

# Sustainable Innovation and Design – Integrating Renewable Energy

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**Specialists in Renewable Energy Technologies**

"By 2015, it is forecast that 75% of the UK's gas requirements will need to be imported."

1. About Southern Solar
2. Energy Conservation
3. Renewable heat
4. Renewable electricity
5. Developing and Accelerating SID

## 1. About Southern Solar

### Southern Solar Ltd

#### What we do?

Design and install systems for:

- Solar Hot Water
- Solar Electric
- Wind Turbines
- Ground Source Heat Pumps
- Wood Pellet Boilers

Offices in Sussex, Bristol and Hereford

**Specialists in Renewable Energy Technologies**

## 2. Conservation



**If all 23 million domestic electricity consumers switched one light bulb to an energy efficient one, then we could turn off two nuclear power stations.**

## 3. Renewable heat

# Renewable Heat

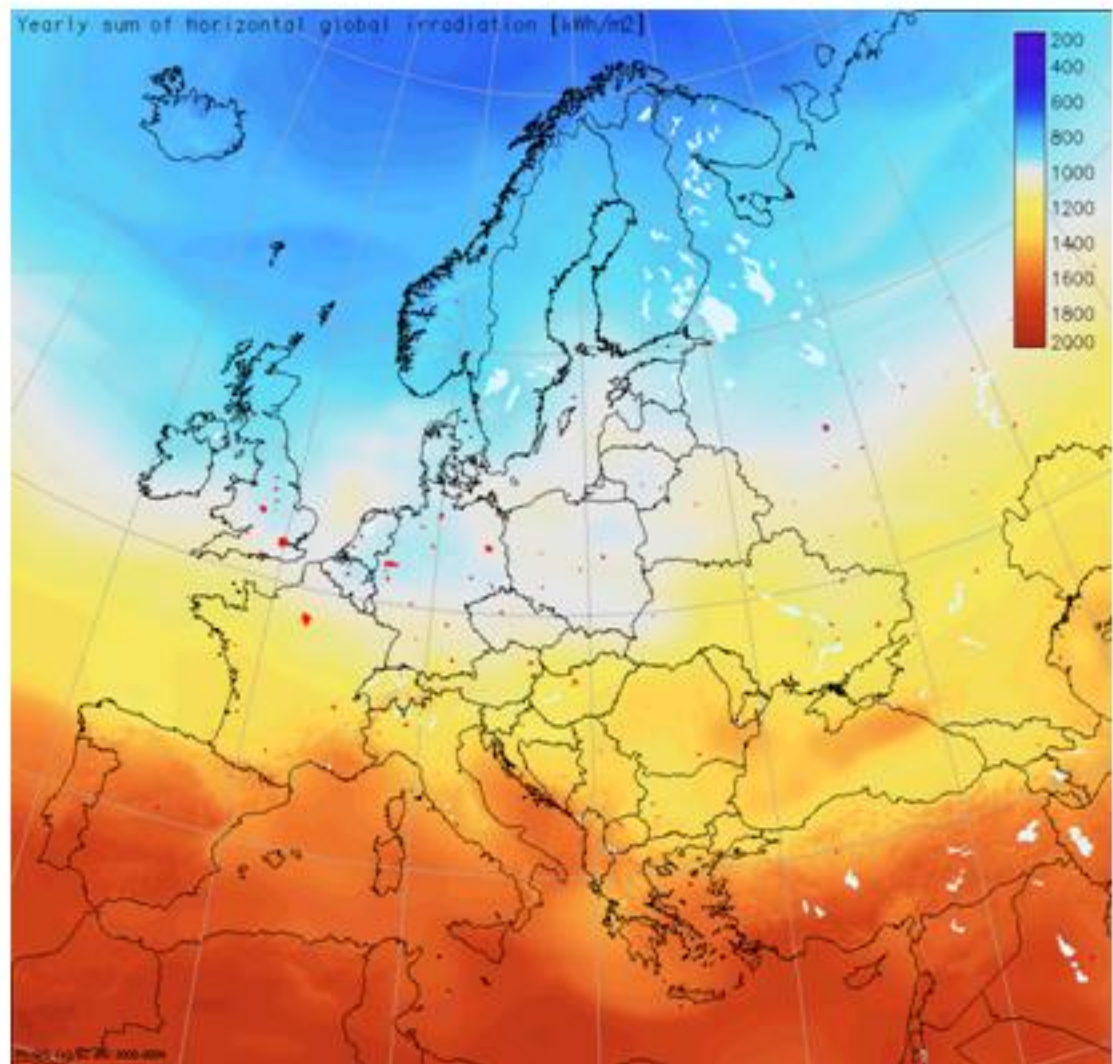
- Solar Thermal
- Biomass
- Heat Pumps

## 3. Renewable heat

The resource available:

**In one day, enough solar energy lands on the planet to power the whole world for several years.**

*img: solar Solar*



## 3. Renewable heat

### Technologies: Solar Thermal

- Simple technology.
- Easily Integrated into existing buildings.
- Provides 60% of hot water needs over year.
- Most market ready of all small renewables.
- Lots of development potential.
- Could meet 4% of UK energy requirements





## 3. Renewable heat

### Types of Panel

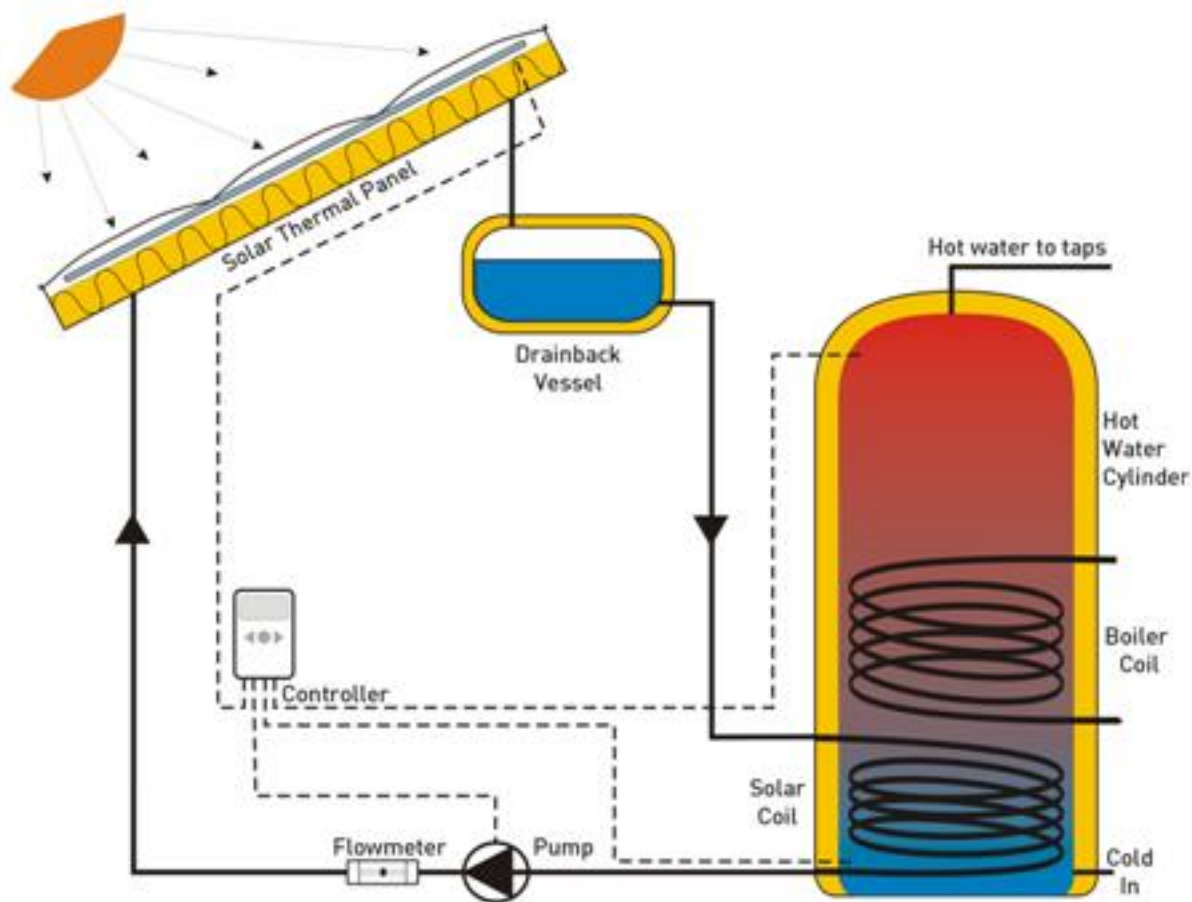


## 3. Renewable heat



## 3. Renewable heat

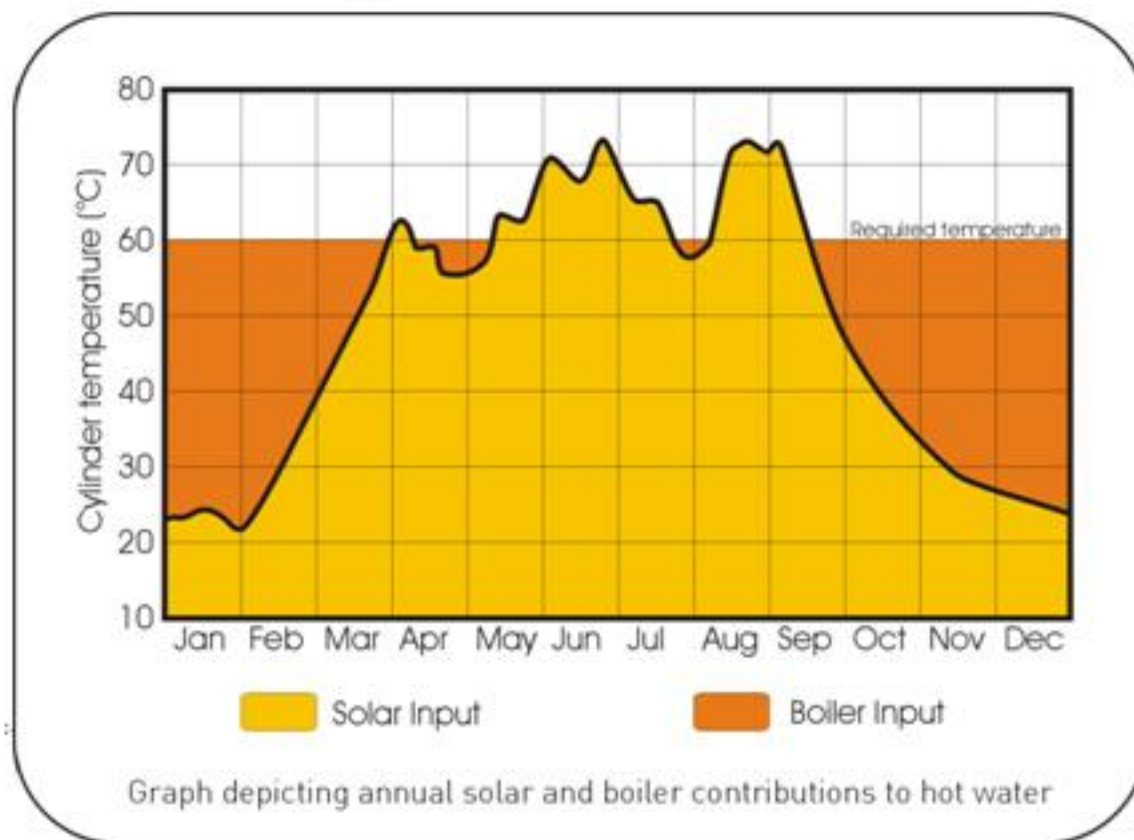
### A Typical System



“Drain back” systems

mag. solar solar

## 3. Renewable heat Outputs and Savings



## 3. Renewable heat

### Biomass

- Oldest form of heating
- Burned and replanted to become virtually carbon neutral.
- Wood products or wastes can be chipped or pelletised to make them easy to handle and ignite.



**Short rotation coppice**



**Domestic Wood Pellet Stove**

## 3. Renewable heat

### Biomass -

**Wood Pellet Boilers**  
Controllable clean wood  
heating for a range of  
applications.



## 3. Renewable heat

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## 3. Renewable heat

### Technologies: Heat Pumps

- Efficient buildings needed
- Large space around them required
- Works best with under floor heating
- "Factor of four"





## 4. Renewable Electricity

- Solar Electric
- Wind Power

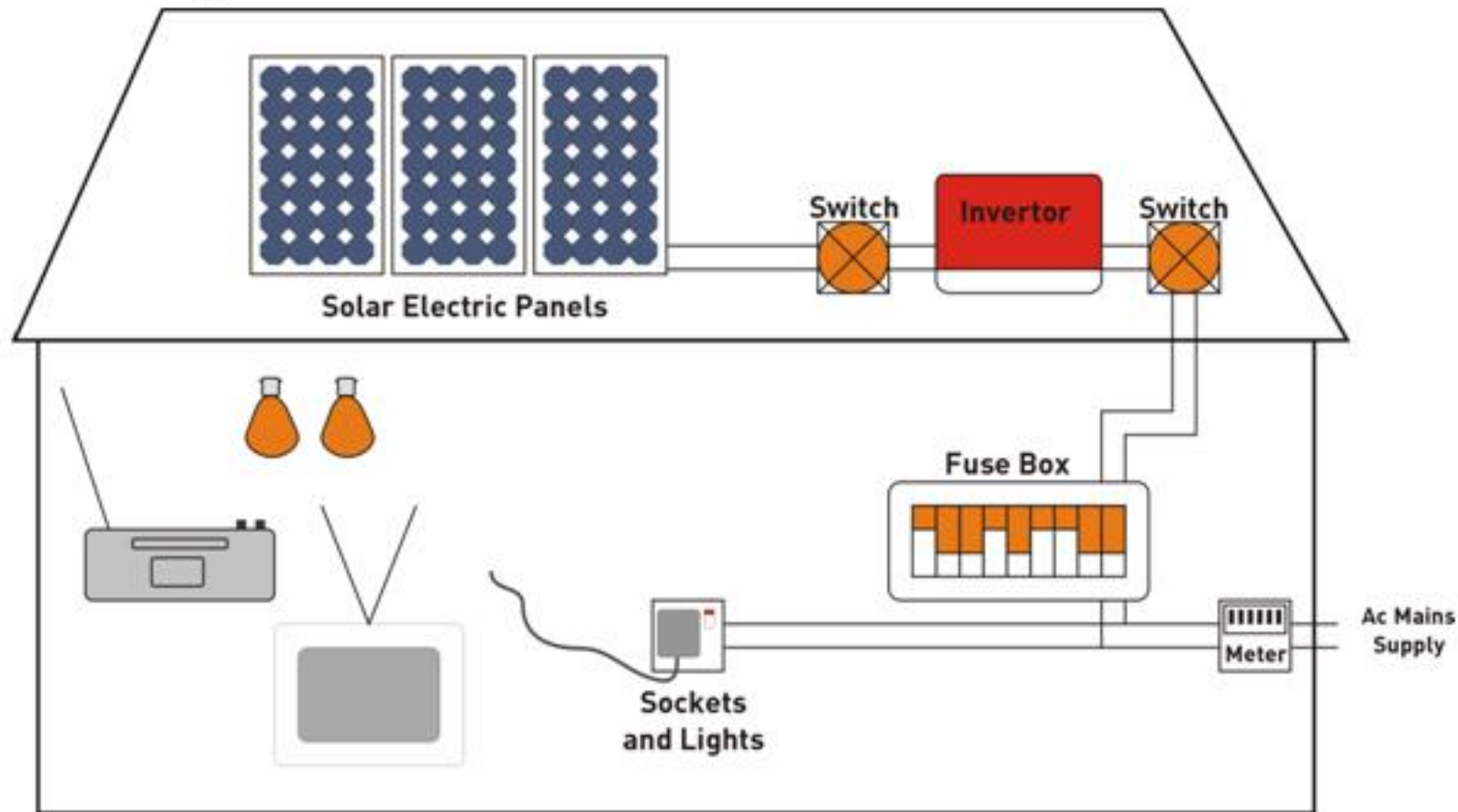
## 4. Renewable electricity Solar Electric

- Generates electricity from light.
- Can be used to replace roof covering, or cladding.
- Hi – tech with a long life expectancy.



- Typical system could prevent 34 tonnes CO<sub>2</sub> in its lifetime.
- Could provide 10,000 times more energy than the world currently uses.

## 4. Renewable electricity Technologies: Solar Electric



## 4. Renewable electricity

Building Integration:

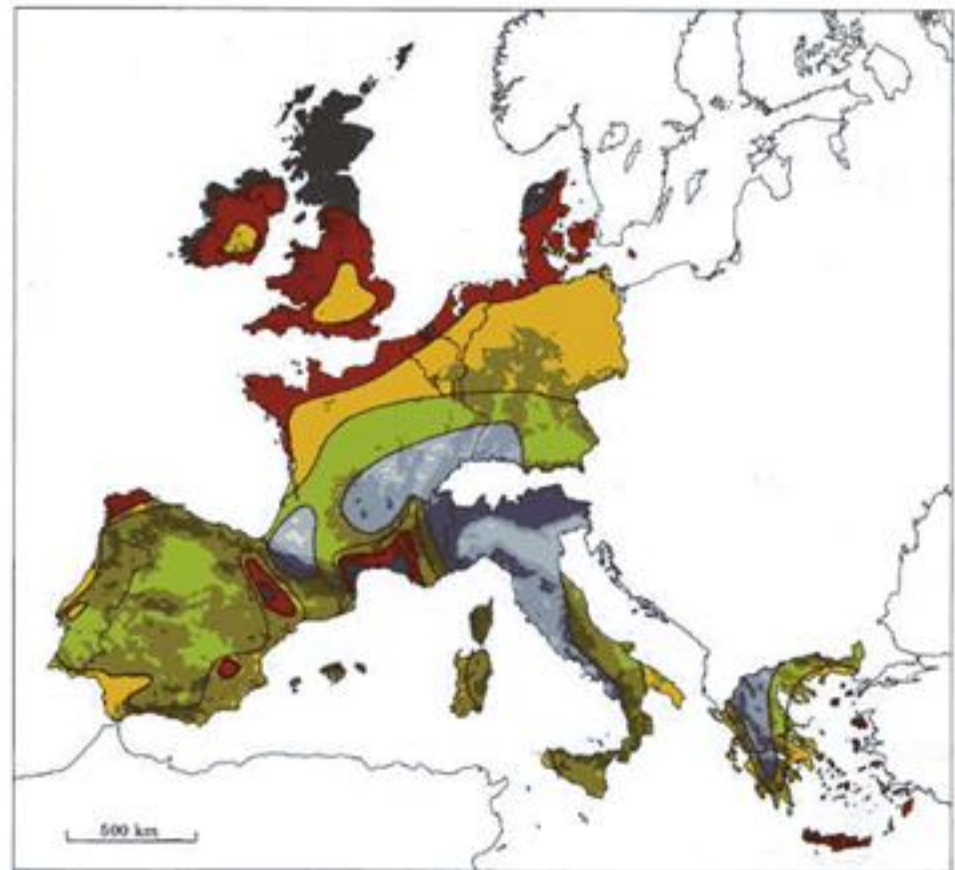


## 4. Renewable electricity

### Wind Power

The resource available:

**The UK is the  
windiest country in  
Europe**



Wind resources <sup>1</sup> at 50 metres above ground level for five different topographic conditions									
Sheltered terrain <sup>2</sup>		Open plain <sup>3</sup>		At a sea coast <sup>4</sup>		Open sea <sup>5</sup>		Hills and ridges <sup>6</sup>	
$m s^{-1}$	$Wm^{-2}$	$m s^{-1}$	$Wm^{-2}$	$m s^{-1}$	$Wm^{-2}$	$m s^{-1}$	$Wm^{-2}$	$m s^{-1}$	$Wm^{-2}$
> 6.0	> 350	> 7.5	> 500	> 8.5	> 700	> 9.0	> 800	> 11.5	> 1800
5.0-6.0	150-250	6.5-7.5	300-500	7.0-8.5	400-700	8.0-9.0	600-800	10.0-11.5	1200-1800
4.5-5.0	100-150	5.5-6.5	200-300	6.0-7.0	250-400	7.0-8.0	400-600	8.5-10.0	700-1200
3.5-4.5	50-100	4.5-5.5	100-200	5.0-6.0	150-250	5.5-7.0	200-400	7.0- 8.5	400- 700
< 3.5	< 50	< 4.5	< 100	< 5.0	< 150	< 5.5	< 200	< 7.0	< 400

## 4. Renewable electricity

### Wind Power

- Largest wind resource in Europe.
- Many different sizes of turbines.
- Currently 1200 large turbines in UK
- Providing enough power for 500,000 homes
- Preventing 2 million tonnes CO<sub>2</sub> emissions

## 4. Renewable electricity

### Wind Power



## 4. Renewable electricity

### Wind Power





## 5. Developing and Accelerating SID

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### Government Support

#### Grant Schemes

- Low Carbon Buildings Program – £28.5 million over 3 years. Householder section only £5 million. Extra £50 million in budget – for public buildings?
- Clear Skies and PV major demo project - £43.5 million over 3 years.

## 5. Developing and Accelerating SID

### Positive Planning

#### Planning Policy Statement 22

**"Local planning authorities and developers should consider the opportunity for incorporating renewable energy projects in all new developments...Local planning authorities should specifically encourage such schemes through positively expressed policies in local development documents."** (Para 18)

**"10% On site generation"**

## 5. Developing and Accelerating SID

### Building Regulations

ODPM mention solar thermal in the new revision of the building regulations Part L 2006.

They are looking to include solar thermal in all new houses by 2010.

## 5. Developing and Accelerating SID Solar Thermal - Development and innovation Solar Cooling and Desalination



## 5. Developing and Accelerating SID

Building Integration:



## Case Studies

## Case Study - Park Avenue Louth

- 51 Houses
- 50% Grant funding from Clear Skies
- Linx Homes houses for elderly residents





**Interesting systems:  
Combination of technologies  
Eg. Ground Source Heat  
Pumps,  
Solar hot water and underfloor  
heating.**



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