

# Solar Technologies

Mark McGuigan

*South West College*

# Introduction

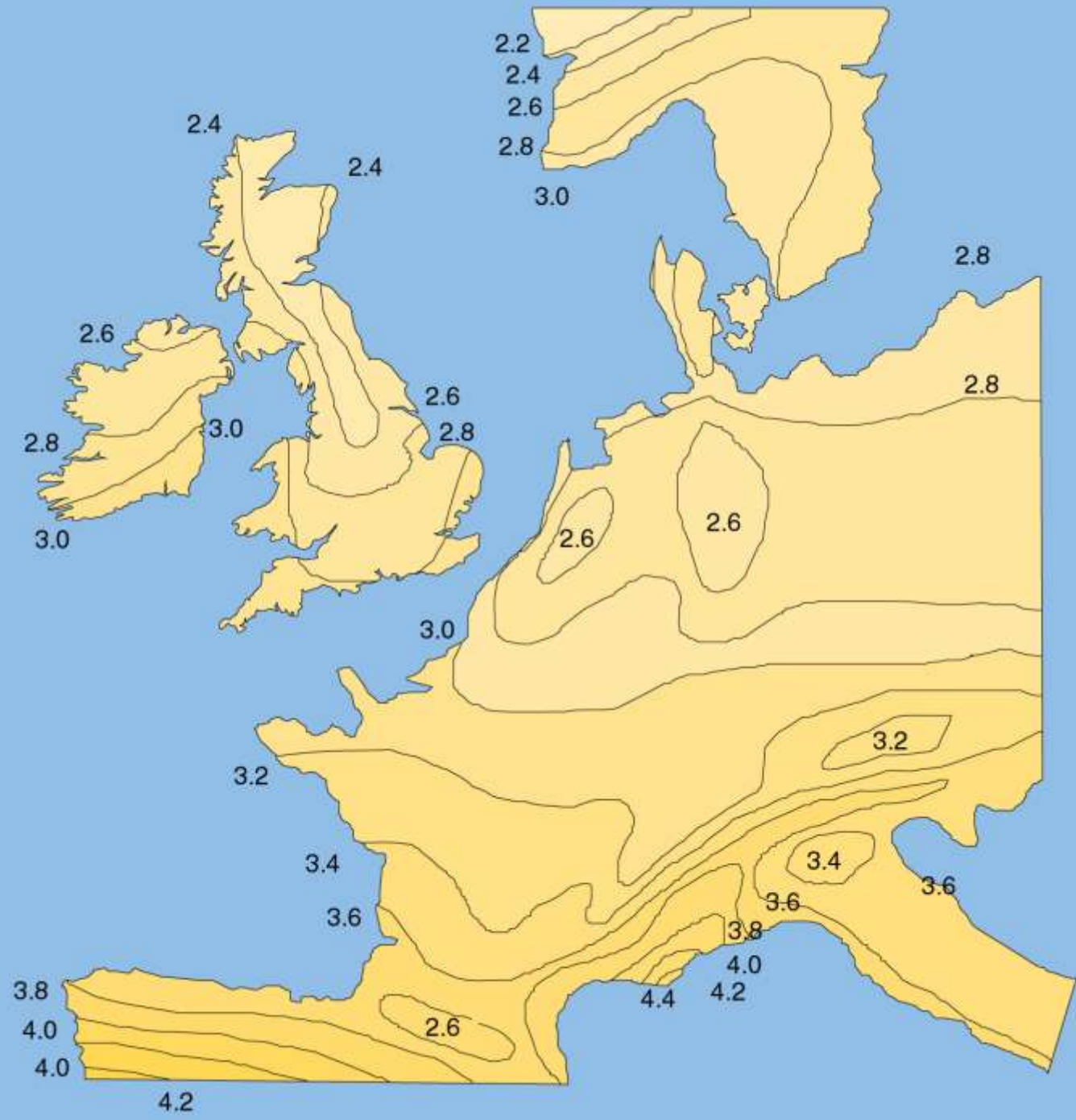
- Sun is the ultimate source of most of our renewables
- Abundant and clean.
- Does Ireland have enough sun?
- Ireland has 60% solar radiation levels of those at the equator.



# Ireland's Impressive Solar Energy Resource

**3 kWh/m<sup>2</sup>  
per day -the  
same as  
Paris**

**420 times our  
annual energy  
consumption**



- 70% of Ireland's annual radiation is received between April to September.
- 25% is received in the months of June and July.

# Water Heating

- Required for:
- Space heating
- Domestic water heating (DWH)
- Agriculture
- Commercial usage
- Heating swimming pools



# Water Heating

- DWH is best potential application
- DWH accounts for 6% of the total national delivered energy use.
- DWH demand continues all year round.

# Water Heating

- A well designed system will provide 100% of a family's hot water requirements during the summer months and make a useful contribution the rest of the year. In a typical year the system will provide 50-60 % of a family's annual domestic water heating needs.



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# The Environmental Argument

- A well designed system can save in excess of half a tonne of carbon dioxide per annum.
- Good visibility raising renewables profile.
- Reliable and easy to use.
- Can add to the value of your property.
- Reduce damage to the environment.



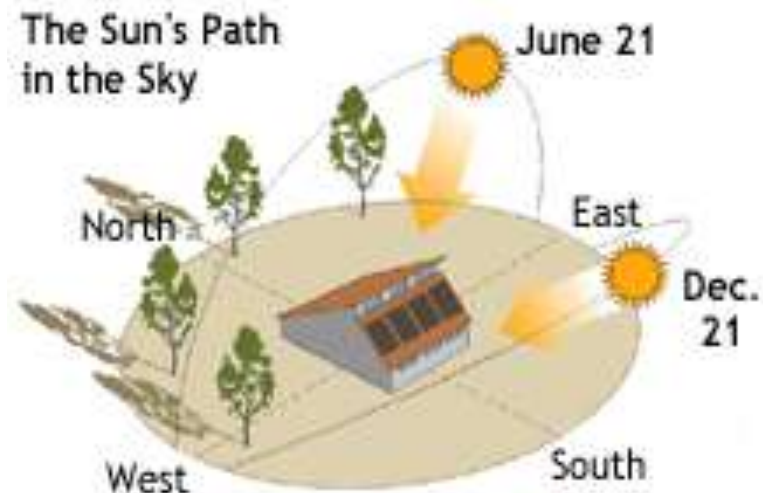
# Reliability of SWH

- 700 systems sampled
- Solar systems work reliably for 20 -25 years
- System performance have improved.
- Half the systems needed no new components and only 1% where considered unreliable.



# Orientation

- In the northern hemisphere collectors should face south.



Geographic orientation and collector tilt can affect the amount of solar radiation your system receives.

# Orientation

- Orientations between 30° east and 40° west of south are acceptable and will not result in more than a 10% loss in efficiency.



# Orientation

- For primarily summer heating in Ireland the angle of inclination should not exceed an angle equal to latitude -  $10^{\circ}$  (i.e.  $40^{\circ}$  to  $45^{\circ}$  to the horizontal)
- In the unusual case of wishing to maximise winter collection (October to March) the collector should be inclined at angles greater than the angle of latitude by up to  $10^{\circ}$

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# Shading



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# Types of Solar Water heating

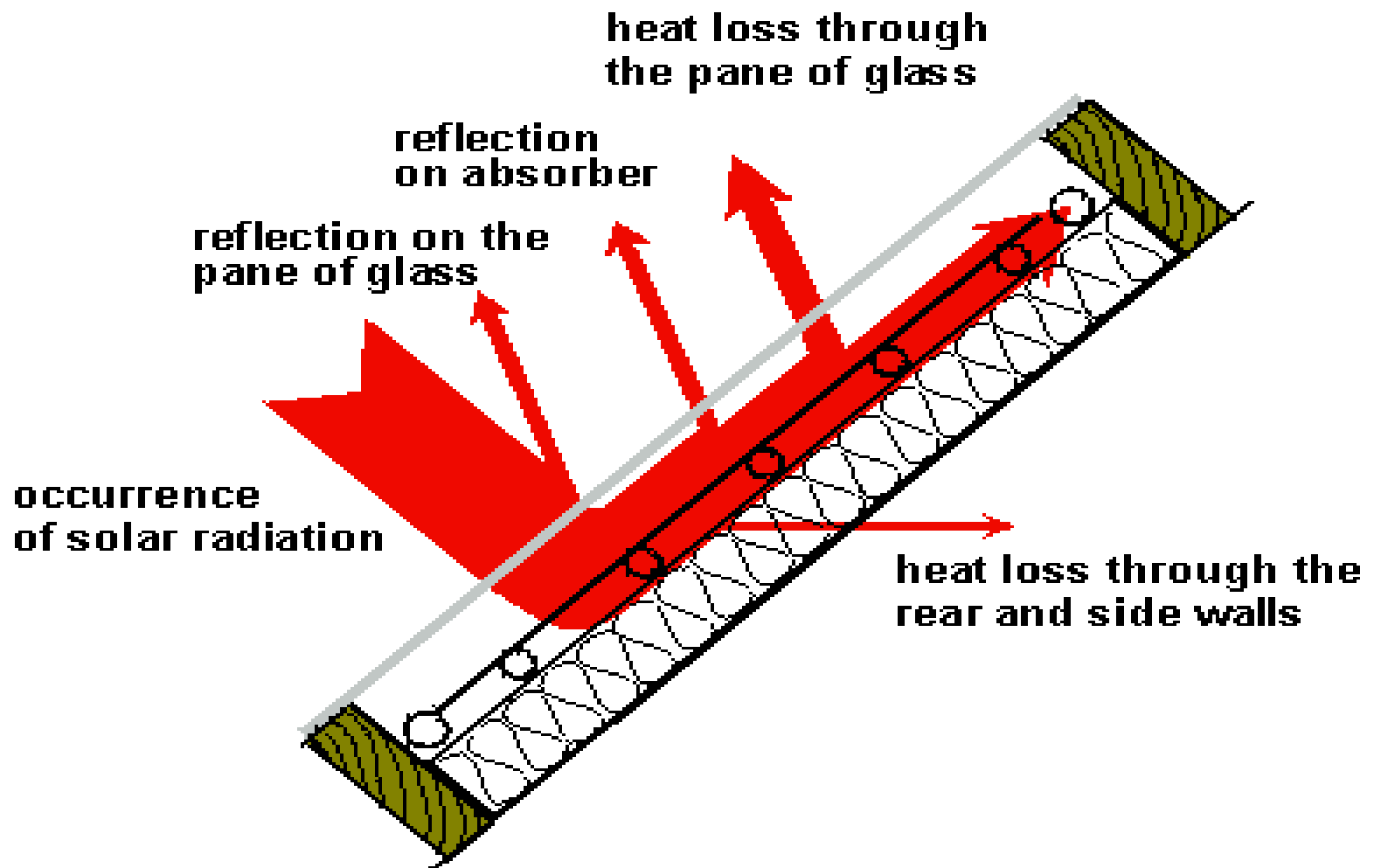
# Flat plate collectors



# Key features

- An absorber plate
- A cover
- Insulation
- A weather proof casing.

# Losses

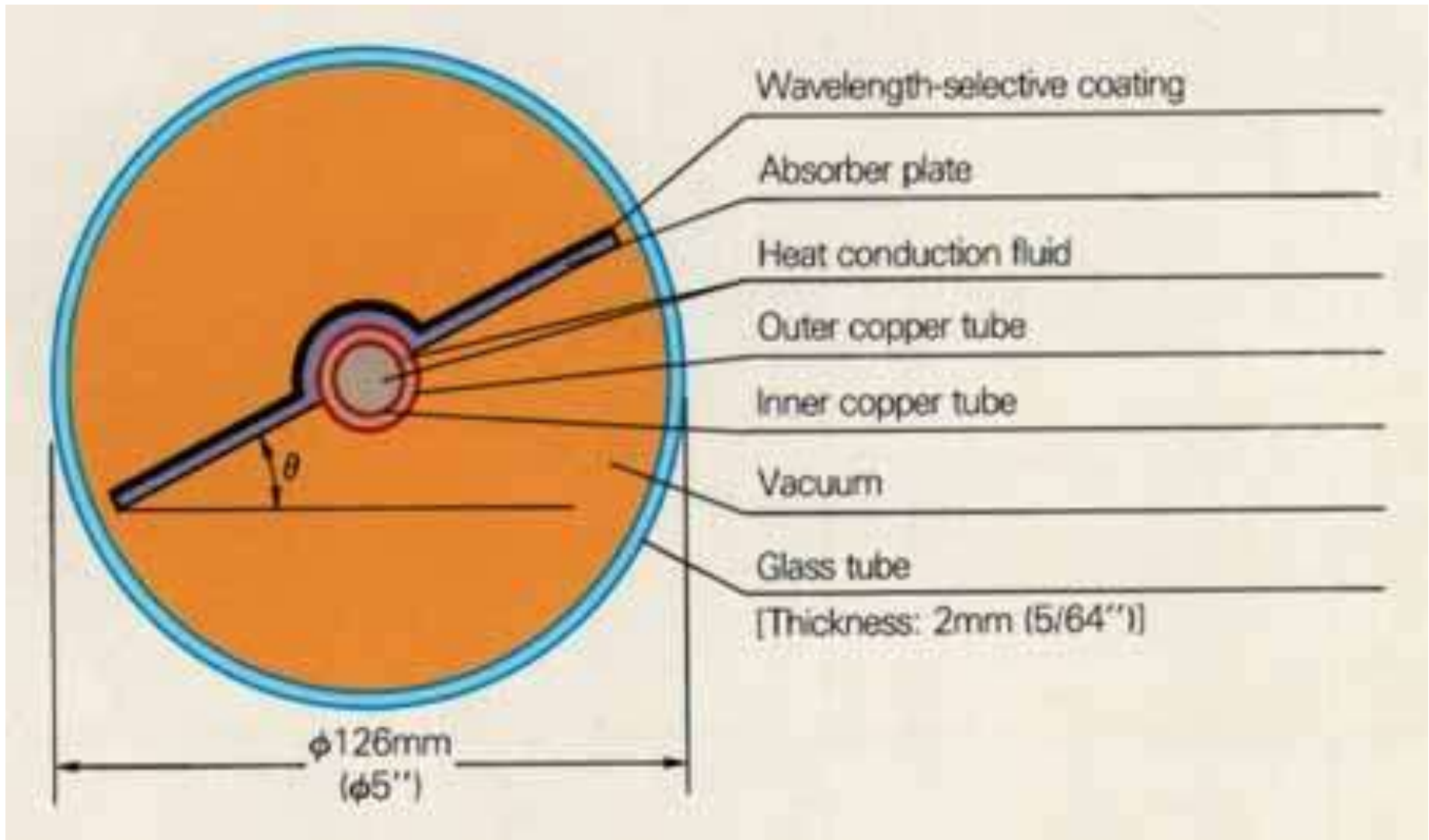


# Evacuated Tube collector

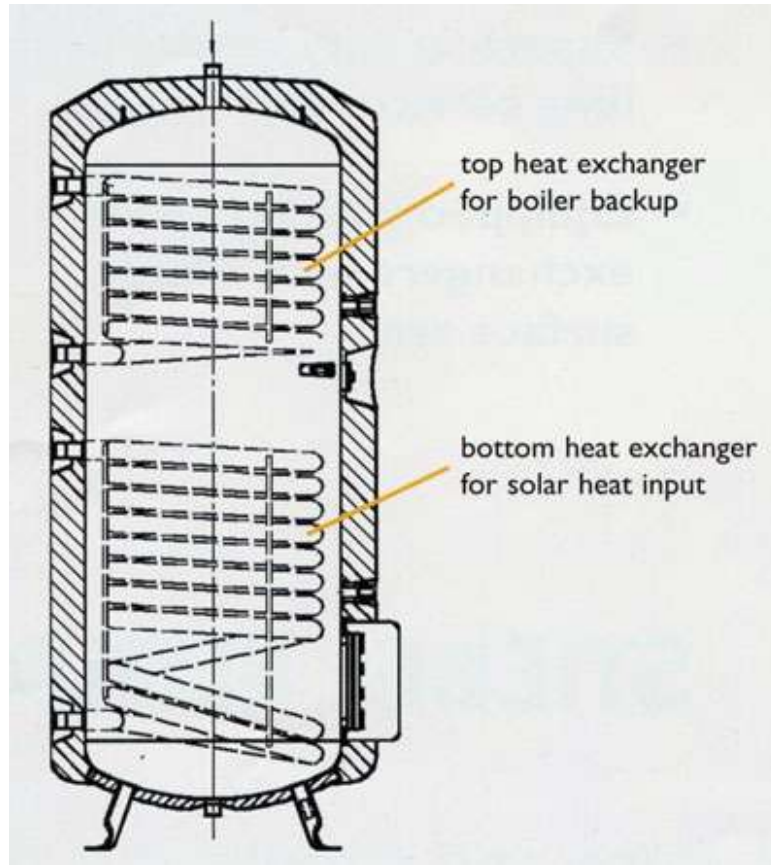
- Key features
- Narrow strip of copper, 60 – 100 mm with black coating bonded to a single copper tube.
- Vacuum with very low convection and conduction.



# Evacuated Tube collector



# Water Storage



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# Savings

- Customers have noted that fuel bills are much lower than expected.
- This is due in part to the fact that heating appliances were often turned on during the summer and left on.