Friendly Fruit

Friendly Fruit Berry School webinar

Pompage solaire : retour sur expérience

Sara Fabrizi and Giuseppe Toscano

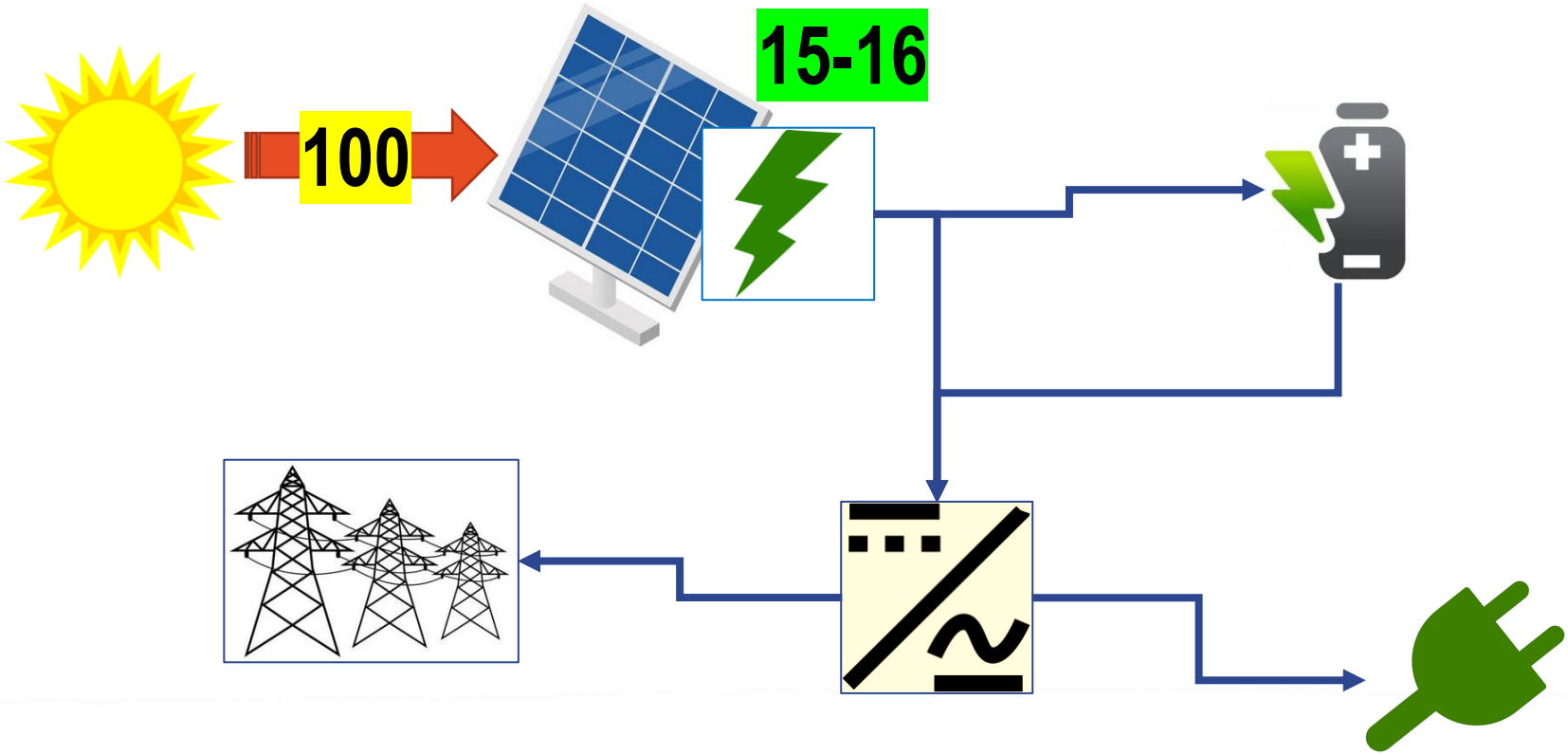
D3A Department
Università Politecnica delle Marche

Supported by: eit Climate-KIC

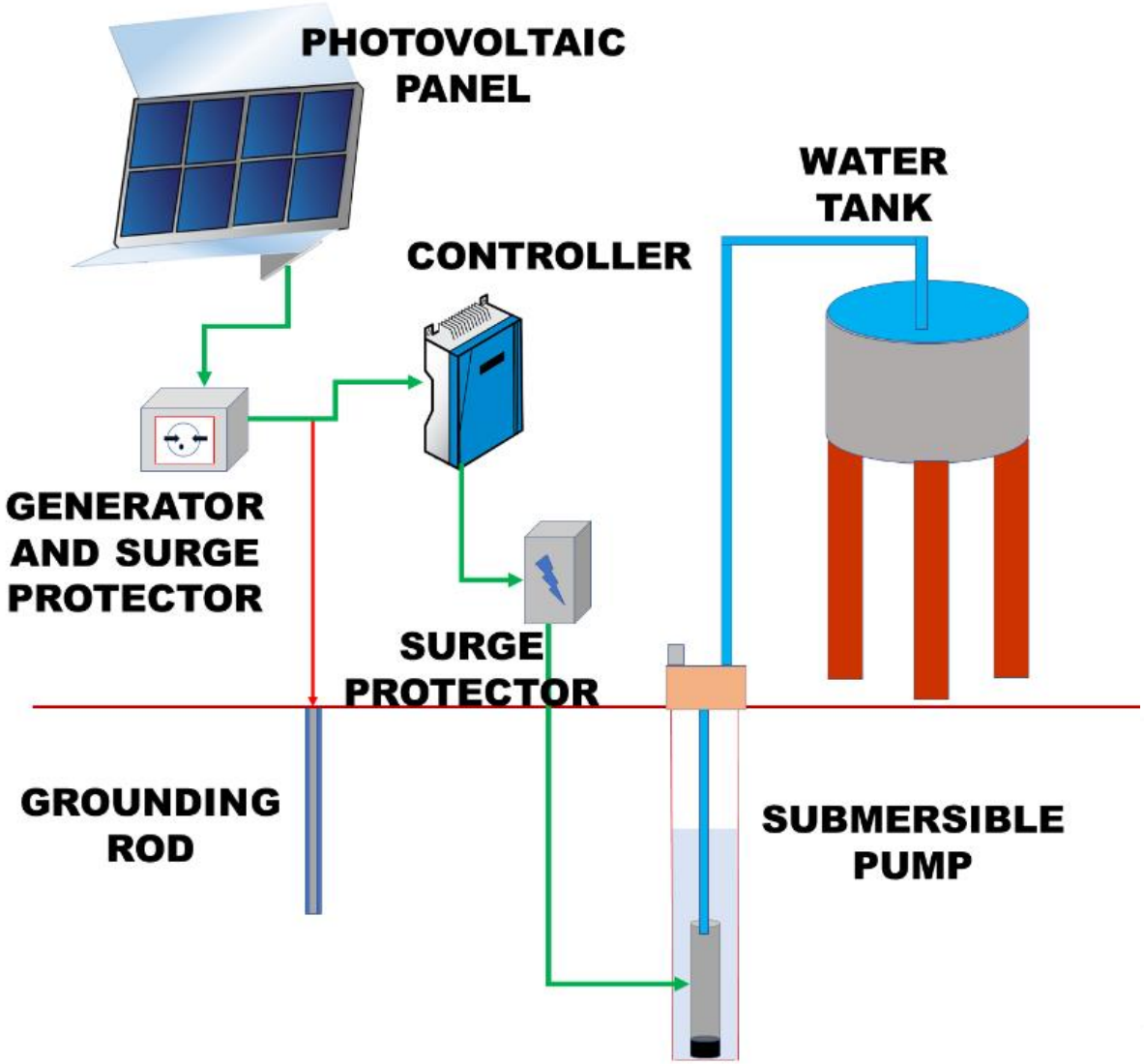
Climate-KIC is supported by the EIT, a body of the European Union

February, 25th – 26th 2021

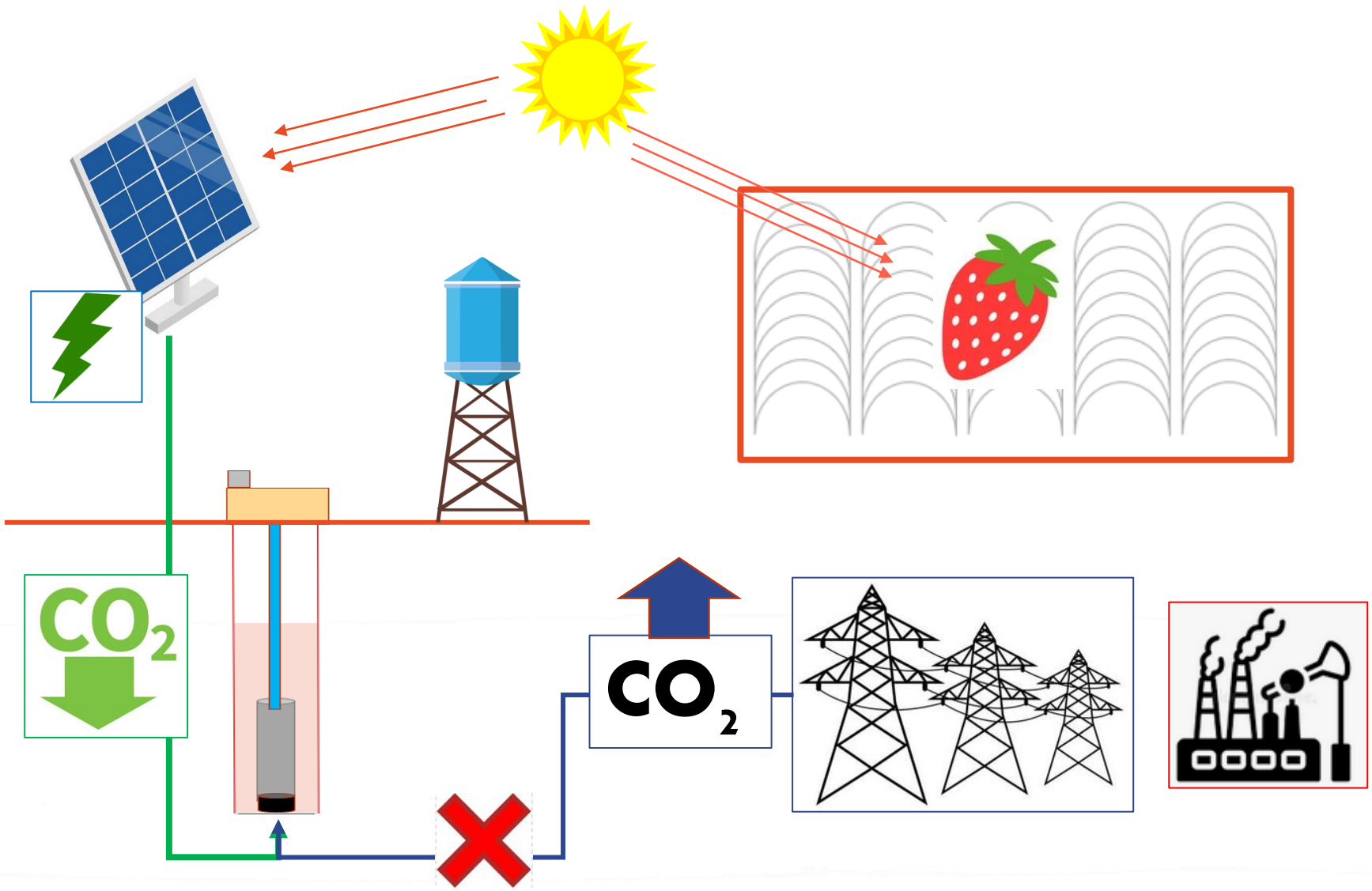
How does photovoltaic work?



Solar pump

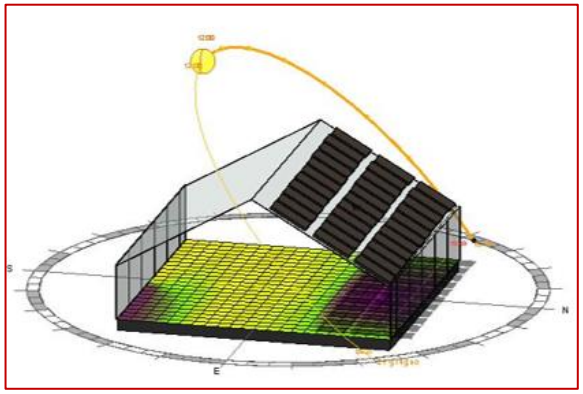

PHOTOVOLTAIC PANEL
WATER TANK
CONTROLLER
GENERATOR AND SURGE PROTECTOR
SURGE PROTECTOR
GROUNDING ROD
SUBMERSIBLE PUMP

Environmental elements



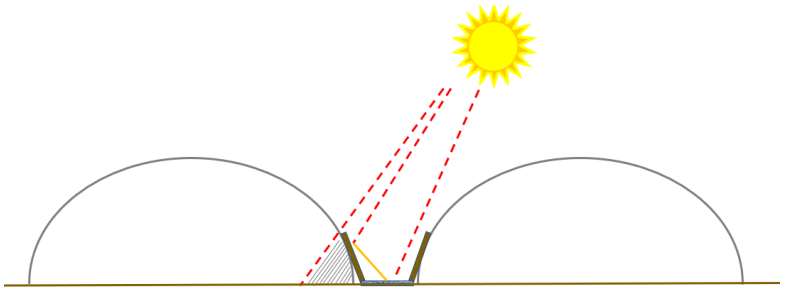
Friendly Fruit innovative solutions

On the rooftop

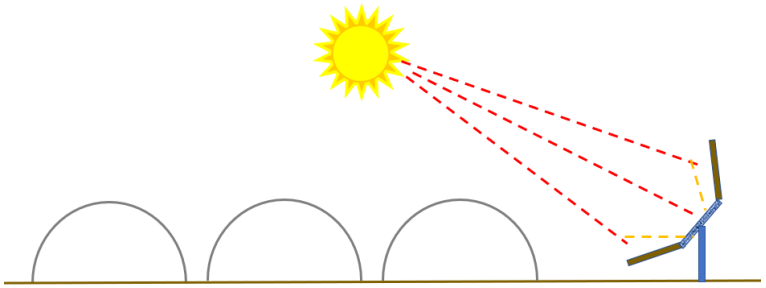


Sunlight concentration systems

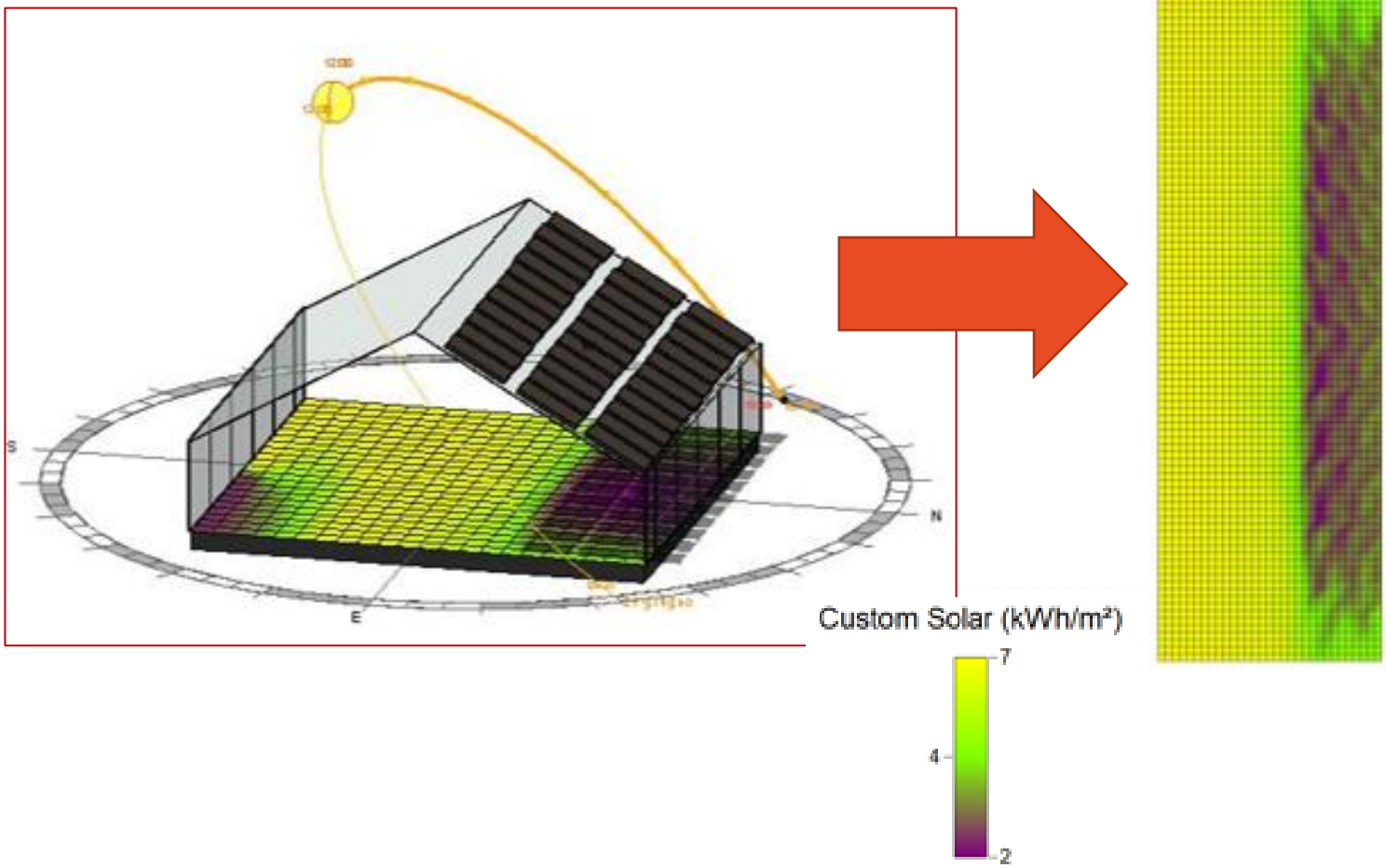
located between greenhouses

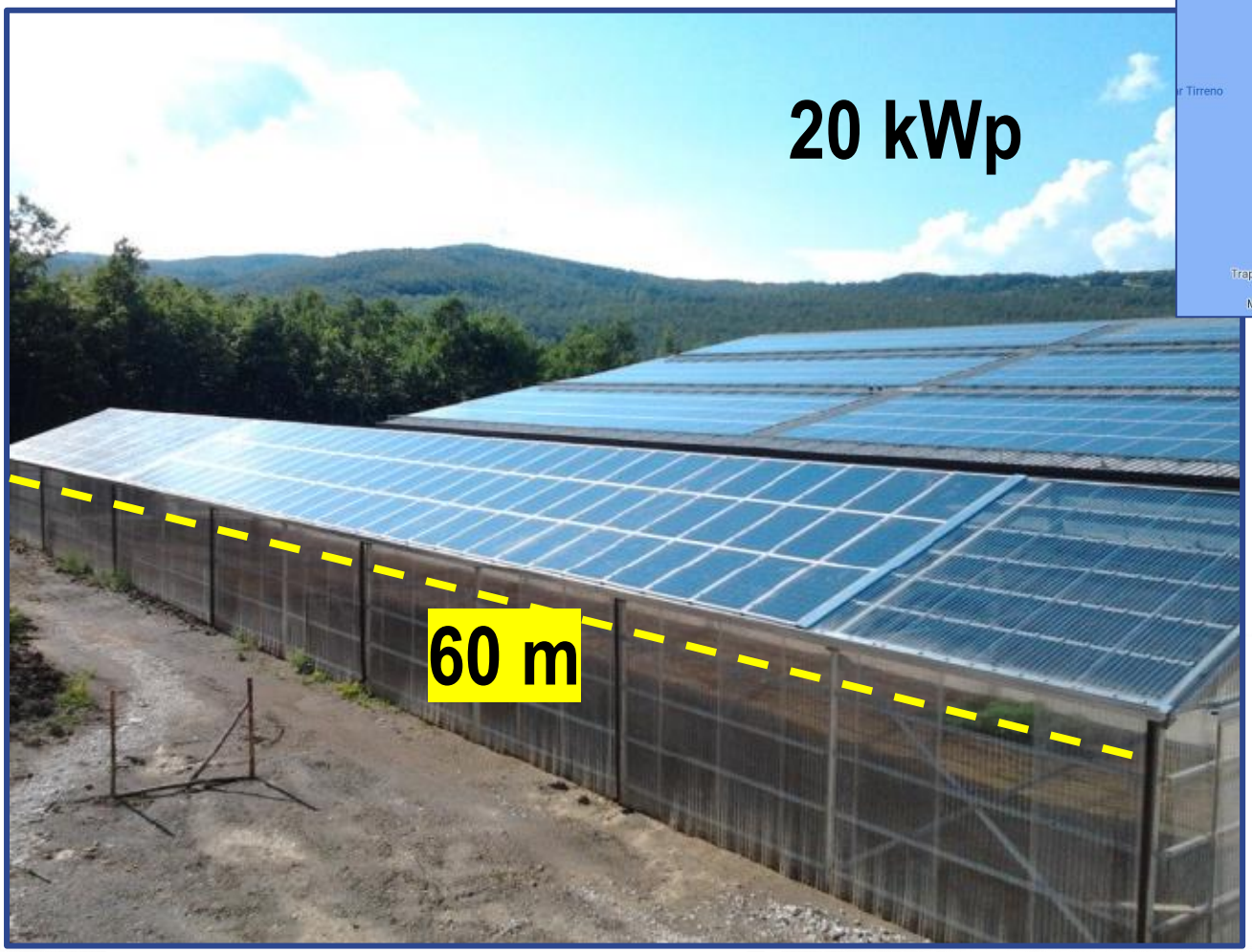


outside cultivated area



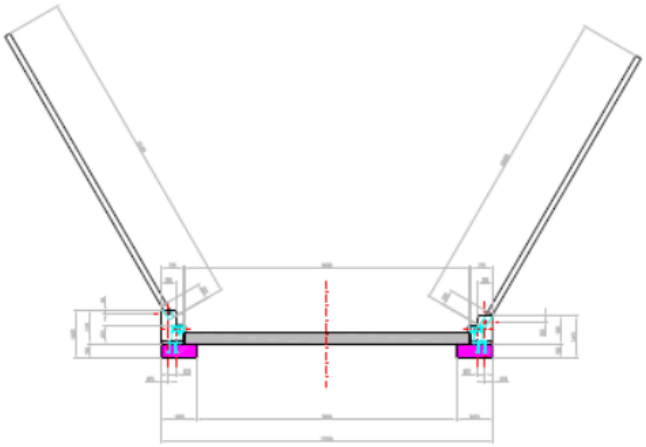
On the rooftop

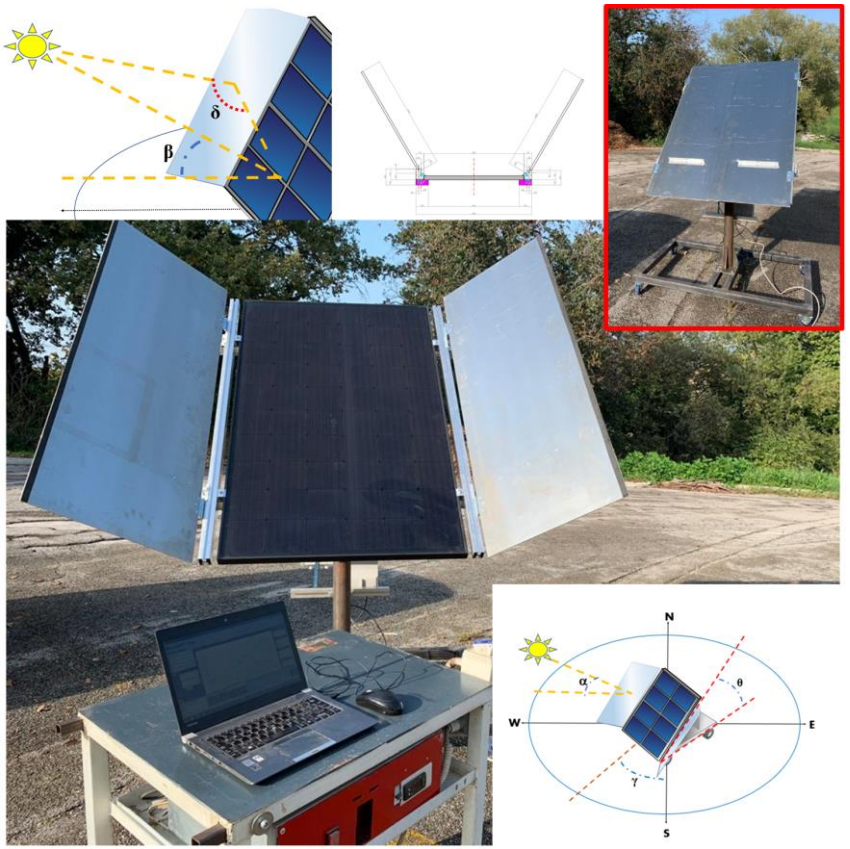




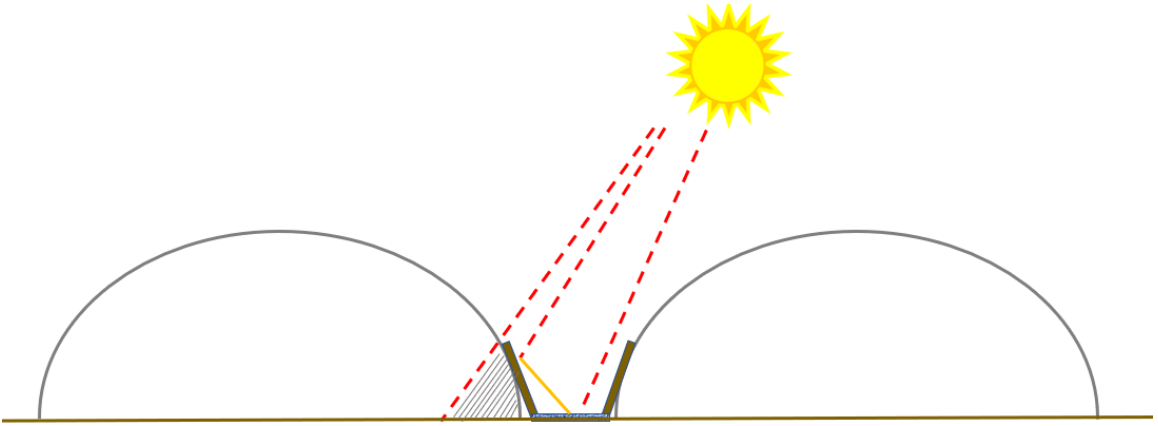
Flower nursery

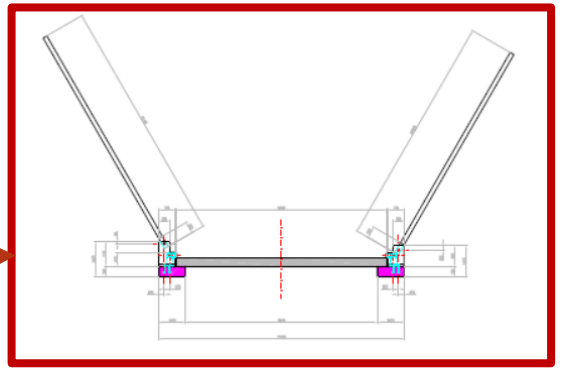
Sunlight concentration system

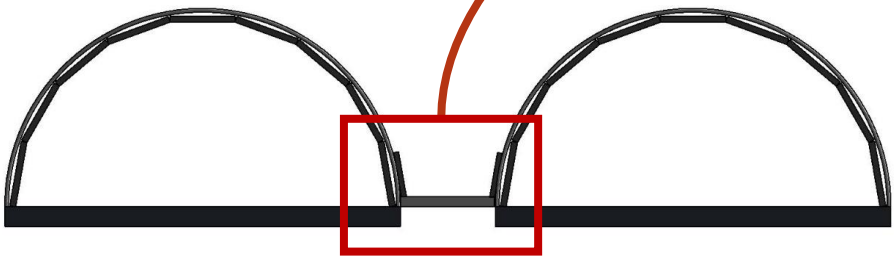




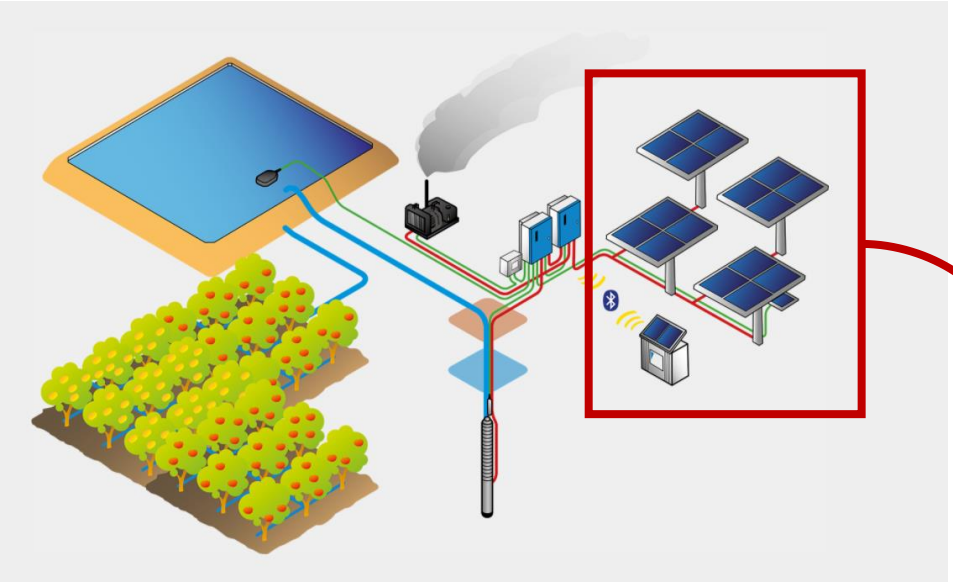
Photovoltaic module placed between greenhouses

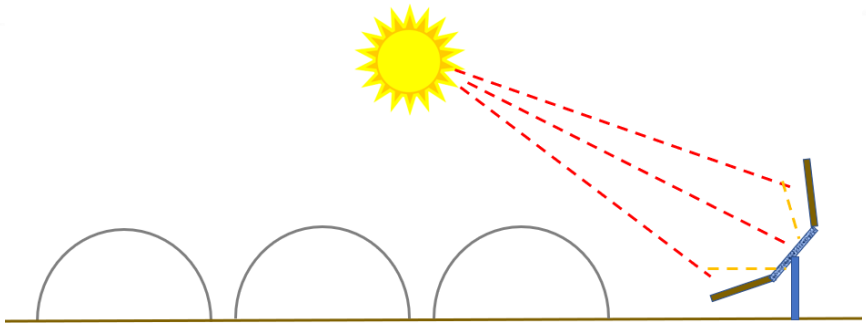






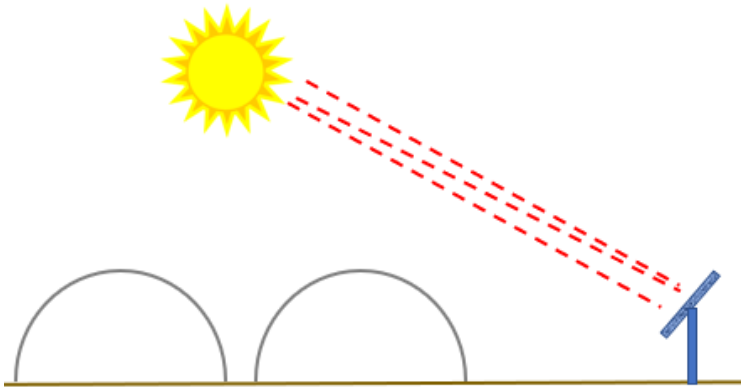
Photovoltaic system placed outside cultivated area



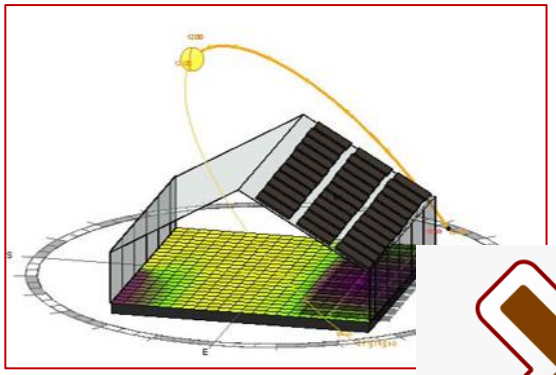


Possible solutions – photovoltaic (pv) systems

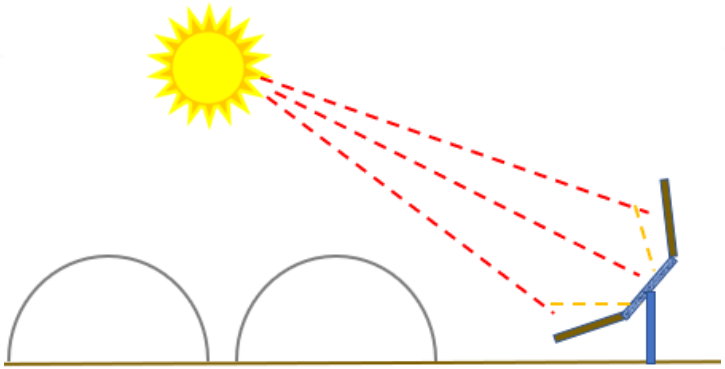
NORMAL PV PANEL



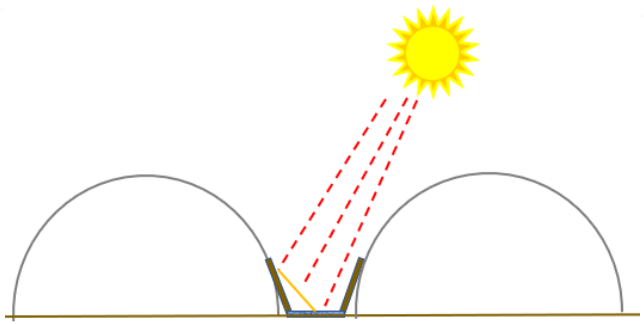
PV PANEL OVER ROOF



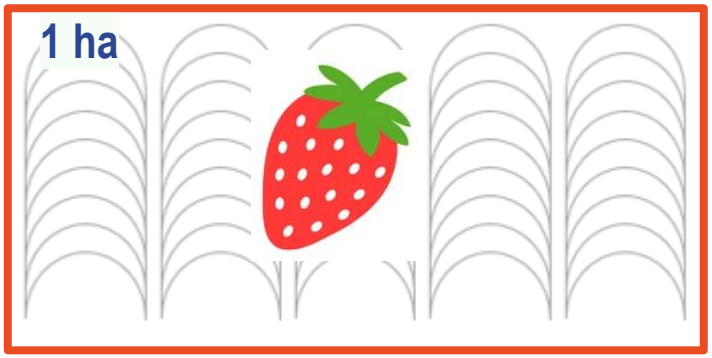
PV PANEL REFLECTIVE SYSTEM



PV PANEL REFLECTIVE SYSTEM

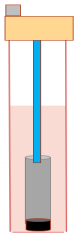


Solar pump performance



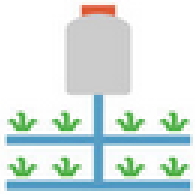
Requirements = 6000 m^3/year
Peak = 1700 m^3/month

Area = 22 m^2
Power = 5 kW_p



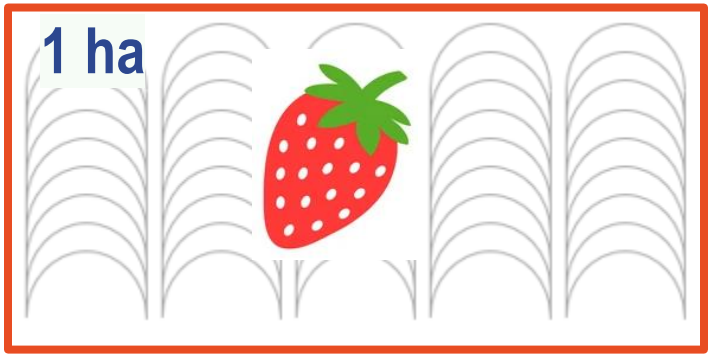
Static head = 50 m
Engine Power = 3,6 kW

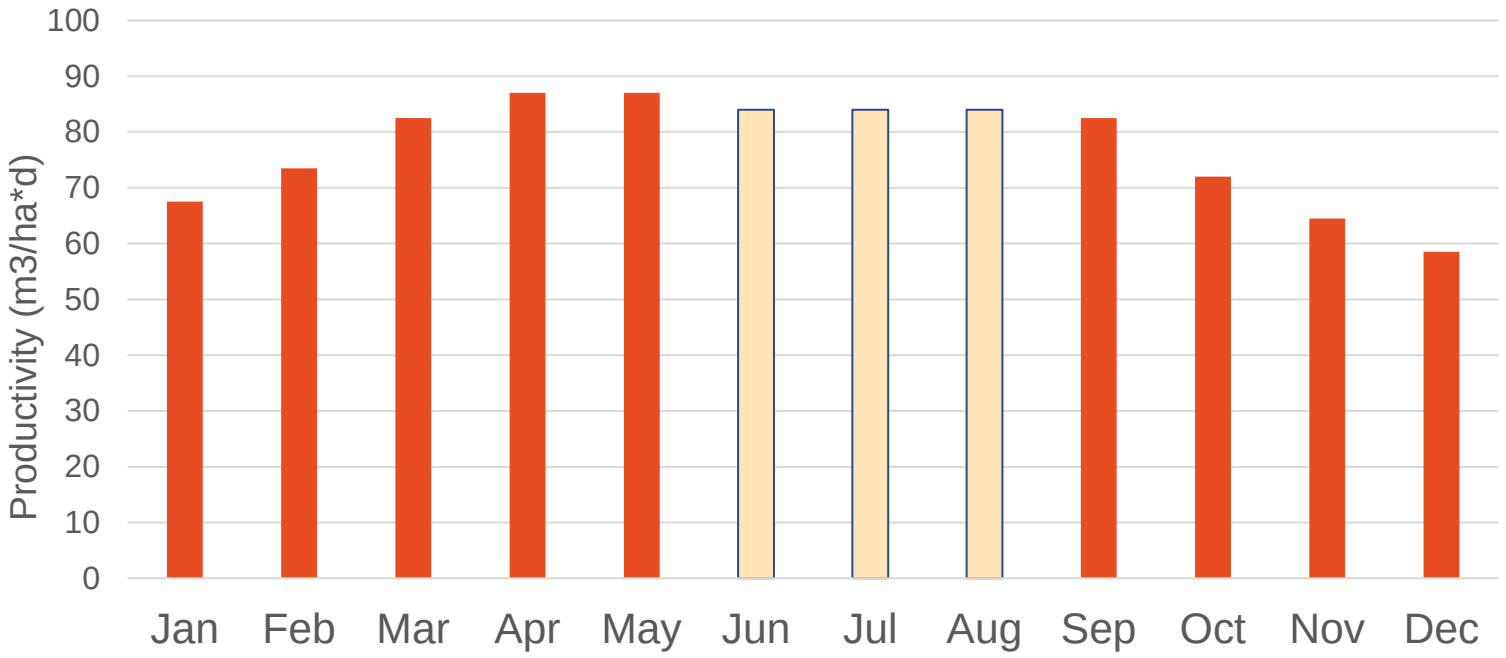
5 – 7 k€
5 €cent/kg strawberry



Pipe length = 500 m

Solar pump performance





Main steps to implement this practice

1. System fits for South-European or North-African climates
2. Located outside greenhouse to avoid shading
3. Water intake and energy need evaluation
4. Sizing and design
5. Choice of different solutions (conventional system, dual sides, with reflecting panels, solar trackers…)
6. Context analysis (irradiation)
7. System placement
8. Performance monitoring and maintenance

Practice Performances

AGRONOMY & ENVIRONMENT

Pesticide reduction effect not expected.

Substitution of fossil fuel with renewable energy and stand-alone electricity production (mitigation of GHG emission).

No effect on **yield** and fruit **quality**.

Replacement of non-renewable resources' use.
GHG emission reduction.
No impact on the agronomic practice

COSTS & BENEFITS

Initial investment required.

Low time required for setting-up of the practice.

No extra time required for management.

Maintenance costs are very low.
Service life at least 12 years
The cost is less than 5c€/kg strawberry.

The practice does not require highly skilled staff.

Sustainable and effective energetic solution for south-European & north-African context.

OPERATIONALITY

Positive outcome | Neutral to positive outcome | Areas of improvement | Critical points

Key result

The use of a solar pump to extract the water needed for irrigation improves the environmental sustainability of strawberry cultivation.

About 22 m^2 photovoltaic panels → quantity of water necessary annually

Up to 150 gCO2eq saved for 1 kg of strawberry

Message to take home

The use of renewable energy is nowadays an essential element to make environmental friendly the plantations ensuring accessibility to a key production factor such as water.

Friendly Fruit

Supported by: eit Climate-KIC

Climate-KIC is supported by the EIT, a body of the European Union

Thanks for your attention