CONSORZIO
ARCA

# About us

**ARCA is a public-private consortium established in 2003 by the University of Palermo and a private group founded by local researchers in mid 90s to promote innovative technology transfer processes.**

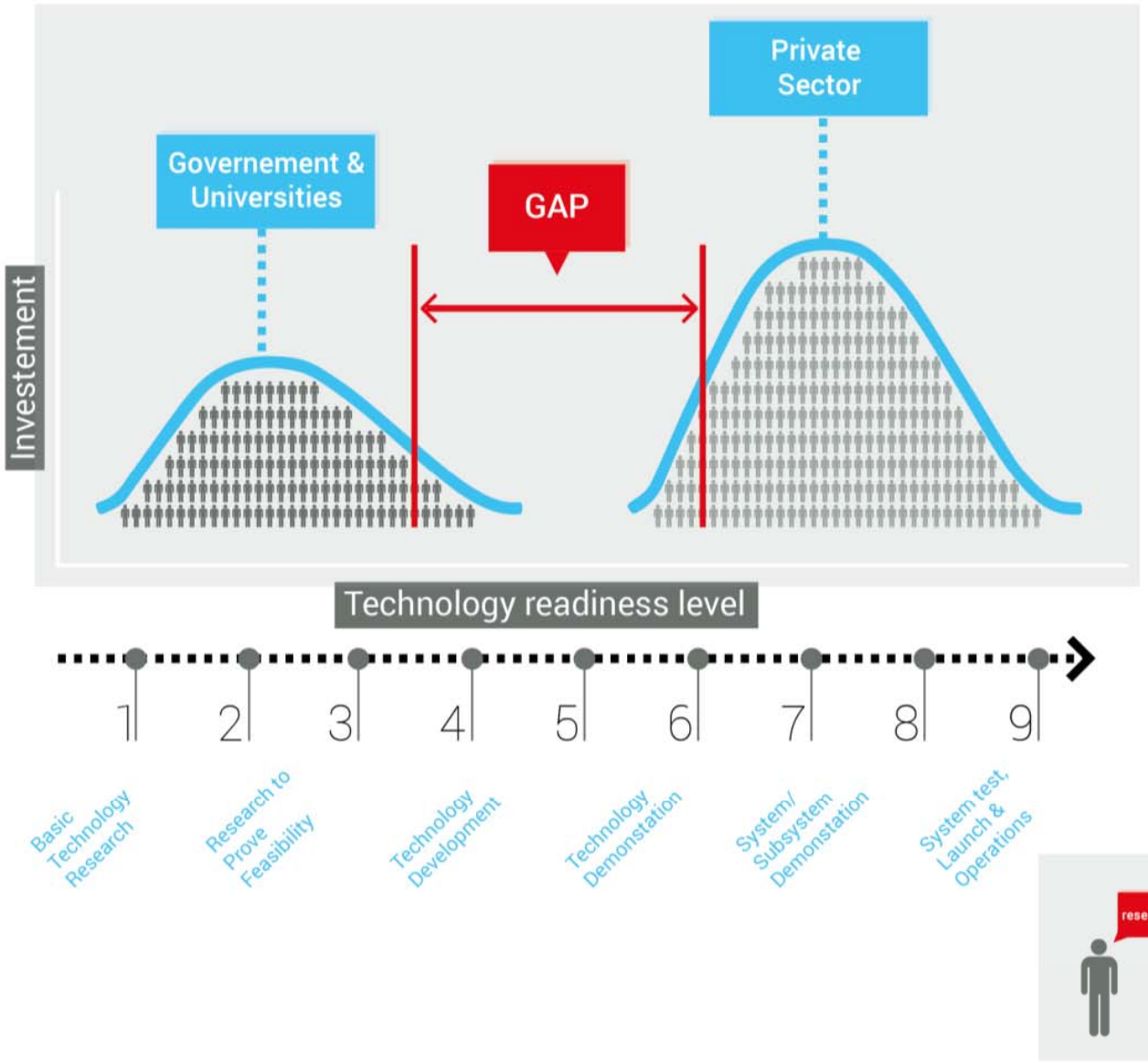
# What we do

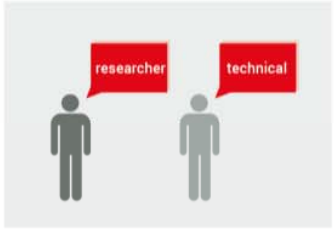
**Business incubation**

**Technology transfer and development of new products with SMEs and clusters**

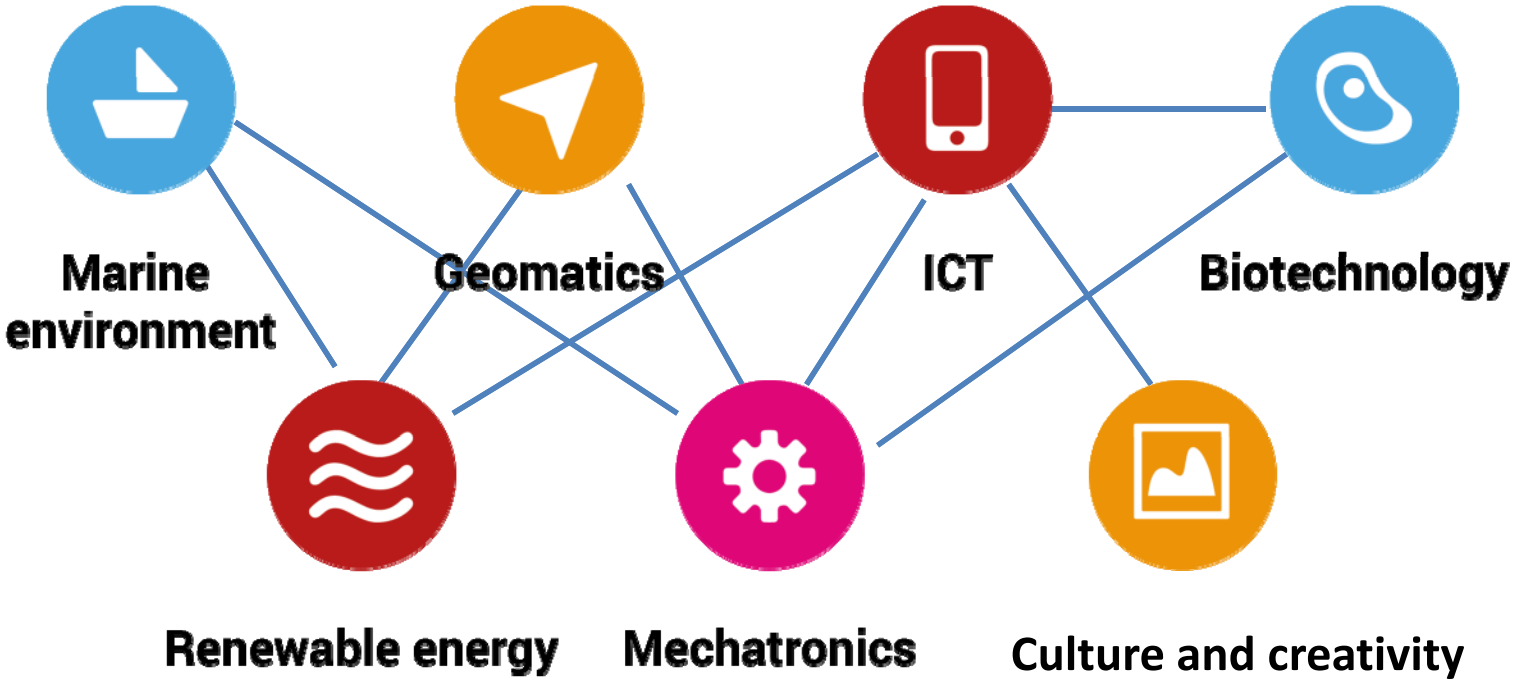
**Management of capacity building and social innovation projects involving local communities**

# WE MIND THE GAP



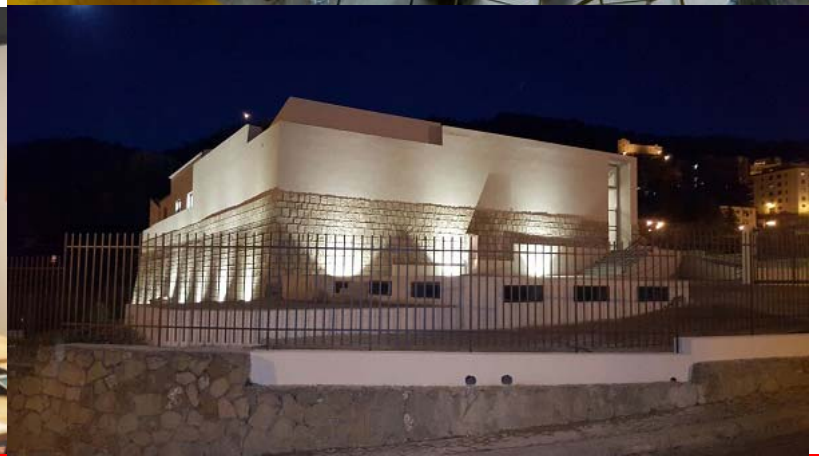



# CONTAMINATIONS

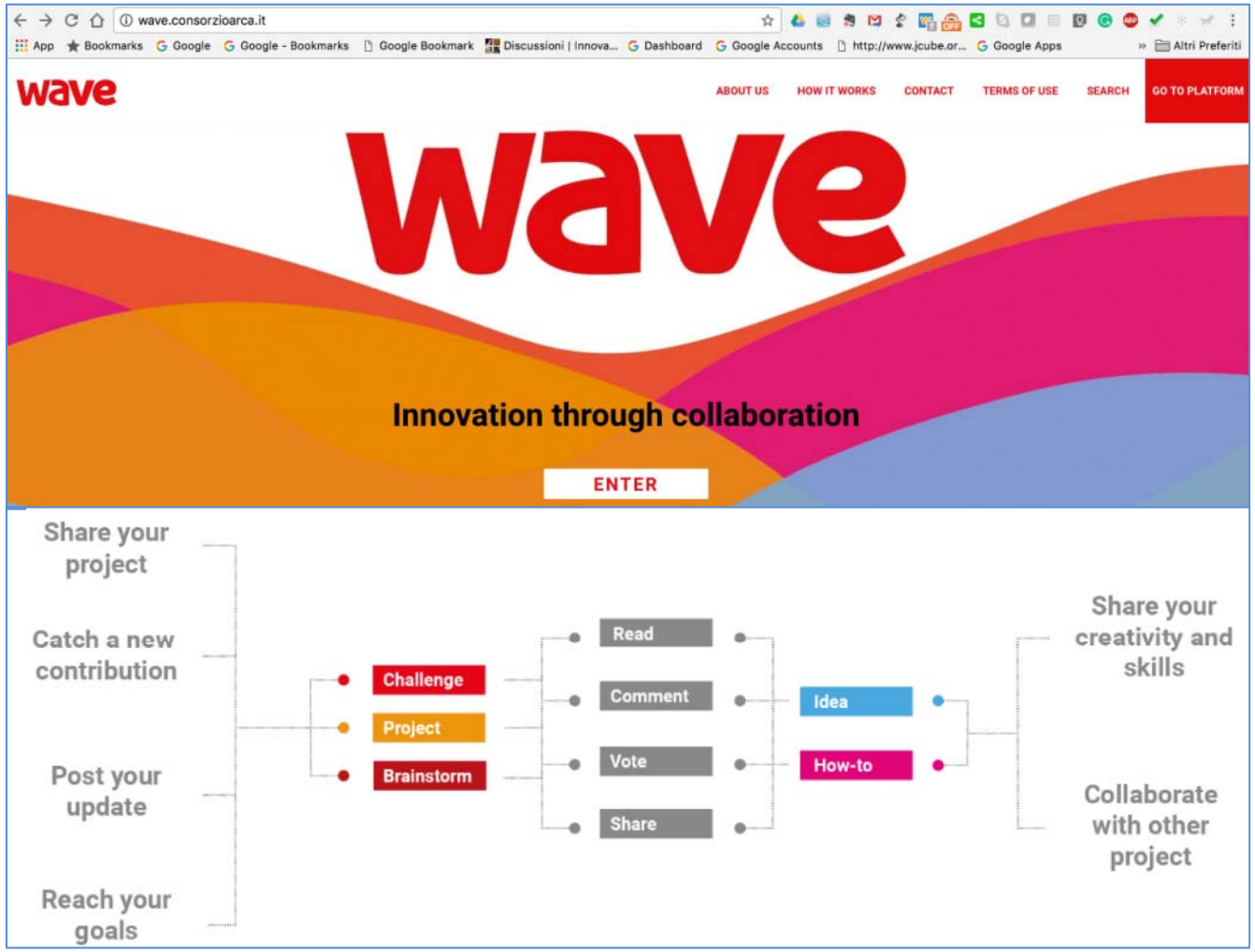


# Our innovation hubs

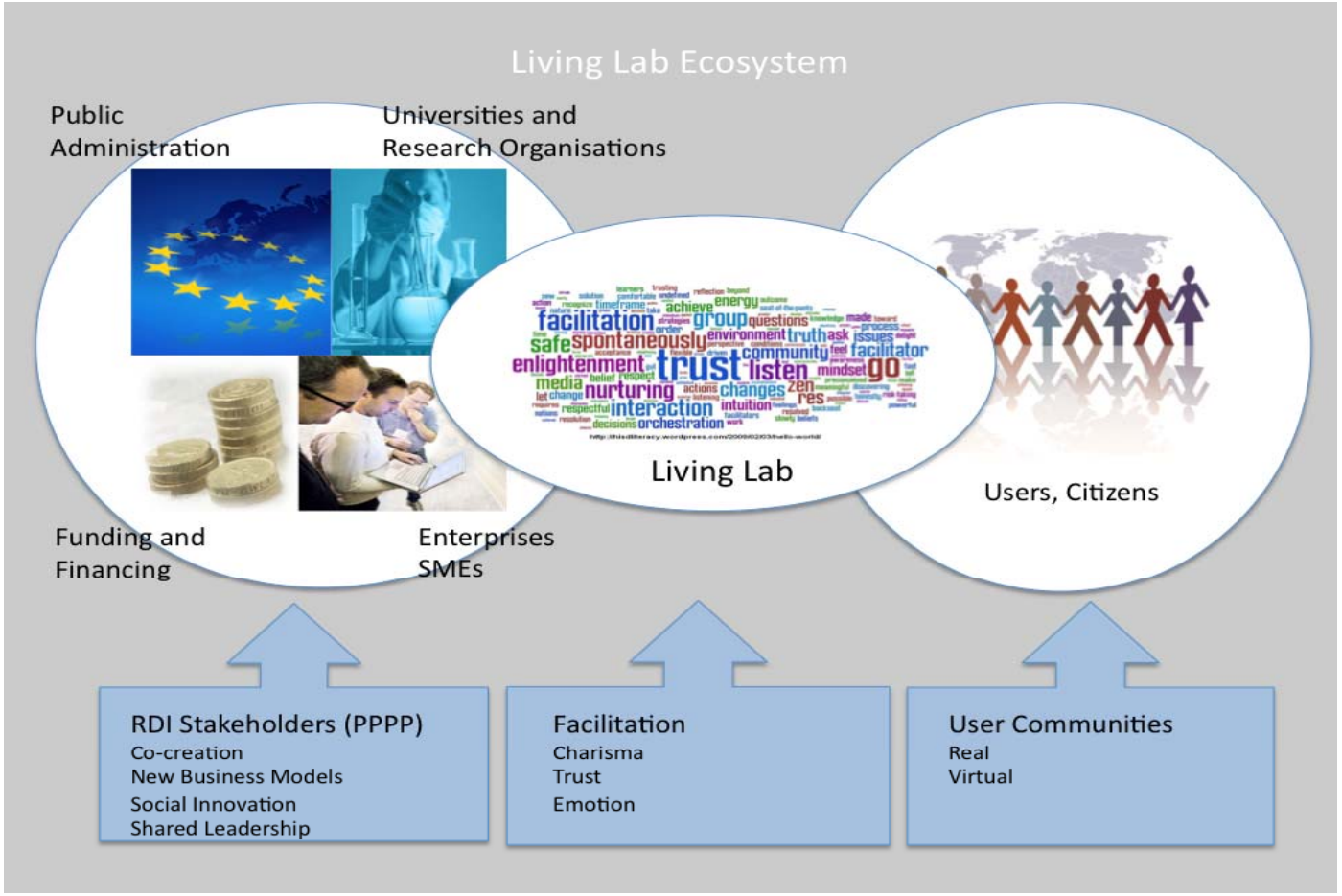
- **High tech incubator** inside the university campus of Palermo
- **Creative industry hub** inside the cultural campus of the municipality of Palermo
- **Rural innovation hub** in the natural park of Madonie

# Our Open Innovation platform



# Our Living Labs




MALL
Madonie Living Lab

SOLL
Solar Living Lab

TECLA
Textile&Clothing Living Lab

European Network of Living Labs

# TECLA – from tradition to innovation

- **Regenerates** traditional know-how through education and practical training activities
- **Hosts** showcase events devoted to the promotion of innovative talents and companies
- **Supports** new manufacturing possibilities by offering spaces and tools
- **Offers** international networking opportunities with the reference hubs in the field of creative industry

# SoLL as Responsible Research & Innovation arena

- **Exploits** an open research, innovation and educational demonstrative infrastructure within the university campus
- **Supports** knowledge and technology transfer to the productive system, promoting entrepreneurship in renewable energies
- **Hosts** a showcase of innovative projects generated in the research labs, bridging the gap between research and market
- **Coaches** promising professionals and entrepreneurial teams in the energy sector
- **Promotes** a larger 4-helix ecosystem conducive to innovation and entrepreneurship within the sustainable development transition

SMARTGEMS energy network

STS med

zero+

ar(a)

# MaLL – a territorial rural Living Lab

- Promoting a new identity of the rural areas combining **tradition and innovation**
- Three strategic sectors: **agrofood, natural and cultural heritage, energy**
- Fisically based in the **EXMA innovation hub**
- Opening local opportunities for young professionals / attracting experienced talents looking for a **slower life**
- With the perspective of connections and exchanges with similar realities at an **international level.**

# EU & Global Networks

ebn innovation network

An international community of smart & specialised organisations,
that connect & coach innovators, entrepreneurs & SMEs,
to start, grow & transform our economies


SUSTAINABLE DEVELOPMENT
SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

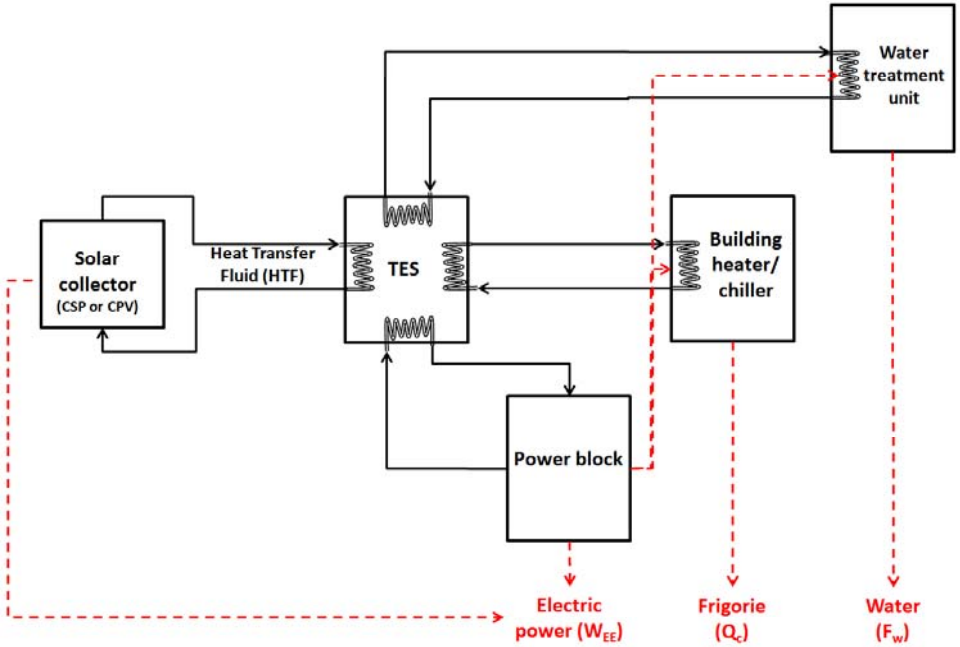
European Network of Living Labs

eit Regional Innovation Scheme

# Ideas for Iran-Italy investment opportunities in Energy & Environment

# New solar technologies for urban environment

We decided to invest in advanced solar systems especially designed for **distributed polygeneration** (heating, cooling, power, water treatment) based upon **innovative storage.**
Demonstrative plants have been installed in Italy, Cyprus, Jordan and Egypt, involving SMEs from local supply chains. The application in Lebanon is under study.




# FRESCO: DOWNSCALING CSP TECHNOLOGY TO DISTRIBUTED POLYGENERATION

- Modular & cost effective
- Easy to mount and “roof ready”
- Integrated polygenerative modules
  - Double effect absorbtion solar cooling
  - High efficiency TES
  - ORC power unit
  - Low/mid enthalpy water treatment

Suitable for

- District Heating&Cooling
- Industrial thermal processes
- Food logistics
- Small CSP plants
- …

# DEMONSTRATIVE SOLAR FIELDS

| | Cyprus | Egypt | Italy | Jordan |
|---|---|---|---|---|
| |  |  |  |  |
| **Location** | Aglantzia, on the roof of a school, next to the NTL | Markaz Belbes, nearby the Sekem medical center | University of Palermo, on the ground at ARCA premises | Irbid, roof a building of the Al Balqa University College |
| **Latitude<br>Longitude<br>Elevation** | 35°08'28.1"N<br>33°22'50.7"E<br>176m | 30°25'05.5"N<br>31°38'07.8"E<br>35m | 38°06'01.0"N<br>13°20'37.3"E<br>50m | 32°29'13.2"N<br>35°53'24.0"E<br>648m |
| **DNI per year** | 2142 $kWh.m^{-2}$ | 1958 $kWh.m^{-2}$ | 1703 $kWh.m^{-2}$ | 2377 $kWh.m^{-2}$ |
| **Type of collector** | LFR | LFR | LFR | PTC |
| **Aperture area** | 184.32 $m^2$ | 299.50 $m^2$ | 483.84 $m^2$ | 163.2 $m^2$ |
| **Thermal oil** | Duratherm 450 | Therminol 66 | Paratherm NF | Seriola eta 32 - Total Lubmarine |
| **Peak power** | 70 kW | 115 kW | 190 kW | 85 kW |
| **Receiver length** | 32 m | 52 m | 84 m (3 x 28 m receivers rows) | 38.56 m |
| **Working temperature** | 170°C | 140°C | 280°C | 240°C |

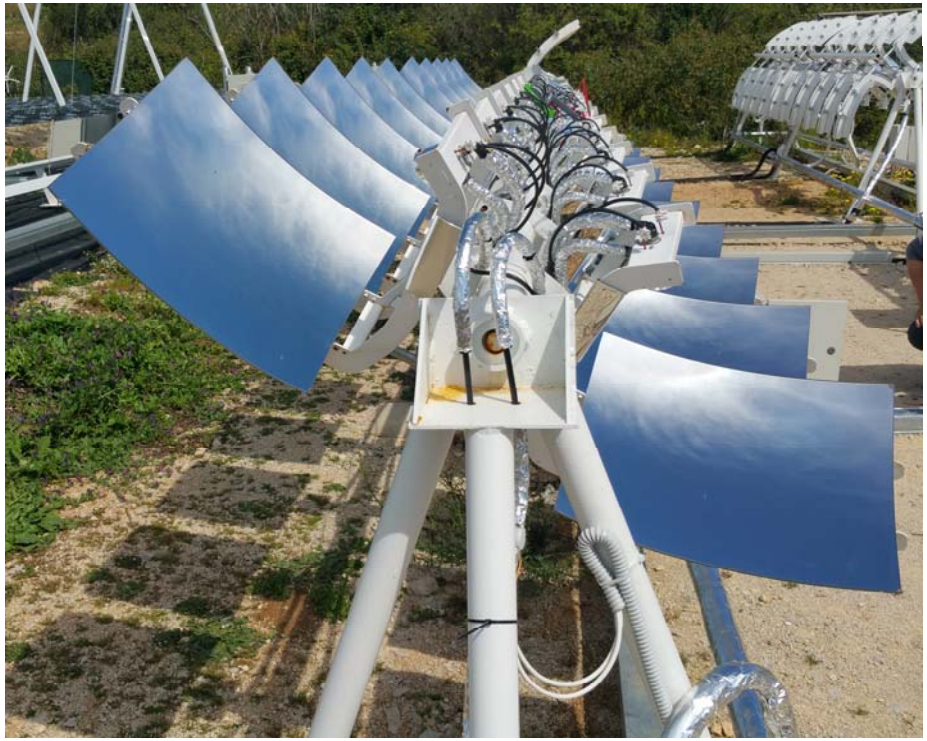
# PLANNED DEVELOPMENTS

- Greenhouse/solar canopy integrated design
- Improvement of the integrated control system
- Scale-up projects
- Testing triple-effect  absorption chillers
- Effective hybridization with biomass/gas

# FAE – High Efficiency Photovoltaic system

HCPVT can provide an unbeatable global efficiency **electricity + thermal energy**. As $T_{out}$ can be raised up to 100°C, solar cooling and water treatment services can be integrated to PV/T generation.

| | |
|---|---|
| Net surface single mirror | 2,025 $cm^2$ |
| Solar concentrator | ≈ 2,000x |
| Optical efficiency | 90% |
| | |
| Mirrors per module | 20 |
| Cells per module | 20 |
| Module elect. efficiency | ≈ 30% |
| Module thermal efficiency | ≈ 45% |
| Overall efficiency | ≈ 75% |
| Peak electrical power | ≈ 1.000 $W_{ep}$ |
| Peak thermal power | ≈ 2.000 $W_{thp}$ |
| | |
| Tracking system | Alt-Alt |
| Dimension | 1,4 x 6,5 m |
| Weight | 280 Kg |
| | |
| Heat transfer fluid | glycol & water |
| Flow rate per module | 4 l/min |
| Heating temperature | ≈ 70°C |



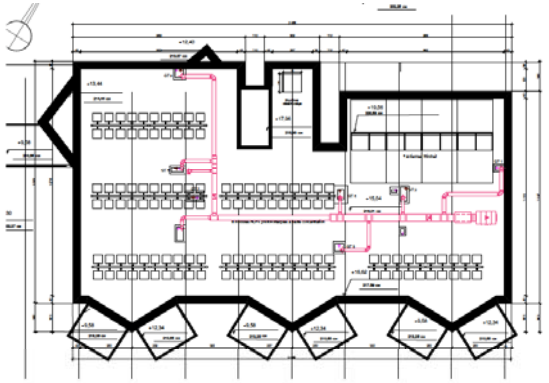
# PILOT INSTALLATIONS

**Horizon 2020 Zero Plus project**: Achieving near Zero and Positive Energy Settlement in Europe using Advanced Energy Technology

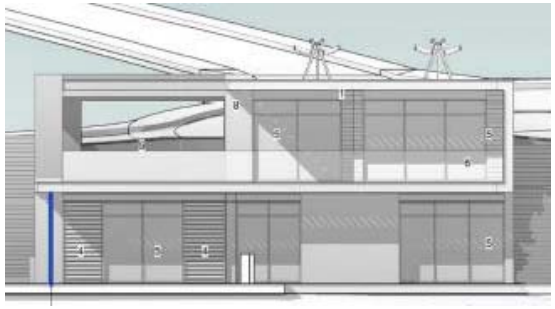
- 16% initial cost reduction  with the reference case
- Net regulated energy consumption of less than 20 KWh/m$^2$ per year
- Energy production by RES of at least 50kWh/m$^2$ per year

**HCPV installations**

**Voreppe (France)**



**Paphos (Cyprus)**



# Thank you!

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