Michael Hyde and Associates

1ME3/Db Wythenshawe NIHR **Roof membrane colours** 13-10-11

Planning Approval reference: 093601/FO/2010/S2

Michael Hyde and Asociates understand as follows:-

- Existing adjoining roof of the MEU building approximates to RAL 7046
- Proposed Roof membrane to accommodate Photovoltaic film approximates to RAL 7040

PLANNING AND BUILDING CONTROL
20 OCT 2011

Relevant RAL colour charts shown below

(Note – colours are approximations only, due to limitations of minotors and printers. Two charts have been provided from diferent sources to offer an illustration of such variations,)

RAL 1035 Pearl beige	RAL 3026 Luminous bright red	RAL 5020 Ocean blue	RAL 6029 Mint green	RAL 7039 Quartz grey	RAL 9007 Grey aluminium
RAL 1036 Pearl gold	RAL 3027 Raspberry red	RAL 5021 Water blue	RAL 6032 Signal green	RAL 7040 Window grey	RAL 9010 Pure white
RAL 1037 Sun yellow	RAL 3031 Orient red	RAL 5022 Night blue	RAL 6033 Mint turquoise	RAL 7042 Traffic grey A	RAL 9011 Graphite black
RAL 2000 Yellow orange	RAL 3032 Pearl ruby red	RAL 5023 Distant blue	RAL 6034 Pastel turquoise	RAL 7043 Traffic grey B	RAL 9016 Traffic white
RAL 2001 Red orange	RAL 3033 Pearl pink	RAL 5024 Pastel blue	RAL 6035 Pearl green	RAL 7044 Silk grey	RAL 9017 Traffic black
RAL 2002 Vermilion	RAL 4001 Red lilac	RAL 5025 Pearl gentian blue	RAL 6036 Pearl opal green	RAL 7045 Telegrey 1	RAL 9018 Papyrus white
RAL 2003 Pastel orange	RAL 4002 Red violet	RAL 5026 Pearl night blue	RAL 7000 Squirrel grey	RAL 7046 Telegrey 2	RAL 9022 Pearl light grey
RAL 2004 Pure orange	RAL 4003 Heather violet	RAL 6000 Patina green	RAL 7001 Silver grey	RAL 7047 Telegrey 4	RAL 9023 Pearl dark grey


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PLANNING AND
BUILDING CONTROL
20 OCT 2011

Solar PV Feasibility Study & Outline Estimate

Project: Clinical Research Facility, Wythenshaw Hospital
For: Michael Hyde & Associates



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Introduction

Thank you for the opportunity to quote for the installation of this project. Based on the information supplied, we enclose our estimate and clarifications.

Kingspan Powerpanel Solar PV Systems

- Kingspan Ltd is part of Kingspan Group PLC and is a leading construction system supplier in the United Kingdom. With a turnover of £1.25 billion it has both the financial ability to fund and guarantee large scale photovoltaic systems.

- Kingspan Powerpanel is a fully integrated solar PV system. With Kingspan's expertise in sustainable energy solutions customers can be assured that we not only have the expertise to design a solution that will suit your requirements but also the capacity to fulfil every aspect of your renewable energy project, from design and procurement to installation, commissioning and maintenance.

- All our installers and products are MCS Accredited, which enables customers to fully utilise their PV installations and maximise returns from the Clean Energy Cashback scheme (Feed-in Tariffs).

- The mechanical attachment mechanisms for our PV systems are specially designed for Kingspan Roof profiles and Kingspan have carried out extensive structural and mechanical testing on all of our roof panel specific PV mounting solutions. Kingspan avoid going back to the main steel work or purlins and therefore eliminate problems associated with this type of protrusion.

- Kingspan have secured a guaranteed supply of PV modules and inverters to meet our supply chain demand. Each supplier has been vetted in terms of health and safety, quality, technical and financial status.

- Kingspan offers a comprehensive post project install Operation and Maintenance (O&M) contract which will ensure that the PV system is running as efficiently as it should be at all times.

Kingspan 25 Year Total Panel Guarantee

Kingspan Powerpanel Total Panel Guarantee warrants the thermal and structural performance of the insulated panels, the mountings and fixings of the solar panels and the power output for a period of 25 years.

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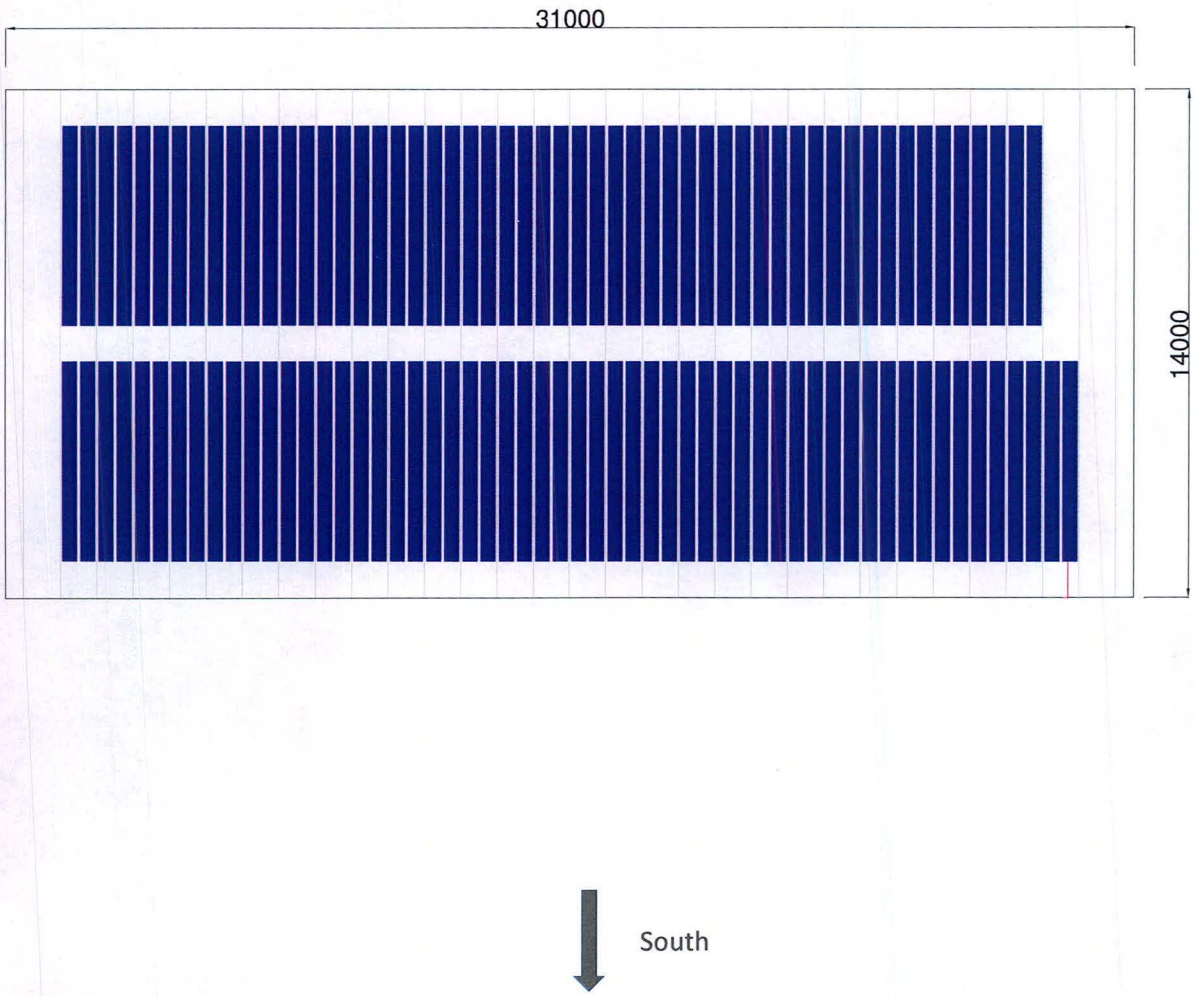
PV System Initial System Design

The initial system design below has been produced based on the information supplied to us.

Based on this information we have calculated:

- System Cost per kWp installed
- System Size: configuration with layout, sizes and quantity, and determination of all system parts.
- Calculation of expected power output and the associated revenue achievable.



Kingspan Ltd, Greenfield Business Park No. 2, Greenfield, Holywell, Flintshire, North Wales, CH8 7GJ.
Tel: +44 (0) 1352 716100 Fax: +44 (0) 1352 710161
www.kingspanpowerpanel.com

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Summary and Price

This turnkey estimate includes the design, supply, installation and commissioning of the solar PV system. We will mount the solar PV panels, make all AC & DC cabling works to the inverter equipment and the final AC connection to the building's main LV panel.

You will receive all the benefits listed below while maintaining your complete 25 year roof guarantee.

PV System Summary

Total System Size	15.84 kWp
PV Area	237.6 m^2
Number of modules	110 modules
Annual yield based on PVSYST	13,252 kWhrs
Annual CO^2 offset	6,851 $kgCO_2$/annum
kWr/kWp/annum	837
Cost per kWp	£3,427
Revenue Generated per annum (100% used on site)*	£5,685
Revenue Generated per annum (50% on site/50% grid)*	£5,221
Feed-in tariff rate per kWh	£0.329
25 year Feed-in Tariff forecast**	£192,823
Simple Payback	9 years
Fully installed guide price	**£54,284**

Each kWh produced on-site offsets 0.529 kgCO2
*We have assumed savings for offset electricity using 10p/kWh and a 5% annual increase in electricity costs
RPI indexation of 3% p.a. assumed

This estimate is based on the information supplied and is subject to a full site Technical Survey.

The performance of solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year. The indicated output detailed in this estimate is calculated using industry leading solar system design software, PVSYST. Estimates given should be used as guidance only and should not be considered as a guarantee of performance.

Please read our attached clarifications of estimate & quotation breakdown section and do not hesitate to contact us for any further information you may require.

Carla Jones
PV Estimator

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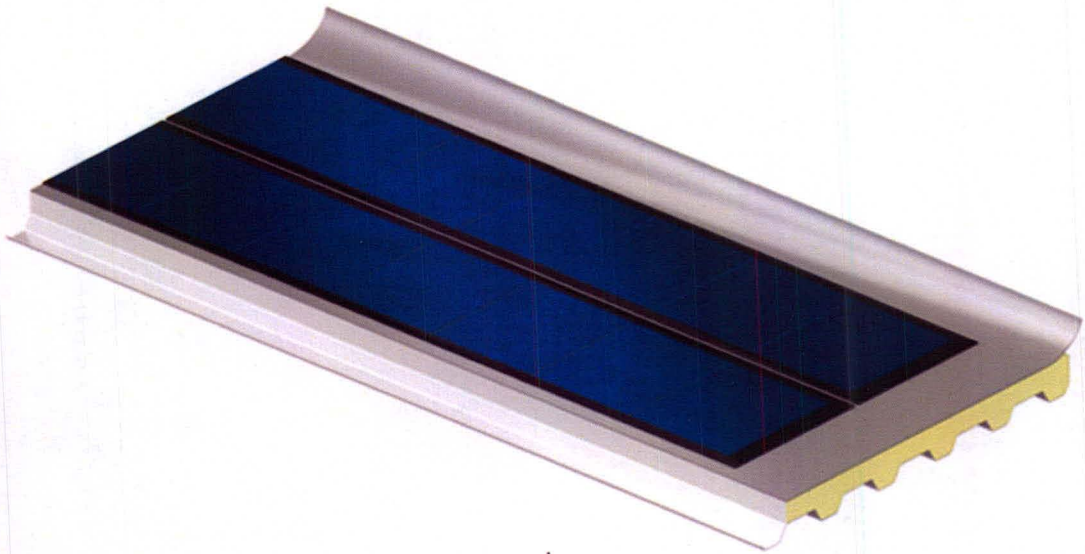
Thin Film PV Technical Data



Centrosolar TF Membrane Professional

Nominal Power	**144 Wp**
Cell technology	Amorphous Silicon (a-si) Thin Film
Output tolerance	+5%
Length	5486 mm
Width	394 mm
Thickness	4mm
Safety Class	II
Max. system voltage	1000 VDC

*Wired and ready for connection
*2 cables with MC plug connector
Certified in accordance with IEC/EN 61730. IEC/EN 61215

Performance Guarantee & Weight

Guaranteed performance at 10 years (92%), 20 years (84%), 25 years (80%). No mechanical framework required. Extra weight associated with PV system: 4.5kg/m2. Adhesive: Ethylene propylene copolymer adhesive sealant with microbial inhibitor.

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Technical Data: Inverter

We use high performance inverters made by Fronius. They function to convert the Direct Current, produced by the modules into Alternating Current which can then be fed into a 220 – 240 Volt Network.

The actual operating data can be retrieved over a communication interface and logged using the appropriate PC program.

Fronius
POWERING YOUR FUTURE

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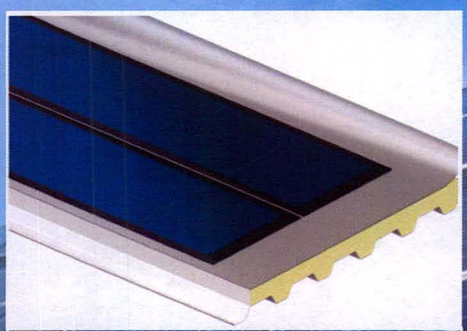

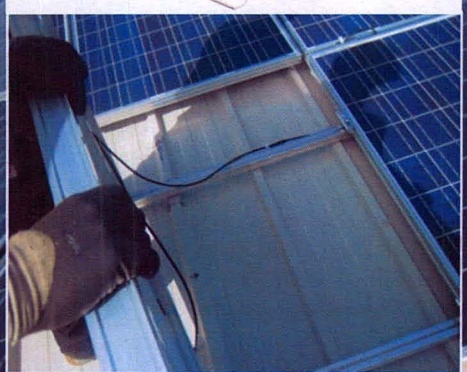



Integrated Solar PV Solutions



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