500W or a printer, air cooler electric food processor, rice cooker, fridge, toaster or electric hari dryer that causes tripping or is not allowed to be used. Or the household has access to SHS or a rechargeable battery system or less than 8h of electricity supply per day or pays his bill for the grid to a private person or doesn't pay at all. Or the household has experienced damages due to voltage drops.

Tier 3: A household that does not fall under the category of tier 0, 1 or 2 that has a capacity between 501W and 2000W. Or a washing machine, water pump, water heater, microwave oven, air conditioner, electric space heater or electric cooling system causes tripping or is not allowed to be used. Or the household has access to a minigrid or a diesel generator as the primary energy source or there is less than 16h of electricity supply during the day, or less than 4h in the evening. Or there is no meter and the household is connected to a diesel generator with a cost higher than 5% of the household's total income (obsolete condition). Or there is a (un-)metered electricity access which costs more than 5% of the household's total income. Or there are more than 3 unpredictable interruptions per week staying on longer than 31min.

Tier 4: A household that does not fall under the category of tier 0, 1, 2 or 3 that has three or less unpredictable interruptions per week which last less than half an hour and 22h or less of electricity supply per week.

Tier 5: A household that does not fall under the category of tier 0, 1, 2, 3 or 4 that has three or less unpredictable interruptions per week which last less than half an hour and more than 22h of electricity supply per week.

3. S3: Tier Status of households

Table 1. Tier Status of the households in the sample

| Algorithm | NA | Tier 0 | Tier 1 | Tier 2 | Tier 3 | Tier 4 |
|--------------------------------|----|--------|--------|--------|--------|--------|
| Electricity Supply Simple 2015 | - | 57 | 22 | 135 | 17 | - |
| Appliances | 63 | 69 | | 86 | - | 13 |

4. S4: Physical Properties of Solar Off-Grid Products: Raw data of the market research.

Table 2. Physical Properties of PV-Panels for Solar Off-grid Purposes. * m = monocrystalline, p = polycrystalline

| Capacity in [Wp] | Weight [kg] | Type* | Voltage in [V] | Company | Source |
|------------------|-------------|-------|----------------|-----------------------|----------------------|
| 3 | 0,5 | m | 12 | Sundaya LEC50 | Phaesun C. 2016/2017 |
| 5 | 0,9 | p | 12 | Phaesun | Phaesun C. 2014/2015 |
| 5 | 1,3 | m | 12 | EtSolar | Phaesun C. 2014/2015 |
| 5 | 0,9 | p | 12 | Phaesun Sun Plus 5 | Phaesun C. 2016/2017 |
| 5 | 1,5 | m | 12 | ETSolar ET-M53605 | Phaesun C. 2016/2017 |
| 6 | 1 | m | 12 | Sundaya LEC100 | Phaesun C. 2016/2017 |
| 9 | 1,5 | m | 12 | Sundaya LEC150 | Phaesun C. 2016/2017 |
| 10 | 1,2 | p | 12 | Phaesun | Phaesun C. 2014/2015 |
| 10 | 1,6 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |
| 10 | 1,08 | p | 12 | Fosera | Phaesun C. 2014/2015 |
| 10 | 1,2 | p | 12 | Phaesun Sun Plus 10 | Phaesun C. 2016/2017 |
| 10 | 1,5 | m | 12 | Phaesun Sun Plus 10 S | Phaesun C. 2016/2017 |
| 10 | 1,8 | m | 12 | ETSolar ET-M53610 | Phaesun C. 2016/2017 |
| 12 | 2 | m | 12 | Sundaya LEC200 | Phaesun C. 2016/2017 |
| 20 | 2,1 | p | 12 | Phaesun | Phaesun C. 2014/2015 |
| 20 | 2,4 | | 12 | EtSolar | Phaesun C. 2014/2015 |
| 20 | 3 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |
| 20 | 1,78 | p | 12 | Fosera | Phaesun C. 2014/2015 |
| 20 | 2,1 | p | 12 | Phaesun Sun Plus 20 | Phaesun C. 2016/2017 |
| 20 | 2,1 | m | 12 | Phaesun Sun Plus 20 S | Phaesun C. 2016/2017 |

| Capacity in [Wp] | Weight [kg] | Type* | Voltage in [V] | Company | Source |
|---------------------|----------------|-------|-------------------|-----------------------------|----------------------|
| 20 | 2,4 | m | 12 | ETSolar ET-M53620 ED | Phaesun C. 2016/2017 |
| 30 | 2,95 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 30 | 4 | | 12 | EtSolar | Phaesun C. 2014/2015 |
| 30 | 4 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |
| 30 | 4 | m | 12 | Phaesun Sun Plus 30 | Phaesun C. 2016/2017 |
| 30 | 2,95 | m | 12 | Phaesun Sun Peak SPR 30 | Phaesun C. 2016/2017 |
| 30 | 4 | m | 12 | ETSolar ET-M53630 | Phaesun C. 2016/2017 |
| 45 | 5 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |
| 50 | 5,5 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 50 | 5 | | 12 | EtSolar | Phaesun C. 2014/2015 |
| 50 | 5,5 | m | 12 | Phaesun Sun Plus 50 S | Phaesun C. 2016/2017 |
| 50 | 5 | m | 12 | ETSolar ET-M53650 | Phaesun C. 2016/2017 |
| 60 | 5,7 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 60 | 5,7 | m | 12 | Phaesun Sun Peak SPR 60 | Phaesun C. 2016/2017 |
| 70 | 6 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |
| 75 | 8 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |
| 80 | 6,2 | m | 12 | Solarworld | Phaesun C. 2014/2015 |
| 80 | 6,2 | m | 12 | Phaesun Sun Plus 80 | Phaesun C. 2016/2017 |
| 80 | 6,2 | m | 12 | Solarworld SW 80 mono RHA | Phaesun C. 2016/2017 |
| 85 | 7 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 85 | 7,5 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 85 | 7 | m | 12 | Phaesun Sun Peak SPR 85 | Phaesun C. 2016/2017 |
| 85 | 7,5 | m | 12 | Phaesun Sun Peak SPR 85 S | Phaesun C. 2016/2017 |
| 90 | 8,2 | | 12 | EtSolar | Phaesun C. 2014/2015 |
| 90 | 7 | m | 12 | Phaesun Sun Peak SPR 90 | Phaesun C. 2016/2017 |
| 90 | 7,5 | m | 12 | Phaesun Sun Peak SPR 90 S | Phaesun C. 2016/2017 |
| 90 | 8,2 | m | 12 | ETSolar ET-M53690 | Phaesun C. 2016/2017 |
| 100 | 7,8 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 100 | 7,4 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 100 | 8,2 | | 12 | EtSolar | Phaesun C. 2014/2015 |
| 100 | 8 | m | 24 | Solarworld | Phaesun C. 2014/2015 |
| 100 | 7,8 | m | 12 | Phaesun Sun Plus 100 | Phaesun C. 2016/2017 |
| 100 | 7,4 | m | 12 | Phaesun Sun Peak SPR 100 | Phaesun C. 2016/2017 |
| 100 | 8,2 | m | 12 | ETSolar ET-M536100 | Phaesun C. 2016/2017 |
| 100 | 8 | p | 24 | Solarworld SW 80 poly RGP | Phaesun C. 2016/2017 |
| 110 | 9,3 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |
| 130 | 12,25 | m | 12 | Phaesun | Phaesun C. 2014/2015 |
| 130 | 12,25 | m | 24 | Phaesun | Phaesun C. 2014/2015 |
| 130 | 12,25 | m | 12 | Phaesun Sun Peak SPR 130 | Phaesun C. 2016/2017 |
| 130 | 12,25 | m | 24 | Phaesun Sun Peak SPR 130 | Phaesun C. 2016/2017 |
| 135 | 13,2 | p | 12 | EtSolar | Phaesun C. 2014/2015 |
| 135 | 13,2 | p | 12 | ETSolar ET-M536135 | Phaesun C. 2016/2017 |
| 140 | 12,25 | m | 12 | Phaesun Sun Peak SPR 140_12 | Phaesun C. 2016/2017 |
| 140 | 12,25 | m | 24 | Phaesun Sun Peak SPR 140_24 | Phaesun C. 2016/2017 |
| 150 | 11,8 | m | 12 | Solarworld | Phaesun C. 2014/2015 |
| 150 | 13 | p | 12 | Istar Solar | Phaesun C. 2014/2015 |

| Capacity in [Wp] | Weight [kg] | Type* | Voltage in [V] | Company | Source |
|---------------------|----------------|-------|-------------------|----------------------------|----------------------|
| 150 | 11 | p | 12 | Phaesun Sun Plus 150_12 | Phaesun C. 2016/2017 |
| 150 | 16,5 | p | 24 | Phaesun Sun Plus 150_24 | Phaesun C. 2016/2017 |
| 150 | 11,8 | p | 12 | Solarworld SW 150 poly R6A | Phaesun C. 2016/2017 |

Table 3 Physical Properties of Lead-Acid Batteries for Solar Off-grid Purposes

| Capacity [Ah] | Weight [kg] | Type | Producer | Source |
|------------------|----------------|-----------------|--|----------------------|
| 1,2 | 0,6 | AGM | Intact Block-Power BP 12-1.2 | Phaesun C. 2016/2017 |
| 2,1 | 0,9 | AGM | Intact Block-Power BP 12-2.1 | Phaesun C. 2016/2017 |
| 2,9 | 1,1 | AGM | Intact Block-Power BP 12-2.9 | Phaesun C. 2016/2017 |
| 3,5 | 1,3 | AGM | Intact Block-Power BP 12-3.5 | Phaesun C. 2016/2017 |
| 4 | 1,5 | AGM | Intact Block-Power BP 12-4 | Phaesun C. 2016/2017 |
| 6,6 | 2,6 | AGM | Sonnenschein Solar S12/6,6S | Phaesun C. 2016/2017 |
| 7 | 2,5 | AGM | Intact Block-Power BP 12-7 | Phaesun C. 2016/2017 |
| 10 | 3,4 | AGM | Intact Block-Power BP 12-10 | Phaesun C. 2016/2017 |
| 12 | 3,8 | AGM | Intact Block-Power BP 12-12 | Phaesun C. 2016/2017 |
| 17 | 6,1 | AGM | Sonnenschein Solar S12/17.0 G5 | Phaesun C. 2016/2017 |
| 17 | 5,6 | AGM | Intact Block-Power BP 12-17 | Phaesun C. 2016/2017 |
| 18 | 6 | Gel | Intact | Phaesun C. 2014/2015 |
| 18 | 6 | Gel | Intact Gel-Power 16 | Phaesun C. 2016/2017 |
| 20 | 10,75 | Tubular Plate | Hamko | Data Sheet |
| 20 | 14,2 | Tubular Plate | Gaston | Data Sheet |
| 24 | 5,8 | AGM | Intact Block-Power BP 12-24N | Phaesun C. 2016/2017 |
| 26 | 8,4 | AGM | Intact Block-Power BP 12-26 | Phaesun C. 2016/2017 |
| 26 | 8 | AGM | Intact Block-Power BP 12-26N | Phaesun C. 2016/2017 |
| 27 | 9,5 | Gel | intact | Phaesun C. 2014/2015 |
| 27 | 9,6 | AGM | Sonnenschein Solar S12/27 G5 | Phaesun C. 2016/2017 |
| 27 | 9,5 | Gel | Intact Gel-Power 25 | Phaesun C. 2016/2017 |
| 30 | 17,1 | Tubular Plate | Hamko | Data Sheet |
| 30 | 16 | Tubular Plate | Gaston | Data Sheet |
| 32 | 11,1 | Gel | Intact | Phaesun C. 2014/2015 |
| 32 | 11,1 | AGM | Sonnenschein S12/32 G6 | Phaesun C. 2016/2017 |
| 32 | 11,1 | Gel | Intact Gel-Power 30 | Phaesun C. 2016/2017 |
| 35 | 11,2 | AGM | Intact Block-Power BP 12-35 | Phaesun C. 2016/2017 |
| 38 | 13,5 | AGM | Intact Block-Power BP 12-38 | Phaesun C. 2016/2017 |
| 40 | 20,73 | Tubular Plate | Hamko | Data Sheet |
| 40 | 17,4 | Tubular Plate | Gaston | Data Sheet |
| 41 | 14,6 | Gel | intact | Phaesun C. 2014/2015 |
| 41 | 14,2 | AGM | Sonnenschein Solar S12/41 A | Phaesun C. 2016/2017 |
| 41 | 14,6 | Gel | Intact Gel-Power 40 B | Phaesun C. 2016/2017 |
| 52 | 14,8 | AGM | Intact Block-Power BP 12-50 | Phaesun C. 2016/2017 |
| 55 | 26,9 | Tubular Plate | Hamko | Data Sheet |
| 55 | 18 | Gel | Intact | Phaesun C. 2014/2015 |
| 55 | 18 | Gel | Intact Gel-Power 50 B | Phaesun C. 2016/2017 |
| 55 | 13,3 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 55 | Phaesun C. 2016/2017 |

| Capacity [Ah] | Weight [kg] | Type | Producer | Source |
|---------------|-------------|----------------------------|---|----------------------|
| 60 | 29,2 | Tubular Plate | Gaston | Data Sheet |
| 60 | 19 | Gel | intact | Phaesun C. 2014/2015 |
| 60 | 18,1 | AGM | Sonnenschein Solar S12/60 A | Phaesun C. 2016/2017 |
| 60 | 19 | AGM | sun.power VR-M 12 V 58 | Phaesun C. 2016/2017 |
| 60 | 19 | Gel | Intact Gel-Power 55 | Phaesun C. 2016/2017 |
| 65 | 21,8 | Gel | Intact | Phaesun C. 2014/2015 |
| 65 | 22 | AGM | Intact Block-Power BP 12-65 | Phaesun C. 2016/2017 |
| 65 | 21,8 | Gel | Intact Gel-Power 60 | Phaesun C. 2016/2017 |
| 65 | 21,8 | Gel | Intact Gel-Power 60 B | Phaesun C. 2016/2017 |
| 70 | 23 | AGM | sun.power VR-M 12 V 70 | Phaesun C. 2016/2017 |
| 70 | 14 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 70 | Phaesun C. 2016/2017 |
| 70 | 37 | Flooded Battery | Hoppecke 12V 1 OPzS bloc solar.power 70 | Phaesun C. 2016/2017 |
| 72 | 22 | AGM | Phaesun Sun Store 65 | Phaesun C. 2016/2017 |
| 72 | 20 | AGM | Phaesun Store Rich 70 | Phaesun C. 2016/2017 |
| 75 | 15,5 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 75 | Phaesun C. 2016/2017 |
| 78 | 23,8 | AGM | Intact Block-Power BP 12-75 | Phaesun C. 2016/2017 |
| 80 | 36,53 | Tubular Plate | Hamko | Data Sheet |
| 80 | 33,35 | Tubular Plate | Gaston | Data Sheet |
| 80 | 23 | Gel | intact | Phaesun C. 2014/2015 |
| 80 | 24 | AGM | sun.power VR-M 12 V 80 | Phaesun C. 2016/2017 |
| 80 | 23 | Gel | Intact Gel-Power 75 | Phaesun C. 2016/2017 |
| 81 | 35 | Flooded Battery | GNB Industrial Power Classic OPzS Solar Block 70 | Phaesun C. 2016/2017 |
| 85 | 26 | Gel | Intact | Phaesun C. 2014/2015 |
| 85 | 26,8 | AGM | Sonnenschein Solar S12/85 A | Phaesun C. 2016/2017 |
| 85 | 26 | Gel | Intact Gel-Power 80 B | Phaesun C. 2016/2017 |
| 90 | 32 | Gel | intact | Phaesun C. 2014/2015 |
| 90 | 29,2 | AGM | Sonnenschein Solar S12/90 A | Phaesun C. 2016/2017 |
| 90 | 24,5 | AGM | Intact Block-Power BP 12-90 | Phaesun C. 2016/2017 |
| 90 | 28 | AGM | sun.power VR-M 12 V 90 | Phaesun C. 2016/2017 |
| 90 | 32 | Gel | Intact Gel-Power 85 | Phaesun C. 2016/2017 |
| 90 | 17,4 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 90 | Phaesun C. 2016/2017 |
| 92 | 23,5 | AGM | Phaesun Sun Store 80 | Phaesun C. 2016/2017 |
| 92 | 34 | AGM | Phaesun Store Rich 70 | Phaesun C. 2016/2017 |
| 100 | 42,6 | Tubular Plate Lead-Acid | Hamko | Data Sheet |
| 100 | 36,9 | Tubular Plate Lead-Acid | Gaston | Data Sheet |
| 100 | 38 | AGM | sun.power VR-M 12 V 105 | Phaesun C. 2016/2017 |
| 107 | 31 | AGM | Intact Block-Power BP 12-100 | Phaesun C. 2016/2017 |
| 110 | 18,2 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 110 | Phaesun C. 2016/2017 |
| 115 | 30 | AGM | Phaesun Sun Store 100 | Phaesun C. 2016/2017 |
| 115 | 28 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 115 | Phaesun C. 2016/2017 |
| 120 | 26 | Flooded Battery | Intact Solar-Power Batteries | Phaesun C. 2016/2017 |

| Capacity [Ah] | Weight [kg] | Type | Producer | Source |
|------------------|----------------|----------------------------|--|----------------------|
| | | | Solar-Power 120 | |
| 124 | 38 | AGM | Intact Block-Power BP 12-120 | Phaesun C. 2016/2017 |
| 125 | 28,7 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 125 | Phaesun C. 2016/2017 |
| 128 | 23,7 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 128 | Phaesun C. 2016/2017 |
| 130 | 54,5 | Tubular Plate Lead-Acid | Hamko | Information Sheet |
| 130 | 53 | Tubular Plate Lead-Acid | Gaston | Information Sheet |
| 130 | 40 | Gel | Intact | Phaesun C. 2014/2015 |
| 130 | 37,5 | AGM | Sonnenschein Solar S12/130 A | Phaesun C. 2016/2017 |
| 130 | 46 | AGM | sun.power VR-M 12 V 135 | Phaesun C. 2016/2017 |
| 130 | 40 | Gel | Intact Gel-Power 115 | Phaesun C. 2016/2017 |
| 130 | 32,3 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 130 | Phaesun C. 2016/2017 |
| 130 | 48 | Flooded Battery | Hoppecke 12V 1 OPzS bloc solar.power 130 | Phaesun C. 2016/2017 |
| 135 | 41 | Gel | intact | Phaesun C. 2014/2015 |
| 135 | 41 | Gel | Intact Gel-Power 120 | Phaesun C. 2016/2017 |
| 136 | 45 | Flooded Battery | GNB Industrial Power Classic OPzS Solar Block 140 | Phaesun C. 2016/2017 |
| 138 | 37,6 | AGM | Phaesun Sun Store 120 | Phaesun C. 2016/2017 |
| 140 | 40 | Gel | Intact Gel-Power 125 | Phaesun C. 2016/2017 |
| 140 | 37,2 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 140 | Phaesun C. 2016/2017 |
| 149 | 45 | AGM | Intact Block-Power BP 12-140 | Phaesun C. 2016/2017 |
| 150 | 55 | AGM | sun.power VR-M 12 V 150 | Phaesun C. 2016/2017 |
| 155 | 48 | Gel | Intact Gel-Power 140 | Phaesun C. 2016/2017 |
| 156 | 48 | AGM | Intact Block-Power BP 12-150 | Phaesun C. 2016/2017 |
| 172 | 48,2 | AGM | Phaesun Sun Store 150 | Phaesun C. 2016/2017 |
| 190 | 32 | AGM | sun.power VR-M 6 V 200 | Phaesun C. 2016/2017 |
| 200 | 33 | Gel | Intact Gel-Power 180-06 V1 | Phaesun C. 2016/2017 |
| 200 | 33 | Gel | Intact Gel-Power 180-06 V2 | Phaesun C. 2016/2017 |
| 200 | 48 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 200 | Phaesun C. 2016/2017 |
| 200 | 67 | Flooded Battery | Hoppecke 12V 1 OPzS bloc solar.power 200 | Phaesun C. 2016/2017 |
| 203 | 65 | Flooded Battery | GNB Industrial Power Classic OPzS Solar Block 210 | Phaesun C. 2016/2017 |
| 208 | 66 | AGM | Intact Block-Power BP 12-200 | Phaesun C. 2016/2017 |
| 230 | 64 | AGM | Phaesun Sun Store 200 | Phaesun C. 2016/2017 |
| 230 | 70 | Gel | Intact Gel-Power 210 | Phaesun C. 2016/2017 |
| 250 | 41 | AGM | sun.power VR-M 6 V 250 | Phaesun C. 2016/2017 |
| 250 | 61 | Flooded Battery | Intact Solar-Power Batteries Solar-Power 250 | Phaesun C. 2016/2017 |
| 262 | 73 | AGM | Intact Block-Power BP 12-250 | Phaesun C. 2016/2017 |
| 330 | 48 | Gel | Intact Gel-Power 300-06 | Phaesun C. 2016/2017 |

Table 4 Physical Properties of other battery technologies for off-grid solar proposes

| Capacity | Type | Weight [kg] | Producer | Source |
|----------|---------|-------------|----------------------------------|---|
| 4 Ah | LiFEPO4 | 0.68 | Phaesun Solar Side 4 | Phaesun C. 2016/2017 |
| 7 Ah | LiFEPO4 | 1.03 | Phaesun Solar Side 7 | Phaesun C. 2016/2017 |
| 4,5 Ah | LiFEPO4 | 0.8 | Vision Power Green LFP124.5 T | Phaesun C. 2016/2017 |
| 10 Ah | LiFEPO4 | 1.4 | Vision Power Green LFP1210 | Phaesun C. 2016/2017 |
| 15 Ah | LiFEPO4 | 1.8 | Vision Power Green LFP1215 | Phaesun C. 2016/2017 |
| 17 Ah | LiFEPO4 | 2.7 | Vision Power Green LFP1217 | Phaesun C. 2016/2017 |
| 25 Ah | LiFEPO4 | 4.0 | Vision Power Green LFP1225 | Phaesun C. 2016/2017 |
| 40 Ah | LiFEPO4 | 6.0 | Vision Power Green LFP1240 | Phaesun C. 2016/2017 |
| 580 kJ | Li-Ion | 1.25 | Sundaya Joule Box 500 | http://www.sundaya.se/files/JouleBox500_datash_eets_Feb_2015.pdf [Accessed 06.12.2016] |
| 1000 kJ | Li-Ion | 2.1 | Sundaya Joule Box 1000 | http://sundaya.com/files/Sundaya_JouleBox_data_sheets_July2016.pdf [accessed: 06.12.2016] |
| 4Ah | LiFEPO4 | 0.680 | Zimpertec LS 4000 | http://www.zimpertec.com/Lithium-Battery-Systems |
| 7Ah | LiFEPO4 | 1030 | Zimpertec LS 7000 | http://www.zimpertec.com/Lithium-Battery-Systems |

Table 5. Physical Properties of Lighting Equipment for solar off-grid purposes

| Wattage [W] | Weight [g] | Type | Lumen | Additional Inform. | Company | Source Company |
|-------------|------------|----------|-------|--------------------|--------------------------------|----------------------|
| 1,3 | 48 | bulb | | Only LED | Phaesun | Phaesun C. 2016/2017 |
| 3 | 60 | bulb | | Only LED | Phaesun | Phaesun C. 2016/2017 |
| 4,5 | 80 | bulb | | Only LED | Phaesun | Phaesun C. 2016/2017 |
| 4,4 | 10 | LED bulb | 500 | Only LED | Steca LED Lamp Steca LED 4 | Phaesun C. 2016/2017 |
| 5,6 | 12 | LED bulb | 600 | Only LED | Steca LED Lamp Steca LED 6 | Phaesun C. 2016/2017 |
| 7,8 | 15 | LED bulb | 800 | Only LED | Steca LED Lamp Steca LED 8 | Phaesun C. 2016/2017 |
| 11,5 | 29 | LED bulb | 1100 | Only LED | Steca LED Lamp Steca LED 12 | Phaesun C. 2016/2017 |
| 1,6 | 60 | LED bulb | 176 | Only LED | Phaesun Lux Me WW 150_12 | Phaesun C. 2016/2017 |
| 3 | 60 | LED bulb | 300 | Only LED | Phaesun Lux Me NW 270_12 | Phaesun C. 2016/2017 |
| 8 | 140 | LED bulb | 760 | Only LED | Phaesun Lux Me WW 720_12 | Phaesun C. 2016/2017 |
| 4,5 | 80 | LED bulb | 420 | Only LED | Phaesun PN-OP | Phaesun C. 2016/2017 |

| Wattage [W] | Weight [g] | Type | Lumen | Additional Inform. | Company | Source Company |
|-------------|------------|-------------------|-----------|------------------------|---------------------------|---|
| | | | | | 401T E27 12V W | |
| 3 | 120 | tube light | 300 | Only LED tube light | Phaesun Super Illu 270_12 | Phaesun C. 2016/2017 |
| 5 | 120 | tube light | 500 | Only LED tub light | Phaesun Super Illu 450_12 | Phaesun C. 2016/2017 |
| 10 | 140 | tube light | 1000 | Only LED tube light | Phaesun Super Illu 900_12 | Phaesun C. 2016/2017 |
| 5 | 120 | tube light | 500 | Only LED tube light | Phaesun Super Illu 450_24 | Phaesun C. 2016/2017 |
| 10 | 140 | tube light | 1000 | Only LED tube light | Phaesun Super Illu 900_24 | Phaesun C. 2016/2017 |
| 0,8 | 16,5 | LED bulb | 100 | only Led | Sundaya Ulite 100 | http://sundaya.com/files/Sundaya_JouleBox_datasheets_July2016.pdf |
| 1,9 | 30 | LED bulb | 200 | only LED | Sundaya Ulite 200 | http://sundaya.com/files/Sundaya_JouleBox_datasheets_July2016.pdf |
| 3,6 | 41 | LED bulb | 400 | only LED | Sundaya Ulite 400 | http://sundaya.com/files/Sundaya_JouleBox_datasheets_July2016.pdf |
| 5,8 | 41 | LED bulb | 600 | only LED | Sundaya Ulite 400 | http://sundaya.com/files/Sundaya_JouleBox_datasheets_July2016.pdf |
| 0,78 | 330 | bulb | | Incl. Cable and switch | Fosera | Datasheet |
| 1,56 | 330 | bulb | | Incl. Cable and switch | Fosera | Datasheet |
| 1,1 | 690 | bulb | 20/50/100 | Incl. 4m Cable | Niwa LED Lamp Home 100 | Phaesun C. 2016/2017 |
| 3,3 | 690 | bulb | | including Cable | Niwa | Datasheet |
| 2 | 117 | Lamp Sun Flower | 200 | Lamp and lampshade | Phaesun Sun Flower 180_12 | Phaesun C. 2016/2017 |
| 3 | 117 | Lamp Sun Flower | 300 | Lamp and lampshade | Phaesun Sun Flower 270_12 | Phaesun C. 2016/2017 |
| 5 | 117 | Lamp Sun Flower | 500 | Lamp and lampshade | Phaesun Sun Flower 450_12 | Phaesun C. 2016/2017 |
| 7 | 117 | Lamp Sun Flower | 700 | Lamp and lampshade | Phaesun Sun Flower 630_12 | Phaesun C. 2016/2017 |
| 2,5 | 320 | LED lighting Unit | 165 | Lighting unit | Microlux SI3 2-1 | Phaesun C. 2016/2017 |
| 5 | 568 | LED lighting Unit | 165 | Lighting unit | Microlux SI3 2-3 | Phaesun C. 2016/2017 |
| 7 | 460 | LED lighting Unit | 900 | Lighting unit | Powerlux SI3 5-1MV | Phaesun C. 2016/2017 |
| 12,5 | 460 | LED lighting Unit | 1420 | Lighting unit | Powerlux SI3 5-3MV | Phaesun C. 2016/2017 |

Table 6 Charge Controller for solar off-grid proposes

| Current | Voltage [V] | Weight [g] | Company | Source |
|---------|-------------|------------|-------------------|----------------------|
| 3A | 12/24 | 160 | Steca | Phaesun C. 2014/2015 |
| 5A | | 160 | Steca | Phaesun C. 2014/2015 |
| 6A | 12/24 | 150 | Steca Solsum 6.6F | Phaesun C. 2016/2017 |
| 8A | 12/24 | 150 | Steca Solsum 8.8F | Phaesun C. 2016/2017 |

| Current | Voltage [V] | Weight [g] | Company | Source |
|---------|-------------|------------|---|---|
| 10A | 12/24 | 150 | Steca Solsum 10.10F | Phaesun C. 2016/2017 |
| 25A | 12/24 | 345 | Steca Solsum 2525 | Phaesun C. 2016/2017 |
| 40A | 12/24 | 345 | Steca Solsum 4040 | Phaesun C. 2016/2017 |
| 10A | 12/24 | 345 | Steca Solarix PRS 1010 | Phaesun C. 2016/2017 |
| 15A | 12/24 | 345 | Steca Solarix PRS 1515 | Phaesun C. 2016/2017 |
| 20A | 12/24 | 345 | Steca Solarix PRS 2020 | Phaesun C. 2016/2017 |
| 30A | 12/24 | 345 | Steca Solarix PRS 3030 | Phaesun C. 2016/2017 |
| 15A | 12/24 | 340 | Morningstar PS-15M | Phaesun C. 2016/2017 |
| 15A | 48 | 340 | Morningstar PS-15M-48V | Phaesun C. 2016/2017 |
| 15A | 48 | 340 | Morningstar PS-15M-48V-PG | Phaesun C. 2016/2017 |
| 30A | 12/24 | 340 | Morningstar PS-30M | Phaesun C. 2016/2017 |
| 6 | 12 | 230 | Morningstar SunSaver SS-6L-15V | Phaesun C. 2016/2017 |
| 10 | 12 | 230 | Morningstar SunSaver SS-10L-12V | Phaesun C. 2016/2017 |
| 20 | 12 | 230 | Morningstar SunSaver SS-20L-12V | Phaesun C. 2016/2017 |
| 10 | 24 | 230 | Morningstar SunSaver SS-10L-24V | Phaesun C. 2016/2017 |
| 20 | 24 | 230 | Morningstar SunSaver SS-20L-24V | Phaesun C. 2016/2017 |
| 5 | 12/24 | 150 | Phocos CIS05 | Phaesun C. 2016/2017 |
| 5 | 12/24 | 150 | Phocos CIS05 2L | Phaesun C. 2016/2017 |
| 10 | 12/24 | 150 | Phocos CIS10 | Phaesun C. 2016/2017 |
| 10 | 12/24 | 150 | Phocos CIS10 2L | Phaesun C. 2016/2017 |
| 20 | 12/24 | 150 | Phocos CIS20 | Phaesun C. 2016/2017 |
| 20 | 12/24 | 150 | Phocos CIS20 2L | Phaesun C. 2016/2017 |
| 5 | 12/24 | 210 | Phocos CIS LED 5A | Phaesun C. 2016/2017 |
| 10 | 12/24 | 210 | Phocos CIS-N-LED 10A | Phaesun C. 2016/2017 |
| 20 | 12/24 | 250 | Phocos CIS-N-LED-1050 20A | Phaesun C. 2016/2017 |
| 20 | 12/24 | 250 | Phocos CISN-LED-2800 20A | Phaesun C. 2016/2017 |
| 10 | 12 | 110 | Phocos ECO 10 | Phaesun C. 2016/2017 |
| 14 | 12 | 160 | Phocos Ecoterm 14 | Phaesun C. 2016/2017 |
| 10 | 12/24 | 130 | Phocos CMLup 10 | Phaesun C. 2016/2017 |
| 20 | 12/24 | 130 | Phocos CMLup 20 | Phaesun C. 2016/2017 |
| 30 | 12/24 | 420 | Phocos Cmsolid 30A | Phaesun C. 2016/2017 |
| 12 | 12 | 900 | Schneider Electric C series - charge controller C12 | http://www.ops-ecat.schneider-electric.com/ecatalogue/ |
| 3 | 12 | 270 | Schneider Electric AEH-SCC01-3A | http://www.ops-ecat.schneider-electric.com/ecatalogue/ |
| 6 | 12 | 210 | Schneider Electric AEH-SCC04-6A-BD | http://www.ops-ecat.schneider-electric.com/ecatalogue/ |
| 6 | 12 | 280 | Schneider Electric | http://www.ops-ecat.schneider-electric.com/ |

| Current | Voltage [V] | Weight [g] | Company | Source |
|---------|-------------|------------|--|--|
| 10 | 12 | 300 | AEH-SCC05-6A-BD Schneider Electric | ecatalogue/ http://www.ops-ecat.schneider-electric.com/ecatalogue/ |
| 10 | 12 | 290 | AEH-SCC06-10A-BD Schneider Electric | ecatalogue/ http://www.ops-ecat.schneider-electric.com/ecatalogue/ |

Table 7. Physical Properties of Solar Lanterns

| Company | Usage | Wattage [W] | Battery Type | Battery Capacity (mAh) | Weight [g] | Source |
|---------------------------------------|---|-------------|--------------|------------------------|------------|---|
| Pico PV Lamp Niwa Uno 50 | Lighting | 0,5 | LiFePO4 | 400 | 280 | Phaesun C. 2016/2017 |
| Pico PV Lamp Niwa Multi 300 XL | Lighting + USB Charging | 3 | LiFePO4 | 3000 | 1170 | Phaesun C. 2016/2017 |
| Modular Solar System Niwa Home 200 X2 | Lighting + USB Charging | 5 | LiFePO4 | 3000 | 3250 | Phaesun C. 2016/2017 |
| JouLite Kits 1 | Lighting + USB Charging | 1,8 | | 2250 | 550 | Phaesun C. 2016/2017 |
| JouLite Kits 2 | Lighting (2Lamps) + USB Charging | 1,8 | | 2250 | 650 | Phaesun C. 2016/2017 |
| T-lite 180 1 Lightkit | Lighting (1 Lamp) | 3 | LiCoO2 | 4500 | 1700 | Phaesun C. 2016/2017 |
| T-lite 180 2 Lightkit | Lighting (2 Lamp) | 6 | LiCoO2 | 4500 | 2600 | Phaesun C. 2016/2017 |
| T-lite 180 3 Lightkit | Lighting (3 Lamp) | 9 | LiCoO2 | 4500 | 3600 | Phaesun C. 2016/2017 |
| T-lite 180 4 Lightkit | Lighting (4 Lamp) | 12 | LiCoO2 | 4500 | 4700 | Phaesun C. 2016/2017 |
| 1 Ulitium Kits | Lighting (1 Lamp) + USB Charging | 3 | LiCoO2 | 4500 | 1700 | Phaesun C. 2016/2017 |
| 2 Ulitium Kits | Lighting (2 Lamp) + USB Charging | 6 | LiCoO2 | 4500 | 2600 | Phaesun C. 2016/2017 |
| 3 Ulitium Kits | Lighting (3 Lamp) + USB Charging | 9 | LiCoO2 | 4500 | 3600 | Phaesun C. 2016/2017 |
| 4 Ulitium Kits | Lighting (4 Lamp) + USB Charging | 12 | LiCoO2 | 4500 | 4700 | Phaesun C. 2016/2017 |
| WakaWaka Base 10 | Lighting (2 Lamps + 1 Light Torch) + USB Charging | 10 | LiPo | 10000 | 1880 | https://za.waka-waka.com/store/catalogue/wakawaka-base-10_31/ |

| Company | Usage | Wattage [W] | Battery Type | Battery Capacity (mAh) | Weight [g] | Source |
|------------------|----------------------------------|-------------|--------------|------------------------|------------|---|
| WakaWaka Light | Lighting (1 Lamp + USB Charging) | 0,75 | NiMh | 800 | 130 | https://waka-waka.com/store/catalogue/wakawaka-light_15/ |
| Fosera PSHS 2800 | 4 Loads + USB | 1,5 | LiFePO4 | 2800 | 390 | http://www.fosera.com/downloads/data-sheets.html |
| Fosera PSHS 4200 | 4 Loads + USB | 2,5 | LiFePO4 | 4200 | 410 | http://www.fosera.com/downloads/data-sheets.html |
| Fosera PSHS 7000 | 4 Loads + USB | 6 | LiFePO4 | 7200 | 500 | http://www.fosera.com/downloads/data-sheets.html |

Table 8. Solar Lanterns and Pico Solar Systems

| Liters | Voltage [V] | Weight [kg] | Article | Source |
|--------|-------------|-------------|------------------------------------|---|
| 14 | 12/24 | 11,5 | Engel Portable cooling box MD14-F | Phaesun C. 2016/2017 |
| 15 | 12/24 | 16 | Engel Portable cooling box MT17-F | Phaesun C. 2016/2017 |
| 21 | 12/24 | 17 | Engel Portable cooling box MT27-F | Phaesun C. 2016/2017 |
| 25 | 12/24 | 13 | Wemo E25 | http://www.wemo.ch/download/catalogEng.pdf |
| 26 | 12/24 | 18 | WEMO 200 | http://www.wemo.ch/download/catalogEng.pdf |
| 32 | 12/24 | 21 | Engel Portable cooling box MT35-F | Phaesun C. 2016/2017 |
| 32 | 12/24 | 21 | Engel Portable cooling box MT35-FS | Phaesun C. 2016/2017 |
| 40 | 12/24 | 24 | Engel Portable cooling box MT45-F | Phaesun C. 2016/2017 |
| 40 | 12/24 | 24 | Engel Portable cooling box MT45-FS | Phaesun C. 2016/2017 |
| 40 | 12/24 | 22 | Engel Portable cooling box MR040 | Phaesun C. 2016/2017 |
| 41 | 12/24 | 22,5 | WEMO 26 | http://www.wemo.ch/download/catalogEng.pdf |
| 42 | 12/24 | 14,9 | WEMO 42 | http://www.wemo.ch/download/catalogEng.pdf |
| 45 | 12/24 | 16,7 | Wemo E45 | http://www.wemo.ch/download/catalogEng.pdf |

| Liters | Voltage [V] | Weight [kg] | Article | Source |
|--------|-------------------|-------------|------------------------------------|---|
| 48 | 12 (DC) and AC | 13,2 | Solageo TWB-BCH-48ACDC | http://www.solageo.com/ProductResourceFiles/BUABZWQRGPXQ.pdf |
| 50 | 12/24 | 17 | Frigor FHK 50 12-24 V | http://order.phaesun.com/index.php/loads-40891/refrigeratorandfreezerboxes-40910/frigorfridgesandfreezers-46779/refrigerator-frigor-fhk-50-12-24v.html |
| 50 | 10-31 | 34 | Sundanzer DCR50 | http://www.sundanzer.com/app/uploads/2016/03/SunDanzer-Main.pdf |
| 50 | 12/24 | 34 | Onergy ONCool | GIZ DC Appliances Catalog |
| 50 | 12 | 17,8 | Solageo TWB-BC-50 | http://www.solageo.com/ProductResourceFiles/XVWPVEQQXSJT.pdf |
| 51 | 12/24 | 18 | WEMO 51 | http://www.wemo.ch/download/catalogEng.pdf |
| 60 | 12/24 | 31 | Engel Portable cooling box MD60-FC | Phaesun C. 2016/2017 |
| 60 | 12/24 | 28 | WEMO 60 GTA | http://www.wemo.ch/download/catalogEng.pdf |
| 60 | 12/24 | 18,9 | WEMO 66 | http://www.wemo.ch/download/catalogEng.pdf |
| 62 | 12/24 | 18 | WEMO 62 | http://www.wemo.ch/download/catalogEng.pdf |
| 73 | 12/24 | 34 | WEMO WL 73 P | http://www.wemo.ch/download/catalogEng.pdf |
| 75 | 12/24 | 21,8 | WEMO 76 | http://www.wemo.ch/download/catalogEng.pdf |
| 80 | 12/24 (DC) and AC | 29 | Engel Fridge CK-100 | https://solarkontor.de/Engel-Kuehlbox-CK-100-Kompressor-Kuehlschrank [xxx] |
| 90 | 12/24 | 26 | WEMO 85 | http://www.wemo.ch/download/catalogEng.pdf |
| 96 | 12/24 | 26 | WEMO 96 | http://www.wemo.ch/download/catalogEng.pdf |
| 99 | 12/24 | 25,5 | WEMO WL 91 | http://www.wemo.ch/download/catalogEng.pdf |
| 103 | 12/24 | 30 | Frigor FHC 85 12-24V | http://order.phaesun.com/index.php/refrigerator-frigor-fhc-85-12-24v.html |
| 133 | 12/24 | 26 | WEMO 106 | http://www.wemo.ch/download/catalogEng.pdf |
| 134 | 12/24 | 28,3 | WEMO WL 152 | http://www.wemo.ch/download/catalogEng.pdf |
| 143 | 12/24 | 36 | WEMO WL 160 | http://www.wemo.ch/download/catalogEng.pdf |

| Liters | Voltage [V] | Weight [kg] | Article | Source |
|--------|-------------|-------------|--|---|
| 165 | 12/24 | 51 | Phocos FR165R/F | http://www.phocos.com/wp-content/uploads/Product/Information/Library/Datasheet_FR_ENG.pdf |
| 165 | 10-31 | 54,4 | Sundanzer DCR165 | http://www.sundanzer.com/app/uploads/2016/03/SunDanzer-Main.pdf |
| 165 | 12/24 | 59 | Onergy ONCool | GIZ DC Appliances Catalog |
| 166 | 12/24 | 47 | Steca Solar Refrigerator/Freezer PF166 | Phaesun C. 2016/2017 |
| 212 | 12/24 | 17 | Frigor FHK 142 12-24 V | http://order.phaesun.com/index.php/refrigerator-frigor-fhc-142-12-24v.html |
| 225 | 12/24 | 59 | Phocos FR225R/F | http://www.phocos.com/wp-content/uploads/Product/Information/Library/Datasheet_FR_ENG.pdf |
| 225 | 10-31 | 63,5 | Sundazner DCR225 | http://www.sundanzer.com/app/uploads/2016/03/SunDanzer-Main.pdf |
| 240 | 12/24 | 62 | Steca Solar Refrigerator/Freezer PF240 | Phaesun C. 2016/2017 |
| 317 | 12/24 | 53 | WEMO WL270 | http://www.wemo.ch/download/catalogEng.pdf |

Table 9. Physical Properties of Off-Grid Solar Fans

| Article | Watt age [W] | Volt age [V] | Weight [kg] | Type | Source |
|---------------------------|--------------|--------------|-------------|----------|---|
| Phaesun Cool Breeze 12 RC | 3 - 18 | 12 | 3 | Ceiling | Phaesun C. 2016/2017 |
| Phaesun Cool Breeze 24 | 19 | 24 | 4,65 | Ceiling | Phaesun C. 2016/2017 |
| Phaesun Cool Breeze RC 24 | 19 | 24 | 4,65 | Ceiling | Phaesun C. 2016/2017 |
| Phaesun Table Fast Breeze | 2,7 - 10,4 | 12 | 2,1 | Table | Phaesun C. 2016/2017 |
| Fosera Ceiling Fan 40 | 4 | 12 - 14 | 0,374 | Ceiling | http://www.fosera.com/products/power-line/applications.html [accessed 06.12.2016] |
| Sundaya Ceiling Fan500 | 5,5 | 12 - 18 | 0,2 | Ceiling | http://sundaya.com/files/Sundaya_JouleBox_datasheets_July2016.pdf |
| Fosera Ceiling Fan 50 | 4 | 13 | 0,41 | Ceiling | http://www.fosera.com/downloads/data-sheets.html |
| Fan Onergy | 15 | 12 | 5,5 | Standing | GIZ DC Product Catalog |

| Article | Watt age [W] | Volt age [V] | Weight [kg] | Type | Source |
|-------------------------------|--------------------|--------------------|-------------|----------|---|
| Pedestal Fan | | | | | |
| BBOX 12" FAN | 10 | 12 | 2 | Standing | http://buenpower.com/pdf/ventilador.pdf |
| OmniVoltaic 16in Stand Fan | 10 | 12 | 4,5 | Standing | http://www.omnivoltaic.com/wp-content/uploads/2014/03/spsf-16_datasheet.pdf |

Table 10 Physical properties of off-grid solar DC TVs

| Type | Wattage [W] | Size [in] | Voltage [V] | Weight [kg] | Article | source |
|-------------|----------------|--------------|-------------|----------------|--|---|
| LED | 16 | 15 | 12 | 3,1 | alphatronics | Phaesun C. 2014/2015 |
| LED | 19 | 19 | 12 | 3,1 | Mobisol | company information |
| LED | 24 | 24 | 12 | 4,2 | Mobisol | company information |
| LED | 6 | 15,6 | 12 | 2,21 | Fosera | Data Sheet Product |
| LED | 8 | 15,6 | 12 | 1,5 | Niwa Solar ELED TV Niwa 15,6" | Phaesun C. 2016/2017 |
| LED | 19 | 19 | 12/24 | 3,7 | alphatronics R-19eWDSB | Phaesun C. 2014/2015 catalog |
| LED | 23 | 22 | 12/24 | 4,2 | alphatronics R-22eWDSB | Phaesun C. 2014/2015 catalog |
| LED | 26 | 24 | 12/24 | 5 | alphatronics R-24eWDSB | Phaesun C. 2014/2015 |
| LCD- TFT | 12 | 14 | 12 | 2,64 | Omnivoltaic ovCamp™ 12V DC TV 14in | http://www.omnivoltaic.com/wp-content/uploads/2014/03/SPM-14_datasheet.pdf |
| LCD- TFT | 10 | 19 | 12 | 3,4 | Omnivoltaic ovCamp™ 12V DC TV 19in | http://www.omnivoltaic.com/wp-content/uploads/2014/03/SPM-19_datasheet.pdf |
| LED | 8 | 15,6 | 12 | 2,2 | Solargeo TWB-TVE1603A | http://www.solageo.com/ProductResourceFiles/PXASRJSFSZUC.pdf |
| LED | 30 | 18,6 | 12 | 3,4 | Solargeo TWB-TVE1801A | http://www.solageo.com/ProductResourceFiles/VJDOESVNHKNS.pdf |
| LED | 35 | 24 | 12 | 4,8 | Solargeo TWB-TVE2315A | http://www.solageo.com/ProductResourceFiles/XNYBVSXFUSIN.pdf |
| LED | 10 | 15,6 | 12 DC . | 1,7 | MAKS Solar LED Television | http://www.maksgroupbd.com/temp/MS40MjI3OTA3NDE1OUUrMTM_3D/MS40MjI3OTA3NDE1OUUrMTM_3D.pdf |
| LCD- TFT | 12 | 14 | 12 | 2,64 | OmniVoltaic 14,1" Solar TV | http://www.omnivoltaic.com/wp-content/uploads/2014/03/SPM-14_datasheet.pdf |

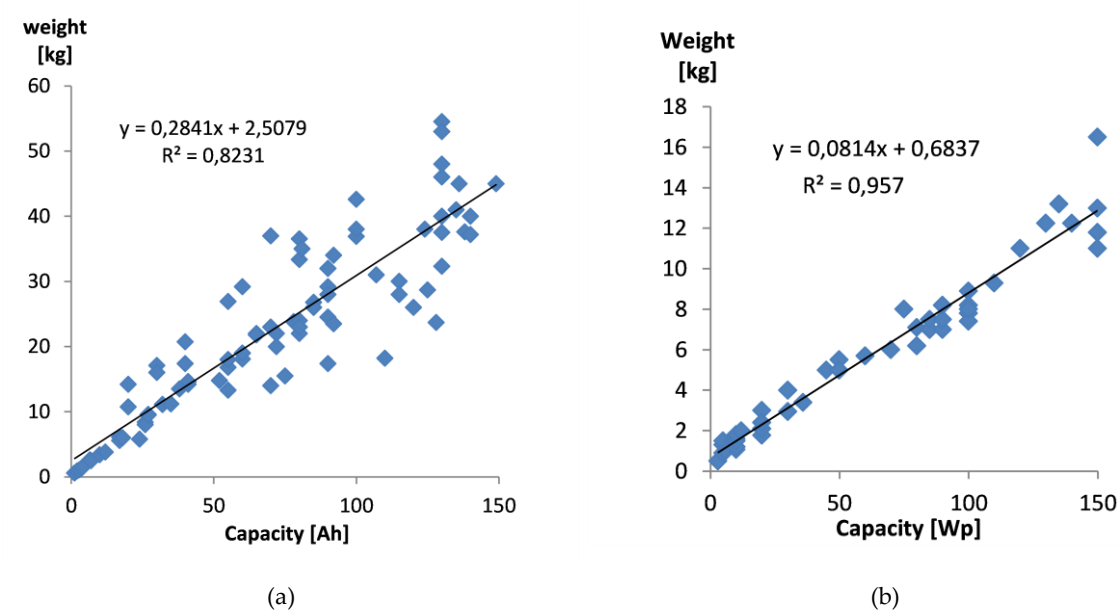
| Type | Wattage [W] | Size [in] | Voltage [V] | Weight [kg] | Article | source |
|---------|-------------|-----------|-------------|-------------|----------------------------|---|
| LCD-TFT | 10 | 18,5 | 12 | 3,4 | OmniVoltaic 19 " Solar TV | heet.pdf http://www.omnivoltaic.com/wp-content/uploads/2014/03/SPM-19_datasheet.pdf |
| LED | 13 | 16 | 12 | 3,5 | Barfoot Power 16" Solar TV | http://www.amazon.in/Barefoot-Power-12V-Digital-Player/dp/B01LQCP5K0 |

Table 11 Physical properties of cables for off-grid solar products

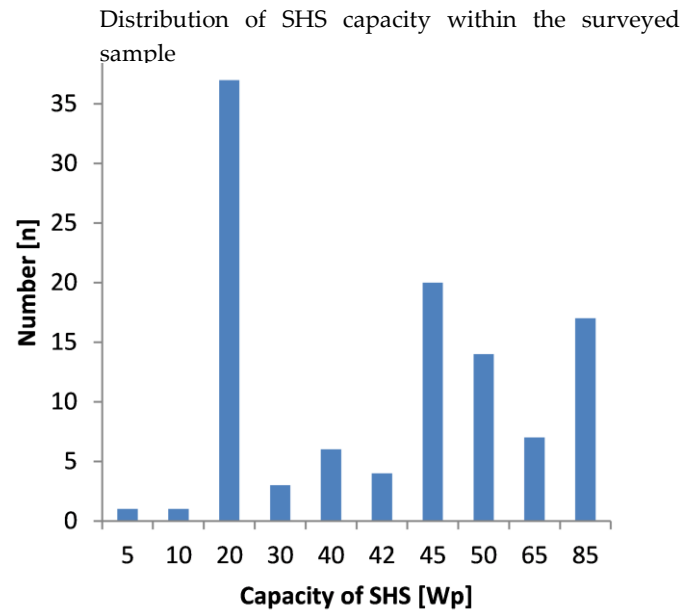
| Product | Length | Weight | Source |
|---|--------|--------|----------------------|
| Phaesun Load Cable Extension /5 Solar Side | 5 | 0.18 | Phaesun C. 2016/2017 |
| Phaesun Load Cable /0,4 Solar Side | 0,4 | 0.01 | Phaesun C. 2016/2017 |
| Phaesun Load Cable Extension /3 Solar Side | 3 | 0.12 | Phaesun C. 2016/2017 |
| Phaesun Load Cable E27 /5 Solar Side | 5 | 0.19 | Phaesun C. 2016/2017 |
| Phaesun Load Cable E27 /9 Solar Side | 9 | 0.43 | Phaesun C. 2016/2017 |
| Phaesun Load Cable Illu /5 Solar Side | 5 | 0.22 | Phaesun C. 2016/2017 |
| Phaesun Load Cable E27 /3 Solar Side | 3 | 0.15 | Phaesun C. 2016/2017 |
| Phaesun Load Cable Extension /1,3 Solar Side | 1.3 | 0.08 | Phaesun C. 2016/2017 |
| Load Cable Illu /5 | 5 | 0.21 | Phaesun C. 2016/2017 |
| Load Cable 3X /3 Solar Side | 3 | 0.14 | Phaesun C. 2016/2017 |
| Extension Cable Phaesun High Drive 3M 1X | 3 | 0.06 | Phaesun C. 2016/2017 |
| DC Cable 360 Cm Sundaya With Bayonet Plug | 3.6 | 0.1 | Phaesun C. 2016/2017 |
| DC Cable 120 Cm Sundaya With Bayonet Plug | 1.2 | 0.05 | Phaesun C. 2016/2017 |
| DC Cable 240 Cm Sundaya With Bayonet Plug | 2.4 | 0.1 | Phaesun C. 2016/2017 |
| DC Cable 480 Cm Sundaya With Bayonet Plug | 4.8 | 0.15 | Phaesun C. 2016/2017 |
| DC Cable 600 Cm Sundaya With Bayonet Plug | 6 | 0.20 | Phaesun C. 2016/2017 |
| Cable Drop Light Fitting E27 12 VDC | 0.7 | 0.1 | Phaesun C. 2016/2017 |
| Battery Cable With 20A Fuse No Clamp, With Ring Terminal M8 | 1.5 | 0.4 | Phaesun C. 2016/2017 |
| Battery Cable 1.5m 16 mm ² incl. Battery Terminal Clamps +/- | 1,5 | 1.1 | Phaesun C. 2016/2017 |
| Battery Cable 1,5 M 25 Mm ² | 1.5 | 1.2 | Phaesun C. 2016/2017 |
| Battery Cable With 15A Fuse No Clamp, With Ring Terminal M8 | 1.5 | 0.35 | Phaesun C. 2016/2017 |

5. S5: Linear Regression of the weight of pv-panels and lead-acid batteries over capacity

S5. Linear regression of weight of Lead-Acid batteries used for solar off-grid products based on market review data; (b) Linear Regression of weight of PV panels used for solar off-grid products based on market review data.



6. S6: Distribution of SHS capacity within the surveyed sample



7. S7: Modelling assumptions and used literature values.

For grid connected households almost exclusively literature values from the Global E-Waste Monitor were used. For households with Solar Home Systems, several assumptions had to be taken.

| Type of EEE | chosen value [kg] | Source | Assumption |
|--|-------------------|-------------|--|
| Lighting point | 0.1 | GEM | To the extent of the knowledge of the author, there are only light bulbs, light tubes and no combination of bulb and shading in use |
| Mobile Phone | 0.1 | GEM | Regular mobile phone |
| Phone Charger | 0.13 | GEM | Regular mobile phone charger |
| BW TV | 8.0 | * | Black and White TVs were almost exclusively found in SHS households. They used to be 20 W CRT-TVs. Newer SHS will exclusively be distributed with LED color TVs. It is hard to assess small CRT TVs, as they are not sold in high numbers. One product was found at Amazon India http://www.amazon.in/Bipl-14-CRT-TV-Conventional/dp/B01L8N22US/ref=sr_1_1?ie=UTF8&qid=1492754135&sr=8-1&keywords=crt+tv+14+inch |
| Color TV | 21.35 | GEM | The ratio between CRT TVs and LCD/LED TVs was assumed to be 1:1. Any added new TV will be an LCD/LED TV. |
| Electric Fan | 2.7 | S3 Table 8 | It was assumed, that all fans in rural Bangladesh follow the properties of off-grid fans. |
| Computer | 9.4 | GEM | The Value from the Global E-Waste Monitor was chosen |
| Refrigerator | 54.1 | GEM | " |
| Rice Cooker | 2.6 | GEM | " |
| Iron | 0.8 | GEM | " |
| Sound box | 2.1 | GEM | " |
| Battery Cable | 1 | S3 Table 10 | The average weight of the battery cable was assumed to be 1 kg |
| TV HH _{SHS+G} | | Assumption | Based on the results for HH _G and HH _{SHS} it was assumed, that the black and white TV are powered by a SHS and the color TVs by the grid. |
| Appliance cable | 0.13 | S3 Table 10 | The average weight of the cables was calculated to be 0.13 kg. Every appliance found in a HH was assumed to be connected with one cable |
| Households without primary access to electricity HH ₀ | 0 | Assumption | Based on the possession data for HH _G and HH _{SHS} , it can be assumed, that HH ₀ do not possess any EEE in significant numbers. |

8. S8: Statistical Distribution of the in-use stocks by different clusters

Table 12. Statistical distribution of the in-use stocks clustered by Tier Status using the Supply Simple 2015 algorithm

| Supply Simple 2015 | n | min | Quartile (1/4) | Median | Quartile (3/4) | max |
|--------------------|-----|-----|----------------|--------|----------------|-------|
| Tier 0 | 57 | 0.1 | 0.1 | 0.1 | 0.1 | 3.4 |
| Tier 1 | 23 | 0.3 | 1.4 | 3.4 | 6.8 | 11.9 |
| Tier 2 | 134 | 0.1 | 0.9 | 3.6 | 9.4 | 149.6 |
| Tier 3 | 17 | 0.1 | 0.1 | 5.0 | 28.8 | 182.1 |
| Tier 4 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Tier 5 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 13 Statistical distribution of the in-use stocks clustered by Tier Status using appliance ownership algorithm

| Appliance | n | min | Quartile (1/4) | Median | Quartile (3/4) | max |
|-----------|----|-----|----------------|--------|----------------|-------|
| NA | 63 | 0.0 | 0.1 | 0.1 | 0.1 | 22.3 |
| Tier 0,5 | 69 | 0.3 | 0.6 | 0.8 | 1.1 | 22.0 |
| Tier 2 | 86 | 3.2 | 3.7 | 4.6 | 12.0 | 182.1 |
| Tier 3 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Tier 4 | 13 | 3.3 | 4.7 | 76.0 | 86.6 | 95.6 |
| Tier 5 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 14 Statistical distribution of the in-use stocks clustered by income quintile

| Income Quintile | n | min | Quartile (1/4) | Median | Quartile (3/4) | max |
|-----------------|----|-----|----------------|--------|----------------|-------|
| NA | 6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| <0,2 | 51 | 0.1 | 0.1 | 0.3 | 3.4 | 182.1 |
| <0,4 | 67 | 0.1 | 0.1 | 0.8 | 4.1 | 57.4 |
| <0,6 | 18 | 0.1 | 0.1 | 0.8 | 3.9 | 16.7 |
| <0,8 | 53 | 0.1 | 0.7 | 3.4 | 9.5 | 89.0 |
| <1 | 36 | 0.1 | 1.4 | 4.1 | 20.2 | 95.6 |

9. S9: Questionnaire of the Access to electricity survey

INTRODUCTION AND GENERAL INFORMATION

"Hello, my name is _____. We are conducting a survey on behalf of the United International University. This survey is part of a study aimed to measure the access to electricity in Bangladesh. We would like to ask you few questions which will take about 20min. All the answers that you provide will be kept anonymous—only members of the survey team will have access to this information. You can stop the interview at any time, ask me to clarify any question, or ask me to repeat something if you don't understand. Your cooperation is greatly appreciated."

HOUSEHOLD IDENTIFICATION

| | CODE | NAME | |
|---------------------------------|---|----------------------|--|
| 1. REGION ¹ | <input type="text"/> <input type="text"/> | _____ | GPS COORDINATES OF THE DWELLING: |
| 2. UPOZILLA ² | <input type="text"/> <input type="text"/> | _____ | |
| 3. VILLAGE | <input type="text"/> <input type="text"/> | _____ | |
| 4. WARD # | <input type="text"/> <input type="text"/> | | |
| 5. UNION PARISHAD | _____ | | |
| LOCALITY | URBAN....1 RURAL....2 PERI- URBAN....3 | <input type="text"/> | [][] ° [][] . [][][] 'N |
| 7. NAME OF HOUSEHOLD HEAD: | _____ | | 9. |
| 8. HOUSEHOLD HEAD PHONE NUMBER: | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | 10. LONGITUDE (E) [][] ° [][] . [][][] 'E |
| Special notes: | | | |

¹ MA = Manikgnaj; BH = Bhola; LA = Lalmonirhath

² RA= Razibpur; TE = Tepra; JH = Jhitka | MO = Monpura; DU = Dularhat Charfashion; TA = Tajumuddin | HA = Hatibandha; KA = Kaliganj Lamonirhat; PA = Patgram

Multi-tier Framework Questionnaire: Bangladesh

INTERVIEW DETAILS

11. ENUMERATOR ID:

| | |
|--|--|
| | |
|--|--|

12. ENUMERATOR
NAME:

| |
|--|
| |
|--|

13. DATE OF INTERVIEW
[DD/MM/YY]

| | | | | | | | |
|--|--|---|--|--|---|--|--|
| | | / | | | / | | |
|--|--|---|--|--|---|--|--|

14. TIME INTERVIEW
STARTED:

| | |
|--|---|
| | : |
|--|---|

15. TIME INTERVIEW
ENDED:

| | |
|--|---|
| | : |
|--|---|

Multi-tier Framework Questionnaire: Bangladesh

MODULE 0: CHARACTERISTICS OF HOUSEHOLD MEMBERS

| 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|-----|--|---|----------------------------|---|---|--|--|--|
| | Please state the names of people who currently live in the household, starting with the head of the household. | Is [NAME] a male or female? 1. MALE 2. FEMALE | How old is [NAME]? (YEARS) | What is the highest level/grade of school that [NAME] has attended? [for age 3 and above only] (ENTER 0 FOR NO SCHOOLING) 1 NURSERY 2 PRIMARY 3 POST-PRIMARY 4 SECONDARY 5 HIGHER SEC. 6 UNDERGRAD 7 POSTGRAD | What is [NAME]'s current main occupation? (FOR MEMBERS AGES 16-65) 1 FARMER 2 TRANSPORT 3 FISHERMAN/FISHMONGER 4 SKILLED TRADE (CARPENTRY, MASONRY, WEAVER, ELECTRICIAN, REPAIR WORK) 5 BARBER, TAILOR, LAUNDRY 6 HAWKER 7 DOMESTIC HELP 8 UNEMPLOYED 9 HOMES BUSINESS 10 STUDENT 11 NRB 12 OTHER (SPECIFY) | What is [NAME]'s current main employment status 1 WAGE EMPLOYMENT (not including casual day labor) 2 NON-FARM SELF EMPLOYMENT (EMPLOYER) 3 NON-FARM SELF EMPLOYMENT (OWN-ACCOUNT WORKER) 4 NON-FARM SELF-EMPLOYMENT (UNPAID FAMILY WORKER) 5 FAMILY FARMING 6 CASUAL DAY LABORER 7 UNPAID INTERNSHIP 8 NOT ENGAGED IN ECONOMIC ACTIVITY 9 OTHER (SPECIFY) | What is [NAME] average monthly income? | Is [NAME] a business owner or self-employed/ freelancer in the area? |
| | | | Year | Level | | | Amount in Tk. per month | yes/ no |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Multi-tier Framework Questionnaire: Bangladesh

MODULE A: ACCESS TO ELECTRICITY SUPPLY

| SOURCE & CAPACITY | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|--|--|--|----------|----------|----------|---------|----------|----------|---------|------------|--|--|--|--|--|--|--------------|--|--|--|--|--|--|
| A. 01 | What is the primary source of electricity in the household? <i>If answer is 4-5-6 please ask the number of devices in the household</i> | <input type="checkbox"/> 1. National grid connection from [name of utility] → A.02 <input type="checkbox"/> 2. Local mini-grid (Specify source) → A.02 <hr/> <input type="checkbox"/> 3. Fossil fuel based generator → A.02 <input type="checkbox"/> 4. Solar home system → A.13 4a How many? (.....) <input type="checkbox"/> 5. Solar lantern → A.13 5a How many? (.....) | <input type="checkbox"/> 6. Rechargeable battery system (e.g. car battery) → A.02 6a How many? (.....) <input type="checkbox"/> 7. Dry cell battery (Non-rechargeable) → AB.01 <input type="checkbox"/> 8. No electricity → AB.01 <input type="checkbox"/> 9. Other (specify): _____ | | | | | | | | | | | | | | | | | | | | | |
| A. 02 | (Question based on observation: Read the value from the nameplate of the electricity supply equipment or ask for the equipment documentation) | <input type="checkbox"/> 1. Less than 1 Watt <input type="checkbox"/> 2. 1 Watt – 50 Watts <input type="checkbox"/> 3. 51 Watts – 500 Watts | <input type="checkbox"/> 4. 501 Watts – 2000 Watts <input type="checkbox"/> 5. More than 2000 Watts <input type="checkbox"/> 99. No documentation | | | | | | | | | | | | | | | | | | | | | |
| SEASONALITY | | | | | | | | | | | | | | | | | | | | | | | | |
| A. 03 | In the last 3 months, did the number of outages of your primary source of electricity vary across seasons? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → A.06 [ask all questions based on the last 3 months] | | | | | | | | | | | | | | | | | | | | | | |
| A. 04 | If yes, which is the most difficult season for electricity performance in your household? Please respond to following questions considering the worst season of the year [ask all next questions based on the worst season] | <input type="checkbox"/> 1. Season 1 (month specification) <input type="checkbox"/> 2. Season 2 (month specification) | <input type="checkbox"/> 3. Season 3 (month specification) <input type="checkbox"/> 4. Season 4 (month specification) | | | | | | | | | | | | | | | | | | | | | |
| QUALITY OF SUPPLY | | | | | | | | | | | | | | | | | | | | | | | | |
| A. 05 | [During the worst season/in the last 3 months] Have any appliances been damaged by electricity supply? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | | | | | | | | | | | | | | | | | | | | | | |
| DURATION OF SUPPLY | | | | | | | | | | | | | | | | | | | | | | | | |
| A. 06 | [During the worst season/in the last 3 months] On average, how many hours of electricity do you receive from your primary source each day (per 24 hours)? | <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[hours] (max 24 hours)</div> </div> | | | | | | | | | | | | | | | | | | | | | | |
| A. 07 | [During the worst season/in the last 3 months] On average, how many hours of electricity do you receive in the evening, from 6 pm to 10 pm from your primary source each day? | <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[hours] (max 4 hours)</div> </div> <p>(check consistency: number of hours cannot be higher than A.07)</p> | | | | | | | | | | | | | | | | | | | | | | |
| RELIABILITY OF SUPPLY | | | | | | | | | | | | | | | | | | | | | | | | |
| A. 08 | [During the worst season/in the last 3 months] On average, how many times do you face unpredictable interruptions of your primary source of electricity per week? (Note: unscheduled interruptions are unanticipated disruption when the user would expected the supply to be available) | <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[number of interruptions per week]</div> </div> <p>[insert 00 if none]</p> | | | | | | | | | | | | | | | | | | | | | | |
| A. 09 | [During the worst season/in the last 3 months] On average, how long is each unpredictable interruption of your primary source of electricity? | <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[hours]</div> <div style="margin: 0 10px;">[hours]</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[minutes]</div> </div> | | | | | | | | | | | | | | | | | | | | | | |
| A.10 | At what time of the day do these interruptions normally occur? | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>6am-10am</th> <th>10am-2pm</th> <th>2pm-6pm</th> <th>6pm-10pm</th> <th>10pm-2am</th> <th>2am-6am</th> </tr> </thead> <tbody> <tr> <td>schedule d</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>unschedu led</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table> | | | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm-2am | 2am-6am | schedule d | | | | | | | unschedu led | | | | | | |
| | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm-2am | 2am-6am | | | | | | | | | | | | | | | | | | |
| schedule d | | | | | | | | | | | | | | | | | | | | | | | | |
| unschedu led | | | | | | | | | | | | | | | | | | | | | | | | |
| AFFORDABILITY | | | | | | | | | | | | | | | | | | | | | | | | |
| A. 11 | Does your household have a meter for the primary source of electricity? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | | | | | | | | | | | | | | | | | | | | | | |
| A. 12 | In the last 3 months, how much did you spend for your primary source of electricity on average per month? | <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[Tk.]</div> </div> | | | | | | | | | | | | | | | | | | | | | | |
| A. 13 | What is the price you currently pay: | <p><i>If Question A.01 is 1. Grid connection or 2. Local mini-grid</i></p> <div style="display: flex; align-items: center;"> <input type="checkbox"/> by Kwh <div style="margin-left: 10px;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[Tk.]</div> </div> <div style="margin-left: 10px;"> </div> <div style="margin-left: 10px;"> <input type="checkbox"/> fixed charged <div style="margin-left: 10px;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div>[Tk.]</div> </div> </div> </div> | | | | | | | | | | | | | | | | | | | | | | |

Multi-tier Framework Questionnaire: Bangladesh

| | | | |
|------------------------|--|---|--|
| | | <p><i>If Question A.01 is 3. Fossil fuel based generator</i></p> <p> <input type="checkbox"/> by litre of fuel [Tk.] <input type="checkbox"/> fixed charged [Tk.] </p> | |
| | | <p><i>If Question A.01 is 6. Rechargeable battery system</i></p> <p> <input type="checkbox"/> to recharge the battery one time [currency] </p> | |
| | | <p><i>If Question A.01 is 4. Solar home system 5. Solar lantern</i></p> <p> <input type="checkbox"/> monthly instalment for the electricity supply equipment [Tk.] </p> | |
| LEGALITY OF CONNECTION | | | |
| A. 14 | Who do you currently pay for your primary source of electricity? | <input type="checkbox"/> 1. Local representative/official of the electricity company <input type="checkbox"/> 2. Pre-paid meter card seller <input type="checkbox"/> 3. Community /village/ municipality <input type="checkbox"/> 4. Relative <input type="checkbox"/> 5. Neighbour | <input type="checkbox"/> 6. Land lord <input type="checkbox"/> 7. No one <input type="checkbox"/> 8. No need to pay –I have already paid for the equipment <input type="checkbox"/> 9. PO <input type="checkbox"/> 10. Others (specify): _____ |

Multi-tier Framework Questionnaire: Bangladesh

| ADDITIONAL QUESTIONS | | |
|----------------------|--|---|
| A.15 | Overall, are you satisfied with the primary source of electricity in your household? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No |
| A.16 | Does your primary source of electricity cover all your needs? | <input type="checkbox"/> 1. Yes → B.01 <input type="checkbox"/> 2. No |
| A.17 | If not, which of the following aspects of the primary source of electricity would you like to improve? [Rank according to priority from 1- 7] | <input type="checkbox"/> Longer supply hours <input type="checkbox"/> More appliances I can use <input type="checkbox"/> Lower cost <input type="checkbox"/> More flexible payment <input type="checkbox"/> Address low voltage issues and voltage fluctuations <input type="checkbox"/> Reducing number of unpredictable interruptions <input type="checkbox"/> Reducing duration of unpredictable interruptions |
| A.18 | What do you use when you face problems with your electricity supply? (only if grid) | <input type="checkbox"/> 1. Invertors <input type="checkbox"/> 2. Voltage stabilizer <input type="checkbox"/> 3. Generators <input type="checkbox"/> 4. Battery and storage devices <input type="checkbox"/> 5. Others (specify): _____ |
| A.19 | Would you like to change your primary source of electricity? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No |
| A.20 | If so, which source would be your main preference? | <input type="checkbox"/> 1. National grid connection <input type="checkbox"/> 2. Local mini-grid (Specify source) _____ <input type="checkbox"/> 3. Fossil fuel based generator <input type="checkbox"/> 4. Solar home system <input type="checkbox"/> 5. Solar lantern <input type="checkbox"/> 6. Other: _____ |

Multi-tier Framework Questionnaire: Bangladesh

MODULE B: ACCESS TO ELECTRICITY SERVICES

| B.1 | When do you most use these appliances? [Please mark with a cross, compare A03 for appliances in use] | <table border="1"> <thead> <tr> <th></th><th>Appliance</th><th>Quantity</th><th>Hours of operation per day</th><th>6am-10am</th><th>10am-2pm</th><th>2pm-6pm</th><th>6pm-10pm</th><th>10pm -2am</th><th>2am-6am</th></tr> </thead> <tbody> <tr><td>A</td><td>Incandescent Light Bulbs</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>B</td><td>Fluorescent Tube</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>C</td><td>CFL</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>D</td><td>LED</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>E</td><td>Radio</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>F</td><td>Phone charger</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>G</td><td>Black and white TV</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>H</td><td>Colour TV</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>I</td><td>Electric Fan</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>J</td><td>Computer</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>K</td><td>Printer</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>L</td><td>Air Cooler</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>M</td><td>Electric Food Processor</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>N</td><td>Rice Cooker</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>O</td><td>Washing Machine</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P</td><td>Water Pump</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Q</td><td>Refrigerator</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>R</td><td>Electric Iron</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>S</td><td>Electric Hair Dryer</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>T</td><td>Microwave Oven</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>U</td><td>Electric Toaster</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>V</td><td>Water Heater</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>W</td><td>Air Conditioner</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td>Electric Space Heater</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Y</td><td>Electric cooking system</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Z.1</td><td>Dish Washer</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Z.2</td><td>OTHER</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Z.3</td><td>...</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> | | | | | | | | | | | Appliance | Quantity | Hours of operation per day | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm -2am | 2am-6am | A | Incandescent Light Bulbs | | | | | | | | | B | Fluorescent Tube | | | | | | | | | C | CFL | | | | | | | | | D | LED | | | | | | | | | E | Radio | | | | | | | | | F | Phone charger | | | | | | | | | G | Black and white TV | | | | | | | | | H | Colour TV | | | | | | | | | I | Electric Fan | | | | | | | | | J | Computer | | | | | | | | | K | Printer | | | | | | | | | L | Air Cooler | | | | | | | | | M | Electric Food Processor | | | | | | | | | N | Rice Cooker | | | | | | | | | O | Washing Machine | | | | | | | | | P | Water Pump | | | | | | | | | Q | Refrigerator | | | | | | | | | R | Electric Iron | | | | | | | | | S | Electric Hair Dryer | | | | | | | | | T | Microwave Oven | | | | | | | | | U | Electric Toaster | | | | | | | | | V | Water Heater | | | | | | | | | W | Air Conditioner | | | | | | | | | X | Electric Space Heater | | | | | | | | | Y | Electric cooking system | | | | | | | | | Z.1 | Dish Washer | | | | | | | | | Z.2 | OTHER | | | | | | | | | Z.3 | ... | | | | | | | | |
|-----|--|---|----------------------------|----------|----------|---------|----------|-----------|---------|--|-----------|---|--------------------------|----------|----------------------------|----------|----------|---------|----------|-----------|---------|---|--------------------------|--|--|--|--|--|--|--|--|---|------------------|--|--|--|--|--|--|--|--|---|-----|--|--|--|--|--|--|--|--|---|-----|--|--|--|--|--|--|--|--|---|-------|--|--|--|--|--|--|--|--|---|---------------|--|--|--|--|--|--|--|--|---|--------------------|--|--|--|--|--|--|--|--|---|-----------|--|--|--|--|--|--|--|--|---|--------------|--|--|--|--|--|--|--|--|---|----------|--|--|--|--|--|--|--|--|---|---------|--|--|--|--|--|--|--|--|---|------------|--|--|--|--|--|--|--|--|---|-------------------------|--|--|--|--|--|--|--|--|---|-------------|--|--|--|--|--|--|--|--|---|-----------------|--|--|--|--|--|--|--|--|---|------------|--|--|--|--|--|--|--|--|---|--------------|--|--|--|--|--|--|--|--|---|---------------|--|--|--|--|--|--|--|--|---|---------------------|--|--|--|--|--|--|--|--|---|----------------|--|--|--|--|--|--|--|--|---|------------------|--|--|--|--|--|--|--|--|---|--------------|--|--|--|--|--|--|--|--|---|-----------------|--|--|--|--|--|--|--|--|---|-----------------------|--|--|--|--|--|--|--|--|---|-------------------------|--|--|--|--|--|--|--|--|-----|-------------|--|--|--|--|--|--|--|--|-----|-------|--|--|--|--|--|--|--|--|-----|-----|--|--|--|--|--|--|--|--|
| | Appliance | Quantity | Hours of operation per day | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm -2am | 2am-6am | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Incandescent Light Bulbs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Fluorescent Tube | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | CFL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | LED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | Radio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F | Phone charger | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G | Black and white TV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | Colour TV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I | Electric Fan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| J | Computer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | Printer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | Air Cooler | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M | Electric Food Processor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | Rice Cooker | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| O | Washing Machine | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | Water Pump | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q | Refrigerator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | Electric Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S | Electric Hair Dryer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | Microwave Oven | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | Electric Toaster | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V | Water Heater | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | Air Conditioner | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | Electric Space Heater | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Y | Electric cooking system | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z.1 | Dish Washer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z.2 | OTHER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z.3 | ... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B.2 | Do you use your appliances always at those times the most? | <input type="checkbox"/> Yes, always <input type="checkbox"/> No, only during the week, specify: _____ <input type="checkbox"/> No, depends on the season: specify: _____ <input type="checkbox"/> Other: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B.3 | In the last 3 months, has any appliance caused tripping OR have you been advised not to use any appliance with your primary source of electricity? | <table border="1"> <thead> <tr> <th></th><th>Appliance</th></tr> </thead> <tbody> <tr><td>A</td><td>Incandescent Light Bulbs</td></tr> <tr><td>B</td><td>Fluorescent Tube</td></tr> <tr><td>C</td><td>CFL</td></tr> <tr><td>D</td><td>LED</td></tr> <tr><td>E</td><td>Radio</td></tr> </tbody> </table> | | | | | | | | | Appliance | A | Incandescent Light Bulbs | B | Fluorescent Tube | C | CFL | D | LED | E | Radio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Appliance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Incandescent Light Bulbs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Fluorescent Tube | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | CFL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | LED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | Radio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Multi-tier Framework Questionnaire: Bangladesh

| | | | | |
|--|--|-----|-------------------------|--|
| | | F | Phone charger | |
| | | G | Black and white TV | |
| | | H | Colour TV | |
| | | I | Electric Fan | |
| | | J | Computer | |
| | | K | Printer | |
| | | L | Air Cooler | |
| | | M | Electric Food Processor | |
| | | N | Rice Cooker | |
| | | O | Washing Machine | |
| | | P | Water Pump | |
| | | Q | Refrigerator | |
| | | R | Electric Iron | |
| | | S | Electric Hair Dryer | |
| | | T | Microwave Oven | |
| | | U | Electric Toaster | |
| | | V | Water Heater | |
| | | W | Air Conditioner | |
| | | X | Electric Space Heater | |
| | | Y | Electric cooking system | |
| | | Z.1 | Dish Washer | |
| | | Z.2 | OTHER | |
| | | Z.3 | ... | |
| | | | | |

MODULE AB: SOURCES OF LIGHTING USED WITHIN THE HOUSEHOLD

(All households should respond)

| ENERGY SOURCES FOR LIGHTING | | | | | |
|--|---|---|--|--|---|
| | AB | AB.01 | AB.02 | AB.03 | AB.04 |
| Type of lighting source | Does the household use this energy source for lighting? | How many lamps/bulbs do you use? [number] | What is the frequency of use? | On average, how much do you spend per month for each lighting fuel? [currency] | On average, what quantity of fuel to do use each month? |
| a. Candle | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> candles |
| b. Kerosene lamp | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> liters |
| c. Diesel/gasoline lamp | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> liters |
| d. LPG lamp | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> cylinders |
| e. Biogas lamp | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| f. Dry-cell battery torch | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> batteries |
| g. Rechargeable battery (e.g. car battery) | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> recharges |
| h. solar lantern | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| i. solar home system | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| j. mini-grid | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | | |
| k. national grid | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | | |
| l. Others (specify) _____ | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> Every day or almost <input type="checkbox"/> Few times per week <input type="checkbox"/> Few times per month <input type="checkbox"/> Few times per year | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> [unit] |

Multi-tier Framework Questionnaire: Bangladesh

MODULE AC: SOLAR BASED LIGHTING SYSTEMS

Only households that have responded yes to **AB.01.h** (solar lantern) and **AB.01.i** (solar home system); please ask for the installment plan/ documentation

| QUALITY OF SUPPLY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|---|---|---------|----------|-----------|---------|--|--|----------|----------|---------|----------|-----------|---------|-------|--|--|--|--|--|--|-----|--|--|--|--|--|--|----|--|--|--|--|--|--|--------|--|--|--|--|--|--|
| AC. 01 | How many solar systems or devices do you currently use in the household? | <input type="text"/> <input type="text"/> [number] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PRIMARY SYSTEM (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.02a | In this device, are the solar panel and the storage battery together or separate (connected by a wire)? | <input type="checkbox"/> 1. Together, in a single casing <input type="checkbox"/> 2. Separate, connected by a wire <input type="checkbox"/> 3. There is no storage battery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 03a | In this device, are the battery and the bulb together or separate? | <input type="checkbox"/> 1. At least one light bulb is separated from the battery by a wire <input type="checkbox"/> 2. Light bulbs are together with the battery <input type="checkbox"/> 3. This system or device does not power any lights <input type="checkbox"/> 4. There is no storage battery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.04a | In this device, how many light bulbs do you have? | <input type="checkbox"/> 1. One light bulb <input type="checkbox"/> 2. Two light bulbs (that can be separated from each other) <input type="checkbox"/> 3. Three (that can be separated from each other) <input type="checkbox"/> 4. Four (that can be separated from each other) <input type="checkbox"/> 5. Five or more light bulbs (that can be separated from each other) <input type="checkbox"/> 6. Zero – this system or device does not power lights | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 05a | What type of light bulbs do you use? | <input type="checkbox"/> 1. LED <input type="checkbox"/> 2. CFL <input type="checkbox"/> 3. Incandescent <input type="checkbox"/> 4. Other (Specify) _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.06a | What is the size of the solar module [centimetres] | <input type="text"/> <input type="text"/> <input type="text"/> x <input type="text"/> <input type="text"/> <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 07a | What is the power rating of the solar module? [watts peak] | <input type="text"/> <input type="text"/> <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.08a | Please identify the device using the photos provided Name: PO | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 09a | How long do you expect this system to last before it needs repair or replacement? | <input type="text"/> <input type="text"/> months | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 10a | On average how many hours do you use this system for lighting each day? | <input type="text"/> <input type="text"/> hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.10b | At what times do you use the system most? | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>6am-10am</th> <th>10am-2pm</th> <th>2pm-6pm</th> <th>6pm-10pm</th> <th>10pm -2am</th> <th>2am-6am</th> </tr> </thead> <tbody> <tr> <td>Light</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Fan</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>TV</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Mobile</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table> | | | | | | | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm -2am | 2am-6am | Light | | | | | | | Fan | | | | | | | TV | | | | | | | Mobile | | | | | | |
| | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm -2am | 2am-6am | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Light | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Multi-tier Framework Questionnaire: Bangladesh

| | | Radio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--|--|---------|----------|-----------|--|--|--|--|--|----------|----------|---------|----------|-----------|-------|--|--|--|--|--|-----|--|--|--|--|--|----|--|--|--|--|--|--------|--|--|--|--|--|-------|--|--|--|--|--|-----|--|--|--|--|--|------|--|--|--|--|--|
| | | ... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 11a | How many people can use this device / system at the same time without moving the lamp around for task lighting (e.g. for reading or for cutting vegetables)? / Can all people use it | <input type="checkbox"/> <input type="checkbox"/> yes/ no | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 12a | Are you able to power mobile phones or other loads with this device? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SECONDARY SYSTEM (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.02b | In this device, are the solar panel and the storage battery together or separate (connected by a wire)? | <input type="checkbox"/> 1. Together, in a single casing <input type="checkbox"/> 2. Separate, connected by a wire <input type="checkbox"/> 3. There is no storage battery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 03b | In this device, are the battery and the bulb together or separate? | <input type="checkbox"/> 1. At least one light bulb is separated from the battery by a wire <input type="checkbox"/> 2. Light bulbs are together with the battery <input type="checkbox"/> 3. This system or device does not power any lights <input type="checkbox"/> 4. There is no storage battery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.04b | In this device, how many light bulbs do you have? | <input type="checkbox"/> 1. One light bulb <input type="checkbox"/> 2. Two light bulbs (that can be separated from each other) <input type="checkbox"/> 3. Three or more light bulbs (that can be separated from each other) <input type="checkbox"/> 4. Zero – this system or device does not power lights | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 05b | What type of light bulbs do you use? | <input type="checkbox"/> 1. LED <input type="checkbox"/> 2. CFL <input type="checkbox"/> 3. Incandescent <input type="checkbox"/> 4. Other (Specify) _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.06b | What is the size of the solar module [centimetres] | <input type="text"/> x <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 07b | What is the power rating of the solar module? [watts peak] | <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.08b | Please name the brand of the system | ----- <input type="checkbox"/> Not identifiable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 09b | How long do you expect this system to last before it needs repair or replacement? | <input type="text"/> <input type="text"/> months | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC. 10c | How many hours do you use this system for lighting each day? | <input type="text"/> <input type="text"/> hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC.10d | At what times do you use the system most? | <table border="1"> <thead> <tr> <th></th><th>6am-10am</th><th>10am-2pm</th><th>2pm-6pm</th><th>6pm-10pm</th><th>10pm -2am</th></tr> </thead> <tbody> <tr><td>Light</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Fan</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>TV</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Mobile</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Radio</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>...</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>....</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> | | | | | | | | | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm -2am | Light | | | | | | Fan | | | | | | TV | | | | | | Mobile | | | | | | Radio | | | | | | ... | | | | | | | | | | | |
| | 6am-10am | 10am-2pm | 2pm-6pm | 6pm-10pm | 10pm -2am | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Light | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Multi-tier Framework Questionnaire: Bangladesh

| | | |
|---------|--|---|
| AC. 11b | How many people can use this device / system at the same time without moving the lamp around for task lighting (e.g. for reading or for cutting vegetables)? | <input type="text"/> <input type="text"/> |
| AC. 12b | Are you able to power mobile phones or other loads? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No |

Questions for all respondents

| | | |
|--------|---|---|
| AC. 13 | Are you able to recharge mobile phones within 500m from your house? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No |
| AC. 14 | How many times per month do you recharge mobile phones outside the household? | <input type="text"/> <input type="text"/> |
| AC. 15 | How much does a recharge cost? | <input type="text"/> <input type="text"/> {Tk.} |

Questions for RSF customers only

| | | |
|--------|---|--|
| AC. 16 | How many times have you faced a technical problem with the system within in the last 3months? | <input type="text"/> <input type="text"/> times |
| AC. 17 | If yes, how long did it take until RSF people were there to fix? | <input type="text"/> <input type="text"/> days |
| AC. 18 | Did they manage to f ix the problem? | <input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No. What happened? ----- |
| AC.19 | How often do you receive visits from RSF staff per month? | <input type="text"/> <input type="text"/> times |
| AC.20 | Are these visits only for collection or also for fixing? | <input type="checkbox"/> 1. Yes, only for collection <input type="checkbox"/> 2. No, also for fixing, how many in the last three months? <input type="text"/> times |
| AC.21 | Did you miss any payments in the last three month? | <input type="checkbox"/> 1. Yes, why? ----- <input type="checkbox"/> 2. No |

Multi-tier Framework Questionnaire: Bangladesh

| | | |
|-------|--|---|
| AC.22 | What is your level of satisfaction of the system? (1 being very low; 6 being very high) | <div>1 2 3 4 5 6</div> <div><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></div> |
| AC.23 | What is your level of satisfaction of the service? (1 being very low; 6 being very high) | <div>1 2 3 4 5 6</div> <div><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></div> |
| AC.24 | Is there anything you would like to change in the current payment model? | <div><input type="checkbox"/> 1. Yes, what? -----</div> <div><input type="checkbox"/> 2. No</div> |
| AC.25 | Is there anything you would like to change in the current service model? | <div><input type="checkbox"/> 1. Yes, what? -----</div> <div><input type="checkbox"/> 2. No</div> |
| AC.26 | When was the system installed? | <div>d d m m y y</div> <div><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></div> |

Multi-tier Framework Questionnaire: Bangladesh

MODULE D: PRODUCTIVE USE OF ENERGY

NOTE: Please select members of household who replies YES to question 0.9

Only business owners and self-employed/freelancers working within the targeted area will be considered.

| D.01 | D.02 | D.03 | D.04 | D.05 | D.06 | D.07 |
|------|---|---|--|--|---|---------------------------------|
| CODE | Who in the household manages a business or an enterprise? LIST UP TO 2 FROM HOUSEHOLD ROSTER (roster HH code 0.2) | What is the nature of the business activity that you own? 1. FARMER (SPECIFY CROPS) 2. LIVESTOCK/POULTRY 3. FISHERY 4. TRANSPORT/DRIVER 5. CONSTRUCTION 6. HOUSE REPAIR /CARPENTRY 7. MECHANIC 8. DOMESTIC HELP/ MAID 9. TAILORING/SEWING 10. POTTERY 11. BLACKSMITH 12. TRADE/ RETAIL SHOP (SPECIFY) 13. PHYSICIAN/ HEALER 14. HAIRDRESSER/BARBER 15. OTHERS/ SPECIFY | Where do you operate this [ENTERPRISE]? READ RESPONSES 1. HOME (INSIDE RESIDENCE) 2. HOME (OUTSIDE RESIDENCE) 3. INDUSTRIAL SITE 4. TRADITIONAL MARKET PLACE 5. COMMERCIAL AREA SHOP 6. ROADSIDE 7. OTHER FIXED PLACE 8. MOBILE | Do you run this business alone or you have partners? READ RESPONSES 1. ALONE/ no partner 2. ONE PARTNER –shared profit 3. TWO PARTNERS- shared profits 4. OTHER (SPECIFY) | On average, how long is your working day? | How many employees do you have? |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |

Multi-tier Framework Questionnaire: Bangladesh

| | | Lighting* | ICT & Entertainment* | Motive power* | Cooling | Product heating* | Water heating* | |
|---------------|---|---|---|---|---|---|---|---|
| Relevance | 8. Please indicate which of the following application you consider strictly necessary to enable you to undertake your productive activity? | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | |
| | 9. Would the lack of this application significantly make your business suffer in one of the following aspects: | 1. Productivity 2. Sales 3. Costs 4. Quality | 1. Productivity 2. Sales 3. Costs 4. Quality | 1. Productivity 2. Sales 3. Costs 4. Quality | 1. Productivity 2. Sales 3. Costs 4. Quality | 1. Productivity 2. Sales 3. Costs 4. Quality | 1. Productivity 2. Sales 3. Costs 4. Quality | |
| Applications | 10. Please indicate if you regularly use each of the following applications in your productive activity? ³ | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | |
| | 10a. For those you do use regularly, at what time do you use them most? | 10am-2pm <input type="checkbox"/> | 2pm-6pm <input type="checkbox"/> | 6pm-10pm <input type="checkbox"/> | 10pm-2am <input type="checkbox"/> | 2am-6am <input type="checkbox"/> | 6am-10am <input type="checkbox"/> | |
| | 11. If you indicated an application that you consider strictly necessary for your productive activity but which you do not use regularly, (7 is Yes and to 9 is No), please indicate which is the most important reason why you do not use the application. (Select from Code A) | | | | | | | |
| Energy Source | 12. What is the primary energy source being used for this application? (Select from code B) | | | | | | | |
| | 13. <u>If non-BLEN⁴ fuel</u> : Is your primary equipment of fuel combustion (e.g. stove) for this application? | 1. Self-made 2. Manufactured | 1. Self-made 2. Manufactured | 1. Self-made 2. Manufactured | 1. Self-made 2. Manufactured | 1. Self-made 2. Manufactured | 1. Self-made 2. Manufactured | |
| | 14. <u>If non-BLEN fuel</u> : Do you use a smoke extraction device? (e.g. chimney, hood) | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | |
| Seasonality | 15. In the last 3 months, does the availability of your primary source of electricity vary across seasons? | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | |
| | 16. If yes, which is the most difficult season for electricity supply in your household? Please respond to all the next questions considering the worst season of the year | I. Monsoon II. Non-Monsoon | | | | | | |
| Capacity | Report the capacity of the system in WATT : read the value from the name plate of the electricity supply equipment. If not available read question 16. | | _____ W or _____ Wh | _____ W or _____ Wh | _____ W or _____ Wh | _____ W or _____ Wh | _____ W or _____ Wh | |
| | Electricity | 17. What is the capacity (in watts or watt hours ⁵) of your primary source of electricity for this application? | _____ W or _____ Wh | _____ W or _____ Wh | _____ W or _____ Wh | _____ W or _____ Wh | _____ W or _____ Wh | _____ W or _____ Wh |
| | | 18. Which of the following electrical appliances (see Code D) do you run with the primary energy source? | | | | | | |
| | Electricity or RM&T or A&H | 19. Does the capacity of the primary energy source cover your needs for this application? | 1. Totally ⁶ 2. Largely ⁷ 3. Partially ⁸ 4. No or little ⁹ | 1. Totally 2. Largely 3. Partially 4. No or little | 1. Totally 2. Largely 3. Partially 4. No or little | 1. Totally 2. Largely 3. Partially 4. No or little | 1. Totally 2. Largely 3. Partially 4. No or little | 1. Totally 2. Largely 3. Partially 4. No or little |

³ If answer is NO only ask question 8 and then the questionnaire is over for this application.

⁴ Non-BLEN refers to kerosene, biomass, biofuels, diesel, gasoline and other petroleum products (BLEN stands for Biogas, LPG, Electricity and Natural Gas)

⁵ For grid, mini-grid and fuel-based electricity generators (fossil fuel, biofuels, biogas), capacity is measured in watts. For all other off-grid systems, capacity is measured in watt hours.

⁶ Totally means 100% of the needs are covered

⁷ Largely means between 75% and 100% of the needs are covered

⁸ Partially means between 25% and 75% of the needs are covered

Multi-tier Framework Questionnaire: Bangladesh

| | | | | | | | | |
|---------------------------|----------------------------------|--|--|--|---|---|---|---|
| Duration/ Availability | Electricity or RM&T or A&H | 20. [During the worst season/in the last 3 months] , out t of the average number of hours you are working each day, how many hours is the primary energy source available for running the following application (should you decide to use it)? | <input type="text"/> <input type="text"/> [hours] | <input type="text"/> <input type="text"/> [hours] | <input type="text"/> <input type="text"/> [hours] | <input type="text"/> <input type="text"/> [hours] | <input type="text"/> <input type="text"/> [hours] | <input type="text"/> <input type="text"/> [hours] |
| | Fuel | 21. [During the worst season/in the last 3 months] What percentage of you needs are you able to cover with the average quantity of fuel available for running the following application? To be rephrased? | 1. <25% 2. 25%-50% 3. 50%-75% 4. 75%-100% 5. 100%+ ¹⁰ | 1. <25% 2. 25%-50% 3. 50%-75% 4. 75%-100% 5. 100%+ | 1. <25% 2. 25%-50% 3. 50%-75% 4. 75%-100% 5. 100%+ | 1. <25% 2. 25%-50% 3. 50%-75% 4. 75%-100% 5. 100%+ | 1. <25% 2. 25%-50% 3. 50%-75% 4. 75%-100% 5. 100%+ | 1. <25% 2. 25%-50% 3. 50%-75% 4. 75%-100% 5. 100%+ |
| | | 22. [During the worst season/in the last 3 months] On average, how many times do you face unpredictable interruptions of your primary source of electricity per week? (Add a definition of interruption) | <input type="text"/> <input type="text"/> interruptions | <input type="text"/> <input type="text"/> interruptions | <input type="text"/> <input type="text"/> interruptions | <input type="text"/> <input type="text"/> interruptions | <input type="text"/> <input type="text"/> interruptions | <input type="text"/> <input type="text"/> interruptions |
| | | 23. [During the worst season/in the last 3 months] On average, how long is each unpredictable interruption of your primary source of electricity? | <input type="text"/> <input type="text"/> [hours] <input type="text"/> <input type="text"/> [minutes] | <input type="text"/> <input type="text"/> [hours] <input type="text"/> <input type="text"/> [minutes] | <input type="text"/> <input type="text"/> [hours] <input type="text"/> <input type="text"/> [minutes] | <input type="text"/> <input type="text"/> [hours] <input type="text"/> <input type="text"/> [minutes] | <input type="text"/> <input type="text"/> [hours] <input type="text"/> <input type="text"/> [minutes] | <input type="text"/> <input type="text"/> [hours] <input type="text"/> <input type="text"/> [minutes] |
| | | 24. How do unscheduled interruptions to energy access for this application impact your business operations ¹¹ ? | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely |
| Quality | Electricity | 25. [During the worst season/in the last 3 months] have you experienced situations in which appliances cannot be used or may get damaged because of low voltage or voltage fluctuations from the primary source? | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No |
| | Fuel | 26. [During the worst season/in the last 3 months] did you face problems of adulteration or fluctuating calorific value of the fuel resulting in poor combustion ¹² or slower RPM? Simplify language | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No |
| | RME or A&H | 27. [During the worst season/in the last 3 months] did you face problems of low or fluctuating RPM (e.g. due to variable wind speed or water flow) or speed? Simplify language | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No |
| | RTE | 28. [During the worst season/in the last 3 months] did you face problems of low or fluctuating heat or temperature? In each attribute? Needs explanation | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No |
| | | 29. How does inadequate quality of energy supply impact your business operations or to what extent has it damaged any equipment for each of the applications you use ¹³ ? | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely | 1. A little or not 2. Moderately 3. Severely |

⁹ No or little means that less than 25% of the needs are covered

¹⁰ 100% of the needs are covered and there are no constraints in extending operating hours

¹¹ The definition of the impact level (little or not; moderately; severely) is left to the respondent's perception within the context of his/her business and experience.

¹² Poor combustion may be the result of wet biomass, or adulterated fuel, resulting in weak flame, excessive black smoke, etc.

¹³ The definition of the impact level (little or not; moderately; severely) is left to the respondent's perception within the context of his/her business and experience.

Multi-tier Framework Questionnaire: Bangladesh

| | | | | | | | | |
|--------------------------|---|--|--|--|--|--|--|--|
| Health and Safety | 30. [During the worst season/in the last 3 months] has your primary energy source for this application caused any health issue (i.e. Electrocuting; smoke/fumes; Burns; Fire; Injuries etc. | | 1. Yes 2. No → D.32 | 1. Yes 2. No → D.32 | 1. Yes 2. No → D.32 | 1. Yes 2. No → D.32 | 1. Yes 2. No → D.32 | 1. Yes 2. No → D.32 |
| | 31. IF YES, what level of damage has caused? | | 1. Severe damage ¹⁴ 2. Moderate damage ¹⁵ 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage |
| | 32. Does your primary energy source for this application likely to cause any health issue (i.e. Electrocuting; smoke/fumes; Burns; Fire; Injuries etc. | | 1. Yes 2. No → D.34 | 1. Yes 2. No → D.34 | 1. Yes 2. No → D.34 | 1. Yes 2. No → D.34 | 1. Yes 2. No → D.34 | 1. Yes 2. No → D.34 |
| | 33. IF YES, what level of damage is likely to cause? | | 1. Severe damage ¹⁶ 2. Moderate damage ¹⁷ 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage | 1. Severe damage 2. Moderate damage 3. No or little damage |
| Legality | Electricity | 34. Who do you pay for your primary electricity supply? (Select from code C) | | | | | | |
| | | 35. Does your household have a meter for the primary source of electricity? | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No |
| Affordability | Electricity | a. If metered connection (grid or mini-grid): [During the worst season/in the last 3 months] what is the price per kWh that you pay? | _____ Tk. | | | | | |
| | | b. [This price excludes any fixed fees, connection fees, etc.] | | | | | | |
| | | c. If flat rate ¹⁸ (grid, mini-grid or solar stand-alone system): [During the worst season/in the last 3 months] what is the monthly flat rate that you pay in the last 3 months? | _____ Tk. | | | | | |
| | | d. If rechargeable battery ¹⁹ : [During the worst season/in the last 3 months] how much does it cost to recharge one of your batteries each time? | _____ Tk. | | | | | |
| | | e. If fuel based generator ²⁰ : [During the worst season/in the last 3 months] what is the average price per litre or kg or m ³ that you pay for fuel to power your generator in the last 3 months? | _____ Tk. | | | | | |

¹⁴ Severe damage means death or permanent limb/organ failure or incapacity for > 1 week.

¹⁵ Moderate damage means damage (short of death, permanent limb/organ failure or incapacity for > 1 week) which requires medical treatment or time off work or is likely to cause a reduction in lifespan.

¹⁶ Severe damage means death or permanent limb/organ failure or incapacity for > 1 week.

¹⁷ Moderate damage means damage (short of death, permanent limb/organ failure or incapacity for > 1 week) which requires medical treatment or time off work or is likely to cause a reduction in lifespan.

¹⁸ To obtain the price per kWh, the flat rate will be divided by the capacity (information obtained through question 11 or estimated based on information gathered from the mini-grid operator).

¹⁹ To obtain the price per kWh, recharging cost will be divided by the capacity of a rechargeable battery (information obtained through question 11 or estimated).

²⁰ To obtain the price per kWh, the price per litre is multiplied by the number of liters needed by kWh (e.g. for diesel it is estimated at 3 litres/kWh).

Multi-tier Framework Questionnaire: Bangladesh

| | | | | | | | | | |
|--|-----------------------------|--|--|--|---|---|---|---|--|
| | Fuel²¹ | f. [During the worst season/in the last 3 months] What is the average price per litre or kg or m ³ that you pay for fuel to power your equipment? | _____ Tk. | | | | | | |
| | RM&TE or A&H | g. [During the worst season/in the last 3 months] How much do you spend on average per month for running the following application? h. [The price excludes capital and maintenance costs] | _____ Tk. | | | | | | |
| | | 36. [During the worst season/in the last 3 months], how many hours in a week on average do you spend on collecting, producing, purchasing your primary energy source for the following applications? | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□</div> <div>[hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□</div> <div>[hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | |
| | | 37. [During the worst season/in the last 3 months] How many hours in a week on average do you (or any of the members of your productive activity) spend on maintaining (cleaning, oiling, repairing) the primary energy source used for the following application? | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□</div> <div>[hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□</div> <div>[hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | <div style="display: flex; flex-direction: column; align-items: center;"> <div>□□ [hours]</div> <div>□□</div> <div>[minutes]</div> </div> | |
| | | 38. [During the worst season/in the last 3 months] Does spending the time above (question 32 and 33) subtract relevant time to your productive activity and reduce business productivity? | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | 1. Yes 2. No | |
| | | 39. Which alternative energy sources that could significantly reduce the time and/or effort involved? (Select from Code B) | | | | | | | |

*** Application definitions:**

1) Lighting: Use of energy to light working spaces to enable workers to undertake tasks, and for the comfort of customers (particularly in retail and hospitality).

Examples: task lighting, general lighting, security lighting

2) ICT: Use of energy for computing, electronics and other communication and audio-visual purposes

Examples: computing, communications (including phone charging), photography, photocopying, printing and media (radio/TV/sound systems)

3) Motive power: Mechanical uses of energy in which motion (either linear or rotational) is imparted to machinery

Examples: ploughing, harrowing, planting, irrigation, hoeing/weeding, harvesting, logging/felling, digging, lifting, grinding, milling, hulling, sawing, planning, drilling, turning, pumping, throwing (pots), sewing, cutting, spinning, weaving, air circulation, air conditioning, refrigeration, freezing, mechanical printing

4) Space heating: Use of energy to heat interior working spaces for the welfare and comfort of workers and customers

Examples: local space heating and central heating

5) Product heating: Uses of energy for heating as a direct part of the production process

Examples: cooking, baking, firing, drying, distilling, brewing, curing, smoking, forging, smelting, annealing, welding, soldering, ironing, incubating, pasteurizing, dissolving substances, sterilizing.

6) Water heating: Use of energy to heat water for hygienic and cleaning purposes²²

Examples: heating, boiling, steam production (eg for wood bending), evaporation

²¹ Each unit of fuel (litre, kg, m3) will be converted into the equivalent in kWh. The derived unit price per kWh equivalent will be then compared with the grid tariff. Affordability will not be assessed for fuels used for transport.

²² Water heating as a means of achieving space heating is regarded as part of Space Heating

Multi-tier Framework Questionnaire: Bangladesh

| Code A (single answer) | | Code B (single answer) | | Code C (single answer) | | |
|------------------------|-------------------------------------|------------------------|--|--|---|--------------------------------|
| I. | Energy is not available in the area | Electricity | I. IPS II. Solar lantern III. Solar stand-alone system IV. Rechargeable battery V. Electricity generator VI. Mini grid VII. National grid connection from <i>[name of utility]</i> | I. | Local representative/official of the energy company | |
| II. | Energy in not affordable | | Fuel | VIII. Direct use of biomass (fuel wood, charcoal,...) IX. Direct use of biofuels X. Direct use of biogas XI. Direct use of natural gas XII. Direct use of kerosene XIII. Direct use of LPG XIV. Direct use of diesel, gasoline, and other petroleum products (except kerosene & LPG) | II. | Pre-paid meter card seller |
| III. | Appliance is not available | | | | III. | Community/village/municipality |
| IV. | Appliance in not affordable | | | | IV. | Neighbour |
| V. | Load shedding | V. | | | Land lord | |
| VI. | Other (specify) | VII. | | | Fuel purchase to power generator | |
| | | RME | XV. Direct use of wind energy XVI. Direct use of water energy | VI. | | |
| | | RTE | XVII. Direct use of solar energy | VII. | PO | |
| | | A&H | XVIII. Animal power XIX. Human power | VIII. | None | |
| | | | | XX. | No energy sources | IX. |

| Code D (multiple answers) | | | | | |
|--|--|--|---|---|---|
| Lighting | ICT | Motive power | Cooling | Product heating | Water heating |
| a ___ # of fluorescent bulbs b ___ # of halogen (PAR) bulbs c ___ # of incandescent lamps d ___ # of LED bulbs e ___ # of LED streetlights f ___ # of sodium streetlights | ___ Camera charger ___ Cell phone charger ___ DVD player ___ Fax machine ___ Internet router ___ Hand-held computing device ___ Personal computer ___ Photocopier ___ Portable media player ___ Printer (inkjet) ___ Printer (laser) ___ Projector ___ Radio ___ Recording device (industrial) ___ Satellite decoder | ___ Belt sander ___ Cold room ___ Drill (electric hand drill) ___ Drill machine <16mm ___ Drill machine 16-40mm ___ Drill machines 41-50mm ___ Excavator <1,200 kg ___ Excavator >1,200kg ___ Grain mill (<13kg per hour) ___ Grain mill (13-50kg per hour) ___ Grain mill (51-250kg/hour) ___ Grain mill (>250kg/hour) ___ Hand plough/hoe ___ Lathe (metal) ___ Lathe (treadle) ___ Lathe (wood) ___ Milling machine 12-25mm | a ___ Air conditioner (central) b ___ Air conditioner (industrial) ___ Air conditioner (room) ___ Fan (small table fan) ___ Fan (standing fan or ceiling fan) ___ Refrigerator/freezer (500 liters) -----Bought iceblocks | ___ Brewing kettle (2,000 liters) ___ Brewing kettle (200 liters) ___ Cooker, rice (domestic) ___ Cooker, rice (commercial) ___ Cooker (pressure cooker) ___ Cooker (commercial range cooker) ___ Cooker (slow cooker, 3.5 liters) ___ Distillation apparatus (1.5liter/hour) ___ Distillation apparatus (5liter/hour) ___ Electric burner (single) ___ Electric burners (2) ___ Electric burners (4) ___ Fan for grain drying shed ___ Forge (industrial) | ___ Domestic electric shower ___ Steam cleaner (3kg/hour at 4 bar) ___ Steam generator (portable) (2kg/hour) ___ Steam generator (23kg/hour) with 6000 cylinder ___ Water heater (7-30liters) |

Multi-tier Framework Questionnaire: Bangladesh

| | | | | | |
|--|---|---|--|---|--|
| | <input type="checkbox"/> Satellite dish <input type="checkbox"/> Scanner <input type="checkbox"/> Server (quad core) <input type="checkbox"/> Server (system) <input type="checkbox"/> Server room power distribution unit <input type="checkbox"/> Television (black & white) <input type="checkbox"/> Television (color) <input type="checkbox"/> VHS <input type="checkbox"/> Voice recorder | <input type="checkbox"/> Potter's wheel <25kg clay <input type="checkbox"/> Potter's wheel 30-50kg clay <input type="checkbox"/> Power loom <input type="checkbox"/> Saw (chain) <input type="checkbox"/> Saw (circular) <input type="checkbox"/> Saw (rip saw) <input type="checkbox"/> Sewing machine <input type="checkbox"/> Spinning wheels/machines, looms <input type="checkbox"/> Vacuum cleaner <input type="checkbox"/> Washing machine (domestic) <input type="checkbox"/> Water pump <3m ³ /hour over <30m head <input type="checkbox"/> Water pump 3-4m ³ /hour over 30-70m head <input type="checkbox"/> Water pump 5-80m ³ /hour over 30-70m head | | <input type="checkbox"/> Grain dryer >10Te/hour <input type="checkbox"/> Grill <input type="checkbox"/> Hair dryer <input type="checkbox"/> Incubator (25-400 eggs) <input type="checkbox"/> Iron (cloth iron) <input type="checkbox"/> Kettle (domestic, 1,7 liters) <input type="checkbox"/> Metal arc welding (500A) <input type="checkbox"/> Microwave (commercial) <input type="checkbox"/> Microwave (domestic) <input type="checkbox"/> Oven (commercial) <input type="checkbox"/> Oven (domestic) <input type="checkbox"/> Pasteurizer (5,000 liters/hour) <input type="checkbox"/> Pottery kiln 1,300°C (>140 liters) <input type="checkbox"/> Pottery kiln 1,300°C (25-140 liters) <input type="checkbox"/> Soldering iron <input type="checkbox"/> Tea dryer <input type="checkbox"/> Toaster <input type="checkbox"/> Tobacco curing kiln fan <input type="checkbox"/> Wood-drying kiln (46m ³) | |
|--|---|---|--|---|--|