

The table below lists the very limited impacts of the construction and operation of the Company's wind farms located in protected areas (e.g., Natura 2000 Network and archaeological sites **ASI**).

**Operational sites under lease by MYTILINEOS in protected areas [GRI 304-1]** **Biodiversity value of protected area [GRI 304-2]**

1. Wind Farm in the locality "Koryfi" of the Municipality of Sintiki (Regional Unit of Serres), with a power output of 170MW, in operation, owned by the company Eoliki Sidirokastrou, situated at an average distance of 1.5 km from the outer boundaries of the Natura 2000 area "GR 1260001" and at a distance of more than 7.0 km from the area "GR 1260008".

Concerns the lease of 0.802 km<sup>2</sup> of land from Public Properties Company S.A.  
Area of operational site: 0.12 km<sup>2</sup>.

2. Wind Farm in the locality "Koryfi (Expansion)" of the Municipality of Sintiki (Regional Unit of Serres), with a power output of 150 MW, in operation, owned by the company Aeoliki Sidirokastrou, situated at an average distance of 1.0 km from the outer boundaries of the Natura 2000 area "GR 1260001" and at a distance of more than 7.5 km from the area "GR 1260008".

Concerns the lease of 0.027 km<sup>2</sup> of land from the Municipality of Sintiki. Area of operational site: 0.035 km<sup>2</sup>.

3. Wind Farm in the locality "Pyrgos" of the Municipality of Karystos (Regional Unit of Evia), with a power output of 15.3 MW, in trial operation since April 2019, owned by the company Eoliki Evias Pyrgos, situated as follows: (a) At a maximum distance of 1,000 m from the outer boundaries of the area with code number "GR 2420012", which is the "Mt Ochi, Coastal Area and Islets" Special Protection Area (SPA) for birds. (b) At a maximum distance of 200 m from the outer boundaries of the area "GR 2420001", which is the Special Management Area (SMA) "Mt Ochi - Karystos Plain - River - Cape Kafireas - Marine coastal area" of the Natura 2000 Network. Two (2) Wind Turbines are located within this area.

Lease of 0.0579 km<sup>2</sup> from private land owners holding the ownership rights to the "Dafniza-Kalipeti" private forest.  
Area of operational site: 0.103 km<sup>2</sup>.

4. Wind Farm in the locality 'Chelona' of the Municipality of Karystos (Regional Unit of Evia) with a power output of 8.1 MW, in trial operation since October 2019, owned by the company Eoliki Evias Chelona, situated at a maximum distance of 200 m from the outer boundaries of the Special Protection Area (SPA) for Birds 'Mt Ochi, Coastal Zone and Islets', with code number "GR 2420012", belonging to NATURA 2000 network. Seven (7) Wind Turbines are located within this area.

Area of operational site: 0.130 km<sup>2</sup>.

The "GR 1260001" area encompasses wetlands and mountainous ecosystems of great national and international importance. It supports rich -in terms of both numbers and diversity- bird populations, including rare and endangered species. The wetland is of great importance as a feeding ground for birds of prey nesting in the nearby forests, as a winter site and stopover site for migratory birds, as well as a breeding ground for a significant number of birds. The increased biological productivity, the existence of rare plant species and of equally rare and diverse fauna (fish, mammals, amphibians, reptiles), increase even more the area's biodiversity value.

As was the case in 2018, 2019 and 2020, an annual avifauna monitoring study was carried out in the area of the Wind Farms in 2021 and is pending submission (usually within the first six months of the next year), to the competent Department of Protected Areas of the Directorate of Natural Environment and Biodiversity Management of the Ministry of Environment, Energy and Climate Change. No impacts on the protected area, as the operation areas of the Wind Farms are located in the area's peripheral zone, away from the Priority Habitats.

An automated bird collision avoidance system has been installed in the second one of these Wind Farms.

**No bird killing incident has been observed.**

In the Natura area "GR2120012" (Mt Ochi, Coastal Area and Islets), 55 avifauna species listed in Annex I of Directive 79/409/EEC have been recorded, together with 38 important species of migratory birds. The protected area "GR2420001" (Mt Ochi - Karystos Plain - River - Cape Kafireas - Marine coastal area) is mainly mountainous, with a relatively wild and difficult to access coastline in the north-eastern foothills of Mt Ochi. 16 habitats in this area are listed in Annex I of Directive 92/43/EEC, of which Habitat 1120\* - Marine vegetation areas with Posidonia (Posidonion oceanicae) is a priority habitat. Four (4) species of reptiles, two (2) of invertebrate and two (2) of mammals are listed in Annex II of Directive 92/43/EEC and in article 4 of Directive 2009/147/EC. The two species of mammals (Mediterranean seal and otter) are priority species. As was the case in 2018, 2019 and 2020, an annual monitoring study of avifauna was carried out in 2021, which assesses the limited effects of the test operation of the Wind Farm on the avifauna of the area.

**Limited impacts on the avifauna of the area due to the operation of the Wind Farm.**  
**No bird killing incident has been observed.**

The Natura area "GR24200012" (Mt Ochi, Coastal Zone and Islets) is mainly mountainous, with a relatively wild and difficult to access coastline in the steep northern and eastern foothills of Mt Ochi. 55 species of birds listed in Annex I of Directive 79/409/EEC have been recorded, together with 38 important species of migratory birds. The species that characterize the Special Protection Area (SPA) are Puffinus yelkouan (Yelkouan shearwater), Larus audouinii (Audouin's gull), Hieraaetus fasciatus (Bonelli's eagle), Bubo Benelli's (Eurasian eagle-owl) and Emberiza caesia (Cretzschmar's bunting), whereas its delimitation species are Phalacrocorax aristotelis (great cormorant), Circaetus gallicus (short-toed snake eagle), Falco eregrinus (peregrine falcon), Apus melba (pallid swift), Lullula arborea (woodlark), Anthus campestris (tawny pipit). As was the case in 2018 and in 2020, an annual avifauna monitoring study was carried out in 2021 and is pending submission (usually within the first six months of the next year), to the competent Department of Protected Areas of the Directorate of Natural Environment and Biodiversity Management of the Ministry of Environment, Energy and Climate Change.

**Limited impacts on the avifauna of the area due to the operation of the Wind Farm. An automated bird collision avoidance system has been installed in this Wind Farm.**  
**No bird killing incident has been observed.**

# Other significant Environmental topics

## Raw & other materials

Regarding the use of primary natural resources in the production of the main products of MYTILINEOS, the quantity of bauxite used in the Metallurgy Business Unit to produce aluminium and alumina in 2021 was slightly increased compared to 2020 (4.5%), while the total quantity of natural gas used in the Power & Gas Business Unit decreased by 10.9%. The Sustainable Engineering Solutions (SES) and Renewables & Storage Development (RSD) Business Units do not manage primary natural resources, but instead use semi-ready or finished products.

In detail:

In the **Metallurgy Business Unit**, approximately 2.6 million tons of raw materials were used in 2021, to produce alumina and primary and secondary aluminium products, a quantity increased compared to 2020. Of this total quantity, 74% was bauxite, while the remaining 26% regarded the use of other raw materials from non-renewable sources.

MYTILINEOS, in its effort to limit the consumption of natural resources and to reduce the energy required in aluminium production, has adopted in its production process the practice of recasting aluminium waste (scrap) that replaces the use of raw materials. Furthermore, in this direction, the Company has also expanded its activities in the industrial production, processing and trading of metals and in particular of aluminium alloys and their products, investing in the know-how for the optimal treatment of aluminium scrap, so as to be able, in the years to come, to produce raw materials again, spending a much lower quantity of energy and thus significantly cutting costs and mitigating the impact on the environment. **ASI**

**The Sustainable Engineering Solutions (SES) and Renewables & Storage Development (RSD) Business Units** do not manage primary natural resources, but instead use semi-finished or finished products, according to the detailed plans and procedures for each project, which specify with great accuracy each material to be used, its manufacturing method and its exact position and operation. Additionally, a key criterion in the design stage of the projects that the Business Unit is carrying out is the use of recyclable materials. The Company's requests for proposals and contracts with suppliers of materials and equipment contain a specific clause regarding their compliance with the requirements of the ISO 14001 standard, specifically referring to the prohibition of using environmentally hazardous materials and the obligation to make the maximum possible use of recyclable materials.

**In the Power & Gas Business Unit**, the raw material used in power plants is natural gas, which is the transition fuel towards an economy with lower greenhouse gas emissions. The annual consumption of natural gas in the Company's thermal units is linked to the fluctuations in the generation of electricity on an annual basis, and in 2021 recorded a slight decrease by 10.9% compared to 2020, due mainly to the scheduled maintenance of power plant of Korinthos Power. Regarding the materials used in the production process and not incorporated in the end product, such as lubricating oils and chemicals, in 2021 these remained close to their 2020 levels.

**Weight (in tons) of materials used in the production and packaging of the Company's main products [GRI 301-1]**

	2019	2020	2021	Basic materials
<b>Metallurgy Business Unit ASI</b>				
Raw materials	2,265,428	2,278,815	2,373,121	Bauxite, Alumina, Aluminium Scrap
Materials (not incorporated in the end product)	237,655	250,133	264,995	Anodes, Lime, Soda, Coke, Tar
Packaging materials	1,309	1,192	1,125	Pine planks, Rings
<b>Total</b>	<b>2,504,392</b>	<b>2,530,140</b>	<b>2,638,928</b>	
Recycled materials	39,922	49,012	50,181	Aluminium scrap
<b>Percentage of recycled input materials [GRI 301-2]</b>	<b>1.59%</b>	<b>1.94%</b>	<b>1.90%</b>	

**Composite Construction and Steel Treatment Units**

Materials (used in the production process but not incorporated in the end product)	256.0	309.9	313.3	Oxygen, Argon, Nitrogen
Semi-finished products	649.3	1,043.2	1,301.1	Steel
Packaging materials	4.5	8.2	8.1	Nylon
<b>Total</b>	<b>909.8</b>	<b>1,361.3</b>	<b>1,622.5</b>	
Recycled materials	235.2	372.6	440.8	Recycled steel
<b>Percentage of recycled input materials [GRI 301-2]</b>	<b>25.8%</b>	<b>27.4%</b>	<b>27.2%</b> <sup>1</sup>	

<sup>1</sup> Of the 1,309.2 tons of total weight of materials used and incorporated in the end products, steel (in the form of plates, merchant bars or other project materials) accounted for approximately 1,102 tons. Around 40% of the EU's total steel production comes from electric arc furnaces, in which steel is produced from 100% recycled raw material (scrap) (Source: eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0407:FIN:EN:PDF, Strasbourg, 11.6.2013, COM (2013) 407 final, p.11). Thus, 440.8 tons (40% of the 1,102 tons of steel materials) correspond to recycled steel.

## Research & Development

Research & Development is not just another business choice but a modern-day necessity in the context of the Sustainable Development Goals (SDGs). To this end, MYTILINEOS invests in research and development with the aim of contributing, acknowledging its share of the relevant responsibility, to strengthening scientific research, upgrading the technological capabilities of the country's industrial sector, and encouraging innovation, thus ensuring industrial diversification and the added value of its products and services.

In the **Metallurgy Business Unit**, the Company continues to consistently invest in the installation of pilot units for the development of research in the following areas:

- Utilization of bauxite residues: The Company both participates in and conducts pilot tests in the framework of European programs on the use of efficient "green" technologies in the production of useful products and materials (iron, alumina, cement additives and construction products), as well as on the development of technologies for the extraction of rare earths.
- New aluminium recycling technologies: The Company participates in research programs on the design and control of the production of recycled aluminium products with a low energy and environmental footprint.

At the same time, the Company continues to consistently invest in research for the development of know-how in new technologies, and is actively participating in research activities in the following fields:

- Utilization of carbon-rich by-products of the alumina electrolysis production process, exploring a recycling technology within the aluminium production cycle.
- Heat recovery and utilization from exhaust gas flows of the aluminium production process.
- Use of RES in alumina / aluminium production: The Company participates in a Study Network exploring the possibilities of direct application of RES in the industry.
- Digitization alumina and aluminium production processes.
- Education and lifelong learning: The Company participates in programs aimed at developing new tools and training courses for engineers and technicians working in the raw materials and metallurgy sector.

In this direction, the Research and Sustainable Development activity was established under the Innovation Division of the Company's Metallurgy Business Unit. The Company participates in **24 research projects** co-funded by the EU or the Greek State under the Horizon 2020, EIT Raw Materials, EIT Manufacturing, ERA-NET Cofund on Raw Materials (ERA-MIN 2) programs, and under programs of the Greek General Secretariat for Research and Technology (GSRT). MYTILINEOS participates in these programs with a view to increasing competitiveness and exploring the application of an industrial circular economy.

The total financing of the programs for the period 2017-2025, exceeds €120 million, of which €8.7 million are related to investments of the Metallurgy Business Unit of MYTILINEOS, while the applied research is carried out in collaboration with industrial partners, research bodies and universities in Greece and Europe.

In summary, in 2021, the Unit's Research and Sustainable Development activity announced the following research results on a

pilot scale, while the two pilot units continued to operate for testing new metallurgical processes at the aluminium plant:

- **Production of 1<sup>st</sup> scandium concentrate from bauxite residues.**



Under the SCALE project ([scale-project.eu](https://scale-project.eu)), 10 m<sup>3</sup> of bauxite residue extract solution were treated using the SIR technology of the company II-VI. The treatment resulted in the production of 200 g of solid concentrate containing 34% by weight of scandium oxide. The overall process has succeeded in upgrading the scandium concentration from the bauxite residues to the concentrate by 3000 times ([youtu.be/qFE8nr-cRDHY](https://youtu.be/qFE8nr-cRDHY)). The technology will be further optimized in the SCALE-Up program which starts in 2022 and will be co-funded under the EIT Raw Materials program.

Scandium is a metal, classified as a rare earth element, whose global production does not exceed 15 tons (mainly from industrial by-products) and is used in "emerging" technological applications such as: (a) "Electrolytic" gas-fired power generation (SOFC), whose efficiency is twice that of conventional thermal power plants, (b) very high resistance Aluminium-Scandium alloys, such as the Al-Sc-Mg alloy used by AIRBUS in 3D component printing technology ([scale-project.eu](https://scale-project.eu)).

### ASI

- **Recovery of soda from bauxite residues.**



Under the RemovAl program ([removal-project.com](https://removal-project.com)), 600 kg of bauxite residues underwent hydrometallurgical treatment in order for their soda content to be recovered. The new "dealkalized" bauxite residues contain less than 0.5% by weight soda and will be tested as a raw material for the production of mixing cement under the ReActiv program. Today, bauxite residues are used to a limited extent as a raw material for the production of the cement raw meal ("farin"). Their conversion into an "active ingredient" (the so-called supplementary cementitious material) is the main objective of the ReActiv program ([reactivproject.eu](https://reactivproject.eu)) coordinated by the company Holcim in collaboration with MYTILINEOS.

- **Recovery of alumina from bauxite residue slag.**



Under the RemovAl program, 300 kg of bauxite slag, which had been produced by the Research and Sustainable Development Department activity in 2020, underwent hydrometallurgical treatment in order for their alumina content to be recovered. 70% of the alumina was extracted in the solution and then precipitated using CO<sub>2</sub> gas, producing about 40 kg of hydrated alumina as the final product.

- **Treatment of Greek bauxite using the Pedersen method.**



Under the ENSUREAL programme ([ensureal.com](https://ensureal.com)), 2 tons of Greek bauxite (from MYTILINEOS' subsidiary DELPHI-DISTOMON) underwent pyrometallurgical treatment for obtaining a cast iron product, while the slag produced underwent hydrometallurgical treatment for producing hydrated alumina. This process is an alternative to the Bayer method for the treatment of bauxites, which leads to fewer and more easily usable by-products.

The above technologies are intended for use in developing the know-how of the Metallurgy Business Unit for the production of new products, investigating technical solutions to sustainability problems, and exploring the possible future activity of MYTILINEOS in new markets if and when these are considered profitable.

In addition, DELPHI-DISTOMON launched a **pilot project on the digital monitoring of ventilation at an underground work site**. The solution used (Ventilation-on-Demand) had been designed to ensure air quality in underground mining sites and reduce the energy consumption of the ventilation system. It combines cutting-edge technologies such as Internet of Things, Cloud big data, Sensors.

In the **Power & Gas Business Unit**, an Applied Research & Development and Innovation Department is in operation. In 2021, more than 10 projects were underway in this Department, including the following:

- Energy Blockchain - Green PPAs: Green Power Purchase Agreements (PPAs), which constitute a contract between the two parties and certify the provider of "green" energy, the amount of energy, the value of the energy, the geographical information of the place of origin of the agreed energy, etc.
- Digital Innovations: New mobile apps, marketplaces and innovative digital processes to upgrade the digital customer engagement and on-boarding of Retail customers (Protergia ON).
- AI Factory: creation of processes, know-how and organization of an internal AI structure and Data Factory for introducing an Artificial Intelligence strategy at MYTILINEOS.
- Prediction of the electric power produced by wind turbines - quantification of uncertainty.
- Approval in 2021 for participation in the new Hellenic Energy Centre, whose primary purpose is to promote innovation in domestic entrepreneurship, with emphasis on the production of energy in the post-lignite era, RES projects, decentralized production and savings, smart cities and communities, and energy transmission and distribution networks.

**In 2021, total investments in research and development by the Metallurgy and Power & Gas Business Units stood at €2.5 million, while the Company's Research & Development departments employed 17 people in total.**

