



Getting Solar PV Off the Ground – some Practical Feedback from the Worthy Farm PV Installation



Solar – the facts
for Farmers
January 27th 2011

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Agenda:

1. Site Selection
2. Performance Forecasting
3. Building issues
4. Planning
5. Electrical Capacity / Grid Issues
6. Plant Room Conditions
7. Rodent Proofing
8. Installation Safety
9. Security
10. Comprehensive Design





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Site Selection:



- Orientation
- Roof Pitch
- Shading
- Electrical Supply

- Initial structural check
- Look for deflection
- Obstructions under array
- Health and safety issues





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Performance:

Affected by :

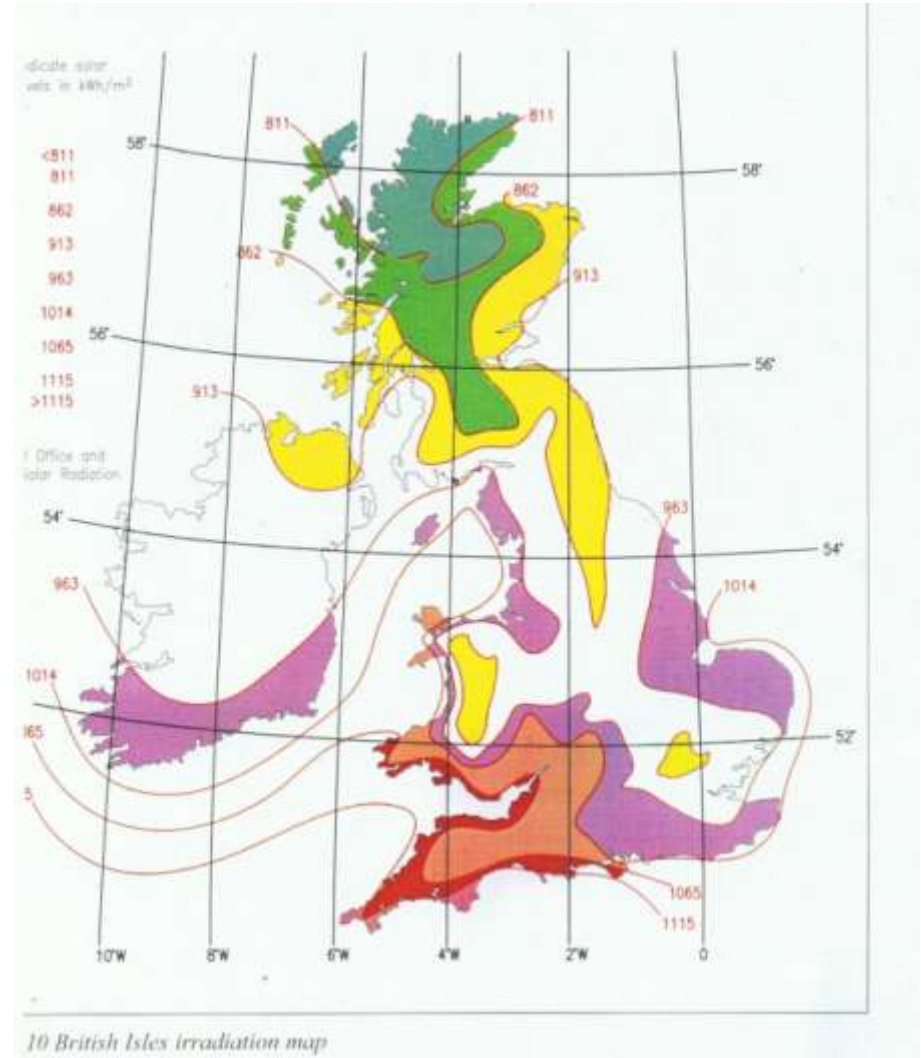
Latitude

Orientation

Roof Pitch

Shading

Cable length to connection point.





Worthy Farm

Performance:

Design Department
 Solarsense UK Ltd
 Long Ashton Business Park, Bristol BS41 9LB
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Project Name: Worthy Farm
 Variant Reference: System Variant
 09/03/2010

Get a third-party Report on Performance from your supplier:

Without this, you cannot accurately know what your yields will be, and therefore what the return on your investment may also be over the lifetime of the system.



| | |
|-------------------------------|------------------------------------|
| Location: | Bristol |
| Climate Data Record: | Bristol (1981-2000) |
| PV Output: | 200.16 kWp |
| Gross/Active PV Surface Area: | 1,456.82 / 1,433.57 m ² |

| | |
|-----------------------------------|---------------|
| PV Array Irradiation: | 1,508,824 kWh |
| Energy Produced by PV Array (AC): | 156,920 kWh |
| Grid Feed-in: | 156,920 kWh |

| | |
|------------------------|---------------|
| System Efficiency: | 10.4 % |
| Performance Ratio: | 74.2 % |
| Specific Annual Yield: | 780.9 kWh/kWp |
| CO2 Emissions Avoided: | 138,482 kg/a |



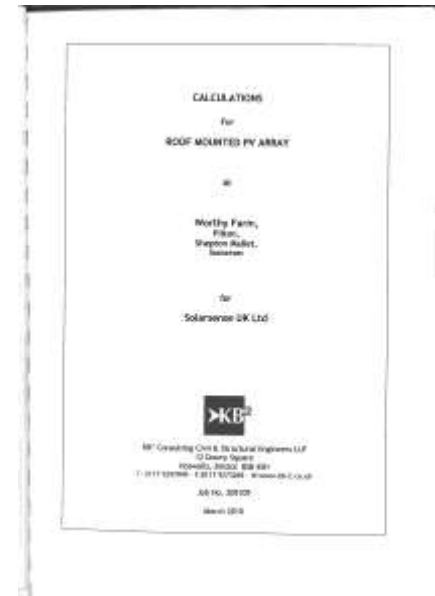
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The Building Itself:



- Downward pressure (dead loads)
- Snow loads and access (live loads)
- Uplift – a critical issue
- Working around rooflights
- Cleaning and maintenance access

Get a detailed structural report, or better still, get your installer to arrange this for you. It must include uplift and all dead and live loads, or it is not worth printing.

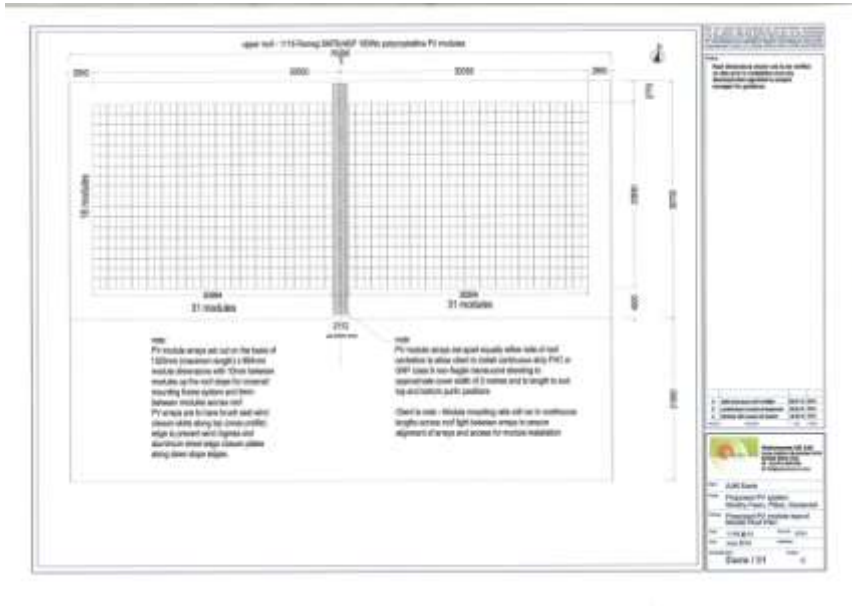




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Planning:

Rarely an issue on farm buildings, but always discuss with planners. You will need to know what size the array will be and what it might look like when completed.



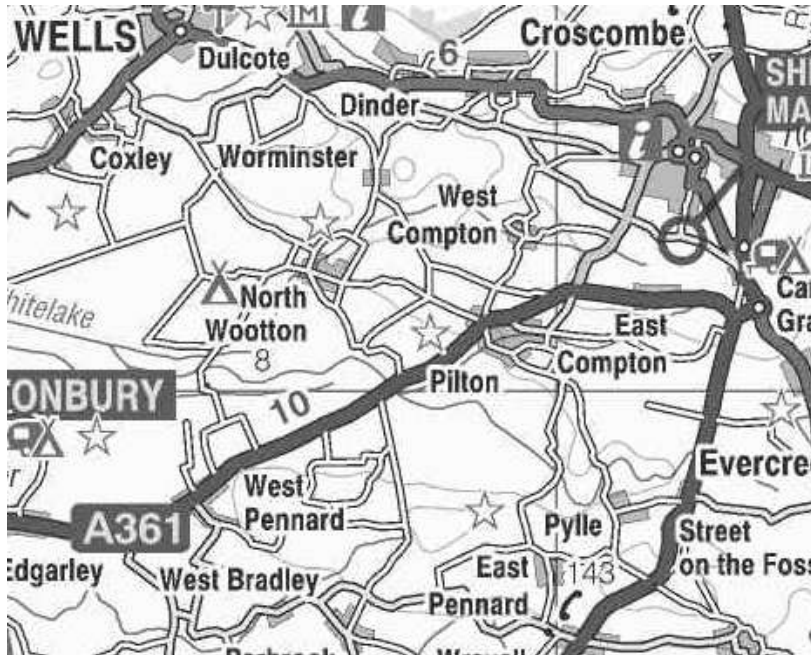
Others will cover this aspect in more detail later today.





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Electrical Capacity:



2 levels to consider, and requires an upfront investment to check the grid can take the power – normally about £1000. You will need to know what the maximum power output might be.



Level 1 – can the transformer take the projected output?

Level 2 – can the HV grid switchgear take the power? Worthy Farm now at Capacity with current infrastructure.



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Plant Room Conditions:



Inverters are sensitive items – they need to be within certain tolerances for moisture, dust, temperature, and ventilation, and can be badly affected by corrosion. One example is cow urine condensation, whose ammonia levels can destroy the cooling fins over the design lifetime.

Ensure the system designer is placing the inverter in a safe and compliant location in respect of your farm – with no inverter, there are no yields and therefore no paybacks.





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Rodent Proofing:



Squirrels are, over our past experience of nearly 4000 installations, the major reason why PV arrays stop working – the cables are chewed under the array itself. Rats on farms present the same sort of risks.

A good designer should check wildlife issues and work around them – in particular wiring trays should be vertical so vermin cannot sit in the trays, and pipes should be sealed. Array edges can also be sealed with pigeon spikes.





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Installation Safety:



Although technically the *responsibility* of the installers, do make sure that your installer provides you with a risk assessment. On Worthy Farm, farm traffic, a fragile roof and livestock all presented an increased risk to staff.

The roof will need safety netting and edge protection, fragile roofs will need crawling boards and asbestos will need testing to determine how to deal with it - all of this should be included in your quote. Dealing with an asbestos roof will add cost to your installation, so if it's very old, perhaps now is a good time to get the sheets replaced?





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Security:



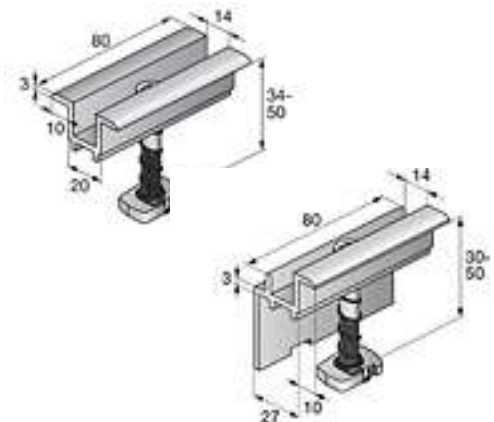
On-roof security is far easier to provide than for ground-mounted arrays, which may need palisade fencing and a CCTV contractor.

Roof-mounted arrays are normally covered by building fabric insurance, as they are considered an integral part of the roof structure when fitted. Check with your insurer.

Theft of panels will increase in the future, so using security fixings on module clamps can be requested if access to your barn roof is easily afforded.

One cheap answer is to cover edge boards in anti-climb paint and ensure you have plenty of signs warning that the roof is fragile.

CCTV is only useful if the theft is clearly seen and the thieves can be traced – far better to prevent theft.





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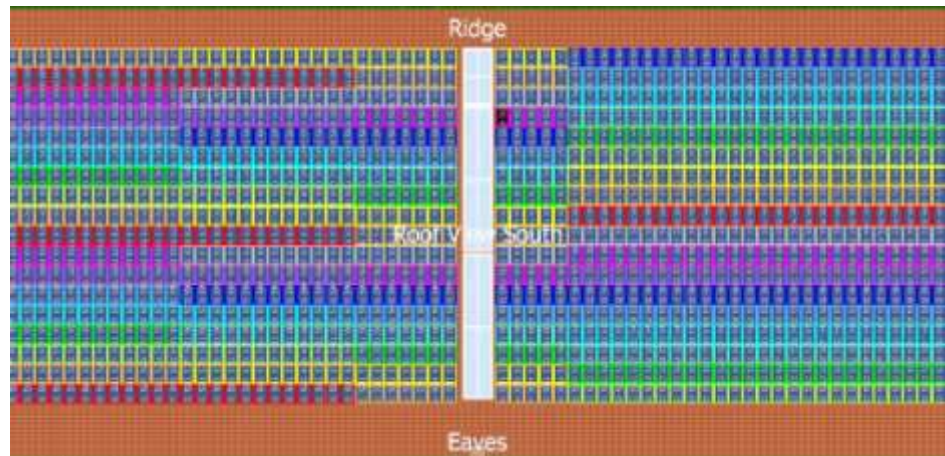
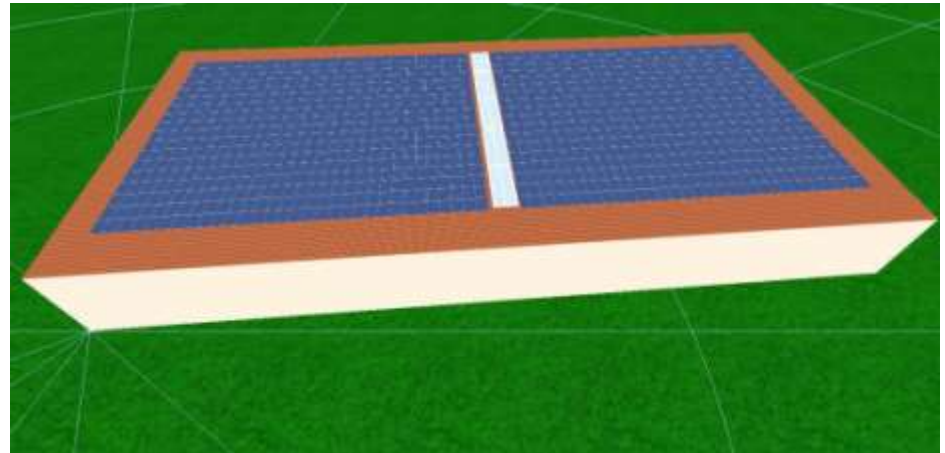
Comprehensive Design and Install Service:

If you are going ahead, here are some questions to ask:

Is your installer experienced – can they provide proof of similar sized-installations successfully completed?

Can they provide you with a Turnkey service – covering everything from design to ongoing operation and maintenance?

Do they have a project management team or an account manager who will look after you?





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If we can help or answer any questions, please don't hesitate to contact us:



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