

COMMERCIAL SOLAR PV

Build Options Guide

A practical overview of the main solar PV system configurations available for commercial and industrial sites.

Roof. Ground. Optimised. Storage. EV. Monitoring.

Every commercial solar PV project is different. The most suitable system depends on the building, available space, electrical demand, existing infrastructure, DNO requirements and the client's objectives.

QUEST Electrical considers the complete electrical installation when developing a solar solution, allowing the PV system, LV infrastructure, monitoring and future energy requirements to be considered together.

01 | ARRAY & MOUNTING OPTIONS

ROOF-MOUNTED SOLAR PV

A common solution for commercial and industrial buildings with suitable roof space. Systems can be designed around different roof constructions and layouts, subject to structural suitability and the selected mounting system.

- Makes use of existing roof space
- Suitable for warehouses, factories, schools and commercial premises
- Can be designed around rooflights, plant and access requirements

FLAT-ROOF SOLAR PV

Flat-roof arrays can use suitable mounting systems to position modules at the required orientation and inclination while considering roof loading, wind loading, drainage and maintenance access.

- Flexible module layout
- Useful on large commercial roof areas
- Ballasted or mechanically fixed solutions may be considered subject to design

GROUND-MOUNTED SOLAR PV

Where suitable land is available, a ground-mounted array can provide an alternative to roof installation and may allow greater flexibility over array size, orientation and maintenance access.

- Suitable where roof space is restricted
- Scalable for larger arrays
- Requires appropriate land, structural and planning considerations

02 | INVERTER & OPTIMISATION OPTIONS

The inverter arrangement is a key part of the system design. The correct solution depends on array size, roof layout, shading, module configuration, monitoring requirements and the site's electrical infrastructure.

STRING INVERTER SYSTEMS

A conventional string inverter arrangement can provide an effective solution where the array has consistent orientation and operating conditions. Multiple inverters may be used on larger commercial systems.

OPTIMISED SOLAR PV SYSTEMS

Module-level power optimisers can provide enhanced monitoring and design flexibility. QUEST can deliver SolarEdge systems using optimisers selected to suit the module and inverter arrangement.

As an example, the Albert Harrison design uses a 48.00kWp array comprising 96 modules, one SolarEdge SE33.3K inverter and 48 S1000 optimisers, configured across three strings.

03 | SOLAR PV + BATTERY STORAGE

Battery storage can be considered alongside solar PV where the site's consumption profile and project objectives support it. Instead of exporting all surplus generation, suitable energy storage can retain energy for use at another time.

Potential applications include:

- Increasing on-site use of solar generation
- Reducing reliance on grid electricity at selected times
- Supporting energy management strategies
- Providing a platform for future energy optimisation where technically and commercially suitable

Battery sizing should be based on measured or reliable consumption data, the PV generation profile, available electrical capacity and the intended operating strategy.

04 | SOLAR PV + EV CHARGING

Solar generation and EV charging can be considered as part of the same wider electrical strategy. Where charging takes place during solar generation periods, a proportion of the charging demand may be supplied by on-site PV generation.

A coordinated design should consider the site's maximum demand, available electrical capacity, EV charger load management, PV generation and future expansion.

05 | EXPORT-LIMITED SOLAR PV

The amount of generation that can be exported to the distribution network may be restricted by the DNO. Where required and technically suitable, an export limitation arrangement can be incorporated into the system design.

Export limitation does not necessarily mean that the PV array must be limited to the same capacity as the permitted export. The complete design should consider on-site demand, inverter capacity, protection and the approved DNO connection arrangement.

06 | ENERGY MONITORING & SUB-METERING

Understanding how a site uses electricity can help determine the most appropriate solar PV configuration. QUEST can incorporate energy monitoring and sub-metering to provide greater visibility of generation and consumption.

Monitoring can be used to review:

- Solar PV generation
- Building consumption
- Grid import and export
- Individual distribution boards or operational areas
- Performance trends and abnormal consumption

07 | EXISTING ELECTRICAL INFRASTRUCTURE

A commercial solar PV system becomes another source of electrical energy within the building. The existing installation therefore needs to be considered as part of the design.

Depending on the project, this can include assessment of:

- Main LV switchboards and distribution boards
- Existing switch and busbar ratings
- Transformers and incoming supply arrangements
- Protective devices and discrimination
- Cable capacity and point of connection
- Metering and CT arrangements
- Earthing, isolation and surge protection

Where the existing infrastructure requires modification, QUEST can coordinate the associated electrical works as part of the overall solar project.

08 | ACCESS, PROTECTION & ANCILLARY OPTIONS

The final installation can also incorporate ancillary requirements needed to protect the system and support long-term operation.

- Bird protection where required

- Scaffolding and access coordination
- Cable containment and mechanical protection
- Plant and inverter mounting arrangements
- Labelling and isolation
- Ongoing inspection and maintenance

09 | WHICH SOLAR SOLUTION IS RIGHT FOR YOUR SITE?

There is no single build configuration that suits every commercial property. The preferred option should be based on the site's physical layout, electrical demand, existing infrastructure and long-term energy objectives.

BUILD OPTION	BEST SUITED TO	KEY CONSIDERATION
Roof-mounted PV	Commercial buildings with usable roof space	Roof condition, structure, access and array layout
Flat-roof PV	Large flat commercial roofs	Loading, wind, drainage and mounting method
Ground-mounted PV	Sites with suitable available land	Land use, planning, security and cable routes
String inverter	Consistent array layouts	String design, orientation and inverter location
Optimised system	Complex layouts or enhanced module monitoring	Optimizer/inverter compatibility and system design
PV + battery	Sites seeking greater control of generated energy	Consumption profile and storage strategy
PV + EV charging	Sites adding or expanding EV infrastructure	Maximum demand and load management
Export-limited PV	Sites with DNO export constraints	Approved export limit and control arrangement

10 | A TYPICAL OPTIMISED COMMERCIAL SYSTEM

The Albert Harrison project provides an example of an optimised commercial roof-mounted design. The SolarEdge design comprises **96 x 500W modules**, providing **48.00kWp** of installed DC capacity, together with **1 x SE33.3K inverter** and **48 x S1000 optimisers**.

The electrical design uses **three strings** with **32 PV modules per string**. The design simulation estimates approximately **46.09MWh annual usable solar production**, with around **34.83MWh** used directly by the building.

This illustrates how module layout, inverter sizing, optimisation and the site's consumption profile can be considered together when developing a commercial PV system.

11 | THE QUEST APPROACH

Commercial & Industrial Solar PV - Designed Around the Site

QUEST Electrical combines renewable energy capability with commercial and industrial electrical experience. This allows us to assess the solar array and the infrastructure behind it as one complete electrical project.

- Site assessment and system design
- Commercial and industrial solar PV
- SolarEdge systems and module-level optimisation
- Existing LV infrastructure assessment
- DNO connection and export limitation
- Energy monitoring and sub-metering
- EV charging integration
- Testing, commissioning and ongoing electrical support

PLANNING A COMMERCIAL SOLAR PROJECT?

The right build option starts with understanding your roof or land, electricity consumption, existing electrical infrastructure and future requirements.

QUEST Electrical can assess the complete installation and develop a solar PV solution around your site.

IMPORTANT: This guide provides a general overview of commercial solar PV build options. The suitability of any configuration depends on the individual site, structural conditions, electrical installation, DNO requirements, applicable standards and manufacturer requirements. Each project should be assessed and designed individually by suitably competent persons.

QUEST ELECTRICAL | Solar PV • Energy Monitoring • EV Charging • Electrical Infrastructure