



STAR-CENTRE

Role: Solar PV Design Engineer



This document provides a comprehensive set of technical, structural, and regulatory questions for the role of Solar PV Design Engineer, ensuring thorough preparation for the position.

1. Role-Specific Questions

Q: What are the primary responsibilities of a Solar PV Design Engineer?

A: Responsibilities include designing solar PV systems, conducting site assessments, preparing layout drawings, performing energy yield calculations, and ensuring compliance with technical and regulatory standards.

Q: How do you ensure the accuracy of a solar PV system design?

A: Accuracy is ensured by conducting detailed site surveys, using simulation tools like PVsyst, adhering to design standards, and validating calculations for energy output and system efficiency.

Q: What factors do you consider when designing a solar PV system?

A: Factors include site location, solar irradiance, shading, roof orientation, tilt angle, system size, load requirements, and grid connection standards.

2. Technical Knowledge

Q: What is the difference between string inverters and microinverters?

A: String inverters are centralized and connect multiple panels in series, while microinverters are installed on each panel, allowing independent operation and better performance in shaded conditions.

Q: How do you calculate the size of a solar PV system?

A: The size is calculated based on the client's energy consumption, available space, panel efficiency, and local solar irradiance. For example, if a household consumes 600 kWh/month and the location receives 5 peak sun hours/day, a system of approximately 4 kW is needed.

Q: What tools or software do you use for solar PV system design?

A: Common tools include PVsyst, Helioscope, AutoCAD, SketchUp, and Google Earth for layout design, energy simulations, and shading analysis.

Q: What is the importance of shading analysis in solar PV design?

A: Shading analysis ensures optimal panel placement by identifying areas with minimal shading, maximizing energy production, and reducing system losses.

3. Electrical Design

Q: How do you determine the number of panels and inverters required for a system?

A: The number of panels is determined by dividing the system size by the panel wattage. Inverter sizing depends on the total DC capacity of the panels and the inverter's efficiency and input voltage range.

Q: What is the significance of the tilt angle in solar PV design?

A: The tilt angle affects the amount of sunlight received by the panels. It is optimized based on the site's latitude to maximize energy production throughout the year.

Q: How do you ensure proper wiring and cable sizing in a solar PV system?

A: Proper wiring is ensured by calculating current and voltage levels, selecting cables with appropriate ratings, minimizing voltage drops, and adhering to electrical safety standards.

4. Structural Design

Q: What factors do you consider when designing the mounting structure for a solar PV system?

A: Factors include roof type, wind load, snow load, panel orientation, and material durability. Structural integrity is ensured by adhering to local building codes.

Q: How do you ensure the safety and stability of rooftop solar installations?

A: Safety is ensured by conducting structural assessments, using certified mounting systems, ensuring proper anchoring, and following industry standards for load calculations.

Q: What are the challenges in designing ground-mounted solar PV systems?

A: Challenges include land leveling, soil conditions, shading from nearby objects, and ensuring proper spacing between rows to avoid inter-row shading.

5. Regulatory Compliance

Q: How do you ensure compliance with local regulations and standards in solar PV design?

A: Compliance is ensured by staying updated on local codes, using certified components, obtaining necessary permits, and adhering to grid connection standards.

Q: What are the key documents required for solar PV system design approval?

A: Key documents include site assessment reports, layout drawings, single-line diagrams (SLDs), energy yield calculations, and structural and electrical compliance certificates.

Q: How do you handle changes in regulations that affect your design?

A: I stay informed about regulatory updates, revise designs to meet new requirements, and communicate changes to stakeholders to ensure compliance.

6. Performance Optimization

Q: How do you optimize the performance of a solar PV system?

A: Performance is optimized by selecting high-efficiency panels, minimizing shading, using appropriate tilt angles, ensuring proper wiring, and conducting regular maintenance.

Q: What is the role of energy storage in solar PV system design?

A: Energy storage enhances reliability by storing excess energy for use during non-sunny periods, reducing dependency on the grid, and improving overall system efficiency.

Q: How do you calculate system losses in a solar PV design?

A: System losses are calculated by considering factors like shading, temperature effects, wiring losses, inverter efficiency, and soiling. These losses are factored into energy yield simulations.

7. Solar Domain Knowledge

Q: What are the advantages of monocrystalline panels over polycrystalline panels?

A: Monocrystalline panels are more efficient, space-saving, and durable, making them ideal for installations with limited space.

Q: How does temperature affect the performance of solar panels?

A: High temperatures reduce panel efficiency due to increased resistance in photovoltaic cells. This is measured by the temperature coefficient, which indicates the percentage loss in efficiency per degree Celsius rise above standard test conditions.

Q: What is the importance of net metering in solar PV systems?

A: Net metering allows excess electricity generated by the solar system to be sent back to the grid, providing credits on the utility bill and improving the financial feasibility of the system.