

INSTALLING SOLAR PANELS WHAT TO CONSIDER:

What is a PV System?

Photovoltaic (PV) Cells convert sunlight into electrical energy using semi-conducting materials. The panels are composed of multiple PV cells, generating electricity even on cloudy days.

The Electricity generated must be used immediately, stored in batteries, or exported to the National Grid.

Considerations When Planning a PV Installation:

Heritage Significance: Evaluate the impact on heritage sites and consider alternatives if necessary.

Building Fabric: Minimize damage to the building and ensure easy removal of the system later.

Structural Loading: Ensure the roof can support the panels; consult a structural engineer.

Ecological Issues: Consider the impact on wildlife and use bird guards to prevent nesting.

System Efficiency: Maximize efficiency by considering shading, panel orientation, and inverter sizing.

Shading: Try to avoid shading from nearby structures and vegetation.

Designers and Installers:

Finding a Designer: Look for members of CIBSE or IET. Structural design should be done by an IStrucE engineer.

Finding an Installer: Use MCS and Solar Energy UK to find experienced installers. **Checklist for Finding an Installer:**

- Ask for examples of their work.
- Get a detailed written quote.
- Check the warranties provided.

Main Components:

PV Array: Group of solar panels. **Inverter:** Changes DC electricity from panels to AC electricity.

Electrical Distribution System: Sends electricity throughout the building. **Energy Storage System:** Saves extra electricity for later use.

PV Tiles and Slates: Solar panels that look like roof tiles.

Energy Yield: Maximum power generated, measured in kilowatt-peak (kWp).

Fire Risk Assessment and Emergency Planning:

Fire Risk Assessment: Identify fire hazards, risks to people and property, and existing safety measures. Develop mitigation strategies and firefighting plans.

Mitigation Measures: Choose and size DC protection, isolators, and switches properly. Use arc fault detection, manage cables well, and install fire detection equipment.

Safe Access for Emergency Services: Ensure PV installations don't block emergency services. Provide isolators, signage, and clear roof access routes.

Protection Against Lightning: Assess lightning risk and install a professional lightning protection system if needed.

Consents and Permissions: Planning Permission: Needed for PV installations on listed buildings, monuments, conservation areas, and wildlife sites.

Building Regulations: Must follow rules for structure, fire safety, and electrical safety. Inform your local Building Control team.

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Installing PV Arrays on Buildings:

Pitched Roof: Panels are clamped to rails on roof rafters. Avoid long-term structural or moisture issues.

Tiled Roofs: Roof anchors are fixed to rafters by lifting and notching tiles to prevent water leaks.

Slate Roofs: Use clamps or lead flashing to weatherproof connections. Avoid drilling through slates.

Lead Roofs: Use timber blocks capped with lead sheets to fix panels without drilling through the lead.

Structural Loading: Ensure the roof can support the panels' weight. Consult a structural engineer.

Appearance: Choose colours and finishes that match the roof. Use anti-reflection coating to reduce glare and improve energy yield.

Roof-Integrated PVs: Serve as both roof covering and energy generator but have a shorter lifespan.

Flat Roofs: Panels can be mounted at low angles or flat, held by ballast or screws. Ensure proper sealing to prevent leaks.

Ground-mounted PV Arrays:

Installation: Survey the site for heritage impact, flood risk, vegetation, archaeology, services, topography, access, and security. Ensure the installation can be reversed to restore the land.

Cabling: Connect cables from the PV array to the building's electrical board. Consider cable size, burial depth, and protection.

Array Frame Design: Use minimal foundations, avoiding mass concrete. Opt for pile-driven, screw foundations, or premoulded concrete blocks. Detail ground clearance, height, row lengths, pitch, and fixing methods. **Electricity Distribution and Storage: Grid-Connected Systems:** PV systems connect to the grid to export or store excess electricity. Approval from the DNO is needed.

Battery Storage: Batteries store extra energy. Consider technology, placement, and maintenance.

Distribution Equipment: Ensure equipment is accessible for maintenance. Use fire-resistant boards or steel frames. **Electrical Cabling:** Protect and route cables properly. Consult experienced contractors. **Inverters:** Convert DC to AC electricity. Types include string, central, and microinverters. Place near the array and ensure good ventilation.

Maintenance, Inspection, and Testing: Regular Maintenance: Keep collectors clean and ensure the system operates efficiently. Maintain the building fabric around the array to keep it in good condition and weather-tight. Keep the ongoing cists of the maintenance in mind for future budget planning.

Handover Pack: Include warranty, system info, commissioning data, test results, and maintenance details.

Recommended Maintenance Tasks:

- Conduct visual checks
- Check the monitoring system
- Look for new shading
- Clean the collector surface
- Check battery fluid levels
- Inspect the electrical installation
- Monitor and record the inverter's performance
- Keep a maintenance logbook

To find a competent installer and certified generation products visit www.mcscertified.com



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