INVEST IN ITALY

ITA ITALIAN TRADE AGENCY

INVITALIA

ITALY

Home to GreenTech Innovation

Donato Parrinello

Project Manager – GreenTech sector

INVITALIA

July 14th, 2021

Sustainability and industrial leadership

Green-oriented production system

Energy intensity of GDP in 2019 - total energy consumption per unit of GDP
(constant purchasing power parities, kilogram of oil equivalent/$2015p. *Source: Enerdata*)

0,110 koe
Energy intensity of World GDP

0,064 koe
Energy intensity of Italian GDP

0,073 koe
Energy intensity of EU GDP

Over **300.000**
Italian companies
made eco-investments in green products and technologies in 2019
(21,5% of Italian non-agricultural companies)

3mln green jobs
as of 2019
(13,4% of total Italian workforce)

Eco-investments and green jobs in Italy
(*Source: Unioncamere - Union of the Italian Chambers of Commerce*)

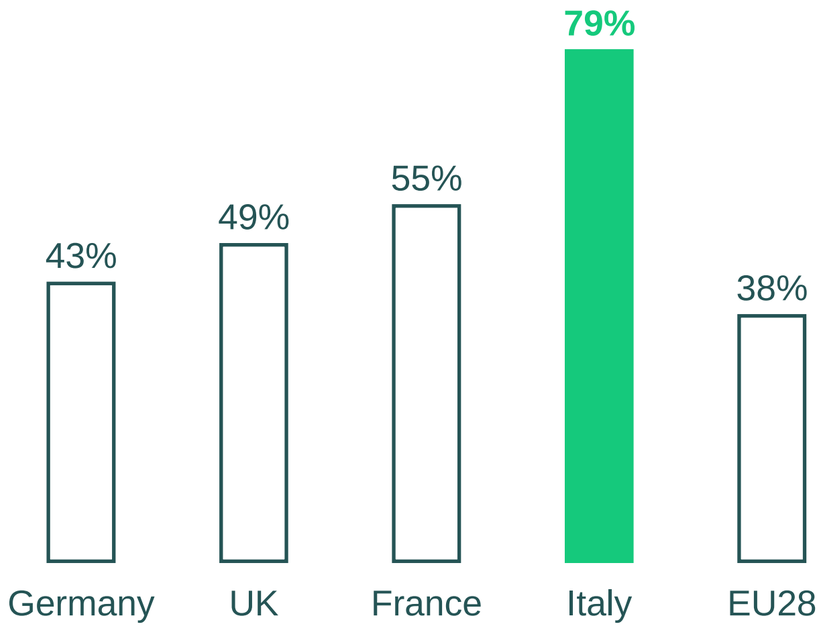
2nd in the world for the **ability to export technologically advanced green products** thanks to the number of environmental patents registered, low CO2 emissions and strict environmental policies

1st in the world for the **index growth potential**

Export of high-tech green products
(*Source: "Economic Complexity and the Green Economy", University of Oxford*)

At the forefront for Circular Economy

Recycling rate in 2018
(% on total volume, industrial and domestic waste)



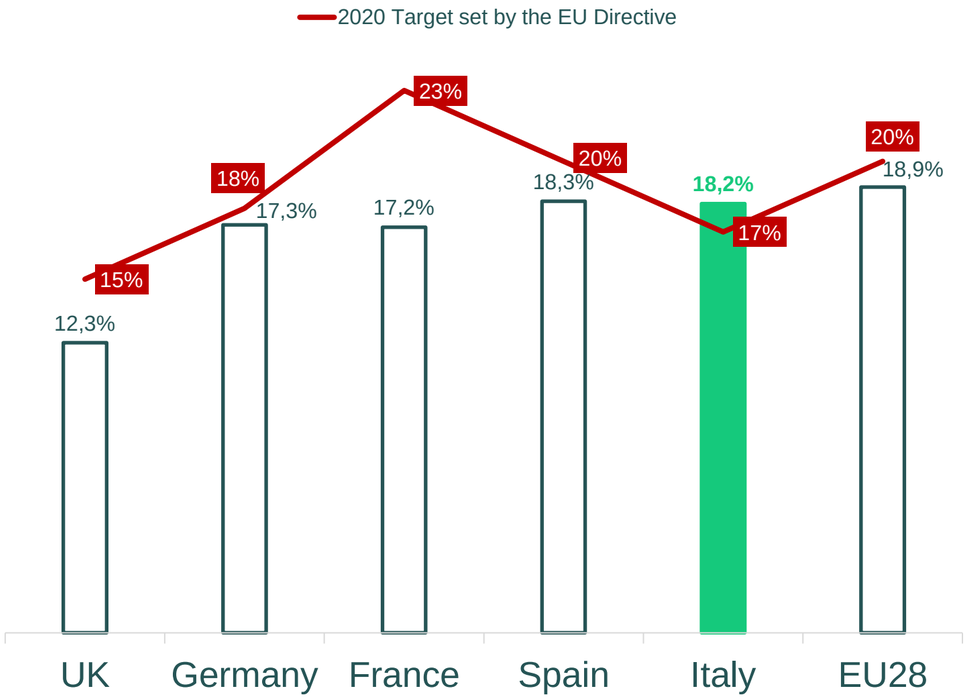
Italy ranks **1st** among most industrialized European countries **for the recycle of domestic and industrial waste**

- High share of secondary materials in overall material use. In 2019 Italy recorded a **circular materials use rate of 19,3%**, among the highest scores in the EU.
- Despite being **the second manufacturing industry in Europe**, Italy presents **the lowest per capita consumption of materials in Europe** (**8 tons**, almost halved from 2000) and **one the highest resource productivity levels in Europe,** € 3,6 of GDP generated from 1 kg of resources consumed.
- The Country is also a **world leader in the regeneration of lubricant exhausted oils**. In 2019, excellent results were confirmed: **100% of the collectable potential** and **99% of collected oils regenerated**.

Sources: Eurostat; CONOU.

An ever cleaner energy mix

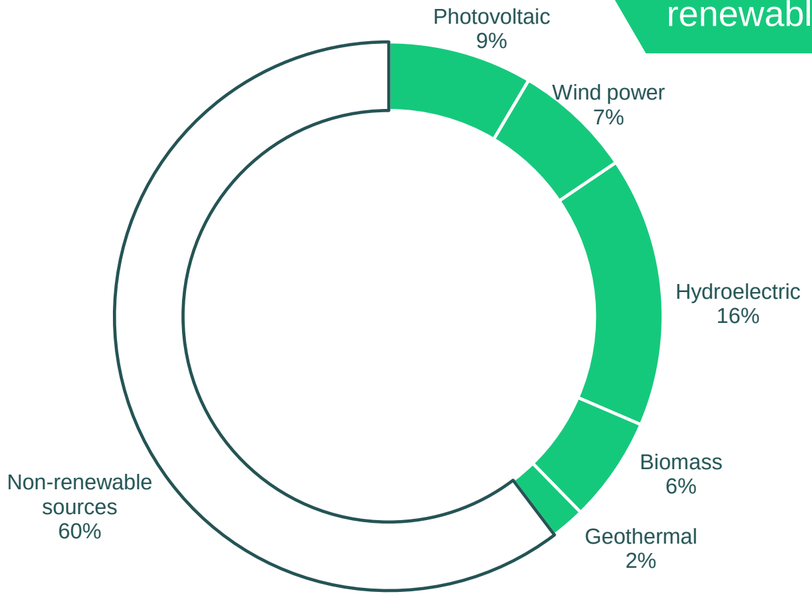
Energy consumption from renewable sources in 2019
(% on total gross consumption)



As of 2019, Italy is the only country among top 5 EU economies that **reached and exceeded the 2020 target for the share of gross consumption from renewables**

Italian electrical energy production mix in 2019
(% on total net production)

40% from renewables



In 2019, **renewable sources covered 40% of Italian total net production of electricity** (112.893 GWh), recording an increasing trend in recent years

Sources: Eurostat; Terna.

Areas of green excellence – key facts

GREEN CHEMISTRY

Flagship biorefineries and pioneering champions

30% of **biotechnological companies** in Italy operate in the **Industry & Environment field**

over **€ 2 bln turnover in 2019**

Source: Assobiotec.

National bioplastics industry in 2020

111K tons produced
(**66% of the EU market**)

€ 815 mln turnover
(+ 122% vs 2012)

Source: Assobioplastiche.

+251,5% of **electric cars sales** in 2020 (over **60K vehicles**)

19K charging points in 2020
(+81% from 2019)

Source: Motus-E.

National electric mobility industry

€ 98 bln turnover by 2030
(€ 6 bln as of 2017)

Source: Motus-E.

ELECTRIC MOBILITY

Long-standing tradition in Automotive Engineering

CLEAN ENERGY

High public commitment and advanced know-how

18,2% of **energy consumption from renewables**

40% of **electricity production from renewables**

Sources: Eurostat; Terna.

Home to global green leaders:

Enel Green Power confirmed as the **first operator in renewable energy in the world in 2020 for installed capacity** (3.106 MW) and **Saipem** (part of ENI group) boasts **cutting-edge expertise in off-shore wind energy** and is involved in relevant projects in Italy and abroad.

Sources: Enel; Saipem.

The way to an Italian H2 value chain

The Italian Government aims to install at least **5 GW of electrolysis capacity by 2030** and to make the Country the **European hub for green hydrogen production and distribution**, thanks to its geographical position as a natural bridge at the center of the Mediterranean Sea.

ASSETS

2nd EU country for the consumption of natural gas

One of the most extensive and structured gas infrastructure networks in Europe: 32,7K km
(FR 32,3K; DE 23,5K; NL 15,5K)

FORECAST

2020 – 2050 cumulative production values of the Italian manufacturing companies along the hydrogen value chain

€ 890 – 1.500 bln

Source: The European House – Ambrosetti elaborations of Milan Polytechnic, Eurostat and Istat data.

Hydrogen R&D
€ 160 mln
implementation: 2022-2025

Ambitious objectives require significant R&D efforts. For this reason, this NRRP investment aims to improve knowledge of the implementation of the hydrogen vector in all phases: production, storage and distribution.

Four lines of R&D activities will be developed:

- Green and Clean Hydrogen production;
- Innovative technologies for hydrogen storage, transport and transformation into derivates and e-fuels;
- Fuel Cells for stationary and mobility application;
- Integrated smart management systems to increase the resilience and reliability of intelligent hydrogen-based infrastructures;

H2 – Italy's competitive advantages

The table that follows contains an analysis of various technological clusters and their expertise levels with reference to some existing technologies that can be used for hydrogen (**core technologies**) and others that are "adjacent" (**ancillary technologies**).

CORE TECHNOLOGIES

PRODUCTION OF GREEN HYDROGEN

Italy has a **production share of around one quarter of the EU total,** but needs to implement a technological and production upgrade on a wider scale.

PRODUCTION OF BLUE HYDROGEN

Italy produces around **one quarter of the technologies in the EU belonging to the cluster,** with a strong manufacturing base for the conversion of these plants for hydrogen.

FUEL CELL

In Italy there are companies operating with **major development plans for advanced technologies,** pursued also with the cooperation with research centers of excellence.

ANCILLARY TECHNOLOGIES

THERMAL CLUSTER

The country is a **leading manufacturer** in the production of thermal technologies, with a **24.4%** share at EU level.

MECHANICAL CLUSTER

Italy has a **19% share** of EU production, with unique expertise in the production of various components and equipment.

ELECTRICAL CLUSTER

The country counts for **11%** of EU production, with some excellences, for example in the production of inverters.

CONTROL SYSTEMS CLUSTER

Italy produces around **7%** of the EU market and has major operators in the transport and energy sectors.

CLUSTER FEEDSTOCK

Italy produces **11.8%** of the total EU production, with excellences in the petrochemical sector.

The blue icon indicates the presence of Italy's competitive advantage in the European scenario.

Source: H2 Italy 2050 , The European House Ambrosetti & Snam .

Talent pool & academic environment

Wide and prominent academic system

97 Universities

337K graduates in 2019

1,7 mln students

11 Italian public Universities included in the **top 250 of the 2021 QS World University rankings**

for the «**Engineering & Technology**» and «**Natural Sciences**» domains:

QS WORLD UNIVERSITY RANKINGS

POLITECNICO MILANO 1863

POLITECNICO DI TORINO

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

SAPIENZA UNIVERSITÀ DI ROMA

UNIVERSITÀ DEGLI STUDI DI PADOVA

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

UNIVERSITÀ DI PISA

UNIVERSITÀ DI TRENTO

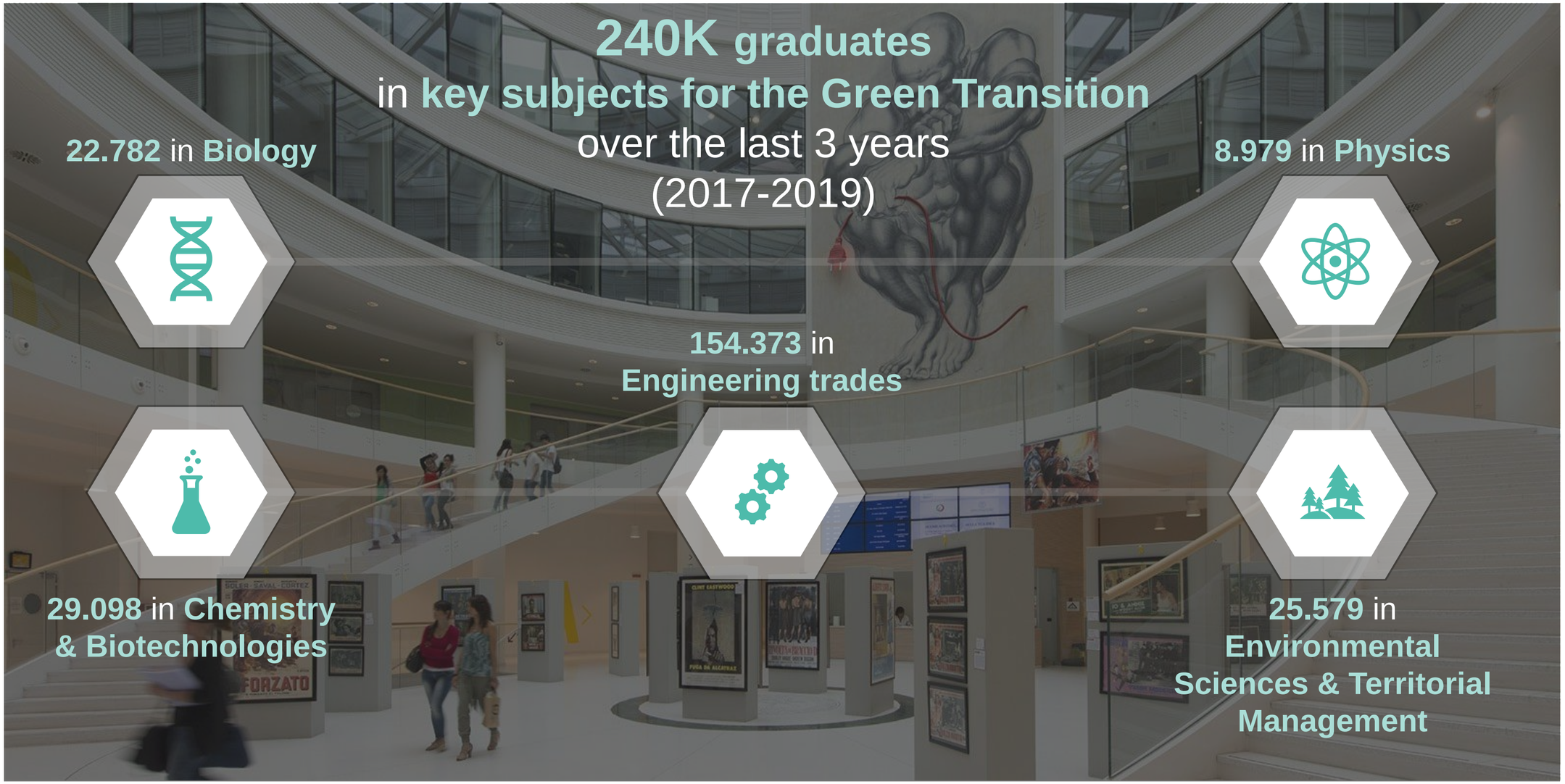
UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

TOR VERGATA UNIVERSITÀ DEGLI STUDI DI ROMA

UNIVERSITÀ DEGLI STUDI DI MILANO

Sources: Ministry of University and Research; QS World University Rankings.

A vast highly-qualified talent pool



Source: Ministry of University and Research.

Dedicated academic programs

In recent years, the Italian University system has started a path to **align the training offer to the mutation of production and labour dynamics** with a view to the **green transition**

MASTER BIOCIRCE

BioCirce is the first European **Master in Bioeconomy in the Circular Economy.**
The field of study covers the **entire value chain of bio-based products**: from the production of raw materials in agricultural ecosystems to the bio-technological and industrial processes used to convert these resources into (new) bio-based products, and the marketing and consumption of final products.

The Master is jointly organized by **4 Italian Universities**:

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA
UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
UNIVERSITÀ DEGLI STUDI DI TORINO
ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

And **4 industrial players**:

NOVAMONT
GF Biochemicals
INTESA SANPAOLO
PTP SCIENCE PARK

M UNER MOTORVEHICLE UNIVERSITY OF EMILIA-ROMAGNA

MUNER - The Motorvehicle University of Emilia-Romagna is an inter-university and entrepreneurial consortium that has its roots in the **Motor Valley**: land of legends and cutting-edge technology.
10 industry leaders and the **4 main regional Universities** merged together to design the **automotive engineering careers of the future**. Among the Master Programs, the Course in **Electric Vehicle Engineering** focuses on **the development of high-tech electric vehicles**, with particular emphasis on the electric subsystems that are embedded in future vehicles.

4 regional Universities:

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA
UNIMORE UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA
UNIVERSITÀ DI PARMA
Università degli Studi di Ferrara

10 industrial players:

Automobili Lamborghini
dallara
DUCATI
Haas F1 Team
HPE COXA
MARELLI
Maserati
PAGANI
ALPHATAURI

Sources: Master BioCirce; MUNER - Motorvehicle University of Emilia-Romagna.

Top quality research

European Research Council

Italian researchers ranked 1st in 2020 for the number of Consolidator Grants awarded through a highly competitive selection process conducted by the European Research Council.

Italy places in the **top 3 in the European Union** and in **the top 10 at the global level** for the number of citations in **scientific disciplines relevant for the development of green technologies**

1st in the EU for:

- **Civil & Structural Engineering** (5° in the world)

2nd in the EU for:

- **Automotive Engineering**
- (7° in the world)
- **Energy** (6° in the world)
- **Energy Engineering & Power Technology** (9° in the world)
- **Environmental Sciences** (9° in the world)
- **Fuel Technology** (9° in the world)

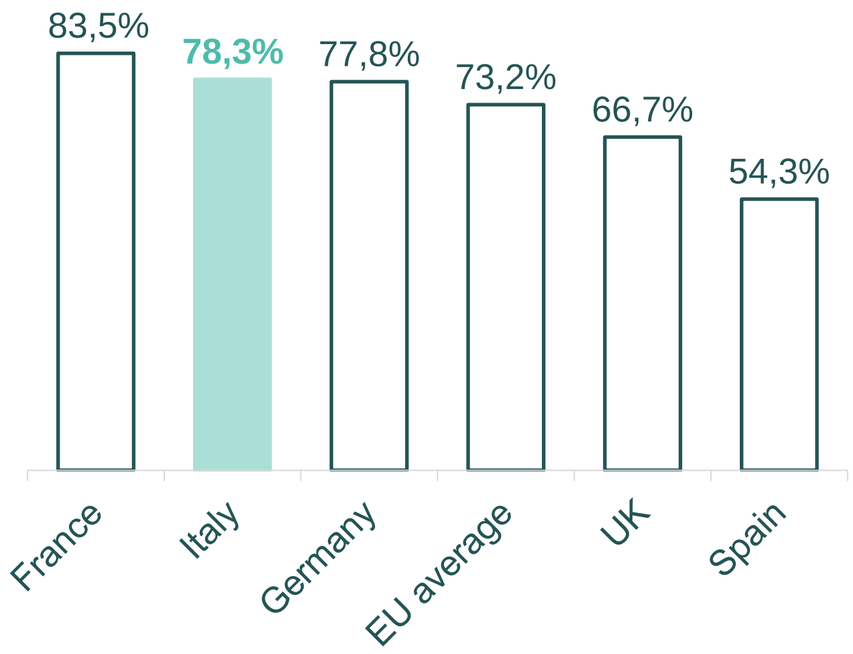
3rd in the EU for:

- **Environmental Chemistry** (7° in the world)
- **Environmental Engineering** (6° in the world)
- **Materials Science** (9° in the world)

Sources: European Research Council; SCImago Journal & Country Rank.

Patent productivity and “green patents”

Patent Productivity in top 5 European countries in 2018
(% of patent applications approved on total applications)



Italy shows **one the highest ratios** between the number of patent applications filed and the number of the approved ones (**78,3%**)

“**Green patents**” constitute **10,6% of the total patents filed in Italy** in 2018 (one the highest values at the global level), confirming a relevant and increasing attention of Italian companies in the research for **technological innovations careful of environmental sustainability**.

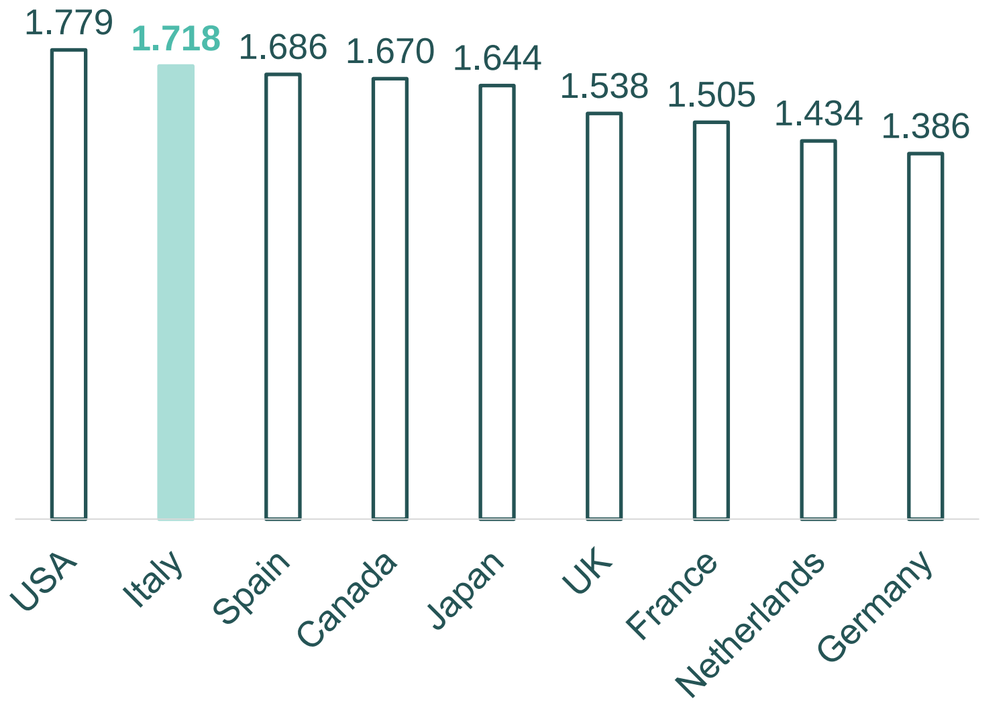
8.029 GREEN PATENTS IN 2009-2018

Alternative energy production	20,9%
Waste management	20,9%
Energy conservation	20,6%
Administrative, regulatory or design aspects	19,2%
Transportation	12%
Agriculture/Forestry	5%
Nuclear power generation	1,4%

Sources: elaborations of The European House - Ambrosetti on European Patent Office data; Ufficio Italiano Brevetti e Marchi.

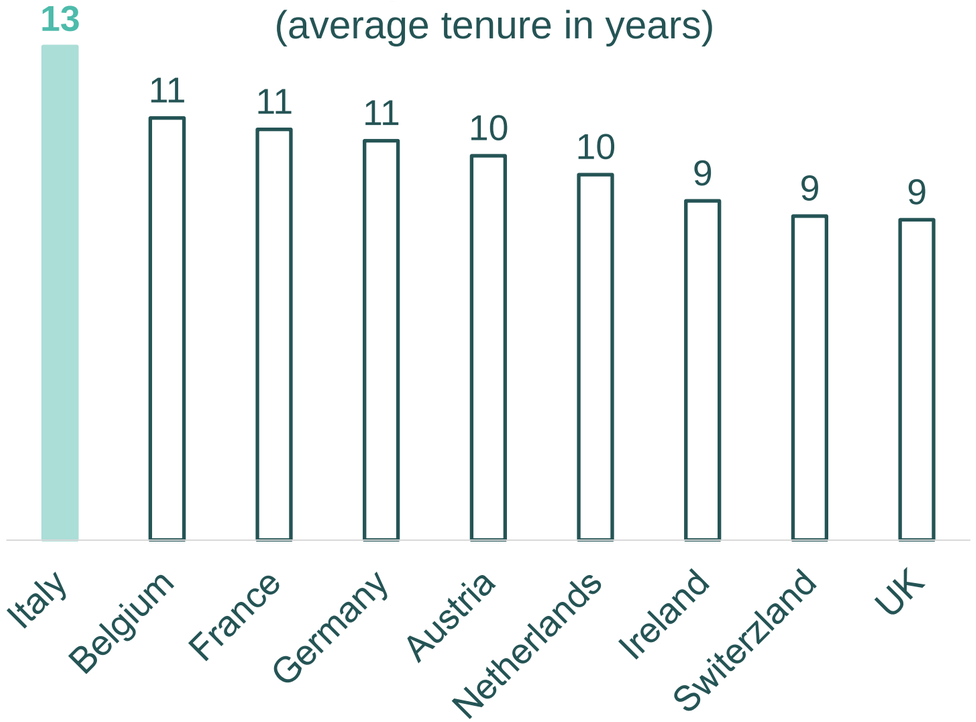
Committed and loyal workers

Average annual hours worked in 2019
(hours per worker)



Italy ensures a **high level of commitment** in terms of hours worked. **One of the highest values among most industrialised countries**

Employment by job tenure intervals at European level in 2019
(average tenure in years)



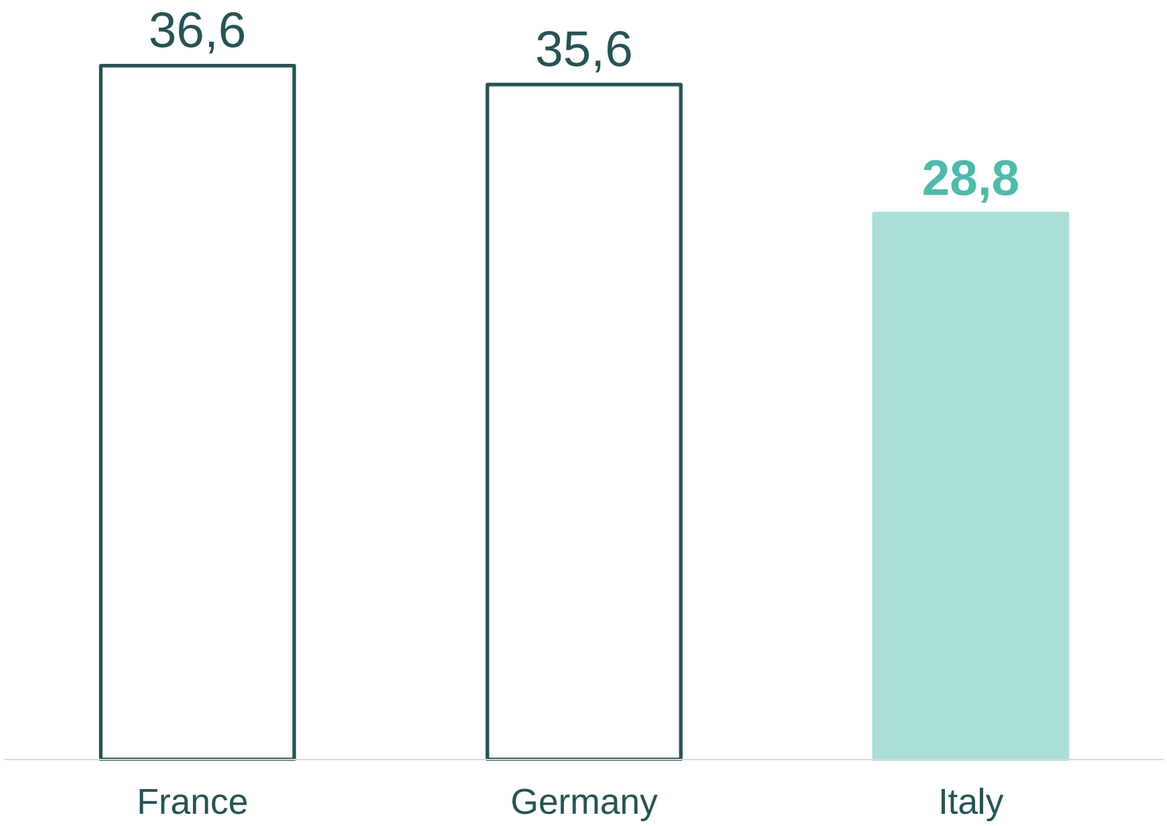
Italy ranks **1st in Europe for loyalty of employees towards their main employer**

Source: OECD.

Labour cost competitiveness

Labour cost of employees in top EU economies in 2019

(thousand € per worker, per year)



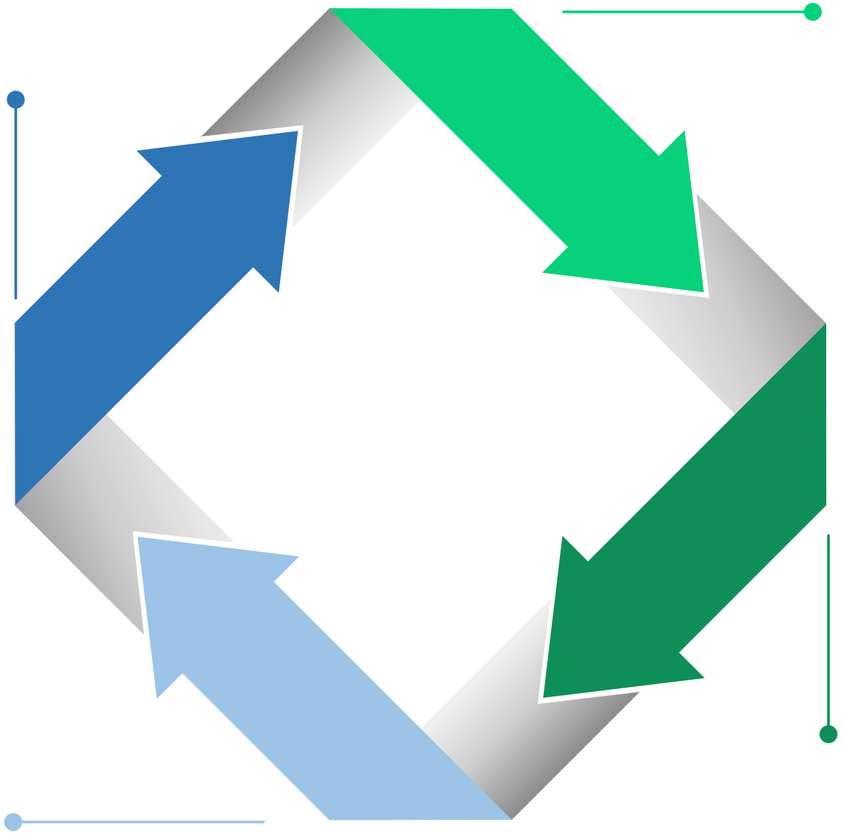
Among the three largest EU economies, **Italy is extremely competitive in terms of labour cost**.

Source: Eurostat.

Innovation ecosystem

Leading players in Hi-Tech innovation

2 Public Research Institutions with environment-related specializations: **CNR & IIT**



4 GreenTech Innovation Hot-spots

1 National Agency for New Technologies, Energy and Sustainable Economic Development: **ENEA**

1 Government-backed Cleantech Accelerator**:** **ZERO by *Cassa Depositi e Prestiti***

Public Research Institutions

The **National Research Council** (**CNR**) is the **largest public research institution in Italy** under the supervision of the Ministry of Research performing multidisciplinary activities.
The CNR counts over **5K scientific partnerships** with research institutions around the world, **350 patent families** and **49 start-ups** and **spin-offs**.
Among its **91 specialised Institutes** throughout the Country (and **224 satellite offices**), **37 boast hi-tech specialisations in environment-related disciplines** distributed in **13 regions**. Research activities range from **technologies for energy and sustainable mobility** to **polymers** and **bio-materials**.

8600 people

The **Italian Institute of Technology** (**IIT**) aims to promote **excellence in basic and applied research**.
The ITT counts over **1000 active patent applications** and **24 established start-ups**.
The IIT's network currently consists of the **Central Research Laboratories in Genoa**, **11 centers throughout Italy** and **2 outstations in the USA** in collaboration with **MIT** and **Harvard**.
The **Centre in Turin** studies the development of advanced materials for **carbon capture and storage** and its **transformation into valuable specialty or everyday products**.

1890 people
(**50% from more than 60 countries**)

37 Institutes with environment-related specialisations in **13 regions**
HQ in Genoa & **Turin Center for Sustainable Future Technologies**

Sources: CNR; IIT.

National Agency ENEA

ENEA is the **National Agency for New Technologies**, **Energy** and **Sustainable Economic Development**.

Since its foundation in the 1960s, its strengths have been **applied research**, **technology transfer** and **technical-scientific support** to companies, associations, territories, central and local administrations.

Its focus sectors are **energy technologies**, **pollution**, **life sciences**, **strategic raw materials**, **climate change**.

Among the **several patents** (**over 900**), ENEA also owns the most advanced patents for **Concentrated Solar Power solutions**, designed by the **Italian Nobel Laureate Prof. Carlo Rubbia**.

ENEA's research activities are carried out in **14 Research Centers and Labs** throughout the Country.

14 Research Centers and Laboratories
2.600 people

Source :ENEA.

ENEA Casaccia Research Center

The Casaccia Research Center is ENEA's **largest hub**. The primary research activities are focused on **energy efficiency**, **renewable sources**, **nuclear fission**, **new technologies and materials**, **innovation of the agro-industrial system**.

- **25 km from Rome;**
- **90 hectares with equipped labs and hi-tech infrastructures with all energy technologies covered (from nuclear to biology, geology and agriculture)**
- **Capillary road plan;**
- **Low-V/Med-V electrical grid;**
- **4,3 km natural gas pipelines;**
- **Over 1.000 people (researchers and employees).**

2 major recent projects open to partnerships with industries

- H_2 **H2 Demo Valley**
- **Advanced Battery Lab**

Source: ENEA.

ENEA – Hydrogen Demo Valley

€ 14,8 mln investment
for the
Hydrogen Demo Valley
in **Casaccia** (**Rome**)

H_2 H2 Demo Valley

Thanks to an investment of **€ 14,8 mln from the Ministry of Economic Development as part of the European Mission Innovation program**, ENEA's Casaccia Center will host a high-tech **Hydrogen Demo Valley**, a **technological incubator for the development of the hydrogen supply chain**, in collaboration with **research institutes** and **companies**, with the aim of promoting the **energy transition** and **decarbonization**.

ENEA's research platform will also allow the experimentation of **new technologies for hydrogen production** such as from **residual biomass** or through and the use of **renewable heat** produced by **concentrated solar plants**.

Source: ENEA.

ENEA – Hydrogen Demo Valley

H2 Demo Valley – key assets and interested phases of the H2 value chain

The ENEA's H2 Demo Valley offers a **multifunctional platform and technological incubator** to accelerate research and innovation by providing companies with **hi-tech infrastructures** to conduct experiments along the **entire H2 value chain on a significant scale**

PRODUCTION & STORAGE

Production of green hydrogen (**c.a. 30 tons/year**) through **RES** (also thanks to a new 200KW photovoltaic park connected to a 200KW electrolyser) and through an innovative **steam methane reforming (SMR) process from biomethane** (derived from agricultural biomass).

Examples of potential fields of experimentation:

electrolysis; solid oxide; molten carbonate; SMR; integration of concentrated solar power; storage (centralized, mobile through fuel cells, etc.).

DISTRIBUTION

Hydrogen distribution through **two dedicated pipelines** (4,3 Km). One will be used for **pure hydrogen** and the other to experiment various combinations of **natural gas/hydrogen (NG/H2) blending**.

Examples of potential fields of experimentation:

analysis and testing of materials and components for the transport of high-pressure hydrogen; network diagnostics and monitoring; digitalization.

END-USE

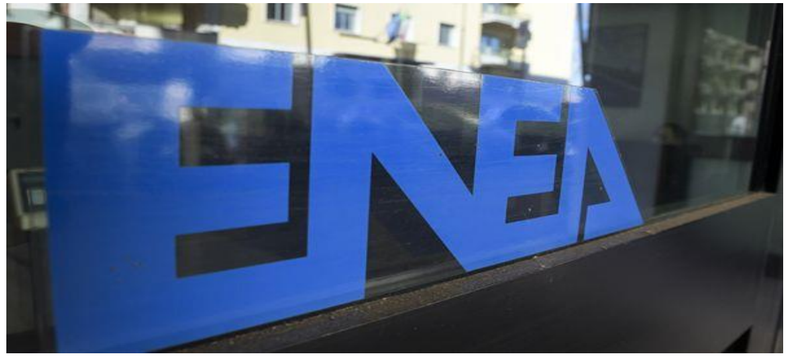
The Valley also covers the **demand dimension** providing companies with infrastructures to experiment **hydrogen end-use technologies**: a **large-scale boiler** (7MW), **a series of smaller boilers** (up to 100 KW), also fueled with pure hydrogen, a **hydrogen refuelling station** (350/700 bar) to serve ENEA's shuttle buses and forklifts, and **systems for fuel cell micro-cogeneration**.

Examples of potential fields of experimentation:

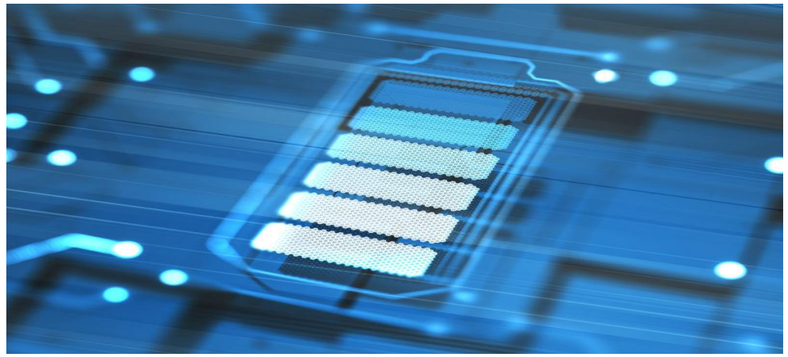
analysis and testing of pre-commercial products and components on pilot plants, including energy-intensive industries.

Source: ENEA.

ENEA – Advanced Battery Lab



€ 27 mln investment
for the
Advanced Battery Laboratory
in **Casaccia** (**Rome**)



Advanced Battery Lab

An **Advanced Battery Laboratory** for the development of **high-efficiency batteries** will be soon inaugurated within ENEA's Casaccia Center.
The initiative that will provide Italy with a **cutting-edge pilot infrastructure**, is part of an *Important Project of Common European Interest* (IPCEI), named "**EuBatIn**" (European Battery Innovation)**,** promoted by the European Commission to develop a **European value chain** capable of providing **advanced technologies for electric mobility** and **energy storage**.

ENEA's researchers will focus on the development of **electrochemically active materials** (anodes, cathodes and electrolytes) and of **a pilot multifunctional line** capable of producing **advanced lithium batteries to be transferred to the market** and to train **new professional figures** that meet the needs of the industry.

Source: ENEA.

ENEA – Advanced Battery Lab

Advanced Battery Lab – context

EuBatIn covers the entire value-chain connected to the battery life cycle. The project is divided into **four main modules**: Raw and Advanced Materials; Battery Cells; Battery Systems; Requalification, Recycling and Refining.

The project involves 12 member states with 53 players. **Italy is the country with the highest number of players involved (16) and over € 1 bln of national funds allocated**.

01 AVL
02 Borealis
03 Miba eMobility
04 Rosendahl Nextrom
05 VARTA
06 Voltlabor

07 Prayon
09 Hydrometal

09 Rimac Automobili

10 ACI Systems
11 Alumina Systems
12 BMW
13 Cell Force Group
14 ElringKlinger
15 Liofit
16 Manz
17 Northvolt
18 Skeleton Technologies
19 SGL CARBON
20 Tesla

21 Sunlight Systems

22 FMG
23 Fortum Group
24 Keliber
25 Valmet Automotive

26 Arkema Group
27 Carbone Savoie

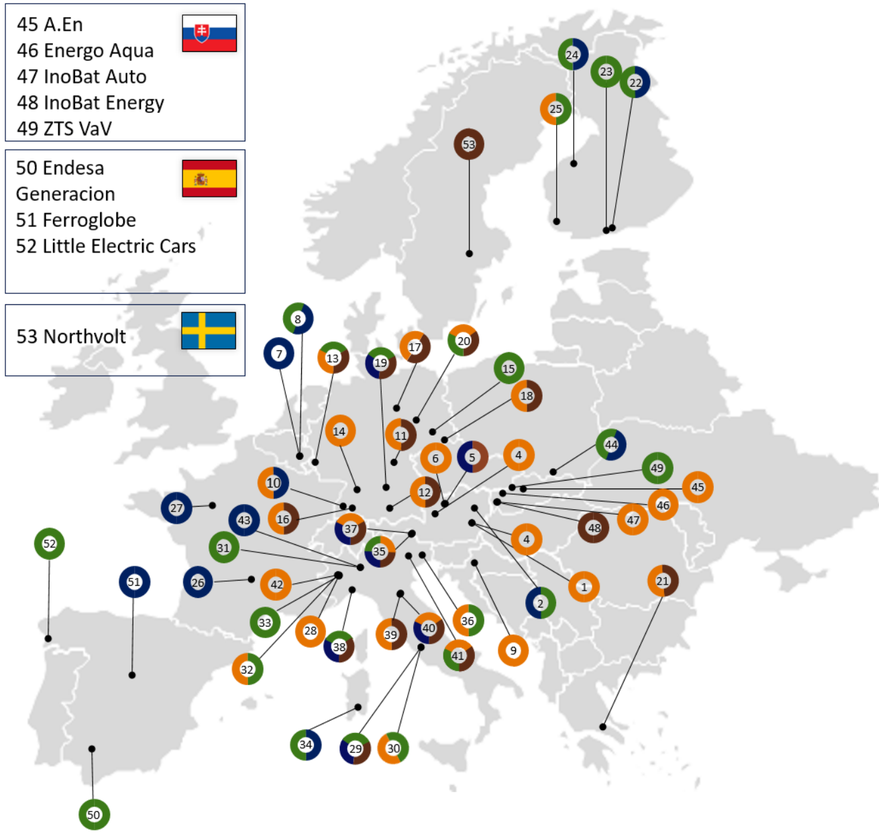
28 Endurance
29 ENEA
30 Enel X
31 Engitec Technologies
32 FIAMM Energy Technologies
33 Fiat Chrysler Automobiles
34 Fluorsid
35 Fondazione Bruno Kessler
36 FPT Industrial
37 Green Energy Storage
38 Italmatch Chemicals Group
39 Manz Italy
40 Marposs Italia
41 Midac
42 SIMPRO
43 Solvay

44 SGL Graphite Solutions

45 A.En
46 Energo Aqua
47 InoBat Auto
48 InoBat Energy
49 ZTS VaV

50 Endesa Generacion
51 Ferroglobe
52 Little Electric Cars

53 Northvolt

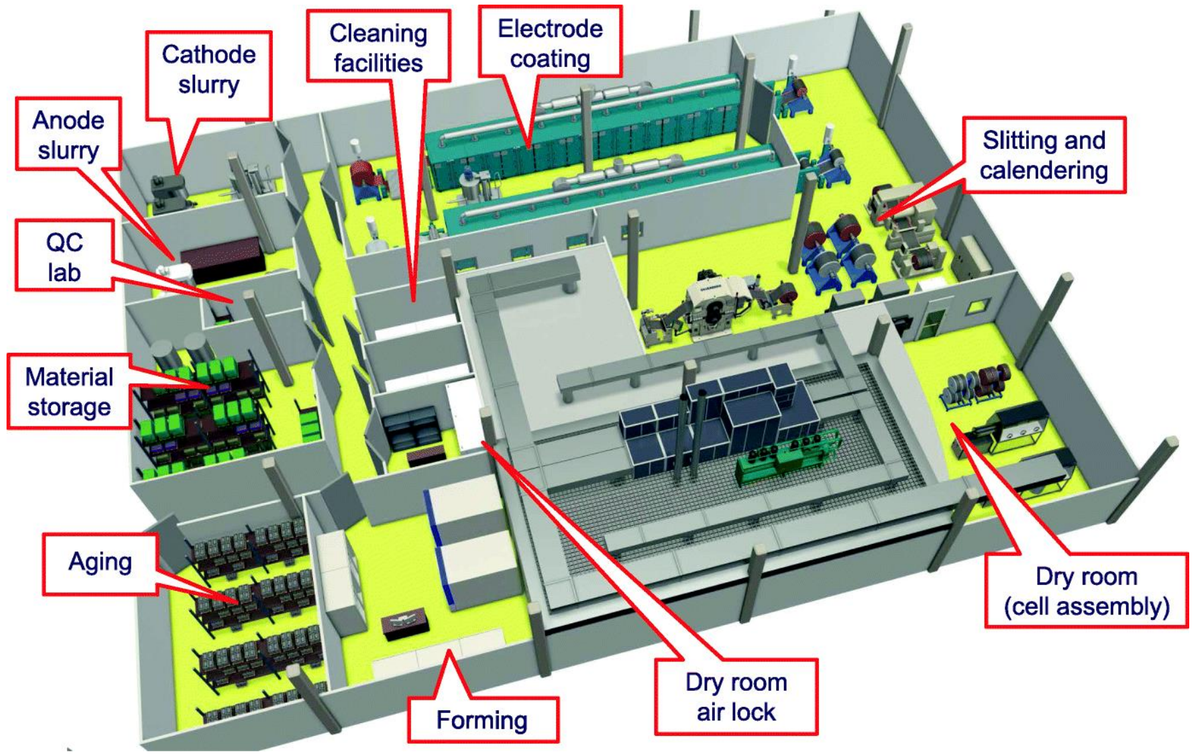


WS1 „Raw and Advanced Materials“
WS2 „Battery Cells“
WS3 „Battery Systems“
WS4 „Recycling and Sustainability“

Source: ENEA.

ENEA – Advanced Battery Lab

Advanced Battery Lab – features and functions



The primary purpose of ENEA within the IPCEI is to create lighter and more durable batteries and to find solutions that are safe for users and the environment and cheaper than current storage technologies.

The Advanced Battery Laboratory, conceived as **multipurpose platform of integrated technologies**, aims at assisting industries in the experimentation and validation of differentiated technological solutions along the entire battery life cycle.

The Lab **main features and functions** are:

- **ability to handle various materials, from traditional electrodes to lithium metal;**
- **computing tools based on AI to accelerate R&D;**
- **development of new-concept batteries;**
- **optimization of the end-of-life management;**
- **testing of innovative recycling processes.**

Source: ENEA.

Selection of GreenTech Innovation Hot-spots

PROVINCE OF BOLZANO

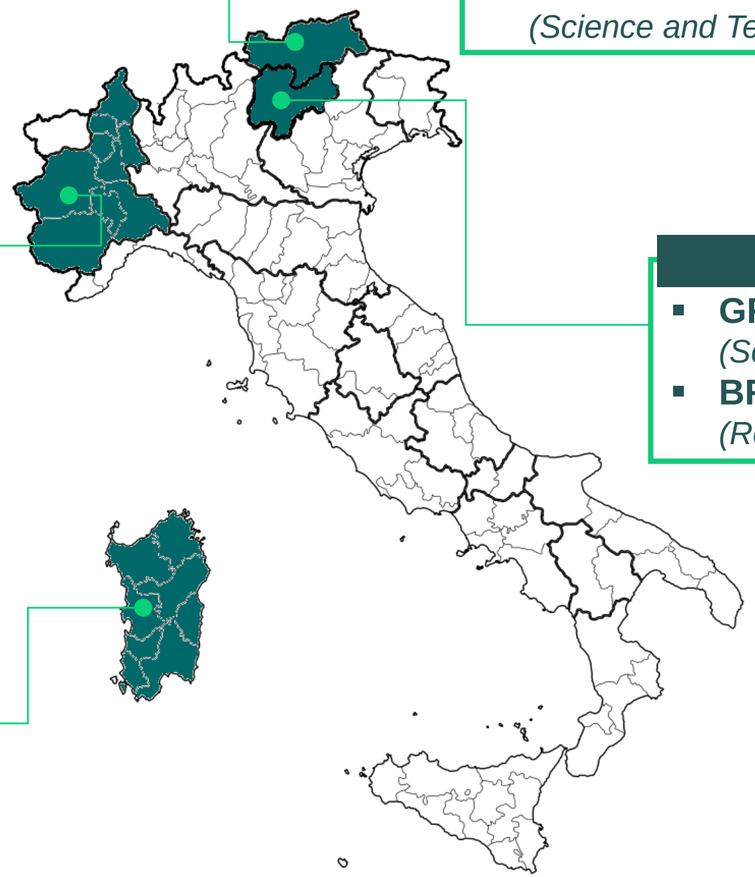
- **NOI TECHPARK**
  (Science and Tech Park)

PIEMONTE

- **ENVIRONMENT PARK**
  (Science and Tech Park)

PROVINCE OF TRENTO

- **GREEN INNOVATION FACTORY**
  (Science and Tech Park)
- **BRUNO KESSLER FOUNDATION**
  (Research Center)



SARDINIA

- **SARDEGNA RICERCHE**
  (Science and Tech Park)
- **CRS4** *(Research Center)*
- **SOTACARBO** *(Research Center)*

This – non-exhaustive – list of innovation hot-spots presents some **ecosystems with strong and diversified specializations in green technological areas** thanks to the presence of **science and tech parks**, as well as **research centers of excellence**, which offer **settlement opportunities and R&D partnerships**, making these territories **top destinations for technology-intensive investments**.

Green Innovation Factory

PROGETTO MANIFATTURA
green innovation factory

The **Green Innovation Factory** (Progetto Manifattura) in **Rovereto**, managed by the local development agency **Trentino Sviluppo,** is a dynamic space (**90.000 sq.m.**), result of an ambitious regeneration process of a former tobacco factory, where **large industrial groups**, **small and medium enterprises** and **innovative startups** interact and promote **business synergies** with the aim of solving common problems and tackling together the challenges of **circular economy** and **sustainability**.

The Factory offers **modular offices** and **production areas,** and it already hosts **more than 60 companies**, **research centers** (like **COSBI**, participated by **Microsoft Research**), the **Green Building Council Italia**, the **Habitech Cluster** and departments of the **Universities of Trento and Verona**.

GREENTECH AREAS OF EXPERTISE		
Energy efficiency	**Sustainable building**	**Sustainable mobility**

Source: Progetto Manifattura - Green Innovation Factory.

Expertise, services and Labs

Choosing the **Green Innovation Factory** gives access to a series of services for industrial growth and consolidation offered by the local development agency **Trentino Sviluppo**, such as:

- **training**, **mentorship** and **strategic networking**;
- **thematic accelerators** (**EU Climate-KIC Startup Accelerator** in the green economy field and **SPIN-Accelerator** for the sports technologies sector);
- **Trentino Investors Club** (80 business angels, matching funds and equity crowdfunding programmes).

The Factory also hosts the new **TESS Lab - Laboratories of technologies and services for sustainability**, a **700 sq.m. area** with **5 five labs**, equipped with the most modern technologies and qualified personnel for **research and prototyping projects** in close **collaboration with the industrial world**, a result of a partnership between **Trentino Sviluppo**, the **University of Trento** and the **Bruno Kessler Foundation**.

Source: Progetto Manifattura - Green Innovation Factory.

Bruno Kessler Foundation

The **Bruno Kessler Foundation** (**FBK**) is a non-profit research entity of public and national interest. According to the results of the latest national assessment (ANVUR), FBK is the **top research foundation in Italy**, ranking **1st for scientific excellence in Engineering and for the employment impact of its spin-offs and the number of spin-offs acquired by the market**.

FBK is organized in **11 specialized centers**. The **Centre on Sustainable Energy** promotes **R&D&I on new energy solutions** and to be transferred to the market. The main research areas and objectives of the Center are:

- development of **energy storage technologies in batteries**, flux and of next generation;
- development of innovative solutions for the production of **green hydrogen**;
- development of initiatives related to **energy grids**: micro grids, distribution grids and transmission grids.

500+ researchers & PhDs
3.500 sq.m. R&D Labs
11 specialised centers

Source: Bruno Kessler Foundation.

FBK's strategic projects

GREEN HYDROGEN Hydrogen implementation for mobility and industrial processes is a **pillar of FBK's strategy**. Since 2017 the Foundation works closely with 7 industrial partners on the **CH2P project** aimed at developing a **new technology based on high-temperature fuel cell modules with solid oxide technology for filling stations**. These modules will be able to variably and flexibly produce both hydrogen and electricity.

FBK is also involved in the "**PROMETEO**" project which aims to **reduce green hydrogen production costs** to less than €2/kg, thanks to a highly efficient technology that combines electricity from photovoltaics (or wind), with **concentrated solar heat**, field in which Italy emerges as a **global excellence** thanks to the cutting-edge expertise of the **National Agency ENEA**.

BATTERIES Italy participates to the **Important Project of Common European Interest** (**IPCEI**) on **batteries** with the **highest investment** (**more than €1 bln**). The aim of the Project is to create **a sustainable and innovative European batteries value chain**. **FBK**, together with the National Agency ENEA, has been chosen to coordinate the research activities by **valuing its existing expertise** and **expanding its industrial partners' network**.

SELECTION OF FBK'S PARTNERS

Massachusetts Institute of Technology
CHINESE ACADEMY OF SCIENCES
National Astronomical Observatory of Japan
UCL
esa European Space Agency
BOEING
CISCO
STMicroelectronics
eni
orange
SAP

FBK proposes itself as an open **technological district**, making its **human capital and infrastructures available for collaborations with industrial and research partners**.

Source: Bruno Kessler Foundation.

Environment Park

Environment Park is **Turin's Science and Tech Park** focused on **environmental sustainability**. Its activities are divided into **two business units**: Innovation & Development and Real Estate Services. The first provides expert **technical advice** and **market solutions**. The **Real Estate Services** unit, on the other hand, is the operative area of Environment Park, focusing on the management of its business area, which covers over **35.000 sq.m**. and already houses around **70 businesses** devoted to technological innovation.

Environment Park also hosts the **Center for Sustainable Future Technologies** of the **Italian Institute of Technology** (**IIT**) which studies the development of **advanced materials** for **carbon capture** and **storage** and its **transformation into valuable specialty or everyday products**.

GREENTECH AREAS OF EXPERTISE

Energy & Mobility **Hydrogen** **Green chemistry**

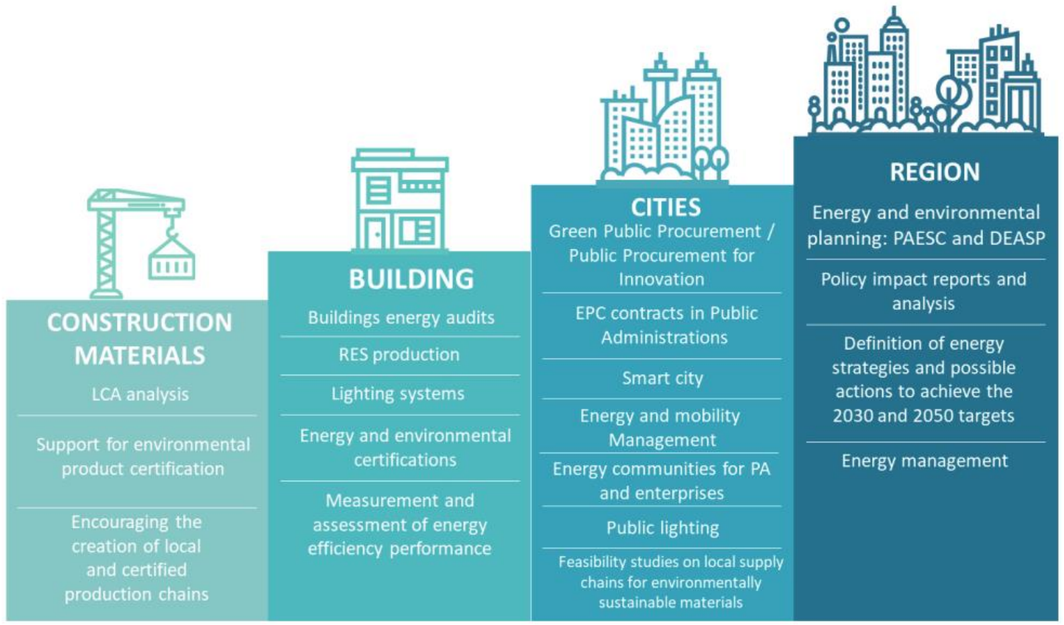
Clean surface treatments

Source: Environment Park.

Expertise, services and Labs (1/2)

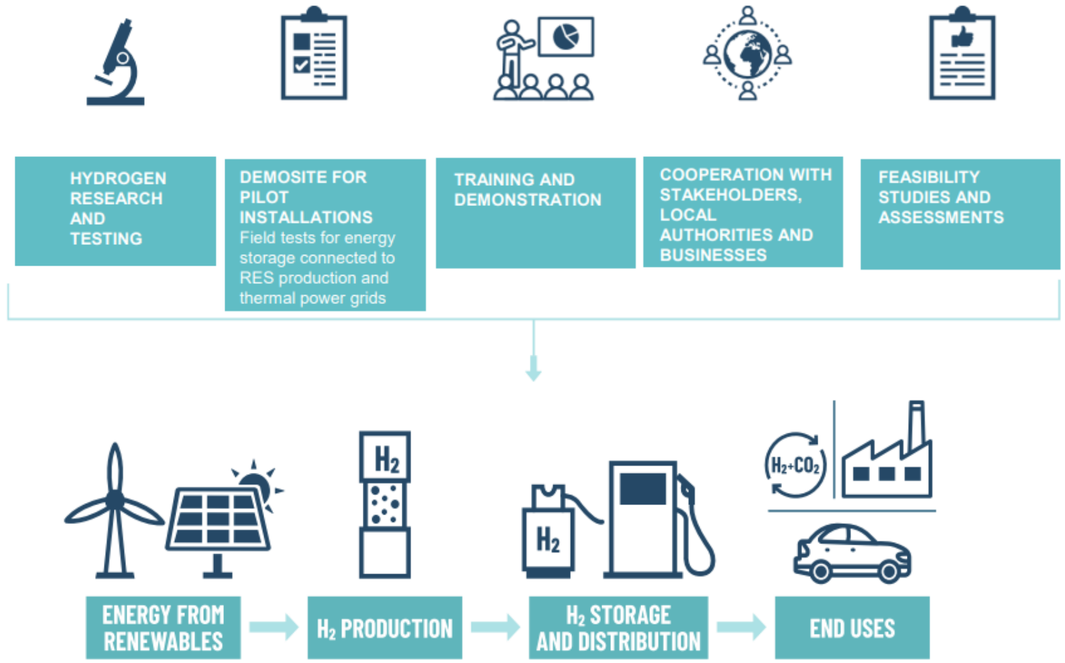
Environment Park provides companies and institutions with **advanced services and laboratories** which reflect its specialization fields

Energy & Mobility



Environment Park works on different scales to support public authorities and businesses in using energy more efficiently and in implementing sustainable mobility, solutions for smart cities, green buildings, etc.

Hydrogen



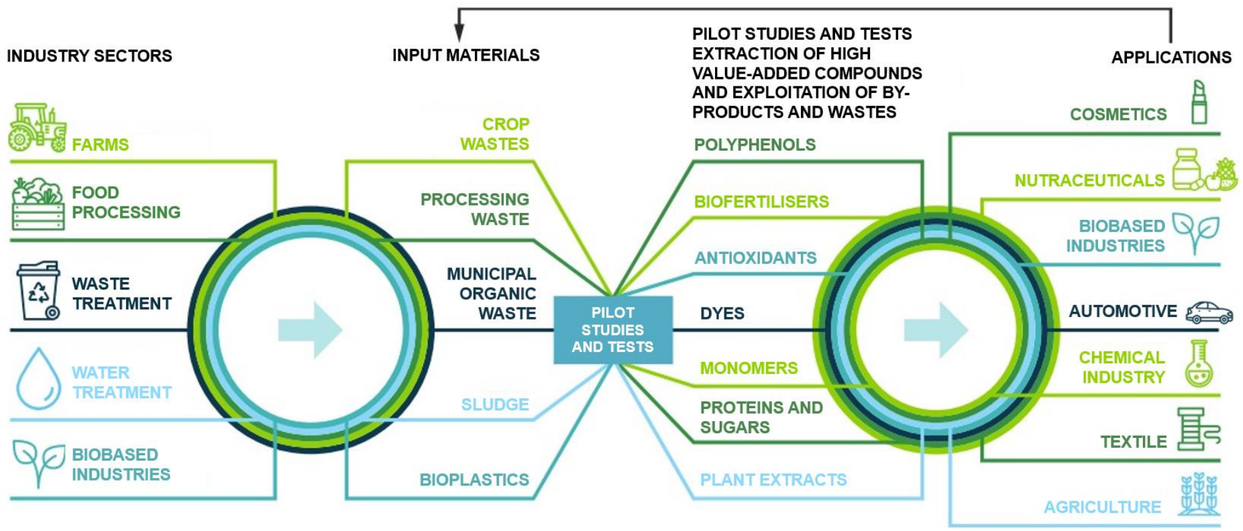
Environment Park boasts cutting-edge infrastructures (including a dedicated H2 Lab), expertise and network to exploit the potential of hydrogen and tackle its challenges

Source: Environment Park.

Expertise, services and Labs (2/2)

Environment Park provides companies and institutions with **advanced services and laboratories** which reflect its specialization fields

Green Chemistry



Environment Park develops, through pilot-scale plant tests, processes for identifying the potential of by-products and waste for turning them into value

Clean surface treatments

PROCESS AND PRODUCT ANALYSIS

DESIGN OF NEW PROCESS AND PRODUCTS

TESTING AND PROTOTYPING + CHARACTERISATION OF MATERIALS

SUPPORT IN THE adoption and use OF PLASMA TECHNOLOGIES

INDUSTRIAL SCALE UP

IP PROTECTION: PATENT DRAFTING support

Plasma is a gas that produces chemical and physical reactions that change both the appearance and functional properties of surfaces. It is a low-energy technology, a dry process that does not require solvents or chemicals that compromise the environment, and, above all does not require large quantities of water. Its applications are many: automotive, textile, biomedical, food packaging, additive manufacturing.

Environment Park offers companies technical support for the development of eco-innovative surface treatments, also based on plasma technologies

Source: Environment Park.

NOI Techpark

TECHPARK SÜDTIROL / ALTO ADIGE

NOI Techpark is the Science and Tech Park of the **Autonomous Province of Bolzano**. The Park connects over **70 companies and innovative start-ups**, **4 research institutions** and **4 faculties of the Free University of Bolzano**. Its activities focus on leading innovation areas: **Green**, **Food**, **Digital** and **Automotive & Automation**. Firms wishing to join NOI Techpark can benefit from the proximity to research institutions and like-minded innovators.

NOI Techpark is also home to **Eurac Research**, a private applied research organization based in Bolzano. The Institute hosts **100 researchers** who deal with **renewable energy**, **technologies for environmental monitoring** and **climate simulations**.

GREENTECH AREAS OF EXPERTISE

Renewable energy **Energy efficiency** **Bio-products**

Source: NOI Techpark.

Expertise, services and Labs

The Province of Bolzano is a model in terms of energy efficiency and sustainability: energy production doubles the local energy demand (60% of which covered thanks to RES). For this reason, **NOI Techpark focuses most of its research skills on renewable energy, energy efficiency, biomass and the circular economy.**

40 Labs

142 clients and R&D partners

The NOI laboratories, with **state-of-the-art equipment and researchers from all over the world**, are **ready to carry out joint or commissioned research, laboratory tests and consultancy services**. **13 laboratories specifically address GreenTech scientific and industrial challenges**:

- **Accelerated Life Testing Lab** (*for lifetime tests of industrial products*)
- **Bioenergy & Biofuels Lab** (*energy production from biomass*)
- **Building Physics** (*analysis of the energetic performance and the dynamic behaviour of buildings envelopes and facilities*)
- **Energy Exchange Lab** (*testing of district heating and cooling systems*)
- **Façade System Interactions Lab** (*research on the interaction between façade systems and indoor climate*)
- **G-value Lab** (*analysis on solar energy transmitted through glass*)
- **Heat Pumps Lab** (*testing and certification of heat and cooling pumps*)
- **Hygrothermal Testing Lab** (*analysis of the hygrothermal behaviour of building materials*)
- **Multifunctional Façade Lab** (*perfomance analysis of multifunctional façades*)
- **PV Integration Lab** (*test rig for the integration of PV installations in buildings and power grids*)
- **Solar PV Integration Lab** (*solar simulator for PV modules*)
- **Thermo Fluid Solar PV Integration Lab** (*solar simulator for PV modules*)

Source: NOI Techpark.

Sardegna Ricerche

SARDEGNA RICERCHE

The **Science and Tech Park of Sardinia,** managed by the **regional development agency Sardegna Ricerche**, comprises two main **facilities**: the main center located in the territory of **Pula** (**Cagliari**), and the second in **Alghero**, Northern Sardinia. The park boasts several hi-tech **laboratories**, which provide enterprises with **spaces**, **highly specialized equipment** and **human resources**.

The Park already hosts more than **60 companies**, **500 researchers** and **entrepreneurs,** and it is also home to the regional research center **CRS4**, founded in 1990.

GREENTECH AREAS OF EXPERTISE

Renewable energy **HPC for energy efficiency**

Environmental & industrial biotech

Source: Sardegna Ricerche.

Expertise, services and Labs

The Park is organized in **technological poles** consisting of **laboratories and high-tech equipment open to partnerships with the industrial world**, distributed in its territorial articulations of Cagliari, Alghero and Oristano

PIATTAFORMA ENERGIE RINNOVABILI

PortoConte Ricerche

IMC International Marine Centre

Cagliari

The **Renewable Energy Platform** is a cutting-edge technological structure, available to the entrepreneurial and research system, for the implementation of R&D activities in the fields of renewable energy, intelligent energy management (Smart Grid, Micro Grid), electric mobility, energy efficiency.

The Platform benefits from the partnership with the University of Cagliari and has three high-tech labs:

- **Biofuels and Biomass Lab;**
- **Electric Energy Lab;**
- **Hydrogen Lab**

Alghero

Porto Conte Ricerche is the specialized pole for biotechnologies and food technologies. For over 15 years, it has been developing and delivering high-tech services to companies engaged in the innovation of their production systems through industrial research and experimental development activities.

The Green Chemistry Lab allows the design of green technologies for the extraction and synthesis of molecules. The Lab can perform extractions from various biological matrices to obtain products with a very high level of purity and free from toxic residues.

Oristano

The **International Marine Center** focuses on the marine environment, aquatic species and their relationship to the environment. It is involved in the transfer of technology to businesses for the development of sustainable production activities, specifically in the areas of aquaculture and algal production.

Sardinia presents ideal environmental conditions for large-scale cultivation of Spirulina algae and is becoming its main producer in Europe. Spirulina is strategic for CO2 sequestration and its several industrial applications (bioplastics; biofuels; pharma; etc.).

Source: Sardegna Ricerche.

CRS4

The **CRS4** is an interdisciplinary research center, founded by the Sardinia Region in 1990, whose sole shareholder is the regional agency Sardegna Ricerche**.** The Center boasts a **solid specialization in ICT, High Performance Computing (HPC) and mathematical modelling, applied also to environmental and energy issues** by developing, for example, **analytical and numerical models and tools for solar concentration plants and heat storage**.

CRS4 has a **long-standing tradition in supporting companies in strategic projects** which have often resulted into new investments for production and R&D activities in Sardinia. Among recent CRS4 partners:

- HUAWEI establishment of the Joint Innovation Center in Cagliari for smart city technologies;
- TOLO Green optimization of Spirulina production in Oristano and zero-gravity cultivation experiments;
- Italgas design and engineering of a pilot plant to produce hydrogen and synthetic methane from RES.

130 people

HPC services and wide Technology Catalogue

245 national and international projects since its foundation

Source: CRS4.

Sotacarbo

SOTACARBO Centre of Excellence on Clean Energy

Sotacarbo is a joint-stock company founded by the **National Agency ENEA** and the **Sardinia Region**. It was founded in 1987 in a former mining area to develop innovative technologies in the use of coal. Today the Company is considered an excellence in the field of **Carbon Capture, Utilization and Storage (CCUS) technologies**. The new **Center of Excellence on Clean Energy** consists of an **advanced research infrastructure of international significance**, understood as the set of sophisticated equipment and highly specialized personnel. Its activities focus on:

- **Gasification of biomass, waste and refined plastics;**
- **CO2 separation technologies;**
- **CO2 reuse technologies;**
- **Monitoring of geological confinement systems.**

2.500 sq.m. R&D Labs open to industrial partnerships

Source: Sotacarbo.

CDP – Cleantech Accelerator «ZERO»

ZERO, based in Rome, was created in 2021 to intercept **startups with great business potential and a zero-impact solutions** for the environment mainly in the fields of:

- Circular Economy;
- Waste prevention and reduction;
- Renewable and new energy sources;
- Carbon Capture, Utilization and Storage technologies.

ZERO aims to support the development of 30 startups and innovative SMEs (incorporated in Italy or willing to open a legal entity in Italy) **over three years**.

WHO

Software startups and innovative SMEs
(minimum viable product)
Hardware startups and innovative SMEs
(working prototype and defined roadmap for large-scale production)

WHAT

80K investment in each company
5 months acceleration program

Source: CDP Venture Capital – ZERO Accelerator.

CDP Venture Capital

ZERO is part of the strategy of **CDP Venture Capital** – VC operational arm of the Italian Promotional Bank *Cassa Depositi e Prestiti* (CDP) founded in 2020 – to make Venture Capital a strategic pillar to Italy's growth through **10 thematic funds**

1365
MILLION
ASSET UNDER MANAGEMENT

400+
MILLION
CAPITAL COMMITTED

680+
START UP POTENTIALLY REACHED
WITH OUR COMMITTED CAPITAL

ACCELERATORS FORMAT

The **Accelerators Fund** aims to create a national network of accelerators in sectors linked to advanced industrial networks in Italy. Each accelerator always involves two categories of partners:

- **National and foreign Venture Capital professional operators and platforms** (with a proven track record in a specific sector);
- **National and foreign corporate partners** (they may join as shareholders of the newco, as Fund subscribers or as sponsors providing economic resources and technical support).

ACTIVE ACCELERATORS

MOTOR VALLEY ACCELERATOR – L'ACCELERATORE MOBILITY DELLA RETE NAZIONALE CDP (Automotive, *Modena*)

ZERO (Cleantech, *Rome*)

CYBER XCELERATOR (Cybersecurity, *Cosenza*)

WESPORTUP (Sport technologies, *Rome*)

…and many others coming
(Bioplastics; Blue Economy; Education; Fintech)

Source: CDP Venture Capital.

CDP VC – a new Green Transition Fund

GREEN TRANSITION FUND –

Support to start-ups and venture capital active in the ecological transition

€ 250 mln

The new "**Green Transition Fund**" (GTF), managed by CDP Venture Capital, will be characterized by an investment strategy that will focus on relevant domains of the green transition (i.e. renewables, circular economy, sustainable mobility, energy efficiency, waste management, energy storage, etc.) and on the whole range of development stages. The GTF, with a **5-year investment period**, will follow **4 main lines of action**:

1) **Indirect investments in VC funds**. **€ 100 mln** to strengthen existing VC Fund of Funds platforms and finance new and existing VC managers with a relevant sectoral focus and expertise;
2) **Indirect investments in pre-seed and seed startup stages**. **€ 50 mln** to expand the capital available to researchers and startups (through investments in tech transfer hubs and startup acceleration programs);
3) **Direct investments in early and growth stage startup**. **€ 50 mln** to strengthen the action of the existing CDP VC Funds;
4) **Venture building investments**. **€ 50 mln** to develop new and innovative ventures in partnership with corporates, enabling new players and solutions to enter the green transition space.

Source: Italian Government – National Recovery and Resilience Plan.

INVEST IN ITALY | ITA ITALIAN TRADE AGENCY | INVITALIA

THANK YOU

For further information:

Donato Parrinello
dparrinello@c.invitalia.it
Marco D'Acunto
mdacunto@invitalia.it