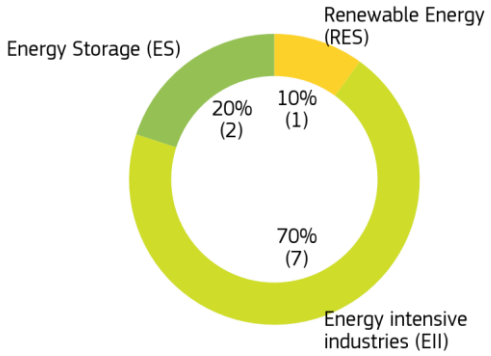
European Commission

Innovation Fund Programme

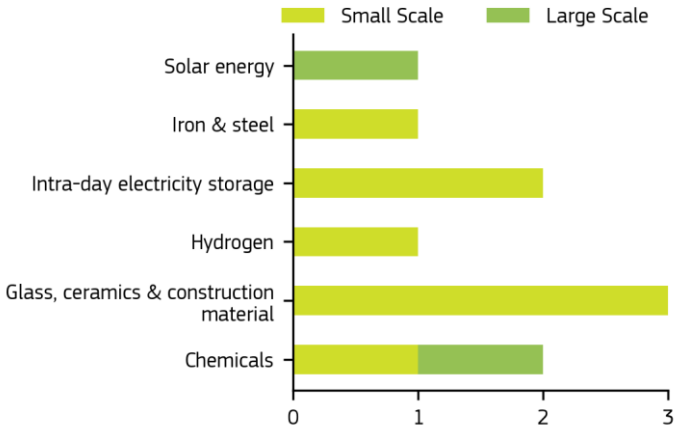
Overview of ongoing projects in Italy

Funded by the revenue of the EU Emissions Trading System, the Innovation Fund's goal is to help businesses investing in innovative low-carbon technologies with significant GHG emissions reduction potential.
The Innovation Fund currently supports **10 projects** located in Italy, which will contribute to the decarbonisation of European industries with a total expected GHG emission reduction of **25.8 Mt CO_2 equivalent in the first 10 years of operation.**
The total **Innovation Fund grant in Italy is of EUR 161.4 million**, out of the **total relevant costs of EUR 397.2 million**, as defined in Art 5 of the Delegated Regulation 2019/856 on the Innovation Fund[1].

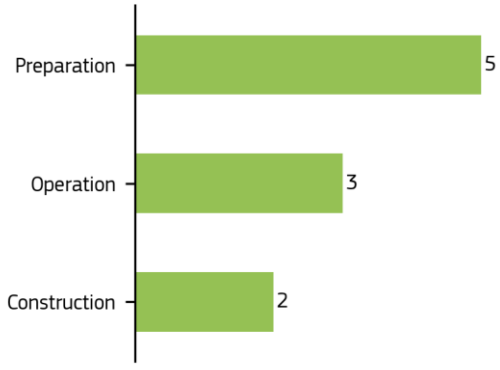
Projects per category
Number of projects and percentage of the total



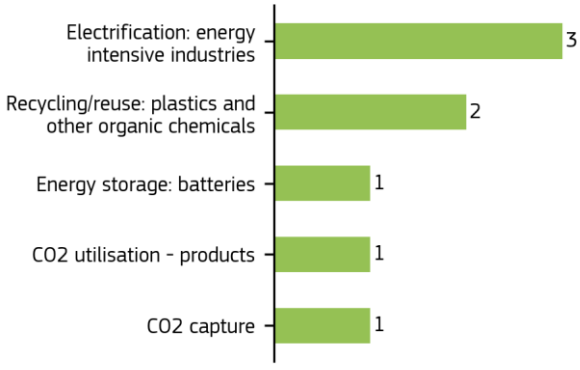
Projects per sector
Number of Small and Large-Scale projects



Projects per phase[2]
Number of projects



Top 5 technology pathways[3]
Number of projects



[1] *OJ L 140, 28.5.2019, p. 9.*
[2] *Preparation means the period before financial close is reached; construction means the period between financial close and entry into operation; operation means that the construction is finished and the project has already started production.*
[3] *Projects may employ several technological pathways, only the top 5 per country are kept in the graph.*
State of play: 18/06/2024

List of ongoing Innovation Fund projects in Italy

Acronym	Title	Sector	Start date	Project phase	Beneficiaries	Innovation Fund grant (EUR million)	Expected GHG emission avoidance (t CO2eq)
Large Scale						**133.9**	**25,182,944**
SC-HOOP	Sustainable Chemical recycling through HOOP technology	Chemicals	01/07/2023	Preparation	VERSALIS SPA	16.2	139,838
TANGO	ITaliAN PV Giga factOry	Solar energy	01/01/2021	Operation	3SUN | EGPI	117.7	25,043,106
Small Scale						**27.5**	**618,695**
BOOST	BOOST: Back-to-mOnOmer recycling of polymeric materialS using molten meTals	Chemicals	01/10/2023	Preparation	NX Tech | MyRemono	4.0	236,126
CUSTARD	carbon Capture and Use at a STeel plant with an Advanced solution to Reach Decarbonisation	Iron & steel	01/07/2024	Preparation	DANIELI | ABS	4.2	179,040
DrossOne V2G Parking	Large-scale vehicle-to-grid system with integrated stationary storage: harnessing EV batteries and their fast response to deliver grid services, currently provided by highly polluting gas plants	Intra-day electricity storage	01/05/2021	Operation	F2MeS	1.6	62,336
H2 Valcamonica	Green hydrogen for the decarbonisation of Valcamonica	Hydrogen	01/01/2022	Preparation	FNM | A2A | SNAM S.P.A.	4.4	42,295
HITeUP	Heat up Isover Transition to Electric Under Production	Glass, ceramics & construction material	01/10/2023	Preparation	SGI	1.6	14,965
PIONEER	airPort sustaInability secONd lifE battEry stoRage	Intra-day electricity storage	01/01/2022	Construction	Fraunhofer | ADR | ENEL X SRL	3.1	16,004
PRIMUS	PRIme Manufacturing of crystal glass Under innovative Solution	Glass, ceramics & construction material	01/09/2022	Operation	Bormioli Rocco	4.5	42,332
VITRUM	Virtuous Innovative TRansformation of high-qUality container glass Manufacturing	Glass, ceramics & construction material	01/08/2022	Construction	Bormioli Luigi	4.1	25,597

Project overview

Acronym	Title	Description
BOOST	BOOST: Back-to-mOnOmer recycling of polymeric materialS using molten meTals	The BOOST Project is aimed at implementing the first-of-its-kind commercial plant of MyRemono's NXRe PMMA (NXRe PMMA, formerly known as CatC) modular technology for producing high-quality recycled Methyl Methacrylate (r-MMA) by chemically recycling secondary raw materials sourced from Polymethyl Methacrylate (PMMA) waste. PMMA is a transparent thermoplastic used for applications in various industries such as automotive, construction, electronics and healthcare. PMMA production is based on the polymerisation of its monomer, the virgin Methyl Methacrylate (MMA), traditionally produced by different routes that require fossil-based feedstock. The BOOST Project will offer a circular solution to the plastic waste dilemma by redefining PMMA waste as a sustainable source for r-MMA production. It is forecasted that over the first ten years of operation, the first commercial plant will achieve a 96% relative Greenhouse Gas (GHG) emission avoidance compared to the reference scenario. Due to the combination of the patented innovative molten metal-flow and the distinctive charging system, NXRe PMMA allows for the optimisation of the depolymerisation process, ensuring a thorough PMMA-metal mixing. The depolymerisation process is performed continuously with a short residence time and with improved heat and mass transfer rates. Both factors allow for the construction of compact depolymerisation units with high-energy efficiency levels, resulting in lower capital expenditures and operating costs, and ensuring the production of high-quality and sustainable r-MMA with a final purity greater than 99%. The first commercial plant will increase the European PMMA chemical recycling capacity by 5 000 tonnes per year, producing approximately 4 345 tonnes per year of r-MMA, and avoiding the consumption of more than 13 000 tonnes per year of fossil based raw materials. The project will enable the commercial deployment of NXRe PMMA with the aim to address the same target market from both the supply and off-take sides, embracing a fully circular model. Furthermore, the positive results arising from the research & development campaign tests, already conducted on polystyrene (PS) and polyolefin (PO), demonstrate the potential NXRe PMMA technology scalability into various sectors within the plastic manufacturing and recycling industry. This means closing the waste recycling loop for different plastic waste and enhancing the production of sustainable plastic products. The BOOST Project will yield positive socio-economic effects contributing to the growth of a transition region within the framework of the EU Cohesion Policy and fostering the resilience of the EU economy in compliance with the principles of sustainability and circular economy.
CUSTARD	carbon Capture and Use at a STeel plant with an Advanced solution to Reach Decarbonisation	CUSTARD aims to reduce the carbon dioxide (CO2) emissions of a steel plant (managed by Acciaierie Bertoli Safau Spa). Thanks to innovative Carbon Capture and Usage (CCU) technology, about 13 000 tons of CO2 will be captured annually from the flue gases of a reheating furnace and used in a chemical reaction with caustic soda to produce a high value-added chemical compound (sodium bicarbonate) to be sold on the market. In terms of relative greenhouse gas reduction, around 40% CO2 equivalent (CO2e) with respect to the most adopted method for bicarbonate production (the Solvay process for reference), will be saved during the first 10 years of operation. The sodium bicarbonate production route proposed by CUSTARD will be based on caustic soda production from green electrolysis and the available use of waste heat, thus reducing the final product's carbon footprint. After passing through a carbon capture and concentration unit and a caustic soda scrubbing unit, the reagents enter a 3-phase reactor where sodium bicarbonate is generated, followed by its crystallisation and purification to reach food grade quality.Furthermore, no by-products are generated. Similar CCU applications are already present in other industrial sectors, such as in energy; however, no CCU technologies of this kind (characterised by flue gases with variable flowrates and CO2 concentration) have been tested in the steel sector. The CCU technology will impact the steel industry as a climate mitigation measure and energy intensive industries in general. The reduction of CO2 could contribute to the decarbonisation goals set in the European Green Deal in all sectors. Once it has been industrially applied in the steel sector, the technology could be replicated in other steel plants in Europe as well as in other hard-to-abate (i.e. cement, glass, ceramic) industries, including the chemical sector. The local community will benefit from CUSTARD thanks to the creation of new jobs both in the direct workforce of the new plant and in the possible related services. The Region will increase its gross domestic product since both sodium bicarbonate and caustic soda will be produced in the same local area. Moreover, CUSTARD will promote the development of a regional centre of competence for circular carbon chemistry, including a private research centre (Serichim s.r.l.) with local universities that already collaborate with the project partners.
DrossOne V2G Parking	Large-scale vehicle-to-grid system with integrated stationary storage: harnessing EV batteries and their fast response to deliver grid services, currently provided by highly polluting gas plants	Recently, Free2Move esolutions (former EPS EPS eMobility) and FCA Italy S.p.A (hereinafter referred to as FCA) have been awarded a contract by the Italian transmission grid operator Terna to manage 25 MW of ultra-fast reserve services. This is part of a bigger initiative by Terna aggregating up to 230 MW of nominal capacity of Fast Reserve Units (FRU) providing frequency and voltage services to ensure grid stability. In this context, Free2Move will develop and build the first large-scale centralised bi-directional V2G system (DrossOne V2G), capable of guaranteeing a Maximum Dispatchable Power of 30.8MW. The project configuration consists of 280 double bi-directional recharging stations (2x50kW each) and a stationary storage system (second-life batteries). The stationary storage not only enables the optimisation of the power and energy capacity available, it also allows to successfully regulate the microgrid DC bus. The V2G plant will be implemented at FCA's Drosso logistics centre (Mirafiori, Turin), where the plant will provide grid services while newly built full electric vehicles (FIAT 500e) are parked in the stockyard before being shipped to the dealers. The target market is to deliver ancillary and energy services, all within the compliant response times required by Terna. Free2Move innovative centralised charging solution coupled with the Energy Management System, which optimises energy and power flows, is based on a DC microgrid architecture: it allows to easily connect and increase the synergies between distributed energy resources, to optimise energy consumption and provide innovative Behind-the-Meter and Front-the-Meter (i.e grid) services. Indeed, electric vehicle fleets using a physical connection are able to provide different services to the distribution and transmission grid with very fast response time (<200 ms).

Acronym	Title	Description
		In a first stage, the V2G platform will deliver the new fast reserves service (ultra-fast frequency response) and a pool of real-time (RT) services
H2 Valcamonica	Green hydrogen for the decarbonisation of Valcamonica	H2Valcamonica project is the first step in the ambitious goal of creating the first Italian green hydrogen valley through the use of highly innovative technologies for the production of green hydrogen that will be used to replace traditional fossil fuels in the transport and industrial sectors, bringing a disruptive innovation in their production processes. The proponent is a consortium of partners whose expertise is essential for the implementation of the project. A2A, coordinator of the project, will bring its expertise on the supply of energy, Snam, beneficiary, will bring its expertise on the production of hydrogen and FNM, beneficiary, will bring its expertise on the distribution of energy sources for the railway transport sector. The objective of the project will be achieved through the implementation of an electrolyser that will produce the hydrogen, a storage and compression system at production site that will allow the storage of the hydrogen produced and a storage system at the distribution point to allow the refuelling of trains at the refuelling station. The target market is the mobility sector and the industrial sector in the Valcamonica area where green hydrogen is not currently used as energy source. The pioneer costumer, Trenord (FNM group) will foster the creation of a local hydrogen market, through the application of the green hydrogen to the rail transport sector. Thanks to the H2Valcamonica project, the emission of 42295,25 tCO2e will be avoided.
HITeUP	Heat up Isover Transition to Electric Under Production	The main objective of the HITeUP project at the Saint-Gobain Italy (SGI) plant at the Vidalengo site is to demonstrate a first-of-a-kind, hybrid curing oven that maximises its electrification and allows for 11% of relative greenhouse gas (GHG) avoidance during the mineral wool process. The HITeUP hybrid curing oven will replace the traditional gas-fired burners with electric heating equipment. In addition to switching the nature of the energy input, electrification will also allow for the increase of the process's energy efficiency. Whilst electric alternatives to conventional equipment are commercially available, their full integration with the traditional glass wool curing process has never been developed and implemented at the industrial scale. HITeUP technology will then help to move towards net-zero mineral wool production. The European Union is the world's biggest producer of mineral wool, with a market share of around 35% of total world production. The industry is known for the quality of its products, its capacity for technological innovation, and its skilled labour force. Moreover, mineral wool is a strategic material to minimise heat loss through improved energy efficiency of buildings. However, the production of glass wool is an energy intensive process that emits high amounts of Greenhouse Gases (GHGs), thus negatively impacting the carbon footprint of the construction sector. These emissions particularly relate to natural gas consumption from melting furnaces, fiberizing machines, and curing ovens. The project will contribute to the European objectives to reduce GHG emissions and is in line with the RePowerEU Plan. This project is also in line with Saint-Gobain's decarbonisation strategy to implement innovative, first-of-a-kind, net-zero carbon plants by 2030 to reach its 2050 net-zero carbon target. To promote HITeUP, SGI will develop and implement a communication strategy on local and worldwide scales to promote the project's positive environmental and social impacts. Furthermore, the HITeUP technology is easy to transfer, even to existing curing ovens. Once validated, the technology could readily be rolled out throughout the sector.
PIONEER	airPort sustaInability secONd lifE battEry stoRage	During next decades, the market-uptake of electric vehicles (EVs) is expected to result in the availability of terawatt-hours of batteries that, after their first 5 years of intense exploitation, no longer meet the high-performance requirements of EV?s. Yet, since still functional and able to serve less-demanding applications, these batteries can live a second life providing stationary energy storage services at lower cost, reducing thereby environmental impacts and GHG emissions of served energy systems, as well as of the battery supply and recycling chain in general. The Project aims to take the Leonardo da Vinci international Airport Rome Fiumicino a significant step towards the net-Zero-climate-goal, by adding to the existing power supply system an energy storage exploiting 2nd life batteries totalling 2.5 MW power and 10 MWh energy storage capacity. This system shall store excess energy produced during the day by a 30MW solar PV power-plant planned to start operation in 2025, and to return the stored energy by covering the peak-demand of airport facilities during evenings when solar energy becomes unavailable. The Innovations expected from the project shall allow to define how to optimally integrate into a same common power-supply system batteries of different size, voltage, capacity, brands, technologies and at differing ageing levels. Furthermore, the lessons learned by the project shall allow to outline a guidance for applicable business-models, including technical characterization procedures allowing to determine the ageing level of adopted batteries and of ensuing economics, both at the beginning for acceptance testing of 2nd-life batteries, and during the remaining battery lifetime. Expansion of project results to other EV brands shall allow to enlarge applicability to possibly any market-available EV battery make. Once the project will be completed, AdR plans to install additional storage systems up to at least 30 MW power and 90MWh capacity
PRIMUS	PRIme Manufacturing of crystal glass Under innovative Solution	The PRIMUS project will deliver an innovative combination of crystal glass furnace technologies to improve energy efficiency and reduce GHG emissions. The innovations will include furnace electrification, and an innovative waste heat recovery solution related to the furnace channels, regenerative burners and the exhaust furnace gas. The project will be developed in the Fidenza plant in Italy and will contribute to the decarbonisation of the production of high-quality crystal glass, through the electrical hybridisation and energy efficiency measures. Among the outcomes of the Bormioli Rocco solution is a significant reduction of GHG emissions, with an expected relative emission reduction of about 28% compared to the reference scenario. The PRIMUS project aims to create a lower emission plant capable of producing a large quantity of high-quality crystal glass for the tableware market. This will be achieved using a highly efficient hybrid furnace in combination with an innovative waste heat recovery solution to improve the energy efficiency of the site. The project will be the first application of hybridisation in this specific sector. Electrodes will be used in the furnace, allowing part of the fuel to be substituted with electricity. This will result in a significant reduction in direct methane consumption, and therefore in a remarkable cut to the emissions of the plant. GHG reduction is also achieved due to the waste heat recovery system and the use of regenerative burners in the "channel" section of the plant. The ceramic heat regenerators enable the recovery of 85-90% of heat from the waste gases and a fuel consumption reduction of up to 45%. This represents a first-of-a-kind application of this technology in the glass sector, optimising the energy efficiency of combustion.

Acronym	Title	Description
		As well as the regenerative burners, a waste heat recovery system from the exhaust furnace gases will be installed. This will allow a major reduction to the methane consumption in the plant, which is used for the heating and hot water production. Two of the main pillars of the decarbonisation pathway are efficiency and electrification. Across the whole plant, PRIMUS uses these pillars to cut CO2 emissions from methane combustion from 6.8 to 2.6 tonnes CO2equivalent, per year, equating to a 61% reduction. This is a remarkable result for such a hard-to-abate sector. In this way, over the first ten years of operations, the plant will have an absolute GHG reduction of about 42 000 tonnes CO2 equivalent. Scalability is embraced by the PRIMUS project at all levels. The hybrid furnaces and the waste heat recovery systems can be replicated in other plant furnaces and in the other regional methane fuelled glass furnaces. The scalability of the PRIMUS project is also projected to have significant impact on the European crystal glass tableware production sector. It has been evaluated that, over a period of 10 years, the implementation of PRIMUS technologies in the revamping of glass industry furnaces, would result in greenhouse gas emissions savings of up to 8 000 000 tonnes CO2 equivalent within the sector.
SC-HOOP	Sustainable Chemical recycling through HOOP technology	Sustainable Chemical recycling through HOOP technology The SC-HOOP® (Sustainable Chemical recycling through HOOP ® technology) project is the realisation of a pilot plant with a feedstock capacity of 6 000 tonnes/year. The plant is based on a Versalis proprietary technology named HOOP®, for the valorisation of plastic waste that is currently not recyclable. This will be used to produce a recycled naphtha which can replace steam cracker feedstocks, to produce new polymers suitable for all applications with a relative greenhouse gas emission avoidance of 81% compared to the reference scenario. From all of the collected plastic waste in Europe, only about a third is recycled. This is mainly because plastic products are made up of heterogeneous materials with complex structures. These are difficult to re-process whilst maintaining the quality standards, they can hinder mechanical recycling and they can cause down-cycling. The SC-HOOP® project is complementary to mechanical recycling and drastically improves the circularity of plastic products, closing the loop of plastics lifecycle. The HOOP® technology presents several advantages with respect to traditional pyrolysis, such as: higher yield, greater feedstock flexibility and high quality of r-naphtha suitable to be directly fed to steam crackers. The pilot plant will produce 4 860 tonnes/year of recycled naphtha, converting 6 000 tons/year of mixed plastic waste, with absolute greenhouse gas emissions avoidance of 139 838 tonnes of CO2 equivalent over the first ten years of operation compared to equivalent virgin naphtha production from oil refinery. Chemical recycling and - more specifically the SC-HOOP® project - is pivotal in supporting the implementation and development of circular economy. The SC-HOOP® project development is strategic to achieve the challenging EU recycling targets and full circularity of plastics. The HOOP® technology can be applied “as is” to any location where mixed plastic waste is available. In future industrial scale-up, proximity with a steam-cracking plant makes the whole process economically and environmentally more convenient. The proximity simplifies the logistics, but also crucially enhances energy and material recovery. The HOOP® technology is designed to build its innovative section in a modular way, such as the reaction section, while other sections can be easily scaled-up. The pilot plant construction and operation will allow the consolidation of data for scale up and the plant could be replicated in other Versalis site units.
TANGO	ITaliAN PV Giga factOry	The TANGO project will develop an industrial-scale pilot line in the South of Italy for the manufacture of innovative, high-performance photovoltaic (PV) modules, increasing production capacity by 15 times, from 200 MW to 3 GW per year. Production will include bifacial heterojunction (B-HJT) PV cells, which offer a very important effective efficiency improvement of up to 20%, relative to current state-of-the-art cells, and an innovative module design called a Tandem structure. The modules produced in one year (3 GW) will have the potential to generate 5 445 GWh of renewable electricity per year. Once installed, all the modules produced over the first ten years of operation have the potential to avoid up to 25 Mt CO2e emissions. The main innovation lies in scaling up production of these cells to a gigawatt scale – a key goal for the European PV industry. The gigawatt-scale factory will foster European technology leadership in the manufacture of next-generation PV modules, thereby contributing to the reduction of energy dependency in Europe and improving European competitiveness in PV manufacturing.
VITRUM	Virtuous Innovative TRansformation of high-qUality container glass Manufacturing	The VITRUM project will develop an innovative technology based on a hybrid gas and electricity furnace for high-quality glass. This will be combined with a high share of Post-Consumer Recycled (PCR) glass and a more efficient forehearth conditioning system. The project will be developed in the Abbiategrasso plant and will be applied to the high-quality cosmetic container glass production, a sector with a currently low usage of hybrid furnaces and PCR. Among the expected outcomes of the Bormioli Luigi solution is a significant reduction of GHG emissions, with an expected relative emission reduction of 14% compared to the reference scenario. The most innovative and novel aspect of the VITRUM project is the deployment of the hybrid methane and electricity furnace, coupled with advanced PCR use and distributed digitalisation technologies. The project aims to develop energy efficient solutions and the electrification of the process, while guaranteeing a high-quality final product. The melting section of the furnace will be equipped with electrodes which account for up to 30% share of the required heat. GHG emissions reduction and energy efficiency are also achieved due to the increase in PCR input share (up to 23%). The VITRUM project approach to glass production is able to deliver excellent results in terms of decarbonisation. CO2 emissions are reduced in different sections of the plant, of which

Acronym	Title	Description
		the greatest contribution comes from the hybridization of the furnace, which accounts for about 80% of the total amount during the lifetime of the plant, while the remaining part comes from the use of PCR, since it substitutes energy-intensive materials, and the forehearth conditioning system. In total, the project plans to avoid the emission of about 25 500 tonnes CO2 equivalent over the first ten years of operation. The VITRUM project offers well defined scalability opportunities. At the project and regional level, both the hybridisation and digitalisation can be applied to all glass manufacturers that currently use gas furnaces. Also, an increased PCR share in the feedstock mix is an intervention that can be applied to the other high-quality cosmetic glass producers, the only sector where PCR glass has not been widely used yet, due to quality constraints. The container glass sector in Europe accounts for 61.7% of the European glass production in 2021 with 164 plants. Electricity is only used as an energy source in 15% of these plants, meaning there is significant potential to scale up the hybridisation of glass furnaces. Further opportunities exist to increase electrification in all energy-intensive and high-temperatures industries, such as the steel, cement, and ceramic sectors. The engineering of a hybrid solution for high-temperature furnaces is therefore likely to be a key factor for the decarbonisation in these sectors.