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2017–2018 Minerals Yearbook

FRANCE

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The Mineral Industry of France

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Note: In this chapter, information for 2017 is followed by information for 2018.

France was a major producer of industrial minerals (gypsum, lime, mica, and pumice) and a significant processor of raw materials (aluminum, cobalt, indium, pig iron, lead, nickel, and zinc); the country no longer mined metals because metallic mineral deposits were no longer economically viable for extraction. Fuel mineral production included natural gas and crude petroleum. France's heavy industries, which among other product categories produced automotive and aviation products, chemicals, and machine tools for domestic consumption and export, relied on imported metallic ores, industrial minerals, and mineral fuels (table 1; U.S. Central Intelligence Agency, 2018).

In 2017, France ranked fifth in the world in the production of indium, with 4% of global output (excluding the United States). It ranked sixth in the production of mica (6%) and talc (6%) (Anderson, 2019; Bolen, 2019; Curry, 2019).

Minerals in the National Economy

France, which had a nominal gross domestic product (GDP) of $2.6 trillion in 2017, had the seventh largest economy in the world GDP and the third largest economy in the European Union (EU) after Germany and the United Kingdom. France's real GDP increased by 2.3% compared with a 1.1% (revised) increase in 2016. The majority of the country's GDP was from the services sector, which accounted for 70.3% of the GDP in 2017. The construction sector contributed $324.1 billion[1] to the GDP, which was an increase of 3.4% compared with that of 2016. The production from the mining, energy, and water sector contributed $171 billion, which was an increase of 1.3%. The refining of petroleum products and the manufacturing of coke contributed $38.9 billion, which was an increase of 0.6%. In 2016 (the latest year for which data were available), about 1,700 mining enterprises were owned by private or state entities, down from 2,100 in 2015 (Institut National de la Statistique et des Études Économiques, 2018, p. 165; 2019, p. 113, 165; World Bank, The, 2019a–c).

Government Policies and Programs

The mineral industry of France is regulated by the French Mining Code, including Decree Nos. 80–331, 2006–648, and 2006–649. Exploration and extraction of mineral resources required both a mining title and an operation permit. The Minister of Economy and Finance was responsible for issuing and regulating mining titles through the raw materials policy of Decree No. 2017–1078. The raw materials policy was enforced through the Directorate-General for Enterprises; the Directorate-General for Planning, Housing, and Nature; and the Directorate-General for Risk Prevention. 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 (MinéralInfo, 2017; Legifrance, 2018; Clément and others, 2019).

Production

In 2017, major increases in production included that of cobalt, which increased by 133%; dolomite, by 120%; limestone, by 51%; chalk, by 15%; zinc, by 11%; and pig iron, by 10%. Major decreases in production included that of refined nickel, by 50%; gypsum, by 28%; nitrogen, by 26%; and ferromanganese, by 20%. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Bureau de Recherches Géologiques et Minières 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. Eramet S.A. mined manganese in Gabon and nickel in New Caledonia and produced manganese alloys, refined cobalt, and refined nickel in about 10 countries. Imerys S.A.—the world's leading producer of industrial minerals in terms of quantity—mined and processed bentonite, diatomite, graphite, kaolinite, mica, 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 worldwide (Eramet S.A., 2018, p. 4, 27; Imerys S.A., 2018, p. 19, 24, 27, 232, 233; Total S.A., 2018, p. 1). Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2017, France exported $798 billion and imported $826 billion in goods and services. Exports in the mining, energy, and water sector were valued at $11 billion, and imports were valued at $43 billion. Exports of the coke and refined petroleum products sector were valued at $13 billion, and imports, $22 billion (Institut National de la Statistique et des Études Économiques, 2019, p. 135).

Total exports from France to the United States were valued at $48.9 billion. This included exports of petroleum products valued at $794 million; iron and steel mill and other products, $468 million; bauxite and aluminum, $192 million; unclassified nonferrous metals, $77 million; nickel, $23 million; gold, $16 million; coal, $8.4 million; zinc, $5.8 million; copper, $2.4 million; and tin, $86,000. Total imports from the United States to France were valued at $33.6 billion. This included imports of crude petroleum valued at $587 million;

[1]Where necessary, values have been converted from euro area euros (EUR) to U.S. dollars (US$) at an annual average exchange rate of EUR0.887=US$1.00 for 2017 and EUR0.847=US$1.00 for 2018.

unclassified nonferrous metals, $472 million; petroleum products, $412 million; iron and steel mill and other products, $143 million; aluminum and alumina, $105 million; coal, $53 million; copper, $12 million; and gold, $6.8 million (U.S. Census Bureau, 2019a, b).

Commodity Review

Metals

Gold and Tungsten.—In March 2017, Apollo Minerals Ltd. of Australia acquired Ariege Tungstene SAS, which owned an 80% interest in the Couflens tungsten-copper-gold project in the south of France. The Couflens exploration license was a joint venture between Ariege Tungstene SAS and Variscan Mines Ltd., which owned the remaining 20% of the project. The project area, which encompasses 42 square kilometers located 130 kilometers south of Toulouse in the Pyrenees region, includes the historic Salau tungsten mine. The mine produced a total of 930,000 metric tons (t) of ore at a grade of 1.5% tungsten from 1971 to 1986. Rock samples in the license area indicated high-grade ore of up to 24.5 grams per metric ton gold and up to 8.25% tungsten trioxide. Apollo Minerals planned to undertake surface exploration to investigate new prospects for future mining in the area (Australian Mining, 2017; Apollo Minerals Ltd., 2019).

Iron and Steel.—In 2017, production of pig iron increased by 10%; raw steel, by 8%; and steel products, by 5%. In December 2016, ArcelorMittal S.A. of Luxembourg signed a contract with the European Investment Bank to finance projects from 2017 to 2020 within the EU, including France. ArcelorMittal remained the leading steel company in France. In 2016 and 2017, the company produced 9.5 million metric tons (Mt) and 10.7 Mt of raw steel, respectively, which accounted for 66% and 69% of domestic production, respectively. ArcelorMittal designed and manufactured advanced steel products in France for use in the automotive and energy sectors. ArcelorMittal owned and operated raw steel works in Dunkerque, Florange, and Fos-sur-Mer and a rolling mill in Gandrange (table 1, 2; ArcelorMittal S.A., 2019a, p. 39; 2019b).

Zinc.—Nyrstar NV of Belgium (formerly Nyrstar S.A.) owned and operated the mid-scale electrolytic Auby smelter, which was the only zinc smelter in France and which had a production capacity of 172,000 metric tons per year (t/yr). In 2017, production of refined zinc in France increased to 166,000 t, or by 11% compared with that of 2016 (table 1; Nyrstar NV, 2017).

Mineral Fuels and Other Sources of Energy

Nuclear Energy.—In 2017, the construction of the International Thermonuclear Experimental Reactor Organization (ITER) continued in Cadarache in the Provence-Alpes-Côte d'Azur region. By yearend, the ITER council announced the completion of 50% of the total construction work necessary to begin initial operation of the facility, referred to as first plasma. The construction of the project started in 2008; the first plasma phase was expected to be reached in 2025, and full power fusion phase, in 2035 (De Clercq, 2016; International Thermonuclear Experimental Reactor Organization, 2016, 2017).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

Minerals in the National Economy

In 2018, France's nominal GDP was $2.78 trillion. The real GDP increased by 1.7%. France exported $364 million worth of metallic ores and concentrates, slag, and ash, which was an increase of 24% compared with that of 2017. The major recipients of these exports were Belgium (accounting for 27%), Norway (19%), and Germany (16%). The country imported $2.2 billion worth of metallic ores and concentrates, slag, and ash (an increase of 9%). The major suppliers were Canada (28%) and Brazil (25%). Exports and imports of crude petroleum were valued at $2.4 million and $28.5 billion, respectively (United Nations Statistics Division, 2019; World Bank, The, 2019a, b).

Total exports from France to the United States were valued at $52.4 billion. This included exports of petroleum products valued at $1 billion; iron and steel mill and other products, $482 million; bauxite and aluminum, $205 million; unclassified nonferrous metals, $79 million; coal, $53 million; nickel, $27 million; gold, $17 million; zinc, $3.6 million; copper, $3.3 million; and tin, $219,000 (U.S. Census Bureau, 2019b).

Total imports from the United States to France were valued at $36.6 billion. This included imports of crude petroleum valued at $574 million; petroleum products, $505 million; unclassified nonferrous metals, $499 million; iron and steel mill and other products, $140 million; aluminum and alumina, $113 million; coal, $34 million; copper, $8 million; and gold, $4.8 million (U.S. Census Bureau, 2019a).

Decree No. 2018–434 of June 4, 2018 regulated protection from radiation for mine workers' safety. To simplify implementation, law No. 2018–727 of August 10, 2018, allowed the Government to reform the provisions of the Mining Code for granting and extending titles for the exploration and operation of geothermal energy (Clément and others, 2019).

Production

In 2018, notable increases in production included refined nickel, by 57%; dolomite, by 45%; refined indium, by 34%; ferromanganese, by 31%, and salt (all sources), by 13%. Notable decreases in production included refined cobalt, by 83%, and aluminum (primary), by 11% (table 1).

Commodity Review

Metals

Aluminum.—In 2018, aluminum production from Rio Tinto plc of the United Kingdom's Aluminium Dunkerque aluminum smelter decreased to 227,000 t from 284,000 t in 2017. The decrease was owing to a power outage in the first quarter of the year and the completion of the sale of the Dunkerque smelter in December. Liberty House Group [a part of the Gupta Family Group Alliance (GFG)] completed the acquisition of Aluminium Dunkerque for $500 million on December 14, 2018. The 285,000-t/yr facility was the largest aluminum smelter in Europe, employing 570 workers. GFG planned to rename the smelter to Liberty Aluminium Dunkerque SAS and to modernize

the smelter to produce components for the automotive and other industries in France and Europe (Liberty Steel Group, 2018; Rio Tinto Ltd., 2020, p. 22).

Cobalt, Lithium, and Nickel.—Eramet S.A. engaged in mining and supplying energy transition metals used mainly for batteries in electric vehicles, including cobalt, lithium, and nickel salts. Eramet was working to increase production of cobalt and nickel from its Sandouville refinery by increasing imports of feed materials from New Caledonia. Eramet's Société Le Nickel in New Caledonia mined 3.0 Mt of nickel ore in 2018 and planned to increase both output and exports for the next 10 years. From a project in northern Argentina, Eramet aimed to begin producing 24,000 t/y of lithium carbonate in late 2021 (Eramet S.A., 2019a, p. 21, 73; 2019b; Société Le Nickel, 2019, p. 3; Thomson Reuters, 2019).

Gold and Tungsten.—Based on the initial risk assessment for the Salau Mine at the Couflens gold and tungsten project, Apollo Minerals reported that the mine's infrastructure, ventilation, and ground conditions had been well maintained since its closure in 1986. The company began reinstalling mine services and removing operational hazards and waste from the mine in 2018. Apollo Minerals expanded its gold and tungsten project in 2018 to include Aurenere area in northern Spain adjacent to the Couflens project. The geology at Aurenere is similar to that at Couflens (Apollo Minerals Ltd., 2019, p. 5).

Indium.—Globally, zinc concentrates were the principal source of primary indium. Nyrstar NV halted indium production after a fire at its Auby zinc smelter in November 2015. The smelter resumed indium production in early 2017 with an increased production capacity of 70 t/yr compared with 45 t/yr before the accident. The smelter produced 29.8 t of indium in 2017 and ramped up production to 40 t (estimated) in 2018 (Nyrstar NV, 2016, p. 16; 2019, p. 12).

Mineral Fuels and Related Materials

Nuclear Energy.—Areva S.A., France's state-owned company for the production of uranium and nuclear fuel, was renamed Orano S.A. in January 2018. Orano continued to develop nuclear materials; manage nuclear logistics; oversee uranium mining, conversion, enrichment, and waste disposal; recycle nuclear fuel; and decommission nuclear powerplants. In 2018, Orano mined 7,950 t of uranium in Canada, Kazakhstan, and Niger accounting for 15% of the global total. Domestically, the company converted natural uranium into uranium hexafluoride at the Malvesi plant in Narbonne and at the Philippe Coste plant in Tricastin and enriched uranium at the Georges Besse II plant in Tricastin (World Nuclear News, 2018; Orano S.A., 2019, p. 7, 18; World Nuclear Association, 2019).

Outlook

France processes minerals principally for export and, to a smaller degree, for its manufacturing industry. France will likely continue to import much of the ores and raw minerals for its manufactured goods industry. The country may restart metallic ore production if the Couflens gold and tungsten project can be developed. Production of cobalt, indium, and nickel may increase when production at Eramet's plant increases and Nyrstar's new capacity is fully achieved. Nuclear power will continue to be the focus of the Government's energy generation strategy, although increasing energy production from renewable sources continues to be a stated objective of the Government.

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TABLE 1
FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2014	2015	2016	2017	2018
METALS						
Aluminum, metal:						
Primary	thousand metric tons	360 r	420	425	429	380
Secondary	do.	180 r	180 r	180 r	190	190
Total	do.	540 r	600 r	605 r	619	570
Cobalt, refinery, chloride, Co content		219	133	119	277	48
Ferroalloys:						
Ferromanganese	thousand metric tons	116 e	126 r	119 r	95	125
Ferrosilicon[e]	do.	50	40 r	50 r	50	50
Silicomanganese	do.	65 r	65 r	58 r	58	57
Indium, refinery, primary, In content	kilograms	43,000	41,000	--	29,800	40,000 e

See footnotes at end of table.

TABLE 1—Continued
FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2014	2015	2016	2017	2018
METALS—Continued						
Iron and steel:						
Pig iron	thousand metric tons	10,866	10,097	9,724	10,678	10,530
Steel:						
Raw steel	do.	16,143	14,984	14,413	15,505	15,391
Products, hot rolled	do.	15,464	14,994	14,319	15,103	15,100 e
Lead, refinery, secondary		72,000 e	72,000 e	70,000	70,000	70,000
Nickel, refinery, metal		8,404 r	6,533 r	4,639 r	2,329	3,667
Silicon, metal[e]	thousand metric tons	100	100	120 r	113	108
Zinc, smelter, primary		171,000	169,000	149,000	166,000	155,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	16,400	15,600	15,900	16,900	17,200 e
Clay, kaolin, marketable	do.	317	275	274	279	302
Gypsum, mine, including anhydrite	do.	3,279	2,027	4,183	3,014	3,000 e
Iron oxide pigments	do.	29	8	8	8	8 e
Lime, quick and hydrated	do.	2,864	2,504	2,500 e	2,600 e	2,600 e
Mica[e]		20,200	20,700	19,600	19,200	20,000
Nitrogen, ammonia, N content	thousand metric tons	760 r	1,040 r	1,010 r	750	750 e
Pumice and related minerals, pozzolan, including lapilli		276,000	276,000	280,000 e	280,000 e	280,000 e
Salt, all sources	thousand metric tons	5,725 r	6,062 r	5,463 r	5,003	5,653
Sand and gravel, industrial, silica	do.	8,750 r	8,818	9,282	9,300 e	9,300 e
Stone, sand and gravel, construction:						
Sand and gravel, unspecified	do.	230,000	221,000	223,000	230,000 e	230,000 e
Stone:						
Crushed:						
Chalk		2,676,997 r	2,625,889 r	2,622,074 r	3,028,386	2,961,569
Limestone, agricultural and industrial		8,984,613 r	9,224,051 r	6,964,260 r	10,525,681	9,884,545
Dimension:						
Dolomite		418,169 r	419,985 r	248,847 r	547,326	793,493
Granite		197,000	217,000	243,514 r	238,310	246,841
Marble, including travertine		21,864 r	17,374 r	17,795 r	--	--
MINERAL FUELS AND RELATED MATERIALS						
Carbon black	thousand metric tons	117 r	134 r	140 r	NA	NA
Natural gas, marketable	million cubic meters	17 r	28 r	20 r, e	20 e	20 e
Petroleum:						
Crude	thousand 42-gallon barrels	5,475	6,205 r	5,840 r	5,475	5,840
Refinery:						
Distillate fuel oil	do.	193,086	196,300	196,000 r, e	196,000 e	196,000 e
Gasoline	do.	96,725	98,600	98,600 e	98,000 e	98,000 e
Kerosene, including jet fuel	do.	28,835	30,100	30,100 e	30,000 e	30,000 e
Liquefied petroleum gas	do.	17,155	16,800	16,800 e	17,000 e	17,000 e
Residual fuel oil	do.	41,975	37,700	37,700 e	38,000 e	38,000 e
Other	do.	87,600	82,400	82,400 e	83,000 e	83,000 e
Total	do.	465,376	461,900	462,000 e	462,000 e	462,000 e

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

[1]Table includes data available through October 2, 2019. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits; may not add to totals shown.

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

TABLE 2
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(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, 100%	Plant at Gardanne	700
Aluminum		Liberty House Group	Smelter, Dunkerque	285
Do.		TRIMET Aluminium SE	Smelter, Saint-Jean-de-Maurienne, Savoie Department	145
Andalusite		Imerys Refractory Minerals (Imerys S.A.)	Glomel Mine, Brittany	75
Antimony, metal		Produits Chimiques de Lucette	Plant at Le Genest, Mayenne Department	15
Barite		Barytine de Chaillac	Mine and plant at Chaillac	150
Do.		Société Industrielle du Centre	Mine at Rossigno, Indre Department	100
Cement		LafargeHolcim Ltd.	27 plants, the largest at St. Pierre-la-Cour (1,160)	10,000
Do.		Société des Ciment Français (Italcementi S.p.A.)	Nine plants, the largest at Gargenville (1,100)	7,500
Do.		Vicat Group	Plants at Montalieu, in the north of the Rhône-Alpes; Crechy (Allier), near Vichy; La Grave de Peille (Alpes-Maritimes) inland from Nice; Saint-Egreve (Isere), Grenoble area	6,000
Clay, kaolin		Groupe Mineral Harwanne (GMH)	Kaolin d'Arvor Mine, Quessoy	310
Cobalt, metal	metric tons	Eramet S.A.	Plant at Sandouville, near Le Havre	400
Diatomite		Ceca S.A.	Mines and plants at Riom-es-Montagnes and St. Bauzille	100
Feldspar		Imerys Refractory Minerals (Imerys S.A.)	Mine and plant at St. Chely d'Apcher	55
Ferroalloys		Comilog Dunkerque (Eramet, 100%)	Plant at Gravelines	70
Do.		FerroPem S.A. (Grupo Ferroglobe Plc., 100%)	Plants at Anglefort, l'Ain Department; Château-Feuillet and Montricher, Savoie Department; Laundun, Gard Department; Les Clavaux, l´Isere Department; and Pierrefitte-Nestalas, Hautes-Pyrenees Department	290
Do.		Glencore Manganese France S.A. (Glencore plc, 100%)	Plant at Dunkerque	140
Gypsum		S.A. de Matériel de Construction	Mine at Taverny	1,500
Indium	metric tons	Nyrstar NV	Smelter at Auby	70
Iron and steel, steel:		ArcelorMittal S.A.	Plants at:	
Raw		do.	Dunkerque, Florange, and Fos-sur-Mer	11,000
Rolling mills		do.	Gandrange	8,400
Mica		Imerys Refractory Minerals (Imerys S.A.)	Mine at Ploemeur, Brittany	160
Natural gas	million cubic meters	Total Group	Gasfield and plant at Lacq	30
Nickel, metal		Eramet S.A.	Plant at Sandouville, near Le Havre	16
Nitrogen, N content of ammonia		GPN S.A.	Plant at Grandpuits	NA
Petroleum:				
Crude	thousand 42-gallon barrels	Total S.A.	Paris Basin oilfields	6,000
Refined	do.	Cie. Rhenane de Raffinage (CRR)	Refinery at Reichstett	28,000
Do.	do.	Esso S.A.	Refineries at Fos-sur-Mer	21,700
Do.	do.	Ineos Group Ltd.	Refineries at Lavera	61,300
Do.	do.	Petroplus S.A.	Refinery at Petite Couronne	99,800
Do.	do.	Total S.A.	Refineries at Gonfreville and La Mede	156,000
Do.	do.	do.	Refinery at Donges	70,000
Do.	do.	do.	Refinery at Feyzin	42,000
Do.	do.	do.	Refinery at Grandpuits	33,600
Do.	do.	do.	Refineries at Gravenchon	83,000

See footnotes at end of table

TABLE 2—Continued
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(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, Dax, Salin-de-Giraud, and Varangeville	2,500
Sulfur	Total S.A.	Natural gas processing plant at Lacq	400
Talc	Imerys Performance Minerals (Imerys S.A.)	Trimouns Mine near Ariege, Pyrenees	450
Zinc, metal	Nyrstar NV	Smelter at Auby	172

[e]Estimated. Do., do. Ditto. NA Not available.