



**ΚΑΠΕ
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ΚΕΝΤΡΟ ΑΝΑΝΕΩΣΙΜΩΝ ΠΗΓΩΝ
ΚΑΙ ΕΞΟΙΚΟΝΟΜΗΣΗΣ ΕΝΕΡΓΕΙΑΣ

Concentrating Solar Thermal technologies

Athens, 27 / 5 / 2016

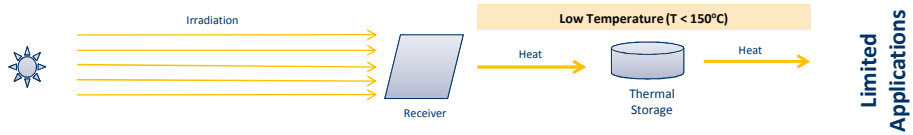
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Overview of presentation

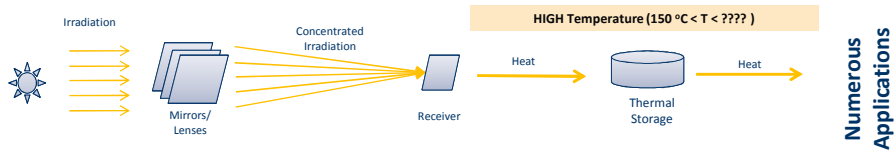
- ✓ **Concentrating Solar Principle**
- ✓ **Overview of applications**
- ✓ **Solar Potential**
- ✓ **Parabolic Trough**
- ✓ **Linear Fresnel Collectors**
- ✓ **Solar Tower**
- ✓ **Parabolic Dish**

Why Concentrating Irradiation ?

Solar Thermal without Concentration ($T < 150^{\circ}\text{C}$)



Solar Thermal with Concentration ($150^{\circ}\text{C} < T < 1000^{\circ}\text{C}$)

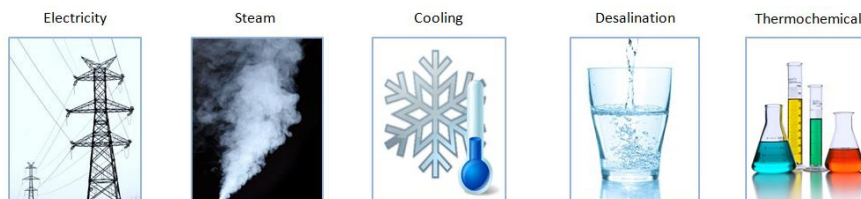


Applications

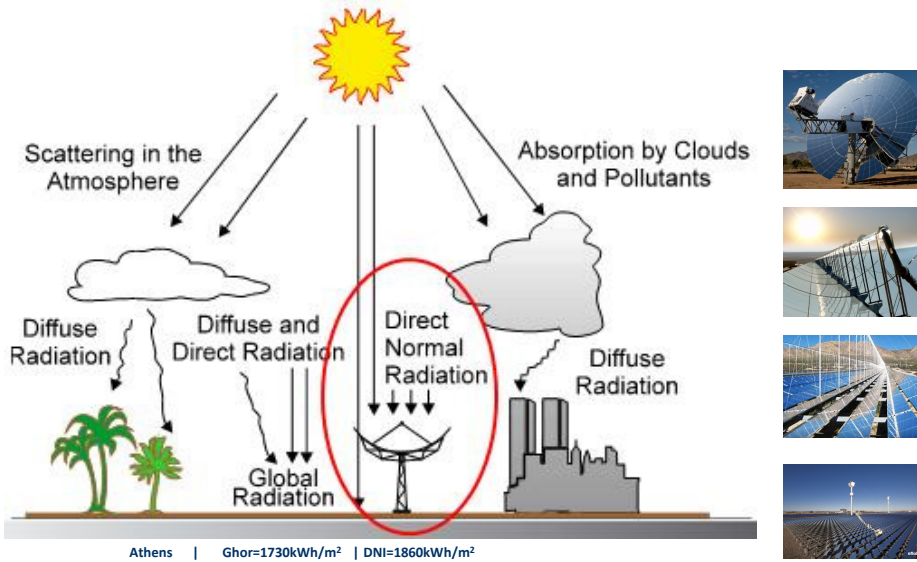
Solar Thermal without Concentration



Concentrated Solar Thermal



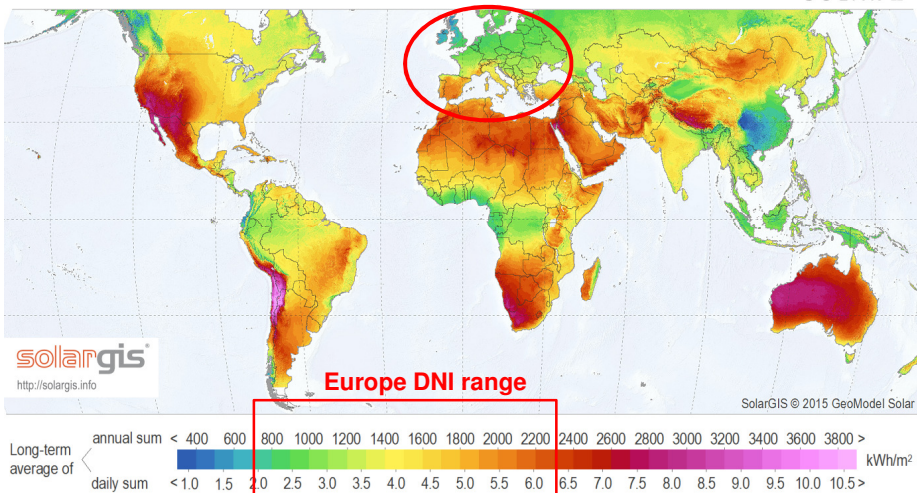
Solar potential – Direct Normal Irradiance



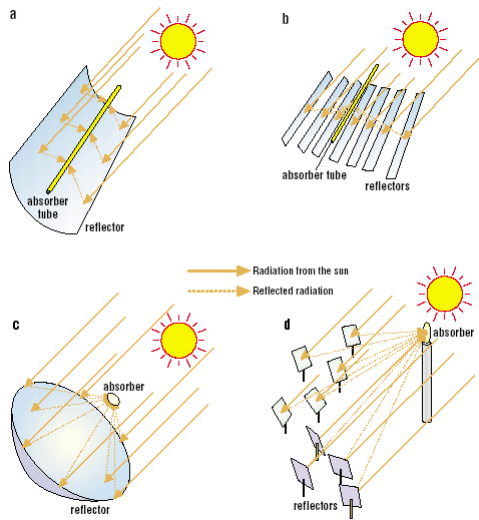
Solar potential in World

DIRECT NORMAL IRRADIATION

GeoModel SOLAR



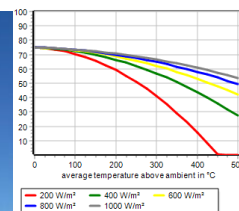
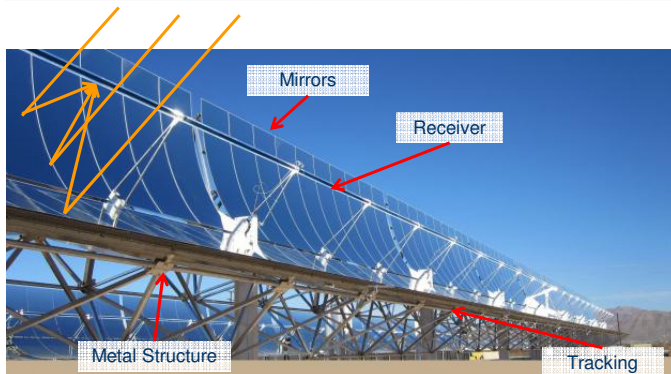
Common mechanisms of concentration



Parabolic Trough

Generic characteristics

Mirror shape	Focus type	Tracking	Receiver	Solar Fluid	Temperature
Parabolic	Linear	1 axis	Vacuum pipe	Thermal oil	150 -400°C



Common applications

Electricity	Steam	Cooling	Desalination	Fuels
✓	✓	✓	✓	✗

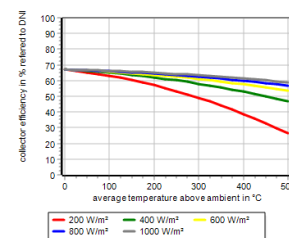
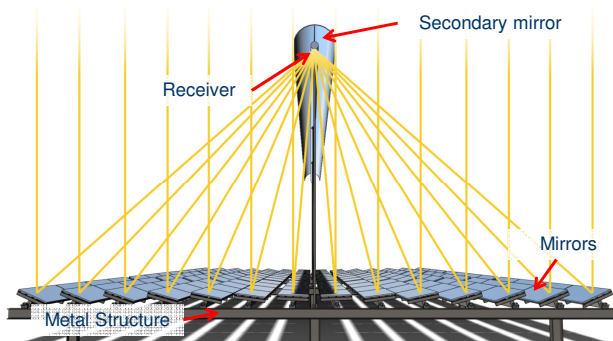
Parabolic Trough



Linear Fresnel

Generic characteristics

Mirror shape	Focus type	Tracking	Receiver	Solar Fluid	Temperature
Flat (or slightly curved)	Linear (with secondary mirror)	1 axis	Vacuum pipe (or glass cover, multiple pipes)	Thermal oil (steam, pressurized water)	150 -400°C



Common applications

Electricity	Steam	Cooling	Desalination	Fuels
✓	✓	✓	✓	✗

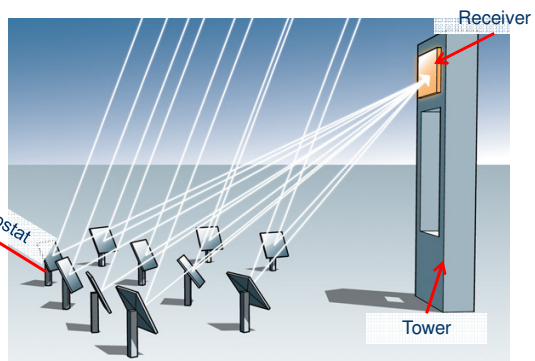
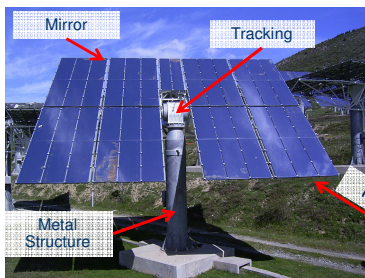
Linear Fresnel



Solar Tower

Generic characteristics

Mirror shape	Focus type	Tracking	Receiver	Solar Fluid	Temperature
Flat (or slightly curved)	Point	2 axis	Pipes (or Cavity receiver)	Molten salt (or Air, Chemical)	400 - 1000°C



Common applications

Electricity	Steam	Cooling	Desalination	Fuels
✓	✗	✗	✗	✓

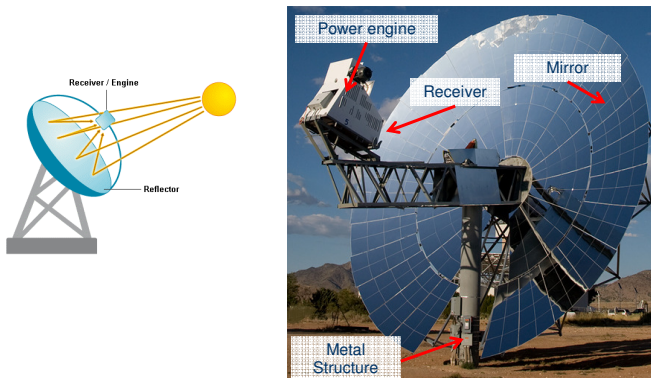
Solar Tower



Parabolic Dish

Generic characteristics

Mirror shape	Focus type	Tracking	Receiver	Solar Fluid	Temperature
Parabolic	Point	2 axis	Power engine	Helium	300 - 1000°C



Common applications

Electricity	Steam	Cooling	Desalination	Fuels
✓	✗	✗	✗	✗

Parabolic Dish



Why CST ?



Thank you for the attention



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