

## ENEA for Circular Economy

ENEA has advanced knowledge and expertise in the development and management of circular economy tools, technologies and services, for efficient use and management of resources, ranging from design to the production of goods and services and closure of loops, finalized to achieve the highest possible value for resources, thus reducing their consumption.

The Agency provides support to enterprises and public administration bodies and other stakeholders with:

- highly specialised researchers and technicians, and know-how in the field of process, product/service and system eco-innovation;
- infrastructures, technology halls, pilot plants, laboratories/workshops, digital platforms and databases;
- eco-innovative methodologies and approaches;
- advanced technologies (realization, diffusion and implementation) for characterization and production of innovative materials, recovery/recycling, valorization of resources, treatment of scraps, waste and effluents;
- new business and management models for urban and industrial areas;
- tools for quantitative monitoring of circularity and resource diagnosis;
- back-up for development of local, national and European strategies and adaptation of regulatory instruments;
- patents and software development for the circular economy;
- training, information and communication.

## National and international networks



- ENEA represents Italy in the Leadership Groups of the European Circular Economy Stakeholder Platform (ECESP) – a joint initiative by the European Commission and the European Economic and Social Committee for diffusion of knowledge, multistakeholder dialogue and good practices.

<https://circulareconomy.europa.eu/platform>



- ENEA manages and coordinates the Italian Circular Economy Stakeholder Platform (ICESP) – a national forum dedicated to initiatives, experiences, criticalities and best practices that Italy wishes to represent at the European level. At present there are over 140 members and 200 participants (institutions, enterprises and public administration players).

[www.icesp.it](http://www.icesp.it)



- ENEA chairs over and participates in the work of the expert committee, technical commission UNI CT057 “circular economy”. It heads the Italian delegation for the purposes of the corresponding tasks undertaken by the ISO/TC323 “Circular Economy” committee. The aim of these bodies is to set an ISO international technical standard by 2023.

<https://bit.ly/UNICT057> - <https://bit.ly/ISOTC323>



- ENEA promotes and coordinates the Symbiosis Users Network (SUN), a national network for operators intending to apply industrial symbiosis and ensure systemic development of eco-innovative models.

[www.sunetwork.it](http://www.sunetwork.it)



- The Ministry of the Environment charged ENEA with the task of coordinating the National Phosphorus Platform, which aims to ensure national self-sufficiency for this strategic raw material, as well as coordination with European policies.

[www.piattaformaitalianafosforo.it](http://www.piattaformaitalianafosforo.it)



- ENEA is the scientific coordinator of the Horizon Project CICERONE and coordinates the elaboration of the European Strategic Agenda to fund research and innovation in the circular economy sector.

<http://cicerone-h2020.eu>



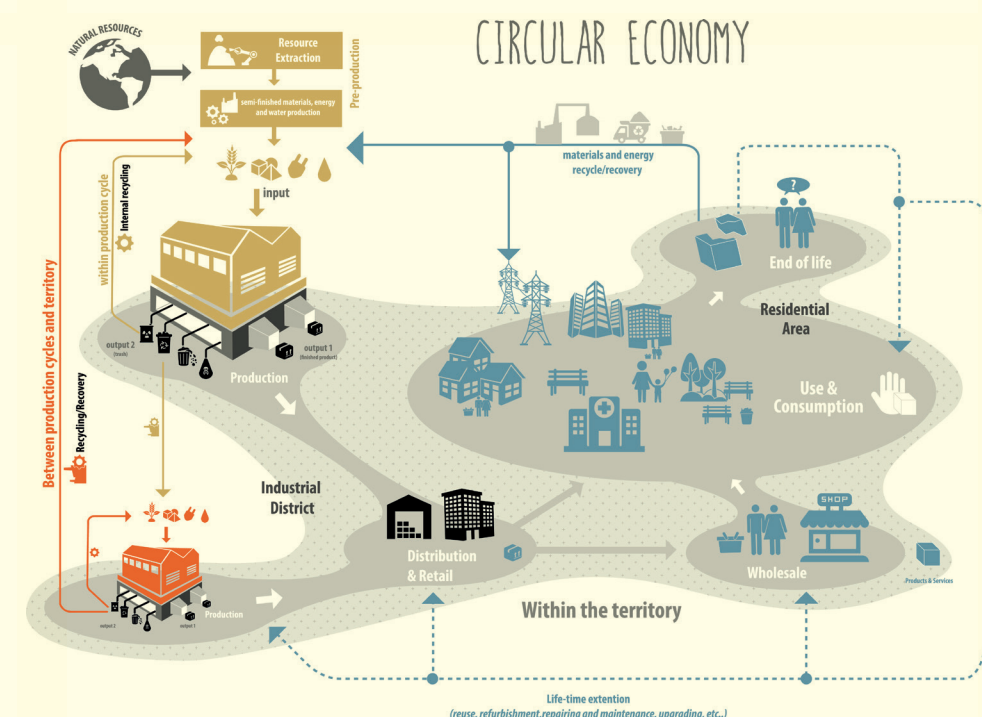
- ENEA is part of the network of research organisations aiming to bolster and integrate scientific knowledge and interdisciplinary experience in the circular economy (other members are CEA (FR), IETU (PL), IVL (SE), SINTEF (NO), TECNALIA (ES), TNO (NL), VITO (BE), VTT (FI), Wuppertal Inst. (DE)).

[sostenibilita.enea.it/en/circulareconomy](https://sostenibilita.enea.it/en/circulareconomy)  
[www.enea.it](http://www.enea.it)

# ENEA for Circular Economy



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





## Research infrastructures

### Recovery and valorization of scrap and effluents (Process Eco-innovation)

**Technological hall of the laboratory for reuse, recycling, recovery and valorization of waste and raw materials** (Casaccia research centre) develops eco-innovative technologies and processes for the valorization of byproducts, scraps, waste and secondary raw materials (plastic, organic waste, critical raw materials).

**Agrobiopolis and agro-industrial processes technology halls** (Trisaia and Casaccia research centres) operate in the Mild Technologies sector in order to enucleate, characterise, extract and purify, on a pre-industrial scale, fractions, substances, and biologically active metabolites for many industrial segments.

**Technologies laboratory for efficient use of water and effluents** avails itself of a technological hall equipped with pilot plants (Brasimone research centre). It implements industrial-scale demonstration units at purifying plants, for sustainable, circular valorization of sewage and industrial effluents, agro-industrial byproducts and purification sludge.

**ROMEO pilot plant** (Casaccia research centre) enables control of recovery processes of high added-value secondary raw materials that include complex matrices such as, for example, circuit boards, permanent magnets, batteries, fluorescent lamps and end-of-life catalysts.

### Development of new sustainable materials (Product Eco-innovation)

**Advanced Materials Laboratory in an Open Infrastructure - MAIA** (Casaccia research centre) is set up as a center devoted to research and service orders from aerospace industries and biomedical sector. MAIA is equipped with innovative process devices and systems (3D printers, presses, furnaces) and technologies for materials and components qualification and for the study of new materials.

**Agrifood sustainability, quality and safety Laboratory** (Brindisi and Casaccia research centres) is specialised in membrane separation processes for recovery of bioactive substances and of wastewater from the agriculture and food sector.

**Virgin and recycled Carbon Fibers Composites and "nature-based solutions" Laboratory** (Brindisi research centre) has skill and equipments for materials characterization; the laboratory develops hi-tech materials with virgin and recycled carbon fibers for automotive components.

**Technological hall for recyclable composite materials** (Faenza research centre) is specialised in the development of high-performance ceramics and recyclable composites for transportation (aeronautics and automotive).

### New business models and knowledge platforms (System Eco-innovation)

**Italian platform of industrial symbiosis "Symbiosis"** targets enterprises and serves as a meeting place between resources supply and demand (e.g. waste materials, energy byproducts, wastewater, services, know-how), in order to establish and implement inter-corporate industrial symbiotic practices ([www.industrialsymbiosis.it](http://www.industrialsymbiosis.it)).

**Italian database for LCA** (Arcadia project) is a tool for fostering and implementing sustainable development and a circular economy based on a life-cycle approach to fifteen chains. The database serves as back-up for public administration, political decision makers, companies, consultants, universities and researchers ([www.arcadia.enea.it](http://www.arcadia.enea.it)).

**Circular Economy Training** - ENEA organises courses for enterprises and institutions, dedicated to sustainable, shared use of resources (consisting in hands-on workshop sessions, assisted presentations, and analysis of success stories).



Technologies for reuse, recycling, recovery and valorization of waste and raw materials (Casaccia research centre)



Agrobiopolis technological hall (Trisaia research centre)



Technological hall equipped with pilot plants for sustainable circular valorization of effluents and byproducts (Brasimone research centre)



Romeo plant (Casaccia research centre)



"Advanced Materials Laboratory in an Open Infrastructure" - MAIA (Casaccia research centre)



Agrifood sustainability, quality and safety Laboratory (Brindisi research centre)

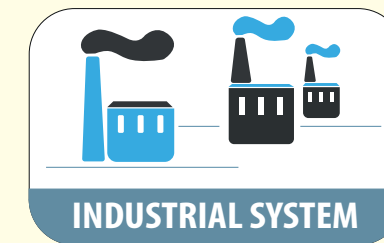


Carbon fibers composites Laboratory (Brindisi research centre)



Technological hall for composite materials (Faenza research centre)

## Integrated innovative approaches for the transition to circular economy and low-emission systems



Development and implementation of technologies and methodologies for sustainable and regenerative production and consumption models in support of industry in the transition to circular economy



Circular design and industrial symbiosis models

Innovative technologies for efficient use and management of resources and scraps/waste valorization

Reconversion of industrial sites according to circularity principles

Tools for enterprises (resource diagnosis, LCA/LCC, standards, labels and certificates)



Design and implementation of models and systems for integrated, circular urban management for the transition towards regenerative, sustainable, circular and inclusive towns and cities



Sustainable life and consumption style

Valorization and management of urban waste, water as resource, wastewater and purification sludges

Urban enhancement/valorization in circular perspective

Health and safety



Development and implementation of systemic approaches to foster and facilitate closure of loops in production chains and throughout the life cycles of products and materials

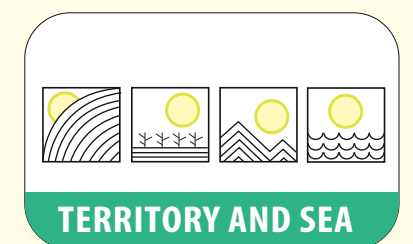


Activities aiming at fostering teamwork among players and sectors

New business/consumption models and market analysis

Integrated multidisciplinary approach to managing and efficiently using resources throughout their life cycles

Life cycle thinking and measurement of «circularity»



Development and implementation of processes and methodologies for sustainable management of natural capital, territory and sea in line with circular economy principles



Sustainable tourism

Management of circular marinas/ports

Management of natural capital and coastlines

Analysis and valorization of agricultural and fishing chains