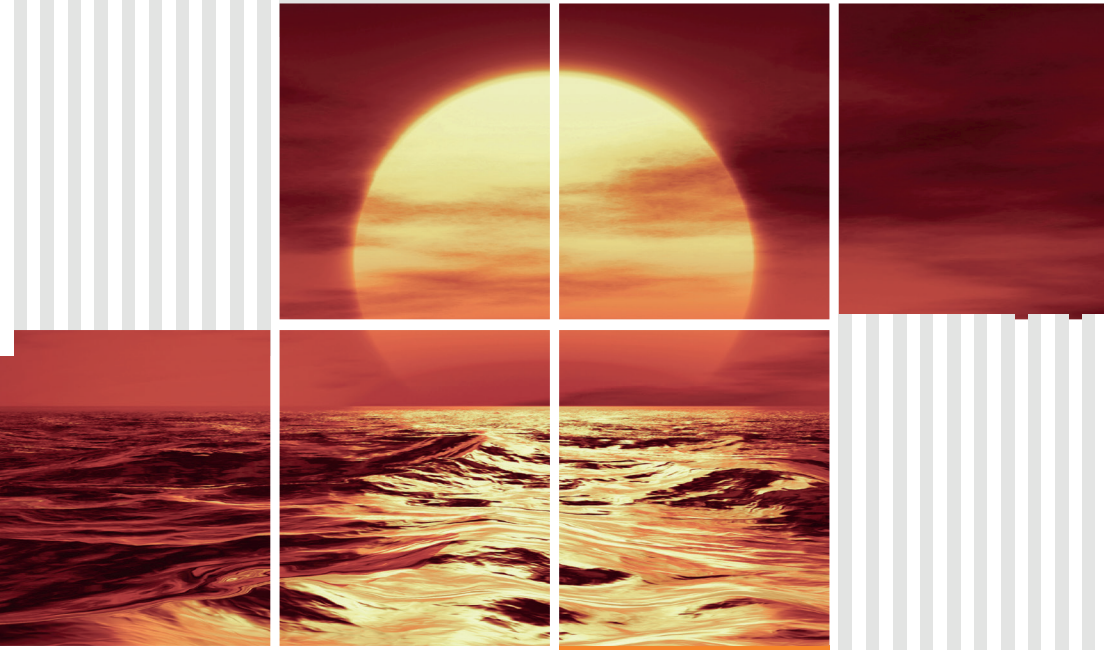
we research innovation



energy technologies

Department for Energy Technologies and Renewable Sources

The Department is engaged in research, development, and validation of technologies, processes, and products for renewable energy sources and their integration into the energy system. Its activities include the design of prototype plants and the development of innovative solutions for photovoltaics, thermal energy, agrivoltaics, biomass, biofuels, hydrogen, and multi-vector systems.

Its core objectives include decarbonisation, improving energy efficiency, and optimising storage systems—both electrochemical and thermal.

Furthermore, the Department conducts experimentation with technologies for the generation, storage, and distribution of renewable energy, as well as the development of enabling technologies such as Artificial Intelligence, the Internet of Things, and blockchain.

Strategic goals include promoting Renewable Energy Communities (RECs), integrating renewables into smart grids, and enhancing sustainable carbon sources.

The Department actively participates in international projects and supports energy policy development, contributing to emissions reduction and decreasing dependence on fossil fuels, while fostering technological innovation and industrial competitiveness.

It also develops solutions to support sustainable mobility, enhance energy efficiency in industrial sectors, and deploy new ICT technologies to improve the quality of public and industrial services.

Organisational Structure

Director: Eng. Giulia Monteleone

500 researchers, technologists, technicians, and administrative staff organised into six Divisions, four technical-scientific Sections, and seventeen research laboratories.

12 Research Centres and Major Laboratories located across the country.

energia.enea.it - direzione.terin@enea.it

Strategic Areas

- Innovative and integrated photovoltaics
- Concentrated Solar Thermal Power
- Bioenergy
- Wind Energy
- Low-Enthalpy Geothermal Energy
- Hydrogen and New Energy Carriers
- Energy Storage Technologies (Electrical and Thermal)
- Sustainable Mobility
- Energy Communities and Smart Cities
- Infrastructure Protection and Resilience
- Models, Systems, and Technologies for Smart Sector Integration (smart grids, smart cities, smart buildings, etc.)
- Digital Technologies, HPC, Cloud, AI, and Robotics Applied to Energy Systems
- Sustainability Assessment of Energy Technologies

Smart Sector Integration and Distributed Generation from Renewable Energy Sources

This Division conducts R&D on integrating renewable energy sources, developing microgrids and storage systems, and optimising smart grids. It develops advanced technologies such as Artificial Intelligence and machine learning to enhance the management and resilience of energy infrastructures.

- Smart Grids and Energy Networks
- Energy and Data Science
- Energy and Thermal Storage

Photovoltaic Solar Energy

This Division is dedicated to R&D in the photovoltaic sector, focusing on high-efficiency crystalline silicon solar cells and innovative production technologies. It promotes the integration of photovoltaics into buildings, landscapes, and agriculture through approaches such as Sustainable Agrivoltaics.

- Innovative Devices
- Engineering for the Photovoltaic Industry

Decarbonisation Technologies and Energy Carriers: Storage, Hydrogen, Mobility, and CCUS

This Division focuses on R&D and innovation in bioenergy and biofuels.

- Technologies and Devices for Electrochemical Storage
- Sustainable Combustion and Advanced Thermal and Thermodynamic Cycles
- Hydrogen and New Energy Carriers
- Sustainable Mobility and Transport

Tools and Services for Critical Infrastructure and Renewable Energy Communities

The Division develops digital solutions for infrastructures, Smart Cities, and Energy Communities, integrating renewables, AI, and machine learning. It addresses the resilience of critical infrastructures and supports the deployment of Renewable Energy Communities through innovative tools and the ENEA Observatory on RECs.

- Cross-Technologies for Urban and Industrial Districts
- Analysis and Modelling of Critical Infrastructure and Essential Services
- Smart Cities and Communities

Development of Computing and ICT Systems

This Division focuses on research, technological innovation, and advanced services to support ENEA's activities in energy and sustainable economic development through ICT.

- High Performance and Scientific Computing Infrastructure
- Enterprise Information Systems
- Network Infrastructure and Services

Bioenergy, Biorefineries, and Green Chemistry

The Division conducts research, technological innovation, and advanced services in bioenergy, focusing on producing thermal and electrical energy, biofuels, and bio-based products from renewable raw materials.

- Technologies, Processes, and Plants for the Valorisation of Biomass, Residues, and Waste
- Techniques and Processes for Biorefineries

ITALIAN NATIONAL AGENCY FOR
NEW TECHNOLOGIES, ENERGY AND
SUSTAINABLE ECONOMIC DEVELOPMENT

"ENEA is a public body dedicated to research and technological innovation, as well as the provision of advanced services to businesses, public administrations and citizens in the fields of energy, the environment and sustainable economic development."
Law 28th December 2015, no. 22

ENEA's mission is to contribute to the competitiveness and sustainable development of Italy through research, technological development, and agency activities supporting public administration, businesses – with particular focus on SMEs – and citizens.

60
years of research and innovation

14
research centres

8
technical and administrative directorates

17
local offices

2250
researchers, technologists, and administrative staff

4
departments

enea.it