2020–2021 Minerals Yearbook

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World rankings for mineral production, shares of world production, and reserves presented in this chapter are derived from the referenced sources. Production data in this chapter may differ from data in other sources because of differences in the date of reporting.

The Mineral Industry of France

By Keita F. DeCarlo

Note: In this chapter, information for 2020 is followed by information for 2021.

France no longer mined metallic minerals. Many of the mineral deposits that were historically important for the country's economy were no longer being mined because doing so was no longer economically viable. Although efforts had been made to explore the possibility of extracting minerals from economically viable deposits with minerals whose value had increased in recent years, such as gold and tungsten, there were environmental, legal, and regulatory barriers that prevented further development of such deposits. The country's mineral industry produced processed mineral commodities, such as aluminum, cobalt, indium, pig iron, lead, nickel, and zinc; and mined industrial minerals, such as gypsum, lime, mica, and pumice. In 2020, France was the world's sixth-ranked producer of talc (6.7% of global output) and the fifth-ranked producer of mica (5.4% of global output) (table 1; U.S. Central Intelligence Agency, 2021; Bolen, 2022; Jasinski, 2022).

Minerals in the National Economy

In 2020, France had the seventh largest economy in the world in terms of its nominal gross domestic product (GDP) of $2.63 trillion (2.31 trillion euro area euros),[1] and it had the second largest economy in the European Union after Germany, accounting for 17% of the total GDP of the European Union. France's real GDP decreased by 7.8% in 2020 owing to lockdowns and other economic restrictions imposed as a result of the coronavirus disease 2019 (COVID-19) pandemic. The industrial sector (including the extractives sector) contributed 13.2% of real GDP; the construction sector contributed 5.29% of the GDP; and the extractives, energy, water, waste management, and decontamination sectors combined contributed 2.81% of the GDP. The extractives sector employed 15,226 people in 2020, and this figure was 0.52% of the total employed in the manufacturing sector and a decrease of 2.4% compared with that in 2019. The construction sector employed approximately 1.83 million people, which was an increase of 1.7% compared with the number employed in this sector in 2019 (European Commission, 2021, p. 27; National Institute of Statistics and Economic Studies, 2022a–c).

Government Policies and Programs

The mineral industry of France is regulated by the French Mining Code, including Decree No. 2006–648, Decree No. 2006–649, and Decree No. 80–331. Exploration and extraction of mineral resources require both a mining title and an operation permit. In 2017, the Government adopted Act No. 2017–1839 to ban new exploration of hydrocarbons to comply with the objectives of the 2015 Paris Agreement on climate change. Decree No. 2018–434 of June 4, 2018, includes provisions for regulating the safety of workers engaged in the extractives industry against exposure to radiation (Clément and others, 2020; MinéralInfo, 2020; Legifrance, 2021).

Law No. 2018–727 of August 10, 2018, is a comprehensive law that provides for the implementation of a new trust-based relationship between companies and the Government's tax authorities that, among other aspects, allows the Government to reform the provisions of the Mining Code, including with respect to the granting and extending of licenses for the exploration for geothermal energy and the operation of geothermal energy facilities. Reform project proposals related to this law were planned for February 2020 but were postponed owing to the COVID-19 pandemic. A Ministerial reply published on July 2, 2020, by the Ministry of Ecological and Solidarity Transition outlined several provisions as part of this reform project, including adding health risk considerations to the Mining Code; integrating mining work into environmental authorizations; extending the financial obligations of mining operations to include post-closure site rehabilitation; and enabling the parent company to be held responsible if its subsidiary becomes insolvent. A draft bill of law for the reform was presented to the National Council for the Ecological Transition at the end of October 2020 (Legifrance, 2018; Clément and others, 2020).

Production

In 2020, major increases in production (those greater than 10% compared with production in 2019) included that of electrolytic nickel, by 22%; and zinc, by 11%. Major decreases in production included that of ferromanganese, by 41%; nickel chemicals, by 35%; refined petroleum (throughput), by 32%; pig iron, by 22%; raw steel, by 20%; hot-rolled steel products and crushed chalk, by 19% each; dimension marble (including some travertine), by 18%; iron oxide pigments and silicon metal, by 17% each; ferrosilicon, by 15%; secondary refined lead, by 14%; primary aluminum, by 13%; crude petroleum and industrial silica, by 11% each; and crushed limestone (agricultural and industrial) and kaolin, by 10% each. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Bureau de Recherches Géologiques et Minières (BRGM) is the Government agency that performs geologic and mineral research in France and abroad. Major French mineral-producing companies had operations in France and abroad. The Minister of Economy and Finance is responsible for issuing

[1]Where necessary, values have been converted from euro area euros (EUR) to U.S. dollars (US$) at the annual average exchange rates of EUR0.877=US$1.00 for 2020 and EUR0.846=US$1.00 for 2021

and regulating mining titles through the raw materials policy of Decree No. 2017–1078. Eramet S.A. mined manganese in Gabon, mineral sands (zircon and ilmenite) in Senegal, and nickel in New Caledonia, and it produced manganese alloys and refined cobalt in France. Imerys S.A.—the world's leading producer of industrial minerals, in terms of quantity—mined and processed bentonite, diatomite, graphite, kaolinite, perlite, and wollastonite domestically and from deposits in other countries, including China, Germany, the United Kingdom, and the United States. Total S.A. produced crude petroleum, natural gas, and petrochemicals in 29 countries (Eramet S.A., 2021, p. 12, 14; Imerys S.A., 2021, p. 15, 90, 244; Total S.A., 2021, p. 7, 11). Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2020, France's total exports and imports were valued at $489 billion and $583 billion, respectively. Exports and imports of mineral products were valued at $10.3 billion and $43.3 billion, respectively; of these amounts, imports of ores and concentrates were valued at $315 million and exports of ores and concentrates were valued at $1.87 billion. The majority of exports were mineral fuels and and refined petroleum products, valued at $9.20 billion. Of this amount, exports of refined petroleum were valued at $4.72 billion; petroleum gases and hydrocarbons, $1.69 billion; and crude petroleum, $40.7 million. In 2020, France's top five export partners for mineral fuels and refined petroleum products were Italy (which received 11%, by value), Belgium (13%), Germany (11%), Spain (10%), and the Netherlands (7.8%). France's imports of mineral fuels and refined petroleum products were valued at $40.2 billion. Of this amount, imports of refined petroleum were valued at $16.5 billion; crude petroleum, $12.4 billion; and petroleum gases and hydrocarbons, $8.23 billion. In 2020, France's top five import partners for mineral fuels and refined petroleum products were Belgium (which provided 16%), Russia (13%), the United States (9.7%), Saudi Arabia (7.6%), and Algeria (7.0%) (United Nations Statistics Division, 2022).

In 2020, France's exports of ferrous metals and articles thereof were valued at $17.9 billion, of which exports of ferrous metals alone were valued at $10.8 billion. France's top five export partners for ferrous metals and articles thereof included Germany (which received 20%), Spain (12%), Belgium (11%), Italy (8.7%), and Turkey (4.4%). France's imports of ferrous metals and articles thereof were valued at $20.1 billion, of which imports of ferrous metals were valued at $9.65 billion. France's top five import partners for ferrous metals and articles thereof were Germany (which provided 22%, in terms of value), Belgium (19%), Italy (15%), Spain (11%), and the Netherlands (5.3%) (United Nations Statistics Division, 2022).

Exports of base metals and articles thereof were valued at $9.51 billion. Of this amount, exports of aluminum and articles thereof were valued at $4.48 billion (including unwrought aluminum valued at $528 million); copper and articles thereof, $2.65 billion (including unrefined copper, $6.9 million); nickel and articles thereof, $690 million (including unwrought nickel, $135 million); zinc and articles thereof, $599 million (including unwrought zinc, $262 million); lead and articles thereof, $149 million (including unwrought lead, $89.1 million); and tin and articles thereof, $53.5 million (including unwrought tin, $14.3 million). In 2020, France's top five export partners for base metals and articles thereof were Germany (which received 20%), Belgium (10%), Spain (9.9%), Italy (8.6%), and the United Kingdom (6.0%). Imports of base metals and articles thereof were valued at $11.8 billion, including imports of aluminum and articles thereof valued at $5.90 billion (of which imports of unwrought aluminum were valued at $935 million); copper and articles thereof, $3.21 billion (including unrefined copper, $1.9 million); nickel and articles thereof, $1.07 billion (including unwrought nickel, $359 million); zinc and articles thereof, $599 million (including unwrought zinc, $351 million); lead and articles thereof, $105 million (including unwrought nickel, $73.7 million); and tin and articles thereof, $98.7 million (including unwrought tin, $84.5 million). France's top five import partners for base metals and articles thereof were Germany (which provided 19% of France's imports of base metals and articles thereof), Spain (10%), Italy (9.8%), Belgium (6.6%), and the United States (6.3%) (United Nations Statistics Division, 2022).

Commodity Review

Metals

Aluminum.—In 2020, France imported 1.27 million metric tons (Mt) of bauxite valued at $91.0 million and 838,000 metric tons (t) of calcined alumina equivalent valued at $312 million. France's top import partners for bauxite and calcined alumina equivalent were Guinea (which provided 72%, by quantity, of France's imports of bauxite) and Ireland (which provided 76% of France's imports of calcined alumina equivalent), respectively (table 1; United Nations Statistics Division, 2022).

In 2020, aluminum production from the Aluminum Dunkerque smelter, which was owned by GFG Alliance of the United Kingdom through its subsidiary Alvance Aluminium Group S.A.S. of France, increased to 284,000 t from 278,000 t in 2019; the smelter also produced a total of 620,000 t of raw materials (that is, alumina, pitch, and coke). The smelter employed 590 employees in 2020. Alvance Aluminium Group was a new global aluminum group formed in January and headquartered in Paris, which included the Aluminum Dunkerque smelter as well as an aluminum smelter in Fort William, United Kingdom (Dufourg, 2020; Maile, 2020; Alvance Aluminum Group, 2021).

TRIMET Aluminium SE of Germany owned an electrolysis plant in Saint-Jean-de-Maurienne, which had capacities of 145,000 metric tons per year (t/yr) and 155,000 t/yr of primary aluminum and cast products, respectively; the plant had 600 employees. The COVID-19 pandemic did not affect production at the electrolysis plant, which sustained pre-pandemic levels of production. TRIMET had invested more than $228 million during the course of 6 years, or an average of $34 million per year. In 2020, annual investments in the plant by TRIMET were halved to $17 million owing to economic restrictions imposed by the COVID-19 pandemic. TRIMET also owned a wire casting plant at Castelsarrasin, which had a capacity of 10,000 t/yr of cast products and 35 employees (Bert, 2021; TRIMET France, 2021a, b).

Gold and Tungsten.—In June 2020, the Court of Appeals of Bordeaux dismissed the coordinated appeals filed by Apollo Minerals Ltd. of Australia and the Government against the June 2019 decision by the Administrative Court of Toulouse to cancel their exploration permit for the Couflens copper-gold-tungsten project (located in the Pyrenees region along the border with Spain in southern France). The court decision confirmed the cancellation of the permit and noted that the Government followed an irregular procedure and did not sufficiently consult the general public prior to granting the permit. The company submitted a formal claim to the Government for compensation of damages suffered as a result of the cancellation. Total expenses for the Couflens project were $0.6 million in 2020, which was mainly for exploration and evaluation of assets. Additionally, Mines du Salat S.A.S., which was Apollo Minerals' subsidiary in France, was liquidated following the ruling. The 42-square-kilometer area of the Couflens project included the historic Salau tungsten mine. Gold assay results from 1986 showed up to 1.9 meters (m) grading 16 grams per metric ton (g/t) gold from channel sampling programs, and 8.5 m grading 3.4 g/t gold, including 1.9 m grading 8.4 g/t gold, from diamond-drilling results within the project area. The Salau Mine produced a total of 930,000 t of ore grading 1.5% tungsten from 1971 to 1986, when the mine was closed (Apollo Minerals Ltd., 2019, p. 1; 2020, p. 1, 7, 8).

Indium and Zinc.—Trafigura Pte. Ltd. of Switzerland, through its subsidiary Nyrstar NV of the Netherlands, owned a majority interest in the Auby zinc smelter, which was the sole facility that produced zinc and indium in France. Zinc concentrates were the principal source of primary indium. In 2020, France imported 304,000 t of zinc ores and concentrates, and its top import partner was Belgium (which provided 82% of France's zinc ore and concentrate imports, by quantity). The smelter produced 38,000 kilograms (estimated) of indium in 2020, which was a decrease of 5.1% compared with that in 2019; and 166 t of zinc in 2020, which was an increase of 10% compared with that in 2019. In November, Trafigura announced that it invested $16 million in new equipment at the Auby smelter to help maintain the current quality and volume of zinc production and also to increase production in the near future. The new facility was expected to be operational starting between December 2020 and April 2021; additional equipment upgrades were planned to be made between 2022 and 2024. The Auby smelter employed approximately 280 people in 2020 (Nyrstar NV, 2020a, p. 1, 2; 2020b).

Iron and Steel.—In 2020, France imported 11.2 Mt of iron ores and concentrates, and the top import partners were Canada (which provided 47% of France's iron ore and concentrate imports, by quantity), Brazil (23%), and Liberia (16%). ArcelorMittal S.A. of Luxembourg remained the major iron and steel producer in France; it had plants in Dunkerque, Florange, Fos-sur-Mer, and Gandrange. The company's products were sold primarily on the regional market in France and Western Europe, particularly in the automotive and packaging market. The Dunkerque plant had two of its largest blast furnaces (equal to 57% of its total capacity) idled in March and April in response to decreased economic activity caused by the COVID-19 pandemic. The Fos-sur-Mer plant idled one of its two blast furnaces in March owing to the COVID-19 pandemic; the other was scheduled to be idled in June, but this action was postponed. The Florange plant permanently closed its coke oven battery in April at a cost of $92 million. The Florange plant's coke oven battery was initially scheduled to be closed in 2022 and 2023 as part of France's decarbonization initiatives; however, decreased output at the Dunkerque plant owing to the COVID-19 pandemic significantly reduced coke demand within the company and expedited the closure schedule. In June, the Florange plant began production at its Galsa 2 galvanizing line, and had the goal of producing 800,000 t/yr of steel coil products to be used primarily for the automotive market. The Florange plant employed a total of 2,000 people. Most steelmaking production by ArcelorMittal's plants was restarted during the third quarter of 2020 (Eurometal, 2020a, b; Villa, 2020; ArcelorMittal S.A., 2021, p. 26, 75, 76; France TV, 2021; United Nations Statistics Division, 2022).

Nickel.—Eramet's refinery in Sandouville produced 7,355 t of nickel in 2020, of which 6,032 t was nickel cathodes and 1,323 t was nickel salts. Production continued to increase during the year despite considerably depressed economic activity (primarily in the Asian electronics market) and the company's losses of $35 million as a result of the COVID-19 pandemic. The nickel matte raw materials used at the Sandouville refinery had been supplied under a long-term contract with a European metallurgy supplier since 2017; before that, the material had been supplied by the Société Le Nickel-SLN metallurgical plant in Doniambo, New Caledonia (Eramet S.A., 2021, p. 58, 65, 66).

Industrial Minerals

Cement.—In 2020, France produced 16.7 Mt of cement, which was approximately the same amount as in 2019. France exported 198,000 t of clinker and 492,000 t of cement valued at $63.9 million and $39.9 million, respectively, in 2020, and it imported 1.57 Mt of clinker and 3.26 Mt of cement valued at $100.7 million and $319.4 million, respectively. In November, Ciments Calcia announced that it planned to invest a total of $456 million to modernize several of its sites in France for the purpose of lowering carbon emissions and increasing performance. The plan included (1) converting the Gargenville plant into a modern grinding center and shutting down its kiln system and quarry operations; and (2) shutting down white cement production at the Cruas site and converting the plant into an automated cement terminal for white cement distribution. These changes would eliminate 162 current jobs and create 20 new jobs (table 1; Thomas, 2020; United Nations Statistics Division, 2022).

Mineral Fuels and Other Sources of Energy

Nuclear Energy.—Throughout 2020, several components that were needed for the International Thermonuclear Experimental Reactor (ITER) were brought into France for the first time, including some toroidal field coils and a vacuum vessel sector. The ITER is located in the Cadarache Provence-Alpes-Côte d'Azur region. Machine assembly of the ITER formally began in July. The initial production of plasma (known as "First Plasma") was expected to begin in 2025 and the production of full fusion power was scheduled for 2035. The electricity generating capacity of the facility was projected to be 500 megawatts (International Thermonuclear Experimental Reactor, 2020a, b; 2020c, p. 3; 2021a, b).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

Minerals in the National Economy

France's real GDP increased by 6.9% in 2021 and the nominal GDP was $2.97 trillion; the increase was likely attributable to the ongoing recovery from the COVID-19 pandemic, although it was slightly lower than expected because of supply bottlenecks and rising energy prices. The industrial sector (including the extractives sector) contributed 13.1% of the GDP; the construction sector contributed 5.66% of the GDP; and the extractives, energy, water, waste management, and decontamination sectors combined contributed 3.11% of the GDP (European Commission, 2022b, p. 26; National Institute of Statistics and Economic Studies, 2022b, c).

Government Policies and Programs

Article 81 of law No. 2018–1104, a measure to combat climate change and strengthen resilience against its adverse effects, came into effect on August 25, 2021. The law permits the Government to take ordinance-based measures on a wide range of mining-related laws and regulations. Some of the most notable aspects of the new law are that it enables the Government to involve a greater level of participation from the public and local authorities when granting, extending, or refusing applications for mining titles; it requires environmental, economic, and social analyses to be conducted prior to decisions for such applications; and it more tightly regulates illicit gold-mining activities (Legifrance, 2022).

Production

In 2021, major increases in production (those greater than 10% compared with production in 2020) included that of ferromanganese, by 62% (estimated); nickel chemicals (Ni content), by 61%; crushed chalk, by 23% (estimated); pig iron, by 23%; dimension marble (including some travertine), hot-rolled steel products, and cobalt chloride (Co content), by 22% each (estimated); iron oxide pigments, by 20% (estimated); raw steel, by 20%; refined lead (secondary), by 17%; silicon metal, by 15% (estimated); primary aluminum, by 14% (estimated); electrolytic nickel and silica, by 12% each (estimated for silica); crushed limestone (agricultural and industrial) and kaolin, by 11% each (estimated); and silicomanganese, by 10% (estimated). These increases were likely due to the lifting of economic restrictions imposed by the COVID-19 pandemic and the economy rebounding to pre-crisis levels in the second half of 2021 (European Commission, 2022b, p. 26).

Mineral Trade

In 2021, France's total exports and imports were valued at $585 billion and $715 billion, respectively. Exports and imports of mineral products were valued at $21.5 billion and $76.5 billion, respectively. Of these amounts, exports and imports of mineral fuels and associated products were valued at $19.9 billion and $71.8 billion, respectively (United Nations Statistics Division, 2022).

In 2021, France's exports of ferrous metals and articles thereof were valued at $26.4 billion, of which exports of ferrous metals were valued at $18.1 billion. Exports of base metals and articles thereof were valued at $12.9 billion and included exports of aluminum and articles thereof, $6.21 billion (of which exports of unwrought aluminum were valued at $869 million); copper and articles thereof, $4.13 billion (including unrefined copper, $16.2 million); nickel and articles thereof, $757 million (including unwrought nickel, $175 million); zinc and articles thereof, $685 million (including unwrought zinc, $260 million); lead and articles thereof, $249 million (including unwrought lead, $148 million); and tin and articles thereof, $72.1 million (including unwrought tin, $23.9 million). In 2021, France's imports of ferrous metals and articles thereof were valued at $30.3 billion, of which imports of ferrous metals were valued at $15.4 billion. Imports of base metals and articles thereof were valued at $16.7 billion and included imports of aluminum and articles thereof, $8.50 billion (of which imports of unwrought aluminum were valued at $1.77 billion); copper and articles thereof, $4.96 billion (including unrefined copper, $4.66 million); nickel and articles thereof, $1.11 billion (including unwrought nickel, $503 million); zinc and articles thereof, $882 million (including unwrought zinc, $539 million); lead and articles thereof, $170 million (including unwrought lead, $107 million); and tin and articles thereof, $168 million (including unwrought tin, $144 million) (United Nations Statistics Division, 2022)..

Commodity Review

Metals

Aluminum.—In 2021, France imported 959,000 t of bauxite valued at $80.4 million and 906,000 t of calcined alumina equivalent valued at $379 million. France's top import partners for bauxite and calcined alumina equivalent were Guinea (which provided 65% of France's bauxite, by quantity) and Ireland (which provided 67% of France's alumina equivalent), respectively (United Nations Statistics Division, 2022).

Following the bankruptcy in March of Greensill Capital, which was the major financier of GFG Alliance, the assets of GFG Alliance's subsidiary, Alvance Aluminium Group, were placed under judicial review in April. In October, a private equity company from the United States, American Industrial Partners (AIP), which was a lender to GFG Alliance, announced that it had foreclosed on GFG Alliance's debts and thereby acquired ownership of Alvance Aluminium Group, which it renamed Aluminium Dunkerque Service S.A.S. The announcement stated that this acquisition was fully in accordance with European Union merger regulations, but GFG Alliance disputed the takeover. In December, the smelter cut production by approximately 9,000 t (or by 3% of its production capacity) owing to a surge in electricity prices. The smelter employed 630 employees in 2021 (table 1; American Industrial Partners, 2021, 2022; Kinch, 2021a; Perez and others, 2021).

Indium and Zinc.—In December, Nyrstar announced that its Auby smelter would be placed on care-and-maintenance status starting in January 2022 in response to current and projected future increases in electricity prices in Europe. The 297 employees at the smelter would not be affected by this action. The decision to place the smelter on care-and-maintenance status followed discussions in October between Nyrstar's management and operations staff regarding potential decreases in production by up to 50% because of increased electricity prices in Europe (table 1; Nyrstar NV, 2021).

Iron and Steel.—In March, ArcelorMittal announced that $2 billion would be invested in the decarbonization of its steelmaking sites in Dunkerque and Fos-sur-Mer. For the Dunkerque plant, this would involve the construction of a 2.5-Mt-capacity direct-reduced iron (DRI) unit coupled with an additional electric arc furnace (EAF) to increase the proportion of scrap steel use at the plant. For the Fos-sur-Mer plant, this would involve the construction of an EAF alongside the construction of a ladle furnace that was announced in 2020. The new industrial facilities were scheduled to be operational by 2027 and were expected to gradually replace three out of five of the blast furnaces in France by 2030 (two out of three in Dunkerque, one out of two in Fos-sur-Mer). In 2021, ArcelorMittal produced 5.9 Mt and 3.4 Mt of raw steel at its Dunkerque and Fos-sur-Mer steel plants, respectively (ArcelorMittal S.A., 2022, p. 51, 90).

Following the financial difficulties faced by GFG Alliance, in August, Liberty Steel Group (a subsidiary of GFG Alliance) of the United Kingdom sold its Liberty Ascoval specialty steel plant and Liberty Rail Hayange railmaking plant operations to Saarstahl Ascoval (a subsidiary of Stahl-Holding-Saar of Germany). The 600,000-t/yr-capacity steel plant had 294 employees and produced 274,000 t of specialty steel in 2021 (Kinch, 2021b; Saarstahl Ascoval, 2022a, b).

Nickel.—Nickel production at the Sandouville refinery increased to 8,855 t in 2021, of which 6,730 t was nickel cathodes and 2,125 t was nickel salts. In July, Eramet announced the sale of the Sandouville refinery to Sibanye-Stillwater of South Africa for approximately $100 million, to be finalized in February 2022. The smelter employed about 190 people in 2021 (Eramet S.A., 2022, p. 14, 66, 163).

Industrial Minerals

Cement.—In 2021, France produced an estimated 16.9 Mt of cement, which was an increase of 1.2% compared with production in 2020. France imported 2.19 Mt of clinker and 3.75 Mt of cement valued at $149 million and $410 million, respectively; and it exported 440,000 t of cement valued at $39.8 million. No exports of clinker were reported. In January, Ciments Calcia announced that it would invest $355 million in upgrades to its Airvault cement plant, which was located in Airvault, Deux-Sèvres Department, and had a cement clinker production capacity of 4,000 metric tons per day. Upgrades would involve the replacement of two production lines with a single production line as well as improved grinding and mixing equipment, which would ultimately double the clinker production capacity while reducing carbon dioxide (CO_2) emissions. In December, the project was contracted to ThyssenKrupp AG of Germany, and commissioning was scheduled for mid-2024 (table 1; Global Cement, 2021a, b; United Nations Statistics Division, 2022).

Outlook

France's real GDP is expected to increase moderately (by 2.9%) in 2022 and then to increase only modestly (at a rate of from 1.4% to 1.5% per year) from 2023 to 2027 owing to persistent supply chain issues and low domestic demand by consumers because of increased inflation. Near-term investment projects in the mineral sector are expected to include the process gas filtration modernization of the TRIMET electrolysis plant and continued cement plant modernization by Ciments Calcia. The Ciments Calcia modernization project is expected to result in increased cement production in the country. After the cancellation of the exploration permit for the Couflens project, there are now no active attempts toward the realization of domestic gold and tungsten production in the country. It is unlikely that the country can resume mining of metallic minerals in the near future. A partial or total suspension of operations at some plants, such as the Auby smelter and the Dunkerque smelter, have already taken place in response to electricity supply constraints, and more mineral-processing plants could be affected if the supply issues continue or worsen; for example, if there are disruptions to operations at nuclear energy facilities, which supply electricity (European Commission, 2022a, p. 5, 30; International Monetary Fund, 2022).

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TABLE 1

FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2017	2018	2019	2020	2021
METALS						
Aluminum, primary, metal	thousand metric tons	430 r	390 r	402 r	350	400 e
Cobalt, refinery, chloride, Co content		277	48	90 r, e	90 e	110 e
Ferroalloys:						
Ferromanganese	thousand metric tons	95	125	115	68	110 e
Ferrosilicon[e]	do.	50	50	48	41	44
Silicomanganese	do.	58	57	68	62	68 e
Indium, refinery, primary, In content	kilograms	29,800	46,200	40,000 e	38,000 e	38,000 e
Iron and steel:						
Pig iron	thousand metric tons	10,678	10,530	9,878	7,700	9,500
Steel:						
Raw steel	do.	15,505	15,387	14,451	11,596	13,947
Products, hot rolled	do.	15,368 r	14,997 r	13,701 r	11,111	13,500 e
Lead, refinery, secondary	do.	70	70	70	60	70
Nickel:						
Refinery, metal, electrolytic		546	1,913	4,946	6,032	6,730
Products, chemicals, Ni content		1,385	1,797	2,031	1,323	2,125
Silicon, metal[e]	thousand metric tons	149	138	105 r	87	100
Zinc, smelter, primary	do.	166	155	150 r	166	168
INDUSTRIAL MINERALS						
Bentonite		24,497	35,696	36,000 e	36,000 e	36,000 e
Cement, hydraulic	thousand metric tons	16,900	16,500	16,500 r	16,700	16,900 e
Clay, kaolin, marketable		223,842 r	264,606 r	220,000 r, e	197,817	220,000 e
Gypsum, mine, including anhydrite	thousand metric tons	1,874 r	2,836	1,951 r	1,891	1,950 e
Iron oxide pigments	do.	8	8	6 r	5	6 e
Mica[e]		19,200	15,000 r	19,000 r	19,000	19,000
Nitrogen, ammonia, N content	thousand metric tons	750	914	884	822	880 e
Salt, all sources	do.	5,003	5,653	5,439	5,440 e	5,440 e
Sand and gravel, industrial, silica	do.	9,712	10,193	11,022 r	9,784	11,000 e
Stone, sand, and gravel, construction:						
Sand and gravel, unspecified	do.	228,007	238,471	237,274 r	230,712	228,495
Stone:						
Crushed:						
Chalk		3,013,686	3,010,066	2,906,919 r	2,365,407	2,910,000 e
Limestone, agricultural and industrial		7,405,079	7,932,540	9,311,307	8,411,088	9,310,000 e
Dimension:						
Dolomite		547,326	637,114	534,401 r	541,426	534,000 e
Granite		223,218	279,819 r	342,057 r	353,865	342,000 e
Marble, including travertine		18,000 e	20,462	22,096 r	18,070	22,100 e
Talc[e]	thousand metric tons	370	350	350	320	350
MINERAL FUELS AND RELATED MATERIALS						
Natural gas, marketable	million cubic meters	16 r	9 r	16 r	NA	NA
Petroleum:						
Crude	thousand 42-gallon barrels	5,548 r	5,680 r	5,314 r	4,722	4,757
Refinery, throughput	do.	419,385	396,025	356,970	242,725	250,390

[e]Estimated. [r]Revised. do. Ditto. NA Not available.

[1]Table includes data available through July 12, 2022. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

[2]In addition to the commodities listed, alumina, secondary aluminum, andalusite, antimony, barite, diatomite, metallurgical coke, feldspar, germanium, lime, pumice and related minerals, sandstone, slate, soda ash (synthetic), sodium compounds, and sulfur (byproduct of natural gas and petroleum) may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Alumina, metallurgical		Alteo Holdings (United Mining Supply Group, 100%)	Plant at Gardanne, Bouches-du-Rhone Department	700
Do.		Imerys Fused Minerals Beyrède S.A.S. (Imerys S.A., 100%)	Plant at Beyrede, Hautes-Pyrenees Department	40
Do.		Niche Fused Alumina (Dada Holdings LLC, 100%)	Plant at La Bathie, Savoie Department	40
Aluminum:				
Metal		Alvance Aluminium Group S.A.S. (GFG Alliance, 100%)[1]	Aluminum Dunkerque smelter at Dunkerque, Nord Department	285
Do.		TRIMET Aluminium SE	Smelter at Saint-Jean-de-Maurienne, Savoie Department	145
Product		do.	Casting plant at Saint-Jean-de-Maurienne, Savoie Department	155
Do.		do.	Wire casting plant at Castelsarrasin, Tarn-et-Garonne Department	10
Andalusite		Imerys S.A.	Glomel Mine at Brittany, Cotes-d'Armor Department	75
Antimony, metal		Produits Chimiques de Lucette S.A.S.	Plant at Le Genest, Mayenne Department	15
Do.		Société Industrielle et Chimique de l'Aisne (Advanced Metallurgical Group, 100%)	Plant at Chauny, Aisne Department	10
Cement		Ciments Calcia (HeidelbergCement Group, 100%)	10 plants, the largest at Gargenville, Yvelines Department (2,000)	7,500
Do.		Holcim Ltd.	18 plants, the largest at Saint Pierre-la-Cour, Mayenne Department (1,500)	9,600
Do.		Vicat Group	Plants at Crechy (Allier Department), La-Grave-de-Peille (Alpes Maritimes Department), Montalieu-Vercieu (Isere Department), Saint-Egreve (Isere Department), and Xeuilley (Meurthe-et-Moselle Department)	4,600
Clay, kaolin		Groupe Mineral Harwanne (GMH)	Kaolin d'Arvor Mine at Quessoy, Cotes-d'Armor Department	310
Cobalt, metal	metric tons	Eramet S.A.	Plant at Sandouville, Seine-Maritime Department	600
Diatomite		Ceca S.A.	Mines and plants at Riom-es-Montagnes Cantal Department; and St. Bauzille, Herault Department	100
Feldspar		Imerys S.A.	Mine and plant at St. Chely d'Apcher, Lozere Department	55
Ferroalloys		Comilog Dunkerque (Eramet S.A., 100%)	Plant at Gravelines, Nord Department	70
Do.		FerroPem S.A. (Grupo Ferroglobe Plc., 100%)	Factories in Anglefort, Ain Department; Château-Feuillet and Montricher, Savoie Department; Dunkerque, Nord Department; Laudun, Gard Department; Les Clavaux, Isere Department; and Pierrefitte, Hautes Department	290
Do.		Glencore Manganese France S.A. (Glencore plc., 100%)	Plant at Dunkerque, Nord Department	140

See footnotes at end of table

TABLE 2—Continued
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Gypsum, mine, including anhydrite		Placoplatre S.A. (Compagnie de Saint-Gobain S.A.)	Quarry at Bernouille, Seine-Saint-Denis Department	500
Do.		do.	Quarry at Cormeilles-en-Parisis, Val-d'Oise Department	350
Do.		do.	Quarry at Lazer, Hautes-Alpes Department	200
Do.		do.	Quarry at Le Pin-Villeparisis-Villevaude, Seine-et-Marne Department	580
Do.		do.	Quarry at Montmorency massif, Val d'Oise Department	620
Do.		do.	Quarry at Pouillon, Landes Department	15
Do.		do.	Quarry at Saint-Jean-de-Maurienne, Savoie Department	280
Indium	metric tons	Nyrstar NV (Trafigura Pte. Ltd., 24.4%)	Zinc smelter at Auby, Nord Department	70
Iron and steel, steel:				
Raw		ArcelorMittal S.A.	Plant at Dunkerque, Nord Department	7,000
Do.		do.	Plant at Fos-sur-Mer, Bouches-du-Rhone Department	5,100
Do.		Saarstahl Ascoval (Stahl-Holding Saar, 74.9%)	Plant at Saint Saulve, Nord Department	600
Products		ArcelorMittal S.A.	Plant at Gandrange, Moselle Department	8,400
Do.		do.	Plant at Florange, Moselle Department	NA
Do.		Erasteel S.A. (Eramet S.A., 100%)	Plants in Commentry, Allier Department, and Champagnole, Jura Department	NA
Mica		Imerys S.A.	Mine at Ploemeur, Morbihan Department	160
Nickel, metal		Eramet S.A.	Plant at Sandouville, Seine-Maritime Department	16
Nitrogen, N content of ammonia		Borealis Chimie S.A.S.	Plant at Grandpuits, Seine-et-Marne Department	NA
Petroleum:				
Crude	thousand 42-gallon barrels	International Petroleum Corp.	10 oilfields in Paris Basin	1,100
Do.	do.	International Petroleum Corp., 50%, and Vermilion Energy Inc., 50%	5 oilfields in Aquitaine Basin	100
Do.	do.	Vermilion Energy Inc.	21 oilfields in Paris Basin and Aquitaine Basin	2,500
Refined	do.	Esso Raffinage S.A. (Exxon Mobil Corp., 100%)	Refinery at Fos-sur-Mer, Bouches-du-Rhone Department	43,900
Do.	do.	do.	Refinery at Port Jerome, Seine-Maritime Department	80,500
Do.	do.	Ineos Group Ltd.	Refinery at Lavera, Bouches-du-Rhone Department	69,300
Do.	do.	Total S.A.	Refinery at Donges, Loire-Atlantique Department	73,000
Do.	do.	do.	Refinery at Feyzin, Auvergne-Rhone-Alpes Department	36,000
Do.	do.	do.	Refinery at Gonfreville-l'Orcher, Seine-Maritime Department	84,000
Do.	do.	do.	Refinery at Grandpuits, Seine-et-Marne Department	34,000

See footnotes at end of table

TABLE 2—Continued
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Salt	Compagnie des Salins du Midi et des Salines de l'Est (Salins Group)	Mines and plants at Aigues-Mortes, Gard Department; Dax, Landes Department; Salin-de-Giraud, Bouches-du-Rhone Department; and Varangeville, Meurthe-et-Moselle Department	2,500
Sulfur:			
Byproduct, natural gas and petroleum	Esso Raffinage S.A. (Exxon Mobil Corp., 100%)	Refinery at Fos-sur-Mer, Bouches-du-Rhone Department	39
Do.	do.	Refinery at Port Jerome, Seine-Maritime Department	82
Do.	Total S.A.	Refinery at Donges, Loire-Atlantique Department	73
Do.	do.	Refinery at Feyzin, Auvergne-Rhone-Alpes Department	37
Do.	do.	Refinery at Gonfreville-l'Orcher, Seine-Maritime Department	143
Do.	do.	Refinery at Grandpuits, Seine-et-Marne Department	50
Sulfuric acid	Nyrstar NV (Trafigura Pte. Ltd., 24.4%)	Zinc smelter at Auby, Nord Department	185
Talc	Imerys S.A.	Trimouns Mine near Luzenac, Ariege Department	450
Zinc, metal	Nyrstar NV (Trafigura Pte. Ltd., 24.4%)	Zinc smelter at Auby, Nord Department	172

[e]Estimated. Do., do. Ditto. NA Not available.
[1]Ownership under legal dispute with American Industrial Partners as of 2022.