Istituto Sostenibilità Applicata all'Ambiente Costruito (ISAAC)

«Exploring Quality and Assurance in Photovoltaics"

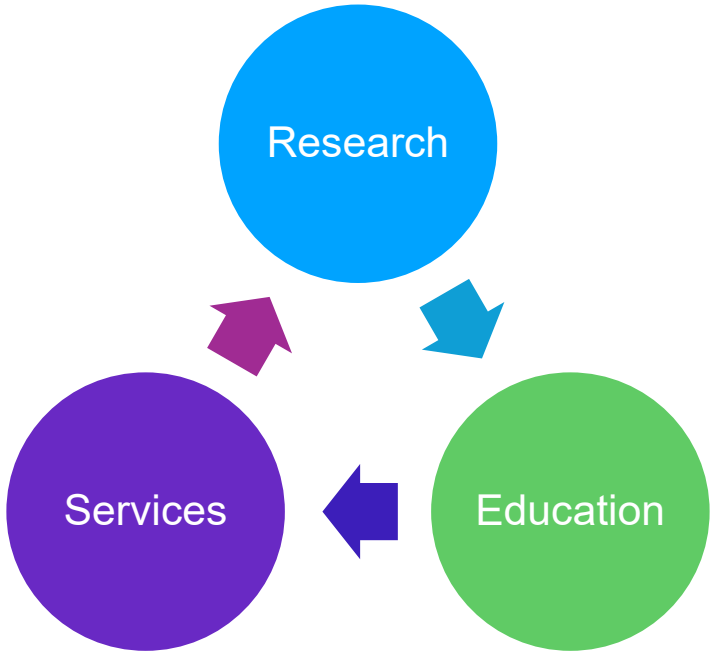
SUPSI

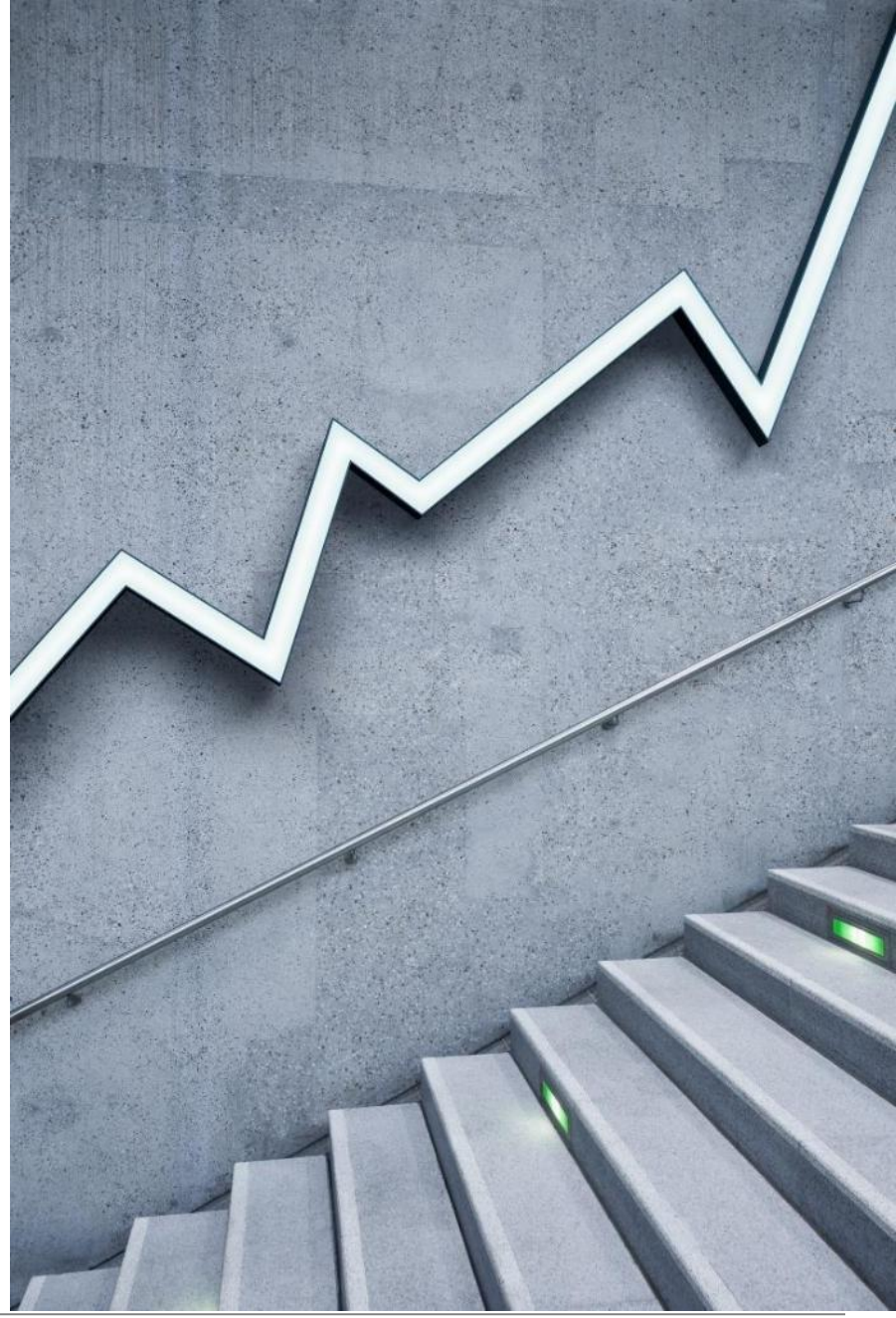
SUPSI PVLAB
INDUSTRY DAY

Prof. Francesco Frontini
Head of ISAAC

21 maggio 2026
Mendrisio

ISAAC as a key player in the energy transition





SUPSI Scuola Universitaria Professionale Svizzera Italiana

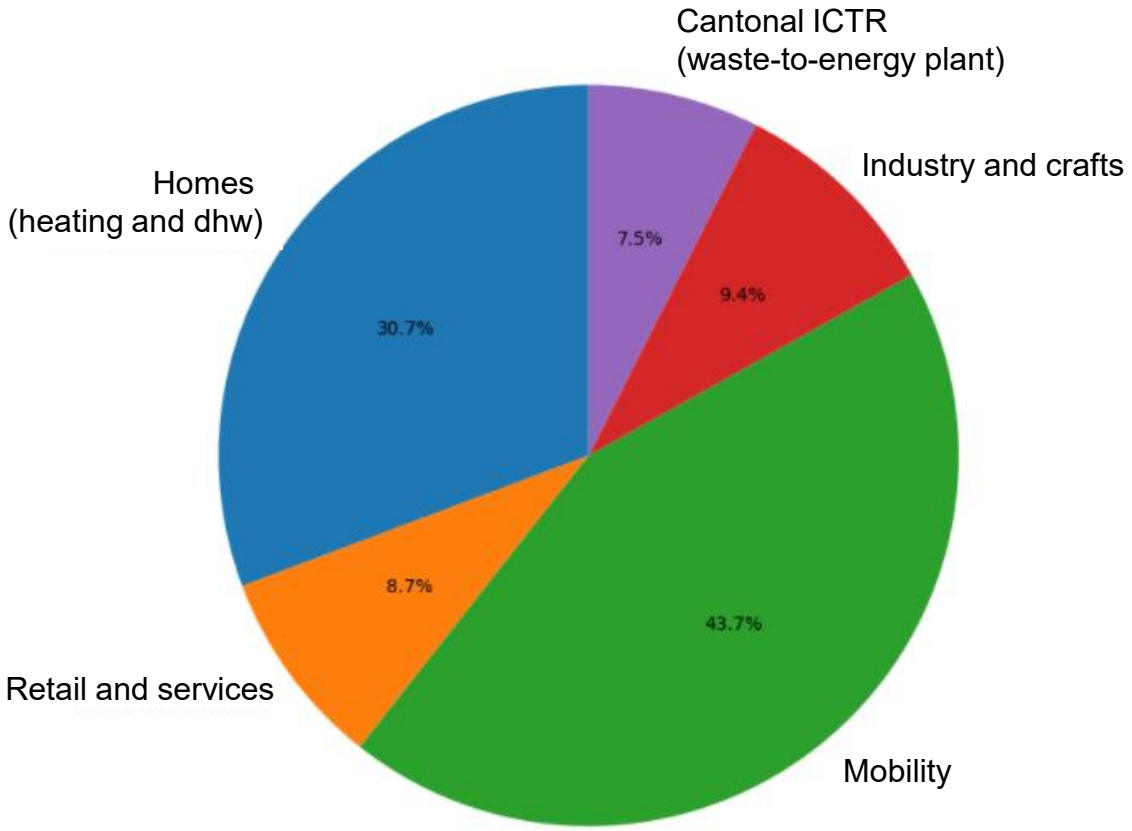
- 1’339 Collaborators, 6’409 Students (4’225 in Ticino)
- 7 departments and 9 research areas
- >800 active projects
- 55 millions (155 MioCHF turnover) of CHF for Applied Research and innovative services
- 1339 collaborators (835 prof./researchers)
- 10’675 Participants in Continuing Education Courses

Milestones of our institute

- 1982: Research on PV modules started
- 1991: outdoor Test stand
- 2000-1: indoor Flash-simulator & first accreditation
- 2003-4: BiPV projects (Swiss BIPV CC)
- 2010: PVLab ISO 17025 accreditation & EU Projects
- 2015-16: Reorganization of the institute and PVLab
- 2018: lunch of the start-up HIVE POWER ; 2019: iwin
- 2019: Solarchitecture.ch platform (with Swissolar&ETHZ)
- 2021: New DACD campus & PV laboratory in Mendrisio
- 2023: The Lugaggia Innovation Community project wins the 2023 Watt d'Or.
- 2025: renew of outdoor spaces and new Transdisciplinary area

https://www.isaac.supsi.ch/en/history

The context in which we operate



Breakdown of direct CO2 emissions from non-renewable sources in Ticino, 2024

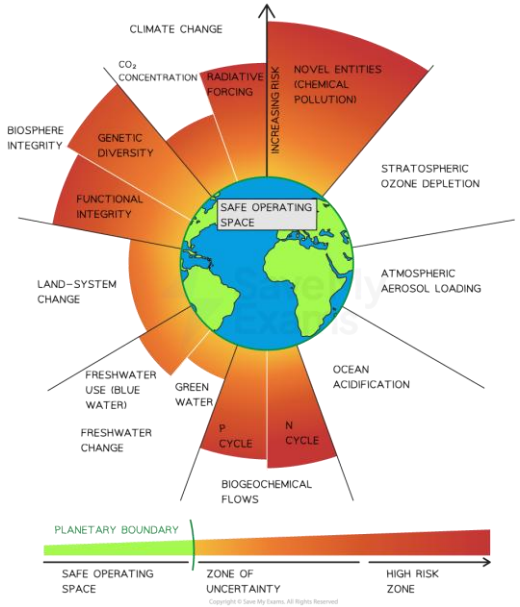
Buildings (and mobility) as main challenge for the **decarbonization**

The context in which we operate

Today on Earth there are
145 billion
of square meters of buildings

Challenges and framework

Research questions



Source: [Planetary boundaries - Stockholm Resilience Centre]

ENERGY TRANSITION and REGENERATION

Increasing the rate of building regeneration (from the current 1%) in a sustainable and 'circular' manner while confronting 'planetary limits*'.

Integrated photovoltaics, ranging from BIPV to IPV (infrastructure, alpine, agricultural, vehicles, car parks, etc.), ensuring **long-term safety and reliability**.

How to monitor and **manage** the widespread adoption and deployment of solar power in our grids and ensure **adequate "winter" generation.**

Increased electrification (across all sectors, particularly construction and transport) alongside **heat generation** from **local sources** (district heating/cooling).

What **policies and regulations** promote the energy transition in a sustainable manner (technically, economically and **socially**); how to collect, map and **present regional energy data.**

* Johan Rockström, Breaking boundaries

Istituto sostenibilità applicata all'ambiente costruito

63
Collaboratrici e collaboratori
(4 professori, 10 senior e 8 dottorandi)

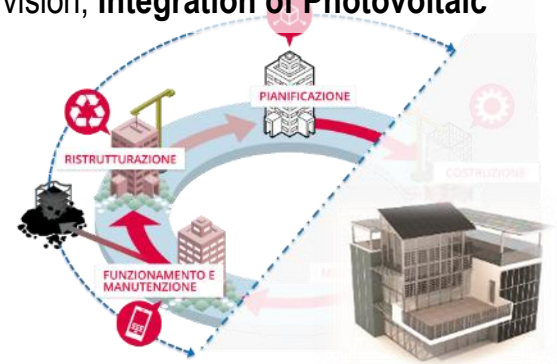
76
Progetti e mandati
di ricerca attivi

4
Settori di ricerca

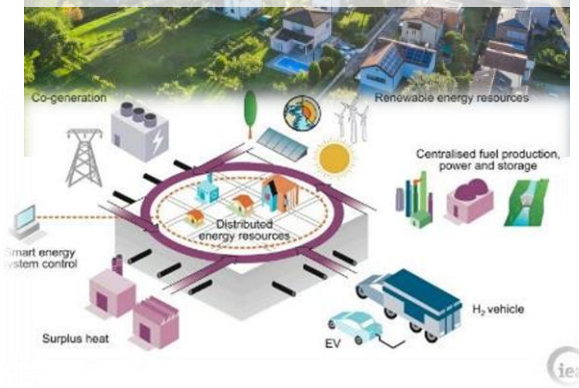
3
Centri di competenza

1) Photovoltaic **reliability** and **characterization**, **PVLab**, towards high performance and quality IPV systems

2) Building System: **Management, analysis and regeneration** of the building stocks in a circular construction vision, **Integration of Photovoltaic**



3) Energy Systems: Intelligent and distributed **energy management** for the Energy transition



4) Energy Sustainability and Territory: Development of **local and regional policies t**o promote energy transition with user engagement

PRODUCE **INTEGRATE** **IMPLEMENT**

Around 40 years of experience in photovoltaics and >20 years in architecture and construction

Multidisciplinary team: engineers, architects, physicists, sociologists...

SUPSI-PVLab unique photovoltaic laboratory in Switzerland accredited to ISO 17025

High TRL → Business-oriented innovation and mercato → spin-offs HIVE POWER iwin The sun keeps on rising

Demonstration and applied research

Test & Qualification

New Technology

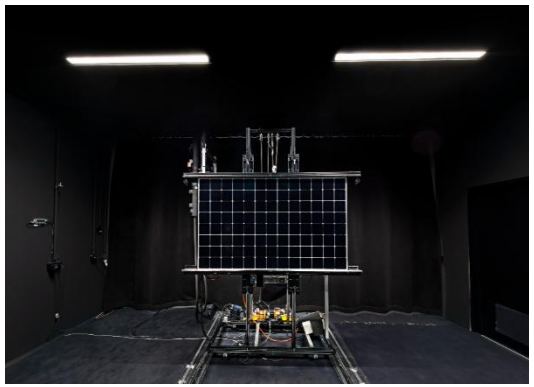
Sensitization, analyis and communication

SUPSI PVLab : Unique ISO 17025 accredited PV Lab in Switzerland

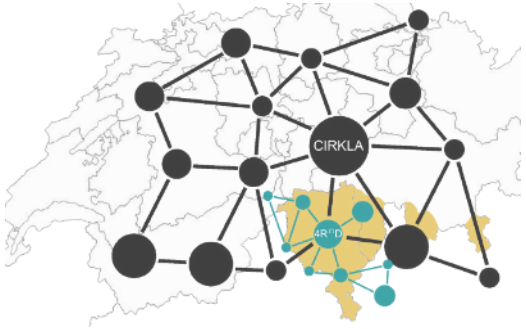
Accreditation number: STS 0531

This accreditation ensures the highest level of precision and reliability in testing, covering electrical, mechanical, and safety assessments in line with international standards

- Two AAA-class flash sun simulators for precise electrical characterization.
- Mechanical load testing apparatus capable of applying up to 14,000 Pa to assess extreme snow load resistance.
- Climate chambers for accelerated aging tests involving temperature and humidity cycles.
- Hail resistance testing with hailstones ranging from 25 to 70 mm in diameter and more.
- On-site verification and data analysis for installed PV systems.



Networks and partnerships



Collaborations and projects with various Swiss institutions and associations:

- Collaboration: EPFL/CSEM, ETHZ/EMPA, HSLU, ZHAW, SPF/OST, HES-SO,…
- Association: IEA-PVPS & SHC, Swissolar, CIRKLA, CAT (Ticino), Bauen Digital CH, Swissproptech, ecobau, SNBS…
- Normative groups: SIA, IEC, ISO, CEN, CENELEC
- Conferences: PVTagung, brenet Status Seminar, Dach+Energy informatics, EUPVSEC, FTAL, …

BAUEN DIGITAL SCHWEIZ
BÂTIR DIGITAL SUISSE
COSTRUZIONE DIGITALE SVIZZERA
CONSTRUIR DIGITAL SUIZA

Home of buildingSMART Switzerland

SWISSOLAR

sia
Schweizerischer Ingenieur- und Architektenverein
Société suisse des ingénieurs et des architectes
Società svizzera degli ingegneri e degli architetti
Swiss society of engineers and architects

SwissPropTech
Innovation in Real Estate & Construction

activehouse

ticino energia

SWISS ENGINEERING STV UTS ATS

brenet

SVG SSG

IEA PVPS

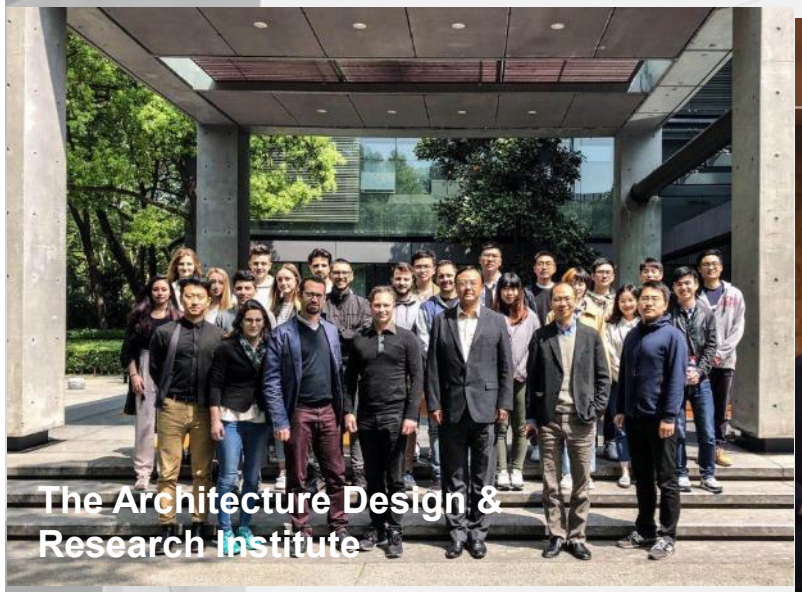
EBC
Energy in Buildings and Communities Programme

ISAAC «beyond borders»

Task 13&15 - International Energy Agency

IEA EBC – Annex 82 Energy Flexible Buildings Towards Resilient Low Carbon Energy Systems

Partnerships: India, China, UAE, USA, Canada, Spain, France, Italy, Sweden, Norway, Germany, The Netherlands, Belgium, Australia, Haiti, Ethiopia,…



Several mockup installations on the roof of ISAAC-DACD and the Viganello campus (TRL6-7)

Viganello Campus

Mendrisio Campus

Mendrisio Campus

Pilot projects as main results and ways of transferring innovations (TRL8)

Alloggi Ticino SA and Solarify

Chiasso Palazzo Positivo

Quality as a goal for a sustainable and durable future!

SUPSI

Bachelor «Sustainability and systemic transition»

Starting in 2027-2028

Stay connected

29 August 2026

9 June 12:15-13:15

brenet ForschungsLunch #4

Solare Energiesysteme im Praxistest: PV, PVT und Solarthermie

Erfahren Sie, wie Labore der Schweizer Fachhochschulen reale Fragestellungen untersuchen und konkrete Lösungen für Praxis und Industrie entwickeln.

09. Juni 2026
12.15 bis 13.15 Uhr
Online

brenet Partner:
MINERGIE®

brenet

GRAZIE PER L'ATTENZIONE!

Have a nice day full of discussion and new opportunities!

Thanks a lot to everyone and especially to:

energieschweiz

SWISS PHOTONICS

And all exibitors:

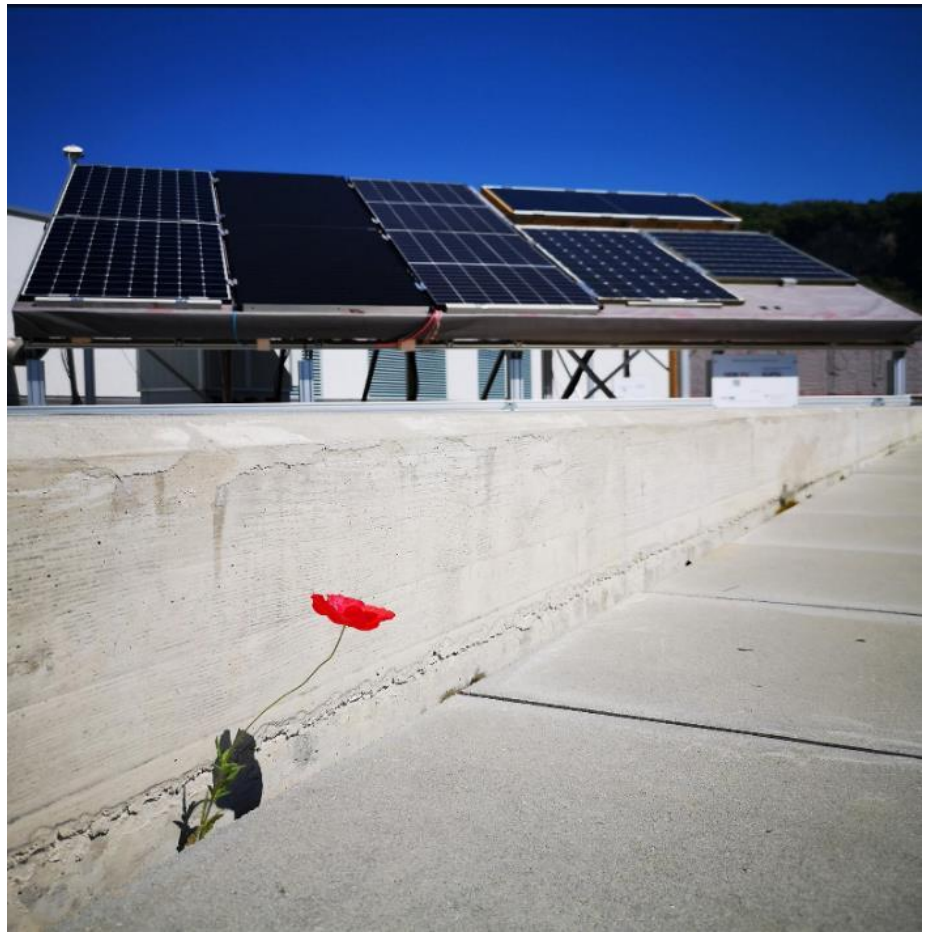
3S

INVITAIC
Invisible Photovoltaic

megasol

SYNAGE
SOLAR BUILDING SKIN

VOLTEC solar



Mission: Towards a 100% renewable future