



SMARTENERGY

What's next? Looking for opportunities for cooperation, industrialization and market access of H₂ solutions

Role and activities of CTNE on H₂

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- **2012** – Aerospace, Agrifood, Green Chemistry, Intelligent factories, Transports, Life sciences, Technologies for living environments, Smart Communities
- **2016** – Made in Italy, Economy of the sea, Cultural heritage, Energy
- **CTN** – Public/private partnership operating on the national territory for industrial research, training and technology transfer, with the aim of coordinating and strengthening the link between the world of research and of industry through national and international initiatives

- **Task:** combine the **demand for innovation** in the **industrial** sector with the scientific and technical outcome provided by the **research structures** of the country to support the **energy transition** and therefore the achievement of the targets set by the *European Union* and the *SET Plan*, and at national level by the *PNIEC*, through research funding: *Horizon Europe, PNRR, PNR, RDSE, Mission Innovation, National and Regional Calls*
- **Founders:** **PRO** (ENEA, CNR, RSE), **INDUSTRY** (e-distribuzione, ENI, BAKER-HUGHES NUOVO PIGNONE TECNOLOGIE, TERNA), **Academy** (EnSiEL)
- **Associates (74):** 14 **territorial bodies** (some of which - territorial district/cluster - represents numerous SME), 10 **large industries**, 50 **Universities and PRO**
- **Reference** for institutional bodies as well as for regional and national administrations

Each National Cluster was specifically requested to include in the proposal submission two pilot projects related to industrial research, having as objectives the development of knowledge, technological solutions and innovative applications in activities related to two specific strategic lines, which for Energy theme were:

- *innovative components and systems for the production and distribution of sustainable and low-CO₂ energy*
- *production, storage and distribution of electricity according to the Smart grid concept*

with **experimental and industrial research** activities suitable to enhance the **links** between **industrial research and basic research**: pilot projects that could demonstrate the ability to **combine the world of research and the world of business**.

The two Projects saw the participation of the Cluster founders: *ENEA, RSE, CNR, ENI, e-distribution, Terna, Nuovo Pignone Tecnologie, EnSiEL Consortium*

▶ NeMESi: New Sustainable Energy Mixing

- The project is aimed at the study and development of advanced solutions in the **CSP** sector and **hybridization** and **integration with other energy sources**
- In particular, it addresses the evaluation of the **benefits** deriving from the **integration of concentrated solar plants** (equipped with innovative systems for thermal storage), with plants for the **production of steam for industrial use and for the generation of electricity**, identifying and defining at the same time the more convenient configurations and related optimization parameters

▶ LIVING GRID

- The focus of the project is the development of new models for the **optimal management**, in emergency conditions, of the **National Transmission Grid**, of the disconnection and reconnection of portions of the grid and the related distributed energy resources.
- The project involves the **construction of a demonstrator/pilot** capable of representing a technologically scalable system

Five Priority Technological Areas -> Technology roadmaps (3-5)

- **Smart networks and micro-networks:** technologies, systems and methods for management and control
- **Energy storage:** technologies and management and control systems
- **Smart Grid:** innovative devices, technologies and measurement methodologies
- **Energy efficiency and renewable energy sources**
- **Smart Energy**

Technology roadmaps (3-5 in each Area, for a total of about 20)

- ✓ Sustainable mobility, power-to-gas, integrated energy networks, digitalization and smart metering, energy storage management, energy production and end-use efficiency, energy production from renewable sources (solar, wind), RES integration in buildings and environment, local energy communities, biochemicals and biofuels, industrial symbiosis in the energy sector (energy recovery from thermal waste)

Current 3-yr Action Plan Update will be submitted to the MUR by **June 30, 2021**

Strategic lines adopted at European and National levels and new interest among Associates (consultation held in January-February 2021)

More emphasis is given to **hydrogen**, as well as deeper insight to **CCUS (blue hydrogen), energy network integration, local energy communities**

Input for the update of the Action Plan will come from National programs and strategies: **National hydrogen strategy, PNRR** (National Plan for Recovery and Resilience, using Next Generation EU funds), **PNR** (National Program for Research), **PNIEC** (Integrated National Plan for Energy and Climate), **Mission Innovation, IPCEI** (Important Projects of Common European Interest)

The **National hydrogen strategy**, in course of approval at the MiSE, aims at the penetration of the hydrogen carrier at 2% by 2030 (applications to heavy transport, hard to abate industry such as chemical, refinery, steel, mixing in the gas network) and at 20% by 2050 (adding storage and electricity production and residential), envisaging the creation of hydrogen valley to run an integrated system research for the whole value chain. The Energy Cluster contributed to the public consultation launched by MiSE last December giving voice to their Associates

In the **PNRR** (National Plan for Recovery and Resilience), in course of finalization, among the six missions, one (mission II) is devoted to Green Revolution and Ecological Transition, inside which *hydrogen* is one of the four components along with RES and sustainable mobility. It is strictly related to the National strategy for hydrogen and directly allocates 2 B€, besides other funds in SLT. The last February, the Energy Cluster contributed with a written statement to the Senate reading of the Plan

Mission Innovation is a global initiative working to accelerate clean energy innovation, launched during COP-21 in 2015, asking members the doubling of public funds in energy research. One of the 8 challenges of the program is **renewable and clean hydrogen** with the objective to accelerate the development of a global hydrogen market by identifying and overcoming key technology barriers to the production, distribution, storage, and use of hydrogen at gigawatt scale.

MiSE is defining with **ENEA** an agreement for three projects related to hydrogen, smart grids and materials for energy, for an initial amount of about 36 M€, along with the participation also of RSE, CNR and IIT, the first two players being associated with CTNE, besides ENEA.

Hydrogen project envisages the realization of a **hydrogen valley** in the ENEA Centre of Casaccia (close to Rome). A multifunctional, comprehensive hub where all the potentials of hydrogen to accelerate research and innovation and make hi-tech infrastructures available to bridge the gap between the lab and industry will be explored. This will be the first large-scale demonstrator of the actual feasibility of an hydrogen-based green economy

IPCEI is an old instrument of recent application that aggregates several industries in a framework of Common European interest, supporting their investments in new products (R&D&I - research, development, and innovation) and in pre-commercialization (FID - first industrial deployment)

CTNE is mainly devoted to technology transfer to industry, so a special attention is paid to **IPCEI-hydrogen** (Important Projects of Common European Interest), which called for expression of interest on behalf of national industry (ended by half of February)

Project proposals have to be quite innovative, not related to incremental innovation

To define the **Italian value proposition** for an **IPCEI on hydrogen**, the approach undertaken has been to call for expressions of interest together with a first description of the specific project proposed by each player

Industry, as well as PRO and Universities have applied, for a total of **142 proposals**

Four different workstreams regarding the hydrogen value chains with sufficient level of readiness have been tentatively identified, as technologies for:

- **production:** *electrolysis, reforming (+ CCU)*
- **logistics:** *transportation & distribution (compression & liquefaction, piping & instrumentation), storage (above ground), transformation (methanation & fuel synthesis, purification & separation)*
- **utilization:** *mobility (land, waterborn & airborne vehicles, refuelling), industry (chemical processes refinery, steels, others, heat and high temperature processes)*
- **R&D and validation** (valleys, residential, waste processing)

First IPCEI should start early in 2022

CTNE will:

- provide **support to the Associates** involved in the hydrogen value chain, with **specific insights** into all issues relating to the **energy sector**
- **coordinate** actions with other **Associations, industries, research centers**
- promote **events** and facilitate **networking**
- participate in institutional activities: **public consultation, auditions, thematic tables**



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