

FOR POSITIONING
REFERENCE
DO NOT SCALE

1-16 = P.V. SOLAR PANELS (ELECTRIC)
A = SOLAR THERMAL PANEL (WATER)

DOC (3)

↑



PHOTOGRAPH OF ROOF CENTRE



Doc (4)



NORTH



Red House Aerial View

IoE number: 334166
Location: RED HOUSE, CHURCH STREET (west side)
CAWTHORNE, BARNSLEY, SOUTH YORKSHIRE
Photographer: N/A
Date Photographed: N/A
Date listed: 18 March 1968
Date of last amendment: 18 March 1968
Grade II

SE 20 NE CAWTHORNE CHURCH STREET
(West side)

3/40 Red House

SE 20 NE CAWTHORNE CHURCH STREET (West side) 3/40 Red House 18.3.68 II House. Later C18. Red brick in Flemish bond with ashlar dressings. Stone slate roof. Two storeys and attic. Double-depth plan. 3-bay symmetrical facade. Raised, rusticated ashlar quoins. Central, 6-panel door, with moulded surround and cornice on console brackets. 3-course brick band between floors. 12-pane sashes in raised surrounds. Moulded eaves cornice. Gable copings on moulded kneelers. Ashlar stack, with moulded cornice, at each end. Left return of 2 bays. Doorway to right, added 3-light, canted, 2-storey bay to left. Small square attic windows. Right return of 2 bays with attic windows as before and central, quoined doorway with round-arched staircase window above. Interior: Dog-leg stair with turned balusters, moulded handrail and string.

Doc (6)



Our ref: EQ/SP/048

V.I.I

23rd June 2010

F.A.O J.P Marsden
Red House
6 Church Street
Cawthorn, Barnsley
S75 4HP

Dear Sir

The Installation of a 2.96Kwp Roof Mounted Solar PV System

Thank you for the invitation to visit and the opportunity to quote for a grid connected Solar system to provide sustainable and environmentally friendly power for the above Dwelling.

Newtech

We are an independent local company and have been involved with energy saving technologies on a commercial basis for 10 years. Our renewable energy division has now been operating 2 years and has seen rapid growth in the past 12 months. We offer a wide range of solar and wind technology and have proposed the Phono Modules to offer the best ROI for this site . We are registered under Napit for our MCS accreditation, this will enable you to claim the new feeder tariff which started on the 1st of April this year.

Phono Solar

Phono Solar has been involved in large-scale projects in Europe, Eastern Asia and north America in the supply, design and installation of PV power plants and solar parks. One of the many high-profile projects is VEPREK in the Czech Republic, a 35MW PV plant which is the 5th largest PV plant in the world.

All Phono Solar modules are guaranteed for 5 years against manufacturing defaults with a **25 year performance output warranty.**

Newtech is a trading name of Newtech Energy Ltd, Unit 17, Dunsdale Mills, Holmpton, HD9 3TW Telephone: 01524 664190
Mobile: 07581 666015X Fax: 01524 666018 Registered in England 05033349 www.newtechenergy.com e-mail: enquiries@newtechenergy.com

The Grid Connect System

The Panels start to produce power in daylight. The output of approximately 400 volts DC is then fed by cable to an inverter. The inverter converts DC to AC voltage at approximately 4 volts above from the intake supply. Surplus power is fed back into the Grid, a process that operates automatically and does not cause any break in supply.

In the event of a power cut however, the inverter will disconnect from the grid for safety reasons, for the duration of the power failure, the system will automatically reconnect when the power is restored.

The annual power output of the solar system is directly related to the intensity of the sun and daylight hours. Our first resort is to look at the Governments SAP calculator to get some identification of the average Kwh yield per annum of the proposed system.

Table H2: Annual solar radiation, Kwh/m²

| Tilt of modules | Orientation of modules | | | | |
|-----------------|------------------------|-------|-----|-------|-------|
| | South | SE/SW | E/W | NE/NW | North |
| Horizontal | 961 | | | | |
| 30° | 1073 | 1027 | 913 | 785 | 730 |
| 45° | 1054 | 997 | 854 | 686 | 640 |
| 60° | 989 | 927 | 776 | 597 | 500 |
| Vertical | 746 | 705 | 582 | 440 | 371 |

The procedure for PV is as follows.

- 1) Establish the installed peak power of the PV System (kwp) = 3.4
- 2) Orientation of the system = 1027
- 3) Starting with the SAP factor of 0.8

The electricity produced by the PV system is

$$0.8 \times 2.96 \times 1027 = 2413 \text{ Kwhs / Annum}$$

The Government requires us to make the following statement:

“Important Note: The performance of solar PV systems is impossible to predict with certainty due to variability in the amount of solar radiation (sunlight) from location to location and from year to year. This estimate is based upon the government’s standard assessment procedure for energy ratings of buildings (SAP) and is given as guidance only. It should not be considered as a guarantee of performance.”

Array Positioning

Shading

First thing in the morning and last thing in the evening it is possible that surrounding buildings or trees may partially shade a PV array, when the sun is low in the sky. Providing this is however for only about an hour after sunrise or before sunset, this will only have a very small impact on the annual energy generation, as very little power will be generated then anyway.

It is important however to ensure that your PV array will not be shaded during the main part of the day and so avoid placing your array where there will be significant shading from surrounding buildings or trees.

Detailed below is the official definition of shading that Newtech uses in its calculations.

Table H4: Overshading factor

| | % of sky blocked by obstacles. | Overshading factor |
|---------------------|--------------------------------|--------------------|
| Heavy | >80% | 0.5 |
| Significant | >60% - 80% | 0.65 |
| Modest | 20% - 60% | 0.8 |
| None or very little | <20% | 1.0 |

Orientation

The sun rises in the East and sets in the West, but never goes North. Clearly therefore the more that a solar PV array is facing South the more direct sunlight it will receive and the more energy it will produce.

In general you should only site a solar PV array so that it faces South East or South West otherwise its energy generation will be significantly reduced.

Angle

The sun spends most of the time relatively high in the sky and therefore to ensure that a PV panel maximises its exposure to direct sunlight it should be mounted at an angle.

In the UK latitudes, the best angle is between 30 degrees and 45 degrees from horizontal.



Export Companies

One of the following energy companies will supply and buy your exported energy and process your application for Fits with Ofgem.

Opus energy Limited www.opusenergy.com Shaun Heasman 0845 0405951

EDF Energy, Green Energy Team, Andrea Johnston 0800 051 1905

Green Energy www.greenenergy.uk.com 0800 783 8851

NPOWER juice microgeneration@npower.com Thomas Harris 01905 340646

Eco-Tricity, www.ecotricity.co.uk Emma Cook 01453756111

Both the generation and the export tariff will rise annually in line with the retail price index. If you feel up to dealing with the electricity market you can choose to opt out of the export tariff @ 0.03p and gain a better price, however you can only opt back in after 12 months.

Carbon Savings

According to DEFRA the carbon saving on electricity production is 0.56185kg of CO₂ per Kwh, the proposed system generating 2413 Kwh per year, the carbon saving is 1.35 tonnes per annum.

Planning

As you are aware, planning permission maybe required and we can supply a planning pack to assist with your application. We will recommend an experienced planning consultant should you wish to move forward with this project, please let me know if you require any further technical details and we will assist you as much as we can.

Installation

We will carry out the complete mechanical and electrical installation and commissioning of the solar powered system. This should take approximately 3 days.

Maintenance

The solar panels, inverter etc, will need virtually no maintenance but should be kept dry and dust free. The system will require an initial inspection after three months just to check everything is running smoothly.

During normal operation, the solar system can be left to run unattended between maintenance services.

Under the G83/1 & G59/1 agreement, we are obliged to seek permission to connect to the National Grid when connecting a new SSEG. As part of our service we will submit this application to the DNO (Distribution Network Operator).

I'm sure you will appreciate the build quality and system as a whole when you visit the show room in Elland; please call me to arrange a site visit.

Your quotation, terms & conditions are enclosed, if you need any more information please do not hesitate to contact me.

We look forward to hearing from you soon.

Yours sincerely,

Dean Staveley,
M.D: Electrical and Energy Engineer



ISOQAR

Certificate of Registration

This is to certify that the Quality Management System of:

Newtech Design Ltd

**Unit P, Bridge Mills,
Holmfirth, West Yorkshire, HD9 3TW**

has been approved by ISOQAR to the following standard:

ISO 9001: 2008

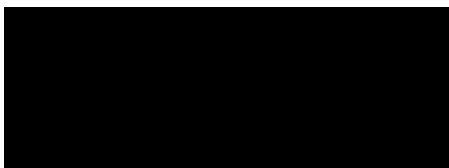


Scope of Activities:

Installation, maintenance, commissioning
and supply of electrical and energy systems

Certificate Number: **7973QM8001**

Signed:
(on behalf of ISOQAR)



Initial Registration Date: **12 October 2009**

Expiry Date: **1 October 2012**

This certificate will remain current subject to the company maintaining its system to the required standard. This will be monitored regularly by ISOQAR. Further clarification regarding the scope of this certificate and the applicability of ISO 9001:2008 requirements may be obtained by consulting the organisation.

REAL Assurance Scheme

for the supply of renewable and micro heat and power generators
to domestic, community and small commercial consumers.

We hereby certify that:

Member No: 00034443

Newtech Design Limited

of

Unit P, Bridge Mills, HOLMFIRTH, HD9 3TW

*has been accepted as a member of the Scheme in respect of any of the following
types of generator:*

Solar photovoltaics
Wind (consumer / micro)

*Members of the Scheme agree to abide by the Consumer Code and may use this
symbol*



Valid From: 01 February 2010

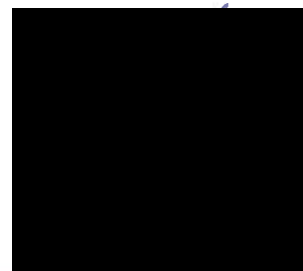
Valid To: 31 December 2010

Issued on behalf of: Renewable Energy Assurance Ltd

Signed on behalf of: Newtech Design Limited

to confirm that we will comply with the consumer code of conduct

by its authorised signatory: Dean Staveley



07 April 2010

Mr Dean Staveley
New Tech Design Ltd
Unit P Bridge Mills
Holmfirth
West Yorkshire
HD9 3TW

Dear Mr Staveley

Confirmation of Cover – Renewable Energy Contractors Insurance
Policy Number: HU PIB 1655615

We are pleased to confirm that cover shall be operative from 07 April 2010 in accordance with your instructions

Features and Benefits

Your policy includes the following features and benefits. Additional covers are available as detailed in the enclosed Key Features document:

- **Professional Indemnity**
 - *Testing, Inspection & certification Feasibility Studies & Calculations* – £250,000
 - *Design / Specification & Advice* – £100,000
 - *All other business activities* - Not Insured
- **Public and Products Liability including Financial Loss**
 - *Limit* – £2,000,000
 - *Financial Loss* £500,000
 - *Inefficacy (Failure to Perform)* - £2,000,000
- **Employers' Liability limit £10,000,000**
- **Additional covers for Material Damage, Business Interruption, Contractors All Risks and Management Liability Portfolio as specified in the attached schedule**

Demands & Needs and Our Recommendation

Please check the details of your schedule which will include details of Sums Insured and confirm which sections of cover are operative, along with the basis of rating you have declared. It is important for you to understand that this information reflects the Demands and Needs you have indicated and that our recommendation is made on this basis. If any of the information has changed or is incorrect please notify us immediately.

Malvern Heights
Chequers Close
Enigma Business Park
MALVERN
WR14 3GP

Fax: 08700 524404

Authorised and Regulated
by the Financial Services
Authority (310320)

Registered Office Address
Fromford House
Church Road, Yatton
Bristol BS37 5JB
Registered in England
Number 1428872

Certificate No:
ECO4002/ASP/238



ECO-Certification

Certificate of Competence

Forename(s): Dean

Surname: Staveley

This is to certify that the above named individual has been successfully assessed against the standards of competence for electrical installation of solar photo-voltaic small scale embedded generator systems.

| Assessment Code: | Description | Expiry Date |
|-------------------------|---|--|
| ECO4002-101 | Design, installation and certification of grid connected Solar Photo-voltaic Systems – Written Assessment | 08/07/2014 |
| ECO4002-102 | Design, installation and certification of grid connected Solar photo-voltaic | 08/07/2014 08/07/2014 |

HIGH PERFORMANCE PHOTOVOLTAIC MODULES SERIES

SPECIFICATION

| | |
|---------------------|--|
| Cells | Mono crystal Si 125mmx125mm pseudo square |
| Number of cells | 6x12 pieces in series |
| Typical application | 24V DC |
| Maximum voltage | 1000V DC |
| Size | 1580 (L) x 808(W) x35(H) mm |
| Weight | 15 Kg |
| Front glass | 3.2 mm toughened glass |

TOLERANCE

| Parameter | Values | Unit |
|--------------------------|-----------|------|
| Operating temperature | -40 +85 | °C |
| Hail diameter @ 80Km/h | Up to 25 | mm |
| Continuous wind pressure | Up to 130 | Km/h |

CONNECTION TERMINALS

Connector type 0.90m wire (ϕ 4 mm²), same as MC connector
 Diode's amount 3 pieces

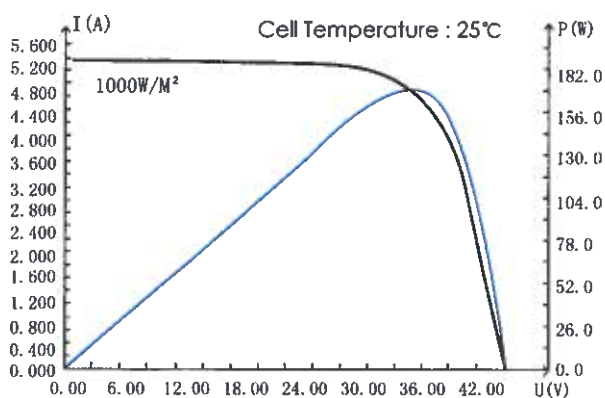
ELECTRICAL TYPICAL VALUES

| Model | Rated Power(Pm) | Tolerance | Rated Current(I _m) | Rated Voltage(V _m) | Short Circuit Current (I _{sc}) | Open Circuit Voltage (V _{oc}) |
|-------------|-----------------|-----------|--------------------------------|--------------------------------|--|---|
| PS160M—24/F | 160W | ±3% | 4.63A | 34.6V | 5.05A | 43.8V |
| PS165M—24/F | 165W | ±3% | 4.71A | 35.0V | 5.10A | 44.0V |
| PS170M—24/F | 170W | ±3% | 4.80A | 35.4V | 5.15A | 44.2V |
| PS175M—24/F | 175W | ±3% | 4.89A | 35.8V | 5.20A | 44.4V |
| PS180M—24/F | 180W | ±3% | 4.98A | 36.2V | 5.25A | 44.6V |
| PS185M—24/F | 185W | ±3% | 5.06A | 36.6V | 5.30A | 44.8V |
| PS190M—24/F | 190W | ±3% | 5.14A | 37.0V | 5.35A | 45.0V |

| | | |
|--|---------------------------------|-----------|
| NOCT (Nominal Operation Cell Temperature) : 45°C±2°C | Voltage Temperature coefficient | -0.35%/°C |
| | Current Temperature coefficient | 0.05%/°C |
| | Power Temperature coefficient | -0.48%/°C |

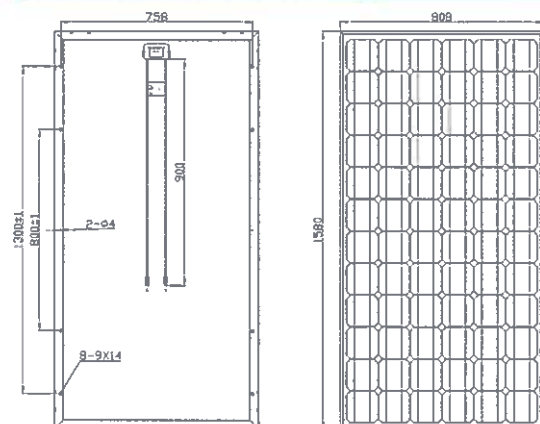
Note: defined as standard deviation of thousands measurements. Absolute power values depend on the measuring system. They can differ by +/- 5% from one measuring system to another.

CHARACTERISTIC CURVES



(Measurement conditions under irradiance level of 1000W/M², Air Mass 1.5 Spectrum, cell temperature of 25°C)

DIMENSIONS



Mr J P Marsden
Redhouse
6 Church Street
Cawthorne
S75 4HP

Doc ⑦

19th April 2010

Quotation Solar Water heating

Dear John

Thank you for your interest in solar thermal, and the opportunity to visit your lovely and interesting property. Following a detailed study of the project, I can confirm that the house is suitable for a solar thermal system. We have designed a bespoke solar system taking into account property size and future usage, to provide many years of free hot water. The system aims to provide around 60 to 70% of you annual hot water usage.

The system will incorporate your existing unvented cylinder, along with a pre heat solar cylinder. Water is heated by the sun in the preheat cylinder before passing through to the main tank. A circulation pump will be incorporated to transfer hot water from the pre heat tank to the main tank, when the pre heat tank reaches temperature. The boiler will only be required to take the pre heated water up to the storage temperature. The advantages of this system include, more rapid heating of the smaller volume pre heat tank, and therefore making solar heated water available more quickly, and less disruption during installation as the existing tank will stay in place.

We have specified High performance Kingspan Thermomax HP200 evacuated tube solar panels. Kingspan Thermomax are regarded as world leaders in solar panel design and manufacture. Thermomax panels have a dark finish, lower profile and are more aesthetically pleasing than many panels on the market. Modern solar systems have an expected useful life cycle of around of 25 years.

This is a complete solar package and includes pump station, digital controller all pipe work and solar controls.

Our quotation includes;

- Kingspan Thermomax HP200 x1 panel (30 tubes in total 3m²)
- Specially manufactured panel mounting frame
- Pump station, controller, expansion vessel
- Stainless steel pre insulated pipe work
- Lightning protection for solar controller
- System glycol solution giving protection to - 30C
- Unvented stainless steel pre heat cylinder 180L
- All associated installation materials
- Installation labour

The cost of the above system installed and commissioned is £5978 plus vat at the prevailing rate, solar usually 5%

- Installation is carried out by ourselves and will take 4 days
- We are BPEC certified for the installation of solar thermal and unvented hot water systems
- The system includes a 12 month warranty on all parts and labour
- This quotation is valid for 3 months from date of issue
- Kingspan Thermomax solar panels carry a 10 year manufacturers warranty if installed by an accredited installer.

Solar water heating is a very effective way of reducing carbon emissions, and helping to reduce climate change, as well as greatly reducing energy bills. A system of this size will reduce your carbon emissions by around 500 kgs annually; it's the equivalent of taking a small car off the road.

If you require any further information, wish to discuss any points in greater detail, or have any questions about Solar Thermal, please do not hesitate to contact me, or visit our website at, www.solarworxs.co.uk

Method statements, qualifications, insurance details are available upon request, as are customer references.


Phil Murat
Solarworxs Ltd



Kingspan SOLAR
Accredited Installer

SolarWorxs Ltd

Chapelgate Scholes Holmfirth West Yorkshire HD9 1SX

T: 0845 8621694 (local rate) M: 07500 932951 E: info@solarworxs.co.uk

www.solarworxs.co.uk

Solarworxs Ltd Registered in England No. 6922187 Vat 981674381

Solar - Specification summary

The HP200 Collector

This collector is a 'dry' heat pipe product. In this collector, the heat pipe is attached to the back of the absorber plate. Evaporator fluid is contained within the heat pipe. The energy absorbed by the absorber causes the fluid to change from a fluid state to a vapour state and the vapour rises to the condenser bulb.

The condenser is connected directly into the manifold via a dry pocket. Within the manifold the solar system solution is passed across the dry pocket that houses the condenser.

The condenser releases the latent heat of evaporation to the solar system solution and condenses, the condensate returns to the heat pipe and the cycle is repeated.

Due to the dry connection the HP200 tubes can be replaced without the need of draining down the solar system.

HP200 collectors are available in 3 sizes:

10 Tube = 1.08m² aperture area

20 Tube = 2.16m² aperture area

30 Tube = 3.23m² aperture area

| | HP200 - 1m ² | HP200 - 2m ² | HP200 - 3m ² |
|---|--|--|--------------------------------------|
| Dimensions | | | |
| Absorber Area | 1.002m ² | 2.01m ² | 3.021m ² |
| Overall Dimensions | 2005 x 709 x 97mm | 2005 x 1418 x 97mm | 2005 x 2127 x 97mm |
| Width of Manifold | 709mm | 1418mm | 2127mm |
| Length (Tube and Manifold) | 2005mm | 2005mm | 2005mm |
| Depth | 97mm | 97mm | 97mm |
| Fluid Volume (In Manifold) | 0.6 Ltr | 1.2 Ltr | 1.7 Ltr |
| Inlet and Outlet Dimensions | 22mm | 22mm | 22mm |
| Weight (Empty) | 25.4kg | 50.3kg | 75.1kg |
| Number of tubes | 10 | 20 | 30 |
| Mounting | | | |
| Recommended Inclination | 20-70° | 20-70° | 20-70° |
| Operating Data | | | |
| Efficiency | Based on Absorber | Based on Absorber | Based on Absorber |
| eta 0 - Zero loss collector efficiency (ni) | 0.778 | 0.792 | 0.778 |
| k1 - Heat loss coefficient (a1) | 1.66 W/m ² K | 1.25 W/m ² K | 0.91 W/m ² K |
| k2 | 0.0062 W/m ² K ² | 0.0088 W/m ² K ² | 0.01 W/m ² K ² |
| Test Report | | | |
| Performance Test report | BLG 3509 | BLG 10906 | BLG 11006 |
| Quality Test report | | | |
| Flow Rate | | | |
| Rated | 80 Ltr / h | 160 Ltr / h | 240 Ltr / h |
| Minimum | 60 Ltr / h | 120 Ltr / h | 180 Ltr / h |
| Maximum | 150 Ltr / h | 300 Ltr / h | 480 Ltr / h |
| Maximum Operating Pressure | 8 Bar | 8 Bar | 8 Bar |
| Stagnation Temperature | 166°C | 166°C | 166°C |
| Heat Transfer Fluid | Water/Glycol | Water/Glycol | Water/Glycol |
| Materials | | | |
| Absorber | Copper | Copper | Copper |
| Coating | Selective Coating | Selective Coating | Selective Coating |
| Absorbance | 95% | 95% | 95% |
| Emissivity | 5% | 5% | 5% |
| Mounting frame and clips | Stainless Steel, Aluminium EPDM | Stainless Steel, Aluminium EPDM | Stainless Steel, Aluminium EPDM |
| Glass | Low Iron - Transm. 0.92 | Low Iron - Transm. 0.92 | Low Iron - Transm. 0.92 |
| Vacuum | Higher than 10 ⁻⁶ Bar | Higher than 10 ⁻⁶ Bar | Higher than 10 ⁻⁶ Bar |
| Quality Certification / Solar Keymark | Yes | Yes | Yes |

Listed Building justification statement for installation of solar panels at Red House

Red House is a grade 2 listed building in the centre of Cawthorne. It was built c 1708 and is a good example of Queen Ann architecture with later Georgian and later additions.

Over the last 5 years we have been sympathetically restoring it to ensure the house remains in good condition well into the next 300 years and beyond.

The house is surprisingly well insulated having very substantial walls and attic rooms which help to reduce heat loss through the roof. We are keen however to try to make Red House as economically self sufficient and environmentally friendly as possible. We are interested in minimising our impact on the environment by reducing our energy usage and making use of renewable energy sources where possible.

Red house has a roof with a central channel and an entrance to it through the centre of the house. The inward looking elevation of one side of the roof faces South West which lends itself to the siting of solar panels.

Our proposal is to place 16 x 185watt PV solar panels on the South West roof elevation and 1 x solar thermal panel on the south (infill) roof elevation under the chimney stack.

The full specification of the panels with their projected performance is included with this application.

The panels will not be visible from any public view point and will sit on top of the roof structure so will not alter the fabric or integrity of the building at all.

The work is to be carried out by fully qualified companies whose details are also included.

We have always been anxious to maintain and respect the historical integrity of the building in which our family lives, at the same time we seek to find ways in which we can live our lives with the minimal affect on the environment and dwindling natural resources. The adaptation we seek is not a permanent alteration, the panels could be removed, but we believe the careful instillation of solar panels is a reasonable attempt to adapt a building to modern circumstances without altering its basic fabric or visible aesthetics.

We hope this plan meets with your approval and remain at your disposal should you require any further information.