**Solar Electric Technician (Level 2)**

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

**E2: Assignment - Solar PV mounting drawing**

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| **E2: ASSIGNMENT MEMO** | |
| **Date** | …. |
| **To** | Participants |
| **From** | Trainers |
| **Subject** | Solar mounting structure drawing |
| **What** | Verify the location and pre-plan for solar mounting structure |
| **Why** | The objective of the assignment is to equip trainees with the skills to assess and verify the best location and orientation for mounting the solar PV panels. Also, to verify the structural environmental factors of site to ensure the mounting structure can be installed properly and function optimally. |
| **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 task. 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: Verify the structural integrity and suitability of a roof for mounting solar PV panels.**

**Required tools/equipment:**

* Measuring tape
* Roof inspection tools (safety equipment)
* Compass and angle meter
* Survey form or checklist
* Camera (smartphone) for documentation

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| **Specific tasks/instructions** | **Findings/Observations/Verifications** |
| 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 based on 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 |  |