**Solar Electric Technician (Level 2)**

**Module 4: Site selection for solar PV systems**

**E1: Assignment - Site assessment using feasibility survey form**

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| **E1: ASSIGNMENT MEMO** | |
| **Date** | …. |
| **To** | Participants |
| **From** | Trainers |
| **Subject** | Site assessment using feasibility survey form |
| **What** | Perform and analyse the site assessment for different solar PV applications. |
| **Why** | The objective of the assignment is to perform site assessment using the survey forms for the respective solar PV technologies and understand its importance.   * To use various tools to assess a site’s solar potential, measure shading and document findings – how obstructions and orientation affect solar PV performance. * To estimate the potential energy output for solar PV system at a specific site. * To assess whether a roof can structurally support a solar PV installation. * To assess an electrical system’s capacity for integrating a solar PV system and to evaluate compliance with the electrical codes and safety standards. * To evaluate a site for off-grid solar system and perform load assessment. * To evaluate a site for solar water pump system. |
| **How** | 1. Work in group of 2 or 4 2. Study the survey form. 3. Read and carefully follow the instructions to perform the specific tasks 4. Record the findings/observations for each specific tasks in the table and discuss the results with the trainer. |
| **Time** | 60’ for each technology (at least two) |

**Task 1: Conduct a solar site survey and shade analysis to determine or to access the feasibility of installing a solar PV system, focusing on shading, roof orientation and tilt angles.**

**Required tools/equipment:**

* Solar Pathfinder (Shade analysis tool)
* Compass
* Angle meter
* Measuring tape
* Camera (smartphone) for documentation

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| **Specific tasks/instructions** | **Findings/Observations** |
| 1. Determine the roof orientation using a compass. Trainees should note the azimuth angle (degrees from true north) |  |
| 1. Measure the tilt angle of the roof using an angle meter. |  |
| 1. Use the Solar Pathfinder or a smartphone app to perform a shade analysis. This tool will help identify shading obstructions, like trees or buildings, and measure how much sunlight will be available throughout the year. |  |
| 1. Take measurements of the roof dimensions, noting the available space for solar panel installation |  |
| 1. Document any obstacles (such as chimneys, vents, and antennas) that might interfere with solar panel placement |  |
| 1. Record findings and provide a written summary that includes shading percentages, available roof area, and an assessment of whether the site is suitable for solar PV |  |

**Task 2: Estimate the potential solar energy output of system using site-specific solar irradiance data.**

**Required tools/equipment:**

* Online solar radiation database
* Solar pathfinder app
* Solar panel datasheets

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| **Specific tasks/instructions** | **Findings/Observations** |
| 1. Measure the real-time solar irradiance on the site using the online solar radiation database or solar pathfinder app. Note the values in W/m² at various times of the day. |  |
| 1. Gather monthly and yearly solar radiation data using online databases for the location where the site is being assessed. |  |
| 1. Calculate the expected energy generation in kWh per month/year, based on the site conditions, and adjust for factors like shading, tilt angle, and panel efficiency. |  |

**Task 3: Roof structural assessment and load calculation.**

**Required tools/equipment:**

* Safety equipment
* Ladder
* Measuring tape
* Camera for documentation

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| **Specific tasks/instructions** | **Findings/Observations** |
| 1. Visually inspect the roof for any signs of damage, wear, or structural weakness (e.g., sagging, rotting wood, cracks). |  |
| 1. Measure the roof area to determine how many solar panels can fit. ***Thumb rule: 10 sq. mtr = 1kWp*** |  |
| 1. Estimate the total capacity solar panels can be installed. |  |
| 1. Assess the roof’s ability to handle the load, considering factors like snow or wind loads in the area. |  |
| 1. Determine whether the roof structure needs reinforcement before a solar installation can proceed. |  |

**Task 4: Evaluate the existing electrical infrastructure for compatibility with solar PV system, with identifying connection points and electrical safety requirements. (Solar grid-connected system)**

**Required tools/equipment:**

* Multimeter
* Electrical panel access
* System voltage rating
* Electrical wiring diagram

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| **Specific tasks/instructions** | **Findings/Observations** |
| 1. Visually inspect the roof for any signs of damage, wear, or structural weakness (e.g., sagging, rotting wood, cracks). |  |
| 1. Inspect the electrical panel to ensure there is space for additional breakers for the solar system. |  |
| 1. Use a multimeter to measure the incoming voltage from the grid and ensure it matches the voltage requirements of the proposed solar inverter (e.g., single-phase or three-phase). |  |
| 1. Document the location of connection points (e.g., for grid-tied systems, note where the inverter will tie into the electrical grid). |  |
| 1. Identify the capacity of the main service panel and check if it can handle the additional load from the solar system. |  |
| 1. Ensure that grounding and electrical safety standards (e.g., NEC or local codes) are being followed. |  |

**Task 5: Evaluate the site’s suitability for a solar off-grid system, including load assessment, and battery storage needs.**

**Required tools/equipment:**

* Load calculation worksheet
* Measuring tape, compass, angle meter
* Camera for documentation

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| **Specific tasks/instructions** | **Findings/Observations** |
| 1. Perform a load analysis by identifying the power consumption of the site’s critical appliances (e.g., lights, water pumps, refrigeration). |  |
| 1. Determine the daily energy requirement in kWh based on the load analysis. |  |
| 1. Identify the locations for installation of solar panels, battery, and inverter. |  |

**Task 6: Evaluate the site’s suitability for a solar water pump system.**

**Required tools/equipment:**

* Water requirement demand form
* Measuring tape, compass, angle meter
* Camera for documentation

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| **Specific tasks/Instructions** | **Findings/Observations** |
| 1. Determine water resource and quality of water available. |  |
| 1. Determine the daily water requirement in lpd (liter per day). |  |
| 1. Determine the purpose of water use and number of households or people using it. |  |
| 1. Identify the locations for installation of solar panels, battery, and inverter. |  |