

Master thesis advisor: Professor Pascalis K. Gotsis.

Subject: Solar energy.

Purpose of the above thesis is to use the literature and to write an article about the 'Solar energy'.

**One or two** graduate students can work for this subject.

### **A brief summary about the Solar Energy.**

**Solar energy** is radiant light and heat from the sun harnessed using a range of ever-evolving technologies such as solar heating, solar photovoltaics, solar thermal electricity, solar architecture and artificial photosynthesis.

Solar technologies are broadly characterized as either passive solar or active solar depending on the way they capture, convert and distribute solar energy. Active solar techniques include the use of photovoltaic panels and solar thermal collectors to harness the energy. 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.

#### Applications of solar technology

Architecture and urban planning

Passive solar building design and Urban heat island

Agriculture and horticulture

Greenhouses convert solar light to heat, enabling year-round production and the growth (in enclosed environments) of specialty crops and other plants not naturally suited to the local climate.

Transport and reconnaissance

Solar vehicle, Solar-charged vehicle, Electric boat and Solar balloon

Solar thermal

*Solar thermal energy*

Solar thermal technologies can be used for water heating, space heating, space cooling and process heat generation.

#### ***Water heating***

*Solar hot water and Solar combisystem*

#### ***Heating, cooling and ventilation***

*Main articles: Solar heating, Thermal mass, Solar chimney and Solar air conditioning*

Electricity production

Solar power is the conversion of sunlight into electricity, either directly using photovoltaics (PV), or indirectly using concentrated solar power(CSP).

References:

- 1) Smith, Zachary Alden; Taylor, Katrina D. (2008). *Renewable And Alternative Energy Resources: A Reference Handbook*. ABC-CLIO. ISBN978-1-59884-089-6.
- 2) Solar Fuels and Artificial Photosynthesis. Royal Society of Chemistry 2012