FOSS
Research Centre for Sustainable Energy

DIEGO
Development of quality system through EnerGy Efficiency cOurses

Co-funded by the Erasmus+ Programme of the European Union

University of Cyprus
PV Technology

# FOSS Research Centre for Sustainable Energy University of Cyprus

Prof. George E. Georghiou
Director of FOSS, University of Cyprus

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# Cyprus


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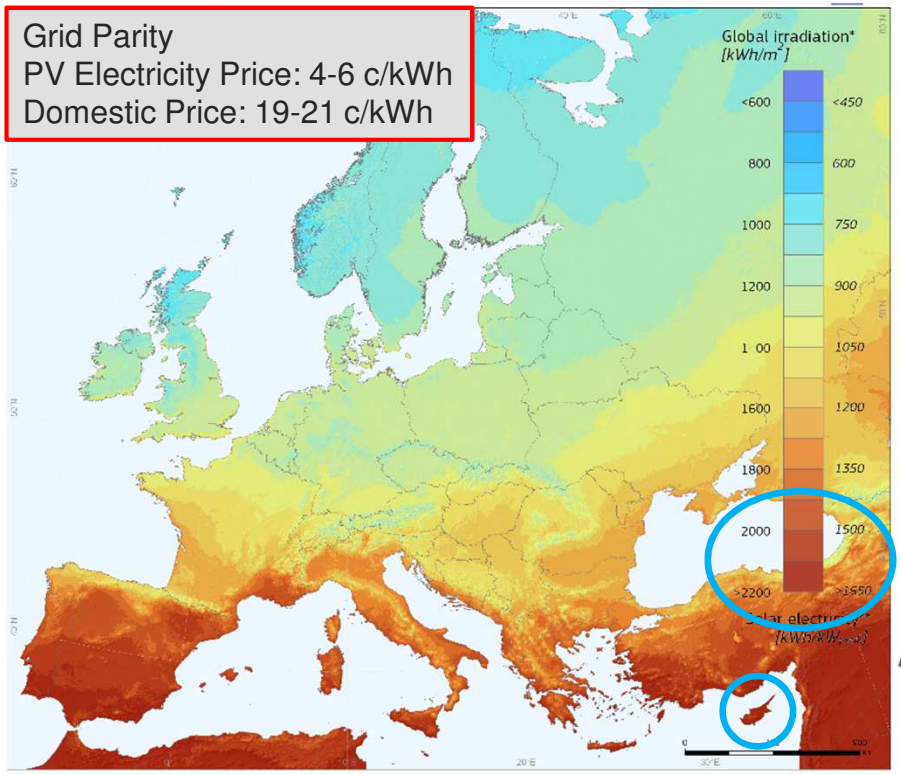
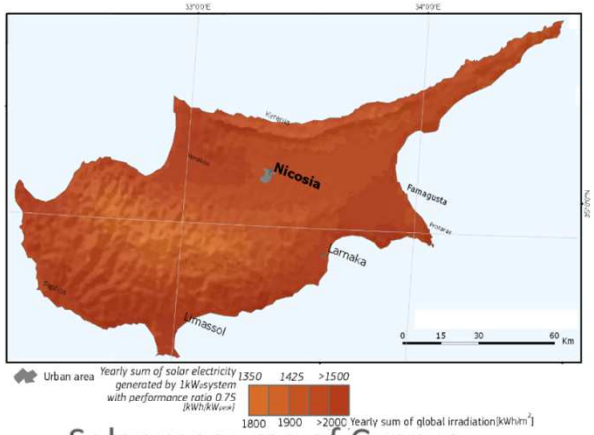
# Solar Potential in Cyprus

Grid Parity
PV Electricity Price: 4-6 c/kWh
Domestic Price: 19-21 c/kWh




Solar resource of Cyprus

$$2000 \frac{kWh/m^2}{year}$$

Annual PV energy yield of Cyprus :

$$1600 - 1700 \frac{kWh}{kW_p}$$

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# Potential of Roof-Top Systems

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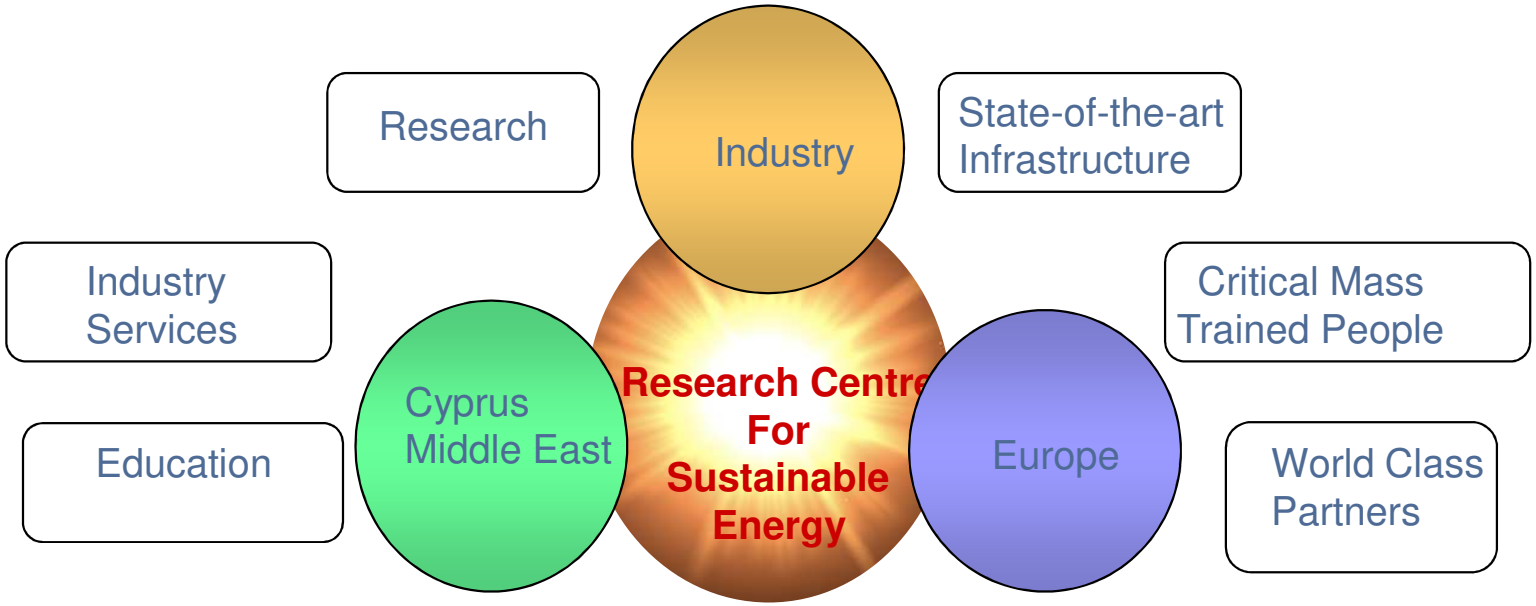
# FOSS in a nutshell




**Core Research Themes**: Renewables (solar energy), smart grids, storage, grid integration, integrated solutions, societal impact

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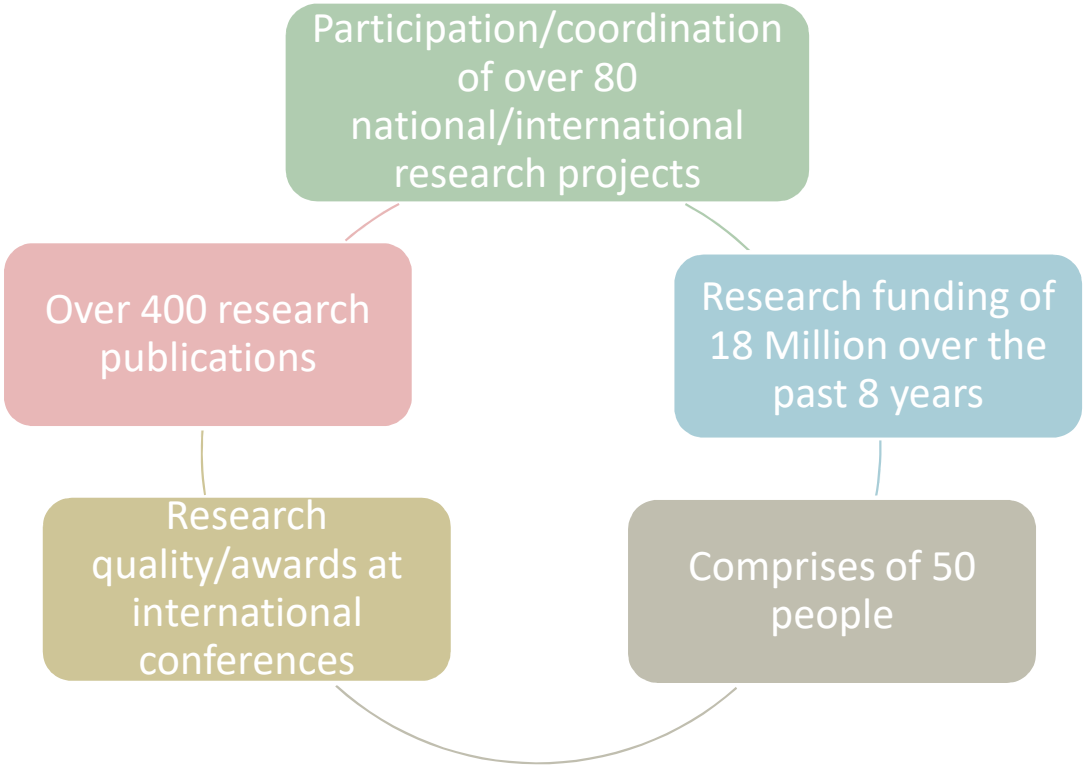
# Highlights of FOSS



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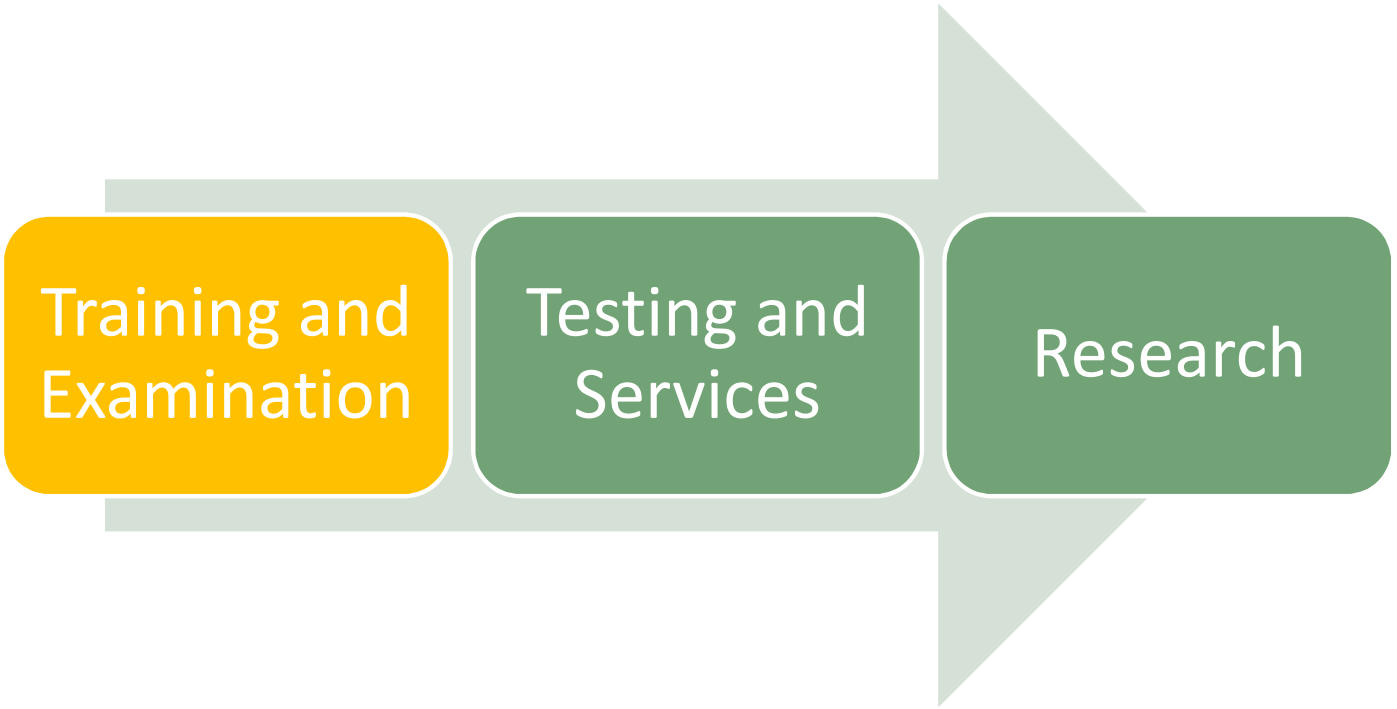
# FOSS Activities



# Academic courses

Πανεπιστήμιο Κύπρου
University of Cyprus

**ECE447: Renewable Energy Sources: Photovoltaics**

This course covers theoretical and practical aspects of photovoltaic technology and in particular introduces students to aspects of solar generation, technology characteristics, design principles and system types.

Πανεπιστήμιο Κύπρου
University of Cyprus

**ECE687: BIPV - Towards nearly zero energy buildings (NZEB)**

This course covers theoretical and practical aspects of building integrated photovoltaics (BIPV) in the domain of nearly zero energy buildings (NZEB).

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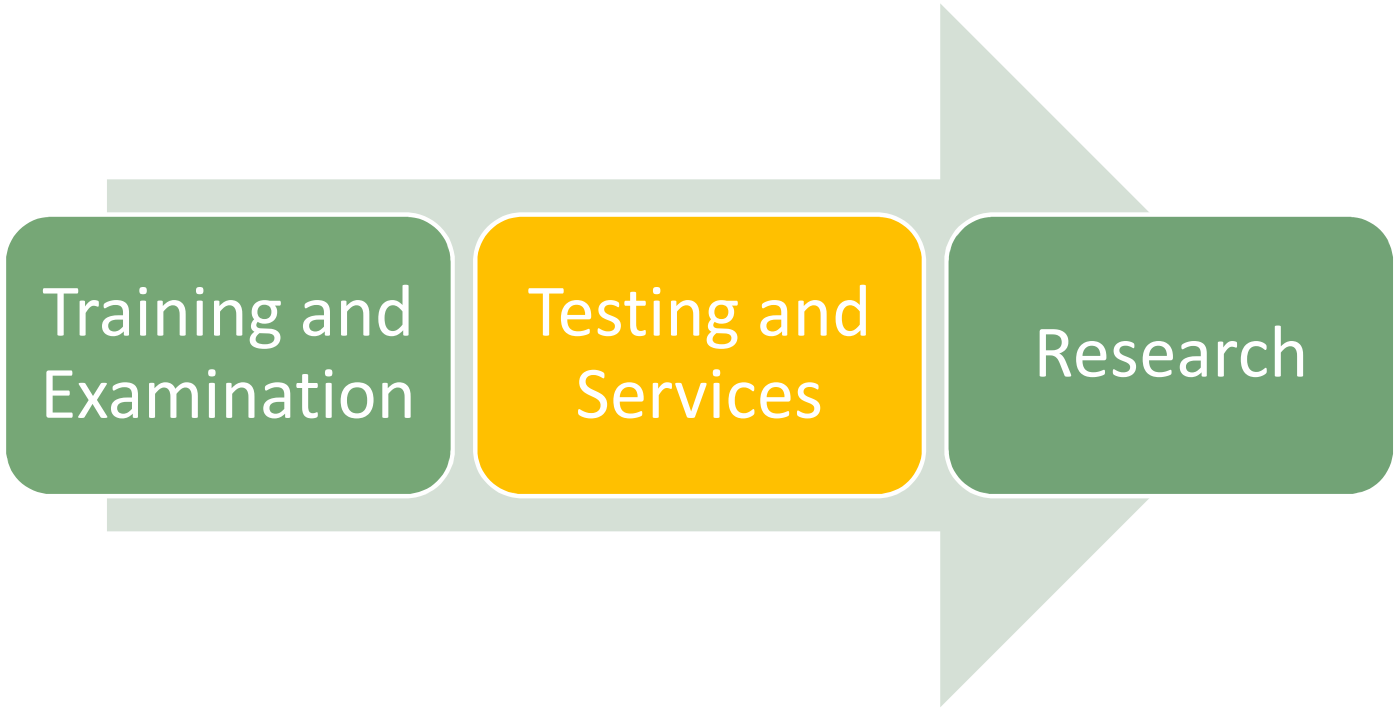
# Vocational Training - Photovoltaics

The courses cover theoretical and practical aspects for trainees to develop skills and understanding on the design and installation of both grid-connected and stand-alone photovoltaic (PV) systems alongside with new and innovative topics such as self-consumption, smart meters, storage and PV applications such as pumping, solar desalination, PV system performance assessment etc.


# FOSS Activities



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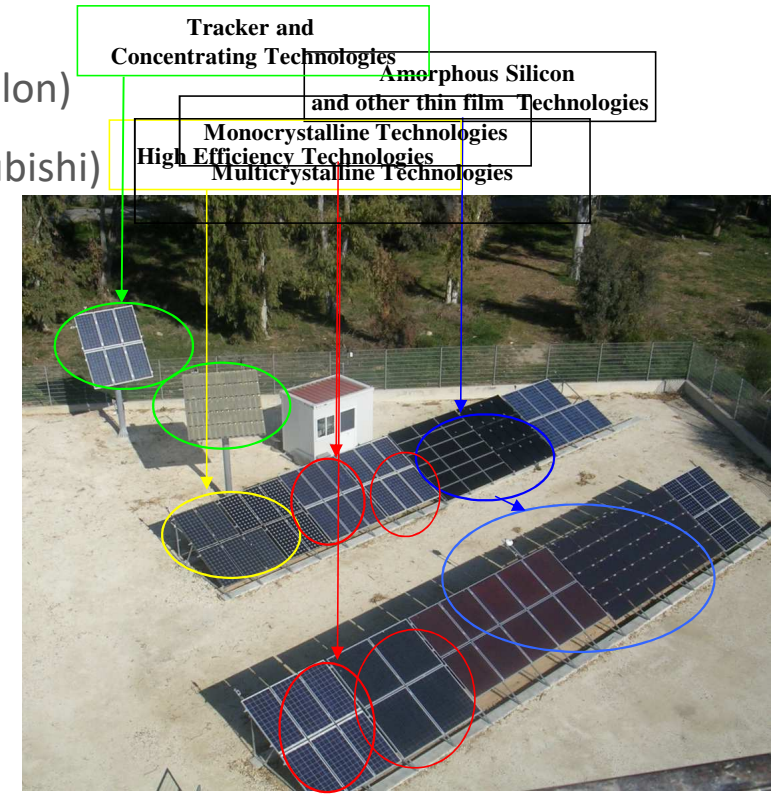
# Reliability Outdoor Facilities

**Project Funded by the German Federal Ministry for the Energy, Environment and Nature Conservation (BMU).**

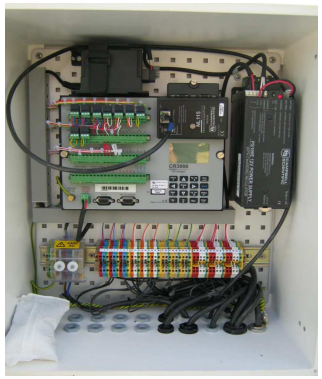
# PV System Technologies

- Monocrystalline Silicon (Atersa)
- Multicrystalline Silicon (SolarWorld, Solon)
- Amorphous Silicon (Schott Solar, Mitsubishi)
- EFG and Main (Schott Solar)
- Saturn Cell (BP)
- Back Contact Cell (Sunpower)
- HIT (Sanyo)
- Cadmium Telluride (First Solar)
- Copper Indium Diselenide, CIS (Wurth)
- Tracked System
- Concentrator System (Concentrix Solar)




Funded by the German BMU

# UCY Outdoor Infrastructure

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# Other Infrastructure


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# Indoor Characterisation (Module)

UV Simulator


Climatic Chamber

Solar Simulator

Infrastructure suitable for IEC 61215, 61646 and 62108 testing

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# Indoor Characterisation (Cell)

## Spectral response setup

- Single – triple junction PV cells
- Spectral response (359nm – 1800nm)
- Quantum efficiency of PV cells

## Cell Characterisation

- I-V curve acquisition
- Temperature coefficient measurements

## Lens Characterization
## Electroluminescence/Photoluminescence


# Before and after…
# First PV research infrastructure in Cyprus

**Then**
Funds: 0
People: 0
Equipment: 0

**Now**
Funds: 18 MEuros
People: 50
Equipment: Indoor and outdoor infrastructure

# Open Doors Event

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# Testing site

Official testing site for over 40 different manufacturers:

Honeywell

Q CELLS Engineered in Germany

CONERCON energy solutions

tsmc solar

SunTechnics

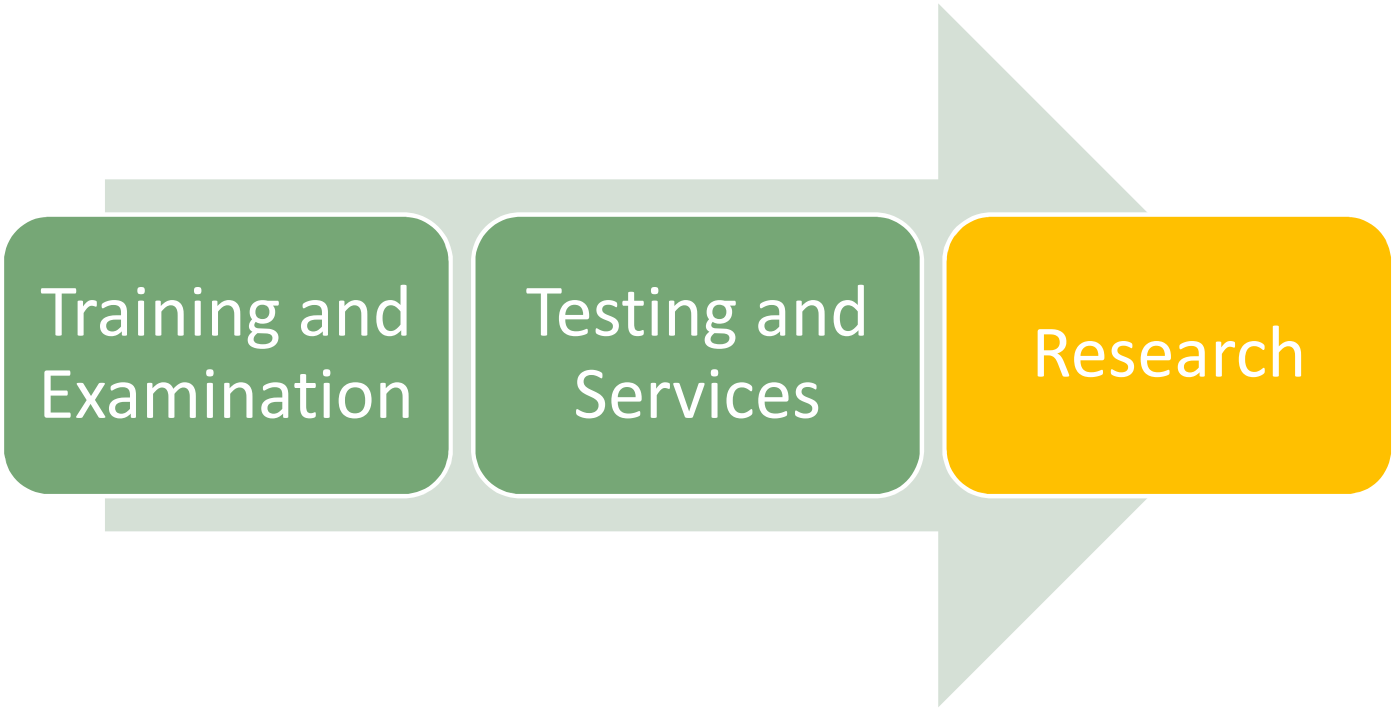
oerlikon

REC Solar

SCHOTT solar

SolarWorld

# FOSS Activities



# Main Research Areas

**PV performance and modelling: reliability, degradation, and performance of PV technologies, system issues as well as building integration.**

**Grid integration issues, control techniques, distributed generation and market tools.**

**Energy management systems, smart grids, storage, demand side management and energy forecasting.**