Kier Energy Solutions
PV Systems
for
Buildings

The Power of Nature

Longships Lighthouse at Lands End

Context

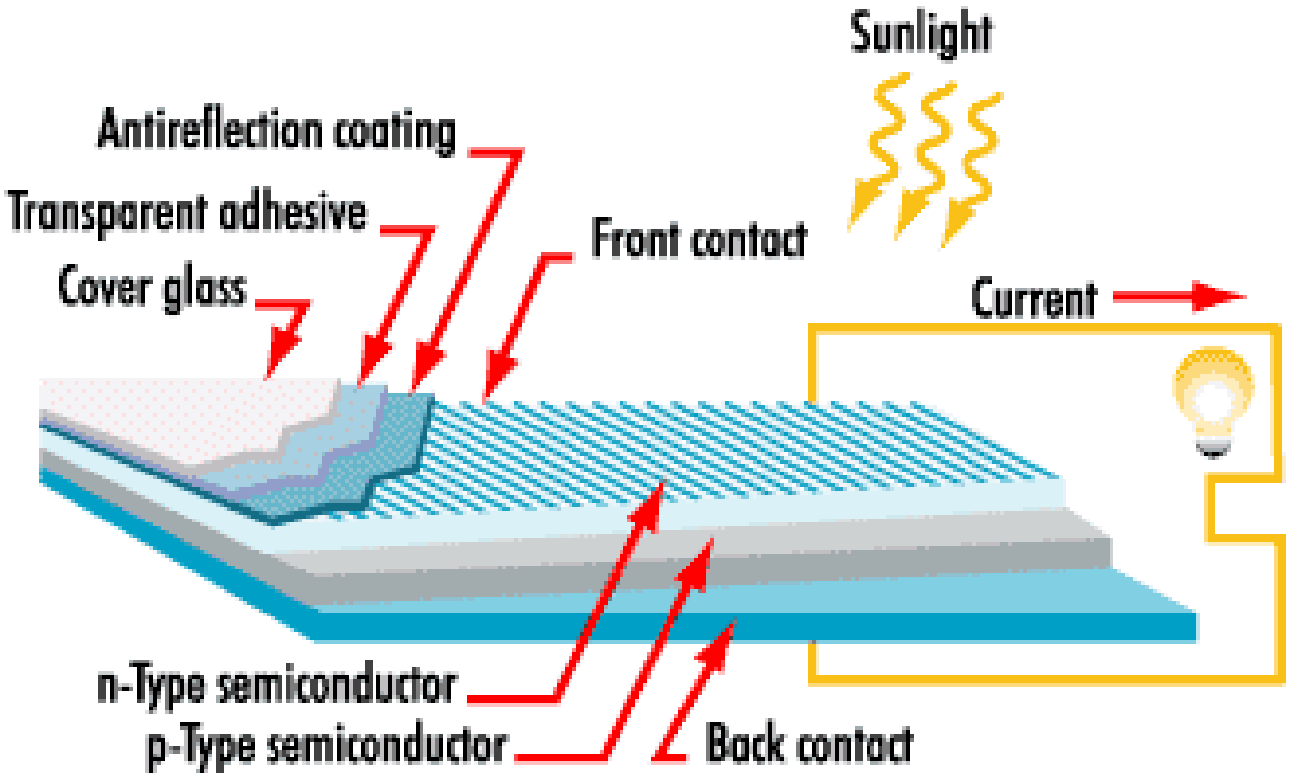
- 30% of the UK's CO^2 emissions from buildings

2/3rd electricity
1/3rd gas & oil

Carbon density of electricity
529g CO^2 per kWh
(Gas: 190g Oil: 260g)

The PV cell

- **The core of the system - silicon**



The PV module

- Mono / Poly / Hybrid
- 1.3 – 1.6 m_2 approx
- 180 to 245 watts
- 24 volts, connected in series
- Strength
- Life
- CO^2 payback 4 years (Energy Bulletin)

The PV array

- 1 kWp array : 900 kWhrs per year

- Pitched roof: 8m^2 per kWp
- Flat roof and Ground Mounted: 12 – 16m^2 per kWp
- Glass/glass: 12 - 20m^2 per kWp

- Approx. weight 17 kgs per m^2

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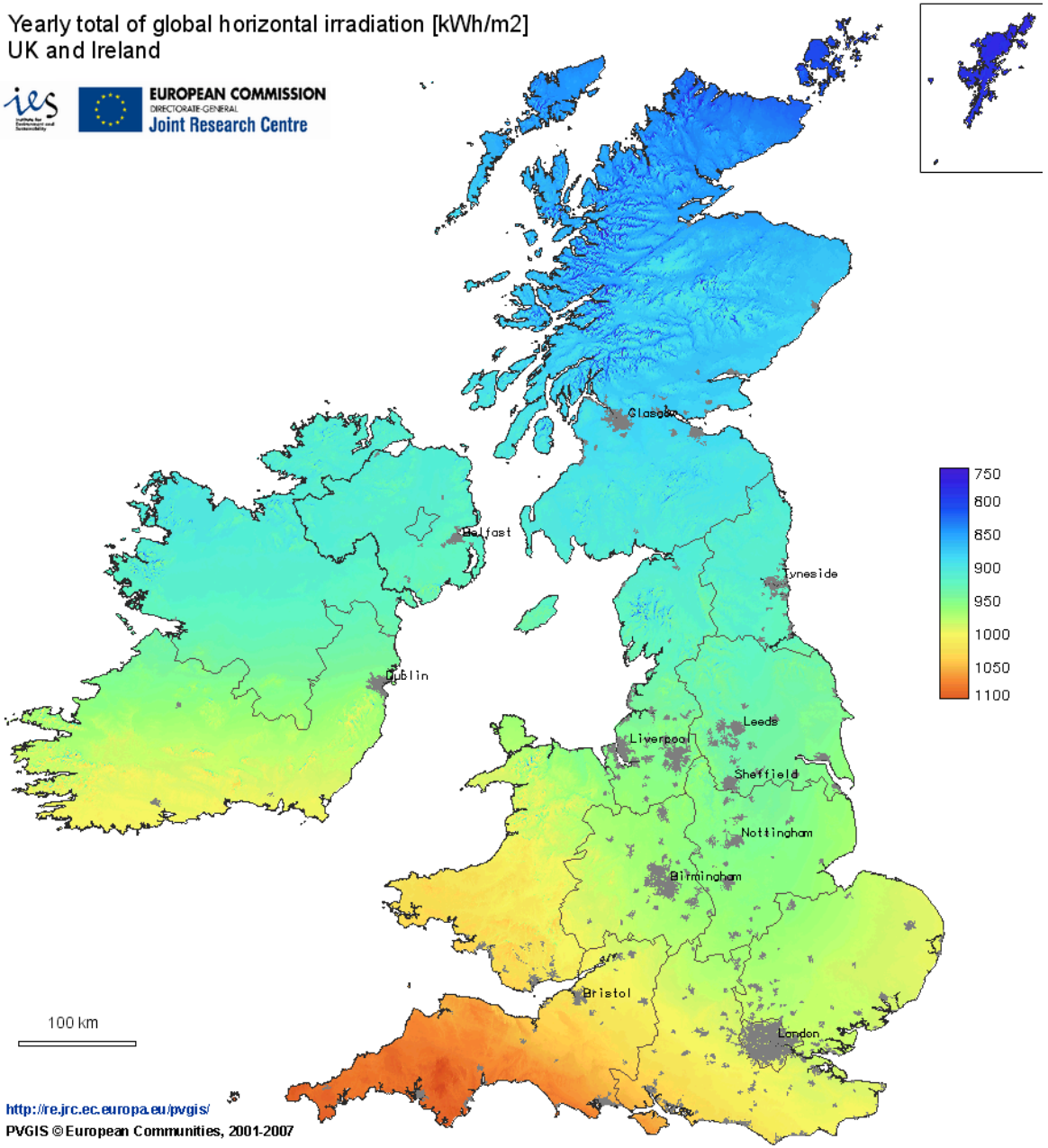
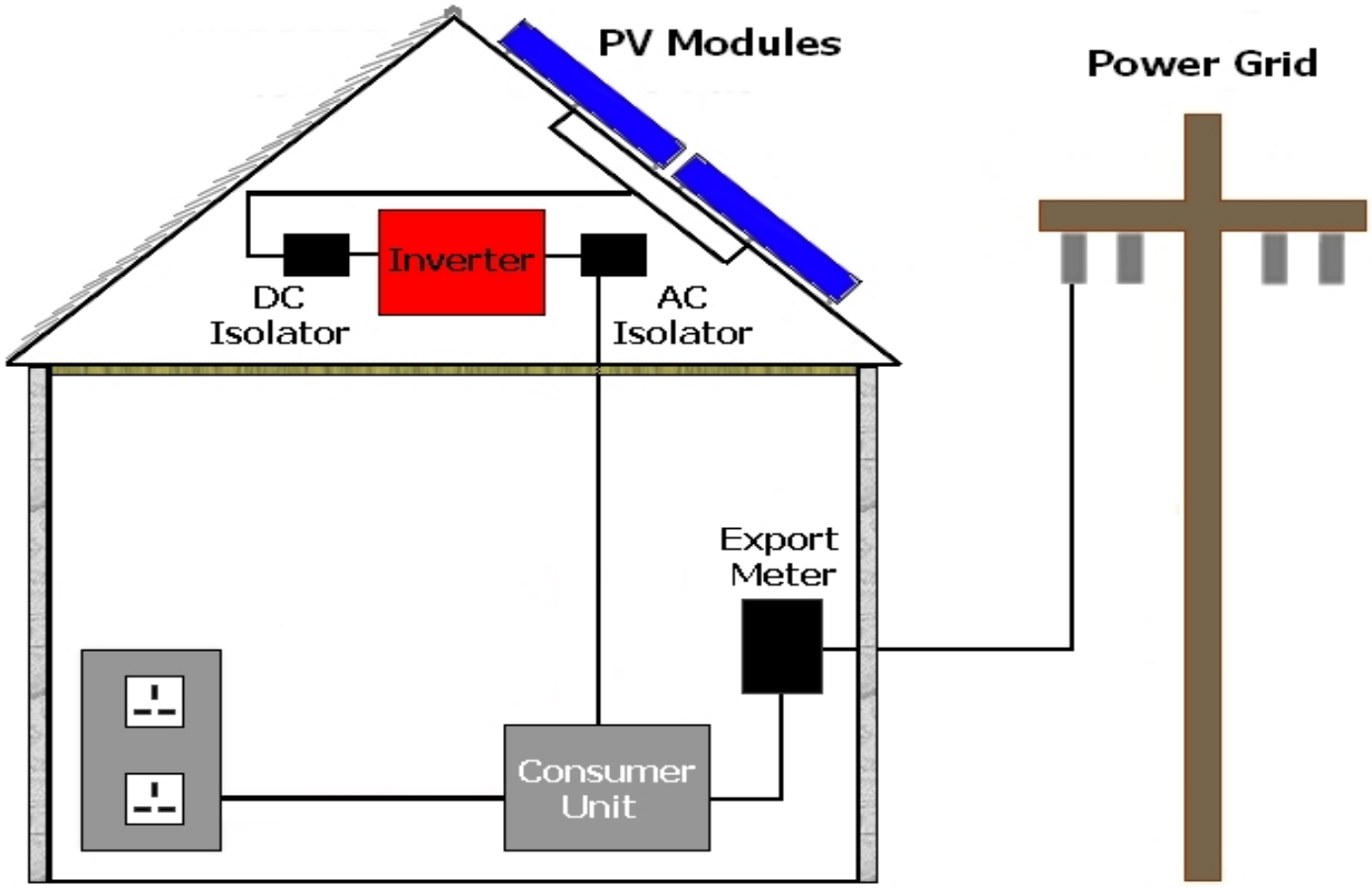
Yearly total of global horizontal irradiation [kWh/m2]
UK and Ireland



The System


PV Modules
Power Grid
Inverter
DC
Isolator
AC
Isolator
Export
Meter
Consumer
Unit

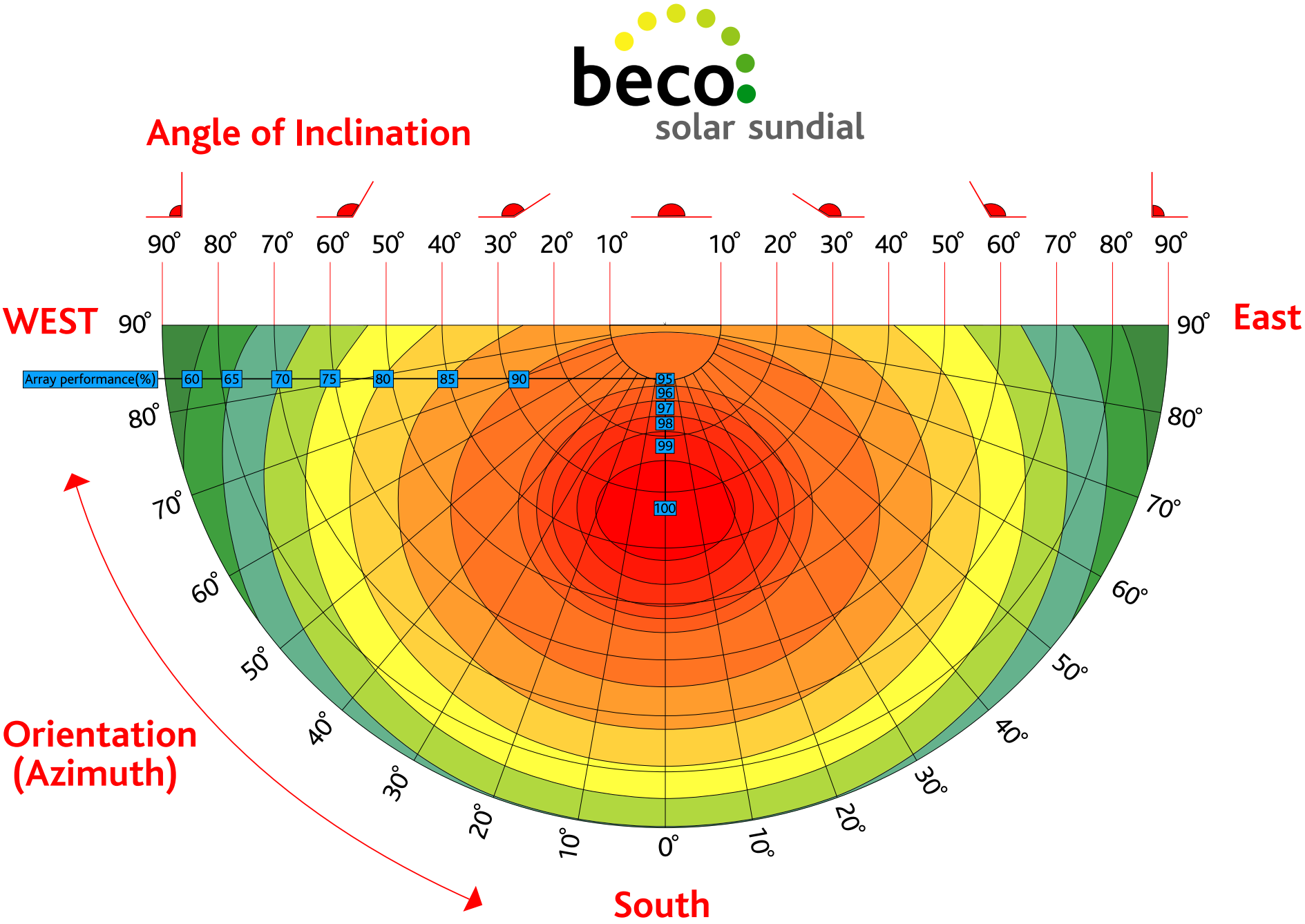
Inverter installation

Design factors

- Orientation & Pitch–

  Optimum - Due south with a pitch of 35°
  Pitch range - 10^{o} to 45^{o}
  East and West Facing **(11% loss @ 15^{o} pitch)**

- Shading – the key factor


beco
solar sundial
Angle of Inclination
90° 80° 70° 60° 50° 40° 30° 20° 10° 10° 20° 30° 40° 50° 60° 70° 80° 90°
WEST
East
90°
80°
70°
60°
50°
40°
30°
20°
10°
0°
Array performance(%)
60 65 70 75 80 85 90 95 96 97 98 99 100
Orientation
(Azimuth)
South

Above Roof Systems

- Can be installed on almost any type of roof
- Ideal for flat-roof applications
- Simple to retrofit

Above roof - vertical and lateral support system

Above Roof 2.6 kWp

Somerset C C. 22.5 kWp

Sidcup Leisure Centre 18 kWp

Solion pods 1.62 kWp

94.72 kWp

Integrated Systems

- Component of the building fabric
- Forms the impermeable roof covering
- Reduces area of the non - PV cladding
- Need for provision at early design stage

Housing Developments


R560 KUF

80W Integrated Panels – powder coated frames

Nu-Lok system 2.1 kWp

Feed-In Tariff

Feed-in Tariff (FIT) from April 2011

The three revenue streams:

Feed-in Tariff	43.3p – 30.7p
Units exported	3.1p
Units generated & used	9p – 13.5p

Expected ROI – between 7% and 13%

What does this mean?

- 1 kWp installed approximately will give approx. 900 kWhs of electricity p.a.
- 900 kWhs = £390 of Feed-in tariff and £108 of free electricity. Index linked for 25 years

Why use Solar PV?

- No mechanical parts, no Maintenance
- Long lifetime – modules guaranteed for 25 years; lifetime aprroximately- 50 years
- The most effective technology for reducing CO2 emissions from buildings in normal English weather conditions
- Excellent for helping reduce ‘Fuel Poverty’
- A financial investment

Why use KIER beco solar

- Over 30 years of experience in Solar systems
- Over 700 systems installed totaling over 2 Mgw
- Local expertise, backed by a FTSE 250 group

PV – the future

- Grid parity – by 2017?
- Grid electricity costs increasing by 3/5/10/20% p.a.?
- PV costs reducing dropped 50% in past 18 months will not continue at this rate
- FIT rates reducing from March 2012

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