



2014 Minerals Yearbook

FRANCE

THE MINERAL INDUSTRY OF FRANCE

By Alberto Alexander Perez

In 2014, France experienced slow economic growth. Its gross domestic product (GDP) measured at market prices was \$2.829 trillion in 2014 compared with \$2.810 trillion (revised) in 2013, resulting in a real GDP growth rate of 0.2%. The Government and administration of France is very centralized, and its economy is highly developed; the majority of the GDP is produced by the services industry. Household consumption was \$1,521 billion¹ in 2014, which was a slight increase compared with that of 2013. The Government's expenditures in 2014 were equivalent to 57.5% of the country's GDP, and the Government's budget deficit equaled \$113.2 billion, or 4% of the GDP, and contributed to an increase of the national debt, which in 2014 was to the equivalent of 95.6% of the GDP.

Employment in the private, nonagricultural sector decreased slightly, by 0.2%, most likely owing to the weak growth in economic activity. Government-subsidized labor contracts, however, increased, particularly in the form of the so-called "jobs for the future," which also included jobs in the education sector. As a result, total employment increased on average by 0.3% compared with that of the previous year, and the unemployment rate in 2014 was 10.4%.

There is no metal mining in the country anymore. Deposits that were important for the country's economy in the past were no longer economically viable for production. The country was a significant processor of raw mineral materials and a manufacturer and consumer of industrial durable goods. France's heavy industries—which, among other product categories, produced automotive and aviation products, chemicals, and machine tools for domestic consumption and export—relied mainly on imported metal ores and concentrates, industrial minerals, and mineral fuels. France had the third largest GDP in the European Union (EU) after Germany and the United Kingdom. The output value of France's industrial sector, not including construction, accounted for \$1,194 billion, or 19.4% of the GDP in 2014, and the construction sector contributed an additional \$367.5 billion (U.S. Central Intelligence Agency, 2015; The World Bank, 2015; Institut National de la Statistique et des Études Économiques, 2016, p. 3, 9, 15, 21).

Minerals in the National Economy

The contribution of the mineral industry to France's economy, excluding France's overseas Departments, which are treated in this volume as separate entities, is small. The value of the production of mining and quarrying, energy, water, waste management and remediation sector (as defined by the Institut National de la Statistique et des Études Économiques) amounted to \$201 billion in 2014, and that of the refining of petroleum products and the manufacture of coke was \$64.6 billion, which

combined represented 9% of France's GDP. The contribution of France's construction sector was more significant, accounting for 13% of the total GDP. France's total industrial output, including construction, amounted to 32.4% of the GDP. Because of the size and structure of France's economy, the upstream input of minerals was key to the continued maintenance and growth of the country's heavy industries (Institut National de la Statistique et des Études Économiques, 2016, p. 21).

Government Policies and Programs

In 2014, the Ministère de l'Écologie, du Développement Durable et de l'Énergie [Ministry of Ecology, Sustainable Development, and Energy] was still considering the changes proposed to the French mining law in 2013, and at the end of the year, was still consulting with its governmental partners and the public (Ministère de l'Écologie, du Développement Durable et de l'Énergie, 2015). The previous Ministère de l'Économie, du Redressement Productif et du Numérique [Ministry of the Economy, Economic Reactivation and the Digital Economy] had proposed the creation of a Government entity—Compagnie Nationale des Mines de France [National French Mining Company] (CMF)—that would develop and promote mining interests in France. The idea was well received by the international mining industry, and in 2013, France extended the first exploration permits in 30 years, seemingly signaling a resumption of large-scale mining in continental France. By the end of 2014, the new minister and the current Government were evaluating the creation of the CMF and modifying the mining law (Bureau de Recherches Géologiques et Minières, 2015; Les Echos, 2015).

France's mining code was last modified on March 1, 2011; however, it was not implemented until January 25, 2014. Most of the changes sought to simplify the exploration and development licensing process (Legifrance, 2015).

Production

In 2014, production increased for the following mineral commodities: indium, by 30%; chalk, 21%; kaolin, 19%; zinc metal, 13%; ferromanganese, 12%; carbon black, 11%; pig iron, 6%; hot-rolled steel, 5%; primary aluminum, 4%; crude steel, 3%; and refined lead, 1%. Production decreased for the following mineral commodities: natural gas, by 50%; crude dolomite, 35%; crude granite, 32%; refined nickel, 31%; cobalt metal, 29%; lime 15%; sand, gravel, and aggregates 12%; limestone, 8%; crude petroleum, 6%; gypsum, 5%; alumina, 5%; marble, 4%; and nitrogen, salt and slate, by 1% each. Economic growth in France continued to be slow, and the construction and manufacturing sectors were affected. Production of many industrial minerals decreased, especially that of construction materials. Production of natural gas and

¹Where necessary, values have been converted from euro area euros (EUR) to U.S. dollars (US) at an average rate of EUR0.75=\$1.00 for 2014.

crude petroleum continued to decrease as the resources were exhausted and no new resources had been found (tables 1, 2).

Mineral Trade

In 2014, France exported \$596 billion in goods and imported \$638.8 billion for a negative trade balance of \$42.9 billion. France's export sectors that showed a positive trade balance were transportation equipment (\$129 billion in exports and \$91.2 billion in imports, for a net balance of \$37.8 billion); food products, beverages, and tobacco products (\$59 billion in exports and \$50.3 billion in imports, for a net balance of \$8.7 billion); and agriculture, forestry, and fisheries (\$20.7 billion in exports and \$16.3 billion in imports, for a net balance of \$4.4 billion). France's mining and quarrying, energy, and water sector, including waste management and remediation services, exported \$15.1 billion worth of goods and services and imported \$65.6 billion for a negative trade balance of \$50.5 billion. The coke and refined petroleum products sector exported \$21.8 billion and imported \$38.9 billion for a negative balance of \$17.1 billion (Institut National de la Statistique et des Études Économiques, 2015a, p. 25; 2015b).

The United States was a leading commercial partner of France outside the EU, and in 2014, it supplied about \$31.3 billion worth of goods and services to France, including civilian aircraft, engines, equipment and parts valued at \$8.27 billion; fuel oil, \$3.9 billion; pharmaceutical preparations, \$2.2 billion; medicinal equipment, \$980 million; and industrial machines, \$874 million. United States exports of mineral-industry-related commodities to France, with the exception of energy-related commodities, included nonferrous metals valued at \$425 million; gem-quality diamond, \$238 million; metallurgical-grade coal, \$221 million; manufactured mineral supplies, \$204 million; aluminum and alumina, \$120 million; iron and steel products (other), \$81 million; iron and steel mill products, \$72 million; and precious metals, \$60 million (U.S. Census Bureau, 2015a).

The most significant United States imports from France in 2014 included civilian aircraft engines valued at \$5.7 billion; civilian aircraft, \$4.7 billion; pharmaceutical preparations, \$2.7 billion; artwork and antiques, \$2.5 billion; toiletries and cosmetics, \$2 billion; alcoholic beverages, excluding wine, \$2 billion; civilian aircraft parts, \$1.7 billion; wine, beer, and related products, \$1.5 billion; industrial machines, \$1.3 billion; and petroleum products, 1.2 billion. United States imports of mineral-industry-related commodities from France, with the exception of energy-related commodities, included iron and steel mill products valued at \$454 million; finished metal shapes, \$393 million; bauxite and aluminum, \$133 million; nonferrous metals, \$106 million; nickel, \$30 million; gem-quality diamond, \$27 million; and nonmonetary gold, \$16 million (U.S. Census Bureau, 2015b).

Structure of the Mineral Industry

In 2014, the role of the Government in the functioning of the mineral industry was principally through its Ministry of Ecology, Sustainable Development, and Energy and the French

mining code, which was last updated in 2011. The Ministry of Ecology, Sustainable Development, and Energy was responsible for overseeing and regulating such environmental issues as agricultural runoff, air pollution from industrial and vehicle emissions, forest damage from acid rain, and water pollution from mining, mineral processing, and urban waste. The Bureau de Recherches Géologiques et Minières [Bureau of Geological and Mining Research] (BRGM) was France's geological survey and it was the institution that performed and developed geologic and mineral research in France and abroad; the headquarters were located in Orleans. In 2014, the Government maintained partial ownership of the country's electricity generation company, Electricité de France S.A. (EDF), and its natural gas production and distribution facilities company, Engie S.A., as well as ownership of the national rail company, Société National des Chemins de Fer Française (SNCF), and public transportation companies at the national level. France's leading mineral-producing companies, which had operations in France and abroad, included Imerys Group, which was a major producer of industrial minerals. Imerys mined and processed ball clays, carbonates, feldspar, and red clays domestically and from deposits in such countries as China, Germany, Spain, the United States, and Vietnam for domestic use and export. Imerys also owned Talc de Luzenac S.A., which was a leading talc-producing company in the world market. Table 2 provides data on the major enterprises that produced metals, industrial minerals, and mineral fuels in France in 2014 (Imerys S.A., 2015a, p. 17).

Commodity Review

Metals

Aluminum.—In September, TRIMET Aluminum SE of Germany (TRIMET) launched its production line F to which electrolytic cells were added and put into operation. The plant, which was located at Saint-Jean-de Maurienne in Savoie, was decommissioned in 2009 and started repairs when it was acquired from Rio Tinto in December 2013. With the reopening of the new line, the Saint-Jean-de Maurienne plant's production capacity would increase to about 145,000 metric tons per year (t/yr).

TRIMET announced that the commissioning of production line F was part of a comprehensive investment program that would cost about \$134 million and would last for the next 3 years. TRIMET announced that it intended to restore the full production capacity of the Saint-Jean-de Maurienne plant and create additional jobs. TRIMET purchased the aluminum smelter and its partner site at Castelsarrasin in December 2013 from Rio Tinto Alcan. The company employed about 500 people at both sites. The company aligned production to develop material solutions for the automotive and energy industry. TRIMET created TRIMET France SAS as the operating company for the two plants and the French energy company, Electricité de France (EDF) held a minority stake in the company (TRIMET Aluminium SE, 2014).

In 2014, Alteo Holdings owned and operated the alumina plant at Gardanne, which was the first plant in the world to

use the Bayer process for the refining of alumina. The plant imported about 3,000 metric tons per day of bauxite, shipped more than 1,200 t of its products daily, and had the capacity to produce 635,000 t/yr. The company's investments in the plant included improving the product grinding and storage facilities, installing six-sigma and lean management systems, and reducing environmental emissions, such as CO₂, dust, and SO₂ (Alteo Holdings, 2016).

Indium and Zinc.—Nyrstar S.A. of Belgium (Nyrstar) owned and operated the Auby smelter in northwestern France, near the city of Lille. During the last quarter of 2014, Nyrstar started to expand indium metal production at Auby; the modifications were expected to be completed during the second half of 2015. These modifications included deconstraining projects, including increasing the silica constraint in concentrates to allow increased indium throughput and recovery. The Auby plant achieved new production records in both zinc metal and indium metal production in 2014. The roaster and the indium plant were shut down during the second half of 2014, which led to lower indium production during this period.

The increases in production were in line with an increased demand for zinc and indium on the world markets. The Auby smelter (an electrolytic zinc smelter) produced cathodes as finished products rather than ingots. Zinc concentrates were the primary source material for the plant; however, secondary zinc materials were used in the roast leach, electrolysis (RLE) smelting process to produce the zinc cathodes. In 2014, the Auby smelter produced 172,000 t of zinc metal.

The Auby smelter had also operated an indium metal production facility since 2012. Auby's zinc concentrates were sourced from suppliers worldwide. Nyrstar reported that the Auby smelter could process a high percentage of secondary feed material without adversely affecting the productivity, efficiency, or residue output of the plant. The concentrates that the plant used were transported by barge from the Port of Antwerp, and the secondary zinc feed materials were delivered by truck. The Auby plant also produced byproducts of sulfuric acid, Auby leach product (a product containing both lead and silver), copper and indium cement, and indium metal (Nyrstar S.A., 2015a, b).

Iron and Steel.—ArcelorMittal of Luxembourg was the leading steel company in France in 2014, with a workforce of nearly 20,000 at about 50 industrial and distribution sites. The company announced that it would create 700 new jobs at its French sites in 2014. The new permanent jobs would cover a wide range of activities and would be in addition to the 600 jobs created in 2013, mostly at the company's Desvres, Dunkerque, Mardyck, and Montataire sites in northern France.

ArcelorMittal designed and manufactured advanced steels in France; its plants had become the group's leading production centers for steel used in the automotive and energy sectors. The company's largest research and development center was located in Maizieres, France. ArcelorMittal has invested more than \$2.7 billion since 2006 in steel production in France, and the company has continued to make regular investments at all its sites. In particular, ArcelorMittal had invested \$140 million in the plant at Florange, which employed 2,200 people, and it planned to invest a total of \$240 million by 2017. ArcelorMittal also announced that it had invested \$123 million to renovate

a blast furnace at Dunkerque and \$120 million to develop the production of electrical steels at the St-Chely d'Apcher site at Lozere (ArcelorMittal, 2014).

Industrial Minerals

Cement.—In April, Lafarge S.A. (Lafarge) announced its merger with Holcim S.A. of Switzerland, which was expected to be finalized in the first half of 2015. In December, Lafarge announced the composition of the executive committee of the new combined company.

Lafarge announced that while the companies awaited regulatory approvals, the new company, LafargeHolcim, would combine operations and that its production sites would be located in 90 countries across all continents. The new company's board would be composed of equal numbers of Lafarge and Holcim directors and distribute its central corporate functions in France and Switzerland. Lafarge stated that no country would account for more than 10% of the revenues of the new company and that LafargeHolcim would be listed on the SIX Swiss stock exchange in Zurich and the Euronext stock exchange in Paris; however, the new company would be domiciled in Switzerland and would operate under the Swiss local governance rules. Prior to the merger, Lafarge was one of France's leading cement manufacturers, employing about 64,000 employees worldwide (Lafarge, 2014a, b).

Italcementi S.p.A. of Italy announced in June that it would purchase the remaining stock in Société des Ciments Français and would completely absorb the company and delist it from the Euronext stock exchange in Paris. The company was delisted on July 15, making official the complete inclusion of Société des Ciments Français into Italcementi. The company was evaluating its options, as the cement market seemed to be consolidating. Italcementi was the fourth-ranked producer of cement in the world after LafargeHolcim, HeidelbergCement of Germany, and CEMEX S.A. of Mexico (Global Cement, 2014; Les Echos, 2014a, b).

The Vicat Group's total sales rose by 6% in 2014 to \$3.23 billion from \$3.06 billion in 2013. Vicat reported that its worldwide cement sales rose by 13.7% in 2014 to \$1.68 billion. The increase was attributed to increased construction in markets in Asia and to market improvements in Egypt and the United States. Vicat reported that cement sales in France decreased by 4.4% in 2014 to \$475 million, and that sales in the remainder of Europe decreased by 5% to \$232 million. In the United States, cement sales increased by 16.7% to \$152 million: in Asia (including India, Kazakhstan, and Turkey), sales increased by 20% to \$622 million; and in Africa and the Middle East, sales increased by 23% to \$499 million. In 2014, Vicat had five cement plants in France with a total production capacity of 6 million metric tons per year (table 2; Global Cement, 2015).

Kyanite and Related Minerals (Andalusite).—In 2014, Imerys, S.A. was the world's leading andalusite producer. The company opened a new pit at Glomel; however, it did not release production data. The new pit supported kernalite production. The beneficiation process used by Imerys Refractory Minerals Glomel, which was the operating entity at the site, allowed the production of high-purity andalusite products that

were suitable for a wide range of applications. Andalusite is a component of both shaped and unshaped refractories, and it is widely used in the technical ceramics and sand-casting industries (Industrial Minerals, 2014; Imerys, 2015b).

Mineral Fuels and Other Sources of Energy

In 2014, the production of nuclear energy, measured in terawatt-hours (TWh), increased by 3% compared with that of 2013 and accounted for 77.4% of total electricity production in France. France's hydroelectric, wind, and solar electricity production decreased by 6.2% in 2014 compared with that of 2013, and thermal production of electricity decreased by 33.9% compared with that of 2013. The total amount of electricity produced in 2014 decreased by 2%; however, consumption of electricity decreased by 6.2%, and France's exports of electricity increased by 25% (Institut National de la Statistique et des Études Économiques, 2015b). The leading consumers of energy in France in 2014 were the residential sector, 68.0%; the industrial sector, 24.7%; the transportation sector, including urban and national train systems, 2.9%; the manufacturing sector and steelmaking industries, 2.4%; and the agricultural sector, 2% (Institut National de la Statistique et des Études Économiques, 2015a).

Outlook

France is principally a processor of minerals, and as such, the domestic and international rate of consumption of manufactured goods that use processed mineral commodities is the principal engine of its mineral industry. Economic growth in the United States and China would increase the demand for France's mineral products, as the economies of the member countries of the EU continue to be flat. France will likely continue to import many of the ores and raw minerals it needs for its manufactured goods industry in the near future, as the Government has decided not to resume mining in metropolitan France. Nuclear power will likely remain the focus of the Government's energy generation strategy for the near future, although increasing its sources of renewable energy continues to be a stated objective of the Government.

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TABLE 1
FRANCE: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014	
METALS						
Aluminum:						
Alumina, metallurgical, gross weight ^c	thousand metric tons	481	470	430 ³	315	300
Metal:						
Primary	do.	356	334	349	346	360
Secondary	do.	184	191	184	180	180
Cadmium metal ^c		50	--	--	--	--
Cobalt, metal:		302	354	350	308	219
Indium	kilograms	--	--	13,000 ^r	33,000 ^r	43,000
Iron and steel, metal :						
Pig iron	thousand metric tons	10,137	9,698	9,532	10,276	10,866
Ferrous alloys, electric furnace:^c						
Ferromanganese	do.	138	131	101 ^r	104 ^r	116
Ferrosilicon	do.	32 ^r	72 ^r	63	50	50
Silicomanganese	do.	62	63	69 ^r	65 ^r	65
Silicon metal	do.	112	104 ^r	95	100	100
Other	do.	60	60	60	60	60
Total	do.	400	430 ^r	380 ^r	380 ^r	391
Steel:						
Crude	do.	15,414	15,780	15,609	15,685	16,143
Hot-rolled	do.	13,581	13,715	13,529	14,716	15,464
Lead, refined, secondary: ^c		71,000 ^r	80,000 ^r	83,000 ^r	71,000	72,000
Nickel, refinery products, Ni content ⁴		12,900 ^r	13,700	13,200 ^r	12,100 ^r	8,400
Zinc metal, including slab and secondary		163,000	164,000	161,000	152,000	171,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	17,733	19,270	17,810 ^r	18,018	18,000
Gypsum and anhydrite, crude ^c	do.	3,440 ³	4,231	3,685 ³	3,455	3,279
Kaolin and kaolinitic clay (marketable)	do.	315	315	315	267	317
Lime, quick and hydrated, dead-burned dolomite ^c	do.	4,000	4,000	4,000	3,371 ³	2,864
Nitrogen, N content of ammonia ^c	do.	3,517 ³	3,500	2,644 ³	2,640 ^r	2,600
Pigments, mineral, natural, iron oxide ^c		1,000	1,000	900 ^r	900	900
Salt, all sources ^c	thousand metric tons	5,867 ³	5,430	5,457	5,893	5,809
Stone, sand and gravel:						
Chalk	do.	1,765	2,733	1,702	2,214	2,677
Dolomite, crude	do.	700	393	423	647	418
Granite, crude	do.	426	482	233	289	197
Limestone, agricultural and industrial	do.	9,102	10,666	10,216	9,721	8,985
Marble and travertine, crude ^c	do.	150	150	150	23	22
Sand and gravel:						
Industrial sand		8,498	6,286	8,880	8,752	7,835
Other sand, gravel, and aggregates		249,512	277,521	251,015	260,524	230,216
Slate, crude ^c		8,700	8,700	8,700	7,081	7,000
Talc, crude ^c	thousand metric tons	420	420	420	450	450

See footnotes at end of table.

TABLE 1—Continued
FRANCE: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014	
MINERAL FUELS AND RELATED MATERIALS						
Carbon, black	thousand metric tons	203,563	134,329	134,000	105,041	116,863
Gas, natural, marketed	million cubic meters	1,245	1,132	538 ^{r,3}	339 ^r	169
Petroleum:						
Crude:	thousand 42-gallon barrels	6,606	6,508	5,949	5,840	5,475
Refinery products:						
Liquefied petroleum gas	do.	24,346	24,300	16,973	17,155 ^r	17,100 ^e
Gasoline, all kinds	do.	115,596	115,000	100,740	91,615 ^r	91,600 ^e
Kerosene and jet fuel	do.	35,113	35,100	29,930 ^r	33,580 ^r	33,600 ^e
Distillate fuel oil	do.	224,950	224,900	194,801	191,260 ^r	191,000 ^e
Residual fuel oil	do.	59,313	59,300	52,962	43,435 ^r	43,400 ^e
Other products	do.	106,617	106,600	86,578	86,870 ^r	86,800 ^e
Total	do.	565,900	565,200	481,984 ^r	463,915 ^r	463,500 ^e

^eEstimated; estimated data rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through January 7, 2016.

²In addition to the commodities listed, France produced abrasives, antimony, asphaltic material, bauxite, coal briquets, metallurgical coke, diatomite, feldspar, germanium, kyanite, mica, pumice, refractory clays, sandstone, sodium compounds, sulfur, synthetic industrial diamond, and Thomas slag, but actual output was not regularly reported, or as in the case for bauxite, it was produced but not intended for metallurgical use. The available information was inadequate to make reliable estimates of output.

³Reported figure.

⁴Excludes secondary production from nickel-cadmium batteries.

TABLE 2
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina, metallurgical		Alteo Holdings (100%)	Plant at Gardanne	635
Aluminum		Rio Tinto Ltd.	Dunkerque, Calais du Nord	270
Do.		Trimet Aluminium SE, 65%, and Electricité de France S.A. (EDF), 25%	Saint-Jean-de-Maurienne, Savoie	145
Andalusite		Imerys, S.A.	Glomel Mine, Brittany	75
Antimony, metal		Produits Chimiques de Lucette	Plant at Le Genest, Mayeene Province	15
Barite		Barytine de Chaillac	Mine and plant at Chaillac	150
Do.		Société Industrielle du Centre	Mine at Rossignol, Indre Province	100
Cement		Four companies:	80 plants, including:	26,700
Do.		Lafarge S.A.	14 plants, the largest of which is at St. Pierre-la-Cour (1,160)	10,000
Do.		Société des Ciments Français (Italcementi S.p.A.)	9 plants, the largest of which is at Gargenville (1,100)	7,500
Do.		Vicat Group	5 plants	6,000
Do.		Holcim Ciments S.A.S	9 plants	5,900
Clay, kaolin		Groupe Mineral Harwanne (GMH)	Kaolin d'Arvor Mine, Quessoy	300
Cobalt, metal	metric tons	Société Métallurgique le Nickel (SLN)	Plant at Sandouville, near Le Havre	600
Copper, metal		Compagnie Générale d'Électrolyse du Palais	Electrolytic plant at Palais-sur-Vienne	45
Diatomite		Ceca S.A.	Mines and plants at Riom-les-Montagnes and St. Bauzille	100
Feldspar		Denain-Anzin Minéraux S.A. (Imerys Group)	Mine and plant at St. Chely d'Apcher	55
Ferroalloys		Comilog Dunkerque (ERAMET Group, 100%)	Dunkerque	70
Do.		FerroPemS.A. (Grupo Ferro Atlantica, 100%)	6 plants	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		Nyrstar S.A.	Plant at Auby	48
Iron and steel, steel		ArcelorMittal Group	Fos-sur-Mer	4,200
Do.		do.	Florange ¹	3,200
Do.		do.	Gandrange, Neuves Maisons	8,400
Mica		Denain-Anzin Minéraux S.A. (Imerys Group)	Mine at Ploemeur, Brittany	160
Natural gas	million cubic meters	Total Group	Gasfield and plant at Lacq	20,000
Nickel, metal		Société Métallurgie le Nickel (SLN)	Plant at Sandouville	16
Nitrogen, N content of ammonia		GPN S.A.	Plant at Grandpuits	390
Petroleum:				
Crude	42-gallon barrels per day	Total S.A.	Paris basin oilfields	1,000
Refined	do.	do.	Refineries at Gonfreville and La Mede	446,000
Do.	do.	Petroplus S.A.	Refinery at Petite Couronne	285,000
Do.	do.	Total S.A.	Refinery at Feyzin	120,000
Do.	do.	do.	Refinery at Donges	200,000
Do.	do.	do.	Refinery at Grandpuits	96,000
Do.	do.	Ineos Group Ltd.	Refineries at Lavera	175,000
Do.	do.	Esso S.A.	Refineries at Fos-sur-Mer	62,000
Do.	do.	do.	Refineries at Gravenchon	237,000
Do.	do.	Cie. Rhenane de Raffinage (CRR) ²	Refinery at Reichstett	80,000
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 Group	Byproduct from natural gas, gasfield and plant at Lacq	3,000
Talc		Talc de Luzenac S.A. (Imerys S.A., 100%)	Trimouns Mine near Ariège, Pyrenees	450
Zinc, metal		Nyrstar S.A.	Plant at Auby	172

Do. do., Ditto.

¹The Florange blast furnace was idle for all of 2012.

²Production operations terminated; conversion to petroleum product distribution in 2012.