## **Detailed feasibility study survey form – Solar mini-grid**

Version 4, 07 June 2023

**Note to surveyor:** Please take as many photographs as possible, GPS location tagging for each load centre and videos of the project location specific to the sections in the survey below (for example, solar array location, powerhouse, community centres, public places, etc.)



  = take photos = record the GPS point(s) = use measuring tape

|  |  |
| --- | --- |
| **Tools required during the survey** | **Checklist** |
| GPS device |  |
| Measuring Tape *(>50 meters)* |  |
| Mobile phones with camera, calculator, angle meter |  |
| Pen and notebook |  |
| A3 printout of google map/field papers with positions, HH orientation, etc. *(for easy layout of site details)* |  |
| Suitable mobile application to find and record sun path diagrams for 12 months |  |

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| **Documents to be collected from the site** | **Checklist** |
| Land permit for solar array erection |  |
| Land permit for powerhouse location |  |
| Minutes on user committee/local government formation *(if applicable)* |  |

The following section gathers data about the selected site, community, accessibility, and related information which will be helpful in planning and designing the system and operational modality.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Location information** | | | | | | |
| **Project name** |  | | | | | |
| **Tole name** |  | | | | | |
| **Village** |  | | | | | |
| **Ward no.** |  | | | | | |
| **Rural municipality/ municipality** |  | | | | | |
| **District** |  | | | | | |
| **Province** |  | | | | | |
| **How far is the national grid from the site?** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_km | | | | | |
| **Which mobile network works best?** | NTC  Ncell  Others: \_\_\_\_\_\_\_\_\_ | | | | | |
| **Name of the client/s**  *Include names of the main local people who contributed to the information on the survey* | **Phone no.** | | | | | |
| 1. | 1. | | | | | |
| 2. | 2. | | | | | |
| 3. | 3. | | | | | |
| 4. | 4. | | | | | |
| **Geographical coordinates of the site** | Latitude |  | Longitude |  | Elevation |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **General information** | | | | |
| **Study team** | | | | |
| **SN** | **Name** | **Designation** | **Phone no.** | **Signature** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |

|  |  |
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| **User committee/LG sub-committee (user’s group)**  *(Information from user committee & local persons interviewed including municipality/ward chairpersons and elected leaders)* | |
| Is the user committee/user’s group already formed? | Yes  No  If yes, name of the user committee: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Number of members in the committee: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| If no, mention the stage/status of user committee and the anticipated date for completion of the process: |
| Probable ownership of the SMG *(tick all that apply)* | User committee  Cooperative  LG/PG  Private company |
| Probable management of the SMG *(tick all that apply)* | User committee  Cooperative  LG/PG  Private company |

|  |  |  |  |  |  |
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| **Source of project funds (*Estimated*)** | **Contribution (NPR)** | | **Remarks**  ***(If % share is applicable, indicate here)*** | | |
| Subsidy *(mention name of the organization)* |  | |  | | |
| Total household contribution |  | |  | | |
| Total enterprise contribution |  | |  | | |
| PG/LG contribution |  | |  | | |
| Civil society organization or third-party (private sector) contribution |  | |  | | |
| Financial institutions - FIs *(loan/equity)* |  | |  | | |
| **In case of loans from financial institutions (FI)** | | | | | |
| **Name of FI** | **Interest rate per annum** | | **Term period *(years)*** | | |
|  |  | |  | | |
|  |  | |  | | |
| **Loan credit experience** | | | | | |
| Does the community have prior loan/credit experiences from financial institutions? | Yes  No | | | | |
| If yes, for what purposes was the loan taken? | 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | |
| Are there any past records of bad debts in the community? | Yes  NoIf yes, give reason for bad debt: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | |
| **Others** | | | | | |
| How many schools are there in the community? | Higher secondary: | | | | |
| Secondary: | | | | |
| Lower secondary: | | | | |
| Primary: | | | | |
| How many health posts/area health centres/primary health centres are there in the community? |  | | | | |
| Does the school and health post have electricity? | Yes | | | | No |
| If yes, please mention the source of electricity. |  | | | | |
| Are there any internet service providers in the community? | Yes | No | | If yes; name: \_\_\_\_\_\_\_\_\_\_\_\_ | |
| If no; what are options for internet? | |
| Is there any electrical/repair shop nearby? | Yes | No | | If yes, mention the distance from the site: \_\_\_\_\_\_\_\_km | |
| Has any organization provided business sensitization training? | Yes | No | |  | |
| If yes, please mention the name of the organization. |  | | | | |



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| **Site Accessibility** | | | | |
| Name of the road up to the village |  | | | |
| Is the road motorable(from the roadhead to the village/ project site)? | Yes  No If yes, road type:  Asphalt coated  Gravel  Earthen | | | |
| If no, mention the means of access (e.g., walking, two-wheeler only, etc.)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| If access to the site is **NOT** motorable? | Name of the nearest motorable road from the site: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Type of vehicle access: 22ft truck  Tractor  Pickup trucks  Hand-held tractorsDistance from the site to the nearest accessible road: \_\_\_\_\_\_\_\_\_\_\_ kmTime taken to reach the nearest motorable road (From the site): \_\_\_\_ hoursoad type:  Asphalt coated  Gravel  Earthen | | | |
| Indicate the months when the site is accessible/not accessible | January | Accessible Not accessible | July | Accessible Not accessible |
| February | Accessible Not accessible | August | Accessible Not accessible |
| March | Accessible Not accessible | September | Accessible Not accessible |
| April | Accessible Not accessible | October | Accessible Not accessible |
| May | Accessible Not accessible | November | Accessible Not accessible |
| June | Accessible Not accessible | December | Accessible Not accessible |
| If the location is only accessible by airplane, what is the nearest airport? | Name of the airport: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Walking distance from the airport to the site: \_\_\_\_\_\_\_\_\_\_\_kmEstimated time for porter to reach the site: \_\_\_\_\_\_\_\_\_\_\_ hrs | | | |
| Describe directions to the village (for example, landmarks, and key directions). | *(The purpose of collection of this data is to guide anyone who wants to reach the site by enquiring to villagers if communications could not be established)* | | | |

The following section gathers information on the socio-economic factors that will have a great impact on designing the operational modality, and design of the solar mini-grid.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Socio-economic information** | | | | | | | | | | | | | | | |
| **Demographic information** | | | | | | | | | | | | | | | |
| **Number of households** | | | |  | | | | | | | | | | | |
| **Base year population (current)** | | | |  | | | | | | | | | | | |
| **Migration rate per year (±)** | | | |  | | | | | | | | | | | |
| **Seasonal migration (if applicable)** | | | | Specify months \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | | | | | | |
| **Caste/Ethnicity** | | | | **Households** | | | | **Population** | | | | | | | |
| **Dalit** | | | |  | | | |  | | | | | | | |
| **Brahmin/Chhetri/Thakuri** | | | |  | | | |  | | | | | | | |
| **Disadvantage groups/differently-abled people** | | | |  | | | |  | | | | | | | |
| **Single woman/widow** | | | |  | | | |  | | | | | | | |
| ***Household (HH) and population***  ***(Please refer to Annex-I for individual HH surveys, use extra sheets if required)*** | | | | | | | | | | | | | | | |
| **SN** | | **Name of the tole** | | | **Number of HHs** | | **Population** | | | | | | **Remarks** | |
| Male | | | | Female | |
| 1. | |  | | |  | |  | | | |  | |  | |
| 2. | |  | | |  | |  | | | |  | |  | |
| 3. | |  | | |  | |  | | | |  | |  | |
| 4. | |  | | |  | |  | | | |  | |  | |
| 5. | |  | | |  | |  | | | |  | |  | |
| 6. | |  | | |  | |  | | | |  | |  | |
| **Source of income** | | | | | | | | | | | | | | | |
| **SN** | **Income source** | | **Households involved in such activities (in %)** | | | | | | **Average monthly expenditure for lighting purposes per HH** | | | | | | |
| 1. | Agricultural production | |  | | | | | |  | | | | | | |
| 2. | Any unique products | |  | | | | | |  | | | | | | |
| 3. | Jobs/services inside Nepal | |  | | | | | |  | | | | | | |
| 4. | Remittances | |  | | | | | |  | | | | | | |
| 5. | Business/  enterprise | |  | | | | | |  | | | | | | |
| 6. | Other | |  | | | | | |  | | | | | | |
| 7. | Below the poverty line (<NPR 250/day) | |  | | | | | |  | | | | | | |
| **Existing enterprises or businesses**  ***(Use extra sheets if required)*** | | | | | | | | | | | | | | | |
| **SN** | **Name of enterprise/**  **Existing infrastructure status** | | | **Type of products** | | **Annual production capacity** | | | | | | **Current energy source** | **Average yearly income** | | |
| 1. |  | | |  | |  | | | | | |  |  | | |
| 2. |  | | |  | |  | | | | | |  |  | | |
| 3. |  | | |  | |  | | | | | |  |  | | |
| 4. |  | | |  | |  | | | | | |  |  | | |
| 5. |  | | |  | |  | | | | | |  |  | | |
| 6. |  | | |  | |  | | | | | |  |  | | |
| 7. |  | | |  | |  | | | | | |  |  | | |
| 8. |  | | |  | |  | | | | | |  |  | | |
| 9. |  | | |  | |  | | | | | |  |  | | |
| 10. |  | | |  | |  | | | | | |  |  | | |
| **Possible future entrepreneurship/enterprise development after installation of solar mini-grid** | | | | | | | | | | | | | | | |
| **SN** | **Name of enterprise** | | | | **Type of products/**  **services** | | | | | **Annual production/service capacity** | | | | **Remarks**  ***(Capture possibility)*** | |
| 1. |  | | | |  | | | | |  | | | |  | |
| 2. |  | | | |  | | | | |  | | | |  | |
| 3. |  | | | |  | | | | |  | | | |  | |
| 4. |  | | | |  | | | | |  | | | |  | |
| 5. |  | | | |  | | | | |  | | | |  | |
| 6. |  | | | |  | | | | |  | | | |  | |
| 7. |  | | | |  | | | | |  | | | |  | |
| 8. |  | | | |  | | | | |  | | | |  | |
| 9. |  | | | |  | | | | |  | | | |  | |
| 10. |  | | | |  | | | | |  | | | |  | |
| From the enumerator’s perspective, is there potential for future enterprise in the community? | | | | | Yes  No  Reason: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | | | | | |

The following section gathers information on the electricity demand of the community households including enterprises and public places, vital information for designing the type and size of the system.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Electricity demand and current energy source information** | | | | | | |
| **Current source of electricity**  ***(Please also refer to Annex-I for individual HH information, please use extra sheets, if required)*** | | | | | | |
| **SN** | **Type of energy source** | **Nos. of HHs using the energy source** | **Nos. of enterprises using the energy source** | **Nos. of institutions using the energy source** | **Installation year** | **Current status (if not functional, state reasons)** |
| 1. | Small/Solar home systems |  |  |  |  |  |
| 2. | Institutional solar power systems |  |  |  |  |  |
| 3. | Pico-hydro/Peltric set |  |  |  |  |  |
| 4. | Micro/Mini-hydro power |  |  |  |  |  |
| 5. | Kerosene/Petrol/Candles |  |  |  |  |  |
| 6. | Diesel generator |  |  |  |  |  |
| 7. | For other sources, please specify |  |  |  |  |  |
| 8. | Jharo |  |  |  |  |  |
| **Average household electricity demand- TYPE A- High demand case**  ***(Please use extra sheets, if required)*** | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts**  **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | LED lights *(High capacity)* |  |  |  |  |  |
| 2. | LED lights *(Low capacity)* |  |  |  |  |  |
| 3. | Radio |  |  |  |  |  |
| 4. | Mobile charging |  |  |  |  |  |
| 5. | Television |  |  |  |  |  |
| 6. | Direct to home receiver (DTH) |  |  |  |  |  |
| 7. | Desktop computer/Laptop |  |  |  |  |  |
| 8. | Refrigerator |  |  |  |  |  |
| 9. | Water pump |  |  |  |  |  |
| 10. | Fan |  |  |  |  |  |
| 11. | Others |  |  |  |  |  |
| **Total household power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |
| **Average household electricity demand- TYPE B- Low demand case**  ***(Please use extra sheets, if required)*** | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts**  **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | LED lights |  |  |  |  |  |
| 2. | Radio |  |  |  |  |  |
| 3. | Mobile charging |  |  |  |  |  |
| 4. | Television |  |  |  |  |  |
| 5. | Fans |  |  |  |  |  |
| 6. | Others |  |  |  |  |  |
| **Total household power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |
| **School/college power demand**  ***(Please use extra sheets, if required)*** | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts**  **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | LED lights |  |  |  |  |  |
| 2. | Desktop computer/Laptop |  |  |  |  |  |
| 3. | Mobile charging |  |  |  |  |  |
| 4. | Television |  |  |  |  |  |
| 5. | Printers |  |  |  |  |  |
| 6. | Projector |  |  |  |  |  |
| 7. | Water pump |  |  |  |  |  |
| 8. | Others |  |  |  |  |  |
| **Total school power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |
| **Health post/hospital power demand**  ***(Please use extra sheets, if required)*** | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts**  **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | LED Lights |  |  |  |  |  |
| 2. | LED lights for OT room |  |  |  |  |  |
| 3. | Desktop computer/Laptop |  |  |  |  |  |
| 4. | Mobile charging |  |  |  |  |  |
| 5. | Refrigerator/Vaccine fridge |  |  |  |  |  |
| 6. | Printers |  |  |  |  |  |
| 7. | Sterilization unit |  |  |  |  |  |
| 8. | Infant radiant warmer/Heater unit |  |  |  |  |  |
| 9. | Suction pump |  |  |  |  |  |
| 10. | Water pump |  |  |  |  |  |
| 11. | Others |  |  |  |  |  |
| **Total health post power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Municipality power demand*****(Please use extra sheets for each category, if required)*** | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts**  **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | LED Lights |  |  |  |  |  |
| 2. | Desktop computer/Laptop |  |  |  |  |  |
| 3. | Mobile charging |  |  |  |  |  |
| 4. | Printers |  |  |  |  |  |
| 5. | Water pump |  |  |  |  |  |
| 6. | Others |  |  |  |  |  |
| **Total power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |
| **Ward office power demand*****(Please use extra sheets for each category, if required)*** | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts** **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | LED Lights |  |  |  |  |  |
| 2. | Desktop computer/Laptop |  |  |  |  |  |
| 3. | Mobile charging |  |  |  |  |  |
| 4. | Printers |  |  |  |  |  |
| 5. | Water pump |  |  |  |  |  |
| 6. | Others |  |  |  |  |  |
| **Total power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh)** ***[(Sum “E”)/1000]*** |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Police station power demand*****(Please use extra sheets for each category, if required)*** | | | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | | **Estimated power consumption per appliance - watts (B)** | | **Total power - watts** **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | LED Lights |  | |  | |  |  |  |
| 2. | Desktop computer/Laptop |  | |  | |  |  |  |
| 3. | Mobile charging |  | |  | |  |  |  |
| 4. | Walkie talkie |  | |  | |  |  |  |
| 5. | Printers |  | |  | |  |  |  |
| 6. | Water pump |  | |  | |  |  |  |
| 7. | Others |  | |  | |  |  |  |
| **Total power demand (kW) *[(Sum “C”)/1000]*** | | | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |
| **Existing Industry/Enterprise power demand**  ***(Please use extra sheets, if required)*** | | | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | | **Total power - watts**  **(C=A x B)** | | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | Agro-processing |  |  | |  | |  |  |
| 2. | Saw-mill |  |  | |  | |  |  |
| 3. | Mechanical/Grill workshop |  |  | |  | |  |  |
| 4. | Automobile workshop |  |  | |  | |  |  |
| 5. | Tailoring business |  |  | |  | |  |  |
| 6. | Shops |  |  | |  | |  |  |
| 7. | Hotels |  |  | |  | |  |  |
| 8. | Private clinics |  |  | |  | |  |  |
| 9. | Telecom towers |  |  | |  | |  |  |
| 10. | Cold storage |  |  | |  | |  |  |
| 11. | Banks/ FIs |  |  | |  | |  |  |
| 12. | Others |  |  | |  | |  |  |
| **Total power demand (kW) *[(Sum “C”)/1000]*** | | | | |  | | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Other public power demands** ***(Please use extra sheets, if required)*** | | | | | | |
| **SN** | **Appliances** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts**  **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | Streetlights |  |  |  |  |  |
| 2. | Community centres |  |  |  |  |  |
| 3. | Temples/Mosques/  Church/Monastery |  |  |  |  |  |
| 4. | Community water pumps |  |  |  |  |  |
| 5. | Others - 1 |  |  |  |  |  |
| 6. | Others - 2 |  |  |  |  |  |
| **Total power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Cumulative electricity demand from the community** | | | | | | |
| **SN** | **Users** | **Quantity (A)** | **Estimated power consumption per appliance - watts (B)** | **Total power - watts**  **(C=A x B)** | **Average daily use - hours  (D)** | **Total daily energy – watt-hour (E=C x D)** |
| 1. | Households |  |  |  |  |  |
| 2. | School/College |  |  |  |  |  |
| 3. | Health post/Hospital |  |  |  |  |  |
| 4. | Municipality |  |  |  |  |  |
| 5. | Ward office |  |  |  |  |  |
| 6. | Police station |  |  |  |  |  |
| 7. | Existing & future industry/enterprise |  |  |  |  |  |
| 8. | Other public power demand |  |  |  |  |  |
| 9. | Others, if any |  |  |  |  |  |
| **Total power demand (kW) *[(Sum “C”)/1000]*** | | | |  | **Total energy (kWh) *[(Sum “E”)/1000]*** |  |

The following section gathers information to access solar PV potential and assess the location used for designing and installing a solar mini-grid at the given location.

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| --- | --- | --- | --- | --- | --- | --- |
| Assessment for solar mini-grid design | | | | | | |
| **Solar Photovoltaic energy assessment** | | | | | | |
| **Winter (shortest day)** | | | | **Summer (longest day)** | | |
| **Sunrise***(above horizon)* | **Sunset***(above horizon)* | | | **Sunrise***(above horizon)* | | **Sunset***(above horizon)* |
|  |  | | |  | |  |
| Are there any obstacles on the horizon during sunshine hours throughout the year or on seasons? | | Yes | No | | If no, describe the time and hours of shading: | |

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| **Solar array and powerhouse location** | | | | | | | | |
| *Identify the location for solar panel considering the following criteria:*   * *South-facing land with maximum sunlight* * *Free from tall trees, buildings, and hills (no shading)* * *Safe from landslides and floods* * *Near the powerhouse* * *The powerhouse must be chosen in such a way that it lies close to the village/load centres and approximately at the centre of the village (Advocate the community on the benefits and risks of having a powerhouse at one end of the village)* | | | | | | | | |
| **SN** | **Parameters** | **Value** | | | | | | **Remarks** |
| **Solar PV array location** | | | | | | | | |
| 1. | Is the feasible land area available? | Yes | | No | | | |  |
| 2. | Type of land | Private | | Public | | | |  |
| 3. | Total land area available (m2) |  | | | | | |  |
| . | Land-facing direction *(if applicable)* | E | W | | N | S | |  |
| Azimuth angle | \_\_\_\_\_\_\_\_\_\_\_\_0 | | | | | |  |
| . | Commitment letter from landowner permitting use of land for the project | Done | | Not done | | | |  |
| 6. | In the case of lease, land lease agreement tenure? | Yes | | No | | | |  |
| If yes, agreement timeline *(in years)* | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ years | | | | | |  |
| Land lease amount/year | \_\_\_\_\_\_\_\_\_\_\_\_\_\_ NPR/year | | | | | |  |
| 7. | Exact PV array location | Pictures | | | | | |  |
| Taken | | Not taken | | | |  |
| 8. | GPS coordinates of the exact array location | \_\_\_\_\_\_\_\_\_ N | | \_\_\_\_\_\_\_\_\_ E | | | |  |
| . | Free from shading from all directions | Yes | | No | | | |  |
| 10. | Proposed land features | Sloppy area | | | ~Slope\_\_\_\_\_0 | | |  |
| Flat/inclined land  Damp area  Rocky area  Others (Mention) | | | | | |  |
| 11. | Is any noticeable wind blowing observed? Describe, if any mishaps occurred due to extreme wind in the past. | Yes | | | No | | |  |
| Describe location identification marks *(school, temple, pond, public centre, etc.)*, if applicable | |  | | | | | | |
| **Powerhouse location** | | | | | | | | |
| 1. | Distance of powerhouse from the solar array location *(It is mandatory that PH must be located near the PV array location)* | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_meters | | | | |  | |
| 2. | Total area allocated for powerhouse | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m2 | | | | |  | |
| . | Powerhouse location features | Sloppy area | | ~Slope\_\_\_\_\_0 | | |  | |
| Flat land/Inclined  Damp area  Rocky area  Others (Mention) | | | | |  | |
| 4. | Commitment letter from landowner permitting use of land for the project | Done | | Not done | | | |  |
| 5. | In case of a lease, land lease agreement done? | Yes | | No | | | |  |
| If yes, for how many years? | \_\_\_\_\_\_\_\_\_\_\_\_\_ years | | | | | |  |
| Land lease amount/year | \_\_\_\_\_\_\_\_\_\_\_\_\_\_ NPR/year | | | | | |  |
| 6. | Exact powerhouse location | Pictures | | | | | |  |
| Taken | | Not taken | | | |  |
| 7. | GPS coordinates of the proposed powerhouse location | \_\_\_\_\_\_\_\_\_ N | | \_\_\_\_\_\_\_\_\_ E | | | |  |

## A picture containing text, clipart Description automatically generated

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| Power transmission and distribution | | | | |
| **Transmission line details** ***(Use extra sheets, if required)*** | | | | |
| **Load centres** | **Name of load centre** | **Distance**  **(in meters)** | **Nos. of households** | **Average load demand (kW)** |
| PH- L1 |  |  |  |  |
| L2 |  |  |  |  |
| L3 |  |  |  |  |
| L4 |  |  |  |  |
| L5 |  |  |  |  |
| L6 |  |  |  |  |
| L7 |  |  |  |  |

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| **Transmission line measurement*****(Use extra sheets, if required, and rename the waypoints and other inputs as per necessity)******(Use map to draw a SLD for the T&D network at the site)*** | | | | |
| **Waypoints** | **Distance in between waypoints (meters)** | **Transmission line type (11kV, 400V, 230V)** | **Nos. of households** | **Relevant identification marks (if applicable)** |
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| **Other details*****(Use extra sheets, if required)*** | | | | |
| **SN** | **Parameters** | **Value** | | **Remarks** |
| 1. | Total nos. of poles *(Estimated)* | 1-Phase: \_\_\_\_\_\_ | 3-Phase: \_\_\_\_\_\_ |  |
| 2. | Transmission and distribution line length *(Estimated)* | 1-Phase: \_\_\_\_\_\_\_\_\_\_km | 3Phase *(400V/11kV)* \_\_\_\_\_\_\_\_\_\_ km |  |
| 3. | Total transmission and distribution line length | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Meters | |  |
| 4. | Recommended cable type | ACSR  \_\_\_\_\_\_\_\_\_\_ km | ABC  \_\_\_\_\_\_\_\_\_\_ km |  |
| 5. | Proximity to the nearest national grid | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ km | |  |
| 6. | Is there a possibility of NEA grid expansion in the near future? | If yes: \_\_\_\_\_\_\_anticipated month/year | |  |
| 7. | Required number of transformers, If applicable |  | |  |
| 8. | Other identified issues *(if any)* |  | | |

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| --- |
| Sketch the overall project layout including solar array location, powerhouse, transmission line along with load points, enterprise, public places, identification landmarks, rivers, road crossings, etc.  North  *For example*  *Powerhouse*  *HH*  *Solar*  *Temple* |

# Annex-I

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| --- | --- | --- | --- | --- | --- |
| **Focused group discussion and questionnaire** | | | | | |
| **SN** | **Parameters** | **Value** | | | **Remarks** |
| 1. | How can the community/LG contribute? | Cash | Kind | Others |  |
| 2. | Where would be the most suitable location for a powerhouse and solar PV array? | 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| 3. | What kind of enterprise development (local business opportunities) is possible after the installation of the mini-grid? | 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| 4. | Is the community willing and able to pay a certain % of the upfront project cost? (Note down all the perspectives received) |  | | | |
| 5. | Who are other potential financial contributors in the village? (Upfront cost) | PG | LG | Existing enterprise | Others  (mention) |
| If yes, how much can/will they invest/provide? | Up to 20% | >20%  \_\_\_\_\_\_\_ | Other %  \_\_\_\_\_\_\_\_ | Cash \_\_\_\_NPR |
| 6. | Is there a possibility of grid extension in the next 5 years? | Yes | No |  | |
| If yes, note down relevant discussion points |  | | | |
| 7. | Are there any conflicts in the past, between the communities (provide reasons and examples)? |  | | | |
| 8. | Is LG ready to own the system or allocate the budget for O&M, or provide service contract after guarantee period (consult with LG)? | Yes | | No | |
| 9. | Which business model does the community prefer? | User committee | | Cooperative | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Follow-up assessment questionnaire**  *(Only for the enumerator’s response)* | | | | | | |
| **Appraisal of the enabling environment** | | | | | | |
| **Items** | **Excellent** | **Very Good** | **Good** | **Fair** | **Poor** | **Comments** |
| General interest in solar mini-grid |  |  |  |  |  |  |
| Understanding of safety measures |  |  |  |  |  |  |
| Understanding tariff mechanisms and payment |  |  |  |  |  |  |
| Understanding of need for  O&M fund |  |  |  |  |  |  |
| Understanding about PEU possibilities |  |  |  |  |  |  |
| Aptitude for ownership |  |  |  |  |  |  |
| Ease in adaptation of RE technology (prior experience) |  |  |  |  |  |  |
| Low/no conflict in adapting new technology among the community members |  |  |  |  |  |  |
| Favourable social and political conditions |  |  |  |  |  |  |
| Community-driven initiatives seen as prevalent |  |  |  |  |  |  |
| Relevancy of SMG at the proposed site (mention) |  | | | | | |

# Annex- II

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Labour cost** | | | | |
| **SN** | **Types of labour** | **Available at site**  **(Yes/No)** | **Rate (NPR/day)** | **Remarks** |
| 1. | Unskilled |  |  |  |
| 2. | Skilled (Mason) |  |  |  |
| 3. | Solar technician/electrician |  |  |  |
| 4. | People with basic computer skills |  |  |  |
| 5. | Porter |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Construction materials cost** | | | | |
| **SN** | **Materials** | **Place of availability and distance from site (km)** | **Rate/unit** | **Comments** |
| 1. | Stone |  |  |  |
| 2. | Brick |  |  |  |
| 3. | Sand |  |  |  |
| 4. | Aggregate |  |  |  |
| 5. | Bamboo |  |  |  |
| 6. | Wood |  |  |  |
| 7. | Cement (53  grade, OPC/PPC) |  |  |  |
| 8. | Steel bar/TMT rod |  |  |  |
| 9. | Binding wire |  |  |  |
| 10. | Diesel cost |  |  |  |
| 11. | Others |  |  |  |

|  |  |  |
| --- | --- | --- |
| Additional information | | |
| Remarks (any other relevant information) |  | |
|  | | |
| Name of the Consultant:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Phone number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | Name of the community representative:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Phone number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |