



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A+ Grade
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

DEPARTMENT OF AGRICULTURE ENGINEERING

19AGT203 – AUTOMATION TECHNIQUES IN AGRICULTURE ENGINEERING

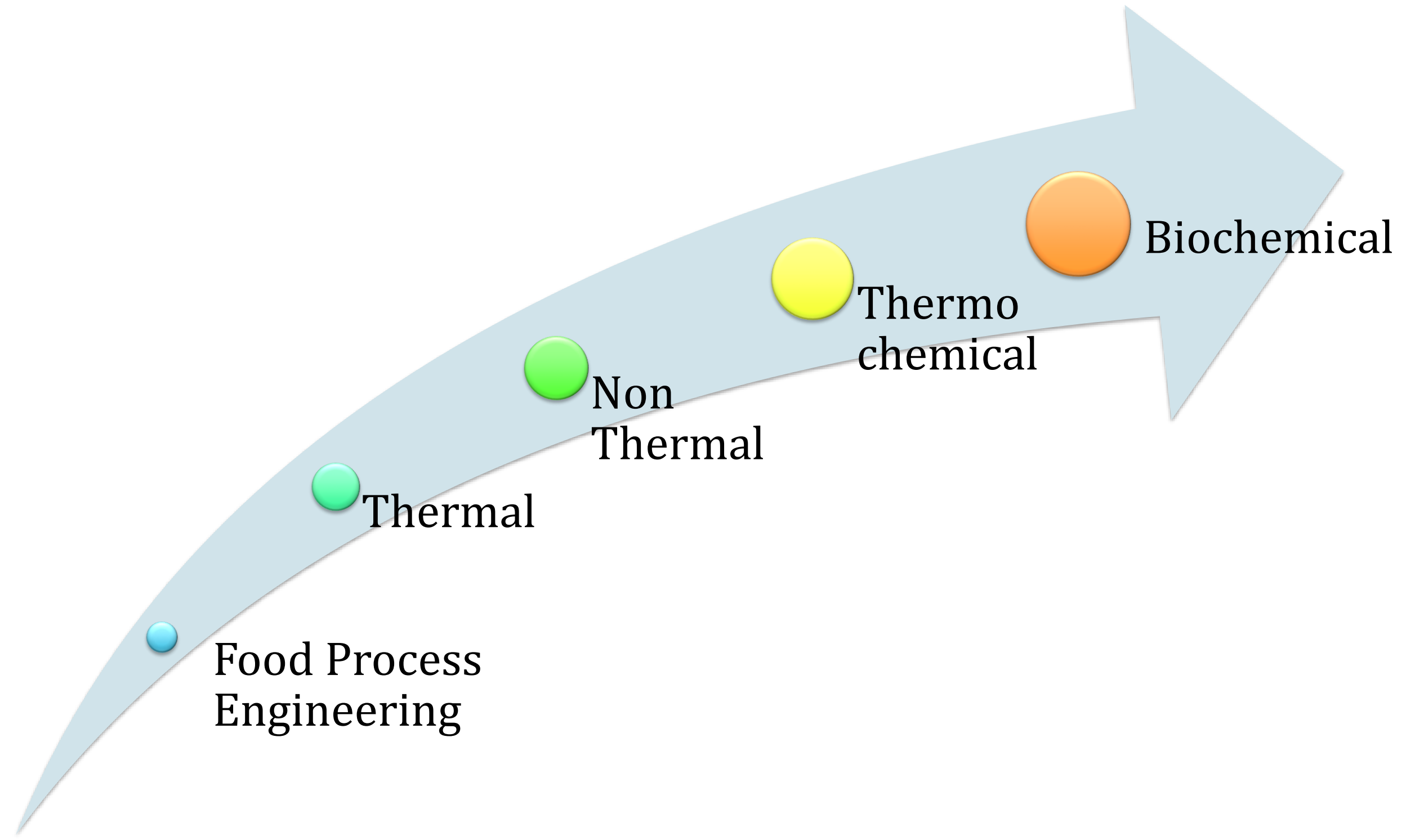
II – YEAR IV SEMESTER

UNIT 2 – ADVANCED MACHINERY/EQUIPMENT IN AGRICULTURAL ENGINEERING- II

TOPIC 6– SOLAR ENERGY



Last Class Review





Solar energy



- ❖ Solar energy is radiant light and heat from the Sun that is harnessed using a range of technologies such as solar power to generate electricity, solar thermal energy (including solar water heating), and solar architecture
- ❖ It is an essential source of renewable energy, and its technologies are broadly characterized as either passive solar or active solar depending on how they capture and distribute solar energy or convert it into solar power.





Active!!!



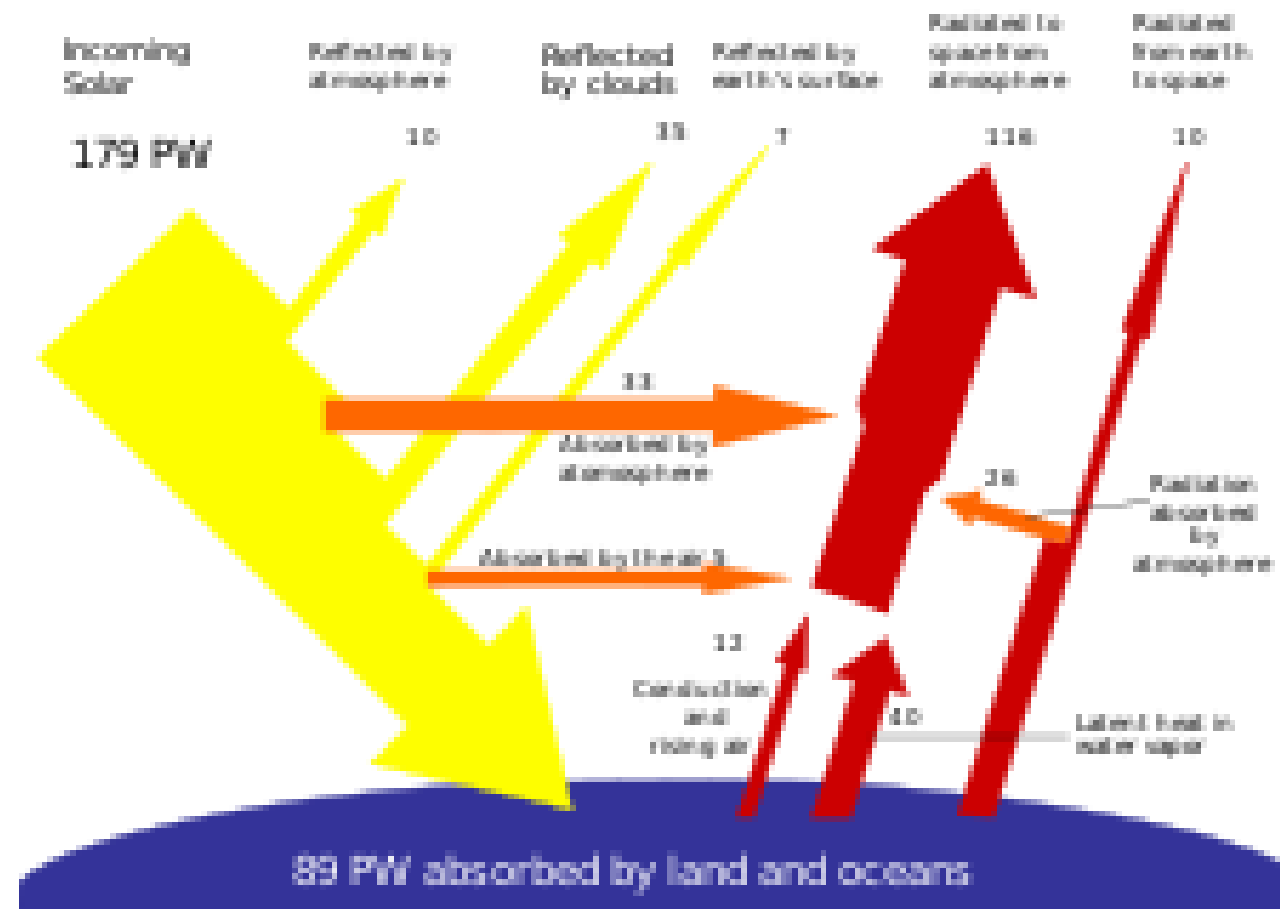
- ❖ Active solar techniques include the use of photovoltaic systems, concentrated solar power, and solar water heating to harness the energy.





Passive !!!

- ❖ Passive solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light-dispersing properties, and designing spaces that naturally circulate air.





Solar Power....

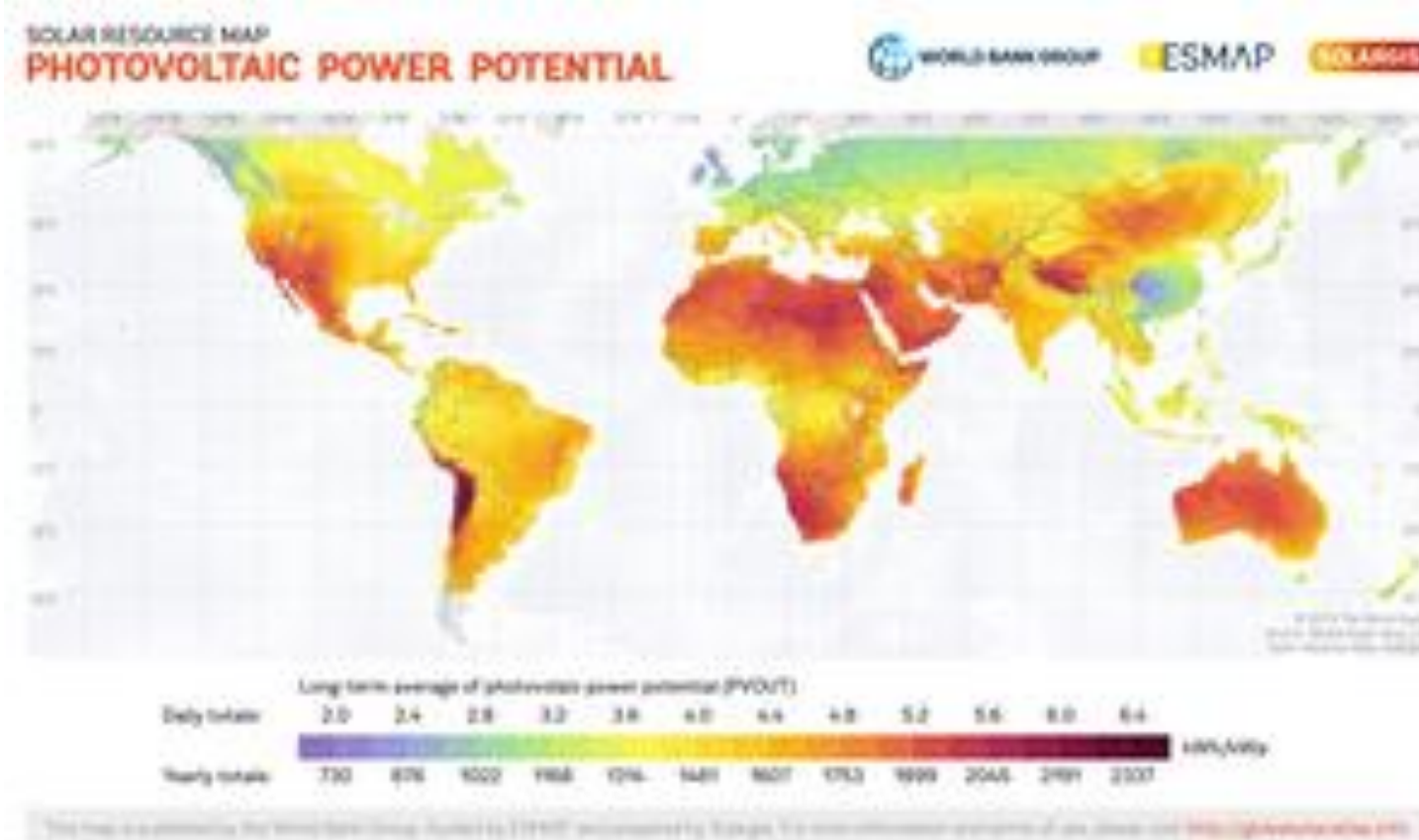
- ❖ Solar power is the conversion of energy from sunlight into electricity, either directly using photovoltaics (PV) or indirectly using concentrated solar power.
- ❖ Photovoltaic cells convert light into an electric current using the photovoltaic effect.
- ❖ Concentrated solar power systems use lenses or mirrors and solar tracking systems to focus a large area of sunlight to a hot spot, often to drive a steam turbine.





Potential!!!

- ❖ Geography affects solar energy potential because areas that are closer to the equator have a higher amount of solar radiation
- ❖ However, the use of photovoltaics that can follow the position of the Sun can significantly increase the solar energy potential in areas that are farther from the equator.
- ❖ Time variation effects the potential of solar energy because during the nighttime, there is little solar radiation on the surface of the Earth for solar panels to absorb.
- ❖ This limits the amount of energy that solar panels can absorb in one day.
- ❖ Cloud cover can affect the potential of solar panels because clouds block incoming light from the Sun and reduce the light available for solar cells.





Environmental effects

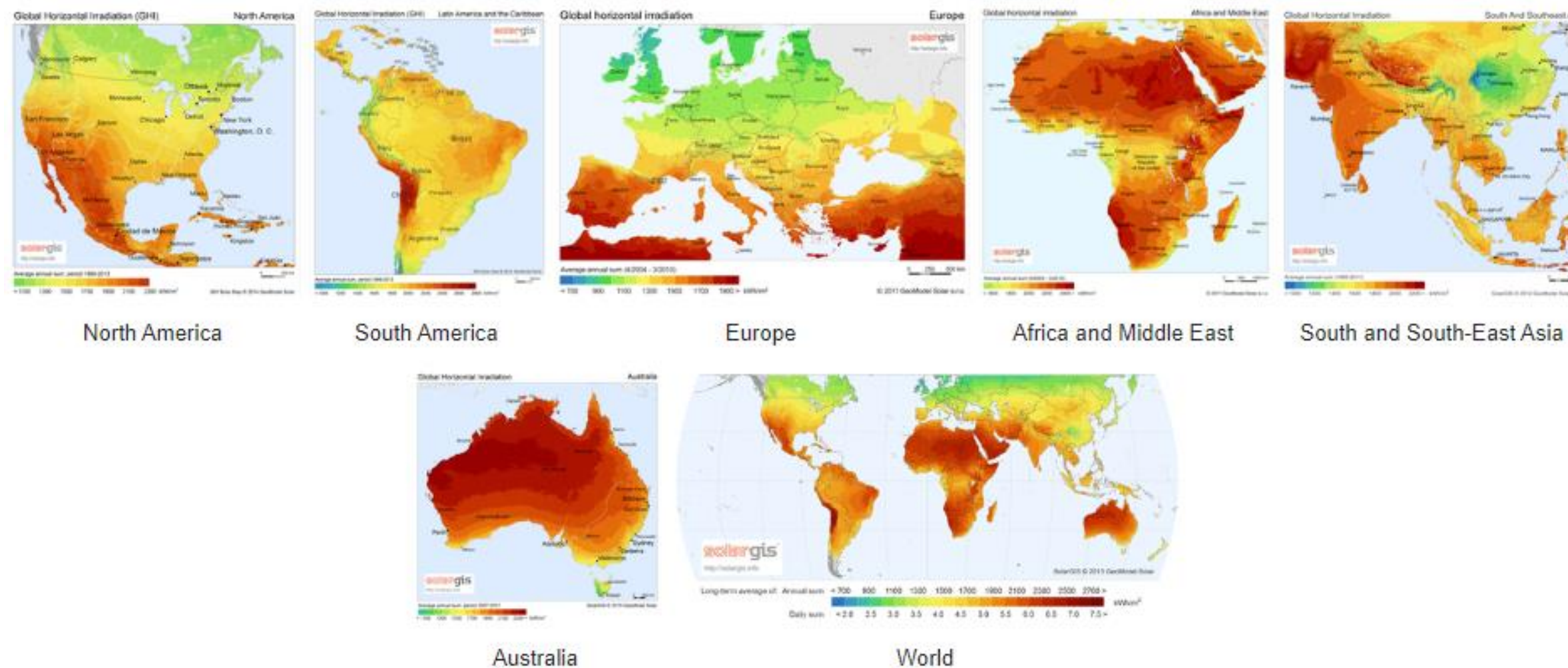
- ❖ A very small proportion of solar power is concentrated solar power. Concentrated solar power may use much more water than gas-fired power. This can be a problem, as this type of solar power needs strong sunlight so is often built in deserts
- ❖ Solar power is cleaner than electricity from fossil fuels: solar power does not lead to any harmful emissions during operation, but the production of the panels leads to some amount of pollution. A 2021 study estimated the carbon footprint of manufacturing monocrystalline panels at 515 g CO₂/kWp in the US and 740 g CO₂/kWp in China, but this is expected to fall as manufacturers use more clean electricity and recycled materials. Solar power carries an upfront cost to the environment via production with a carbon payback time of a few years as of 2022, but offers clean energy for the rest of its 30 year lifetime.





Productivity by location!!!

- ❖ The productivity of solar power in a region depends on solar irradiance, which varies through the day and year and is influenced by latitude and climate. PV system output power also depends on ambient temperature, wind speed, solar spectrum, the local soiling conditions, and other factors.
- ❖ Onshore wind power tends to be the cheapest source of electricity in Northern Eurasia, Canada, some parts of the United States, and Patagonia in Argentina: whereas in other parts of the world mostly solar power (or less often a combination of wind, solar and other low carbon energy) is thought to be best





See You at Next Class!!!!