In 2010, Portugal was a significant world producer of lithium (fifth after Chile, Australia, China, and Argentina), tin (eleventh after China, Indonesia, Peru, Bolivia, Brazil and Congo (Kinshasa), Vietnam, and Australia, Malaysia, and Russia), and tungsten (fifth after China, Russia, Bolivia, and Australia) (Carlin, 2011; Jaskula, 2011; Shedd, 2011).

In 2010, the Portuguese economy reversed the recessive trend of 2008-9, and it is estimated that the country’s gross domestic product (GDP) increased by 1.4%, primarily driven by the increased exports of goods and services. Portugal’s GDP based on purchasing power parity was $247 billion. The sectors that contributed to the country’s GDP were services (74.7%), industry (22.9%), and agriculture (2.4%) (World Trade Organization, 2011).

In 2010, Portugal’s exports amounted to $45.5 billion compared with a revised $44.7 billion in 2009 and included such products as machinery and tools (16.2%), crude oil products (9.8%), base metals (7.7%), minerals and mineral products (5.7%), chemical products (4.8%), and others (55.8%). Portugal’s leading export partners were Spain (26.7%), Germany (13.1%), France (12.3%), Angola (7.2%), the United Kingdom (5.6%), Italy (3.8%), the United States (3.2%), and others (28.1%). The main export destination was the European Union (EU), whose 27 members received 74.2% of Portugal’s exports. Portugal’s imports amounted to $68.8 billion compared with $69.8 billion in 2009, and included such products as machinery and tools (19.1%), crude oil products (16.7%), oil products (12.7%), chemical products (10.3%), base metals (7.7%), minerals and mineral products (1.6%), and others (31.9%). Portugal’s leading suppliers were Spain (32.4%), Germany (12.7%), France (8.7%), Italy (5.7%), the United Kingdom (5.4%), the Netherlands (3.3%), the United States (1.6%), and others (30.2%). The main import origination point was the EU, whose 27 members supplied 78% Portugal’s imports (Federation of International Trade Associations, The, 2011; U.S. Central Intelligence Agency, 2011; U.S. Central Intelligence Agency, 2011).

Portugal’s foreign direct investment (FDI) inflow was $47 billion in 2010. This investment went mainly to commerce (36%), petroleum processing (23%), the financial sector (14%), transportation (10%), and others (17%). In 2010, unemployment increased to 10.8% from 9.5% in 2009 (U.S. Central Intelligence Agency, 2011; U.S. Department of State, 2011; World Trade Organization, 2011).

Minerals in the National Economy

Portugal remained one of the EU’s leading copper, silver, tungsten, and zinc producers and a significant European producer of other metals, as well as of industrial minerals and mineral fuels. The Portuguese mineral sector was controlled by the Instituto Geologico e Mineiro. The Iberian Pyrite Belt (IPB) in south-central Portugal is an area known to host numerous and very large base-metal deposits. The Aljustrel complex, which is located in the IPB, hosts five known volcanogenic massive sulfide (VMS) deposits; these types of deposits are an important source of copper and zinc. The mine was placed on care-and-maintenance status in 2008. The final feasibility study for Aljustrel estimated total reserves to be 13.8 million metric tons (Mt) at average grades of 5.5% zinc, 1.8% lead, and 63 grams per metric ton (g/t) silver (Direcção Geral de Energia e Geologia, 2011; MBendi Information Services (Pty) Ltd., 2011a, b, d).

Portugal’s most valuable metallic mineral resources were copper, silver, tin, tungsten, and zinc. The most valuable resources of industrial minerals were high-quality lithium, marble, pyrites, and rock salt. The country had limited energy resources and depended upon imports for the bulk of its energy needs (Direcção Geral de Energia e Geologia, 2011; MBendi Information Services (Pty) Ltd., 2011a, d; U.S. Energy Information Administration, 2011).

Production

Portugal’s industrial minerals sector was a producer of a variety of materials; the dimension stone and rock salt sectors continued to be particularly important segments of the mineral industry in terms of value and trade. Portugal was one of the leading producers of mined copper, silver, tin, tungsten, and zinc concentrates in the EU and a significant producer of barite and talc (table 1; Direcção Geral de Energia e Geologia, 2011).

Structure of the Mineral Industry

Lundin Mining Corp. of Canada’s operations in Portugal included the Lombador copper-zinc project and the Neves-Corvo copper-zinc mine. The company had begun feasibility studies for the development of the Lombador base-metals mine and the expansion of the Neves-Corvo zinc mine, and expanded mining operations at both mines were expected to begin by 2012. Lundin Mining was also set to conduct greenfield exploration for base and precious metals near the Neves-Corvo Mine. Sojitz Beralti Tin & Wolfram (Portugal) S.A. mined tungsten at its Panasqueira Mine, which is located in Beira Baixa Province in the east-central region of Portugal (Lundin Mining Corp., 2011a; 2011b, p. 1-2; MBendi Information Services (Pty) Ltd., 2011d).

Lusosider Açores Planos S.A. and SN Servicos S.A. were Portugal’s leading steel producers. Cimentos de Portugal, SGPS, S.A. (CIMPOR) was a regionally significant producer.
of cement. With the exception of copper, dimension stone, and tungsten, production of other minerals and related materials had only domestic significance. Some of the leading mineral-related companies were partially owned or controlled by the Government, and some operations were privately owned. In 2010, Portugal had only two metallic mines in operation—the Neves-Corvo copper mine and the Panasqueira tungsten mine (table 2; Cimentos de Portugal, SGPS, S.A., 2011a; b; Lundin Mining Corp., 2011a; MBendi Information Services (Pty) Ltd., 2011a).

Commodity Review

Metals

Copper and Zinc.—Production from the Neves-Corvo Mine was 74,426 metric tons (t) of copper concentrate in 2010 compared with 86,500 t in 2009, which was a decrease of almost 14%. Neves-Corvo’s current production capacity was about 2.2 million metric tons per year (Mt/yr) of ore and 100,000 metric tons per year (t/yr) of copper concentrate. Neves-Corvo produced 6,421 t of zinc in 2010 compared with 501 t in 2009 (table 1; Direcção Geral de Energia e Geologia, 2011). According to the mine’s owner, Lundin Mining, as of early 2011, Neves-Corvo’s copper-rich ores amounted to 23.3 Mt grading 3.6% copper, 1.0% zinc, 0.3% lead, and 43 g/t silver, and the mine’s zinc-rich ores amounted to 42.6 Mt grading 6.9% zinc, 1.7% lead, 0.4% copper, and 62 g/t silver (Instituto Nacional de Estatística, 2011; Lundin Mining Corp., 2011b, p. 1; MBendi Information Services (Pty) Ltd., 2011a).

Tungsten.—Production from the Panasqueira tungsten mine was 799 t in concentrate (W content) in 2010 compared with 823 t in 2009, which was a decrease of almost 3%. The Panasqueira Mine was operated by Sojitz and continued to be one of the EU’s leading producers of tungsten concentrates with a capacity to produce 1,400 t/yr of tungsten oxide (WO₃) concentrate. According to Sojitz, the mine had proven and probable reserves of 1.4 Mt at a grade of 0.233% WO₃, additional indicated resources of 3.3 Mt at a grade of 0.263% WO₃, and inferred resources of 1.6 Mt at a grade of 0.224% WO₃. The main end-use application for tungsten was in the manufacture of cemented carbides (60%), steel and alloys (21%), electrical and electronics products (11%), and catalysts and pigments (8%) (Direcção Geral de Energia e Geologia, 2011; MBendi Information Services (Pty) Ltd., 2011d).

Industrial Minerals

Cement.—Portugal produced 7.2 Mt of cement in 2010 compared with almost 6.9 Mt in 2009. CIMPOR continued to be Portugal’s leading cement producer and the second ranked cement producer on the Iberian Peninsula after Cemex España S.A. In addition to cement, CIMPOR also produced aggregates, dry mortars, and precast concrete products. In line with the world economy, 2010 was a year of transition for Portugal’s cement industry after the recession of 2009. Domestic cement consumption decreased by 5.6 Mt in 2010 from 6.1 Mt in 2009, or by about 7%. The development of Portugal’s infrastructure was expected to increase demand for CIMPOR’s products in the foreseeable future, in spite of the financial crisis (Cimentos de Portugal, SGPS, S.A., 2011a-c).

Salt.—Rock salt was the most valuable of the industrial minerals produced in Portugal. The production of rock salt totaled 618,961 t in 2010 compared with a revised 594,578 t in 2009 (Direcção Geral de Energia e Geologia, 2011).

Mineral Fuels and Other Sources of Energy

Petroleum, Natural Gas, and Coal.—In 2010, Portugal continued to rely on imported energy resources, such as petroleum (75%), natural gas (10%), and coal (5%) for electricity generation. The country’s leading domestic energy resource was hydropower, which is an unreliable source of power because it depends on rainfall. Portugal had two crude oil refineries, which were located in the coastal cities of Porto and Sines. Argus Resources Ltd. of the United Kingdom built the petroleum refinery located 90 kilometers south of Lisbon at Sines; the refinery had a production capacity of 250,000 barrels per day (bbl/d) and cost about $5 billion to build. Government-owned Petróleos de Portugal (Petrogal) operated both refineries, which had a combined capacity of 304,200 bbl/d. The Government was planning to invest about $2 billion to upgrade the country’s refining processes during 2011-12. The political and legal issues surrounding the EU-Russia energy relationship continued to be under review, owing to the 2009 disruption of gas supply to the EU by way of Ukraine, which raised questions concerning the reliability of the energy supply from Russia. Production data for mineral fuels and refined products are shown in table 1 (MBendi Information Services (Pty) Ltd., 2011c; U.S. Energy Information Administration, 2011).

Renewable Energy.—Owing to Portugal’s heavy dependence on imported energy, the country was emphasizing solar, wave, and wind power investment. The Government was planning to invest about $11 billion in renewable energy projects by 2012, of which $2.5 billion would be for building the infrastructure for wind power. In 2010, the wind power production capacity in Portugal increased to 3,898 megawatts (MW) from 3,535 MW in 2009. The leading European countries with wind power installations were Germany (27,214 MW), Spain (20,676 MW), Italy (5,797 MW), France (5,660 MW), the United Kingdom (5,204 MW), Portugal (3,898 MW), Sweden (2,163 MW), and Ireland (1,428 MW) (BP p.l.c., 2011, p. 41; European Wind Energy Association, 2011, p. 5–6).

Outlook

Portugal is the EU’s leading producer of copper, lithium, rock salt, silver, tungsten, and zinc. Feasibility studies for potential gold and other base-metal projects were under way in the Portuguese zone of the IPB, which continued to be a prime target for exploration. The IPB appears to have good potential for additional mineral deposits on the basis of the large VMS deposits developed in the past. Owing in part to the debt crisis in the eurozone, the Portuguese Government is considering increasing investments in energy alternative sources, such as
hydropower, solar, wave, wind, and other renewable energy sources to make the country less dependent on imported energy. The Government is also considering improvements in efficiency and performance of energy alternative sources by way of improved technical and operating efficiencies; maintaining a solid financial position to support the country’s rating and to keep appropriate levels of leverage among the EU countries (Alexander’s Gas & Oil Connections, 2011; MBendi Information Services (Pty) Ltd., 2011d).

References Cited


TABLE 1
PORTUGAL: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

<table>
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<tr>
<th>Commodity</th>
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<th>2009</th>
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<td>NA</td>
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<tr>
<td>Sulfur, byproduct, all sources e</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Talc, thousand cubic meters</td>
<td>5,517</td>
<td>12,367</td>
<td>11,220</td>
<td>11,567</td>
<td>11,951</td>
</tr>
<tr>
<td>MINERAL FUELS AND RELATED MATERIALS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coke, metallurgical, thousand metric tons</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Gas, manufactured, thousand cubic meters</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>Petroleum production, thousand 42-gallon barrels</td>
<td>1,822</td>
<td>2,321</td>
<td>2,730</td>
<td>1,728</td>
<td>1,723</td>
</tr>
<tr>
<td>Petroleum refinery products, do.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquefied petroleum gas, thousand 42-gallon barrels</td>
<td>4,616</td>
<td>4,176</td>
<td>4,444</td>
<td>4,450</td>
<td>4,450</td>
</tr>
<tr>
<td>Gasoline, do.</td>
<td>23,036</td>
<td>21,683</td>
<td>17,805</td>
<td>18,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Kerosene and jet fuel, do.</td>
<td>--</td>
<td>6,516</td>
<td>6,508</td>
<td>6,500</td>
<td>6,500</td>
</tr>
<tr>
<td>Distillate fuel oil, do.</td>
<td>37,710</td>
<td>35,396</td>
<td>34,846</td>
<td>35,000</td>
<td>35,000</td>
</tr>
<tr>
<td>Residual fuel oil, do.</td>
<td>22,234</td>
<td>19,834</td>
<td>19,099</td>
<td>19,000</td>
<td>19,000</td>
</tr>
<tr>
<td>Unspecified, do.</td>
<td>15,599</td>
<td>15,323</td>
<td>15,709</td>
<td>16,000</td>
<td>16,000</td>
</tr>
<tr>
<td>Refinery fuel and losses, do.</td>
<td>3,800</td>
<td>3,800</td>
<td>3,800</td>
<td>3,800</td>
<td>3,800</td>
</tr>
<tr>
<td>Total, do.</td>
<td>106,995</td>
<td>106,728</td>
<td>102,211</td>
<td>102,750</td>
<td>102,750</td>
</tr>
</tbody>
</table>

1Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. 1Preliminary. 1Revised. 1Ditto. 1NA Not available. 1Zero. 1Table includes data available through July 31, 2011. 1Reported figure. 1Reported by Cimentos de Portugal, SGPS, S.A. (CIMPOR). 1Includes washed and unwashed kaolin. 1Not elsewhere specified. 1Reported figure. Source: USGS Minerals Questionnaires, Portugal, 2007–8 and 2009–10.
TABLE 2
PORTUGAL: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Major operating companies and major equity owners</th>
<th>Location of main facilities</th>
<th>Annual capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium carbonate</td>
<td>Omya Mineral Portuguesa Lda. (Salmon &amp; Cia Lda.)</td>
<td>Mine and plant at Fatima</td>
<td>100</td>
</tr>
<tr>
<td>Cement</td>
<td>Cimentos de Portugal, SGPS, S.A. (CIMPOR) (Government, 100%)</td>
<td>Plants (3) at Alhandra, Loule, and Souselas</td>
<td>12,000</td>
</tr>
<tr>
<td>Copper, concentrate</td>
<td>Lundin Mining Corp.</td>
<td>Neves Corvo Mine near Castro Verde</td>
<td>100</td>
</tr>
<tr>
<td>Diatomite</td>
<td>Sociedade Anglo-Portuguesa de Diatomite Lda.</td>
<td>Mines at Obidos and Rolica</td>
<td>150</td>
</tr>
<tr>
<td>Feldspar</td>
<td>A.J. da Fonseca Lda.</td>
<td>Seixigal Quarry, Chaves</td>
<td>10</td>
</tr>
<tr>
<td>Ferroalloys</td>
<td>Electrometalurgia S.A.R.L.</td>
<td>Plant at Setubal</td>
<td>100</td>
</tr>
<tr>
<td>Kaolin</td>
<td>Saibrais Arealas e Caulinos S.A. (Denain Anzin Minerais S.A.)</td>
<td>Mines at Casal dos Bracais and Mosteiro</td>
<td>175</td>
</tr>
<tr>
<td>Petroleum, refined</td>
<td>Petroles de Portugal (Petrogal) (Government, 100%)</td>
<td>Refineries at Porto and Sines</td>
<td>305,000</td>
</tr>
<tr>
<td>Pyrite</td>
<td>Argus Resources Ltd. (private, 100%)</td>
<td>Refinery at Sines</td>
<td>250,000</td>
</tr>
<tr>
<td>Steel, crude</td>
<td>Pirites Alentejanas S.A. (EuroZinc Mining Corp.)</td>
<td>Mine at Aljustrel, plant at Setubal</td>
<td>100</td>
</tr>
<tr>
<td>Do.</td>
<td>SN Servicos S.A. (Metalurgica Galaica S.A., 100%)</td>
<td>Steelworks at Maia and Seixal</td>
<td>600</td>
</tr>
<tr>
<td>Tin</td>
<td>Lusosider Aços Planos S.A. (Corus Group, 50%, and Sollae S.A., 50%)</td>
<td>Rolling mill at Seixal</td>
<td>800</td>
</tr>
<tr>
<td>Tungsten, concentrate</td>
<td>Beralt Tin &amp; Wolfram (Portugal) SAR</td>
<td>Panasqueira Mine and plant at Barroca</td>
<td>1,400</td>
</tr>
<tr>
<td>Uranium</td>
<td>Empresa Nacional de Uranio S.A. (Government, 100%)</td>
<td>Mines at Guargia, plant at Urgeirica</td>
<td>150</td>
</tr>
<tr>
<td>Zinc, concentrate</td>
<td>Lundin Mining Corp.</td>
<td>Neves Corvo Mine near Castro Verde</td>
<td>25,000</td>
</tr>
<tr>
<td>Do.</td>
<td>do.</td>
<td>Aljustrel Mine near Castro Verde</td>
<td>20</td>
</tr>
<tr>
<td>Zinc, refined</td>
<td>RMC Quimigal S.A.R.L.</td>
<td>Electrolytic plant at Barreiro</td>
<td>12</td>
</tr>
<tr>
<td>Do., do. Ditto.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>