Greenet

The network of Horizon Europe
Cluster 5 National Contact Point.

FONDAZIONE NEST IS THE NETWORK 4 ENERGY SUSTAINABLE TRANSITION

NEST is one of the **Italian** large extended partnership projects selected by the Ministry of University and Research (MUR) with the aim of financing basic research projects to strengthen supply chains at national level and promote their participation in European and global strategic value chains.

The NEST Foundation **designs and coordinates projects in nine specialized spokes**, each dedicated to a specific area of sustainable energy transition.

https://fondazionenest.it/

The GREENET project has received funding from the EU Horizon Europe programme under Grant Agreement No 101069604

OUR TOPIC AND SPOKES

- Solar CST CSV PT
- Energy harvesting and offshore renewable energy
- Bioenergy and new biofuels for a sustainable future
- Clean hydrogen and its final uses
- Energy conversion
- Energy storage
- Smart sector integration
- Optimization, sustainability and resilience in the energy supply chain
- Energy-sustainable advanced materials

SPOKES' SCIENTIFIC COORDINATORS AND EXPERTISES

Solar CST CSV PT

UNIVERSITÀ DEGLI STUDI DI PALERMO

Energy harvesting and offshore renewable energy

Politecnico di Bari

Bioenergy and new biofuels for a sustainable future

UNIVERSITÀ DI PISA

Clean hydrogen and its final uses

Università di Genova

Energy conversion

POLITECNICO MILANO 1863

Energy storage

Politecnico di Torino

Smart sector integration

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

Optimization, sustainability and resilience in the energy supply chain

SAPIENZA UNIVERSITÀ DI ROMA

Energy-sustainable advanced materials

Consiglio Nazionale delle Ricerche

Greenet

AND PARTNERS

AMONG THE RESEARCH CENTERS:

ENEA
Italian National Agency for New Technologies, Energy and Sustainable Economic Development

eurac research

FONDAZIONE BRUNO KESSLER

iit ISTITUTO ITALIANO DI TECNOLOGIA

AMONG THE INDUSTRIAL PARTNERS:

ENGINEERING
THE DIGITAL TRANSFORMATION COMPANY

INTESA SANPAOLO

Arco Technologies Inc

idee75

snam

iren

exprivia

NuovoPignone

More on our topics

1.Solar CST CSV PT

- Optical/electrical simulations of solar cells and modules
- Development of selective layers, TCOs, anti-reflective coatings
- Advanced semi-transparent PV for combined light use (PV + photosynthesis)
- Tandem solar cells: perovskite films, tunneling junctions, degradation control
- Mini-module design, large-area metallization, performance stability
- Semi-transparent & flexible PV laminates for integrated applications (IPV)
- Colored PV modeling and functional spectral-shifting coatings
- Mass customization of IPV through product integration prototypes
- CSP/CST integration in industrial & civil energy systems
- Hybrid solar heat systems with new fluids and thermal storage materials
- High-temp ceramic solar absorbers & supercritical power cycles
- Advanced power electronics for grid integration
- IoT-enabled PV modules for O&M optimization
- Energy storage (thermal + electric) impact on grid performance
- AI/ML for energy forecasting, diagnostics & fault prediction
- Lifecycle assessment (LCA) and cost analysis for PV & CSP/CST
- Eco-design of PV and CSP/CST manufacturing equipment
- Dissemination to stakeholders & scientific community

More on our topics

2.Energy harvesting & Offshore renewable

- Development of innovative floating platforms for offshore wind energy
- Development of new wave energy converters
- Numerical modeling to optimize marine energy
- Development of a Digital Twin for predictive management of offshore plants
- Development of energy harvesting technologies from vibrations and heat
- Global mapping for marine energy planning
- Integration of low-temperature geothermal energy for heating and thermal storage
- Development of energy harvesting systems from electromagnetic waves (Spintronics)
- Advanced modeling and monitoring of geothermal resources
- Development of mini-turbines for energy recovery in water pipelines

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More on our topics

3.Bioenergy & New biofuels for sustainable future

Biomass Feedstock Conversion
Development of new thermochemical, catalytic, and biochemical processes and systems to convert various biomass feedstocks into useful energy, advanced biofuels, and value-added products.

Carbon Capture, Utilization, and Storage (CCUS)
Development of innovative technologies for carbon capture, utilization, and storage to enhance the sustainability of both thermochemical and biological conversion processes.

Sustainable Biorefinery
Assessment of innovative sustainable biorefinery pathways that utilize waste streams from the bioenergy and biofuel production chain.

More on our topics

4.Clean hydrogen and final uses

- Development of innovative materials and functional components for Fuel Cell and Hydrogen (FCH) technologies for power generation and electrolysis
- Development of efficient processes for H_2 production through thermochemical, electrochemical, and emerging pathways
- Development of technologies for H_2 storage and distribution, including carriers such as ammonia and LOHCs
- Integration of H_2 with renewable energy and across sectors, promoting the use of FCH in energy communities, sustainable mobility, industrial decarbonization, and residential CHP systems
- Regulatory analysis, safety assessment, and risk evaluation for hydrogen technologies

More on our topics

5.Energy conversion

- Study of innovative electrical energy conversion systems and connected storage solutions
- Development of innovative fluids for heat pump applications
- Development of technologies for hydrogen storage and distribution, including the use of carriers such as ammonia and LOHCs
- New fluids and processes to improve energy conversion efficiency
- Use of artificial intelligence and big data analytics to optimize and control the conversion process

More on our topics

6.Energy storage

- Innovative short- and long-term thermal storage systems based on sensible heat (geothermal), latent heat (advanced PCM), and thermochemical processes
- Innovative mechanical storage systems using water, compressed air, and kinetic energy
- Advanced research on the performance of chemical and electrochemical storage systems, with a focus on next-generation batteries
- Advanced integration into energy systems and networks, including comprehensive cost-benefit analysis

More on our topics

7.Smart sector integration

- Development of multiscale simulation models and digital twins for integrated energy systems in multisectoral and multivector contexts.
- Development of HW/SW technologies and solutions for energy storage and exchange of energy flows/stocks in multisectoral and multivector contexts.
- Development of platforms and digital enablers for sector coupling, smart energy integration, industrial symbiosis, and public engagement.
- Analysis of economic, environmental, social, and legal-regulatory constraints to sustainable energy integration.

More on our topics

8.Optimization, sustainability & resilience in energy supply chain

- General aspects and applications of electromagnetic compatibility, reliability, qualification, and diagnostics of components in intelligent innovations as a whole.
- Market models and business cases to promote efficiency and electrification in end-use applications and their involvement as flexibility service providers.
- Bio-based and high-performance technologies for environmental impact control and greenhouse gas reduction, including the development of energy-efficient HVAC components and systems
- Creating models for optimizing energy use from renewable sources and improving indoor air quality, along with decision-making tools for integrating energy systems in buildings and transportation.
- Innovative schemes for energy distribution with holistic approaches.
- Methodologies, models, and software to enhance resilience against natural and anthropic risks and long-term sustainability.
- Dedicated tools and technologies that promote the use of data intelligence and artificial intelligence for active involvement of end users.

More on our topics

9.Energy-sustainable advanced materials

- Development of materials with controlled and optimized composition, structure, and morphology to enhance functional properties and stability;
- green synthesis protocols;
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- advanced characterization techniques, including in-operando testing;
- and advanced computational and modeling methods.

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NEST IS SEEKING PARTNERS!

HORIZON-CL5-2025-02-D2-03

HORIZON-CL5-2025-02-D2-06

HORIZON-CL5-2025-04-D2-10

HORIZON-CL5-2025-04-D2-11

HORIZON-CL5-2025-04-D2-13

HORIZON-CL5-2025-02-D3-03

HORIZON-CL5-2025-02-D3-04

HORIZON-CL5-2025-02-D3-06

HORIZON-CL5-2025-02-D3-09

HORIZON-CL5-2025-02-D3-11

HORIZON-CL5-2025-02-D3-16

HORIZON-CL5-2025-02-D3-17

HORIZON-CL5-2025-02-D3-21

HORIZON-CL5-2025-02-D3-25

HORIZON-CL5-2025-02-D3-26

HORIZON-CL5-2025-02-D3-27

HORIZON-CL5-2025-01-Two-Stage-D2-02

HORIZON-CL5-2025-01-Two-Stage-D3-23

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NETWORK FOR ENERGY SUSTAINABLE TRANSITION

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