Eni Rewind for 2022

A Just Transition

Eni Rewind's Mission

We are Eni's environmental company.
We work according to the principles of the circular economy
to give new life to industrial land and waste through efficient,
sustainable remediation and revaluation projects.
We base our work on passion, skills and technological research
to regenerate soils, water and recoverable resources.
We believe in dialogue and integration with the communities that host us.

Eni's Mission

We are an energy company.
13 15 We concretely support a just energy transition,
with the objective of preserving our planet
7 12 and promoting an efficient and sustainable access to energy for all.
9 Our work is based on passion and innovation,
on our unique strengths and skills,
5 10 on the equal dignity of each person,
recognizing diversity as a key value for human development,
on the responsibility, integrity and transparency of our actions.
17 We believe in the value of long-term partnerships with the Countries
and communities where we operate, bringing long-lasting prosperity for all.

Global goals for a sustainable development

The 2030 Agenda for Sustainable Development, presented in September 2015, identifies the 17 Sustainable Development Goals (SDGs) which represent the common targets of sustainable development on the current complex social problems. These goals are an important reference for the international community and Eni in managing activities in those Countries in which it operates.

ENI REWIND FOR 2022

A JUST TRANSITION

Disclaimer
Eni Rewind for 2022 is a document published annually that contains forward-looking statements relating to the various topics covered therein, based on the forecasts and beliefs developed by Eni Rewind's management in accordance with the information available at the time of their formulation. Nevertheless, by nature, forward-looking statements have an element of uncertainty, as they depend on the occurrence of future events and developments that are, in whole or in part, beyond the control and reasonable foresight of Eni Rewind. Actual results may therefore differ from those announced due to various factors, e.g. changes in the regulatory framework, success in developing and applying new technologies or changes in stakeholder expectations. Readers of the document are therefore invited to consider a possible discrepancy between certain forward-looking statements made in the text, which are to be understood as estimates, and the results that will be achieved should the events or factors indicated above occur. Eni Rewind for 2022 also contains terms such as "partnership", at times used for mere reference and without a technical-legal connotation.

Images
Photos on the cover and in the Eni Rewind for 2022 Report are from Eni's photo archive.

Message to stakeholders

Porto Torres - environmental platform in operation

The global scenario that has gradually emerged over the past year, marked by Russia's invasion of Ukraine and the uncertainty of economic recovery combined with strong inflationary pressures, has focused the attention of nations, businesses and organisations on the need to define new balances and reinforce processes for debate and cooperation towards the sharing and pursuit of common medium and long-term goals.

The main challenge is to combine the ongoing transition for the gradual decarbonisation of energy consumption with the security of supply, in terms of its continuity and the reduction of price volatility, as well as with the economic and social sustainability of a pervasive and long-lasting change process necessarily spread over several decades.

Building a more equitable future, even in terms of international and intergenerational distribution of resources whilst taking into account social, economic and environmental objectives, requires the commitment of all parties involved, working in synergy and each within the area of responsibility.

In this context, as Eni's environmental company, we are acting to give our strongest contribution, merging our remediation activities with our targets of giving new life to soil, water and waste through processes aimed at resource recovery, reuse and the development of new sustainable projects. We can count on a team of experts with interdisciplinary skills who do their work every day with commitment and passion, in collaboration with other public and private players, and with the strategic leverage of innovation and technological development, in partnership with research institutions and universities.

Overall, in 2022 we have carried out remediation works amounting to about €400 million, bringing cumulative expenditure since 2003 to €3.7 billion, of which more than 80% relates to the historical contamination of sites conferred by law or acquired through mergers, as part of the industrial rescue operations that Eni had to take over when it was a state-owned company.

Sixty per cent of the Eni Rewind's land properties, totalling about 3,800 hectares, is non-contaminated or has already been remediated and is therefore available for new projects, in particular regarding renewable energy production and waste treatment and recovery. There remains 40% of land where environmental interventions are underway, and which will be progressively regenerated for development, with over 70% of the associated soil remediation projects completed by 2030.

As part of Eni Rewind's gradual growth into a provider of environmental solutions for the market, in 2022 we expanded our portfolio of public and private clients, which currently includes Q8, Acciaierie d'Italia, Edison, Anas, Raffineria di Milazzo and Invitalia, leveraging on the skills and experience gained over our twenty year-long experience in the remediation and management of industrial waste at Eni sites. In addition, we maintain our partnerships with Italy's leading operators in the waste sector, including both municipal and special waste, to promote investments that increase the infrastructure available with new treatment and recovery plants. In this prospect, we are also working to give new life to Eni Rewind's remediated areas, located in industrial districts with infrastructure already in place, thus avoiding the consumption of new land.

Recent main developments include:

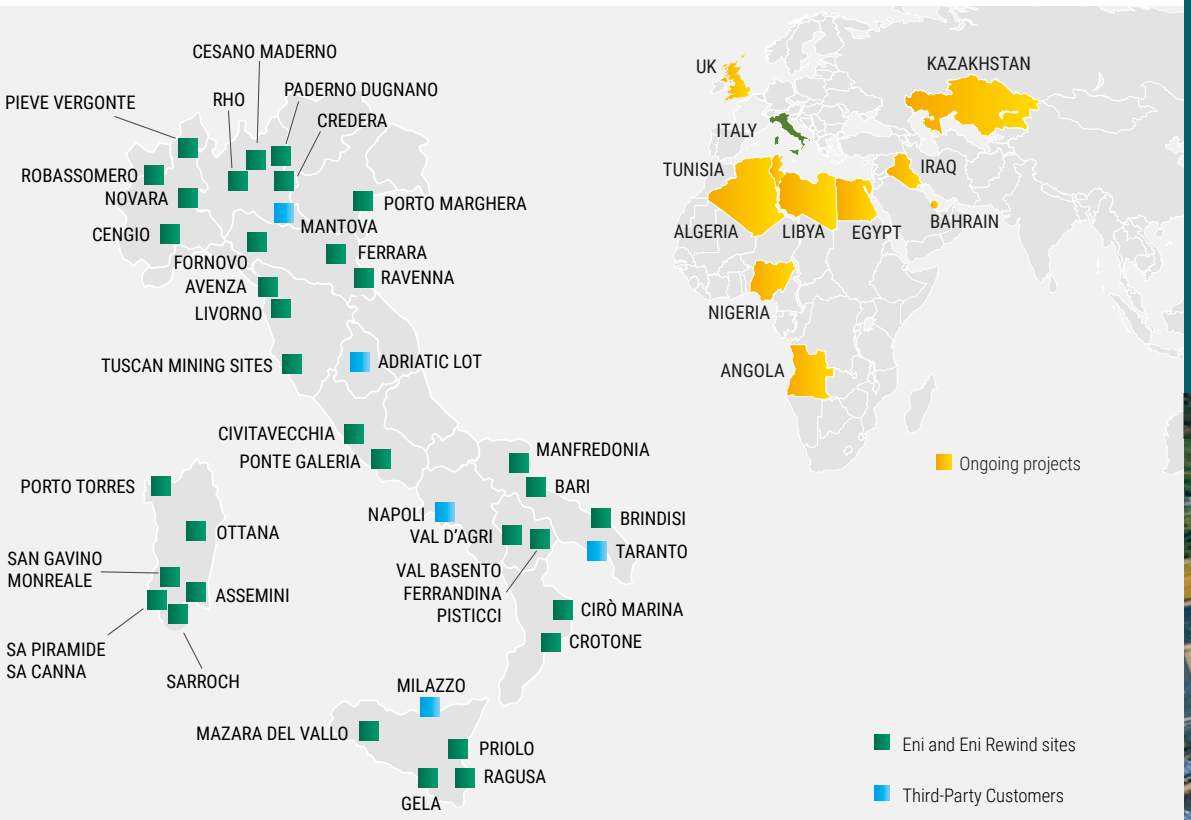
- in Ravenna, the completion of the PAUR (Regional Single Authorising Provision) process to build both a multifunctional waste pre-treatment platform to be managed by HEA, a joint venture between Eni Rewind and Herambiente, and a plant for the recovery of contaminated soil using biopiles managed directly by Eni Rewind;
- in Porto Torres, the multi-purpose treatment platform that allows the recovery and reuse of contaminated soil to backfill excavations in the Minciaredda area, an exemplary zero-kilometre remediation project, is operating at full capacity;
- at Gela, the completion of the authorisation process for the development of the special purpose landfill for the on-site management of waste with radiometrically active materials (TENORM) resulting from the decommissioning of the ISAF phosphoric acid plant, while the activities for the dismantling of the decommissioned plants at the Gela Refinery are ongoing;
- in Cengio, the submission of the application to issue the certification for the permanent safety measures in area A1 following the certification of compliance granted by the Ministerial Commission;
- in Porto Marghera, the submission of an application for PAUR (Regional Single Authorising Provision) in November in order to build a plant for the drying and mono-combustion of sludge from municipal wastewater treatment. The plant will be built in a remediated and certified area owned by Eni Rewind within the Porto Marghera industrial site;
- in Priolo, the granting of a ministerial decree approving the project for permanent safety measures in the San Cusumano Basso area, first submitted in 2020;
- over the course of 2022, we negotiated the agreements, concluded in June 2023, for the acquisition of a 30% stake in the share capital of LabAnalysis Environmental Science, the Italian leader in the environmental analysis sector, to strengthen the specific competence and competitiveness of Eni Rewind's integrated range of remediation and waste management solutions.

We will continue to work for a more resilient and competitive country, contributing to economic recovery and growth while respecting the environment, soil and water, in order to leave nobody out nor unjustly penalised by the transition process and its changes. Constant and constructive dialogue with stakeholders will continue to be a founding principle of our activities, to work in synergy with our host territories and together contribute to a more equitable and sustainable development.

Paolo Grossi
Chief Executive Officer

Eni Rewind in summary

Eni Rewind is Eni's environmental company and has been committed for the last twenty years to giving new life to land, water and waste - both industrial or from remediation activities - through sustainable remediation and revaluation projects. The English word Rewind was chosen as an acronym for Remediation and Waste Into Development, an effective summary of the company mission. The company owns approximately 3,800 hectares of land in Italy, of which about 65% in Sites of National Priority. In 2022, around 40% of the areas had on-going environmental interventions, while the remaining 60% were ready for use in new redevelopment initiatives. Since 2003, the company has spent over €3.7 billion on environmental interventions, 85% of which has been used on sites conferred by law or acquired through mergers, as part of the historic industrial rescue operations that Eni had to take over when it was a state-owned company in the 1980s and 1990s. With around 1,000 employees, Eni Rewind is a global environmental contractor for all Eni business lines, from upstream to the service station network, and supports Eni in planning environmental interventions abroad. Since 2020, as the company aimed at incrementally evolving into a market operator, it has offered its environmental services to public and private third-party clients, such as Acciaierie d'Italia, Edison, Anas, Raffineria di Milazzo, Invitalia and Kupit, leveraging on its twenty years of experience in remediation and the integrated management of water and waste. At the same time, the company has committed to establishing partnerships with leading operators in the municipal and special waste sector and to building new treatment and recovery plants that will help strengthen the industry's competitiveness and infrastructure. For this purpose, the company makes available its own remediated areas, located in brownfield sites and included in industrial redevelopment plans, to avoid the consumption of new land.



Eni Rewind's approach to a Just Transition

Through its integrated and circular operating model, Eni Rewind is committed to maximising the benefits of resource recovery and reuse, while focusing on environmental protection and on the necessities of the workers and of the communities in which it operates, in line with Eni's strategy.
An approach that requires the concrete application of a regenerative systemic vision, in which production and consumption cycles are waste-free and based on the increasing inclusion and participation of the actors involved throughout the supply chain, from institutions and entities to our partners, suppliers and customers. To be truly fair, the Just Transition - for Eni Rewind - must preserve and give new life to natural resources and recover waste and refuse, making the best use of the levers of technological evolution and economic and social cooperation. Furthermore, implementing a complex and long-term transition cannot disregard the need to prioritise the most effective interventions and synchronise the "phase-out", the decommissioning and conversion of obsolete plants and infrastructure, with the "phase-in", which will enable new technologies and more sustainable services and products. This path will be all the more equitable the more it will succeed in minimising the negative social and economic impacts generated by the change and in supporting development opportunities consistent with the requirements and ambitions of the territories on the basis of direct and indirect workers' needs.

ENI REWIND IN 2022

~1,000
employees

€3.7 bn
spent on environmental interventions since 2003

~3,800
ha of property

~€915 million
environmental and waste management costs

~60 sites
with ongoing remediation activities and about 400 service stations with environmental activities

over 100 sites
where Eni Rewind operates

~80 km
total hydraulic barriers

43
water treatment plants

~35 million m³
of water treated

~10 million m³
of water regenerated for industrial and environmental use

~2 million tonnes
of total waste managed

~74%
of waste recovered/ recoverable


Gela - ISAF decommissioning - on-site remediation solution

Our Story

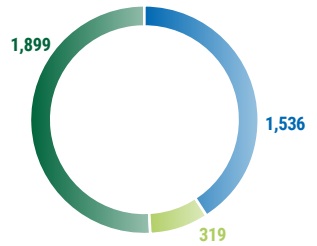
The history of Eni Rewind is strongly linked to Eni and its vision of the future: a joint, concrete commitment towards an energy and ecological transition. During the twenty years of Eni Rewind's course, the company has acquired a wealth of expertise to support a solid evolution of the business, and therefore can provide the market with sustainable, state-of-the-art environmental solutions based on shared values.

eni 1953 2023 70 YEARS of Eni

eni rewind remediation & waste into development 2003 2023 20 YEARS of Environmental Services

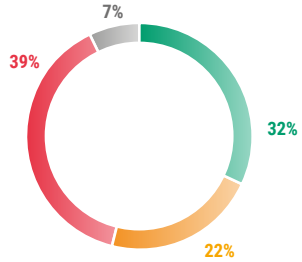
AREAS OWNED AND REMEDIATION COSTS BY SITE ORIGIN

Total areas owned:
3,754 hectares



- Environmental interventions in progress
- Areas with Plenitude renewables
- Non-contaminated/remediated

Breakdown of areas by origin



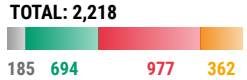
- Sites acquired through Enimont operations (1990)
- Sites acquired by law from other companies

Costs incurred by site origin (€ Mln)

TOTAL: 3,756

Estimated costs to be incurred (€ Mln)

TOTAL: 2,218



- Sites acquired by law from the SIR-Rumianca Group (1981)
- Historical Eni sites

EVOLUTION AND TRANSFORMATION OVER THE YEARS

1953

THE BIRTH OF ENI
On 10th February 1953 the Parliament establishes the Ente Nazionale Idrocarburi.

1982

The chemical plants of the SIR-Rumianca group, following a financial crisis, are transferred to Eni by decree-law.

1988

Eni and Montedison transfer their chemical activities to Enimont, of which Eni acquires total control in 1990.

2003

FROM ENICHEM TO SYNDIAL
In 2003, after transferring its active sites to Versalis, Enichem is renamed Syndial and centred on the remediation of decommissioned sites.

2005

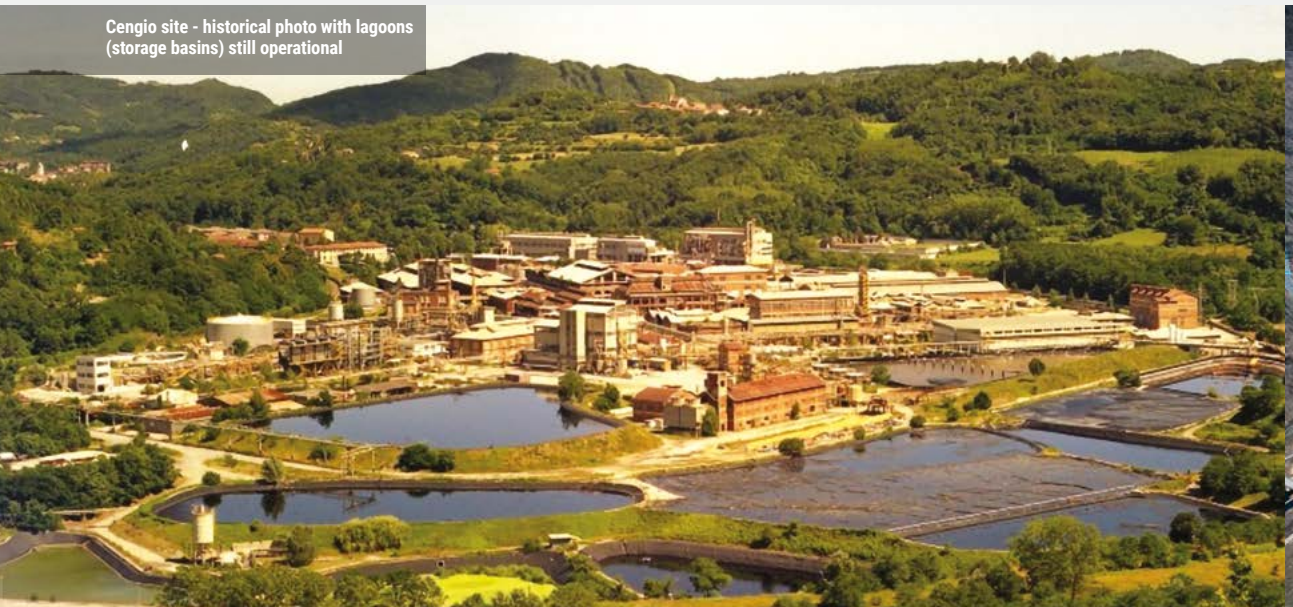
GRADUAL EXPANSION TO ENI GLOBAL CONTRACTOR
• 2005 - incorporation of the activities of Società Ambiente.

2016

• 2011 and 2015 - acquisition from Saipem of the waste logistics and design business unit.
• 2016 - Eni Refining & Marketing entrusts the company with the environmental management of decommissioned sites, and service station remediation activities.

2018

Extension of activities abroad, starting with the water purification project in the Basra area of Iraq.



Cengio site - historical photo with lagoons (storage basins) still operational

Cengio site - remediation interventions completed

Eni Rewind's solutions for the market

Eni Rewind has twenty years of experience in the remediation, water and waste management sector, gained at multiple sites with very different industrial and environmental backgrounds, from Eni service stations to Sites of National Priority. Professionalism and expertise are an added value for external customers and have contributed to the continuous increase of Eni's non-captive market business portfolio.

REMEDIATION SERVICES

ENVIRONMENTAL PROCUREMENT
STAKEHOLDER ENGAGEMENT AND PERMITTING
PROJECT MANAGEMENT

Characterisation/ preliminary analysis/ emergency safety measures | Risk analysis | Design (environmental engineering) | Execution | Water management | Waste management | Certification monitoring | Land valorisation/ reconversion

Eni Rewind guarantees the supervision of the entire remediation process at every stage, from matrix characterisation to final certification, through innovative and environmentally sound solutions, at clients' and owned sites, to maximise the effectiveness and efficiency of environmental interventions.The company's operational approach is strongly oriented towards the application of on-site and in-situ technologies, including proprietary Eni and Eni Rewind technologies born out of partnerships with universities and research institutions, such as e-hyrec®, e-lorec®, e-limina® and passive sampling on LDPE sheets. While the continuous search for technologies aimed at directly treating the source of contamination has led to the testing and application of remediation systems, such as recirculation wells.
The experience gained over the years enables Eni Rewind to design, execute and manage the various types of intervention, relying on in-house units of project managers and field specialists.
The multidisciplinary and integrated management of remediation projects includes HSE and procurement services specific to the environmental sector and an in-house stakeholder engagement unit to involve interested parties from the offset so as to create opportunities for the redevelopment and valorisation of the remediated areas.


Ferrara – Permanent safety measures (MISP) former Monteco site

WATER MANAGEMENT AND TREATMENT SERVICES

ENVIRONMENTAL PROCUREMENT
AUTOMATION – REMOTISATION

Process Engineering | Construction & Management | Process Monitoring | Discharge of treated water or recovery

Eni Rewind carries out groundwater remediation in multiple industrial sectors through hydraulic barrier systems and in-plant treatment as well as via techniques aimed at removing the source of contamination. All water management assets conform to the Best Available Technology (BAT) and are unique examples at European level for the methodologies and technological solutions adopted. In-house expertise and tools for hydrogeological modelling, automation, remotisation and dynamic control of treatment plants enable optimisation of process reliability throughout the supply chain and operating costs, maximising the recovery of reusable water within sites.


Avenza - groundwater treatment plant

WASTE MANAGEMENT SERVICES

ENVIRONMENTAL PROCUREMENT
TRACEABILITY - DOCUMENT MANAGEMENT - PROCESS DIGITALISATION

Characterisation and management of deposits | Homologation | Logistics planning | Treatment and final disposal/recovery | Monitoring and control

Eni Rewind manages the entire waste cycle resulting from industrial activities, remediation and decommissioning of disused facilities, in line with current regulations and industry best practices. Control over the supply chain includes waste characterisation, selecting the best recovery and disposal options and adopting logistics planning systems that minimise costs and environmental impacts (through dedicated software). Activities are ensured through a selected and qualified network of over 90 plants, specialised by type of waste. At the same time, an in-house team of about 110 specialists oversees the traceability system and legal documentation. The company is committed to building new waste treatment and recovery plants, also through cooperation agreements with leading Italian companies in the sector, in order to optimise the supply chain in the medium and long-term as regards to reliability and quality of service, logistics and competitiveness compared to market alternatives.

Certifications and attestations

Eni Rewind's commitment to safeguarding the environment, protecting workers' health and safety and providing a quality service to third-party customers is reflected in its rigorous compliance with the relevant legislation in force and in its voluntary participation to an integrated HSEQ management system that has led to the achievement of a comprehensive certification in accordance with UNI ISO standards.
Eni Rewind holds the SOA attestation in categories OG 12, OS 14 and OS 22, which is compulsory for participation in tenders for the execution of public works contracts in its core activities. In 2022, it qualified for tenders of unlimited amounts in the OS14 and OG12 categories.


Pieve Vergonte - construction of deposits for excavated soils storage

UNI EN ISO 14001 of 2015 Environmental management systems - Requirements	The ISO 14001 standard is an international instrument that outlines the parameters of an Environmental Management System, which demonstrates the adoption of a management system that is adequate to keep the impacts of an organisation's activities on the environment under control and strives for constant improvement in an effective and sustainable manner.
UNI EN ISO 9001 of 2015 Quality Management Systems - Principles and glossary	The ISO 9001 standard is an international instrument for the certification of Quality Management System requirements, which guarantees an organisation's competence in executing corporate processes, improving the effectiveness and efficiency of services, and achieving and increasing customer satisfaction.
UNI ISO 45001 of 2018 Occupational health and safety management systems - Requirements and guidance for use	The ISO 45001 standard is an international instrument that outlines the requirements for the implementation of the Occupational Health and Safety Management System in order to enable an organisation to provide safe and healthy workplaces by preventing occupational accidents and health problems, as well as continuous and proactive improvement in terms of people's health and safety.
SOA OG 12, OS 14 and OS 22 Attestations	Mandatory certification for participation in public tenders to execute works, with an auction amount higher than € 150,000. Eni Rewind obtained certification on its core activities, in the general category OG 12 - Environmental remediation and protection works and plants, and in the specialist categories OS 14 - Waste disposal and recovery plants and OS 22 - drinking water treatment plants and purifiers.

The partnership with LabAnalysis

On 30th June 2023, Eni Rewind acquired 30% of the share capital of ▷ LabAnalysis Environmental Science, a market leader in Italy in the environmental testing sector, founded and led by the Maggi family with a team of over 500 specialists and 14 locations in Italy. The company is part of the LabAnalysis group, founded in 1976 by Prof. Luigino Maggi, also a leader in the field of analysis for the pharmaceutical industry. Through this strategic alliance, the two companies intend to strengthen their integrated range of solutions for the sustainable management of environmental resources, promoting innovation and safeguarding the environment and health. The partnership will harness both companies' innovative technologies, advanced methodologies and expertise to provide tailor-made solutions to new environmental challenges in terms of analyses of water, soil and air quality, waste, and gaseous, noise and electromagnetic emissions. The accuracy and timeliness with which the characteristics of environmental matrices and wastes are determined are fundamental for effectively targeting treatment, decontamination and environmental recovery solutions. With this in mind, the partnership consolidates a long-term collaborative relationship between Eni Rewind and LabAnalysis. It also lays the foundations for developing a range of integrated environmental services, even abroad. As a result of the partnership, Eni Rewind will entrust about 50% of Eni's environmental testing needs to its subsidiary LabAnalysis. At the same time, it will continue to use other qualified suppliers and its own laboratories in Ferrara, Priolo and Assemini to meet the remaining needs.

LabAnalysis
ENVIRONMENTAL SCIENCE

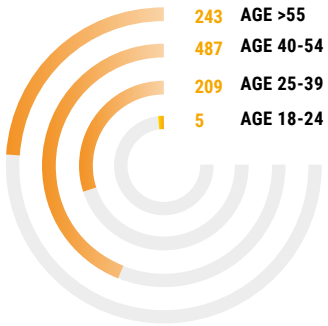
Each of us

The keys to Eni Rewind's success are its people, their skills, and their energy. The women and men who work here do so with passion and a sense of belonging. They are a unique asset and a strategic factor in constantly pursuing operational excellence and undertaking new challenges. The people share the company's values, like the enhancement of human capital and respect for the environment and local communities. The company promotes the creation of a working environment based on relations, where listening is a winning strategy to achieve common goals in an inclusive and discrimination-free context that provides opportunities based on shared merit criteria. Eni Rewind's team consisted of 944 people as at 31st December 2022.

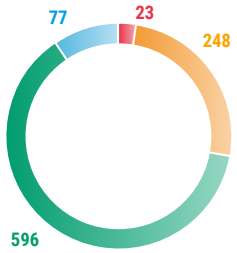
38%
women in engineering/R&D

28%
women in positions of responsibility

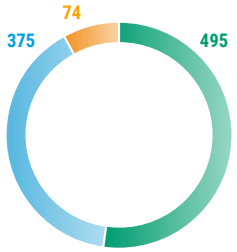
EMPLOYEES BY AGE GROUP IN 2022



EMPLOYEES BY PROFESSIONAL CATEGORY



EMPLOYEES BY QUALIFICATION



ENI REWIND ORGANISATIONAL STRUCTURE

CHAIRMAN
Rita Marino

CHIEF EXECUTIVE OFFICER
Paolo Grossi

- **HR BUSINESS PARTNER** — Angelo Crescenzi
- **PLANNING, ADMINISTRATION & CONTROL** — Marcello Corsaro
- **HEALTH, SAFETY, ENVIRONMENT & QUALITY** — Francesco Manglaviti
- **ENVIRONMENTAL PROCUREMENT** — Filippo Saranga
- **INSTITUTIONAL RELATIONS LIAISON** — Enrica Barbaresi
- **REMEDIATION** — Fabio Troni
- **WATER & WASTE** — Gianluca D'Aquila
- **ENVIRONMENTAL ENGINEERING & MARKET DEVELOPMENT** — Guido Bonfedi

Safety and Environment

To ensure the protection and safeguarding of the health and safety of its employees and suppliers as well as the environment, Eni Rewind deploys measures aimed at minimising the risk factors associated with its various operating contexts, such as organisational models for managing HSE risks, training and skills development, process safety, and the application of new digital technologies to support safety.
The company promotes actions to improve workplace behaviour at all levels, cultivating a health, safety and environmental culture with the tools of Lessons Learned and Golden Rules.

ACCIDENT RATES AND INTERVENTION ACTIONS

As part of preventing and mitigating health and safety risks, Eni Rewind pursues the goal of zero accidents. When accidents occur, thorough investigations are carried out to identify the causes and the most effective corrective actions. In addition, specific Lessons Learned are shared with people to prevent their repetition. In 2022, a TRIR (frequency rate) of 0.94 was stable compared to 2021.

PROCESS SAFETY

In line with the diverse nature of the hazards and risks associated with specific operational activities, process safety is promoted and supported by a widespread culture at all levels of the organisation, including by sharing operating rules, known as Process Safety Fundamentals (PSF). Process incidents are investigated, and outcomes are communicated through Lessons Learned. Every year, the company conducts dedicated audits to monitor the proper management of process safety.

ASSET INTEGRITY

The asset integrity system ensures that assets are managed effectively and efficiently to protect people, the environment and business continuity. The company has surveyed the assets on its sites, grouping them by HSE risk level, to implement those actions necessary to ensure the highest safety standards.

THE CULTURE OF SAFETY AND THE ENVIRONMENT

At Eni Rewind, the HSE culture is central, shared, and involves management, employees and suppliers. Each person is an example and a leader in carrying out their activities safely while respecting the environment. To this end, the company promotes initiatives to raise awareness, develop skills and adopt responsible and proactive behaviour. Examples are the Safety and Environment Pacts for contractors and the Booklet of Environmental Golden Rules promoting virtuous behaviour.


Wafa Field water management optimisation project, Libya

Innovation and digitalisation

Eni Rewind is committed to the process of digital transformation and technological innovation to optimise the efficiency and quality of its environmental interventions, minimise risks for the safety of people and ensure the integrity of assets.

The levers of innovation and digitisation in Eni Rewind:

- research activities: to shorten the gap between the study and development of new solutions and their implementation in the field, in both remediation projects and waste management;
- in-house technology development in cooperation with Eni R&D;
- partnerships with universities: MMIT (USA), Polytechnic University of Milan, Polytechnic University of Turin, Sapienza University of Rome, Ca' Foscari University of Venice, and University of Bologna.

REMEDIATION TECHNOLOGIES BY SITE OF APPLICATION

Matrix	TECHNOLOGIES/SITES	Porto Torres	Crotone	Assemini	Mantova	Priolo	Brindisi	Gela	Manfredonia	Pieve Vergonte	Porto Marghera	Ravenna Ponticelle	Ponte Galeria	Sarroch	Cengio	Ferrara	Service stations
GROUNDWATER	Pump and treat	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Reactive barrier					■											
	Absorbent barrier																■
	Recirculation wells								■								■
	ISCO In situ chemical oxidation																■
	Surfactant Enhanced Remediation																■
	Dual Pump	■			■								■				■
GROUNDWATER + SOIL	Bioremediation	■	■	■			■	■				■		■		■	■
	Multi Phase Extraction	■		■	■	■	■	■			■						■
	Air Sparging	■		■	■				■								■
SOIL	Inertisation	■	■														
	Soil Mixing		■														
	Soil Washing	■								■							
	Collection site	■								■							
	Thermal desorption	■															
	Biopile	■										■	■				
	Phytoremediation		■			■											
	Soil Vapour Extraction	■		■	■		■	■	■	■							■

FOR MORE INFORMATION

▷ See the Vademecum on enirewind.com

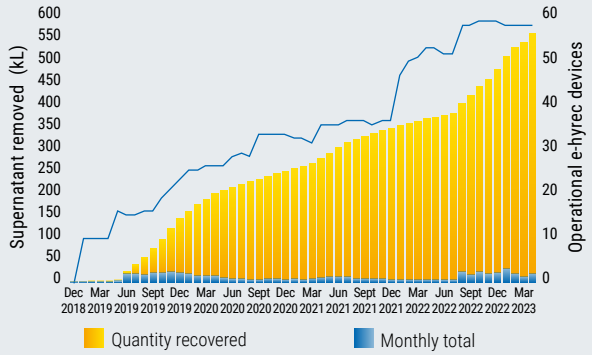
PASSIVE SAMPLING ON POLYETHYLENE (PE) FILM

As part of its collaboration with Eni R&D, the University of Rome Tor Vergata and the Massachusetts Institute of Technology, Eni Rewind has developed and is currently testing at its sites passive sampling, a monitoring methodology that allows for the assessment of both the leaching from soil to groundwater of contaminants and their volatilisation from soil to surface using low-density polyethylene (LDPE) sheets. Due to the adsorption properties of LDPE, pollutants accumulate on the sampler film. This makes it possible to determine more accurately the concentration and distribution, including on the vertical profile, of organic contaminants in sediments and soils and volatile organic compounds in soil gas, thus enabling more targeted environmental interventions.
The data provided by passive samplers can therefore be applied to estimate the actual mobility of contaminants, in addition to traditional characterisation techniques, so as to define the conceptual model of the site more accurately, with specific reference to the volatilisation, leaching and groundwater transport pathways of contaminants. Therefore, it is an innovative and effective tool alternative to traditional monitoring systems and with lower costs.
Field trials are currently underway with ISPRA, ARPA Sicilia, ARPA Veneto and ARPA Emilia-Romagna at the Gela, Porto Marghera and Ferrara sites to validate the methodology, in view of defining dedicated ISPRA guidelines (booklet) by 2023.

E-LIMINA® METHOD

The e-limina® methodology (acronym for eni linking isotopic and microbial investigations aid natural attenuation) is a product of Eni research that combines microbiological, molecular and isotopic monitoring systems to establish the state of biodegradation of contaminants and assess the applicability of biological technologies for site remediation.
The methodology applies to any matrix (aquifers or soils) both during characterisation, to determine natural attenuation effects already present, and during monitoring to verify, with high accuracy in real-time, the state of biodegradation of contaminants and remediation progress. Thanks to the application of high-precision screening and monitoring tools, it is possible to identify the best solutions for the abatement of contamination directly in the environmental matrix, thus reducing the extraction of soil and water resources. To date, the e-limina® method has been applied at the Assemini, Avenza, Cengio, Ferrara and Priolo Gargallo sites in aquifer remediation projects involving chlorinated organic contaminants. Trials for the use of this methodology on hydrocarbons have also been planned.

LNAPL RECOVERED AT ENI SITES



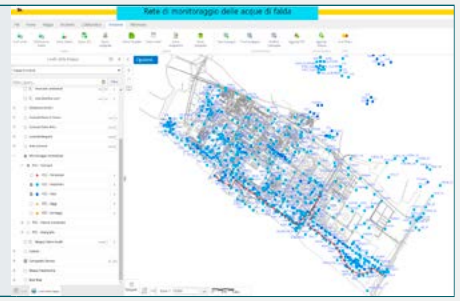
E-HYREC® AND E-LOREC®

These are two automatic devices, developed in collaboration with Eni R&D for the selective removal of hydrocarbons - in the supernatant and subnatant organic phase, respectively - from contaminated groundwater.
The e-hyrec® technology consists of a hydrophobic filter (patented by Eni) capable of separating and extracting from the aquifer only the contaminated part (LNAPL - Light Non-Aqueous Phase Liquid), reducing to virtually zero the quantities of water and waste sent for disposal while significantly decreasing the time needed to extract the supernatant from the aquifer. By 2022, thanks to around 60 units installed at Eni and third-party customer sites, around 500 tonnes of supernatant oil had been recovered, avoiding the disposal of more than 2,000 tonnes of equivalent waste.
The e-lorec® (eni lower-placed hydrocarbon recovery) technology, which is currently being tested, involves the removal of DNAPL (Dense Non-Aqueous Phase Liquid) from groundwater. During 2022, field validation tests were completed at the Cengio, Porto Torres and Roma Ostiense sites.

Within the framework of the Memorandum of Understanding (MoU) with the National Oil and Gas Authority (NOGA) of the Kingdom of Bahrain, aimed at identifying and promoting joint initiatives for the management, recovery and valorisation of water, soil and industrial waste in the country, field trials started with the installation of an e-hyrec® device at the Bapco refinery.

ENVIRONMENTAL AND ASSET DATA MANAGEMENT

In Eni Rewind, environmental and asset data are managed using the new ELVIS system for the ELaboration and VISualisation of environmental surveys and asset data. It is a webGIS platform, designed and owned by the company, for the standardised collection and storage of data from environmental surveys and monitoring at Eni Rewind sites. ELVIS allows the consultation, export and analysis of the information in the system, as well as its sharing with institutional and control bodies.



DIGITISATION AND AUTOMATION OF WATER TREATMENT PLANTS

The digitisation and automation of water treatment plants and barriers continues with the aim of increasing competitiveness and business sustainability, work quality and process safety.
The 24/7 operational control room in San Donato Milanese remotely monitors operational sites and groundwater treatment plants.

GTP control room, San Donato Milanese

Remediation

~ 700,000 h/year
of environmental engineering

30,000 h/year
of research and development

~ €500 million
for remediation interventions

Remediation activities create regeneration and development opportunities for the territories. To enable these opportunities, it is essential to plan the future reuse of the areas at the very early stages of the remediation process, in agreement with local institutions and stakeholders. Today, thanks to the expertise gained while managing over 100 sites with very different industrial backgrounds, Eni Rewind can offer innovative and eco-compatible solutions to maximise the effectiveness and efficiency of its environmental interventions, in compliance with current regulations. Drawing on integrated, multidisciplinary teams, our operational approach is geared towards applying on-site and in-situ technologies that avoid excavation and disposal, reducing waste and the carbon footprint of activities.


Porto Torres - thermal desorption plant

PORTO TORRES

The Nuraghe Project is an example of sustainable "zero km" land remediation, carried out in agreement with the authorities and the territory. The project covers an area of about 30 hectares and it provides for the removal and treatment of about 800,000 m^3 of contaminated materials, mainly from the former Minciaredda landfill, through a multifunctional platform equipped with all types of systems for soil decontamination (screening, biological treatment, soil washing, thermal desorption and inertisation); a unique solution in Italy in terms of innovation and sustainability. The platform, in operation since December 2021, can process up to about 1,000 m^3 of soil per day. After treatment, the soil that complies with the remediation objectives is reused to backfill the excavations from which it derives. At the same time, unsuitable soil is placed in a special permanent repository within the site. Contaminated soils are therefore fully managed, reused or reallocated on site, maximising the recovery of materials while minimising the environmental and economic impacts of handling waste, that sometimes must be sent even thousands of kilometres away from the site.
In 2022, approximately 100,000 m^3 of soil and materials were removed and treated, and remediation was completed for the first of the five areas into which the intervention on the former landfill site is divided.
After remediation (post-2025), in line with regional guidelines, the plant may be authorised to treat waste from the Region.


Ravenna Ponticelle before


Ravenna Ponticelle after (rendering)

RAVENNA

The Ponticelle project in Ravenna is an initiative for the productive redevelopment of a disused industrial area on the border of the petrochemical plant which, following environmental interventions, will become a hub for sustainable remediation, waste valorisation and green energy production.
The initiative represents a concrete example of how remediation can bring added value to the territories and their communities thanks to the synergy between important realities such as Eni and Hera, without resorting to the consumption of new land, but rather by reusing and enhancing that which has already been anthropised.
Eni Rewind, owner of the former industrial area, has planned and completed the permanent safety measures (MISP) with capping implemented on 18 of the total 26 hectares. The environmental intervention, certified by the regional environmental protection authority in August 2021, is preliminary to the area's development plan, which envisages the application of innovative, sustainable and recovery technologies, as well as urbanisation works.
The Ponticelle Project consists of:

Photovoltaic plant

The plant, authorised in January 2021, will be developed by Eni New Energy, a Plenitude company, in a portion of the area interested by permanent safety measures (11 hectares) and will be equipped with a solar tracking system (estimated capacity of about 5.6 MW).

Soil Bio-Recovery Platform

The plant, with a treatment capacity of 80,000 tonnes per year, will be dedicated to the aerobic biodegradation of hydrocarbon-contaminated soils, primarily from the remediation of service stations, using indigenous microorganisms. The aim is to return the post-treatment land to the service stations themselves, according to a circular scheme of recovery and reuse. The platform, which will cover 3 hectares, also includes a bio-laboratory capable of conducting preventive analytical checks on the conformity of waste entering the plant and periodic monitoring surveys of bioremediation processes.

Multifunctional platform for the management of industrial waste

The plant, which will occupy a portion of the area equal to about 3 hectares, will be developed by HEA, a joint venture between Eni Rewind and Herambiente, and will allow to minimise waste disposal, favouring energy and material recovery. The plant, which will replace the current HASI (Herambiente Servizi Industriali) platform, will manage up to 60,000 tonnes per year of special waste from environmental and production activities, with particular attention to those in the area, in line with the European directives of the Circular Economy Package. In June 2023, a joint PAUR (Regional Single Authorising Provision) was obtained for the construction of the two platforms.


Gela - ISAF special purpose landfill

GELA

Gela is a virtuous example of environmental remediation, technological innovation and regeneration aimed at creating development opportunities for the area, in line with the 2014 and 2019 Memoranda of Understanding. At the site, Eni Rewind applied various remediation technologies, progressively adapting to the complexity of the interventions, favouring in situ and on-site solutions that minimise the environmental footprint of operations. Examples are the application of Multi Phase Extraction, Soil Vapour Extraction and thermal desorption technologies on soils and Groundwater Circulation Wells to accelerate aquifer remediation. The company has also applied in the field technologies developed in Eni's research laboratories: this is the case with the e-hyrec device, adopted on a large scale for the selective removal of hydrocarbons from the surface of the aquifer. Compared to traditional systems, its application ensures faster, more effective and efficient groundwater remediation, even in terms of protecting and preserving the water resource. Between 2019 and 2022, the company recovered around 336,000 litres of supernatant oil alone in significantly less time than conventional technologies, avoiding sending over 1,000 tonnes of water for disposal. Another proprietary technology tested at Gela is passive sampling on low-density polyethylene sheets, which is useful to determine the true distribution of contaminants in the sediment and volatile organic compounds in soil gas.

DECOMMISSIONING

In many cases, the environmental remediation process requires the decommissioning of production facilities, already in disuse or at end-of-life, intended as the remediation of circuits and plant equipment, the subsequent demolition of structures and the management of the resulting waste. These interventions are of great importance, not only due to their complexity in terms of management and engineering, but also because they are preparatory to area regeneration projects. In this regard, Eni Rewind possesses unique know-how, comprising technical skills and knowledge gained in the field at various sites. Dedicated teams design and execute this type of interventions that are carried out in our own areas or those of other Eni businesses, or even for third-party customers. With a strong commitment to reducing its environmental footprint, the company ensures the recovery and reuse of materials from demolition activities: in 2022, approximately 12,000 tonnes of scrap metal, mainly iron and steel, were sent for recovery, in order to find a second life in the civil and industrial sectors.


Avenza – warehouse demolition

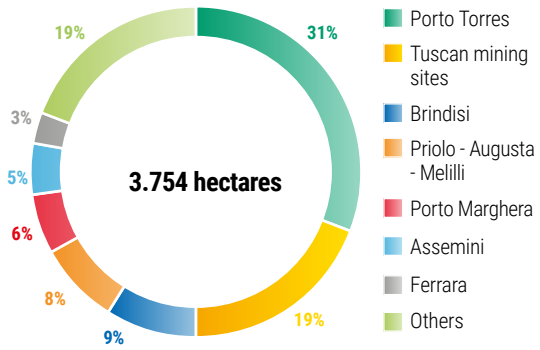
DECOMMISSIONING OF DISUSED PLANTS AT GELA REFINERY

At the Gela site, Eni Rewind is managing the decommissioning project for the disused plants formerly part of the traditional refining process, as provided for in the Memorandum of Understanding signed in 2019 and in line with Eni's energy transition strategy. In the two-year period of 2021-22, the SNOX chimney, the G300 boiler, the Coking 1 and 2 drill structures, and the D-D1 torch were fully dismantled. For the intervention, which has already changed the skyline of the Gela industrial area, top-down disassembly was necessary to avoid interference with other plant operations. By 2023, the company will complete the ongoing demolition of the G100 and G200 boilers and start the demolition of the Quadricanne chimney and Snox plant.

REMEDIATION AND REDEVELOPMENT OF INDUSTRIAL AREAS

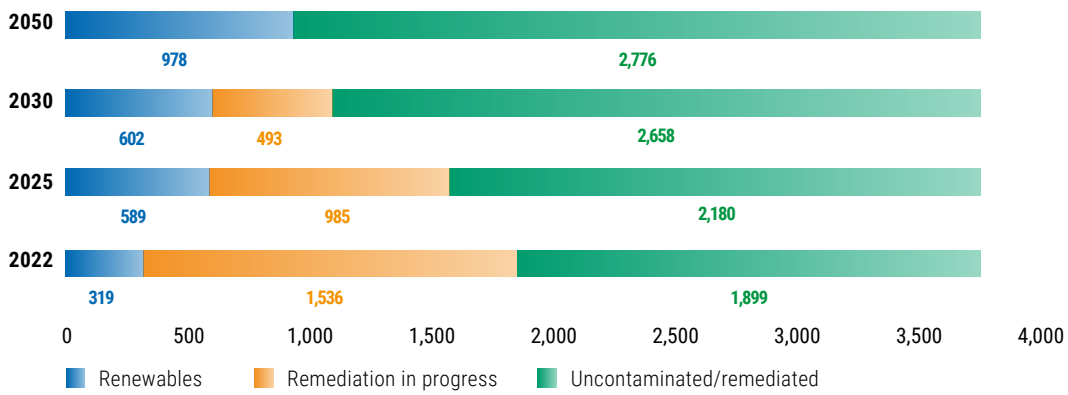
Soil is a limited resource as it is not reproducible. Industrial sites that are disused or no longer usable are as critical environmentally as they are economically and socially, if not regenerated. Eni Rewind's challenge is to give them a new lease of life through remediation projects designed with reuse and productive redevelopment in mind. The company's own areas are located in already highly anthropised and serviced industrial districts that, once remediated, lend themselves to the development of new initiatives, such as the construction of plants for the production of energy from renewable sources or for the treatment and recycling of waste while avoiding the consumption of natural or agricultural land.

TOTAL ENI REWIND AREAS




Site of National Priority at Porto Marghera

STATUS OF LAND OWNED BY ENI REWIND (hectares)



60%
owned areas available for new projects in 2022

~85%
ares available for new development initiatives by 2030

ENI REWIND'S CONTRIBUTION TO THE DEVELOPMENT OF RENEWABLES

54.7 MW
total installed photovoltaic capacity in 2022 on 91 ha

11.8 MW
total authorised capacity in 2022 on 27.3 ha

38.6 MW
total authorised capacity on 147.5 ha

The development of renewable energy is central to Eni's strategy of progressive decarbonisation. The consolidated synergy between Eni Rewind and Eni New Energy, a Plenitude company dedicated to developing renewable energy generation projects, is a concrete example of a circular economy. Proprietary areas that have been decommissioned and are no longer productive are used to house renewable electricity production plants, after the environmental intervention by Eni Rewind. The energy produced is used to meet the energy needs of Eni's industrial assets, and the remaining part is fed into the grid. Of particular significance in this path is the of the photovoltaic plants (now in operation) at the Gela site, starting in 2012 with a 5 MW capacity followed in 2018 by a second 1 MW plant; at the Assemini site in 2018, with a 23 MW capacity and an adjoining storage plant; and at the Porto Torres site in 2020, with a 31 MW capacity. In addition, the construction of plants beginning in summer 2023 has already been authorised for Porto Marghera and Ravenna. To make a further contribution to this collaboration between Group companies, around 1,000 hectares of Eni Rewind property have been identified as suitable, once remediation interventions have been completed, for the installation of photovoltaic and wind power plants.


Assemini - 23 MW ENE photovoltaic plant

Water Management

Eni Rewind carries out aquifer remediation across the country through an integrated system consisting of hydraulic barriers, which prevent contaminants from migrating off-site, and groundwater treatment plants (GTP).
For each site, Eni Rewind implements dedicated solutions, starting with the study of the geology of the aquifer through three-dimensional modelling by a team of in-house specialists. This approach is based on using numerical models to interpret, represent and predict groundwater flow to identify the most appropriate remediation techniques and optimise the flow rates of the barriers. This results in greater effectiveness in removing contaminants and protecting the water table, even from natural phenomena such as salt intrusion, typical of coastal areas.
In 2022, the company treated approximately 35 million cubic metres of water through the 43 plants currently managed, recovering approximately 10 million cubic metres of water for industrial purposes within sites and for environmental uses, like reinjection into the aquifer or for the protection of surface water bodies. At the Priolo, Gela, Porto Torres, Assemini and Brindisi sites, the search for solutions for sustainable and efficient management of water resources has led to the installation and activation of special sections in GTP to produce demineralised water for reuse in the plants. In other cases, for example in Manfredonia, the treated water is reinjected into the aquifer to restore its natural conditions and simultaneously avoid the risk of salt wedge intrusion. Moreover, thanks to its experience, Eni Rewind operates industrial wastewater treatment plants (Manfredonia, Gela, and Assemini) as well as municipal ones (Gela and Cengio).

43 water treatment plants

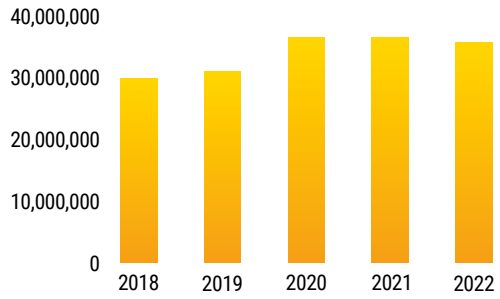
1,400 extraction wells

+ 5,200 monitoring wells

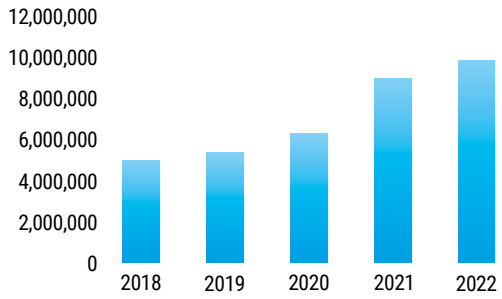
~ 35 million m³ treated water, of which **25 million** returned to the environment

~ 10 million m³ water recovered for industrial and environmental purposes

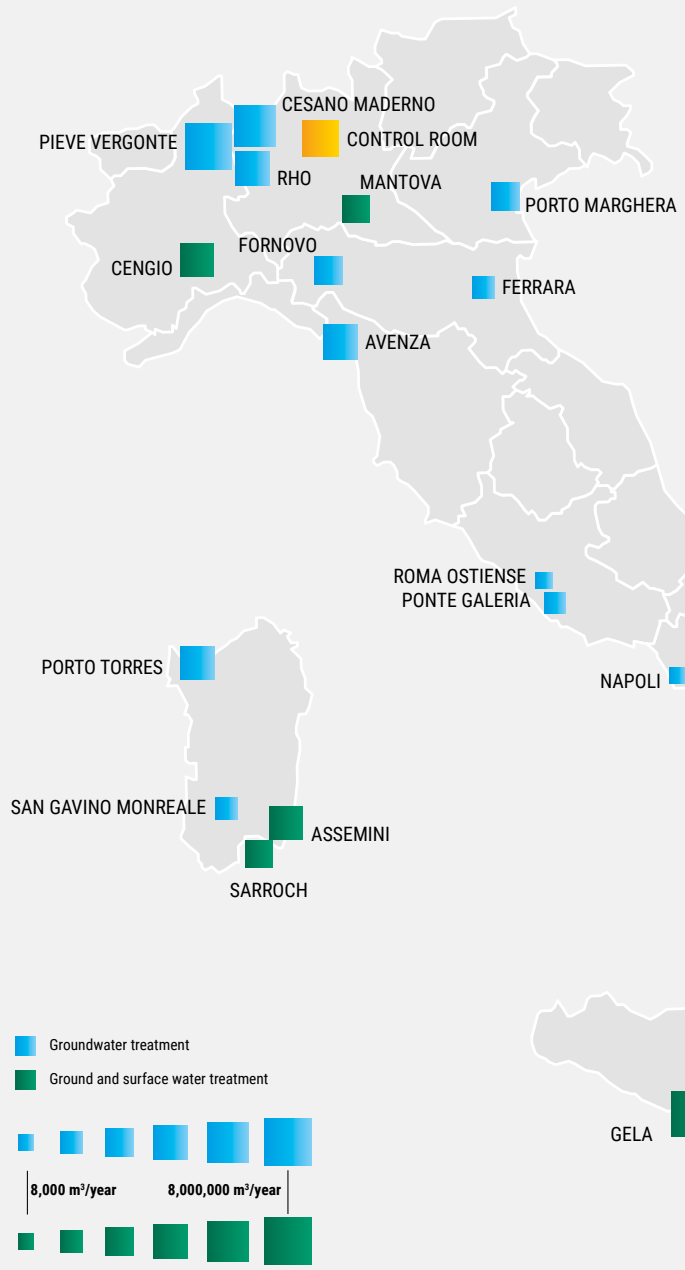
WATER TREATED (m^3)



WATER RECOVERED (m^3)



WATER TREATMENT SYSTEMS (2022 volumes)



ASSET INTEGRITY AND PROCESS OPTIMISATION

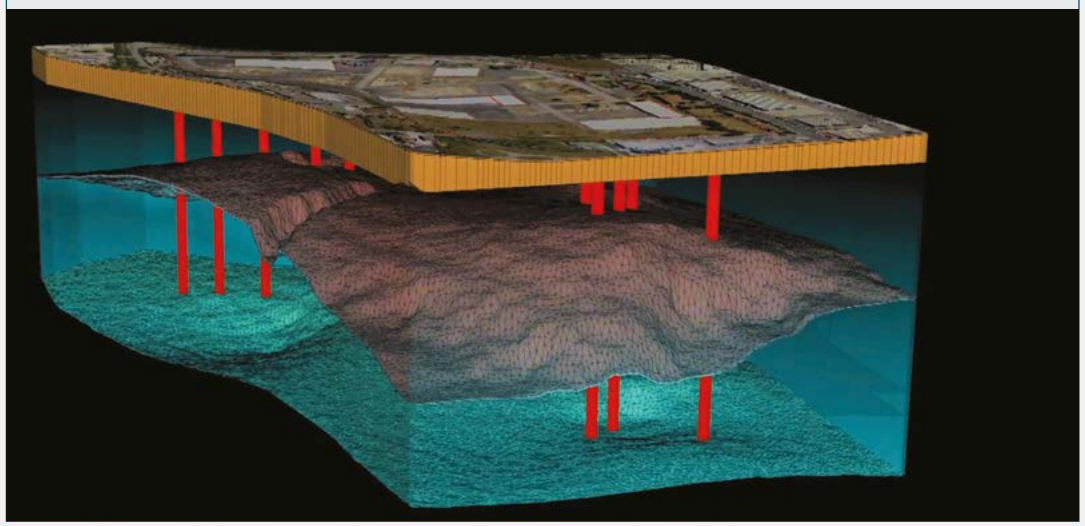
Eni Rewind operates 43 groundwater treatment plants (GTP), 26 of which are owned. All assets are compliant with Best Available Technology (BAT) and Best Available Technology Not Entailing Excessive Cost (BATNEEC), automated and digitalised to increase business competitiveness and sustainability, work quality and process safety. The company remotely monitors the plants at the operating sites through a 24-hour operational control room in San Donato Milanese. Eni Rewind also promotes research into new technical solutions and continuous plant renewal to optimise water management processes. A case in point is the Priolo site, where the new Dynamic Control System being implemented, borrowed from refining experience, allows real-time intervention in the control processes of the GTP and therefore minimises the variance of operating parameters such as pressure, flow rate and pH. Adopting the system allows the plant to operate under ideal conditions, limiting the environmental footprint in terms of reduced energy consumption, reagents and waste produced. At the same time, there is an increase in the osmotised water made available for industrial use within the site - an example of best practice in water management optimisation that Eni Rewind intends to extend to other sites.

HYDROGEOLOGICAL MODELLING: AN EXAMPLE APPLICATION FROM THE AVENZA SITE

In Avenza, Eni Rewind has built a hydraulic barrier consisting of 33 pumping wells. In line with the operational approach applied at those sites involved in aquifer remediation where it operates, the company implemented a numerical groundwater flow model that allows to optimise the flow rate of barrier wells, adjusting it to seasonal water-level fluctuations. The application of the methodology, which enhances the hydraulic seal of the system and the containment of contamination, was divided into three phases:

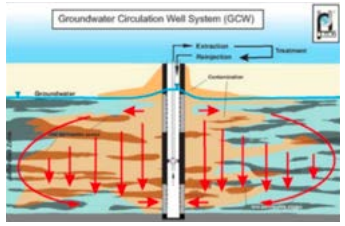
- construction of a geological model to represent characteristics and properties of the subsoil and aquifer;
- development of flow modelling that reproduces groundwater movement in terms of flow, velocity and direction;
- simulation of the transport and pathway of contaminants.

The first annual report showed a reduction in water withdrawals of 30%, or about 500,000 m^3 of water.



RECIRCULATION WELLS

Recirculation wells are a form of groundwater remediation technology that consists of a closed circuit in which water is extracted, treated and reinjected into the ground at a lower concentration than that at the time of extraction and at a different depth in the same well. Extraction and reinjection create a circulation cell around the well that acts vertically and horizontally, promoting the mobilisation of contaminants in the finer fractions as well. The technology thus allows for sustainable water treatment that, thanks to reinjection into the aquifer, does not deplete it and reduces waste production. In addition, there is no rebound effect when the system is stopped once the clean-up targets have been reached. Eni Rewind, in collaboration with the Sapienza University of Rome and IEG, is applying the technology for arsenic removal at the Manfredonia and Gela sites and is evaluating its use at other sites in agreement with the authorities.

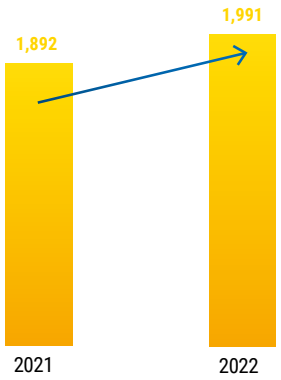



Pieve Vergonte - Europe's largest groundwater treatment plant (1,200 m^3/h)

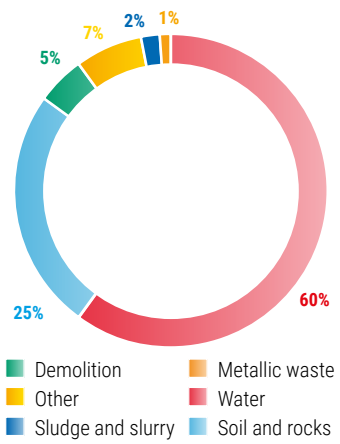
Waste Management

Eni Rewind, as Eni's global contractor, manages the waste cycle produced by the Group's industrial activities or coming from environmental remediation and decommissioning. It does so while guaranteeing a daily consistent control of the entire supply chain, in compliance with current regulations. In line with industry best practices, the company adopts technological and logistical solutions to increase the proportion of waste sent for recovery as an alternative to other disposal choices and to minimise the distance travelled between the production site and the delivery facilities, with a consequent reduction in costs and effects on the environment. In addition, it ensures the environmental sustainability of remediation interventions by using established in situ/on-site technologies, such as biopiles and soil washing, maximising soil recovery. In 2022, about 2 million tonnes of waste were handled, and about 74% of the recoverable waste was sent for recovery.

WASTE MANAGED (Kton)



TYPE OF WASTE MANAGED



RECOVERED WASTE

2021	2022	Δ vs. '21	WASTE RECOVERED	WASTE FROM DEMOLITION	METALLIC WASTE	SOIL AND ROCKS	SLUDGE
73%	74%	1%	% Recovered waste	80%	100%	72%	100%

~ 2 million tonnes
of waste managed, about **80%** of which for Eni

~ 74%
recovered vs. recoverable waste

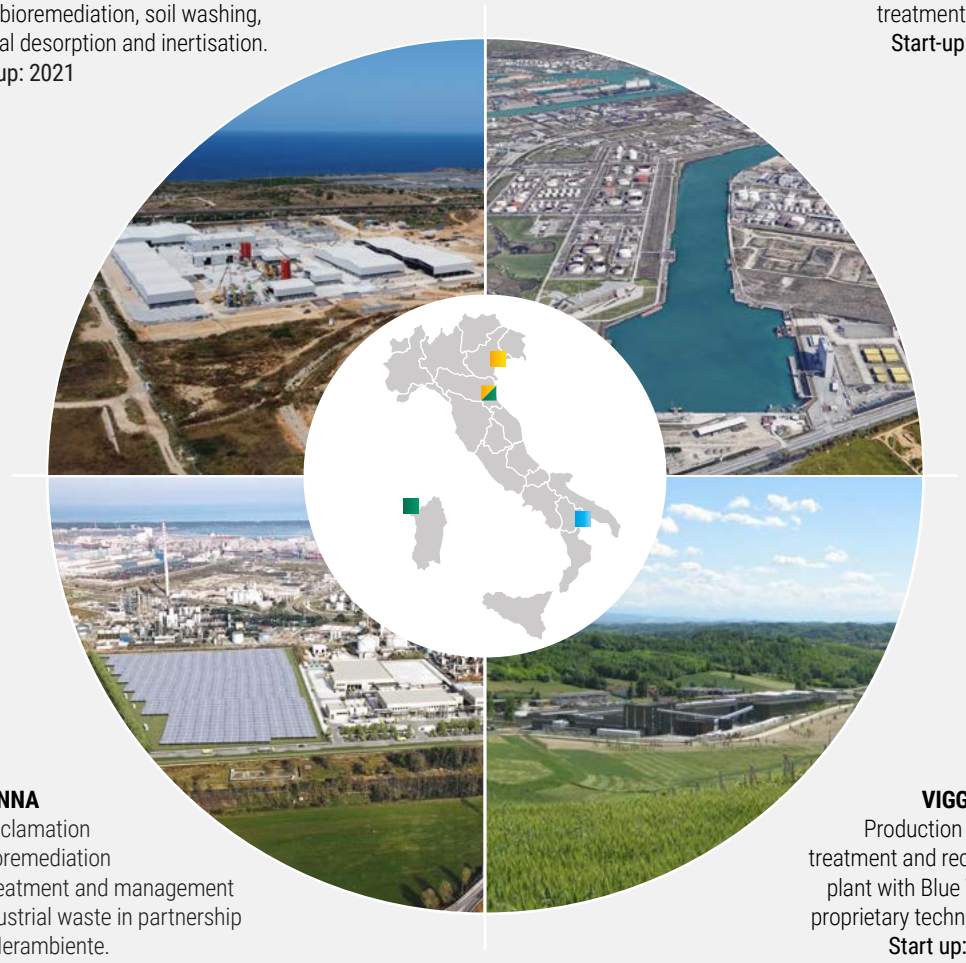
12%
hazardous waste vs. total managed

MAIN NEW PLANTS

Eni Rewind is committed to realising new waste treatment and recovery plants in areas which have already undergone remediation, also by leveraging on cooperation agreements with leading Italian companies in the sector. In a market characterised by structural supply shortages, the construction of new facilities will optimise waste management in terms of continuity and quality of service, logistical costs, and environmental and economic impacts.

PORTO TORRES
Soil treatment platform using bioremediation, soil washing, thermal desorption and inertisation.
Start-up: 2021

PORTO MARGHERA
Municipal sludge treatment plant.
Start-up: 2026



RAVENNA
Soil reclamation via bioremediation
Pre-treatment and management of industrial waste in partnership with Herambiente.
Start-up: 2025

VIGGIANO
Production water treatment and recovery plant with Blue Water proprietary technology.
Start up: 2025

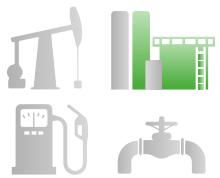
Waste management Soil management Water management

Eni Rewind in the Eni value chain

BUSINESS AREAS

REMEDIATION

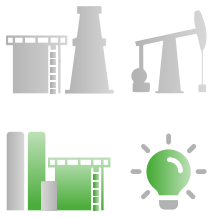
Remediation of contaminated areas to enable new opportunities for sustainable development



- Development and application of remediation technologies
- Management of decommissioning and soil and aquifer remediation activities:
  - at decommissioned and operational industrial sites
  - at service stations
  - at contaminated areas (e.g. due to pipeline break-ins)
- Planning of remediation interventions for land repurposing and future reuse

WATER AND WASTE

Water and waste treatment to maximise recovery and reuse



- Chemical/physical/biological treatment of groundwater, surface and production water for industrial or environmental reuse, contributing to the reduction of water withdrawals in nature
- Management of the industrial and remediation waste cycle, from production to final disposal, maximising recovery and minimising waste
- Technology and skills development in partnership with main players

DEVELOPMENT

New business development to support the energy transition

- Realisation of new waste treatment and recovery plants in synergy with the industrial reconversion of Eni sites
- Use of remediated areas for the development, by Eni New Energy, of plants to produce energy from renewable sources
- Development of third party (non-Eni) clientele portfolio, leveraging on the skills gained in the field of remediation and waste management

Methodological note

The Eni Rewind 2022 Sustainability Report and the data reported therein are part of Eni's sustainability reporting, which includes the ▷ Consolidated Non-Financial Statement (NFD 2022) and the ▷ Eni for 2022 Sustainability Report, subject to limited review by the appointed independent company.

Unless otherwise specified, performance indicator data refer to the financial year ending 31 December 2022. Some data from the previous two years/four years are also given for comparison purposes. The activities and projects included in the document are reported, where relevant, up to the end of the first half of the year of publication to provide the reader with the most up-to-date information possible.

The reporting system is completed by the information provided on the ▷ Eni and ▷ Eni Rewind websites, to which reference should be made for more in-depth information on the topics covered in this report.

Please consult the ▷ online glossary for a guide explaining simply and succinctly the words, concepts and acronyms in the Eni Rewind for 2022 Report.

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remediation & waste into development