Sustainability Report
2022

Highlights 2022

We have published our corporate
Sustainability Plan for 2023-2025

4.51
LTIFR

Lost time injury frequency rate (LTIFR) safety performance index -> -18% vs baseline 2021

35.17
tCO_{2eq} / Revenue in millions of euros

Scope 1 and 2 emissions -> -48% vs baseline 2021

16.6%
Women in managerial roles

stable vs baseline 2021

1.25
Ml / Revenue in millions of euros

Water withdrawals -> -15% vs baseline 2021

94%
of expenditure for supplies
earmarked for local suppliers

91%
of non-hazardous waste
reused or **recycled**

860
million euros

economic value generated and distributed

89
GWh produced by our photovoltaic plants

92%
of work portfolio in **projects eligible** for '**EU Taxonomy for Sustainable Activities**' status

Letter to stakeholders

In 2022 we emerged from a global **pandemic**, making Covid now endemic. This has returned us to a long-awaited normality of life and work. Many countries that were difficult to enter or leave have now reopened their borders, allowing our people to be reunited with their loved ones. The context still remains complicated due to exogenous factors, such as the **war in Ukraine**, with its huge humanitarian, economic and social costs, and **climate change**, which continues to advance, as evidenced by ever more frequent extreme weather events.

In this context, it is of critical necessity that we implement **measures to improve efficiency** in our use of **resources** and **reduce the impacts** associated with production activities.

92% of the activities in our **works portfolio** have the potential to contribute to climate change mitigation and adaptation, with **66%** of the portfolio dedicated to **mobility** projects intended to significantly reduce greenhouse gas emissions and **16%** to projects that will improve access to **water infrastructure**. We produce electricity from photovoltaics, contributing to the transition towards decarbonisation.

As a company that executes these works, we are aware of the importance of commitment by actively contributing to the **ecological transition** towards increased **social responsibility**.

In 2022, we added momentum to the process of consolidating our company strategy by introducing the **2023-2025 Sustainability Plan**, which refreshes and renews our commitments by dividing our corporate mission into three pillars: **Environment**, **People** and **Business Conduct**. The Plan strengthens the culture of innovation, sustainability, and governance as essential factors enabling us to attain our goals.

This Sustainability Report represents the first year of measuring our results against the pre-set targets.

In 2022, the **economic value** directly **generated** by our activities, in other words the total wealth created for stakeholders, amounted to **910.33 million euros**, of which **94%** was **distributed** to employees, lenders, suppliers and the public administration.

We recorded a **24% decrease in greenhouse gas emissions** associated with energy consumption, compared to 2021, and managed to **reuse or recycle 91% of our waste**.

The **health** and **safety** of our workers remain top priorities. In 2022 we renewed our commitment to investing in the **shared culture** of safety on the worksites through raising awareness, training, and continuous monitoring of results. Our Injury Frequency Rate (LTIFR) dropped by **18%** compared to the previous year.

In 2022 we contributed to creating value in the local areas where we operate, with **98% of our personnel hired locally** and **94%** of **our expenditure** on supply going to **local sources**.

Ghella has proved itself to be a **trustworthy partner** for **financial institutions**, which in turn undertake paths to sustainability with use of a rigorous selection process to ensure access to loans based on specific qualifications. This resulted in our securing two **green loans** in 2022, totalling 75 million euros.

This Sustainability Report represents the excellent results we have achieved with respect to our objectives, as we align our ambitions ever more closely with the expectations of our **stakeholders**, in a continuous process of virtuous improvement.

It is our duty to leave a better world for future generations.
Let's do it together.

Enrico Ghella
President and CEO

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New Zealand, Auckland, Central Interceptor
Photo by Giulia Parlato from the photographic project “Nuove Avventure Sotterranee”

Our Company


Greece, Athens, Metro Line 3
Photo by Marina Caneve

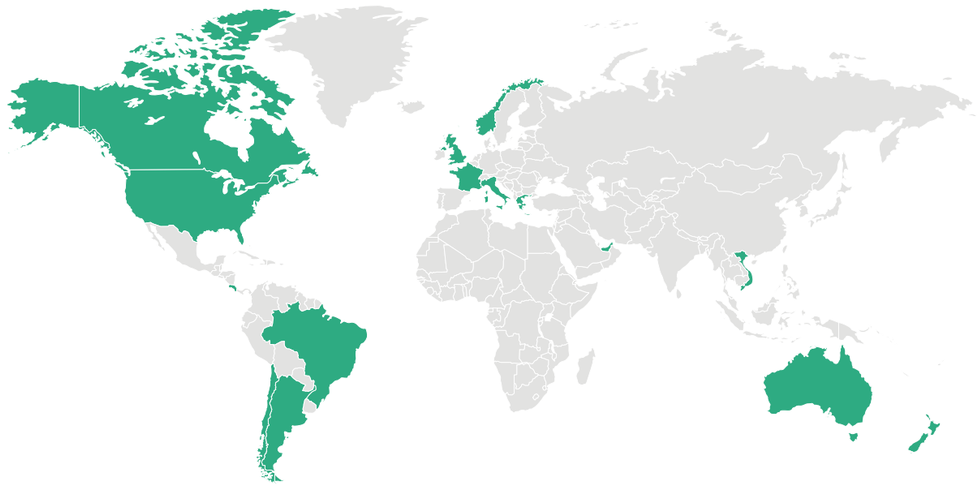
Company Profile

*Data as of 30 May 2023

COUNTRIES
15

LANGUAGES
24

ONGOING PROJECTS
22



ROADS AND HIGHWAYS

16
Highways

>300
km of roads

RAILWAYS AND METRO

39
Railways

18
Metro Lines

WATER

30
Hydraulic Works
* The hydroelectric plants are included in the total hydraulic works figure

10
Hydroelectric Works

With a history of more than 150 years, our spirit of **exploration** has been firmly established since the company's foundation in 1894. Today we are a **global reality of primary importance** in the **construction of large public projects**.

Specialized in underground excavation, **spanning 5 generations**, we have successfully constructed over 180 tunnels and connected more than 1,000 kilometers of **subways**, **railways**, **highways**, and **hydraulic projects**.

Our commitment centres around on a business model focused on **leaving a better world for future generations**.

As active participants in the **renewable energy** sector, we have successfully executed **strategic projects** in **photovoltaic** and **hydroelectric** energy across Italy, Central America, and the Middle East.

At the core of our business philosophy lies the well-being of society. Our dedication focuses on improving communication, promoting freedom of movement, minimizing environmental impact, and optimizing natural resources.

We strive for excellence in construction, adhering to the **highest standards of quality**, **innovation**, and **sustainability**. To achieve this, we employ advanced **technologies** and **state-of-the-art construction methods** while continuously investing in **staff training**. Ensuring workplace safety and environmental preservation are our top priorities. We are committed to promoting economic growth and fostering social development in all the territories in which we operate. With a rich heritage dating back to 1867, we continue to grow with a renewed spirit of exploration, **envisioning new possibilities** and **fostering progress**. We are proud to be a diverse community of **over 3,600 individuals**, **speaking 24 languages**, **living in 15 countries**, and operating **across 4 continents**, primarily in Oceania, Europe, the Americas, and the Far East.

PHOTOVOLTAIC

1.125
MW in operation

PRODUCTION (km excavated as of 31/12/2022)

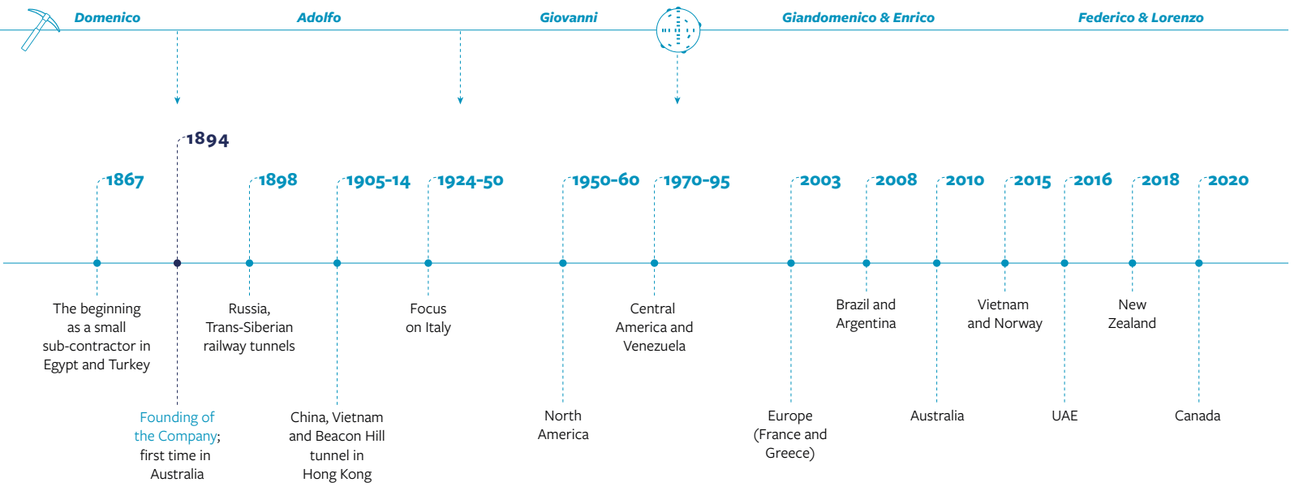
249 **km** with TBM

245 **km** with traditional methods

17 **km** with pipe jacking

Italy, Ferrandina-Matera, Calabro-Lucane Railways
Photo from the archive - 1927

History and Tradition



Since our inception over 125 years ago, we have borne witness to 5 generations of modern history. Our rich know-how and skills have been passed down, along with a legacy of technical ingenuity and an unwavering spirit of enquiry. By triumphing over formidable challenges, each generation has left a mark on its respective era.

RELATED LINK

Ghella.com
Story

China, Hong Kong, Beacon Hill Tunnel
Photo from the archive - 1907

Vision, Mission and Values

VISION **Leave a better world for future generations**

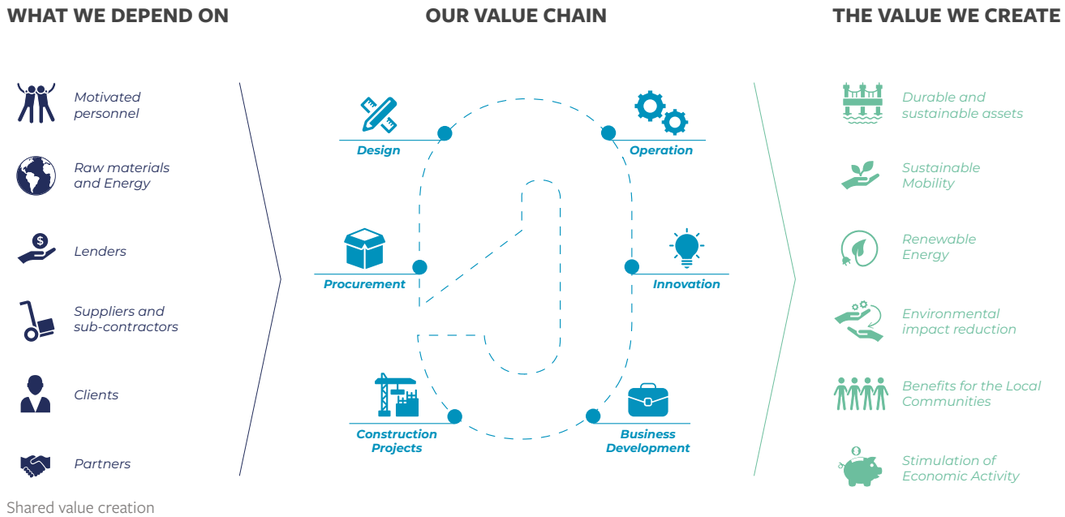
MISSION **Build excellence in a sustainable and innovative way**

Our sustainability journey starts with a **Vision** of a future that we want to build by sharing business decisions: a world that will be better for **generations to come**. We are aware that this vision can only be brought to fruition with the collective action of multiple stakeholders: governments, organisations, companies, and civil society itself. This is why we have kept our company **Mission**, which is to uphold our history as 'builders of **excellence**', on a path of **innovation** and **sustainability**, at the forefront of our daily activity, using a well-defined set of **values** that guide the conduct of us all.

The company's vision and mission both reference sustainability because it is our intention to **integrate** its principles into all aspects of doing business: from the **selection** of focused projects for us to work on through to the methods we will use to **carry out** the work, the strategic and managerial processes and the operational ones at our worksites.

Creating shared value

As a contractor, our role is to ensure **quality** of execution, through technical **excellence** and **innovation**, as well as to reduce the environmental and social impact of the construction phase, all while generating value for the broader area and local communities. Our value chain is the dynamic hub of a virtuous circle of mutual and positive collaboration in which necessary resources such as personnel, raw materials or supplies contribute, through our processes, to creating **shared value** for the company and for society. The creation of **economic value** for the company drives **social well-being**, through the construction of durable infrastructures and the promotion of sustainable mobility, but also personnel training and the positive effects we are able to generate indirectly related to the social and environmental performance of the supply chain. Activities that engage the communities, the professional growth of the local labour force, and cross-fertilization of technological skills among the various countries in which we operate all help our operations leave a lasting legacy that remains beyond the project's construction phase.



Shared value creation

Stakeholder engagement and the materiality matrix

In 2022 we updated the material topics that had been previously identified in 2019. The 2022 material topics are those that have been the focus of our attention for this Sustainability Report and which we have prioritised in our renewed corporate strategy.

The update was intended not only to keep up with changes in reporting standards (the GRI and the ones being made to the ESRS), but also to obtain a set of material topics taking account of external and internal contextual developments, with an eye to defining the new three-year Sustainability Plan.

In applying this so-called double materiality principle, we have integrated our past approach, which only took into account our impacts on the external environment (impact materiality), with an assessment of the economic impacts that sustainability issues can have on the company (financial materiality).

01. →
Context analysis

We **benchmarked** with peers, competitors and clients, analysing the reporting standards to plot changes in the reference market.

02. →
Identification of potentially relevant matters

The analysis we performed was integrated with a review of internal policies and documents. A **list of potentially relevant and priority issues** for Ghella was then drawn up.

03. →
Engagement of stakeholders

A **short questionnaire** was handed to a sample of external stakeholders and to all Ghella employees and managers. The questionnaire was sent out to about 600 stakeholders, and around 40% of them completed it.

04.
Prioritization of issues

The responses received were analysed, and a weight was assigned to each category of stakeholder based on the relevance of the relationship and their knowledge of Ghella's business activity.

Map of Ghella's key stakeholders

THE RESULTS

The outcome of this process was a list of 15 material topics:

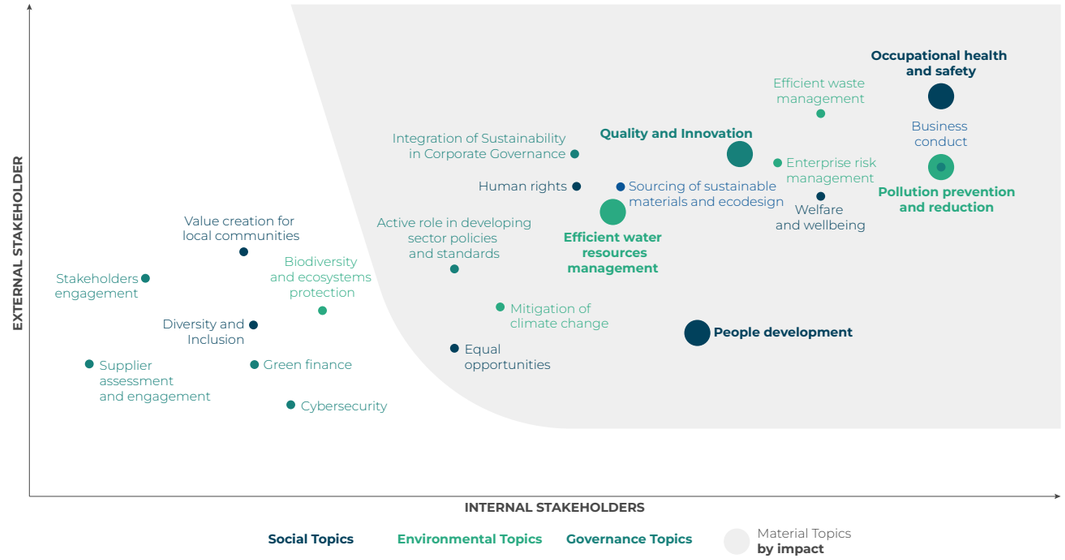
- Occupational health and safety
- Efficient waste management
- Business conduct
- **Prevention and reduction of pollution**
- Quality and innovation
- **Welfare and wellbeing**
- **Enterprise risk management**
- Integration of sustainability into corporate governance
- Sourcing of sustainable materials and eco-design
- Human rights
- Efficient management of water resources
- People development
- **Active role in developing sector policies and standards**
- Mitigation of climate change
- Equal opportunity

The **bold** topics are completely new additions to the previous assessment.

The topics perceived by our stakeholders as relevant but no longer a matter of priority, and therefore left out of the analysis, are: "Non-discrimination", "Assessment of suppliers" and "Assessment of externalities".

The **2022 materiality** matrix shows the material topics by impact, in line with the perspective of internal and external stakeholders. The financial materiality analysis, for its part, pinpointed the following issues:

- Occupational health and safety
- Efficient management of water resources
- Quality and innovation
- Personnel development
- Prevention and reduction of pollution



Materiality Matrix 2022. The 5 topics most relevant to financial impact are bolded and have larger markers.

The "Occupational Health and Safety" topic turned out to be the most relevant, not only in terms of its impact but also for its financial implications, in line with prior consultation and the ESG Strategy, and is therefore an absolute priority in all aspects of our business activities.

Greece, Athens, Metro Line 3
Photo by Marina Caneve

Our objectives

In 2022, we continued to focus our efforts on the process of consolidating our corporate strategy, by introducing the **2023-2025 Sustainability Plan**, which renews the commitments undertaken in the previous plan and includes the **quantitative targets** defined in 2021. The new plan splits the corporate mission into 3 pillars, which in turn are divided into thematic areas. Levers for achieving the relative targets and objectives have been identified in each area.

PLANET

Climate Change
Target **2030**
-25% Scope 1 and 2 emissions
Target **2050**
Carbon neutral

Circular Economy
Target **2025**
Maximise the use of recycled materials and the reuse of excavated earth

Environmental Protection
Target **2025**
Include measurable biodiversity impact indicators in construction decisions
Target **2030**
-15% water withdrawals

PEOPLE

Occupational Health and Safety
Target **2030**
-30% LTIFR index
Target **2050**
Zero Harm in our workplaces

Employee well-being and development
Target **2030**
30% of management roles held by women

Monitor and improve perceived well-being and job satisfaction

Local Communities
Target **2025**
Quantitative monitoring of impacts on local communities

BUSINESS CONDUCT

Ethics and Transparency
Target **2025**
Adopt external ethics and anti-corruption standards

Risk Management
Target **2025**
Identify, monitor and consolidate ESG risk factors within the ERM framework

TRANSVERSE TOPIC: **Sustainable Procurement**

ENABLING FACTORS:
SUSTAINABILITY CULTURE, GOVERNANCE AND INNOVATION

The 2023-2025 Sustainability Plan also introduces so-called **enabling factors**, which are elements of the strategy not linked to our business objectives but whose implementation is essential for the success of the strategy itself. These enabling factors include the following:

- **sustainability culture**, i.e. the sensitivity, conduct and technical training needed to translate the objectives into projects;
- **governance**, well-organised and skilled enough to drive the changes;
- **innovation**.

The plan can rely on consolidated sustainability governance which, with the introduction of new synergetic relationships between the corporate and the territory, will guarantee greater effectiveness in the implementation and monitoring of measures and actions.

The measurable quantitative targets are another strong element, as they reinforce the company's commitment to ecological transition by buttressing corporate social responsibility and bolstering our role as a trusted partner for internal and external stakeholders.

The plan systematically integrates sustainability goals into all business processes, acting from the outset, the prequalification and tender phases, to instil a sense of shared responsibility and inspire the departments and production units involved. Its external sharing represents a formal declaration of commitment and allows us to sharpen our competitive edge in tender processes.

External performance evaluation

For the fourth consecutive year, we underwent the **EcoVadis** assessment, earning another **Platinum rating** through being included in the top 1% of the most competitive companies for sustainability out of all those assessed. EcoVadis is an assessment platform used by 200 industry sectors in 160 countries, and by over 90,000 companies. This assessment is carried out on the basis of 21 Corporate Social Responsibility (CSR) metrics, grouped into 4 key subject areas (environment, labour and human rights, ethics and sustainable procurement), with a methodology that incorporates various international CSR standards, including the United Nations Global Compact, the Global Reporting Initiative (GRI), ISO 26000, the conventions of the International Labour Organisation (ILO), and the principles of the Coalition for Environmentally Responsible Economy (CERES).
The EcoVadis rating is used as a covenant for monitoring Ghella's sustainability performance in the context of green loans, such as the SACE-guaranteed loan obtained in 2020 for a period of 5 years from BNL Group BNP Paribas.

At the beginning of 2023, we ranked among the **Il Sole 24 Ore** "**Sustainability Leaders**" as one of the best-performing Italian companies in the field of Sustainability. The list comprises 200 large companies assessed by a leading market research firm on the basis of over 40 performance indicators in the three dimensions of sustainability (environmental, social, and economic).

Italy, Fortezza, Brenner Base Tunnel
©BBT

Governance

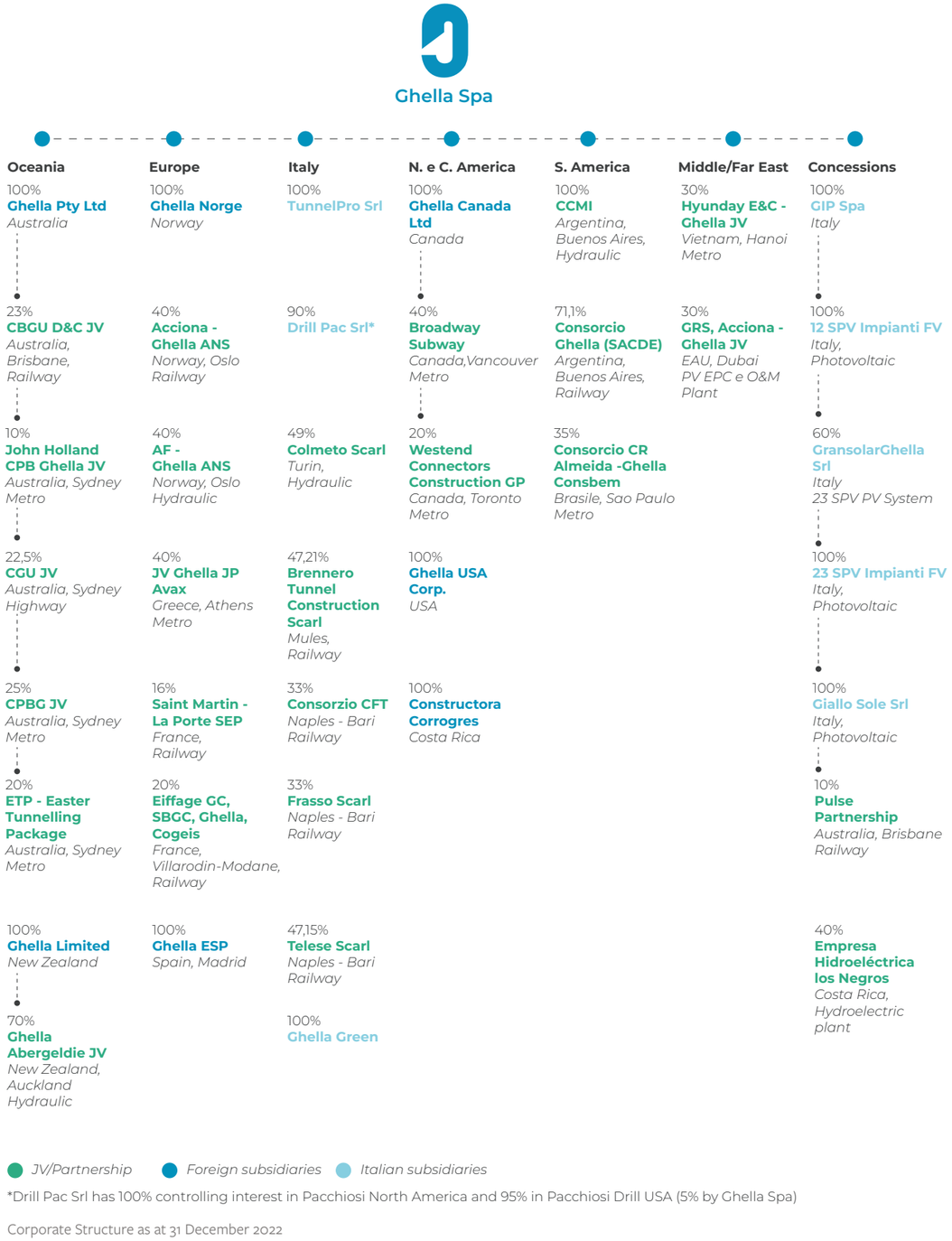
"A company with a strong sustainable identity needs well-structured governance. We are continuously updating our organisational system and processes to ensure we are always aligned with the evolution of our ESG strategy"

Federico Ghella
Vice President

Company Structure

Ghella S.p.A. is an unlisted corporation with indirect holdings, 70% of its stock being owned by Ghella Group S.r.l. and 30% by Geo 2007 S.r.l.

Greece, Athens, Metro Line 3
Photo by Marina Caneve



*Drill Pac Srl has 100% controlling interest in Pacchiosi North America and 95% in Pacchiosi Drill USA (5% by Ghella Spa)

Corporate Structure as at 31 December 2022

While remaining a family business, the governance model adopted by Ghella has evolved over time, keeping pace with its continuous expansion into new international markets.

The organisational structure of Ghella S.p.A. stipulates a Board of Directors and Board of Statutory Auditors, both elected by the shareholders' meeting, the auditing firm and the Supervisory Body pursuant to Leg. Decree 231/01, and appointed by the Board of Directors.

In May 2022, the Board of Directors and the Board of Statutory Auditors were appointed for the three-year period 2022/2024, after expiration of their prior mandates. The members have all been confirmed.

BOARD OF DIRECTORS

Enrico Ghella	| President and CEO
Federico Ghella	| Vice President
Lorenzo Ghella	| Vice President
Alberto Nigro	| Board Member
Giulio Grimaldi	| Board Member
Marco Tummarello	| Board Member

BOARD OF STATUTORY AUDITORS

Riccardo Gabrielli	| Chairman
Alberto Santi	| Statutory Auditor
Francesco Farina	| Statutory Auditor

The Ghella S.p.A. **Board of Directors** comprises six directors, four of which are shareholders. The President and Chief Executive Officer are granted the broadest powers for the ordinary and extraordinary administration of the company. The two Vice Presidents have the same mandates in the event of the President's absence and/or impediment. The board member and Director of Administration and Finance have the necessary powers in the financial domain. The Board of Directors are responsible for providing guidelines on ethics and transparency. In 2022 the Board of Directors (BoD) set up an **Environmental, Social, and Governance** (**ESG**) **Committee** as a collegiate body within Ghella S.p.A. tasked with defining Ghella's ESG strategy and identifying priorities, commitments, and objectives, as well as assigning responsibilities in line with the company's business needs. The Committee is made up of ten members chosen from among the shareholders and internal management of the company, with specific competence or powers of representation, five of whom also hold executive positions. The President is Federico Ghella. The **Compliance & Sustainability** department assists this committee in carrying out its duties. In 2022 the ESG Committee met in 4 sessions as part of its activity monitoring and overseeing the Group's ESG performance.

The BoD approves the Sustainability Plan, materiality analysis, and the annual Sustainability Report, based on the proposals submitted by the ESG Committee.

The **Board of Statutory Auditors** is the internal auditing body that checks compliance with the principles of correct administration, as set out by the bylaws of Ghella S.p.A., and is composed of three statutory members and two substitutes appointed and functioning pursuant to the Italian Civil Code.

The auditing activity is carried out, as required by current legislation, by an independent **auditing firm** on the Special Register and chosen by the Board of Directors.

In implementation of the provisions of Legislative Decree 231/01, Ghella's Board of Directors has set up a collegiate **Supervisory Board** comprising three members selected from outside the company. The Supervisory Board was renewed in July 2022: all the members were confirmed. The Board has been given sufficient financial resources to carry out its functions with the necessary autonomy and independence.

SUPERVISORY BOARD

Gianluca Tognozzi	| External member - Chairman
Paola Scillamà Irti	| External member
Federico Cantatrione	| External member

Canada, Vancouver
Broadway Subway

Responsible business conduct

We have adopted a model of principles, policies and management and control tools that will ensure responsible governance of our activities. Business Conduct is a pillar of our ESG Strategy because we know that ensuring the consistency and integrity of our actions is the only way we can generate lasting value.

PLANET

- **Environmental Policy**

PEOPLE

- **Health and Safety Policy**
- **Human Resources Management Policy**
- **Appropriate Workplace Behaviour Policy**
- **Equality, Diversity and Inclusion (EDI) Policy**

BUSINESS CONDUCT

- **Whistleblowing Policy**
- **Social Responsibility Policy - SA8000**
- **Anti-Corruption Guidelines**
- **Anti-Corruption Policy**
- **Human Rights Guidelines**

SUSTAINABLE PROCUREMENT

- **Sustainable Procurement Policy**

SUSTAINABLE CULTURE, GOVERNANCE AND INNOVATION

- **Code of Ethics**
- **Quality Policy**
- **Sustainability Policy**

All internal codes are made available to employees on the company intranet and to visitors to the ghella.com website. They are presented to new employees during onboarding and are continuously available for all dedicated e-learning courses. The employees of Ghella S.p.A., its subsidiaries and stakeholder companies must abide by the values expressed in the Code of Ethics. Directors will take this into account when setting business goals. The same commitments are also shared with our third parties.

MANAGEMENT AND ORGANISATIONAL MODEL PURSUANT TO ITALIAN LEG. DECREE 231/01

Ghella S.p.A. has adopted an **Organisational**, **Management**, and **Control Model** aimed at preventing the risk that crimes will be committed, pursuant to Italian Legislative Decree 231/01, a law that allows for a company's administration to be held liable for crimes committed in the company's own interest and to its own benefit, with the imposition of pecuniary sanctions and disqualifications. Among these crimes are corruption, environmental and occupational safety offenses, crimes against industry and commerce and anti-competitive practices, crimes against the individual (human rights and labour practices), financing of terrorism and transnational crimes. In 2021, the Board of Directors adopted the updated version of the model, pursuant to Italian Legislative Decree 231/01 and subsequent amendments, to also include tax crimes, which the lawmaker included in the reviewed list of crimes.

RISK MANAGEMENT

Ghella has implemented an Enterprise Risk Management Model that is compliant with ISO 31000 guidelines and capable of identifying and addressing the most relevant risks and opportunities to which the company is exposed within the main strategic business processes of the country areas and contracts within which it operates.

The Risk Management Model we use monitors the principal risks associated with our business activities, including those relating to sustainability issues, among which are environmental and climate-related risks, health and safety risks, human rights risks, corruption risk, responsible supply chain management and many other types. The model is in continuous evolution and periodically checks the progress of the risk handling strategies overseen by the process managers and helps establish a collaborative risk culture throughout the company.

MANAGEMENT SYSTEM

By virtue of our organisational structure, which sees us operating in many countries that are culturally different from each other, we have adopted an **Integrated Management System**: a multi-site structure which on the one hand reflects the standardized organisational and operational approach of Ghella, and on the other guarantees that the individual local units will have the organisational autonomy they need to comply with local legislation and client requirements. The corporate principles and guidelines are communicated to internal and external stakeholders through our website ghella.com, while the procedures are shared on the intranet portal with the project contracts. The system is certified in accordance with international standards **ISO 9001:2015**, **ISO 14001:2015**, **ISO 45001:2018** and **SA8000** (**Social Accountability**), which allow us to manage and control processes within the framework of quality, occupational health and safety, environment and social responsibility plans. We use a risk-based approach in identifying threats and opportunities that could have an impact on good organisational management. The ultimate goal is ongoing improvement of our processes and results. The system applies to all Ghella's activities carried out at the operational sites. For activities relating to work contracts where we operate in a Joint Venture, the management system is designed so that each partner's own management system will be the starting point. In these cases, Ghella participates in the design of the shared JV system, making sure that our own principles and rules are fully guaranteed therein.

ANTICORRUPTION

At Ghella, we operate with the highest standards of conduct, transparency and ethics, in line with our policy, which has "zero tolerance of corruption" as its objective. We have defined a Code of Ethics, an Organisational Model pursuant to Italian Legislative Decree 231/01, and anti-corruption guidelines and procedures that enhance the culture of legality and control safeguards, to prevent any form of corrupt conduct or behaviour running counter to the major national and international standards and laws. At the beginning of 2023, the Ghella S.p.A. Management System was integrated and certified to meet the requirements of the UNI ISO 37001: 2016 "Anti-Bribery management system" standard.

HUMAN RIGHTS

We value **dignity** and **respect** for people as pillars of our corporate culture. By using the **Human Rights Guidelines**, our internal and external stakeholders can identify and prevent potential violations of human and labour rights, based on the best international standards and conventions (such as, for example, the fundamental ILO Conventions).

In 2022, in addition to the "Social Accountability Ethical Certification" according to the SA8000 standard, we obtained the ISO 30415 validation "Human Resources Management - Diversity and Inclusion", which is a new international tool for evaluating how organisations are managing diversity and inclusion.

WHISTLEBLOWING

The **whistleblowing system** governs the processes for disclosing confidential information about any violations or suspected violations of the Code of Ethics, policies, company guidelines, crimes anticipated by Model 231, or other irregularities in the application of internal procedures, through communication channels made available to employees and external stakeholders. There is a functioning guided IT portal where any reports can be sent preferentially and where the whistleblower's identity is kept anonymous.

Whistleblowing

Modern Slavery

The *Modern Slavery Act* was introduced in the UK in 2015, while the *Australian Modern Slavery Act* (*Commonwealth*) was passed at the federal level in Australia in 2018. This law sets out the key steps companies must take to address modern-day slavery and human trafficking. Forms of modern slavery include, for example, forced or coerced labour, or that for which remuneration is below subsistence level.

This law requires all companies providing goods and services with turnover above a certain threshold to ensure greater transparency in their supply chains, produce a statement, and report on the measures they are taking to combat modern slavery. This takes the form of an annual statement, signed and approved by the governing body.

Our **Australian subsidiaries**, in compliance with local regulatory obligations, draft and publish an annual **Modern Slavery Statement**. The public can view these Modern Slavery Statements at the website modernslaveryregister.gov.au

↑ *Focus 1*

Projects

"We strive to offer clients innovative solutions with positive environmental and social impact, which have now become critical differentiators in tenders, thus creating a virtuous circle of sustainability."

Marco Fontana
Managing Director Australia

Our work is an element contributing significantly to the completion of **large-scale public works** essential to the advancement and infrastructure development of the countries in which we operate, and the accomplishment of all 17 Sustainable Development Goals outlined in the UN 2030 Agenda.

The infrastructure projects we are working on take on all the more significance within the framework of the commitments our country has undertaken with the European Union in the **Next Generation EU**, the instrument designed to support a sustainable economic recovery after the pandemic and to stimulate ecological transition. In particular, four of our Italian projects awarded in 2023, including the "Trento Railway Bypass - Section 3" and Battipaglia – Romagnano High-Speed Rail Link - Section 1", are 100% funded with money from the **National Recovery and Resilience Plan** (**PNRR**).

Our projects, mainly focused on railways, metros and hydraulic works, will leave a lasting legacy for the communities in which we operate, and intend to make a more tangible and affordable transition to more sustainable lifestyles.

Looking at our entire works portfolio, based on the principles of EU Taxonomy for sustainable activities, we note that 92% of our activities are eligible for EU classification, in other words they could contribute to mitigation of and adaptation to climate change. In particular, among the economic activities listed in Annex I of the Delegated Regulation (EU) 2021/2139, of which Taxonomy is a part, our projects fall within the following areas:

- 4. Energy

  - 4.1 Electricity generation using solar photovoltaic technology;

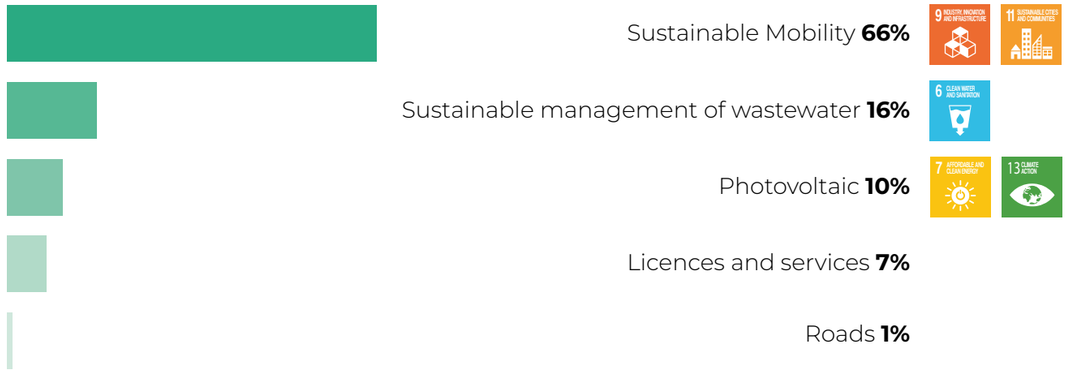
- 5. Water supply, sewerage, waste management and remediation activities

  - 5.3 Construction, extension and operation of wastewater collection and treatment;

- 6. Transport

  - 6.14 Infrastructure for rail transport;

  - 6.15. Infrastructure enabling road transport and public transport.



Portfolio of works by activity: the following classification was created on the basis of Annex I to Delegated Regulation (EU) 2021/2139: "Sustainable mobility" includes activities 6.14 and 6.15 in the transport sector; "Sustainable management of wastewater" includes activity 5.3 of the sector "Water Supply, Sewage Networks, Waste Treatment and Decontamination"; "Photovoltaic" includes activity 4.1 of the energy sector.


Canada, Vancouver
Broadway Subway

Sustainable mobility and water infrastructure

In addition to mitigating climate change, i.e. an impact on a global scale, the projects we help to implement generate numerous **positive** local economic, environmental and social **externalities**:

- the **rail projects** speed up the shift of people and products from road to rail on strategically important national and international routes, lower atmospheric emissions and fuel consumption, and improve road safety;

- the expansion of **metro and urban rail lines** enhances public transportation accessibility, benefiting a broader segment of the population. By connecting previously unserved areas and offering more comfortable and time-efficient commuting options, it effectively reduces traffic congestion and associated emissions in densely populated cities like Sydney, Brisbane, Toronto, and Vancouver, ultimately improving the quality of life of citizens;

- the improvements to the **water infrastructure** enable more effective wastewater management, addressing climate change concerns, mitigating hydro-geological instability risks, and curbing pollution from sewage backflow. Additionally, these improvements will bolster the drinking water supply to accommodate the demands of urban growth.

All of our projects in Australia and New Zealand are subject to the **Infrastructure Sustainability** (**IS**) **rating** system developed by the ISC (Infrastructure Sustainability Council), which assesses infrastructure sustainability during the phases of planning, design, construction and management of the project. In a worldwide setting where measuring the sustainability performance of the work in all phases of its life cycle, including the construction period, is of ever-increasing relevance, the experience obtained through these projects constitutes a strategic advantage for Ghella.

Brenner Base Tunnel, Main Line, “H61 Mules 2-3” lot

Mules, **Italy**

The Brenner Base Tunnel will extend over a distance of approximately 55 km between Fortezza (Bolzano, Italy) and Innsbruck (Austria) stations, where it will connect underground to the existing bypass railway, itself also in tunnel, giving a total length of 64 km. Once completed, the Brenner Base Tunnel will be the longest underground rail link in the world.

The project is included in the overall upgrade of the Verona – Munich axis and is part of the Trans-European Transport Network (TEN-T), nicknamed “Europe’s metro line”, and more specifically, a part of the Scandinavian-Mediterranean corridor. The “Mules 2-3” construction lot is the largest in the entire project area and extends from the northern border of the other Italian lot, called “Underpass Isarco”, to the Italian-Austrian border. This section will entail construction of the two mainline tunnels, an exploratory tunnel, cross passages and the emergency stop (one of the three located along the entire route and the only one in the Italian section) with the related access tunnel.

PROJECT DETAILS

Start Date:
2016

Category:
High-speed railway

Client:
BBT SE - Brenner Basistunnel

Type of excavation:
TBM and Conventional tunnelling

BENEFITS

1. Cuts travel time, compared to the existing railway link, by 55 minutes for passengers transport and 1 hour and 10 minutes for freight transport.

2. Modal shift from road to rail for the North-South links between Austria and Italy.

3. Reduces CO_2 emissions in an amount equal to 200,000 tCO_{2eq} per year, counting from the 15th year in the life cycle of the works.

Naples-Bari High-Capacity/High-Speed Railway

Cancello-Vitulano, **Italy**

This project is to upgrade the Naples - Bari line to allow higher speeds, allowing integration of the southern Italian railway infrastructure with the “Scandinavian - Mediterranean” Core Corridor. Identified as a priority within the framework of infrastructure investments provided by the “Sblocca Italia” [“Unlock Italy”] law of 2014 and included in the National Recovery and Resilience Plan (PNRR), the project has us involved in three sections of the line: Cancello-Frasso Telesino, Frasso Telesino-Telese, and Telese San Lorenzo-Vitulano. The primary objective is to speed up the present connection and improve accessibility to the service in the areas covered, both for national long-distance services and for regional and freight services.

Our client, RFI, has been the first in Europe to obtain Envision certification at Platinum level, for the design of the Frasso Telesino-San Lorenzo section (which includes two of the sections awarded to Ghella). The Envision certification is a U.S. rating system for sustainable infrastructures which evaluates project performance in terms of the extent to which it improves a community’s quality of life, brings all its stakeholders to the table, uses natural resources responsibly, protects the environment and resident species, cuts back on CO_2 emissions, and creates durable infrastructure.

PROJECT DETAILS

Start Date:
2019, Cancello-Frasso Telesino
2021, Frasso Telesino-Telese
2022, Telese-Vitulano

Category:
High-speed railway

Client:
RFI Rete Ferroviaria Italiana Spa (Italian Railway Network)

Type of excavation:
Conventional tunnelling

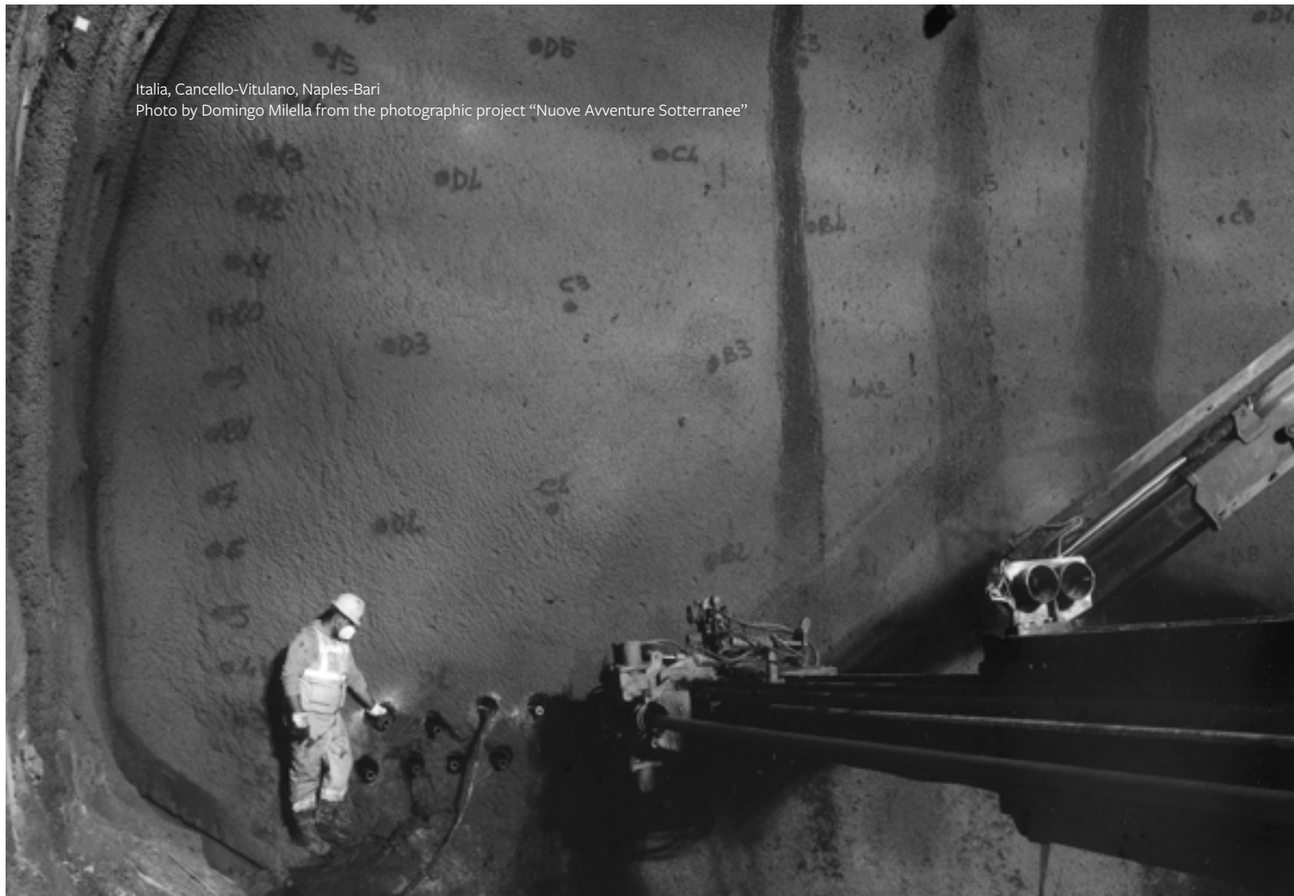
BENEFITS

1. Cuts travel time between Naples and Bari by 1hr 40 min.

2. Modal shift from roads to trains.

3. Reduces greenhouse gas emissions.

4. Improves accessibility to high-speed rail service in areas at risk of becoming depopulated.



Italia, Cancello-Vitulano, Naples-Bari
Photo by Domingo Milella from the photographic project “Nuove Avventure Sotterranee”

New Zealand, Auckland, Central Interceptor
Photo by Giulia Parlato from the photographic project "Nuove Avventure Sotterranee"
©Watercare Services Limited

Turin-Lyon High-Speed Railway – Base Tunnel Section 1

Villarodin-Bourget Modane, **France**

The Turin-Lyon link is a new railway line for freight and passenger transport which will extend for 270 km, 70% of which will be in France and 30% in Italy. It will form the central ring of the Mediterranean Corridor, one of the 9 axes of the Trans-European Transport Network (TEN-T). The cross-border section, for which the binational promoter TELT is responsible, is the central part of the project, running for 65 km, and links the two international stations to be built in Saint-Jean-de-Maurienne (France) and Susa/Bussoleno (Italy). From those two points the tracks will then connect to the already existing lines. The main work of the cross-border stretch consists of the Mont Cenis base tunnel: two single-track tubes 57.5 km long, 45 km of which are in French territory and 12.5 km in Italy. Once completed, the tunnel will be a contender for longest in the world, along with the Brenner Base Tunnel, also built by us.

The tunnel will transform the current mountain railway – which passes through the historic Fréjus tunnel at a height of 1300 m – into a flat route, improving competitiveness and safety standards for rail transport, and reducing energy consumption.

The project has us currently involved in the "Section 1" works, starting in Villarodin-Bourget Modane and excavating for approximately 3.7, using conventional excavation, km in the direction of Lyon and for about 18 km, using mechanized excavation, in the direction of Turin. The section towards Turin is the one with the greatest rock overburden: more than two thousand meters.

PROJECT DETAILS

Start Date:
2021

Category:
High-speed railway

Client:
TUNNEL Euralpin Lyon Turin (TELT)

Type of excavation:
TBM and Conventional excavation

BENEFITS

1. Improves safety standards, cuts energy consumption and travel time, compared to the existing railway link.

2. Will remove roughly one million heavy road vehicles from roads.

3. Cuts greenhouse gases in an amount of approximately 3 million tons of CO_2 equivalent once it is in operation.

Trento railway bypass (3A Lot)

Trento, **Italy**

The Trento railway bypass is financed almost in its entirety by funds from the National Recovery and Resilience Plan (PNRR), for which - from December 2021 to February 2022 - the client RFI conducted a Public Debate1 aimed at collecting observations and proposals from the local community in order to evaluate and improve the project.

We are involved in the first phase of the project (Section 3A), which involves construction of the railway bypass route, as a variant of the historic Verona - Brenner line in the section crossing the city. The rail bypass will allow freight traffic flows to be separated from passenger traffic and mean that the urban area of Trento is bypassed. The new line will originate in Roncafort, near the Trento interport, and connect with the existing line in the Acquaviva area after about 14 km, of which 11 km will run through the new natural twin-tube "Trento Tunnel". The project is part of the broader project to upgrade the Fortezza - Verona railway line to allow southern access to the new Brenner Base Tunnel under construction, with the aim of upgrading the European TEN-T Scandinavian-Mediterranean Core Corridor, itself intended to make international rail freight transport more efficient. The Project is also part of a broader framework of action being taken to further the urban redevelopment of Trento and foster the area's sustainable mobility.

PROJECT DETAILS

Start Date:
2023

Category:
High-speed railway

Client:
RFI Rete Ferroviaria Italiana S.p.A.
(Italian Railway Network)

Type of excavation:
TBM

BENEFITS

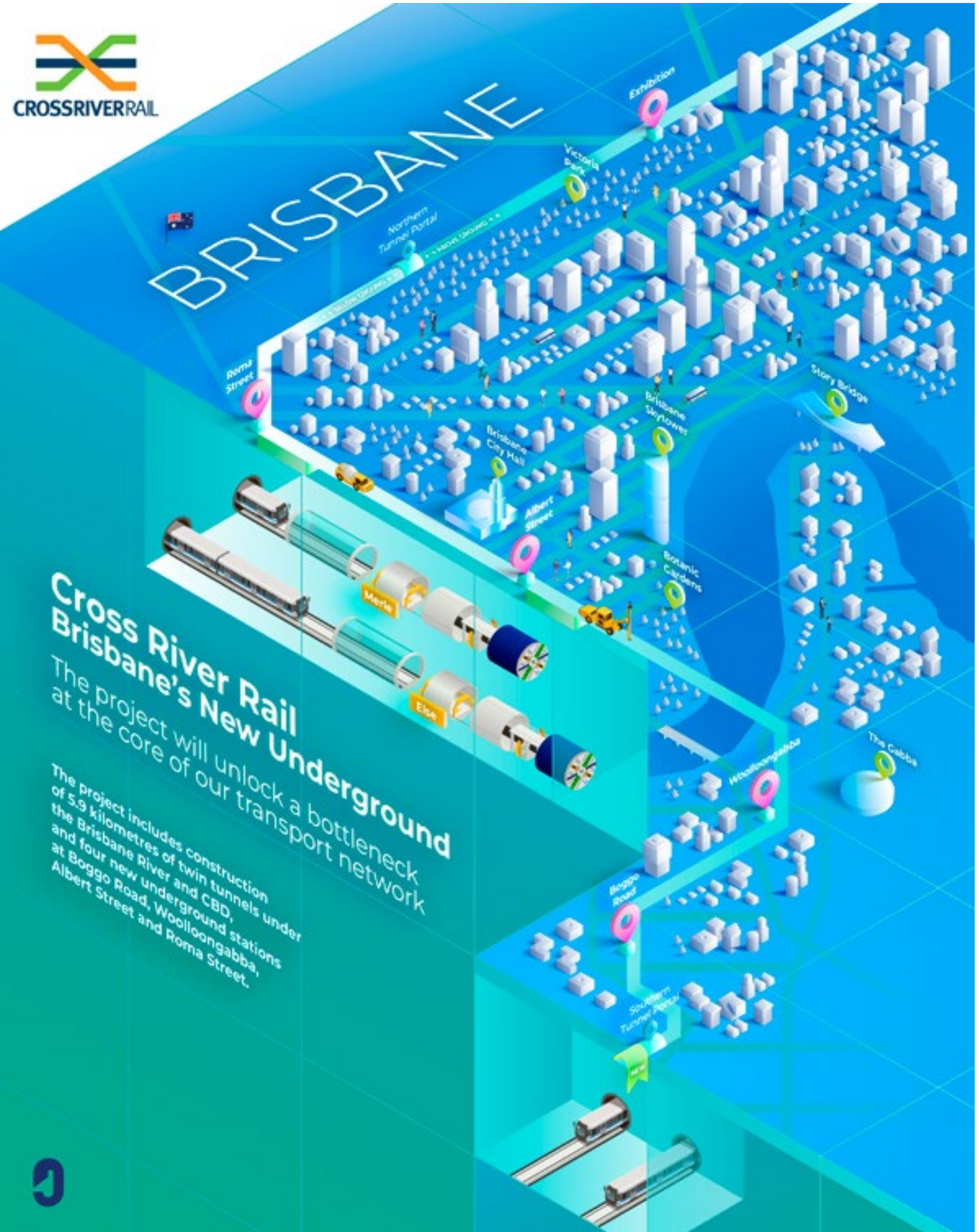
1. Modal shift to rail of freight transport

2. Urban regeneration for the city of Trento

3. Contribution to the efficiency of the international transport of goods.

4. Consistency with the "Do No Significant Harm" (DNSH) principle and with the pursuit of the European Carbon Neutrality objectives.

5. Strengthening of infrastructural connections to support commercial activities, offering opportunities for the logistics sector, the combined transport, the import/export market.



Sydney Metro - Western Sydney Airport

Sydney, **Australia**

The new Sydney Metro – Western Sydney Airport rail project will be a catalyst for economic development in Western Sydney. It will connect the new Western Sydney International Airport with the rest of the city's public transit system and residential areas in the Western Parkland City with business hubs, including the new Aerotropolis.

It is estimated that construction of the metro line will generate 14,000 jobs - with a further 28,000 jobs to be created with the construction of the airport. The resulting development of the Aerotropolis will in turn generate 200,000 skilled jobs in the aerospace and defense industries, and the manufacturing, cargo and logistics, tourism and research sectors.

Ghella is involved in one of the three prime contracts - Station Boxes and Tunnelling Works (SBT). This project involves the excavation of five stations and the design and construction of two twin tunnels: the 4.3 kilometre northern tunnel from St Marys to Orchard Hills and the southern 5.5 kilometre tunnel between the Airport Business Park and Aerotropolis Stations.

Western Sydney Airport will be the first rail infrastructure project in Australian history to commit to "carbon neutral" certification for the construction and operation phases, under the Australian Government's Climate Active Carbon Neutral Service program. All Scope 1, 2 and 3 greenhouse gas emissions will be reduced and offset.

PROJECT DETAILS

Start Date:
2022

Category:
Metro

Client:
Sydney Metro

Type of excavation:
TBM

BENEFITS

1. Acts as a catalyst for economic development in Western Sydney.

2. Over 14,000 jobs will be created.

3. Peak of 12 trains per hour in both directions.

4. 100,000 fewer cars on the road by 2026.

5. Reduces greenhouse gas emissions.

Cross River Rail – Tunnel, Stations and Development (TSD) Package

Brisbane, **Australia**

Cross River Rail (CRR) will be an essential part of Brisbane's city transport system, which is approaching the limit of its capacity with just one rail crossing of the Brisbane River.

CRR will provide a second river crossing at the core of the rail network, enabling an increase in frequency of trains, reducing congestion and increasing network reliability. The project involves excavation of 5.9 kilometres of twin tunnels under the river and the Central Business District (CBD) and construction of four new underground stations. Once operational, CRR will transform travel across the whole of South East Queensland. Journeys will be quicker; there will be new stations in more convenient locations; there will be capacity to increase train services as our population grows and public transport will become a more viable option for the whole of our region, helping to ease congestion on our roads.

The project won the 2021 QMCA (Queensland Major Contractors Association) Innovation and Excellence Sustainability Award for its initiative in using recycled crushed glass as an alternative to aggregates and natural quarry products. In April 2022, the project won the Gold Quill Award of the International Association of Business Communicators (IABC) with the report "10,900 ways to build social license".

PROJECT DETAILS

Start Date:
2019

Category:
Urban railway

Client:
Cross River Rail Delivery Authority

Type of excavation:
TBM

BENEFITS

1. Improved transport capacity, supporting Queensland's population growth.

2. Rush hour periods will be 24% shorter

3. Modal shift from road to rail.

4. Reduces greenhouse gas emissions.

Broadway Subway Project, Millennium Line Extention

Vancouver, **Canada**

The Broadway Subway Project is an extension to the existing Millennium line that will connect VCC-Clark station with a new terminus at Arbutus Street, passing through six new stations and having a length of 5.7 km, with both underground and elevated route sections.

The Broadway Corridor is one of the most densely populated area in British Columbia not yet served by a rapid transit system, yet at the same time experiencing strong population growth, with a 57% increase in population projected by 2040.

Once in operation, the Millennium Line extension will provide fast, frequent and convenient SkyTrain service to B.C.'s second largest jobs centre, world-class health services, an emerging innovation and research hub, and growing residential communities.

PROJECT DETAILS

Start Date:
2020

Category:
Metro

Client:
Province of British Columbia

Type of excavation:
TBM

BENEFITS

1. Have the capacity to move three times as many people as the current 99 B-Line.

2. Save the average transit commuter almost 30 minutes a day and relieving congestion along Broadway.

3. Reduce congestion and improve travel time for transit commuters.

4. Connect to bus, HandyDART, walking and cycling for a complete multi-modal experience.

5. Support the environment by reducing greenhouse gas emissions.

Eglinton Crosstown West Extension

Toronto, **Canada**

The multicultural Greater Toronto Area's transit system is experiencing major growth. One of the main projects underway is the Eglinton Crosstown West Extension (ECWE), a new rapid transit line that will improve connectivity along a key east-west corridor in Toronto, improving travel towards the west end of the city into nearby Mississauga, Canada's sixth largest city, thereby improving the quality of life for numerous commuters who travel daily between these two cities overlooking Lake Ontario. The ECWE project is a 9.2-kilometre extension of the Eglinton Crosstown light rail transit project. The extension will run from the future Mount Dennis station to Renforth Drive. The system will have connections to several local and regional transit services, including Union Pearson Express and Kitchener GO train lines, GO bus routes, and local TTC and Mississauga MiWay bus services. Plans are also being explored to connect ECWE to Toronto Pearson International Airport. The project considers forecasted population growth in the Greater Toronto and Hamilton Area population from 7 million to more than 10 million by 2041. By the same year, the extension will see close to 70,000 daily rides and bring 37,500 more people within walking distance to transit.

PROJECT DETAILS

Start Date:
2021

Category:
Metro

Client:
METROLINX / INFRASTRUCTURE ONTARIO AND LANDS CORPORATION

Type of excavation:
TBM

BENEFITS

1. Modal shift from cars to trains.

2. Reduces annual greenhouse gas emissions up to 5,800 tCO_{2eq} per year.

3. Improved transport capacity, supporting GTHA's population growth.

4. Improved quality of life for people commuting between the cities of Toronto and Mississauga.

Sydney Metro West – Eastern Tunnelling Package

Sydney, **Australia**

We are involved in the construction of the final section of the Sydney Metro West – Eastern Tunnelling Package (ETP).

The ETP works include construction of 3.5 kilometre tunnels under Sydney Harbour, between The Bays and the Sydney Central Business District (CBD), and the excavation of Pyrmont and Hunter Street stations.

Sydney Metro West will double the rail capacity between Greater Parramatta and the CBD, with an estimated journey time of around 20 minutes between the two centres.

With this project, we are once again excavating a railway crossing under Sydney Harbour, having completed the tunnel and station excavation works for the Sydney Metro City & Southwest project in 2022, where we built the first rail tunnels beneath Sydney Harbour, a testimony to the quality of our work.

PROJECT DETAILS

Start Date:
2022

Category:
Metro

Client:
Sydney Metro – Transport for NSW

Type of excavation:
TBM

BENEFITS

1. Over 10,000 direct jobs and 70,000 indirect jobs will be created.

2. Doubles rail capacity between Greater Parramatta and the CBD.

3. Reduces congestion.

4. Reduces travel time.

5. Reduces greenhouse gas emissions.

São Paolo Metro – Line 2, Section 2

São Paulo, **Brazil**

Ghella is involved in the design and construction of the extension of Green Line 2 of the São Paulo metro. The project entails construction of a main double-track tunnel with a diameter of 11.4 meters and a length of approximately 6 km, two underground stations, and ancillary works. Once completed, Section 2 will make it possible to connect the Municipality of São Paulo to the Municipality of Guarulhos, through various interconnections to the urban lines, both rail and road, extending the public transport service to various city districts and to a much wider passenger user base than at present.

PROJECT DETAILS

Start Date:
2021

Category:
Metro

Client:
Companhia do Metropolitano de São Paulo

Type of excavation:
TBM

BENEFITS

1. Extends the public transport service out to various city districts

2. Improved public transport capacity.

3. Reduced congestion.

4. Shorter travel time.

5. Reduction of greenhouse gas emissions.

Sydney M6 Stage 1

Sydney, **Australia**

The construction of Transport for NSW's M6 Stage 1 in Sydney plays a key role in the NSW Government's 40-year transport strategy, which is aimed at improving the connectivity and quality of the state's infrastructure network.

We are involved in the construction of two 4 km road tunnels which will link the new M8 expressway at Arncliffe with President Avenue at Kogarah, as part of the CPB Contractors, Ghella and UGL joint venture.

The South Sydney region will finally be connected to the city's growing expressway network, making travel easier, faster and safer. Directing the road traffic underground will allow vehicles to bypass 23 sets of traffic lights on the Princes Highway, thus cutting driving time and reducing traffic congestion. At the same time, the surface road section will be more usable by the local community, enhanced by the creation of a new 5 km pedestrian and cyclist pathway. All of this will increase the area's liveability and help make Sydney a more accessible city.

PROJECT DETAILS

Start Date:
2021

Category:
Highway tunnel

Client:
NSW Government

Type of excavation:
Roadheader

BENEFITS

1. The number of trucks on surface roads will be reduced by more than 2,000 per day.

2. The project will reduce traffic on General Holmes Drive by 10,000 vehicles per day providing the opportunity to improve the foreshore amenity of Brighton Le Sands.

3. Improved travel times and reliability for road users travelling between Southern Sydney and strategic centres in Greater Sydney while supporting faster and more reliable times for local bus customers and road users in Southern Sydney.

4. Transformed parklands that Connect with Country and enhance the natural environment for the community to live, play and experience.

Turin Median Collector

Torino, **Italy**

The Turin median collector, nicknamed the "Hydropolitan", will be the new backbone of the Turin sewage network, and will be developed in parallel with the current one, running beneath Turin for 14 km at a depth of 20 meters, connecting the southern part of the city at the boundary with Moncalieri with the northwest area of Turin, to bring the water flow to the wastewater treatment plant of Castiglione Torinese.

This new infrastructure will make it possible to deal with problems associated with climate change, such as the significant increase in mixed wastewater discharges that the old collector is no longer able to handle. It will also allow for special maintenance of the structures currently in use and will significantly facilitate environmental clean-up: in fact it will be responsible for conveying and transporting mixed wastewater and initial precipitation run-off, which is often full of contaminants such as hydrocarbons and mineral oils, to the SMAT Water Reclamation Centre in Castiglione Torinese, reducing the concentration of pollutants in the wastewater, and flowback occurrences in the Po river and throughout the area served.

During the construction works, remediation operations will also be carried out due to the presence of unexploded military ordinance from WWII, in addition to efforts undertaken in the area of environmental reclamation: for each shrub that will be cut down along the route of the collector, a new tree will be planted.

PROJECTS DETAILS

Start Date:
2023

Category:
Water tunnel

Client:
Società Metropolitana Acque Torino (SMAT)

Type of excavation:
TBM, microtunnelling and conventional tunnelling

BENEFITS

1. Improved sewage network capacity.

2. Climate change adaptation.

3. Reduction of pollutants concentration in wastewater.

4. Reduction of flowback occurrences in the Po river.

Central Interceptor

Auckland, **New Zealand**

Watercare's 14.7 km long wastewater tunnel will be the longest bored tunnel in New Zealand. In older parts of Auckland, there is a combined sewage/rainwater network. During heavy rain, the system becomes overwhelmed, and overflows occur into local streams and beaches. The Central Interceptor tunnel will capture the combined flows and convey them to Māngere Wastewater Treatment Plant for processing. The Central Interceptor project will reduce around 80 per cent of these wet-weather overflows and will improve the water quality of local waterways. The tunnel will be 4.5 m in diameter and will start in Grey Lynn, and run underneath the Manukau Harbour to central Auckland to depths of between 15m and 100m below the surface.

PROJECT DETAILS

Start Date:
2019

Category:
Hydraulic tunnel

Client:
Watercare Services Ltd

Type of excavation:
TBM

BENEFITS

1. Reduction of wastewater overflows into local streams and beaches.

2. Cleaner waterways and beaches.

3. Improved network capacity to serve the expanding city of Auckland for the next 100 years.

E6 Clean Water Tunnel

Oslo, **Norway**

This project involves the construction of a new water supply system for the population of Oslo, which currently gets 90% of its drinking water from Maridalsvannet Lake. At the moment, a disruption to the existing supply system could have serious consequences for the entire city. The project includes a feeder tunnel for bringing water from Holsfjorden Lake, 19 km from the city boundary, a groundwater treatment plant at Huseby, and a tunnel for the transfer of clean water across the city. In a joint venture with AF Gruppen, Ghella is responsible for the construction of the clean water distribution system. The network will connect to the already operational water treatment plant in Oset, reinforcing the connection between East and West Oslo. This will ensure that the city will have two major water reservoir and a redundant water supply system, thus protecting the people of the Norwegian capital from the consequences of any malfunctions.

PROJECT DETAILS

Start Date:
2021

Category:
Water tunnel

Client:
Municipality of Oslo

Type of excavation:
TBM and Conventional tunnelling

BENEFITS

1. Ensures clean water supply for a rapidly growing population.

2. Reduces network losses and water wastage.

Italy, Canosa
Canosa Sannita 1

Renewable energy

In addition to the large-scale public infrastructure sector, we operate in the sector of renewable energy through the development, construction and management of renewable energy generators, in particular photovoltaic and hydroelectric, in Italy, Central America and the Middle East.

Since 2010, along with our core business activities related to tunnelling infrastructure projects, we have developed and strengthened our presence in the construction and management of photovoltaic plants in Italy, through our subsidiary Gransolar Ghella.

One of our company's divisions that contributes directly to the goal illustrated in the Ecological Transition Plan : of generating 72% (instead of the current 35%) of electricity from renewable sources by 2030, is also indirectly stimulating production and employment opportunities in a supply chain of growing importance.

We have installed 60 MW of photovoltaic power to date in Abruzzo, Lazio, Molise and Puglia. Over 997 GWh of energy has been produced between the start of operations and 31 December 2022, a saving of over 498,000 tonnes of CO_2 equivalent in greenhouse gas emissions. In 2022, the renewable energy generated by our facilities was 89 GWh, or 92% of the electricity required by Ghella construction sites worldwide, saving an estimated 44,000 tCO_{2eq} in greenhouse gas emissions.

Some of our plants are privately owned others are built through agreements signed with municipal administrations, for example those in Abruzzo and Lazio. So our presence in the area is also driving opportunity in both the social and environmental spheres.

Since their commissioning, our plants have generated significant economic benefits for the municipalities concerned, thus generating shared value with the community, by:

- improving citizen services such as school bus shuttles, fee reductions, sports facilities for youth, support for low-income families;
- measures to reduce electricity consumption with small-scale solar power plants or LED lighting systems for municipal users;
- setting up municipal green areas.

Furthermore, our extensive presence and operations in the region over the years has fostered a strong relationship of trust and support with local administrations. This bond has, on numerous occasions, resulted in our direct involvement in municipal road maintenance projects, our contributions to youth social events, and our role as hosts for school visits to our plants, all aimed at raising awareness about renewable energy.

In late 2021, we began a series of studies aimed at revamping and repowering photovoltaic plants whose modules are starting to show deterioration at a rate greater than that forecasted by the project specifications in 2010, where some have not yet reached the end of their life cycle. A total of 8 MW was revamped in 2022, and another 8 MW will be replaced in 2023 through repowering, with a capacity increase of 4 MW.

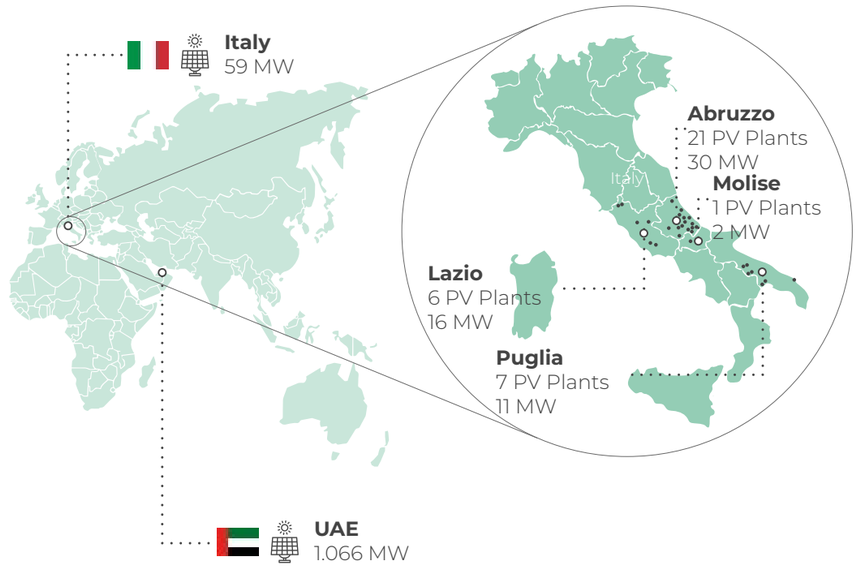
The company Ghella Green, which is 100% owned by Ghella, was established in 2022 with the objective of setting up new photovoltaic plants in Italy and optimizing energy sales through management of PPA (Power Purchase Agreements) to be signed with the major energy traders. In 2023, three 1 MW plants will be built through Ghella Green in the Pontinia (LT) industrial zone and one 1 MW plant will be installed in the industrial zone next to the Moricone (RM) storage facility, which is owned by Ghella. The two projects will generate photovoltaic energy without taking up agricultural land.

To maximize recovery opportunities and promote circular economy, we conducted a survey of recoverable material and used differentiated waste collection to optimize the amount of recyclable material. A CO_2 impact study was also carried out on the revamping operations to minimize the overall impact.

Of special pertinence is the initiative to donate a certain number of the still-operative modules to the municipalities where the systems are installed. The modules will be utilized to create compact plants to serve municipal utilities, thus minimising the economic effects of the recent sharp rise in energy prices.

We are also studying options for re-using still-operative modules at the workers' barracks and base camps of our worksites, subject to the authorisation of the relative works clients. Finally, as part of the DEWA Phase III PV Solar Power Project in the United Arab Emirates, we provided construction, operation, and maintenance (EPC and O&M) services for a 1,066 MW power plant with a target annual production of 2,000 GWh. We installed 3 million photovoltaic panels as part of the project, covering around 20 square kilometres of desert terrain.

The DEWA Phase III plant has been up and running since July 2020 and operation and maintenance (O&M) activity has continued.



Recently completed projects

Athens Metro – Line 3 Extension

Athens, **Greece**

The Athens Metro Line 3 extension to Piraeus, and the opening of the three new stations called "Maniatika," "Piraeus," and "Dimotiko Theatro", were announced by the AVAX-Ghella-Alstom consortium on 7 October 2022. The first three stations, "Nikaia," "Korydallos," and "Ag. Varvara" had been completed two years earlier. At the opening ceremony, the Prime Minister of Greece, Kyriakos Mitsotakis, congratulated all parties involved for completing the project so timely. He pointed out that Greece had set a benchmark for constructing projects similar to this metro, in showing that infrastructure like this can be built whilst still prioritizing cultural heritage. This project will ease traffic congestion in Greece's largest port and provide a link to Athens International Airport in under an hour.

Follo Line

Oslo, **Norvegia**

On 12 December 2022, King Harald V of Norway was joined by the Crown Prince, the Prime Minister, the Minister of Transport, and the CEO of Bane NOR to officially launch the Follo Line project, primarilyconstructed by the Acciona-Ghella JV. Following the ceremony, the King travelled by train from Oslo to Ski, a trip that took just 11 minutes. The project will help decongest the Norwegian capital and reduce the amount of traffic caused by commuters, enabling residents to live outside of the city and yet enjoy their journey there and back, leaving their cars at home.

Sydney Metro City & Southwest

Sydney, **Australia**

The Sydney Metro City & Southwest project entered its testing phase in 2023. The metro's new trains are undergoing trial runs inside the 15.5 kilometre twin railway tunnels extending the Metro North West line from Chatswood to Sydenham, and for the first time in the history of NSW transport they are traveling deep down below Sydney's harbour.

Testing will last until the end of 2023, while from 2025 onwards it will be open to the public. At this point, passengers will be able to travel from Central station to Chatswood station in 15 minutes, from Martin Place station to Sydenham station in 11 minutes, and from Victoria Cross station to Barangaroo station in just three minutes.

The initiative was given the highest-ever ISC IS rating score of 100, or the 'Leading' level, for its efforts. This achievement is mostly attributed to the Tunnel Boring Machine's (TBM) novel assembly process, which is performed not only on the surface but within the tunnelling site itself. This innovation's sustainability advantages include less resource consumption, lower community impact, and better worker safety.

The final project resulted in a reduction of 47,987 tonnes of CO_2 equivalent and 33% fewer materials consumed compared to the footprint quantified for the Base Case.

Matanza Riachuelo Basin

Buonos Aires, **Argentina**

On 30 November 2022, the building of the hydraulic collector for Section 1 (Left Margin Collector) of the Matanza Riachuelo Project was finished. This section is about 40 km long. The contractual 12-month warranty and maintenance period commenced on 1 December 2022. Once finished, the Matanza Riachuelo Basin environmental remediation project in Buenos Aires will rank among the most globally significant aquifer purifying projects. It will improve water quality and greatly lessen pollution in the Rio de la Plata, one of the most polluted rivers in the world.

Profile

Sam Jones

Technical Director Ghella PTY,
Australia

What is your career path and what brought you to Ghella?

I started my construction journey back in 1995, just south of Sydney, Australia, working on concrete gravity structures for off-shore oil drilling platforms. After that I found myself in my first tunnel construction project in Melbourne and have been very privileged to remain in the tunnelling industry ever since. In these 28 years, I have worked in various site management tunnelling roles as well as spending time as a tunnel estimator and being involved in many tenders in methods and planning.

In mid 2020 I was introduced into Ghella in the role of Technical Director and immediately knew that I was going to fit in well and to be able to extend myself professionally. In that time, I've been given the opportunity, and applied myself wholeheartedly, to a wide range of senior site management and pre-contract development roles that have been successful due to consistent support of Ghella colleagues in Australia and Rome.

Can you briefly describe your role?

My role as Technical Director for Ghella PTY Australia allows me access to an enormous range of operational and pre-contractual tasks where I can add value. Some tasks are concerted efforts such as covering operational project roles of Construction Director and Project Controls Director or as Construction Lead creating our response to tenders. Other tasks are as design or methodology review and trouble-shooting. I have recently also taken on the role of SteerCo member for one of our Sydney projects and become an executive director of Ghella PTY Australia. Apart from purely technical endeavours, Ghella PTY Australia is growing and creating new business capabilities, systems and policies to help us attract good people and to manage our company obligation efficiently. I play my part in developing and implementing these improvements to help build a stronger business overall. It's busy, rewarding and very interesting work.

How important are sustainability aspects in the world of Australian infrastructure and how are these aspects implemented in the work sites?

The construction industry in Australia has made significant strides in sustainability over the past 20 years. When I started in construction we were engaged in the minimisation of waste, mainly as a cost issue. Australian society today is extremely engaged with minimisation of all types of environmental impact and Ghella, our partners and clients are now strictly insistent on best-practice sustainability implementation and innovation throughout the construction journey. In our most recent bid in Melbourne's SRL the client specified a significant portion of the tender scoring to sustainability content and as a result we committed to inclusions and innovations representing all of the current best practices and more. Our bid included very passionate people in this space and we put together a comprehensive offering.

How do you think your work can contribute to Ghella's sustainability performance?

In my positions so far there have been many ways to influence sustainable outcomes. These topics can be new so I believe it is very important to keep an open mind, engage with experts and do some personal investigation into practicalities. Whilst sustainability improvements can be made during project delivery (and should be wherever possible), during tender development is where the most value can often be added. Design, constructability and program can all work in unison to fully understand the impacts and benefits of advancing our sustainability objectives and the tender environment is where innovations are likely to get the proper multidisciplinary attention to make them feasible.

What is the most stimulating aspect of your job?

There are many wonderful parts to this job. On one hand I greatly enjoy the deep technical intricacy that can be found in all the complex areas of our projects. On a different angle I get great satisfaction in helping to develop our business systems and in the overview of project process and performance. In all cases the joy is in engaging with the people, at all levels of project and corporate life, learning how they solve their problems and helping anywhere I can.

Italy, Cancello-Vitulano, Naples-Bari
Photo by Domingo Milella from the photographic project "Nuove Avventure Sotterranee"

People

Kī mai ki ahau 'He aha te mea nui o te ao?'
If I was asked "What is the most important thing in the world?"

Māku e kī atu 'He tāngata! He tāngata! He tāngata!'
I would answer: "It is the people! It is the people! It is the people!"

Māori Proverb
Meri Ngaroto, Te Aupouri wāhine rangatira (female chief), 19th century

New Zealand, Auckland, Central Interceptor
©Watercare Services Limited

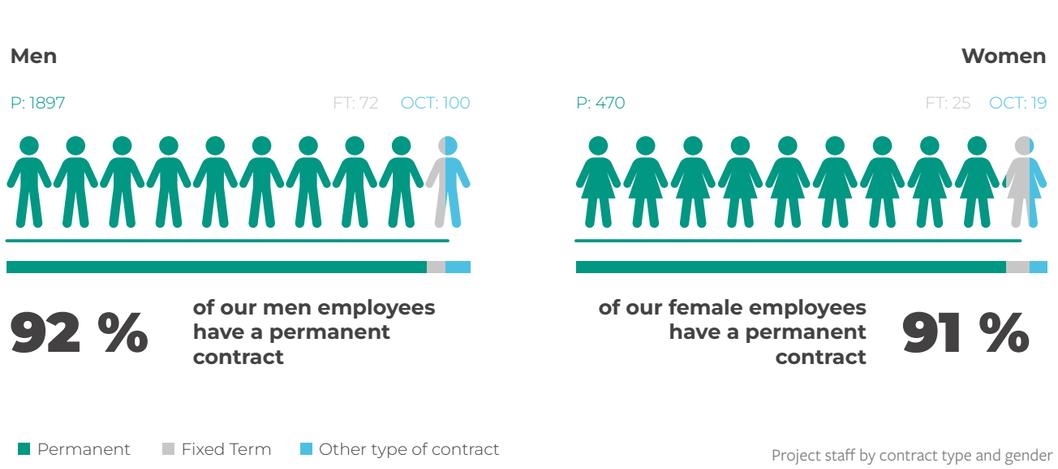
We believe in people, and we **value them**. A focus on **people** is a pillar of our ESG Strategy, and in the new 2023-2025 Sustainability Plan we settled on four areas of priority: occupational health and safety; the well-being and development of personnel; the promotion of equal career opportunities; and listening to the expectations of the local communities who will benefit from the construction projects we help to create.

Our goals in the social area include achieving zero harm, beginning with a 30% drop in the LTIFR (Lost Time Injury Frequency Rate) safety index by 2030, compared to 2021, and a quota of 30% women in managerial positions by 2030. The SA8000 standard Management System certification and its validation based on the new ISO 30415 substantiate our commitment to the development and protection of human capital.

Canada, Vancouver,
Broadway Subway

Our People

As stipulated in our Code of Ethics, people make up the core of our company and constitute its primary **strategic asset**. Not just because we need impassioned, qualified individuals to perform their duties to the highest professional standard, but because we believe above all else that sharing and exchanging ideas and values is crucial to achieving excellence. We encourage trust, transparency, and collaboration through thoughtful, informed management, encouraging the development of an inclusive and open work environment. Operational control and monitoring of the most important human resources issues during the construction phase of the work are carried out by the project's HR team, which is responsible for periodic reporting to the client and to our central office.



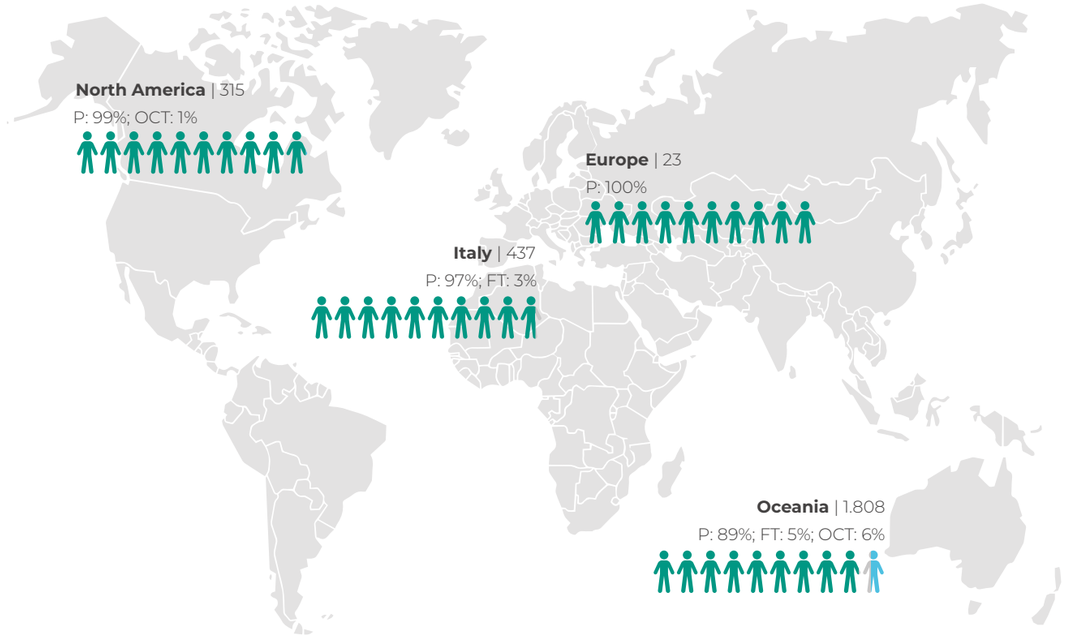
Project staff by contract type and gender

We had 2,583 direct employees in 2022, and 20% of those were women. We took on 667 more employees when we expanded our scope of operations with the E6 worksites in Norway and the M6 worksites in Australia. All of the project contracts from last year have been continued, with a small increase in the workforce to accommodate the demands of the project phases. Most of our female employees are at the Australian construction sites and on the Canadian Broadway Subway project.

Projects are nearly always carried out through Joint Ventures, in which we engage with a number of different partners at varying degrees of involvement, due to the makeup of the industry in which we operate and the specificity of our activities. In the reporting year, 95% of the employees within the reporting scope were involved in contracted projects.

Of all the direct employees within the reporting scope, 2,544 persons, i.e. 98%, are hired locally or are permanent residents of those countries under the terms of their contracts. The data is consistent with that of the previous several years and supports our strategic decision to incorporate the locally-based workforce into our business operations.

Projects make up 93% of our permanent employment contracts. To foster the personal and professional growth of people already employed with us, and cultivate the company's assets and know-how, we favour the transfer of our workers on to new projects.

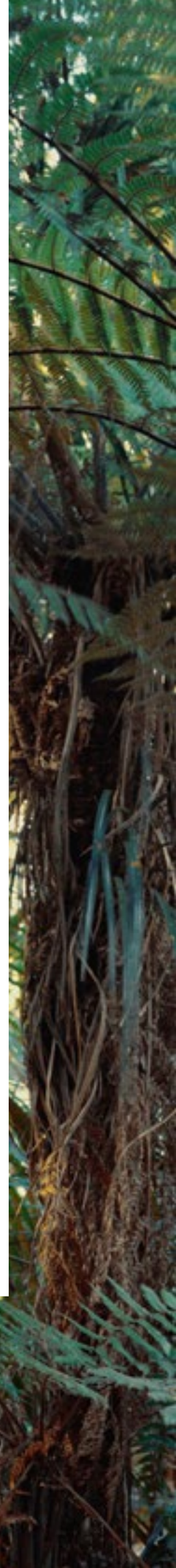


Project staff by contract type and geographic area (not including Italy in Europe)

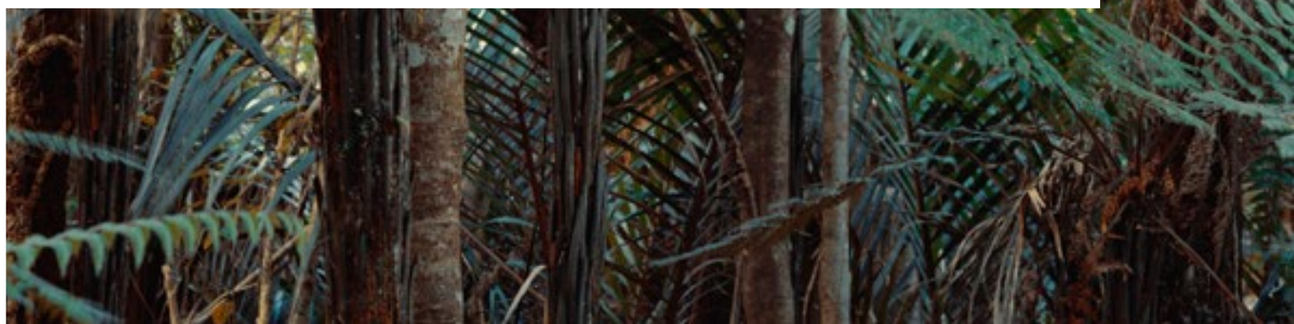
In Oceania, the unique demands of our projects have frequently necessitated the use of unconventional contract types. This requirement has led us to engage highly specialized individuals on short-term contracts to meet the project's specific needs. We had 3,491 non-salaried workers in 2022, mostly on jobs with subcontractors. Other categories of external employees included in our assessment were design consultants and interns.

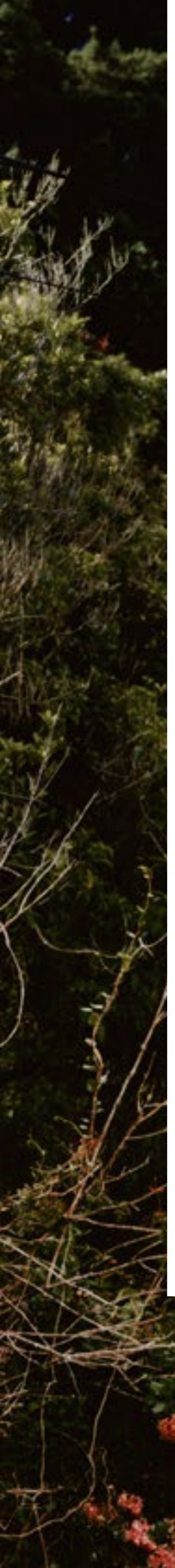
Worker appreciation events in Broadway Subway

The **success** of our projects is dependent on the **dedication** of our crews, of all the people on the site and in the office.
In collaboration with the JV Partners, Acciona and Ghella, **Broadway Subway Project** in Vancouver, Canada, has planned to hold six worker **appreciation events**. The first event was held in December 2022 at the Mount Pleasant Station when the project team served lunch to 55 crew members from a favourite restaurant spot directly across from the Project site. This initiative also helps the Project support **local businesses** and build relationships with restaurants and food suppliers that are impacted by project activities.



↑ *Focus 2*





Activities undertaken for the wellbeing of Ghella personnel

Our HRC Italia **Best HR Team** certification was renewed in 2022 for the categories: employer branding, welfare and wellbeing, people care.

Welfare and Wellbeing

Over the course of the year we undertook a study of two important schemes to further improve personnel attraction, engagement and retention: instituting corporate welfare, and flexible work schedules. At the start of 2023, both were made accessible to every Ghella S.p.A. employee.
The Welfare scheme is a product of valuable input from the people, aiming to address their specific needs through dedicated efforts. By providing a range of services, it enhances the **purchasing power** of families, ultimately improving their overall well-being. The scheme covers site workers, apprentices, office staff and executives at Italian offices and worksites and is a grant system where welfare credits are accrued for using services and purchasing goods through the WellMAKERS platform, which partners with a major European credit institution. The amount accrued can be used with tax breaks up to the expenditure caps imposed by tax legislation, and is based on the job range and company seniority. Any remainder will be donated to charity in support of the entities or organizations that Ghella sponsors, rather than being distributed in cash. Along with the welfare credit, the scheme offers a sizable number of discounts. The basket of goods and services made available includes textbooks, language courses, holiday packages, and subscriptions to affiliated and non-affiliated sports centres. Among the accessible services there are also platforms that provide psychological support.
We wanted to improve the **work-life balance** of our staff as well, so we introduced flexitime for the Rome office and any operational offices that request it. As long as they work their 40 hours as set out by the CCNL (National Collective Bargaining Agreement), staff can decide to start earlier or finish later, in order to better reconcile their private needs with their company service without having to take leave time.

People Care

The Covid-19 pandemic posed significant challenges for a large number of individuals to access essential healthcare services. From May 2022, Ghella started offering a **telemedicine service** in order to add to the benefits provided and foster better connection to our staff, particularly those working overseas. The initiative's objective is to

- improve the quality of health care;
- allow for remote treatment, diagnostic services and medical consulting;
- help the employee or his/her family to interpret symptoms and provide initial specialist advice.

There is a physician available to employees who offers emergency assistance and is someone they can turn to for an initial consultation.

↑ *Focus 3*

Diversity and equal opportunity

We carefully manage our human resources by integrating principles for the protection of diversity and equal opportunities in our Integrated Management System, including definition of specific policies and procedures, such as the "Human Resources Management Policy", the "Equality, Diversity and Inclusion (EDI) Policy" and the "Human Resources and Organization Procedure".

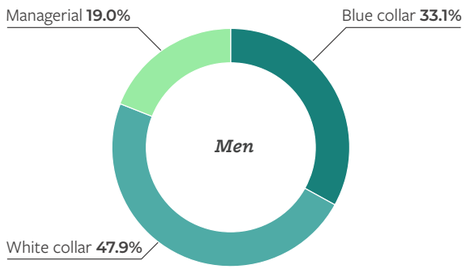
Our procedures guarantee that **hiring** will be based exclusively on skills and qualifications as derived from the submitted applications, keeping track of the CVs analysed during the selection phase. Currently, our company comprises individuals from diverse nationalities, genders, and age groups, fostering a multicultural and enriching work environment.

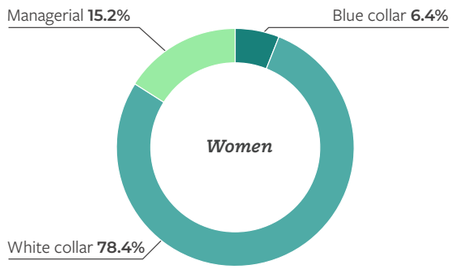
We condemn any type of **discrimination** and promote a culture that respects EDI principles, also achieved through specific training. The "Appropriate Workplace Behaviour Policy" unambiguously defines inappropriate behaviour disallowed by the company, and indicates what reporting channels are available to employees through the "Whistleblowing Policy". ISO 30415 validation ensures that the organizational approach we have adopted is strongly oriented towards diversification and the promotion of an inclusive environment, and demonstrates, once again, that focus on people and their well-being is one of our organisation's most cherished values.

In 2022 we examined the gender distribution of our employees in three professional categories. Overall, women make up about one-third of white-collar employees. The slight increase in the female workforce comes from the Sydney and Auckland construction sites.

		2020		2021		2022	
		Men	**Women**	**Men**	**Women**	**Men**	**Women**
Managerial	n.	356	100	245	49	393	78
White collar	n.	1,227	445	695	252	991	403
Blue collar	n.	1,663	31	668	9	685	33
Total	**n.**	**3,246**	**576**	**1,608**	**310**	**2,069**	**514**
Managerial	%	78.1%	21.9%	83.3%	16.7%	83.4%	16.6%
White collar	%	73.4%	26.6%	73.4%	26.6%	71.1%	28.9%
Blue collar	%	98.2%	1.8%	98.7%	1.3%	95.4%	4.6%

Comparison of gender distribution in each professional category for the years 2020, 2021 and 2022.





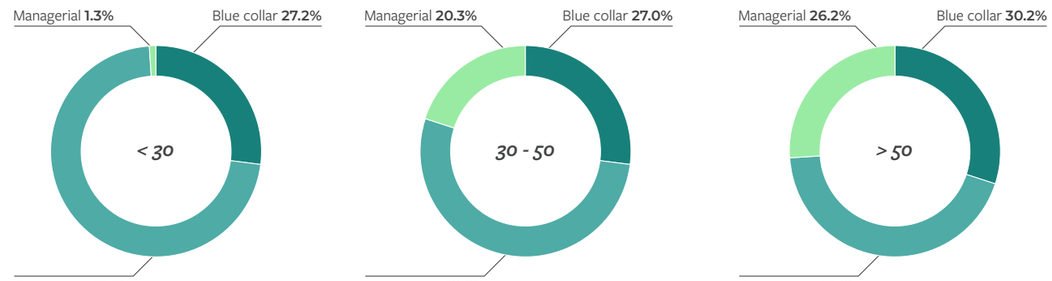
Distribution of employees by professional category in 2022 (% of total, for each gender).

In 2022, women in managerial roles represented 16.6% of the total number of employees in these positions. The trend of this indicator remains steady, with a similar distribution as last year. Approximately 58% of our workforce falls between the ages of 30 and 50, 24% are over 50, while the remaining 18% are in the younger age category.

Considering only the direct employees of the units included in the scope of our reporting, white collar workers have the highest representation in all age groups.

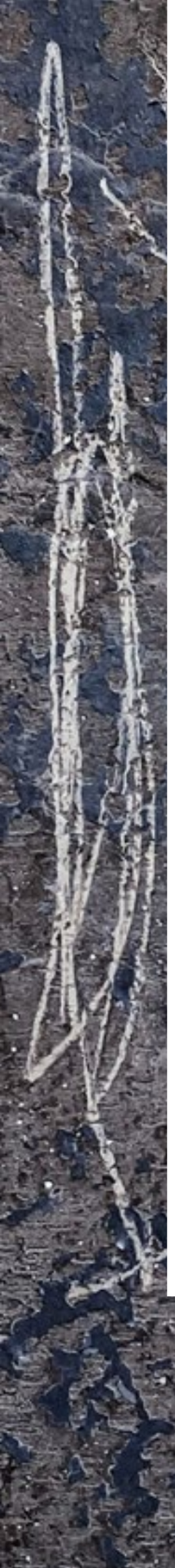
		2020			2021			2022		
		<30	**30-50**	**>50**	**<30**	**30-50**	**>50**	**<30**	**30-50**	**>50**
Managerial	n.	94	236	121	2	179	113	6	305	160
White collar	n.	551	896	229	220	544	183	339	789	266
Blue collar	n.	516	874	305	97	400	180	129	405	184
Total	**n.**	**1,161**	**2,006**	**655**	**319**	**1,123**	**476**	**474**	**1,499**	**610**
Managerial	%	1.2%	50.6%	48.2%	0.7%	60.9%	38.4%	1.3%	64.8%	34.0%
White collar	%	32.9%	53.4%	13.7%	23.2%	57.4%	19.3%	24.3%	56.6%	19.1%
Blue collar	%	30.5%	51.5%	18.0%	14.3%	59.1%	26.6%	18.0%	56.4%	25.6%

Comparison table of employees by professional category and age for the years 2020, 2021 and 2022.



Distribution of employees by professional category and age group.

Australia, Brisbane
Cross River Rail



Te ao Māori, understanding the local culture

In the past year some members of the project team at Watercare's **Central Interceptor** in Auckland, New Zealand, joined a **course**, called Te Wānanga o Aotearoa's He Papa Tikanga, teaching students about **Māori** traditions, concepts, values and protocols. After the course, participants reported a deeper understanding of Te Ao Māori, the Māori culture, and that they feel they can effectively incorporate Te Ao Māori at work, home and in their community.

↑ Focus 4

Italy, Fortezza, Brenner Base Tunnel
©BBT

Development of human capital

Our training process involves identifying the unique needs of each employee. We accompany our staff to understand them better, ensuring we provide the most suitable training, be it on-the-job, e-learning, or face-to-face.

The training plans are designed to take into account both their development needs, as determined from supervisor feedback, and also strategic needs to increase skill level.

The costs of continuing education are covered by inter-professional funds: this allows us to always have a certain amount available to devote to development activities.

In 2022, we provided direct employees of Ghella S.p.A. and project-based workers with continuing education, within the scope of our reporting, amounting to a total of **42,309 hours**. In addition, we arranged over 12,800 hours of training for non-salaried personnel.

Comparison: average hours of training provided in 2021 and 2022 for female and male employees.

The data shows that we provide educational opportunities fairly to all our employees, regardless of gender. Most of the initiatives in the health and safety (42% of the total) and technical (28%) areas are given to blue collar workers.

Over 40% of the total training hours provided related to health and safety issues, including both compulsory and non-compulsory courses, while the development of technical-specialist skills accounted for 30%.

In addition, numerous courses are available to support the development of effective leadership. For example, we are already in the third consecutive year of providing the highly career-boosting course for PMP® (Project Manager Professional) certification.

Finally, in 2022, 72% of the employees of Ghella S.p.A. and those working on projects in its scope of activities completed self-assessments for their job performance.

In 2021 we started the Rookies Programme to acquire fresh young talent. Students in Civil/Construction/Management Engineering, Economics, and Management Studies programs, or graduates with those degrees, are offered a personalised development path within the company, including support of a mentor who will facilitate the corporate integration process. This year we also began pairing them with a fellow employee of similar age who will serve as a "buddy" throughout this experience. We also offer Rookies a perks package including accommodation, transport and travel back to their place of residence. In 2022, we onboarded 15 male and female rookies, in Italy and abroad. Starting in 2023, we will also start extending the opportunity to non-graduates.

Work management and employee well-being

Remuneration is set based on principles of fairness, and is commensurate with the employee's experience and professional skills. We also demonstrate our appreciation to our people by paying them at a rate 15% higher than the market average.

In our field, the majority of specialized technical professionals available on the market are male. However, we are committed to achieving equal pay for all individuals performing the same job at the same professional level, regardless of gender.

About 40% of our employees are covered by collective labour agreements. We sign individual agreements with the rest of our direct employees, in compliance with local legislation. All personnel employed in Italy, at headquarters or on worksites, have signed the CCNL for Construction and Industry.

The Social Performance Team (SPT) ensures further oversight of worker involvement. The SPT was introduced following SA8000 certification and is made up of workers and management representatives tasked with periodically conducting risk assessments in the areas relevant to the SA8000 Standard and monitoring activities in the workplace.

Out of the 82% of our employees entitled to parental leave, 62 people took that benefit in 2022 .

Parental leave by gender	unit	Men	Women
employees with the right to take parental leave	n.	1,706	422
employees who actually took parental leave	n.	37	25
employees who returned to work during the reference period after taking parental leave	n.	37	17
employees who returned to work after taking parental leave and who are still employees of the organization 12 months after their return	n.	27	8

Through our work-family balance initiatives, we prioritize the needs of parents with school-age children. In 2022, we took an additional step by granting unlimited smart working options to all employees in this group, allowing them to better attend to family responsibilities.

Culture of sustainability

We firmly believe that fostering a corporate culture grounded in sustainability principles will effectively facilitate the execution of our ESG Strategy. Shared values and a common understanding of these principles are vital in attaining our group objectives. With this in mind, we run awareness campaigns across our corporate offices and worksites, focusing on topics such as respect for diversity, proper waste segregation, and energy and water conservation, which are themes linked to areas of working life where all individuals are able to contribute.

We held a series of training meetings in 2022 aimed at sharing senior management's strategic directives with the country and corporate representatives in charge of directing ESG Strategy in their areas of expertise, and at discussing ways to implement them. Ghella's most closely-held sustainability issues (such as, life cycle thinking, carbon footprint, employee well-being, and sustainable procurement) are covered in a course that is open to all Ghella S.p.A. employees and was designed internally with the assistance of a training entity. The course also helps participants situate our efforts within an evolving external context.

The intranet, the Ghella **app**, the **LinkedIn** page and **Instagram** page are very useful tools for fostering our corporate culture. These outlets report on a roll of ever-changing topics: information and updates on construction sites, our history in a nutshell, the humanitarian or social causes that we are committed to promoting, and sustainability initiatives at the head office and at the worksites. Together with other channels such as the corporate **photographic archive**, they help us maintain the links between offices and project locations by encouraging interest and curiosity through images and through the sharing of stories.

Instagram

Health and Safety

The health and safety of our workers is our utmost priority. Guaranteeing their protection and safety is how we pursue excellence in our work, dedicating ourselves to achieving our primary objective: **zero harm**.

The **Management System**, certified according to the international standard **ISO 45001:2018** and Standard **SA8000**, ensures proper handling of these issues, which have always been the core of our modus operandi.

The nature of our activities exposes workers to potential risks that could significantly affect their health and safety. To address this, we have established tools within our Management System to identify hazards, assess risks, and implement preventive measures for their protection. In order to accomplish this, we draw on the **know-how** developed from our many years of experience in the sector, taking into consideration the **lessons we have learned** and implementing knowledge-sharing strategies within the company. To improve our performance further, we periodically review the results of these measures at the Annual Meeting of the Management System and the **Health and Safety Committees**, as the Social Performance Team SA8000.

We make use of our expertise and experience when managing potential health and safety hazards during implementation of our projects, including through the active **participation and involvement** of stakeholders. To ensure activities are monitored continuously, our professionals are always committed to developing more innovative and effective security measures. Everyone is involved in the hierarchy of controls, from senior management down to the personnel most involved in operations. Everyone has the opportunity, and responsibility, to report dangerous situations or to suggest improvements. We have set up dedicated communications channels for this, as set out in our Whistleblowing Policy and Social Responsibility Policy SA8000.

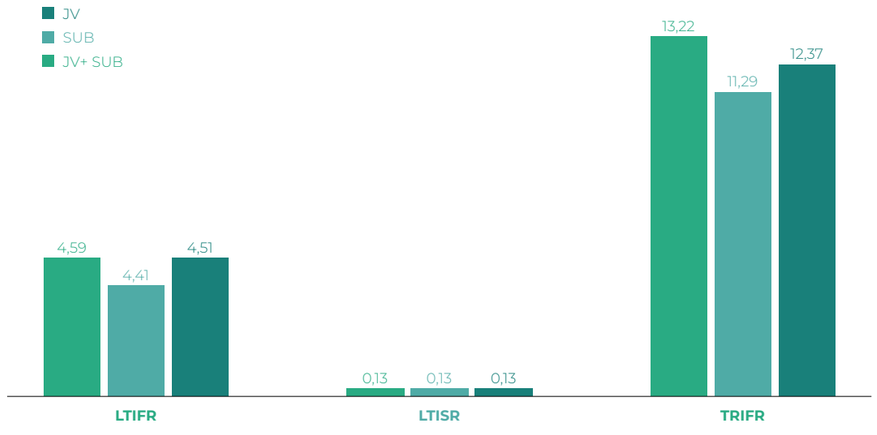
Training is one of the fundamental ways we promote and disseminate a **Health and Safety culture**. It ensures active worker participation in occupational safety matters and the development of essential skills. We provide this training in different ways: at induction, on-the-job training, internships, e-learning, toolbox talks, daily or weekly discussions, Job Safety Analysis, etc., depending on needs and objectives defined and taking regulations and context into account.

CORONAVIRUS

Health protection emerged as a top priority during 2020-2021, largely due to the global pandemic, which significantly impacted people's daily lives, both personally and professionally. However, 2022 brought a turning point in the crisis, with a substantial decline in infection-related fatalities, leading to the SARS-CoV-2 virus being considered endemic. Consequently, government authorities have deemed the situation no longer an emergency. The initial rigorous intervention strategy, comprising specific prevention, protection, and organizational measures, has now evolved into a more scaled-down version that aligns with the current risk level, allowing people to resume social interactions and increased participation. Despite the changes, awareness regarding the situation remains high, both domestically and internationally.

ACCIDENT INCIDENCE RATE

We conduct incident monitoring through detailed analysis to identify root causes and develop effective preventive measures, ensuring the avoidance of future situations. We report accident incidence rates (lost time injury frequency rate - LTIFR , lost time injury severity rate - LTISR and total recordable frequency rate - TRIFR) for Ghella's entire scope of operational activities.



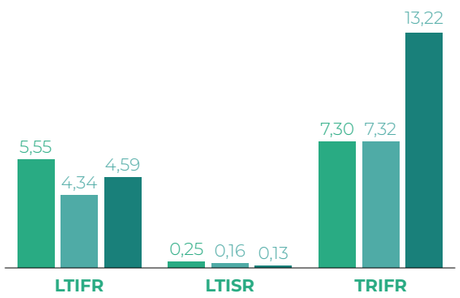
Trend of accident incidence rates for the year 2022 for employees, subcontractors and total workers.

New Zealand, Auckland, Central Interceptor
©Watercare Services Limited

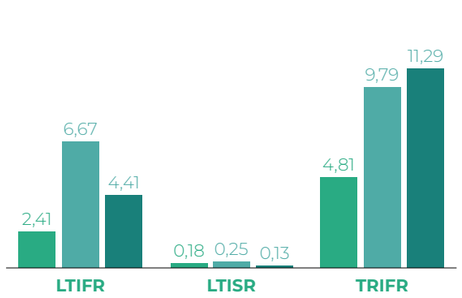
Compared to 2021, for salaried employees, analysis of accident incidence rates shows that the LTIFR was up by 6% and LTISR down by 19%. For subcontractors, on the other hand, both indicators dropped. LTIFR overall shows an improvement of 18% compared to the previous year. This progress has been achieved by undertaking prevention, protection and improvement initiatives such as: continuous training and awareness campaigns to foster worker **involvement**, **incentives and recognition**.

Monitoring proactive and predictive performance indicators and the outcome of risk assessments allows us to carry out targeted checks, focusing attention on the most sensitive areas: tunnels, work performed at heights, electrical work.

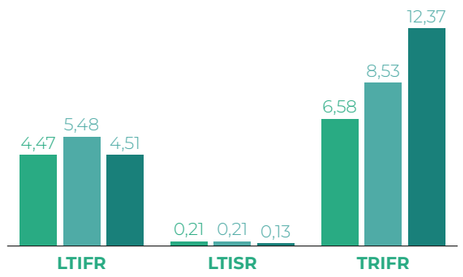
The bar graph below depicts the trend of the accident incidence rates for the reporting period, comparing it with the prior two years.



Comparison of salaried employee accident incidence rates in 2020, 2021 and 2022.



Comparison of accident incidence rates for non-salaried/external employees in 2020, 2021 and 2022.



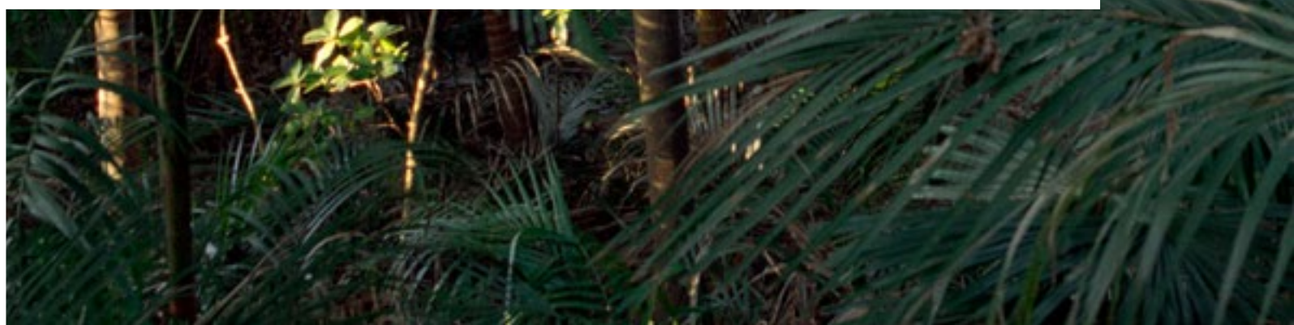
Comparison of accident incidence rates for total workers in 2020, 2021 and 2022.

2020 2021 2022

Making safety personal – Traffic managers campaign in Broadway Subway

Safety is a top **priority** for us and the topic in our **ESG Strategy** receiving the highest interest from both internal and external stakeholders consulted withing our materiality analysis. We believe that a well-designed safety program should include effective **awareness** campaigns and strive for these to be as innovative and engaging as possible.
The **Broadway Subway project** in Vancouver, Canada, delivered a safety awareness campaign aimed at keeping **traffic management personnel** safe. To help increase public awareness of the need to drive safely, the project team created a campaign using their crew members and their families. Photos were taken and paired with safety messages and then signs were installed across the Broadway Corridor near all station areas.

↑ *Focus 5*



2022	Hours worked	LTI[11]	MTC[12] + RWC[13]	Total recordable work-related injuries	Injuries with serious consequences	Rate of injuries with serious consequences[14]
Salaried employees	9,154,794	42	79	121	1	0.11
Non-salaried employees	7,260,206	32	50	82	1	0.14

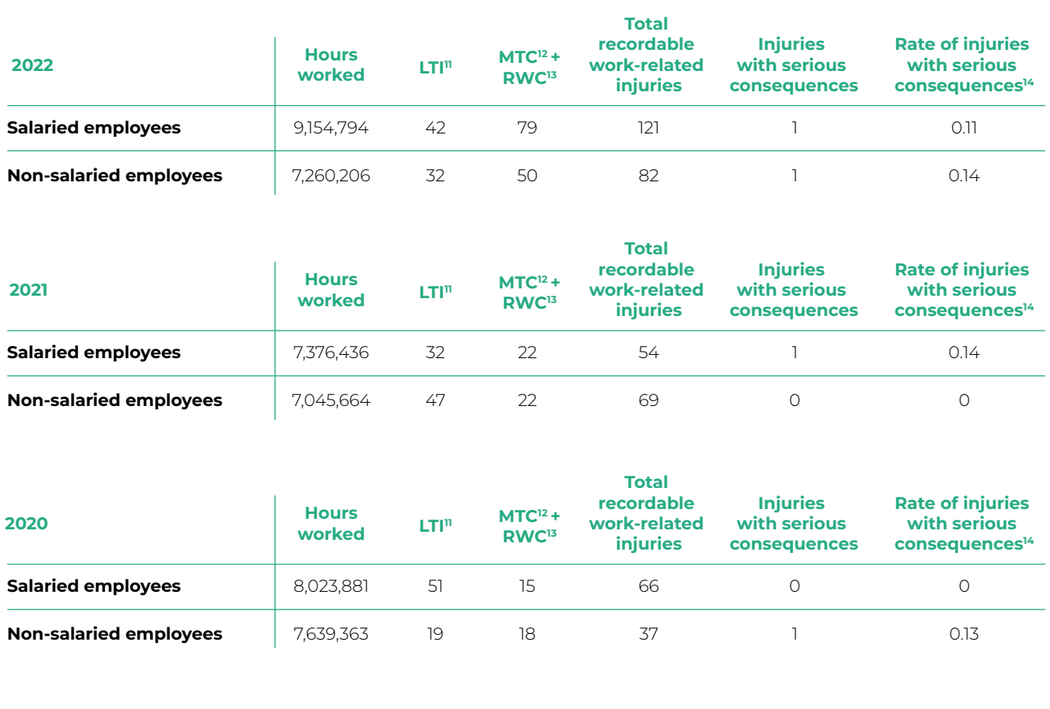
2021	Hours worked	LTI[11]	MTC[12] + RWC[13]	Total recordable work-related injuries	Injuries with serious consequences	Rate of injuries with serious consequences[14]
Salaried employees	7,376,436	32	22	54	1	0.14
Non-salaried employees	7,045,664	47	22	69	0	0

2020	Hours worked	LTI[11]	MTC[12] + RWC[13]	Total recordable work-related injuries	Injuries with serious consequences	Rate of injuries with serious consequences[14]
Salaried employees	8,023,881	51	15	66	0	0
Non-salaried employees	7,639,363	19	18	37	1	0.13

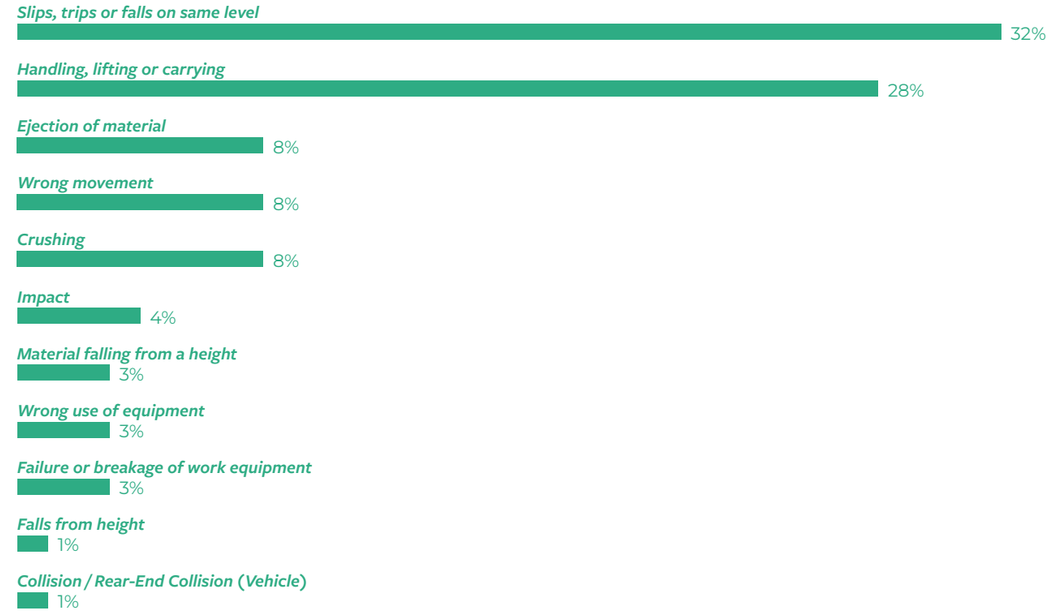
The two injuries with serious consequences that we did record both occurred mainly due to failure to comply with procedures. After analysis of the causes, corrective actions were identified, including the incorporation of new safety devices into vehicles and equipment.

We have also added new training cycles on the correct and systematic application of safety procedures.

Outside of the two episodes reported above, the rate of injuries with serious consequences and in-depth analysis of the types of accidents--including subcontractors--shows that, generally speaking, the majority of these events are not significant. The injuries suffered by the workers are mainly blunt trauma. The breakdown is given below.



Breakdown by types of injury occurred in 2022



Breakdown by causes of injury in 2022.

Considering the types of activities performed by the company, and based on risk assessments conducted in the various production units, the occupational hazards that pose the greatest risk of serious injury are primarily physical in nature, and are linked to work patterns. The most common causes include stumbling or slipping, incorrect moving of loads and improper equipment use.

New Zealand, Auckland, Central Interceptor
©Watercare Services Limited

First aid station at the Brenner TBM site

Worker **safety** is our topmost priority. We are committed to risk reduction, training, and motivational efforts directed at site personnel, but we are also aware that on occasion the need to take quick action arises. For this purpose, the **TBMs** being used for excavation of the north tunnels (GLEN and GLON, respectively the North Line East and North Line West) at our **Brenner** worksite include a **first aid station** manned by a professional EMT who will be available in all work shifts, 24 hours a day, 7 days a week. The unit is equipped to provide first aid/medical treatment for non-serious wounds and, in a worst case scenario, to coordinate and manage the transportation of seriously injured workers from the TBM to a meeting point for assistance from external rescue teams. The presence of a first aid station in the TBM reduces the time any injured person will have to wait before being seen by a professional EMT during the phase of being removed from underground and stabilized. An effective health care interface has therefore been put in place between the EMT, the General Coordinator of Emergencies (GCE), and the external care facility staff.

↑ *Focus 6*

Greece, Athens, Metro Line 3
Photo by Marina Caneve

Local communities

The public works we are involved in generate **long-term benefits**, by improving **services** to citizens and boosting the **productivity** and **competitiveness of the local areas**. The **environment** also benefits, as in the case of rail projects that promote the transition from road to rail transport, thus improving air quality, or water projects that reduce the spillage of wastewater into waterways or into the sea.

Our presence in a local area galvanizes **linked industries**, by creating **jobs** both at the worksite and along the entire supply chain, as evidenced by our commitment to hiring and engaging local resources and businesses. The fact that we are an international company also leads to **transfer of knowledge** from other regions of the world to the one in which we are operating, and professional growth of a highly specialised labour force.

We acknowledge that the construction phase of the work may cause occasional **inconvenience** for communities near the worksites, such as **noise**, **vibrations** or temporary closures of roads and public areas. For works in urban areas, such as projects for underground lines, there are additional inconveniences associated with the **extra traffic** created by site vehicles and delivery of supplies, and with the transport of excavated material through city streets.

To address this, we consistently strive to **engage local stakeholders** at our worksites from the initial construction stages. Our goal is to provide them with information, seek their input through consultations, and mitigate negative impacts whenever possible. Additionally, we explore opportunities to offer compensation measures whenever applicable.

Initiatives linked to **information** sharing include the following:

- individual visits to residents (door-knocking),
- on-site "meet and greet" events for the companies in the JV ("Meet the Contractor"),
- initiatives to involve schools near our worksites.

Our **mitigation** efforts include:

- installation of noise barriers (such as acoustic insulation covers for our belt conveyors),
- the creation of murals or other artistic works to make certain areas of the building site more visually appealing.

Our **compensation** measures might include:

- direct contributions, such as the installation of special windows to reduce noise or the creation of services including playgrounds or bike paths.
- indirect contributions, in the form of donations, fundraising campaigns or sponsorship of initiatives which will benefit the entire community or vulnerable segments of the population.
- support to commercial enterprises adjacent to the worksite.

Some stakeholder engagement initiatives are managed directly by our clients with the support of site personnel. This is the case for the **visitor centres** set up for schools or private individuals, featuring displays with informative materials explaining the various construction and excavation stages. They will often arrange organized visits to the worksites. The broad international scope of our activities requires that we pay a great deal of attention to **integrating** our expatriate personnel into the local context: we both emphasise the distinctiveness of our corporate footprint and encourage mutual enrichment. In this same spirit, **we respect the rights and customs of the local populations** and make them the central focus of our efforts to incorporate our personnel into new settings.

M6 Stage 1 invest in the future through high school engagement

We recognise the importance of engaging with the **younger generations** and inspiring their future career paths in the construction industry.
To this end, Transport for NSW's **M6 Stage 1** project in **Sydney**, Australia, has implemented several successful initiatives through the efforts of its workforce development, training and community engagement teams.
In November 2022, the Rockdale Tunnelling site hosted six year 10 students from the Presbyterian Ladies College in Croydon as part of their **Futures Discovery Program**. The program provides opportunities for students to experience different organisations and industries through real-life 'behind the scenes' **workplace experience**. During the visit to site the six students heard from a number of members of the senior leadership team about the project and career options, they 'built' a roadheader, went on a site tour and also had the honour of naming one of the new roadheaders on site. One of the students commented, "I enjoyed the visit because it was very interesting and different and allowed me to see a new job and career path I had not considered before."
The Arncliffe temporary tunnelling site hosted 12 students in December 2022. These students are considering taking on school-based traineeships or apprenticeships in construction in 2023. They were involved in a project overview and sessions to learn more about the roles on offer and they were also taken on a tour around site to get a realistic job preview.
Several members of the M6 Stage 1 **Women in Construction Committee** attended **Moorefield Girls High School** in December 2022 to be 'interviewers' for their **mock interview program**. The mock interviews give the students practical experience in interviewing skills so that they are more prepared to join the workforce. The Women in Construction Committee focuses on increasing awareness and participation for women in construction through various initiatives and work together on initiatives to attract women and girls into the industry, provide development, educational opportunities and support through workshops and events for our existing team.
The project has also hosted a number of Year 10 students completing a week of work experience. Students from Year 10 and above are encouraged to spend time in the workplace to help them refine their choice of electives and further learning.
The M6 Stage 1 project team are continuing to invest in these initiatives, through reaching out to local schools and others, in 2023 and beyond.

↑ *Focus 7*

Community and Sustainability issues at Central Interceptor

The Central Interceptor project in Auckland, New Zealand, has a strong focus on community engagement and has a number of community-related initiatives. Client Watercare and the Ghella Abergeldie Joint Venture pride themselves on being good neighbours especially as many of the 16 work sites are in residential neighbourhoods across Auckland. The team works hard to come up with new and innovative ideas to increase interaction and engagement with the community. In 2022 they started a new **community event** called **Behind the Blue Gate** (**BBG**), the blue referring to the dark blue hoardings and gates surrounding the site: an opportunity for the closest neighbours and sensitive stakeholders to visit sites to see the construction progress and learn more about the project. The BBG events have been well attended and everyone has especially enjoyed looking down the shafts and **seeing firsthand** the scale of this massive infrastructure project. At the Mt Albert War Memorial site, they created two small viewing windows into the site hoardings so that the community can watch the progress. This site is next to a busy community centre and park. To show how much they value their closest neighbours, the project team gives them a small hamper at Christmas to thank them for their support throughout the year.

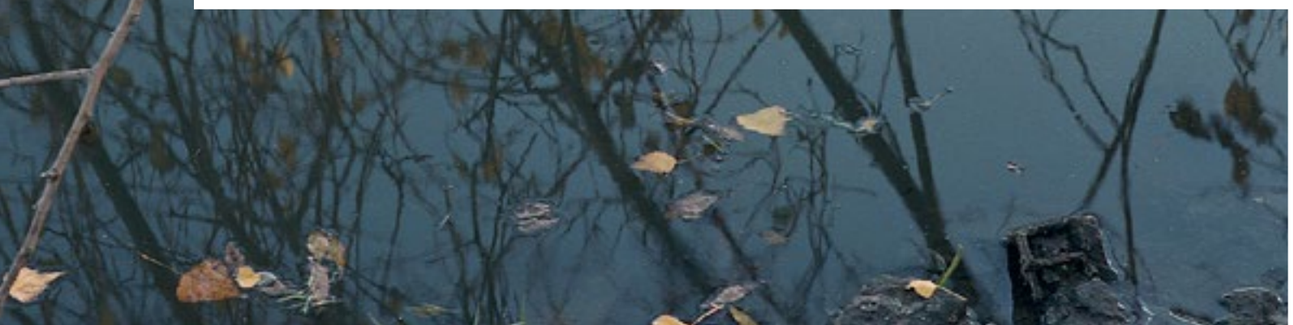
Sustainability remains a priority for the Central Interceptor Project and if it can help neighbours and the community it is a bigger win. The project **donated gum**(**boots**) that no longer met safety requirements to a close neighbour, **Mount Albert Grammar School**. This city school includes an operating farm, and the project restocked their gumboot locker with hardly used boots for use on the farm.

During the site establishment of the Haverstock site in Mount Albert in April it was necessary to clear native flax, also known as harakeke, before earthworks could start. The GAJV social responsibility team reached out to the community to see if anyone was interested in harvesting **harakeke** (**flax**) before it was removed. Harakeke (New Zealand flax, or Phormium tenax) is a plant of great value and importance to Māori, New Zealand's indigenous people. The plant is at the heart of Māori weaving. A local **master weaver** joined the team to **teach** them **how to harvest** the harakeke and the sustainable cycle of this native plant. The weaver will use her harakeke to create wahakura, or sleep baskets, to help prevent SUDI (sudden unexpected death in infancy) for newborn babies.

↑ Focus 8

Community events in Broadway Subway

In order to increase the visibility of the project, engage in meaningful discussions and respond to questions, between May and September 2022 the project team at **Broadway Subway** in Vancouver, Canada, attended four key **community events** in the neighbourhoods where we are building the subway: Khatsalano Festival, Kitsalano and Riley Park Farmers Market, Main Street Car Free Days. During the events the team spoke to **hundreds of residents** in the area and visitors to the community from across Metro Vancouver. In addition, through the year the project team coordinated eight **pop-up tables** in the vicinity of **station areas** to share information with the public and answer questions about new construction activities, celebrate milestones and reinforce our presence on the Broadway corridor. Pop-Up info booths provide an opportunity to quickly adapt to the needs of the neighbourhood. In the Great Northern Way – Emily Carr Station viewing windows into the excavation were open to the public.



↑ Focus 9

Profile

Flavia Cerasi

Special Projects & Communications Specialist
Rome

Could you briefly describe your role?

I have been with Ghella since 2020, based at our headquarters, where I actively engage with our clients, partners, and construction sites worldwide on a daily basis. My primary role involves gathering vital information on project progress, milestones, and key initiatives, ensuring that our colleagues and external followers are consistently updated.Beyond project-related interactions, I play a role in managing Ghella's global image. I oversee the communication channels, including the website, intranet, and social profiles. Additionally, I am responsible for sharing all press releases and news, both internally and externally. Our team serves as a central reference point for all local branches, guaranteeing that Ghella's image is accurately represented outside the company. I actively manage relations with the associations and foundations that we support and coordinate our special projects, which involve side initiatives that promote creativity and talent. Through these projects, we invest in the individual and collective growth of our colleagues and contribute added value to the territories where we operate.

How important is it today to effectively communicate the company's positioning on sustainability issues?

After years of generic statements, companies are finally shifting their communication towards more rigorous and authentic standards regarding sustainability issues. Ghella has consistently embraced a policy centred on presenting concrete examples and case studies. By reporting the tangible results of real actions taken in the world, we underscore the effectiveness of our solutions that yield a reduced environmental impact, such as the reuse of raw materials or the use of clean energy from renewable sources. This commitment goes beyond mere communication; it encompasses the actual commitments made and the outcomes achieved within local areas and communities where these actions were implemented. This approach not only helps us inspire the younger generation, which is increasingly informed and concerned about sustainability matters, but also demonstrates that a better world is achievable when everyone takes responsibility. By doing so, we also gain a competitive advantage in our recruitment efforts.

How do you think your work contributes to achieving Ghella's sustainability targets?

The culture of sustainability is a crucial factor for any committed company undertaking a genuine transition. That is why it is essential to describe the stages and processes accurately and authentically, beginning with internal communication and employee consciousness. Knowledge sharing facilitated through the intranet can indeed play a positive role in accelerating the promotion of replicable best practices. Additionally, well-managed internal and external communication on a global scale aids in conveying complex concepts clearly and simply, which are now more vital than ever.

What is the most stimulating aspect of your work?

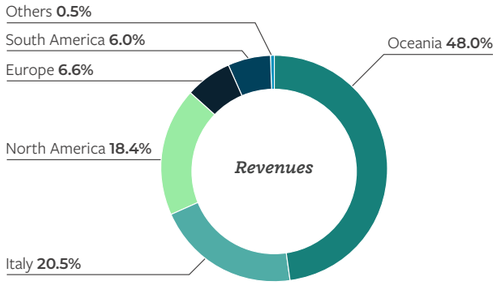
I would say there are two aspects: first of all, the international component, as my role requires me to interact with colleagues in different countries; and secondly – no less importantly – continuous training in the field. I learn new things every day, thanks to the incredible know-how of the people I work and collaborate with. Each of our projects is like a giant universe, and every single one is unique – it is because each has its own special characteristics that I am always acquiring new information – both technical and managerial.

Value

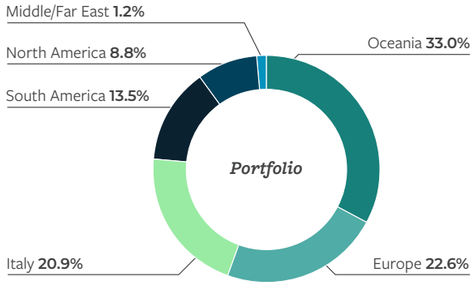
Main operating and financial result

(in thousands of euros)	2020	2021	2022
Revenues	525,418	648,045	859,604
EBITDA – Actual earnings before interest and taxes, depreciation and amortization	58,644	76,429	88,533
Economic value generated and distributed	513,228	631,830	860,010

Another accomplishment in 2022 was demonstrating that we are a solid company and a reliable partner for stakeholders. Our organisation's international trend is even more consolidated than last year, with about 79% of revenues and the work portfolio being achieved outside Italy.



Revenues by geographic area



Work portfolio by geographic area

Greece, Athens, Metro Line 3
Photo by Marina Caneve

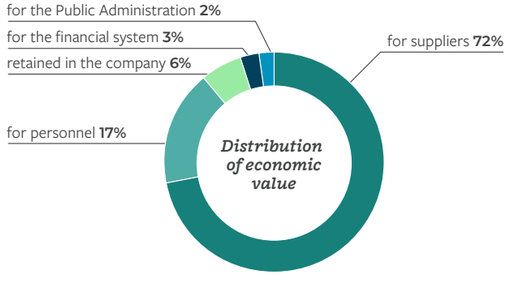
Economic value generated and distributed

The breakdown of the economic value generated and distributed by Ghella was calculated by reclassifying the items on the Income Statement in the Consolidated Financial Statements as at 31 December 2022.

In 2022, directly generated economic value totalled 910.33 million euros and includes revenues and financial income. Most of this value, 72%, is distributed to suppliers, and includes costs for services and raw materials. This is followed by the value distributed to employees (17%), in the form of wages, salaries and benefits. The value distributed to the financial system amounts to 3% and includes financial charges, exchange losses and distributed dividends. The Public Administration received 2% of the economic value generated, via income taxes and local duties and taxes.

The amount of investment in the community totals around 260,000 euros .

The value retained in the company amounts to 6% of the total directly generated.



Distribution of economic value generated


Canada, Toronto
Eglinton Crosstowny West Extension

Sustainability as a competitive advantage: new sustainability-linked loans

We believe that being sustainable is actually a **competitive advantage**. In the last three years, Ghella has carried out several **green financing** operations. These initiatives require the reporting of sustainable investments within the investment plan, identified on the basis of the European Taxonomy, and **highly performing sustainability indicators**. In 2022, Ghella also secured financing from leading banking groups to promote sustainable development. These are **Sustainability-Linked Loans**, for a total amount of **75 million euros**, to support the investment plan. A part of this financing was linked to a quantified **reduction in CO_2 emissions** that Ghella undertook to achieve when the loan was agreed, while another was linked to **revamping** and **repowering** of the Group's **photovoltaic plants**.

Our supply chain

Supply chain management plays a critical role in the construction industry. Suppliers of works, goods and services (hereinafter "suppliers") are key **stakeholders** for us, and their performance can significantly affect the efficiency, quality and sustainability of our activities and the projects we carry out.

Procurement management is a theme that permeates our entire ESG strategy. This is because we involve our suppliers and sub-contractors in creating what are called 'green' solutions, respecting the rights of employees, and using ethical and transparent practices in our commercial relationships. Our goal is to strengthen strategic partnerships with our suppliers for the benefit of both parties by choosing, monitoring and continuously fostering improvements that take ESG criteria into consideration.

The **Sustainable Procurement Policy** sets out the values and principles that guide management.

We share our policies and guidelines with suppliers, and ask them to act in compliance with their statements in this regard in order to ensure a uniform and consistent approach throughout the value chain.

And so the route we have taken with SA8000 accreditation places us in an increasingly synergistic relationship with our suppliers, with a view to mutually fostering continuous progress. We apply the same level of diligence in checking each of our suppliers' compliance with the standard.

SUPPLIER QUALIFICATION AND MONITORING

Qualifying a new supplier, as identified during market surveys ("scouting"), begins with the request to register on our **Ghella Vendor List** platform, where they are asked to fill out a qualification questionnaire: those who successfully complete the process will be included in our **List of Suppliers**. For the projects where the partner qualification system is adopted, we make sure to verify that the qualification criteria adopted corresponds to those found in our questionnaire.

In 2022, we managed over 2,300 suppliers. Of these, 94% are local, meaning their companies are registered in the same country as where the job contract is operational, and they form 94% of our total expenditures. By choosing local suppliers, we lower the financial and environmental costs of transporting goods while also enhancing the economic vitality of the communities in which we operate. In the reporting year, almost 500 of our suppliers were ones we had never hired before. Out of all the units covered by the reporting scope, around 42% were evaluated on the basis of their quality, safety, and environmental standards. 43% were additionally assessed using social criteria. In Australia and Canada, 100% of our major suppliers are assessed according to social and environmental criteria. If environmental criteria were not included in the qualification process, they will nonetheless be applied later, during the monitoring process and during operations.

None of our subcontractors or suppliers of goods come from geographical areas where human and children's rights are at risk. Good environmental performance in compliance with working conditions is a requirement for entering our supply chain, but it is also a prerequisite which must be maintained and improved throughout the whole period of the partnership: we work to gradually incorporate suppliers into our sustainability path. In 2022, 9 second-party audits were conducted on suppliers within the scope of SA8000, and audits were also carried out on the integrated quality, health and safety and environment management systems. The sample was selected based on scores obtained during the initial qualification relating to environmental and social issues. In these activities, which involved both the examination of documents and site visits, we checked the working methods and procedures of our suppliers and communicated our views and suggestions for improvement. In several instances, the audit also allowed for an improvement in scores at the qualification stage. All our suppliers gave their full cooperation both during and after the audit.

In the case of suppliers for which critical issues are identified during periodic audits and monitoring, they must implement the necessary mitigating measures within the established deadlines, or they will be struck off our list of partners, in accordance with our internal procedures.

Working together with suppliers to lower greenhouse gas emissions

In 2022, the AF Gruppen-Ghella Joint Venture won the tender issued by the Municipality of **Oslo** for the construction of the **Clean Water Tunnel**.
This was Ghella's first award where the Client placed great emphasis on sustainability of materials in the context of the technical bid.
Among the Tender's mandatory requirements was that bidders must **quantify the greenhouse gas emissions** associated with supply of the **main building materials**. The bid with the lowest environmental impact would be given the highest score.
Therefore, right at the very start of the **tender phase**, we were faced with the challenge of finding a solution that would allow CO_2 emissions to be kept as low as possible, both in the phase of producing the materials at the supplier's site, and in the phase of transport to the construction site. We addressed this by analysing **product life cycle** (**LCA**) impacts.
The requirement specifically concerned the following building materials: cement, micro-cement, bi-component mortar, concrete, reinforcing steel and segments (the prefabricated reinforced concrete elements used to line the water tunnel). As proof of correct calculation, we were asked to provide an **Environmental Product Declaration** (**EPD**) compliant with the **UNI EN 15804 standard**.
Quantifying the emissions connected to the construction of these **segments** was the most significant challenge for us, as the elements are not already available on the market and need to be designed based on the geology and characteristics of the terrain and the project specifications. This challenge allowed us to strengthen our **cooperative relationships with suppliers** and to develop synergy between **designers** and **environmental specialists**, in order to identify lower-impact environmental solutions right from the design phase, in line with our ESG strategy.

New Zealand, Auckland, Central Interceptor
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Innovation

The search is perpetual for engineering solutions that will enable safe performance of work, allow us to monitor the technical choices made and anticipate potential problems, and stimulate the transfer of know-how.

Excellence in carrying out our projects is our distinguishing characteristic, and means we are recognized on the market because of our extensive specialization. The ongoing search for innovative solutions when performing work allows us to consistently raise quality standards, thus ensuring safer working conditions.

Most of the operational innovations originate from the worksites themselves, and we test new solutions at the sites on a daily basis in order to achieve optimum results.

The following were also the focus of our efforts in 2022:

- applied research and validation of new technologies, materials and concepts, as well as the management and drafting of patents;
- design and development of modifications to Tunnel Boring Machines (TBMs), working in partnership with one of the main TBM manufacturers, using refurbished materials and equipment wherever possible.

Among the major **innovations we have developed** are:

- a new type of Double Shield TBM designed in tandem with the principal TBM manufacturer, which has an additional shield (compared to the usual 4 shields for a Double Shield TBM) adjacent to the excavating head, housing a battery of drills that make holes for grout injections.

But we have also developed new applications using innovative technological solutions:

- **New electric drive train technologies**

Using electric locomotives: not only does use of these cut greenhouse gas emissions and improve the quality of the air in the tunnel; it also lowers maintenance time and costs compared to traditional movers. The power consumption of the primary fans and the risk of fire in the tunnel are also reduced, since diesel locomotives are the primary generator of such risk. We also have started to use electric trucks for spoil removal from TBM tunnels, as far as the cavern or to its final destination.

- **Fiberglass-reinforced segments**

Segments with partial or total replacement of the traditional rebar with fiberglass: in addition to reducing the greenhouse gas emissions associated with this element, our innovation allows time and cost cutbacks in factory manufacture of the segments. Compared to segments with steel rebar, the average saving is around 2,000 tons of iron per 10km of tunnel.

- **Segment design mixes**

In compliance with mechanical performance and durability requirements, at some worksites we employ mixtures with low carbon emissions, through the use of Supplementary Cementitious Materials derived from other industrial processes.

- **Compact launching structure**

The procedure makes it possible to start up the TBM in very confined spaces and in shorter times, avoiding the traditional method which involves assembly of a number of rings, which reduces the space available in the work area and which have to be broken up after launching the machine, thus introducing safety risks. This structure allows the TBM to be started in complete safety, lessening the risk of subsidence and water ingress.

- **Equipment for mechanizing the excavation of bypasses**

A 2022 study conducted by the technical office and the research and development department examined a new system for mechanizing the creation of bypasses (connecting tunnels between one tunnel and another). Our aim was to use downscaled TBM technology to add flexibility to excavation of the bypasses, which are typically shorts measuring 10-20 meters with a reduced cross-section of 2-3 meters. These are placed in significant quantities every 250-400 meters, in our subway, railway and highway projects. Mechanizing their excavation allows us to reduce the time and resources involved and improves safety conditions for workers. The technology will be tested at future worksites.

- **Cement-free mixes**

This was the result of a partnership we started in 2021 and continued through 2022, with the company GEEG (Geotechnical & Environmental Engineering Group), a spinoff of La Sapienza University of Rome. The purpose was to study an alternative cement-free mixture which would be used to fill the annular space between the excavation of the gallery and the external surface of the precast segments lining it. The research project led to the creation of a mixture which has the same mechanical characteristics as cement ones, but is obtained with a by-product of the cast iron production process: blast furnace slag. Emissions associated with production of this mix will be pared due to the absence of cement, and the repurposing of waste from another process makes this solution an excellent example of circular economy. We will start using the new mixture at various worksites in Norway and Australia in 2023.

Knowledge sharing to harness innovation

Building sustainability **partnerships** and **knowledge sharing** is key to setting high standards for sustainability. The Ghella Abergedie JV, which is building Watercare's **Central Interceptor** project in Auckland, **New Zealand**, in 2022 hosted an inter-project **knowledge sharing day** with **City Rail Link** (**CRL**), a large transport infrastructure project in the area. The **two Sustainability teams** exchanged ideas on diverting construction materials away from landfill towards re-use or re-purpose and examined some of their strategic buying decisions to better support sustainability outcomes for both projects. The meeting resulted in some immediate **successes**, with both companies applying ideas to their own projects.

Innovation for safety: FibroLaser fire management at the Brenner worksite

Innovation is an important enabling factor in our ESG Strategy, yielding many kinds of sustainability benefits. When innovation is placed in the service of **safety**, the improvements involve an area that is greatly important to us at Ghella. At the **Brenner** worksite in Italy, in the tunnels where mechanized excavation is present, a **FibroLaser system** was installed. This is a thermosensitive cable which detects the variations in temperature with an approximation of about 1 meter even at its ends, simultaneously, in real time. This system, through the setting of pre-alarm thresholds linked to temperature variations, allows **timely handling of emergencies** by allowing precise identification of critical points. By exchanging data with the external interface, the FibroLaser system allows the GCE (General Coordinator of Emergencies) to activate the audible alarm for the stretch of tunnel concerned and send information on the status and extent of the fire to the emergency services operating centre. This system also allows us to remotely check the status of any **fire** until it is resolved.

Donations, sponsorship and association memberships

We are conscious of our social responsibility, and have adopted a **Sponsorship and Donations Plan** we use as a vehicle to support initiatives that reflect our values.

We commit to this with **three kinds of initiatives**:

DONATIONS

SOCIAL INVESTMENTS

SPONSORSHIPS

Our initiatives target two very specific objectives: **social support** and the **creation of shared value**.

We have decided to focus on **six different specific areas**, each of which is an important building block in the development and growth of the communities in which we operate:

Italy, L'Aquila
MAXXI exhibition "Di roccia, fuochi e avventure sotterranee"

Social, through support given to **aid and charitable** organizations, and also raising consciousness among the employees as to the causes our company supports. This category includes, among others, donations to the **Community of Sant'Egidio** and the **Umberto Veronesi Foundation**.

Culture, by fostering **cultural excellence** in Italy and throughout the world, such as donations to the **Orchestra and Chorus of the Accademia Nazionale di Santa Cecilia** in Rome.

Arts, as guarantors of freedom of expression, a value that helps us to open ourselves to imagination and avoid prejudices, where we support the creation of art. With a view to continuing on from Quodlibet's publishing project **Di Roccia, Fuochi e Avventure Sotterranee** and before staging the show of the same name at **MAXXI National Museum of 21st Century Art in** Rome and **MAXXI L'Aquila**, we brought together five photographers to document the operations of five of our worksites around the world: Naples-Bari, Vancouver, Brisbane, Auckland, and Buenos Aires. We will create a second box set from the material produced, and following that there will be an exhibition called "**Nuove Avventure Sotterranee**", which will feature at MAXXI Roma with Alessandro Dandini de Sylva curating once more.

Sustainable communication, to promote our mission and vision through our stakeholders.

Education and instruction, investing in **master's and undergraduate degrees, both bachelor's and specialist**, in order to bequeath **our passion and skills to future generations**; for example, we have sponsored the Master's for Business Engineers offered by Direxta Business Training and the Level II master's degree in "Tunnelling and Tunnel Boring Machines" at Turin Polytechnic, to name just a few.

Environment, because we believe we need to **take better care of the places we live and work in**, hence our multiyear support of FAI, the **Italian Environmental Fund**, which is a foundation for protecting, safeguarding and enhancing the natural and artistic heritage of Italy.

In 2021 we joined the **AIS** (**Sustainable Infrastructure Association**). The main purpose of the association is to make economic, social and political forces aware of the importance of providing, designing, building and managing infrastructures based on sustainability criteria, involving all the players in the supply chain in the drafting of guidance documents. In 2022 we contributed to the drafting of the following position papers: "The sustainable worksite", "ESG and infrastructures" and "The contribution of concrete to the sustainability of infrastructures". We are part of these Working Groups: "Life Cycle Assessment for Sustainable Infrastructures", "Stakeholder Engagement" and "Social Responsibility and Occupational Safety".

In 2021, our New Zealand subsidiary Ghella Pty joined the **ISC** (**Infrastructure Sustainability Council**), the association that manages the primary sustainability rating scheme used in Australia and New Zealand for infrastructure.

As is consistent with our policy on sponsorships and donations, we **actively support associations** that share our values and purpose.

We are founding members of the **Società Italiana Gallerie**, an association that has been promoting, coordinating and disseminating studies and research in the field of tunnel construction and large underground works for almost fifty years.

We are members of **ANCE** (**Italy's National Association of Constructors**)in which our Vice President **Federico Ghella** occupies the positions of **Vice President** and **Chairman of the Works Abroad Committee**.

In 2019 we joined **Green Building Council Italia**, which promotes dissemination of a sustainable building culture.

Position Paper - AIS

Capogrossi. Behind the scenes

We also experiment in areas outside our core business, searching for **innovative solutions**: this has always been Ghella's way.
For this reason, we often enjoy devoting ourselves to **special projects** that promote **creativity** and artistic talent, as long as they demonstrate a positive impact on **people** and **local areas**.
In September 2022, we supported the large exhibition entitled **Capogrossi. Behind the Scenes** at the **National Gallery of Modern and Contemporary Art**, curated by **Francesca Romana Morelli**, in cooperation with the **Archivio Capogrossi Foundation**. The exhibition was a major opportunity to celebrate one of the fathers of Informalism and twentieth century Italian art, fifty years after Capogrossi's death (Rome, 7 March 1900 - 9 October 1972)).
This event at the National Gallery brought the artist's work back to Rome after an absence of over twenty years, and led to a number of different initiatives memorializing the fiftieth anniversary of his death, in the context of a broader project called Capogrossi. The evidence in Italian museums and institutions, on the initiative of the President of the Guglielmo Capogrossi Foundation.
"Contemporary art is implicitly in line with the company's values and vocation to 'build excellence, in a sustainable and innovative way, [...] **to anticipate the future, to be visionary and creative**'. "

Massimo Mininni | art historian. Former Chief Curator of the Gallery of Modern and Contemporary Art in Rome (GNAM)

LA GALLERIA
NAZIONALE

Standing together with the Umberto Veronesi Foundation to support paediatric cancer research

We sincerely believe that small acts of kindness to others can also contribute to the creation of a better world. As a company, we are conscious of the need to play a role in this by concentrating our efforts on promoting medical and scientific research, the importance of which was thrown into sharp relief by the first pandemic period.
After two years of supporting the Lazzaro Spallanzani Hospital in Rome, we have chosen to support the **Umberto Veronesi Foundation**, as we share not only certain value assets with them but also a commitment to finding solutions that serve scientific progress in the area of health and medicine.
In particular, we have chosen to back the paediatric oncology initiative **Gold for Kids**, **devised by the Umberto Veronesi Foundation**. Developed in synergy with the Italian Association of Paediatric Haematology and Oncology (AIEOP) and its Foundation (Fieop), its goal is to increase the chances of survival and improve quality of life for children and teenagers with cancer, a leading cause of mortality in these age groups.
The project has some specific objectives, namely to finance **treatment protocols** for young cancer patients, conduct **information and dissemination** campaigns on the subject, and raise public awareness of the relevant institutions as to the **needs of adolescents with cancer**.
This is a significant commitment in the area of health, to ensure that everyone has a second chance: looking after the youngest ones means **having the future at heart**.

Fondazione VERONESI

“Di Roccia, Fuochi e Avventure Sotterranee” at MAXXI L’Aquila Museum

Alessandro Dandini de Sylva’s exhibition “Di roccia, fuochi e avventure sotterranee” featured over 120 photos and was a runaway success with both the general public and critics when it opened in September 2021 at the MAXXI museum in Rome. **It was such a hit that, from 12 March to 12 June 2022**, those same images **found a new exhibition home in the MAXXI L’Aquila Museum** in Palazzo Ardinghelli, in the heart of Abruzzo’s historic centre. After extensive post-seismic restoration work by MIBACT, a studio dedicated to artistic and cultural production has reopened to the community, in which site-specific projects and MAXXI Collection pieces coexist with rotating temporary non-permanent art, architecture, and photography exhibitions.
The photo campaign assembles images taken between 2019 and 2020 at five of our worksites spanning three continents, and was managed by five of the most intriguing Italian photographic authors of our day. Fabio Barile (Barletta, 1980) worked on the railway tunnel that will connect Oslo to Ski, juxtaposing images of natural and man-made systems. Andrea Botto (Rapallo, 1973) documented the blasting activity at the excavation face of the worksite of the Brenner Pass tunnel which will join Italy and Austria. Marina Caneve (Belluno, 1988) depicted the relationship triangle of the city, modern planning, and historical memory in construction of the metro line that will connect Athens Airport to the Port of Piraeus. Alessandro Imbriaco (Salerno, 1980) focused on features inside the enormous mechanical moles being used to dig out the tunnels that run beneath Sydney Harbour. Finally, the work of Francesco Neri (Faenza, 1982) bore witness to the birth of Hanoi’s first underground metro line, recasting the worksite as a conflict zone posing a challenge to the city’s chaotic, spontaneous and organic ambience. A number of the displayed works were donated to MAXXI, where they became a part of its photography collection and, in essence, a national asset.

Ghella supports the XXXVI international meeting for peace

In line with our values of solidarity and cooperation, and with our corporate vision of **leaving a better world for future generations**, we confirmed our support at the **XXXVI World Religions International Prayer Meeting for Peace in the Spirit of Assisi**, organized by the Community of Sant'Egidio. The last meeting, called "**The Cry for Peace**" – **Religions and Cultures in Dialogue**, was held in Rome from 23 to 25 October 2022. In an era marked by the tragic return of war to Europe, which is claiming so many victims and wreaking so much destruction, the event brought together the aspirations for peace of many peoples and cultures. It culminated with the Prayer for Peace in the Colosseum, which was attended by the leaders of the Christian churches and the major religions, together with high-ranking representatives from the world of international politics and culture. The meeting sent a strong message of hope and trust in the future. The global world urgently needs an architecture of dialogue that protects and affirms peace, in every context.

SANT'EGIDIO

Profile

Cristina Mai Van

Tunnel Design Lead, Broadway Subway Project
Canada

How long have you been at Ghella, and how has your career there been to date?

I have been at Ghella for about seven years now, and I am grateful for the path I have had the opportunity to take. I was hired at the end of 2015 as an engineer for the Metro Line 3 project in Hanoi, Vietnam. At the end of 2021 I was then chosen as Tunnel Design Lead for the extension of the Vancouver subway, the Broadway Subway Project.

Could you briefly describe your role for us?

In Vietnam, I was handling relations between the client and construction management, and as part of a small team I was able to actively contribute to the construction of the tunnel in all its design components: from design to manufacturing of the segments, design of the cross passages, study of the interface between stations and tunnels, the soil treatments, monitoring, the site installations, assembly of the TBM, and drafting of the emergency plan for the tunnel. At this worksite I was the only woman to be part of the Hyundai - Ghella JV technical office, and it was initially difficult to be challenged by a different reality like the Korean one, but ultimately it was rewarding. Currently, in Vancouver, I have the role of Tunnel Design Lead and also serve as interface with the Construction Department for tunnel execution (TBM and traditional methods), working closely with construction management and the client. I have followed the design phases, discussing possible design optimizations, and now I am working on the phases preparatory to construction. This experience has allowed me to understand the different working methods used in Canada, and I find it satisfying to work with many women who here in Canada often hold prominent positions in the project.

How do you think your work can contribute to improving the sustainability performance of Ghella's projects?

There are several technical aspects of my work where I can make sustainability choices. For example, for the tunnels using TBMs we are using only a steel fibre-reinforced segment design, which allows us to reduce the CO_2 emissions associated with the segments. We make our concrete more sustainable by using fly ash, a product that consumes less water and cement and allows us to further reduce CO_2 emissions. We can manage the choice of additives for soil conditioning, opting for biodegradable ones to eliminate the risk of contaminating groundwater and to obtain non-contaminated excavation material. We use modern machinery, with characteristics that allow us to reduce our impact on the environment. For example, the TBM cooling system can re-use 30% of its water, thus reducing water consumption.

What is the most stimulating part of your work?

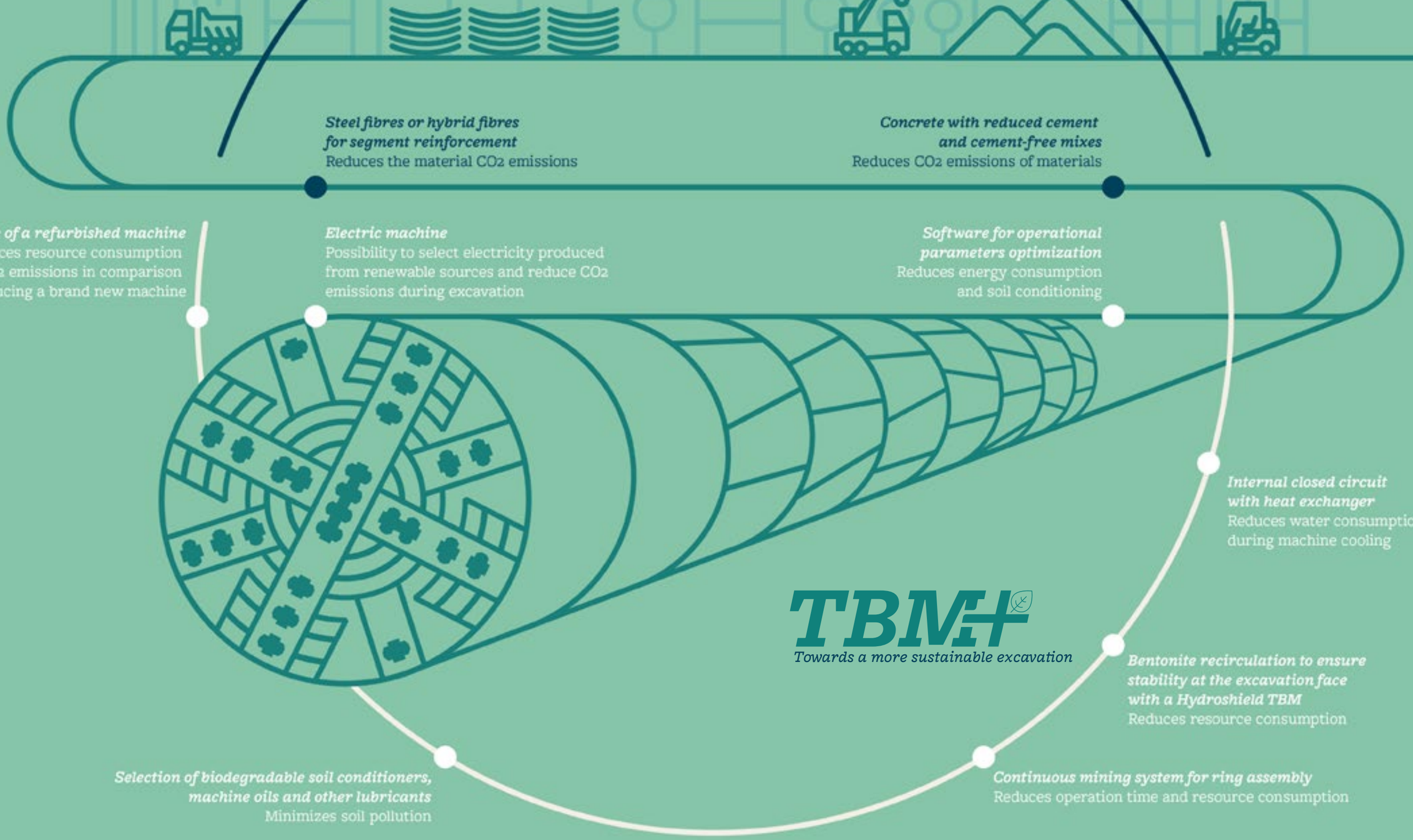
The different challenges that characterize every working day, and the teamwork, carried out with professionalism, creativity and intelligence, with the common goal of pursuing the project in the best possible way, are what give me strong motivation. I am grateful for the opportunity I have to interact with really capable people of various nationalities, cultures and backgrounds, each of whom teach me something new every day.

LED lighting systems
Reduces energy consumption

Electrical vehicles for transportation of muck, materials and/or personnel
Improves air quality in the tunnel; possibility of selecting electricity produced from renewable sources and reducing CO_2 emissions during logistics

Automatic control systems in construction plants
Reduces waste and wear through real-time monitoring

Recovery of excavated materials on site and off site
Reduces the amount of material to be extracted from quarries and the amount of material to be disposed of



Steel fibres or hybrid fibres for segment reinforcement
Reduces the material CO_2 emissions

Concrete with reduced cement and cement-free mixes
Reduces CO_2 emissions of materials

Use of a refurbished machine
Reduces resource consumption and CO_2 emissions in comparison to producing a brand new machine

Electric machine
Possibility to select electricity produced from renewable sources and reduce CO_2 emissions during excavation

Software for operational parameters optimization
Reduces energy consumption and soil conditioning

TBM+

Towards a more sustainable excavation

Internal closed circuit with heat exchanger
Reduces water consumption during machine cooling

Bentonite recirculation to ensure stability at the excavation face with a Hydroshield TBM
Reduces resource consumption

Selection of biodegradable soil conditioners, machine oils and other lubricants
Minimizes soil pollution

Continuous mining system for ring assembly
Reduces operation time and resource consumption

Environment

Environmental protection is a priority for us, and as such, lies at the heart of our **ESG strategy**. The "**Planet**" pillar sets out the company's mission in three thematic areas in which we intend to focus our efforts: fighting **climate change**, promoting a **circular economy** and **environmental protection**.

We understand that we find ourselves playing a very sensitive role in terms of both the context in which we operate and the nature of the work we carry out. For this reason, we work to high sustainability standards, with the aim of reducing the **environmental footprint** associated with the work as much as possible.

The proper management of environmental issues is at the core of our modus operandi, and is formalized through the adoption of an **integrated management system**, the environmental component of which is certified to international standard **ISO 14001:2015**.

The system is based on risk-based thinking, to ensure all our projects receive an appraisal-as early as the planning phase—of the **significant environmental aspects** of all our projects, that is to say an analysis of all the elements of our activities that interact with the environment and potentially impact it, both in normal operating conditions and in any emergency.

The significant environmental aspects that we monitor in our projects are:

- production of emissions into the atmosphere/dust;
- water management;
- soil and subsoil management;
- protection of biodiversity;
- management of waste and hazardous substances;
- production of noise and vibrations;
- generation of vehicular traffic;
- management of historical, architectural and archaeological assets.

For some of these, in 2021 we defined quantitative targets at the corporate level which we integrated into the new 2023-2025 Sustainability Plan:

- reducing water withdrawals by 15%, expressed in m^3 / revenue in millions of euros, by 2030;
- including measurable indicators of biodiversity impact in construction decisions by 2025;
- maximising reuse of excavation soil by 2025.

We also quantify and monitor the environmental aspects which, under normal operating conditions, generate indirect impacts on a global scale.

Australia, Sydney
M6 Stage 1

In particular:

- consumption of natural resources and raw materials;
- consumption of energy;
- greenhouse gas emissions (scopes 1 and 2).

Introduced at corporate level in the new 2023-2025 Sustainability Plan, the quantitative targets for these aspects are:

- maximizing the use of recycled materials by 2025;
- reducing Scope 1 and 2 greenhouse gas emissions by 25% , expressed in tonnes of CO_2 equivalent / revenue in millions of euros, by 2030;
- becoming carbon neutral by 2050.

For each project, the methods of managing and monitoring those environmental aspects that have become significant will be defined in an **Environmental Management Plan**, which is sometimes integrated into a **Sustainability Management Plan**.

The **planning** of management of environmental issues within the project plans will be done with consideration of the stipulations found in **local regulations**, the **contractual requirements**, the **objectives and targets** set by the client and by partners. Our policies and the Corporate Sustainability Plan ensure the commitment to meet the needs and expectations of all stakeholders in each project, to adopt the **same sustainability standards** globally, and continuously improve our **environmental performance** over time.

During the **construction phase** of the work, our teams perform operational control and continuous monitoring of significant environmental aspects. This process goes hand in hand with the specific training of personnel, the conduct of periodic audits and inspections, the analysis and resolution of any environmental non-compliance, and reporting of the project's performance in the context of periodic reporting to clients and to the Head Office.

At the corporate level, this flow of information allows us to monitor the organization's environmental performance, and to structure appropriate action plans in our efforts to achieve continuous improvement.

The consolidated **results** for our projects for **2022** are described in the following paragraphs and compared with the information reported in the previous two years. It must however be taken into account that these representations are affected by the different scopes of reporting.

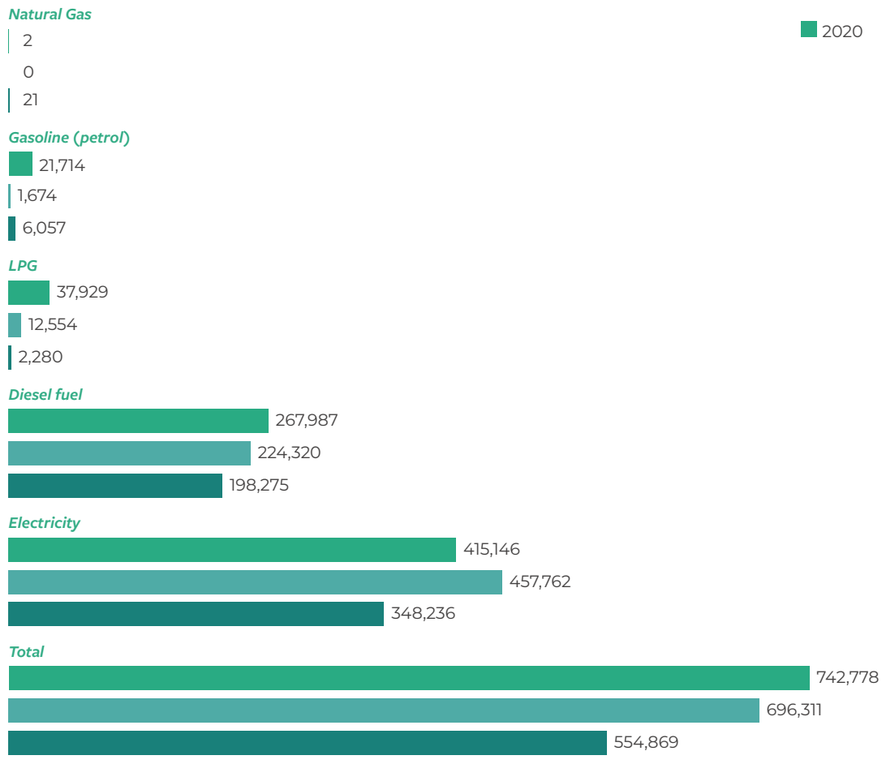
Energy consumption and greenhouse gas emissions

Consistent with our ESG strategy, we are committed to reducing energy consumption and minimizing greenhouse gas emissions. We activate strategic levers for our sector such as: quantification of emissions, electrification, raising the efficiency of plants, the selection of low-carbon vehicles, the production or purchase of energy from renewable sources, and planning according to eco-design criteria to reduce the quantity and impact of building materials.

The work to carry out the projects and the management of the operational areas of the site involve the consumption of energy resources that are attributable both to the Joint Ventures and to the subcontractors active on site, which we constantly monitor.

In 2022, the overall consumption of energy at our worksites amounted to **554,869 GJ**, which is **down by 20%** compared to the **2021** figure and by 25% compared to 2020.

Consumption	u.m.	2020	2021	2022
Natural gas	GJ	2	0	21
Gasoline (petrol)	GJ	21,714	1,674	6,057
LPG	GJ	37,929	12,554	2,280
Diesel fuel	GJ	267,987	224,320	198,275
Electricity	GJ	415,146	457,762	348,236
Total	**GJ**	**742,778**	**696,311**	**554,869**



Comparison of energy consumption in 2020, 2021, 2022, with breakdown by source.

The reduction in energy needs from 2021 to 2022 can be attributed primarily to a **24%** drop in **electricity** consumption which, with a share of 63% of the total, is the primary source of energy supplied. It is mainly used for the operation of the TBMs and site equipment, especially the ventilation systems in tunnels - as well as for ancillary tasks in offices and base camps.

A **12%** decrease in **diesel** consumption compared to 2021 values also contributes to reducing the overall energy requirement in 2022. It is the second most supplied source, with a share of 36% of the total. It is used for the operation of site vehicles, generators and for the car fleet.

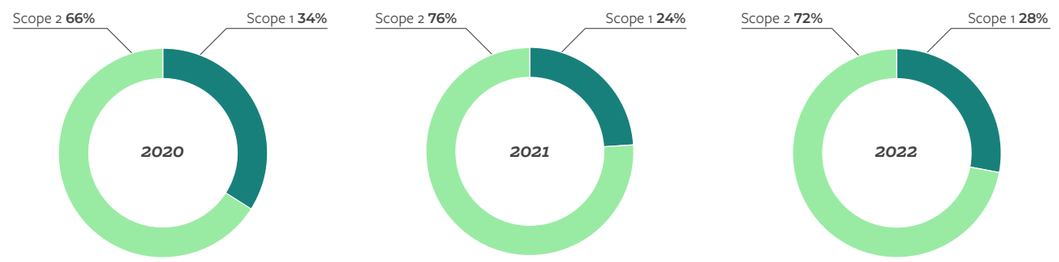
The trends in electricity and diesel energy consumption are mainly attributable to the reduction in excavation activities at the Brenner, Cross River Rail and Cancello Frasso-Telesino worksites, as set out in their work schedule.

The consumption of **petrol** as fuel for the car fleet and worksite vehicles, **LPG** used for the production of steam, for heating and domestic hot water for use by offices, the base camp and the catering service, and finally of **methane**, accounted for less than 1% of our energy needs in 2022.

In addition to energy consumption, we monitor the related **greenhouse gas emissions**, distinguishing between those generated directly by our on-site energy production activities, through the combustion of diesel, LPG and petrol (**scope 1 emissions**) and those related to the purchase of electricity from the grid (**scope 2 emissions**), generated upstream at the plants and for which we are indirectly responsible. The methodology for calculating scope 2 emissions is location-based, i.e. the emission factors adopted depend strictly on the energy mix of the countries in which this consumption takes place.

In 2022 our emissions were **55,431 tCO_{2eq}** connected with energy consumption, **24%** less in absolute terms than the figure for 2021, when emissions were 72,600 tonnes of CO_2 equivalent (tCO_{2eq}). The table below shows the breakdown into scope 1 and 2 for the last three reporting periods.

Emissions	u.m.	2020	2021	2022
Scope 1	tCO_{2eq}	23,966	17,717	15,420
Scope 2	tCO_{2eq}	45,650	54,883	40,011
Total	**tCO_{2eq}**	**69,616**	**72,600**	**55,431**



Comparison between the distribution of scope 1 and 2 greenhouse gas emissions in 2020, 2021, 2022 (% of total).

From the comparison with last year, it is clear that the share of scope 2 emissions is slightly decreasing, but still remains 6 percentage points higher than in 2020, due to the ongoing electrification process.

The information thus reported refers to the worksite organization in its entirety. If, on the other hand, we use the criterion of financial control (attributing to Ghella a share of emissions equal to the percentage of participation in the JVs) and normalize with respect to revenues, again for Ghella's share, the overall value is equal to **35.17** (tCO_{2eq}) / revenue in millions of euros in 2022, which is **48%** less than the 2021 baseline, **in line** with our **decarbonization by 2030 target** included in the 2023-2025 Sustainability Plan.

Greenhouse gases	u.m.	2020	2021	2022	Var. 2022-2021	Target CO_2 in 2030
Absolute emissions	tCO_{2eq}	69,616	72,600	55,431	-24%	-
Emissions (Ghella's share)	tCO_{2eq}	28,183	25,846	19,653	-24%	-
Intensity: Emissions / Revenues (Ghella's share)	tCO_{2eq} /revenue in millions of euros	-	67.13	35.17	-48%	-25% vs 2021

Absolute greenhouse gas emissions and intensity of greenhouse gas emissions relative to revenue for 2020, 2021, 2022.

Below are some examples of initiatives in **energy savings** and **quantification** and **reduction of emissions** implemented up to 2022:

- use of electric trucks for moving excavated soil;
- installation of LED lighting systems in the tunnel and in the offices;
- use of efficient machinery and ventilation systems in the tunnel;
- use of an electric conveyor belt to move the excavated material out of the tunnel, instead of using a truck;
- installation of solar-powered light towers to replace diesel-powered hybrid light towers;
- use of electric locomotives in the tunnel instead of locomotives powered by the TBM's diesel generators;
- carrying out LCA (Life Cycle Assessment) studies and obtaining the EPD (Environmental Product Declaration) for some building materials;
- quantification in the tender phase of greenhouse gas emissions associated with procurement of the main building materials and identification of lower-impact solutions.

Limiting greenhouse gas emissions with electrification and renewable energy

One of the main approaches we use at our construction sites in order to reduce the environmental impact of our activities is **electrification**: the transition from fossil fuel-powered to electric machinery. This choice not only significantly cuts atmospheric emissions and improves local air quality, but also allows us to lower scope 1&2* emissions overall, if electricity can be generated from **renewable sources**, a practice in line with our company's ESG target. This is the case for the **Broadway Subway** works in Vancouver, Canada, where **98%** of the electricity supply is generated by harnessing renewable sources, a very high figure, and for the **Clean Water Tunnel** works in Oslo, Norway, where the figure is **95%**. At these construction sites, the typically high consumption of electricity by the TBMs actually has a low carbon footprint.

*scope 1&2 emissions are direct emissions produced by the use of fossil fuels (scope 1) and indirect ones associated with the production of the electricity used (scope 2)

Electric trucks for carbon reduction

2022 saw Watercare's **Central Interceptor** project's **e-trucks** initiative come to life in Auckland, New Zealand. Three **electric trucks** were delivered and began the operational phase in December with **spoil** being taken from Central Interceptor sites to Puketutu Island, the project's primary spoil destination.
The Central Interceptor project is the first in New Zealand to have a fleet of on-road spoil-moving electric trucks. This has been made possible by co-funding from EECA (the Energy Efficiency and Conservation Authority of New Zealand) and our client Watercare Services Limited.
The trucks are fully electric with a 2 tonne swappable Lithium Ferrous Phosphate battery and typically carry about 13 tonnes. Current spoil movements allow for continuous operation with no need to recharge or swap during the day, so the trucks can recharge overnight at the dedicated re-charge station.
For every 100,000 km the trucks travel, they will be saving 50,000 litres of diesel, equivalent to saving 134 tonnes annually of scope 1 CO_2 emissions. Other benefits include fewer particulates going into the atmosphere, as well as the lower maintenance requirements of electric engines. In addition, scope 2 emissions associated with the charging of the trucks are particularly low thanks to the large share (80%) of hydro, geothermal, biomass and wind energy powering New Zealand's grid, making the net carbon saving of the shift even more significant.

Protection of resources

We are aware that material and natural resources are a valuable asset, we promote their efficient use and ensure their preservation.

WATER

At all our worksites, **water withdrawals**, which are constantly monitored and aimed at saving resources, take place in compliance with the local authorizations obtained for the pumping or sourcing of water from water bodies or public pipelines, in order not to jeopardize the local water balance. The water **requirement** is attributable to cooling of the TBMs, the elimination of dust, the manufacture of segments, tunnel operations, and the base camp.

In line with our ESG strategy, we are committed to reducing water withdrawals through consumption tracking, recovery and reuse.

How we economise on water

- reuse of excavation water through recirculation in the tunnel following purification;
- use of non-potable underground water for construction activities through storage in site tanks fed by wells;
- closed-circuit recirculation line for the TBM cooling water;
- water recovery systems installed at the segment production plant;
- collection and recovery of rainwater through catchment systems.

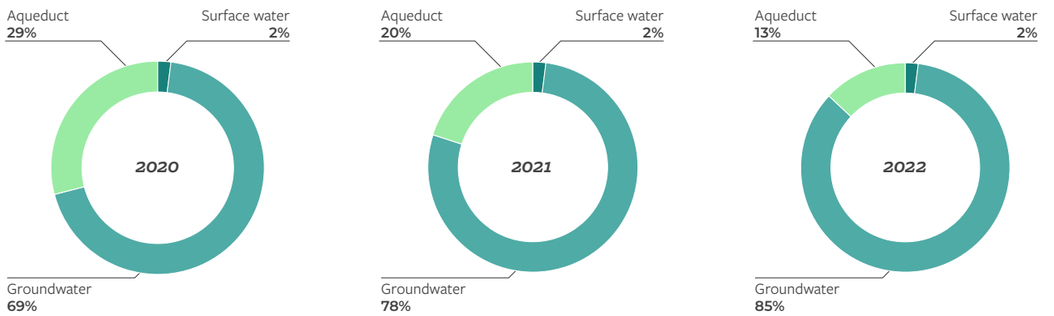
In 2022 we externally sourced **1,278 Ml** of water, slightly less than in 2021 (**-2%**). The normalization with respect to Ghella's share of Revenues, equal to **1.25** Ml/ Revenues in millions of euros in 2022, is **15%** less than the 2021 baseline, **in line** with our **water withdrawals target for 2030** included in the 2023-2025 Sustainability Plan.

Water withdrawal intensity	u.m.	2020	2021	2022	Δ% 22/21	Target 2030
Water withdrawals / Revenues (Ghella's share)	Ml/ Revenues in millions of euros	-	1.48	1.25	-15%	-15% vs 2021

Below the distribution of supply sources in the last three reporting periods:

Water withdrawals	u.m.	2020	2021	2022
Surface water	Ml	20	20	21
Underground water	Ml	839	1,023	1,083
Aqueduct	Ml	346	266	173
Total	**Ml**	**1,204**	**1,310**	**1,278**

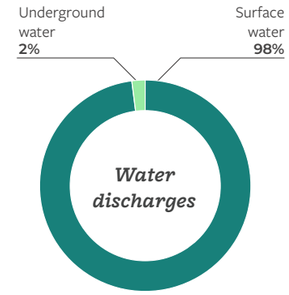
The overall figure does not include the Canadian construction site of Broadway Subway. In this case, water withdrawal is managed through permits issued directly by the Client.



Comparison of water withdrawal sources in 2020, 2021, 2022 (in Ml)

Even in 2022, groundwater continues to be the preferred source of supply. 85% of total water withdrawals are from groundwater, a further increase of 7 percentage points compared to 2021. Withdrawal from surface water remains stable, while withdrawal from aqueducts continues to decline. This result is attributable to the Brenner worksite in Italy, the main contributor to the overall water consumption, which satisfies its water needs by drawing from large underground water reserves that are abundant in the Upper Isarco Valley, therefore without stressing any aquifers.

The **water discharges** from our worksites are made up of the leftover non-reused water from our processes, run-off water from the site aprons and wastewater from the offices and base camp. In 2022 this amounted to **7,606 Ml**, distributed as follows:



Distribution of water discharges in 2022.
The overall figure does not include the Norwegian Clean Water Tunnel worksite, the Australian M6 worksite and the New Zealand Watercare Central Interceptor worksite.

In order to avoid possible water quality alterations, we guarantee compliance with the discharge conditions set out in the permits issued by local authorities, periodically sampling and analysing the quality parameters of the purified wastewater, according to a careful monitoring plan. Almost all discharges occur into surface waters. Discharges into groundwater amount to just 2% and are limited to Australian territory. We try our utmost to prevent potential **accidental damage** to the water and soil sectors (through the choice of products used and the application of operating instructions and containment and waterproofing measures) which at our worksites are attributable to:

- pollution from suspended solids caused by excavation work, leaching of worksite surfaces and washing vehicles;
- pollution caused by dispersion of cement components during concrete processing activities;
- pollution from hydrocarbons and oils caused by leaks from site vehicles and the handling of fuels and lubricants;
- accidental discharges of pollutants into surface waters or onto the ground.

Argentina, Buenos Aires, Riachuelo Matanza Lot 1
Photo by Luca Nostri from the photographic project "Nuove Avventure Sotterranee"

Innovatively designed Tunnel Boring Machine prevents lowering of the water table at Norwegian construction sites

Innovation is a key enabling factor in our **Environmental**, **social**, and **governance** (**ESG**) **strategy**: we are perpetually on the lookout for technical solutions that will allow us to reduce our impact on the environment and on people, in a continuous improvement process driven by the experience we have gained at our construction sites and in **partnerships** with our **strategic suppliers**.
During excavation of the tunnels for the Follo Line project between Oslo and Ski, completed in 2019, it was evident that the actions taken to avoid lowering the level of the **water table** situated above the excavation were hindering the speed at which the TBM advanced. The slowdown was caused by the enormous amount of pre-grouting: a practice consisting in injecting micro-cement under pressure into the rock while the machine is stopped.
When we were submitting the bid on the second Oslo project, E6 Clean Water, we worked together with our local partner AF Gruppen and the largest European manufacturer of TBMs to design a **new type of Double Shield TBM**. This new TBM features an additional shield (one more than the typical Double Shield TBM, which has 4 shields) near the cutter head, which houses a battery of three drills capable of making holes in parallel for injecting cement mortar while the machine is stopped. This new design allows multiple holes to be drilled at the same time, and the micro-cement is injected when the last holes are being made, which makes both the pre-grouting and the excavation cycle shorter. This new feature reduces the likelihood of the water table lowering and of potential damages to surface structures while improving excavation times by up to 25% compared to the standard TBM design with pre-grouting. In addition, our redesign improved the position and posture of the drilling workers, with significant follow-on **benefits** for their **health and safety**. The impressive savings in excavation time also reduces environmental and social impacts related to the **length of the construction phase**.
The new TBM will be deployed in the Oslo E6 Clean Water project starting in late 2023.

↑ Focus 20

BIODIVERSITY

As formalized in our ESG strategy, we are committed to guaranteeing the protection of the local area and local biodiversity, conserving protected areas and endangered species, and adopting suitable technical and organizational measures to protect and safeguard ecosystems.

Upstream of the construction site, we conduct surveys aimed at identifying relevant plant or animal species, for which it may be necessary to develop a specific management and monitoring plan.

Other main activities focused on biodiversity are as below:

Measures for protection of flora

- we limit the removal of native vegetation to the amount strictly necessary for construction purposes, to limit the impact on land use and minimize the risks of erosion and sedimentation problems;
- we map and mark the vegetation to be conserved;
- we guarantee restoration of the vegetation at the end of worksite activities;

Measures for protection of fauna

- before removal of the vegetation we guarantee that any animals found within the confines of the worksite will be removed to a suitable habitat not far from the point of discovery, to a place characterized by the same vegetation but safe from the work areas;
- if injured animals are discovered during vegetation cutting operations, we provide for their transport to and treatment at previously identified veterinary centres.

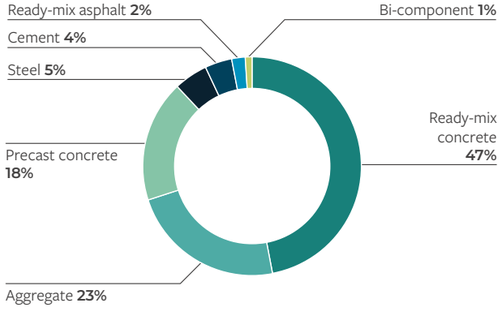
MATERIALS

Due to the specific nature of the activities performed, our construction sites involve a significant demand for materials. In line with our ESG strategy, we are committed to promoting the recovery of building materials and the purchase of recycled material, with the aim of reducing our contribution to the depletion of raw materials and the environmental footprint associated with the supply of goods, in application of the following principles:

Sustainable management of materials

- Reduce the consumption of materials and minimize waste;
- Consider their environmental footprint in the selection phase;
- Give preference to materials with the highest benefits for the circular economy;
- Encourage their reuse on site.

In 2022 we externally procured a quantity of building materials equal to **1,207,416 t**.



Materials procured externally in 2022, values expressed in tonnes and in %.

Almost all of the externally sourced materials are from non-renewable sources. The materials that have the greatest impact on the depletion of resources are, in order, **precast concrete**, **aggregate** and **ready-mix concrete**.

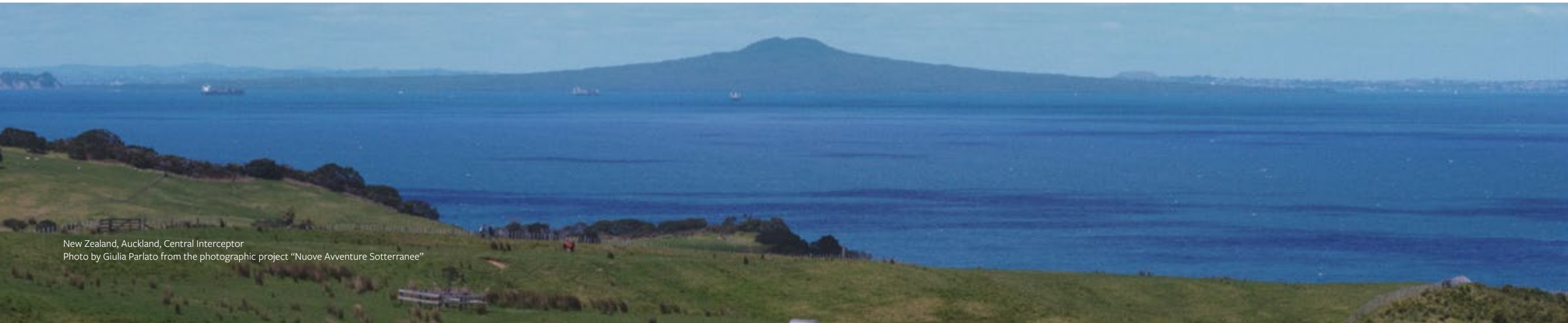
For these materials, unlike the others, the quantities procured do not coincide with the quantities consumed: actual consumption is higher - respectively equal to 678,000 tonnes for ready-mix concrete, 636,000 tonnes for aggregates, 382,000 tonnes for precast concrete.

The difference is due to the Italian Brenner site, where the supply from outside is limited due to a virtuous process of reuse and internal production of materials, which leads to a lower impact on the depletion of resources and on generation of emissions associated with their transport, as well as greater control over production costs and efficiency. In particular:

- almost all of the aggregate is from internal reuse of class A excavated soil and rocks, which is sent to a crushing plant located on site;
- all of the ready-mix concrete, intended for traditional excavation, is produced internally via a batching plant located on site, using aggregate from crushing and other raw materials supplied from outside (e.g. cement);
- all of the prefabricated concrete segments, intended for mechanized excavation, are produced internally by a segment production plant located on site, using aggregate from crushing and other raw materials supplied from outside (e.g. cement, steel).

Other good practices implemented up to 2022 to reduce the supply of materials were:

- identifying solutions, in the design phase, to reduce the quantities of concrete;
- using metal fibre-reinforced segments as an alternative to the traditional rebar reinforcement;
- using concrete with a high content of supplementary cementitious materials (SCM) aimed at reducing the cement content, such as fly ash, granulated blast slag and silica fume.
- managing the production of concrete internally on site and providing systems for the recovery of concrete waste during production;
- reconditioning and reusing TBMs in different projects located in the same country;
- reusing the temporary accommodations of the base camps;
- maximizing the reuse of excavated material from the site itself, instead of purchasing new aggregate from quarries;
- using recycled materials compatible with the inert material (such as crushed glass) to reduce the purchase of new inert materials from quarries;
- producing or asking suppliers for the EPDs of the main construction materials, in order to be aware of their environmental (and carbon) footprint throughout their life cycle.



New Zealand, Auckland, Central Interceptor
Photo by Giulia Parlato from the photographic project “Nuove Avventure Sotterranee”

Beyond tunneling: shared pedestrian and cyclist pathway construction on Transport for NSW's M6 Stage 1 project

Temporary construction sites in **urban areas** can provide great **opportunities** to transform and revitalise open spaces when returning them to the **community** for public use at project completion. This is the case on Transport for NSW's **M6 Stage 1** project in **Sydney**, Australia, which includes the delivery of a large-scale parkland and recreational corridor and a five kilometre **shared pedestrian and cyclist pathway**. The vision is to transform parklands that Connect with Country and cultural history and enhance the natural environment for the community to live, play and experience and for the community to enjoy for years to come, such as **new playing fields** and **opens spaces**. Parklands and wetlands within the M6 Stage 1 site areas will be restored and revitalised with a diverse variety of local trees, plants and vegetation to be planted when construction is complete. The new shared pedestrian and cyclist pathway will serve to improve community access to green open spaces, increase vegetation throughout the area as well as promoting **healthy lifestyles** for those who enjoy walking, jogging and cycling in the area. Shading and amenities will also be improved including lighting, and landscaping to ensure an enjoyable experience any time of the day.
The community had an opportunity to provide feedback on the **Urban Design and Landscape Plan** in 2023. Delivery of this community facility is due in 2025.

↑ *Focus 21*

Low carbon concrete in the Cross River Rail project

Concrete is one of the main materials used in our works, hence solutions aimed at **lowering** its **embedded carbon** represent a big win for our overall carbon impacts.
As part of fulfilling the project's Infrastructure Sustainability (IS) rating targets, the project team at Cross River Rail in Brisbane, Australia, identified an initiative to increase the use of **Supplementary Cementitious Material** (**SCM**) content within ready-mix concrete and shotcrete to an average of **50%**, compared to business-as-usual content which in Queensland is typically 20%. SCM comprises **industrial byproducts** such as fly ash (a coal electric power plants byproduct), granulated blasting slag (a blast furnace byproduct), and silica fume.
Total concrete use estimated for the entire project is around 240,000 m^3, making the overall carbon saving associated with the increased use of SCMs to a saving of over **30,000 tCO_{2eq}**.
This is part of a wider set of initiatives which altogether are expected to deliver an overall saving of over 135,000 tCO_{2eq} (39,800 tCO_{2eq} of energy emissions and 95,500 tCO_{2eq} of material life cycle saving) across the construction and operational phase of the project.
This excellent forecast saving contributed, together with other indicators evaluating economic, social and environmental performance, to an **IS Design Rating** of '**Leading**' – the highest achievable result – with a final score of 81.7 points. This well exceeds the target of 50 points ('Excellent') Rating. The next step is the As-Built Rating, which will be submitted near construction completion when all design phase estimates and forecasts will be updated for actuals.

Reducing the carbon footprint of segments at Canadian construction sites

Precast Segments are reinforced concrete elements that are combined to form rings, and are therefore one of the **main components of our tunnels**.
In 2022, in the Canadian construction sites for the Eglinton Crosstown West Extension in Toronto and Broadway Subway Project in Vancouver, we produced precast segments reinforced exclusively with metal fibres as an alternative to traditional iron reinforcement. They have been incorporated in hybrid arrangements in recent years, but in these two projects we are using segments with **100% metal fibres**. This innovation delivers the same performance, but cuts back on steel use for the concrete, reducing the emissions associated with this element in two different ways: on the one hand we have used less steel per cubic meter, and on the other we have used only the fibre form of steel, which has a carbon footprint better than that of rebar. Fibre-reinforced segments have a simpler production process, because not as much manpower is required, lowering accident risk and saving production time and costs.
At Canadian construction sites we have achieved **40% to 60%** savings over traditional reinforcement in CO_2 equivalent emissions, totalling an estimated **1,700 and 4,900 tCO_{2eq}** saved over the project life cycle.

Waste and materials from excavation

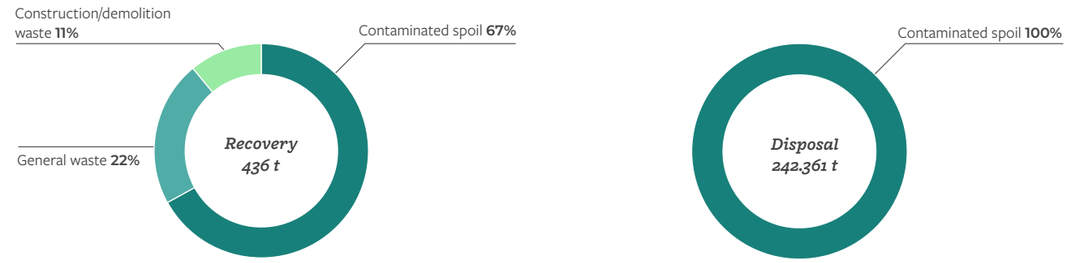
WASTE

In 2022 we generated altogether **376,474 t of waste**, of which 133,678 tonnes was **non-hazardous waste** and 242,797 tonnes was **hazardous or contaminated waste**. Of the **non-hazardous waste, 91%** was sent to **recovery operations** (in particular, 25% for reuse and 66% for recycling) and mainly concerns general solid waste produced by the construction site, base camp and offices with characteristics that mean it can be recovered (e.g. glass, plastic, rubber, crushed stone, wood, cardboard and food waste) and waste deriving from construction activities and demolition (such as steel, concrete waste, waste materials belonging to demolished structures), which in most cases are always associated with a high recovery rate). There was still **9%** that had to be **disposed of in land- fills** and this was mainly general solid waste that did not have characteristics allowing it to be recycled.

Distribution of non-hazardous waste produced in 2022, by destination and type.

Of the **hazardous or contaminated waste**, 99.8% is earmarked for disposal but consists exclusively of earth and rocks contaminated by substances or materials already present in the ground (e.g. asbestos, hydrocarbons, etc.), which is assessed by the project personnel after excavation, classified on the basis of their characteristics, and managed properly as waste to be disposed of in dedicated landfills.

The significant volumes of contaminated earth encountered in 2022 are mainly linked to the excavation activities of the Broadway Subway, M6 and Cross River Rail contracts, which include operations in areas characterized by urban sub-strata covered by the most recent stratifications of the city and zones previously used as landfills.

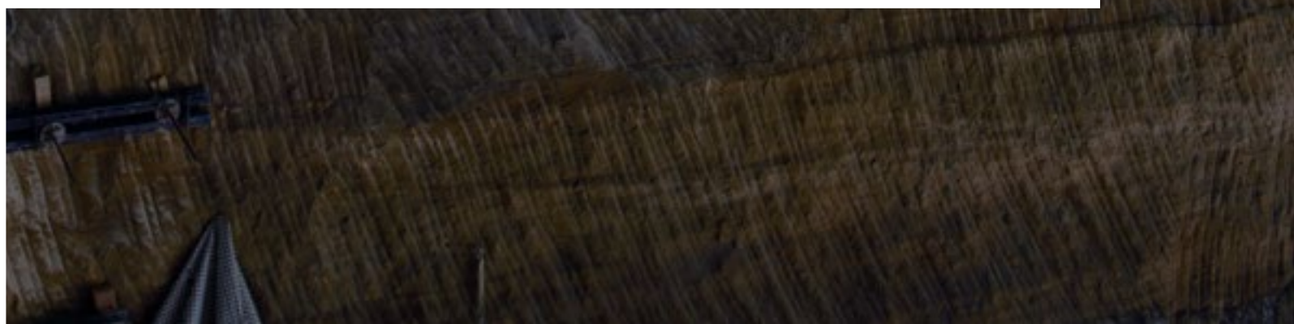


Comparison of distribution of hazardous or contaminated waste produced in 2022, by destination and type.

Travelling TBMs – the circular economy between Australian construction sites

In 2022, our **TBMs** (**tunnel boring machines**) continued their journey between Australian construction sites by taking a **third step** in their **life cycle**. To make more efficient use of resources and reduce environmental impacts, the two TBMs (Else and Merle) used in the Cross River Rail project in Brisbane were reconditioned for the new Sydney Metro – Western Sydney Airport project. Else and Merle had already been used on the Sydney Metro City & Southwest project between October 2018 and March 2020, where they were known as Wendy and Mabel. The TBMs are sophisticated machines: they are large enough to accommodate an entire team of up to 15 people. They have a cabin where the operator can steer the TBM, a lunch room and toilets. Among the most significant **recyclables**, are the electrical, electronic and hydraulic components, as well as the steel structures which form the machines' bodies and gantries.

↑ *Focus 24*



Avoid, Reduce, Re-use, Recycle in the Central Interceptor Project

We act at all levels of the **waste hierarchy**, seeking solutions to minimise our impact on the environment by avoiding the generation of waste, reducing waste at source, and preparing materials for reuse and recycling. In 2022 the Ghella Abergeldie JV, building Watercare's **Central Interceptor** project in Auckland, New Zealand, has been able to address all principles of sustainable waste management with a range of initiatives:

1. The micro tunnel boring machine (mTBM) needs power, water (both in and out) and air to operate. These services are carried in pipes and cables along the inside of the tunnel behind the mTBM on special steel brackets designed so that they do not damage the new tunnel lining. The project team re-engineered the solution to **reduce the number of brackets** needed to carry the same load resulting in less steel needed and less waste generated at the end of the project. The idea, which granted a Sustainability Champion Award to its initiator Dan Malcolm, generated a saving of 260 brackets, which means saving over 2,000kg of steel with an estimated embedded carbon of 5,200kg of CO_{2eq}, in just one of the project's tunnels. In addition, it saved 130 work hours, due to the installation of fewer brackets, and 60,000 NZ dollars in material costs. This innovation established a practice that will be applied to other tunnel elements of the Central Interceptor design, hence multiplying the benefits.

2. Polyfoamer, a material used in abundance in our tunnelling machines, are supplied in Intermediate Bulk Containers (IBCs) which are a little over $1m^3$ and are unable to be returned to the supplier. These are a mix of metal and plastic in a form that cannot be easily separated and would end up in landfill as a result. The project team sourced a small **local supplier** who instead **cleans out the IBCs and re-uses them** in a variety of different ways: some become scaffolding weights, replacing the heavy concrete blocks that ensure building sites are safe for the public; some are used to store rainwater on farms; many go back into the chemical storage sector as containers or are used by cleaning companies for safe stowage of contaminants. The project has supplied for re-use over 250 IBCs so far, saving them from landfill.

3. The project has **recycled 1,488 m^3 of wood** to the end of 2022 through the supply of waste wood to a recycling company. The Recycler processes the wood to soften the fibres and remove nails and other metals. Examples of re-use include the construction of children's play areas, mulch ground cover for weed suppression and as equine stadium cover.

4. Bentonite is a heavy clay and is used in large quantities in tunnel construction. The project gets its Bentonite in 1 tonne woven polyester bags. These get ripped during the loading process so cannot be re-used. **Bentonite bags are collected and picked up by a recycling supplier** who compresses and then sends them off to be recycled.

↑ Focus 25

Norway, Oslo
E6 Clean Water Tunnel

EXCAVATED SOIL AND ROCK

In line with our ESG strategy, we are committed to maximising the reuse of **non-contaminated excavated material,** which is therefore configured as a by-product of excavation activities and not as waste, subject to analysis and verification of suitability, based on local legislation.

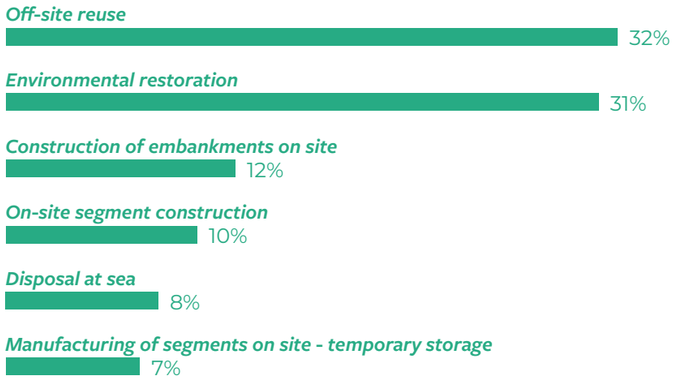
In 2022, **3,211,788 t** of **non-contaminated excavated soil and rock were produced**, plus an amount kept in temporary storage by the Cancello-Frasso Telesino project in previous years and moved in 2022, making a total of **3,546,300 t** moved.

60% of the excavated material moved in 2022 was **reused on site**, for the following activities:

- **31%** was sent for **environmental reincorporation**, in other words delivered to open-air storage sites identified by the client, which will be reintegrated into the environment at the end of the works by replanting operations;
- **12%** reused for construction of **embankments**, **earthworks** and **paths**;
- **10%** reused as inert fill materials, to make **segments**;
- **7%** sent to temporary storage for future reuse as aggregate, for the construction of segments.

32% of the excavated material moved in 2022 was reused off site. This translates to our commitment to work with other players in the construction sector from a circular economy perspective.

Finally, **8%** of the soil was disposed of at sea in accordance with local law, subject to material qualification and approval.



Non-contaminated excavated soil and rocks - management methods

Reuse of excavated soil and rocks at the Cancello-Frasso Telesino worksite

In line with our **ESG strategy**, we are committed to maximizing the reuse of excavated earth and rocks. In the course of **2022**, the Cancello-Frasso Telesino project sent approximately **700,000 t** of excavated soil and rocks for environmental re-incorporation, of which 83% was destined for the **reclamation of the former Selvolella pozzolana and tuff quarry** project in the municipality of Dugenta (BN), while 17% was sent for **reclamation of the abandoned Olivella quarry**, in the municipality of Casamarciano (NA). In both cases, the soil will contribute to filling the depression in the quarry's loading area. For the Selvolella quarry, a recomposition is envisaged that reintegrates the area into the surrounding native landscape, reconstituting profiles, slopes and vegetation to create a naturalized picture, equivalent to the original. For the Olivella quarry, on the other hand, the project envisages the construction of an equipped parking area that can be used by residents, with a substantial area destined for greenery and suitably planted.

↑ *Focus 26*

Basalt Re-Use

In line with our **ESG strategy**, we are always on the look for opportunities to **maximise the use of recycled materials** and the **reuse of excavated earth**.
At the Western Springs site in Watercare's **Central Interceptor** project in Auckland, New Zealand, an access road and working area for shaft excavation and spoil removal was needed. The project team decided to repurpose 2,400 t of **basalt spoil** coming from **other site excavations** in the highly volcanic Auckland area to be crushed to specification by a specialist supplier and **used as aggregate** for Western Spring's haul road. Re-using this spoil saved over 4,000 l of diesel (**6,700 kg CO_{2eq}**) by reducing the approx. 204 journeys needed to procure the aggregate from an 80km round trip to the quarry to a 32km round trip to the specialist supplier. In addition, removing 9,792km (vehicle km travelled) of heavy truck traffic from Auckland's roads generated significant benefits to people and the local environment.
The Project Engineer, Julian Wu, who developed and lead the initiative was recognised as a Central Interceptor 'Sustainability Champion', an initiative to promote innovation through the acknowledgement of team members contributions to the Projects sustainability goals and sharing of ideas.

↑ *Focus 27*

Profile

Alessandra Tana

Precast Concrete Tunnel Lining Manager,
Italy

How long have you been at Ghella, and what has your career journey within the company looked like?

I wanted to challenge myself in a new country and immerse myself in the reality of a large civil construction site, so sixteen years ago I began my journey at Ghella, leaving for Argentina and entering the world of mechanized excavation. Over all these years I have had the opportunity to work in the various technical fields related to tunnel boring: from production, first as Tunnel Design Engineer and then as Tunnel Design Manager in the Arroyo Maldonado project in Argentina, to economic assessment of tender bids as Senior Estimator in the overseas Tender Department at the Rome office, before landing my current role of Precast Concrete Tunnel Lining Manager at the Rome headquarters, a position I started a few years ago, which combines the design, construction and economic aspects.

Could you briefly describe your role?

My role consists in following the entire life cycle of the so-called 'segments', prefabricated concrete elements that cover the tunnel and function as structural support and hydraulic sealing in order to protect the workers and activities taking place inside the tunnel. My work starts from the design study during the tender phase and also incorporates the construction phase in the plants during production, up to installation and operation in the tunnel. I do this monitoring for all our initiatives and active projects worldwide. My role is transversal: it is designed to centralise the information coming from the various projects at a corporate level, to progressively identify actions aimed at supporting continuous improvement of the management system and of the quality of the segments, making the most of the know-how acquired during the planning of new tenders.

What importance is attached to sustainability aspects in tunnelling?

The infrastructure sector , and specifically the tunnelling sector, are becoming increasingly aware of sustainability issues and are already introducing specific criteria in the tender phase, such as those linked to the carbon footprint of the main structural elements which will make up the work. In the case of a tunnel, the prefabricated segment lining represents the main structural element. The most frequently used tool for quantifying the carbon footprint of an item is the EPD (Environmental Product Declaration), which can relate to the individual materials that make up the object, as well as its entire production chain, including transport. Also, in Italy, with the aim of promoting sustainability in the construction sector, the need is emerging to identify shared standardization rules to be integrated into the tender performance requirements in the future. For this purpose, specific work tables are currently open, organized by the AIS (Sustainable Infrastructure Association), in which Ghella participates by contributing with the experience it has acquired in the countries where this debate has already been going on for some time (Oceania and Northern Europe). Ghella itself, based on the awareness it has accumulated on this issue, produced the EPD in 2021 for the segments that make up the lining of the Brenner tunnel, lot AP209 Mules.

How do you think your work can contribute to improving Ghella's sustainability performance?

Being involved right from the design phase allows me to make an incisive contribution to reducing the carbon footprint of the segments, which is mainly linked to the cement component in the concrete mix and the amount of steel reinforcement. For example, we are implementing cement mixtures that integrate more and more products recovered from industrial or natural processes, to the extent of halving the cement component, while maintaining strength and durability requirements. We have been replacing traditional bar reinforcement with steel fibres for many years which, in addition to significantly simplifying the production process and reducing the risk of accidents, has allowed us to significantly reduce the greenhouse gas emissions associated with the element.

What is the most stimulating aspect of your work?

Definitely the opportunity to participate proactively in the search for solutions to improve technical, economic and sustainability performance on the basis of transversal analyses. Familiarising myself with the unique aspects of each project and getting to know the people who work on it, trying to systematise the critical issues, solutions and innovations based on evidence that is very specific but substantial for the core business of our company: for me these are the fundamental stimulus. In a world that is increasingly concerned with social wellbeing and the environment, as experienced by us today and by our children tomorrow, it makes me proud to think I am part of a community that is working towards this.

The Rome head office

Electricity from the grid
767,962 kWh *(2020)*
852,990 kWh *(2021)*
808,608 kWh *(2022)*

Renewable energy produced
30,710 kWh (2020)
29,030 kWh (2021)
33,633 kWh (2022)

Water consumed
2,987 m^3 (2020)
2,987 m^3 (2021)
2,652 m^3 (2022)

Waste
2,005 t (2020)
1,582 t (2021)

Waste produced at the Rome head office
Paper **50%**
Organic Waste **30%**
Unsorted **13%**
Plastic/Glass/Metal **7%**

Head Office initiatives carried out up to 2022

- We have made filtered **water dispensers** available, with the possibility of sanitizing the bottles provided by the company;
- We have added **water reducers** to all taps;
- We have replaced all the ceiling lights with new **LED lamps**, providing a reduction of over 30% in lighting requirements;
- The **coffee pods** are **recycled** for the construction of furniture;
- The interiors and exteriors of the Head Office were painted with **Airlite**, an organic compound **paint** that **purifies the environment**, capturing smog and breaking it down;
- We obtained the **LEED** Conference Room **certification** and started the process to certify the entire building **LEED EBOM**;
- We applied **solar protection films** to all the Head Office **windows**, which reduced incoming solar heat by over 60%. This choice contributes to making the environment more comfortable, especially in the summer months, helping to reduce the workload of the cooling systems.

↑ *Focus 28*

Appendix

Methodological note

OBJECTIVES

The Sustainability Report is the tool we use to communicate to all our stakeholders the impacts and results of Ghella's activities and those of its most significant production units. For us, this is a fundamental part of the continuous improvement process, because only through performance monitoring and measurement is it possible to plan and define a solid and competitive strategy.

PERIOD AND SCOPE OF REPORTING

We have been creating the Sustainability Report, annually and voluntarily, starting from the 2019 reporting. The data presented refers to the period 1 January 2022 – 31 December 2022 and, where appropriate, is compared with the results of the previous two years. In addition to the parent company Ghella S.p.A., the consolidated financial statements also include its direct or indirect subsidiaries. In particular, the entities in which Ghella S.p.A. exercises a controlling interest, by virtue of direct or indirect share ownership of the majority of the votes exercisable at the shareholders' meeting, or through exercising a dominant influence expressed by the power to determine the entity's financial and management decisions and obtaining the related benefits. The Sustainability Report, on the other hand, includes, in addition to the parent company Ghella S.p.A., the following production units:

Greece, Athens, Metro Line 3
Photo by Marina Caneve

Country	Project	Area	Client	JV	Company
Australia	Cross River Rail	Metro line	Cross River Rail Delivery Authority	CPB, BAM, Ghella, UGL	Pulse Partnerships Pty Limited
Australia	M6 Stage 1	Road	NSW Government	CPB, Ghella, UGL	CGU Joint Venture
Canada	Broadway Subway Project	Metro line	Province of British Columbia	Acciona Infrastructure, Ghella	Broadway Subway Project Corporation
Norway	E6 Clean Water Tunnel	Hydraulic	Municipality of Oslo / Water and Sewerage Authority - VAV	AF Gruppen, Ghella	AFGhella Joint Venture
Italy	Brenner Base Tunnel - Lot "Mules 2-3"	Railway	BBT SE - Brenner Basistunnel	Partecipazione Italia S.p.A., Ghella, Cogeis, PAC	Brennero Tunnel Construction S.c.a.r.l.
Italy	Naples-Bari High-Capacity/High-Speed Railway, Cancello-Frasso Telesino	Railway	RFI Rete Ferroviaria Italiana S.p.A.	Pizzarotti, Ghella, itinera	Consorzio CFT
New Zealand	Central Interceptor	Hydraulic	Watercare Services Ltd	Ghella, Abergeldie	Ghella Abergeldie JV

The Projects were selected according to parameters that represent their environmental, social and economic impact. The data collected and reported refers to the projects in their entirety.

The material issues are those identified through the materiality analysis updated in November and described in the chapter "Company". The data shown in the "Environment" chapter refers to projects only.

The Sustainability Report is prepared by the Compliance & Sustainability department, submitted for review to the ESG Committee and approved by the Board of Directors of Ghella S.p.A.

KPMG S.p.A. performed the limited audit ("Limited assurance engagement"), in accordance with the provisions of ISAE 3000 (Revised). For further information on the subject of the audit work and the procedures carried out by the independent auditor, please refer to the "Auditing Firm's Report".

DATA COLLECTION METHOD

Since 2022, data collection has been carried out with the aid of an IT platform to which each Company Unit has access. The collected data is then analysed and processed by the competent corporate offices.

GRI Content Index

Ghella has reported in accordance with the GRI Standards for the period 1 January 2022 – 31 December 2022.

Disclosure	Description	Applicable section	Notes
General information			
2-1	Organizational details	6, 14	The head office of Ghella S.p.A. is at: Via Pietro Borsieri, 2/A - 00195 Rome
2-2	Entities included in the organization's sustainability reporting	106 - 107	
2-3	Reporting period, frequency and contact point	106	The Compliance & Sustainability function can be contacted at email address: sustainability@ghella.com .
2-4	Restatements of information		
2-5	External assurance	107,	
2-6	Activities, value chain and other business relationships	6 - 7, 20	
2-7	Employees	39 - 40	About 1% of employees have part-time work contracts. Of these, 32 are women and 3 are men.
2-8	Workers who are not employees	40	
2-9	Governance structure and composition	14 - 16	
2-10	Nomination and selection of the highest governance body	16	
2-11	Chair of the highest governance body	16	
2-12	Role of the highest governance body in overseeing the management of impacts	16	
2-13	Delegation of responsibility for managing impacts	16	
2-14	Role of the highest governance body in sustainability reporting	16, 107	
2-15	Conflicts of interest		The members of the BoD sign a declaration of responsibility and absence of conflict of interest.
2-16	Communication of critical concerns		The reports are processed and verified by the competent Board of Statutory Auditors (OdV for Italy, General Counsel for those in the foreign scope). At the end of the operations, the minutes are circulated to the BoD. No critical reports were recorded in 2022.
2-17	Collective knowledge of the highest governance body	16, 48	The meetings of the ESG Committee, which include members of the BoD, are also an opportunity to train and raise awareness among those who govern the organisation. The external certification body RINA S.p.A. annually conducts a third-party audit of the organization, to verify compliance with the requirements of the ISO 9001, 14001, 45001 standards of the Management System and the Policies signed by the President.
2-18	Evaluation of the performance of the highest governance body		The Board of Directors is not subject to evaluation of their performance.
2-19	Remuneration policies	48	
2-20	Process to determine remuneration		Due to the nature of our organization, this indicator is not applicable.
2-21	Annual total compensation ratio		5.19 in 2022 (-4% compared to 2021). The result is calculated only for direct employees of Ghella S.p.A..
2-22	Statement on sustainable development strategy	2	
2-23	Policy commitments	17	All our Policies are signed by the President and CEO, communicated to employees in the onboarding process, and made available on the intranet and website ghella.com. They are reviewed annually during the management system review to ensure consistency with the Mission and the Vision of the Company.
2-24	Embedding policy commitments	17	
2-25	Processes to remediate negative impacts	17 - 18	
2-26	Mechanisms for seeking advice and raising concerns	17 - 18	
2-27	Compliance with laws and regulations		In 2022 there were no significant cases of non-compliance with laws or regulations.
2-28	Membership associations	71	
2-29	Approach to stakeholder engagement	10 - 11	
2-30	Collective bargaining agreements	48	
3-1	Process to determine material topics	10 -11	
3-2	List of material topics	11	

Disclosure	Description	Applicable section	Notes
Integration of Sustainability in Corporate Governance			
3-3	Management of material topics	16	
Business Conduct			
3-3	Management of material topics	17	
205-3	Confirmed incidents of corruption and actions taken		During 2022, there were no cases of corruption and no lawsuits were filed against Ghella or its representatives.
Enterprise risk management			
3-3	Management of material topics	18	
Equal opportunity			
3-3	Management of material topics	44	
405-1	Diversity of governance bodies and employees	16, 44 - 45	
Diversity and inclusion			
406-1	Incidents of discrimination and corrective actions taken		During 2022 there were no incidents of discrimination on grounds of diversity or violation of the rights of indigenous people.
Welfare and wellbeing			
3-3	Management of material topics	41 - 43, 48	
401-3	Parental leave	48	
402-1	Minimum notice periods regarding operational changes		The minimum notice period is always recognized by the collective agreements or by the relevant local laws. It varies from 1 to 5 weeks depending on the geographic area.
People development			
3-3	Management of material topics	47	
404-1	Average hours of training per year per employee	47	The average hours of training by professional category are 35 for managers, 21 for office workers and 23 for workers.
404-3	Percentage of employees receiving regular performance and career development reviews	47	

Disclosure	Description	Applicable section	Notes
Salute e sicurezza sul lavoro			
3-3	Management of material topics	17 - 18, 49	
403-1	Occupational health and safety management system	49	
403-2	Hazard identification, risk assessment and incident investigation	49 - 53	
403-3	Occupational health services	49	
403-4	Worker participation, consultation, and communication on occupational health and safety	49	
403-5	Worker training on occupational health and safety	47, 49	
403-6	Promotion of worker health	49	
403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	49 - 53	
403-9	Work-related injuries	49 - 53	
Economic performance			
201-1	Direct economic value generated and distributed	62 - 63	
Assessment and engagement of suppliers			
204-1	Proportion of spending on local suppliers	65	
Creating value for local communities			
308-1	New suppliers that were screened using environmental criteria	65	
414-1	New suppliers that were screened using social criteria	65	
Human rights			
3-3	Management of material topics	17 - 18, 65	
408-1	Operations and suppliers at significant risk for incidents of child labor	65	Only 4 consultancy providers are registered in countries considered at risk (Brazil, Guatemala, Venezuela, Vietnam).

Disclosure	Description	Applicable section	Notes
Quality and innovation			
3-3	Management of material topics	67 - 69	
Active role in developing sector policies and standards			
3-3	Management of material topics	71	
Mitigation of climate change			
3-3	Management of material topics	80 - 85	
302-1	Energy consumption within the organization	81 - 82	
305-1	Direct (Scope 1) GHG emissions	82 - 83	
305-2	Energy indirect (Scope 2) GHG emissions	82 - 83	
Efficient management of water resources			
3-3	Management of material topics	86 - 89	
303-1	Interactions with water as a shared resource	86	
303-2	Management of water discharge-related impacts	87	
303-3	Water withdrawal	86	
Prevention and reduction of pollution			
3-3	Management of material topics	87	
303-4	Water discharge	87	
Sourcing of sustainable materials and eco-design			
3-3	Management of material topics	90 - 95	
301-1	Materials used by weight or volume	90	

Disclosure	Description	Applicable section	Notes
Efficient waste management			
3-3	Management of material topics	96 - 99	
306-3	Waste generated	96	
306-4	Waste diverted from disposal	96	
306-5	Waste directed to disposal	96	
Biodiversity and protection of ecosystems			
304-2	Significant impacts of activities, products and services on biodiversity	90	

Italy, Cancello-Vitulano, Naples-Bari
Photo by Domingo Milella from the photographic project “Nuove Avventure Sotterranee”

Italy, Cancello-Vitulano, Naples-Bari
Photo by Domingo Milella from the photographic project “Nuove Avventure Sotterranee”

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(This independent auditors' report has been translated into English solely for the convenience of international readers. Accordingly, only the original Italian version is authoritative.)

Independent auditors' report on the sustainability report

To the board of directors of
Ghella S.p.A.

We have been engaged to perform a limited assurance engagement on the 2022 Sustainability report (the "sustainability report") of the Ghella Group (the "group").

Directors' responsibility for the sustainability report

The directors of Ghella S.p.A. (the "parent") are responsible for the preparation of a sustainability report in accordance with the "Global Reporting Initiative Sustainability Reporting Standards" issued by GRI - Global Reporting Initiative (the "GRI Standards"), as described in the "Methodological note" section of the sustainability report.

The directors are also responsible for such internal control as they determine is necessary to enable the preparation of a sustainability report that is free from material misstatement, whether due to fraud or error.

They are also responsible for defining the group's objectives regarding its sustainability performance and the identification of the stakeholders and the significant aspects to report.

Auditors' independence and quality control

We are independent in compliance with the independence and all other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

Our company applies International Standard on Quality Control 1 (ISQC Italia 1) and, accordingly, maintains a system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Auditors' responsibility

Our responsibility is to express a conclusion, based on the procedures performed, about the compliance of the sustainability report with the requirements of the GRI Standards. We carried out our work in accordance with the criteria established by "International Standard on Assurance Engagements 3000 (revised) - Assurance Engagements other than Audits or Reviews of Historical Financial Information" ("ISAE 3000 revised"), issued by the International Auditing and Assurance Standards Board applicable to

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limited assurance engagements. This standard requires that we plan and perform the engagement to obtain limited assurance about whether the sustainability report is free from material misstatement.

A limited assurance engagement is less in scope than a reasonable assurance engagement carried out in accordance with ISAE 3000 revised, and consequently does not enable us to obtain assurance that we would become aware of all significant matters and events that might be identified in a reasonable assurance engagement.

The procedures we performed on the sustainability report are based on our professional judgement and include inquiries, primarily of the parent's personnel responsible for the preparation of the information presented in the sustainability report, documental analyses, recalculations and other evidence gathering procedures, as appropriate.

Specifically, we performed the following procedures:

1 analysing the reporting of material aspects process, specifically how the reference environment is analysed and understood, how the actual and potential impacts are identified, assessed and prioritised and how the process outcome is validated internally;

2 comparing the financial disclosures presented in sections "5.1 Key financial figures" and "5.2 Economic value generated and distributed" of the sustainability report with those included in the group's consolidated financial statements;

3 understanding the processes underlying the generation, recording and management of the significant qualitative and quantitative information disclosed in the sustainability report.

Specifically, we held interviews and discussions with the parent's management personnel. We also performed limited procedures on documentation at specific sites (Brennero and Cross River Rail) to gather information on the processes and procedures used to gather, combine, process and transmit non-financial data and information to the office that prepares the sustainability report.

Furthermore, with respect to significant information, considering the group's business and characteristics:

- at group level:
  a) we held interviews and obtained supporting documentation to check the qualitative information presented in the sustainability report;
  b) we carried out analytical and limited procedures to check, on a sample basis, the correct aggregation of data in the quantitative information;
- we held on-site and remote meetings with the management of the Brennero and Cross River Rail sites, which we have selected on the basis of their business, contribution to the key performance indicators at consolidated level and location, and obtain documentary evidence, on a sample basis, supporting the correct application of the procedures and methods used to calculate the indicators.

Ghella Group
Independent auditors' report
31 December 2022

Conclusion

Based on the procedures performed, nothing has come to our attention that causes us to believe that the 2022 Sustainability report of the Ghella Group has not been prepared, in all material respects, in accordance with the requirements of the GRI Standards, as described in the "Methodological note" section of the sustainability report.

Rome, 28 June 2023

KPMG S.p.A.

(signed on the original)

Marco Maffei
Director of Audit

Notes

1. The hydroelectric plants are included in the total hydraulic works figure

2. PORTER M. E., KRAMER M. R., Creating Shared Value, in "Harvard Business Review", January/February 2011, pp.64-77

3. Trento Railway Bypass - Section 3 and Battipaglia-Romagnano High-Speed Rail Link - Section 1, Lercara-Caltanissetta Xirbi High-Speed Rail Link – Section 3, Caltanissetta Xirbi-Nuova Enna High-Speed Rail Link – Section 4.

4. Taxonomy of environmentally friendly economic activities

5. Approved by the Interministerial Committee for Ecological Transition (CITE in Italian) with its Resolution No. 1 dated 8 March 2022

6. This figure does not take into account the training provided by the Australian Cross River Rail project, amounting to over 130,000 hours for both direct and non-direct employees.
7. Employees entitled to parental leave are those whose contract stipulates that benefit, either due to company policy or because national law requires it.

8. The Lost Time Injury Frequency Rate (LTIFR) reflects the average frequency of work-related injuries occurred in a certain period of time resulting in more than three days as specified by Eurostat, and it is calculated according to the UNI 7249 standard as the number of lost time injuries occurring in a workplace per 1 million hours worked.

9. The Lost Time Injury Severity Rate (LTISR) reflects the average severity of work-related injuries resulting in more than three days as specified by Eurostat occurred in a certain period of time and is calculated according to the UNI 7249 standard as the number of days lost due to an injury occurring in a workplace per 1 thousand hours worked.

10. The Total Recordable Injury Frequency Rate (TRIFR) reflects the number of all recordable incidents occurring in a workplace (any recordable work-related injuries and illness that results in occupational injuries requiring days way from work (lost-time injuries -LTI), accidents requiring medication only (medical treatment cases -MTC), injuries not leading to an absence from work (restricted work cases -RWC) and fatal injuries). The index is calculated as the ratio between the number of the total of recordable work-related injuries over a year (or different period) for each million hours worked by a group of employees or workers.

11. Lost-time injury, "LTI"

12. Medical treatment case, "MTC"

13. Restricted work case, "RWC"

14. The reported rate was calculated as the ratio between the number of injuries with serious consequences and the total number of hours worked, multiplied by 1,000,.000

15. The data refers only to investments by Ghella S.p.A., and does not take into account contributions our worksites make to their respective local communities. Donations, grants, sponsorships and cultural investments in foundations that promote scientific research, events, music academies, etc. are included.

16. compared with the 2021 baseline.

17. compared with the 2021 baseline.

18. The ratio between the share of emissions calculated using the percentages of participation and company Revenues is 22.86 tCO_2 / Revenues in millions of euros (-57% compared to 2020, or 53.64 tCO_2 / Revenues in millions of euros).

19. The list shows some examples of initiatives implemented at some of our worksites.


Ghella
5 Generations of Tunnelers