



Powering Education

How solar PV can reduce costs, build resilience and support sustainability across the education sector.



Who this guide is for

This Powering Learning guide is designed for those with operational and financial responsibility or oversight of education facilities. It examines the environmental, economic, social and pedagogical benefits of on-site solar generation, making it a must-read for those in both the private and public education sectors.

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“Education shapes our future and engages the minds of tomorrow’s leaders and decision-makers, making schools, colleges, and universities ideal candidates to invest in and benefit from on-site clean energy generation.

Classrooms, laboratories, kitchens, and sports facilities all rely on power to create safe, comfortable, and effective learning environments, making the education sector a natural home for solar energy. Most sites operate during daylight hours, when solar generation is at its peak, and have large roof areas with untapped potential.

For many institutions, any investment outside the classroom must clearly demonstrate value to teaching and learning. Solar PV supports this link by helping to stabilise budgets, improve thermal comfort and reinvest savings where they matter most: in education itself.

As schools and colleges work towards net zero, solar PV also provides a visible and measurable way to deliver savings, support climate goals and demonstrate leadership to pupils and local communities.

This guide brings together insights, operational considerations, and funding options to help decision-makers across public, private, further, and higher education explore how solar PV can support their estates - from single-site schools to large multi-campus academies and universities.”

“The Department for Education has set a vision for a sustainable education system that builds resilience to climate change and reduces emissions across all schools and colleges.”

Wayne Lockton,
Technical Director,
Geo Green Power



The energy report

Energy powers every aspect of modern education. From heating and lighting to digital learning, catering and ventilation, reliable energy is essential for maintaining safe, comfortable and productive learning environments. Across schools, colleges and universities, energy also supports attendance, wellbeing and attainment as much as operational continuity.

Sources of energy pressure



High demand

Education buildings account for around 3 to 3.5% of total non-domestic electricity consumption, equivalent to around 5.5 TWh in 2021. UK schools alone consume around 3.2TWh of electricity each year, which is roughly 2% of all non-domestic electricity demand.¹

Energy consumption in schools depends on the age and condition of the buildings, the duration of occupancy, and the amount of electrical equipment used. Secondary schools typically face higher energy costs than primary schools because they have larger buildings, more classrooms, longer operating hours, and greater use of ICT, science, sport and design facilities. However, the main sources of energy waste are often the same regardless of school size.

Space heating is the largest contributor, accounting for around 58% of total energy use and 45% of cost. Lighting, by contrast, uses only 8% of the energy but can represent as much as 20% of the total spend due to the higher price of electricity compared to gas.²

In 2023/24, the average annual consumption was 315 kWh per pupil for primary schools and 508 kWh per pupil for secondary schools.³



The cost of energy

According to the Department for Education data for 2023-24⁴, local authority-maintained schools spent £600 million on energy, representing one of the largest categories of premises-related expenditure. Of this, primary schools accounted for approximately £396 million, while secondary schools spent around £136 million, with the remainder spread across nursery, special educational needs and pupil referral units.



Although energy has historically represented a small share of school budgets, its impact has grown sharply. In 2021, many schools were paying around 14-15 p/kWh for electricity, in line with wider non-domestic market averages. By late 2023, that figure had peaked at around 28 p/kWh, an increase of more than 90%.⁵ Current local authority framework rates for schools are typically 22-24 p/kWh.⁶

This shift represents an increase of 10-12 p/kWh in just a few years, equivalent to an additional £10,000 a year for a large secondary school using around 1 million kWh of electricity or, put another way, a third of an early career teacher's salary.



Out-of-hours energy use

Energy use in schools doesn't stop when pupils go home. In fact, most schools consume more energy when they are unoccupied than when they are full. Energy Sparks data⁷ from over 1,000 UK schools shows that the average primary school uses 57% of its electricity and 61% of its gas outside of teaching hours, while in secondary schools, those figures rise to 60% and 64%.

This wasted energy is often the result of heating or hot water systems running overnight or at weekends, lights left on in corridors, or ICT equipment, fridges and immersion heaters running continuously. The problem is exacerbated by the fact that schools are open for only around 15% of the year, once holiday closures and shorter school operating days are factored in.



An ageing estate

Many schools, colleges and universities still operate from buildings that predate modern energy standards. The Department for Education's (DfE) condition data points to an £11 billion maintenance backlog, much of it linked to inefficient heating systems and building fabric.⁸

Older facilities rely heavily on gas, while an expanding digital infrastructure and improved ventilation standards are driving electricity use higher.



The importance of thermal comfort to learning

Heating, cooling and ventilation are among the biggest energy demands in schools, but they're also critical to maintaining safe, comfortable classrooms. Research indicates that students achieve optimal cognitive performance at around 22-23°C, with learning efficiency declining in both warmer and cooler conditions. Each 1°C rise above the comfort range can reduce maths scores by up to 13 points and slow response speed by around 2%.⁹ In the United States, a Harvard University study found that pupils in non-air-conditioned schools were 12% more likely to fail exams on hot days above 32°C compared with those studying in cooler classrooms.¹⁰ Thermal discomfort can also increase fatigue, absenteeism and behavioural issues.¹¹

1 AMA Research, Non-Domestic Rooftop Solar PV Market Report 2023-2027
2 <https://www.herefordshire.gov.uk/downloads/file/21182/guide-for-schools-on-energy-savings-and-carbon-reduction>
3 https://blog.energysparks.uk/wp-content/uploads/2025/03/Energy-Efficiency-in-School-2023_24.pdf
4 <https://explore-education-statistics.service.gov.uk/data-tables/fast-track/564c1b8e-3e60-4317-97c2-08dd0871299b>
5 <https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/theimpactofhigherenergycostsonukbusinesses/2021to2024>
6 <https://wirral.moderngov.co.uk/documents/s50124915/Energy%20Purchasing%20for%20Schools%20Update.pdf>
7 https://blog.energysparks.uk/wp-content/uploads/2025/03/Energy-Efficiency-in-School-2023_24.pdf
8 https://assets.publishing.service.gov.uk/media/60af7cbb90e071b54214c82/Condition_of_School_Buildings_Survey_CDC1_-_key_findings_report.pdf
9 Wang, D., et al. (2023). "The effect of thermal environment on students' learning performance: A quantitative review." Building and Environment, 237, 110403.
10 Harvard University (2017). Heat and Learning: Cognitive Impacts of Hot School Days. Center for the Environment
11 Coventry University (2022). Thermal Comfort and Cognitive Performance in Educational Settings.

Why solar PV, why now?

Despite high and constant energy demand, on-site generation remains rare across the UK's education estate. Fewer than 1% of schools currently use solar PV to power their operations, yet the sector collectively consumes over 3.2TWh of electricity each year.¹² Rising costs, tighter budgets, and growing sustainability requirements mean that solar energy now presents one of the most practical and financially viable opportunities for schools, colleges, and universities to reduce costs and carbon emissions simultaneously.



1. Reducing resilience on volatile markets

The education sector remains vulnerable to fluctuations in energy prices. Electricity costs almost doubled between 2021 and 2023, rising from around 20 p/kWh to 40 p/kWh, and remain unpredictable.¹³ Generating electricity on site allows schools and colleges to stabilise part of their energy spend, reducing exposure to external market shifts and creating greater financial certainty year to year.



3. Funding and financial models

Solar adoption no longer depends on large capital budgets. Power Purchase Agreements (PPAs) and lease models allow installations with no upfront cost, with schools paying only for the electricity they use at a fixed, lower rate than grid prices. These options enable immediate savings, protect against future price rises and make it easier to demonstrate return on investment. Often, they also include maintenance packages.



2. Advances in solar PV

Modern solar technology has transformed both the performance and practicality of installation. Today's panels are lighter, more efficient, and cheaper to install than ever before, making them suitable for both older and new buildings. Installation can often take place during school holidays, with minimal disruption to teaching. Over the past decade, panel efficiency has nearly doubled, meaning schools can generate more electricity per square metre and achieve faster returns on investment.

Why now?

- ✓ Reduce reliance on volatile energy prices
- ✓ Capitalise on advances in solar technology and efficiency
- ✓ Improve efficiency without large upfront spend
- ✓ Make smarter, data-led energy decisions
- ✓ Inspire the next generation to be more sustainable



7. Smarter, data-led energy strategies

Modern solar systems provide more than power, they enable intelligent energy management. Real-time reporting and monitoring tools can help schools understand when and how they use energy, supporting behavioural change and identifying further efficiency opportunities. Integrating battery storage can also maximise on-site consumption, store energy generated during daylight hours and lower peak-time grid costs.

Integrated systems also support:

- Battery storage management, allowing sites to store surplus energy and discharge it when grid prices are high
- Proactive maintenance, with early issue detection to avoid downtime and performance loss
- Scalable planning, by highlighting future opportunities for expansion and investment



¹² AMA Research (2023). Non-Domestic Rooftop Solar PV Market Report UK 2023-2027.

¹³ Office for National Statistics (2024). Impact of Higher Energy Costs on UK Businesses 2021-2024.

How solar PV supports the education sector

From nurseries and primary schools to secondary academies, further education (FE) colleges, multi-academy trusts (MATs) and universities, educational settings vary in scale, mission and energy profiles. However, they share a common opportunity: on-site solar generation can deliver cost savings, energy resilience and educational value.



Continuous but predictable demand

Schools and colleges have distinct energy profiles that make them well-suited to solar generation. While their daytime schedules align closely with peak solar hours, as outlined earlier, many also consume a surprising amount of energy outside of teaching time.

Although behavioural change and better controls can help to reduce this out-of-hours consumption, schools will always have a baseline level of energy demand for essential systems. This consistent need means that solar-generated electricity can often be used directly on site rather than exported, strengthening the financial and environmental case for installation. For FE colleges and universities, extended opening hours, laboratories, libraries, catering, and student accommodation add further consistency to daily consumption.



Long-term alignment

Educational institutions commonly operate under long planning and capital cycles. Solar PV's typical lifespan of 30 years and above aligns with these models, making the investment a strategic decision rather than a tactical one. Many schools and universities own their premises or operate long leases, making the return on investment easier to track.



Diverse sites, scalable impact

While education portfolios are diverse, ranging from small primary schools to sprawling secondary campuses, there are solar PV options to suit. Small rooftop arrays, carpark canopies or ground-mount arrays can serve individual sites, while a trust or university group can aggregate multiple installations for stronger buying power.

Modern solar systems are also more adaptable and lighter, making it even more feasible to fit on aged or complex roof structures.



A phased approach

Large educational trusts, MATs or university groups can begin with pilot installations at a small number of buildings. This enables teams to learn about procurement, operations, and stakeholder engagement before scaling across the entire estate.

Solar PV often fits well into existing maintenance or refurbishment cycles. For example, roof replacements, re-roofing, HVAC upgrades, or façade work can be bundled with installation.



Minimal disruption

Solar installers routinely work on occupied educational sites with minimal disruption and can also look to schedule work outside term times during holidays. No disruption to core teaching functions is necessary, and installation typically takes around a week per building.

Tailoured solar PV solutions

Each educational setting has its own operational pattern, estate condition and energy priorities. Solar PV systems must therefore be designed to meet the specific needs of each type of institution, balancing learning continuity, cost savings and long-term sustainability goals.

We start by understanding each site's energy profile, building fabric, and operational schedule - from classroom hours to exam timetables and maintenance periods - before designing a solution that maximises return on investment with minimal disruption to teaching.



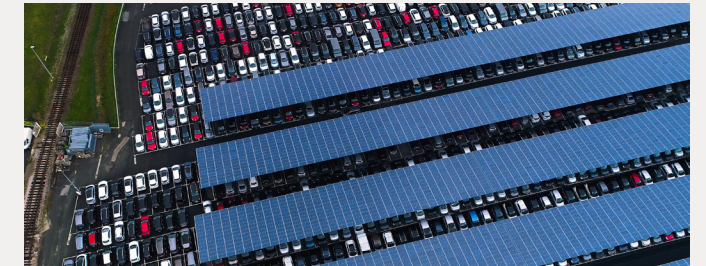
Rooftop solar PV

For most educational settings, rooftop solar is the most direct and cost-effective method to generate renewable energy on-site. Systems can be tailored to match demand, with generation typically reaching its peak during operating hours when usage is highest. Panels can be positioned to work around skylights, ventilation units, or heritage constraints, and installation can be carried out safely during school holidays.



Ground-mounted systems

Where roof capacity is limited or structural upgrades are impractical, ground-mounted solar provides a scalable alternative. Colleges, universities and rural schools with adjoining land can use these systems to generate substantial on-site power.



Solar canopies and car-ports

Many further and higher education institutions, as well as increasingly larger schools, have extensive car parking areas that can accommodate solar canopies. These generate electricity while providing covered parking and the option to integrate EV charging for staff, visitors and service vehicles. They also create visible, demonstrable examples of sustainability in action for students and the community.



Battery storage and energy optimisation

Battery systems store surplus solar energy for demand peaks from ICT equipment, lighting or after-school activities. Stored energy can also be used during early mornings or periods of high grid prices, improving cost efficiency and resilience.

Batteries can:

- Store and release excess solar generation at optimal times
- Charge from the grid at off-peak rates to reduce cost exposure
- Integrate with energy management systems to track and optimise site performance

“From site surveys to future-proofing, we build systems that work for your site, not just the available roof space.”

Wayne Lockton, Technical Director,
Geo Green Power

Funding options for education

Today, a growing number of funding models allow education providers to install solar systems with little or no upfront investment. Whether it's a local authority managing a large estate, a multi-academy trust seeking to reduce energy costs across its schools or a college or university integrating renewables into its net-zero strategy, flexible finance routes can make solar both practical and affordable.

Capital Expenditure (CapEx)

CapEx is the most direct route to ownership. The education provider funds the system upfront, retaining full ownership and benefitting from all future energy and carbon savings.

Best for: Universities, FE colleges, local authorities or trusts with available sustainability funding, reserves or Public Sector Decarbonisation Scheme (PSDS) allocations.

Advantages:

- Full system ownership and control
- Immediate savings on electricity bills
- Carbon and cost savings fully retained
- Contributes directly to net zero and ESG reporting goals

Asset Finance

Asset finance enables the cost of a solar PV system to be spread over several years, typically five to seven. The school or institution retains ownership while spreading payments to align with budget cycles.

Best for: Academy trusts or colleges seeking ownership while preserving cash flow.

Advantages:

- Ownership and long-term value retained
- Immediate bill savings and carbon reduction
- No large upfront payment
- Predictable repayments that can align with energy cost savings

Power Purchase Agreement

A PPA allows a third-party investor to fund, install and maintain the solar system. The school or college then buys the generated electricity at a fixed rate, usually lower than the current grid price, over a term of 10-25 years. PPAs remove capital barriers, offer immediate savings and provide budget certainty.

Best for: Multi-academy trusts, local authority schools or universities without capital budgets but seeking predictable energy costs and lower carbon emissions.

Advantages:

- No upfront or maintenance costs
- Immediate carbon reduction and savings
- Price stability for 10-25 years
- Option to purchase the system at a later stage
- No impact on existing CapEx approvals

Choosing the right route

The best funding model depends on your site ownership, financial structure and long-term energy strategy.

Geo Green Power can support:

- Feasibility studies and financial modelling
- PPA and asset finance structuring
- Grant application support
- Procurement through approved education frameworks

Procurement frameworks for education

Schools, trusts and universities can access pre-approved solar suppliers through frameworks such as Fusion21. These frameworks simplify procurement, ensure compliance with public sector standards, and enable quicker, risk-managed delivery of solar projects.

Grants and Funding Programme

Several schemes and partnerships offer part or full funding for solar installations across the education sector.

- Public Sector Decarbonisation Scheme (PSDS) - Capital funding for schools, colleges and universities as part of wider energy and heat decarbonisation plans
- Salix Energy Efficiency Fund (SEEF) - Interest-free loans and matched funding for academies and maintained schools
- Great British Energy Solar Programme - Government-backed investment aimed at expanding rooftop solar across public buildings, including schools and colleges
- Community Energy Partnerships - Local authority or co-operative schemes enabling shared ownership or discounted solar energy for schools and community facilities

Best for: Maintained schools, academies, colleges and universities undertaking broader sustainability or estate improvement projects.

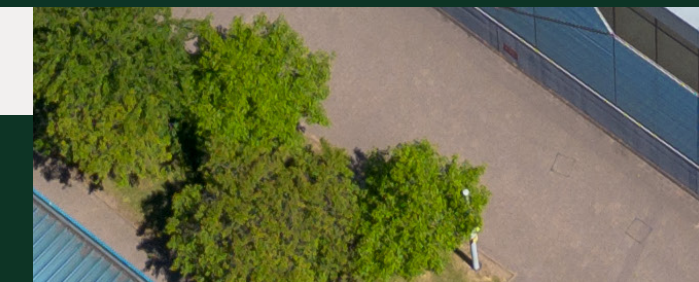
Advantages:

- No or minimal repayment required
- Supports sustainability and cost reduction goals
- Can be combined with other funding or PPAs
- Helps institutions meet Department for Education net zero targets



“Whether you’re a single school or a multi-campus university, there’s now a funding route that makes solar PV both affordable and achievable.”

**Wayne Lockton, Technical Director,
Geo Green Power**



The business case for solar investment

An at-a-glance overview of the strategic benefits of solar for manufacturing businesses.

Strategic benefit	Why solar
Financial return on investment	Projected payback in 3-7 years via CapEx. Long-term savings depend on system size, energy demand and usage patterns across term time and holidays. Larger estates such as multi-academy trusts or universities can achieve greater cumulative savings.
Zero-CapEx options	Power Purchase Agreements (PPAs) offer immediate benefits with no upfront cost and the ability to secure low, predictable electricity prices for 15 years or more. They often also include maintenance packages. Ideal for schools, colleges and universities without capital budgets.
Minimal operational disruption	Systems are designed and installed around the school day and academic calendar. Most installations are completed during holiday periods or outside of hours, with minimal disruption to teaching, examinations, and on-site safety.
Maintenance and uptime	Solar PV systems require minimal servicing, with annual performance packages available to protect yield, monitor generation and ensure long-term performance.
Carbon and ESG performance	Supports the Department for Education (DfE) 's Sustainability and Climate Change Strategy, helping schools, colleges, and universities evidence measurable progress against net zero and ESG goals. Demonstrates visible, auditable sustainability leadership to stakeholders and students
Energy resilience	Strengthens energy security and reduces reliance on grid electricity during price spikes or capacity pressures. On-site generation helps protect budgets.
Scalability	Systems can be phased across estates, integrated into refurbishment and maintenance cycles, or rolled out at local authority or trust level to scale benefits and achieve procurement efficiencies.
Strategic advantage	Improves operational sustainability, aligns with DfE net zero targets, strengthens funding and planning bids and enhances institutional reputation with students, staff, and the wider community.



Why partner with Geo Green Power?

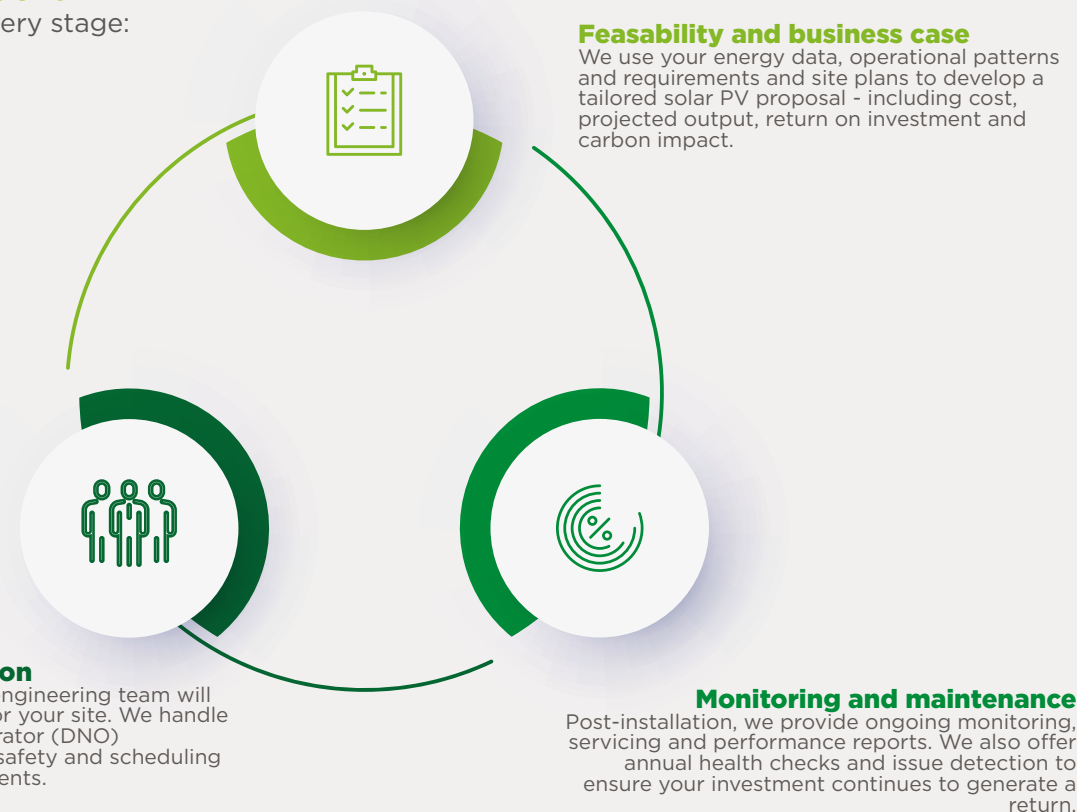
Your energy strategy deserves more than a one-size-fits-all solution.

Choosing solar PV is a strategic decision, and the partner you select to deliver it can significantly impact the long-term success of your investment. At Geo Green Power, we don't just design and install systems. We build long-term relationships based on quality, transparency and performance.

We've delivered solar PV projects of all sizes for over 15 years. Our approach is pragmatic, data-led and focused on outcomes that work for your business. When it comes to the education sector, setting safety is paramount and all of our engineers have advanced DBS checks as standard, as well as robust health and safety training.

A partner from feasibility to long-term support

We support you at every stage:



Trusted public sector delivery

We're an approved supplier on procurement frameworks, including Fusion21 - Heating, Renewables and Electricals and ESPO - Energy Performance of Buildings. These frameworks provide education providers with a compliant and efficient route to appoint trusted solar partners.

Everything we do is grounded in honest advice, clear timelines and upfront pricing. We don't push what isn't needed and we don't disappear after the install. Our reputation is built on long-term performance and personal accountability - values that matter just as much to us as they do to our clients.

We promise to:

- ✓ Take the time to understand your energy needs and priorities
- ✓ Provide straightforward, honest advice
- ✓ Communicate clearly and regularly throughout your project
- ✓ Deliver safely, on time, in budget and in line with educational needs
- ✓ Support your system's performance long after installation

Our accreditations



"We never start with a sales pitch - we start with what works for your site, your energy use, and your school model."

**Wayne Lockton, Technical Director,
Geo Green Power**



Coventry University

About the project

Coventry University installed solar PV systems across five campus buildings as part of its wider decarbonisation strategy. The university secured funding through the Public Sector Decarbonisation Scheme (PSDS) and appointed Geo Green Power following a competitive selection process focused on health and safety, experience and value. Panels were installed on the Alma Building, The Hub, Charles Ward Building, ECB Building and The Cycle Works.

Why solar PV

The university has set clear targets to reduce greenhouse gas emissions and progress towards net zero. Solar PV provided a practical way to generate on-site renewable electricity, reduce reliance on the grid, and demonstrate visible progress toward its sustainability commitments. The project also aligned with the objectives of the PSDS funding to accelerate public sector decarbonisation.

The system

 **Total Solar System Size: 360kWp**

The results

 **Annual Output: 306,850kWh**

 **Annual CO2 Saving: 76 Tonnes**

 **Equivalent Cars Off The Road: 15**

A word from our client

“The team at Geo Green Power were brilliant. The two site leaders in particular, Fads and Dan, were so easy to approach and any issues were dealt with immediately. They were amazing and we’d definitely work with them again.”

**Paul Hinson, Project Manager,
Coventry University**



Wellspring Academy Trust

About the project

Wellspring Academy Trust is delivering a phased solar rollout across six of its schools as part of a wider sustainability and estate improvement programme. The first installation was completed at Springwell Alternative Academy in Grantham, with five additional schools planned as part of the same investment. The Trust committed more than £1m of its own funding to the programme, using school revenue and condition allocation budgets to finance the works.

Why solar PV

The Trust wanted to reduce energy costs across its estate while cutting carbon emissions and improving long-term financial resilience. By generating electricity on-site, the schools can reduce reliance on the grid and redirect savings to educational priorities. The rollout also supports the Trust's broader environmental commitments and provides opportunities to engage pupils with sustainability in practice.

The system

Six school sites included in the solar rollout

The results

⚡ Combined Annual Output: 341,650Wh

☁ Annual CO2 Saving: 85 Tonnes

£ Annual energy savings: £92,000

A word from our client

“Energy costs directly affect our school budgets, so investing in solar power means we can channel those savings into enriching the education we provide. More importantly, our commitment to sustainable practices offers students a real-world example of renewable energy in action, helping them understand the science behind solar power and the importance of sustainability”

**Mark Marples, Project Manager
Wellsprings Academy Trust**



“Thank you for taking the time to read our Powering Learning guide.

At Geo Green Power, we’ve been designing and delivering commercial solar PV systems for more than 15 years, and in that time, the conversation across education has changed completely. Rising energy costs, tighter budgets and growing sustainability targets are prompting schools, colleges and universities to take a more proactive approach to energy resilience, cost control and estate decarbonisation.

We understand that solar PV isn’t just about installing panels. It’s about helping you make the best use of your estate, protect learning environments and reinvest savings where they matter most - in students, staff and facilities. Our approach is built to make the process straightforward, low-risk and aligned to the realities of educational settings.

We don’t offer off-the-shelf systems. We work closely with estates teams, finance leads, local authorities and sustainability officers to understand each site’s operational needs and design solutions that deliver measurable results.

Whether you’re developing a business case, exploring funding routes or ready to procure, we’re here to support your next step with clear data, practical advice and proven experience.”

James Cunningham, Managing Director