

SPAIN

*By José Antonio Espí
ETSIM de Madrid*

The Spanish economy kept up a considerable rate of growth throughout 2000, although at the end of the year it showed signs of cooling down mainly because of a slowing down in domestic demand. The increase in GNP was 4.1%, compared with 4% in 1999. The rise in fuel prices, the decline of the euro against the US dollar, the loss in purchasing power of wages, the fall in the stock market and the rise in interest rates all militated against family spending.

Spain's economic activity has again shown two of its traditional imbalances: an increase in prices which went up by an annual rate of 4% compared with 1999, which was in turn up by 2.9%, and keeping unemployment at levels higher than the average for other European Community countries. Nevertheless, 600,000 jobs were created in EPA terms (Survey of Working Population) and the rate of unemployment went down to 14.1% of the working population as against 15.9% the year before. External trade recorded a deficit of €32.6 billion, equalling that for 1999. Exports increased by 19% but Spanish purchases abroad rose by 23.1%, particularly due to the rise in petroleum products. Industry had a very good first half year, growing at a rate of 5.7%, but in the third quarter this rise was reduced to 2.3%. State finances have also improved, and have continued the process of reducing the public deficit, which went from 1.1% in 1999 to 0.3% of GDP in 2000.

Energy Minerals

Total coal output for 2000 (23.06 Mt) was reduced at the rate agreed under the Coal Mining Plan (24.19 Mt in 1999), that is, a decrease of 4.7%. This systematic reduction in output is a result of the application by the Spanish government of the EU policy on limiting national coal outputs. The programme

currently controlling Spanish production up to the year 2005 is the 'Coal Mining and Alternative Mineral Areas Development Plan', and also the use of alternative fuels to prepare for the full independence of electric power stations using Spanish coal. According to the National Union of Coal Mining Companies (CARBUNION), while productivity per worker rose over the last four years by 28%, over the past year the reduction in the number of workers in the sector reached almost 10%, going from 725 tonnes of coal equivalent/man-year to 999 tonnes of coal equivalent/man-year.

The European Commission is keeping an eye on the achievement of objectives to reduce output which should be down to 2.25 Mt by the end of the ECSC (Steel and Coal European Community Treaty) at the same time as they cut subsidies at an annual rate of 4%.

Oil production continues its sharp decline (233 Mt) and is located almost exclusively offshore on the Mediterranean deposits (Casablanca, Rodaballo, Boquerón and Barracuda) and in the Cantabrian Sea (Gaviota I and II). Natural gas has seen extraction increase through exploitation of small deposits in the south of Spain, in the Guadalquivir Valley and in Huelva.

November 2000 saw the end of mining at Spain's last uranium deposit, Mina Fe at Saelices (Salamanca) which had mined very low-grade ore for 25 years. Exhaustion of its best reserves and the persistent fall in uranium prices on the open market caused its final closure. From now on the only activity at the mining centre will be the development of an extensive shutdown plan to neutralise and restore the plant and mine.

Metallic Minerals

Last year, Minas de Rio Tinto was forced to ask for help from the Andalucian and Central governments to carry on its mining activities. In fact, once the company had received financial support, it sought participation from an international group of companies to pursue its activities. At the moment these consist of preparing to clear the Salomón mine while seeking better grades of copper as an alternative to the Cerro Colorado mine. During 2000, Minas de Rio Tinto processed 3.38 Mt of copper ore with a grade of 0.60% of Cu and produced 15,775 t of copper metal content in its flotation concentrates (74,412 t with 21.2% Cu) with a recovery of 75.1% of the metal.

For 2001, Rio Tinto plans to maintain the output of copper (18,000 t) thanks to an improvement in grades (0.67% Cu). Furthermore, over the year it has continued activity on the ore treatment line with precious metals.

The Irish company Navan Resources, which owns Navan Huelva SA and Almagrera SA, has two mining centres in the Iberian Pyrite Belt (IPB), Aguas Teñidas and Sotiel, both with underground mines. During the past year the first of these produced 242,000 t of 'complex' ore (Cu, Zn, Pb) and 34,000 t of 'coppery' ore which meant 1,210 t of copper metal, 14,880 t of zinc and 2,385 t of lead contained in the following flotation concentrates: 5,769 t (21% Cu), 31,000 t (48% Zn) and 5,300 t (45% Pb). At the Sotiel mining centre the company extracted 'complex' and 'coppery' ores together, reaching an output of 2,580 t of copper, 10,810 t of zinc and 9,000 t of lead, which were contained in concentrates of: 56,000 t (21% Cu), 85,000 t (47% Zn) and 20,000 t (45% Pb). With new investments in the Sotiel treatment plant, by 2001 Navan will be able to process the 600,000 t planned from Aguas Teñidas, together with the output of 'coppery' ore from Sotiel-Migollas.

Spain's Energy Mineral Production				
	Unit	1998	1999	2000 ^P
Anthracite	'000 t	5,682	5,436	5,160
Coal	'000 t	6,718	6,295	6,173
Black lignite	'000 t	3,925	3,695	3,630
Brown lignite	'000 t	9,750	8,831	8,103
Oil	'000 t	535	306	233
Natural gas	Million m ³	114	112	179
Uranium	t U ₃ O ₈	335	351	401

^P Provisional data

Source: Ministerio de Industria y Energía/Carbuni6n

For its part, Boliden-Apirsa SL has finished sealing off the spoil tip which caused the ecological accident that attracted public attention two years ago. At the same time production continued at the Los Frailes deposit, removing and processing 3.15 Mt of ore which were converted into 15,948 t of copper concentrates (19.1% Cu) containing 3,057 t of metal, 204,840 t of zinc concentrates (45.7% Zn) with 93,612 t of metal and 87,429 t of lead concentrates (46.3%Pb) which means 40,480 t of metal.

The current state of Boliden's Spanish subsidiary is complicated since at the end of last year the company declared a suspension of payments and Boliden announced its departure from Spain after having given up continuing to invest in the viability of its mine at Los Frailes. The most recent events, partly to do with climate, opened the way for Boliden's speedy departure. On the other hand, negotiations were afoot for sales options as a "future alternative" with the Dutch group Trafigura Beheer as the most interested party in reaching a purchase agreement.

Once the project was in the hands of the US company MK Gold, Las Cruces (Seville), with 15.8 Mt of ore (5.9% Cu) now finds itself at the stage of following up the final administrative authorisations to start operating. The economic viability study carried out by Bechtel Engineering was positive and supported by hydrometallurgical studies conducted by the Canadian engineering company Dynatec Corp., which

proposes ferric pressure leaching to extract 89% of the copper content, basically as secondary sulphides. For an annual output of 72,000 t of copper cathodes from open-pit mining of 1.2 Mt/y, the estimated investment would be US\$300 million. The operating cost is calculated at US\$0.33/lb of copper, and the life of the mine is over 13 years.

The IPB has been replaced as the main production centre for precious metals by the Río Narcea Gold Mines' mine in the north of Spain. Thus Minas de Rio Tinto will not produce anything in 2001, and in 2000 the company processed a total of 1 Mt from various workings and residues (which yielded 461 kg of gold and 33.1 t of silver). Filón Sur, a company dedicated to gold-bearing gossans by the heap leaching system in the Tharsis field (Huelva), changed ownership in 2000 from belonging to Caledonian Mining Co. to Oak Consortium of Zurich, Switzerland. During the year the plant was prepared for treating the old residues built up over the 13 years of operations. Over the past year the company processed 1.06 Mt with an average grade of 1.49 g/t Au and 18.23 g/t Ag, producing 828 kg of gold and 7.36 t of silver.

In its third year of operation, Río Narcea Gold Mines SA maintained the gold output of the previous year, 3.0 t of gold, compensating for the reduction in grade of ore entering the plant (5 g/t) with an increase in ore production (723,000 t). Operating cash costs were lower went down (US\$178/oz) by comparison with the previous year (US\$182/oz), despite bad weather. With mining starting up on the nearby deposit at Carlés in the second half of last year Río Narcea is now sure to reach the 4 t of gold planned for 2001.

In addition, the company is directing part of its operation towards incorporating an area of high grades known as Charnela and hopes to complete preparations by the end of 2001. This company has an option on the Aguablanca deposit which is a Ni-Cu-Co-PGM deposit located in the Extremadura

region in the west of Spain, containing 31 Mt of resources within a broad area that promises to be worth investigating.

Asturiana de Zinc SA has maintained its output of zinc and lead from its mines at Reocin in Cantabria, extracting 1.08 Mt, 0.47 Mt from its underground mine and 0.61 Mt from its open-pit mine, with a combined grade of 7.82% Zn and 0.77% Pb. The flotation plant produced 134,893 t of zinc concentrates (60.01% zinc) and 9,320 t of lead (71.07% Pb). The metal output was 80,950 t of Zn and 6,624 t of Pb. At the current mining rate, reserves will allow another two years of mining. In January this year, Asturiana was acquired by Xstrata AG of Switzerland whose major shareholder, Glencore International AG, already held a 44.4% interest in Asturiana.

Spain's Production Of Metallic Minerals				
	Unit	1998	1999	2000 ^P
Copper	'000 t*	37.7	3.5	23.6
Zinc	'000 t*	138	153	200.2
Lead	'000 t*	21	28	58.5
Gold	Kg*	3,203	5,200	4,310
Silver	t*	47	129	221
Mercury	t*	672	433	236
Tin	t*	5	11	1
Pyrite	'000 t	883	853	206

^P provisional data

* metal content

Source: Personal research/IGME

Non-metallic Minerals

In general terms, there has been a sharp increase in the production of all minerals associated with the manufacture of ceramic products, while the economic situation for the remainder has stayed more or less stable. Spain continues as the leading country in its production and reserves of meerschaum (more than 15 Mt) located around Madrid. However, the price and transport costs have forced a focus on 'pet litter' and foundry additive qualities. Production is shared by three companies: Tolsa, Sepiolsa and Benesa.

One of the biggest magnesite producers in the world, Grecian Magnesite SA and the French company Timab Industries, have increased their stake in Magnesitas Navarras SA (Magna), the largest Spanish producer, amounting almost to its total acquisition (99.7%). Magna specialises in the manufacture of caustic and 'dead burned' magnesium and has its mining and treatment installations in the Eugui area (Navarre), producing 0.5 Mt/y of magnesite.

Exploration and mineral prospecting

The discovery of primary gold resources is now one of the main objectives of some surveys in the IPB. After having acquired investigation rights in the abandoned deposit at Lomero-Poyatos, Cambridge Mineral Resources has now arrived at an agreement with Newmont Mining Corp. to investigate the resources on this complex sulphide concession which, according to Cambridge, has a confirmed evaluation of 4.25 Mt of massive sulphides containing 1.6 Moz of gold in an ore with 5.76 g/t Au, 117 g/t Ag, 1.58% Cu, 5.71% Zn and 1.48% Pb, in addition to other more widely spread resources. The agreement plans to carry out at least 2,500 m of drilling and other work totalling US\$8 million.

Mention should also be made of the presence of the Japanese mining company Dowa Mining Co. which, in joint venture with Atlantic Copper and with Riomin Ibérica, belonging to Rio Tinto, is investigating its mineral concessions in the IPB. The methodology used, traditional in the IPB (geology, gravimetrics, electromagnetic geophysics and drilling) has enabled them to pinpoint two massive sulphide orebodies after having drilled 5,000 m. The project is currently developing around identifying and measuring the richest areas in the two ore deposits.

For its part, Rio Narcea continues to be by far Spain's largest investor in exploring new resources. In addition to the

investigatory operations in the areas next to its main deposit, El Valle, together with Barrick Gold, Rio Narcea has explored the gold-bearing belt at Navelgas (Asturias) under a US\$2.5 million programme, carrying out almost 11,000 m of drilling in its search for Carlin-type deposits. Rio Narcea has likewise continued prospecting at Corcoesto (Galicia) to confirm the continuance of the gold grade of previously evaluated reserves. The next step will be to carry out a pilot exploitation and 'heap-leaching' test on the 3.9 Mt of established gold reserves which average 1.54 g/t Au (190,000 oz of gold), and assessing a quantity in the inferred category. The scenario for the gold project is an output of 30,000 oz/y, a recovery of 76%, an investment of US\$6 million and a cash cost of US\$179/oz.

Outokumpu Mining Oy continues to explore for lead and zinc deposits in the Basque country under a joint venture with the Independent Local Government institution, EVE, exploring lead-zinc mineralisation in the

Spain's Production Of Non-Metallic Minerals ('000 t)				
		1998	1999	2000 ^P
Fluorspar	CaF ₂	130	133	135
Potash	K ₂ O	597	656	653
Salt		3,699	3,620	5,500
Micro-silica			250	300
Special clays		894	1,030	1,000
Magnesite	MgO	201	183	160
Barite	BaSO ₄	70	60	22
Magnetite		75	64	67
Talc		110	111	121
Lepidolite		7	10	10
Diatomite		56	55	55
Sodium Sulphate	Na ₂ SO ₄	1,001	1,000	1,000
Celestite	SrSO ₄	111	110	130
Washed Kaolin		312	350	450
Feldspar		429	430	550
Calcium Carbonate		1,800	1,880	2,000

^P provisional data

Source: Ministerio de Economía/IGME/Personal research

complex carbonated Urganian of this region. Moreover, the company has extended its activity to the Galician region and to other provinces in the centre of Spain. Also, other independent Local Governments (Murcia, Valencia, Madrid, Extremadura and Andalucia) have undertaken infrastructure studies to have a general picture of their resources and mining activity, with the collaboration of the Geological and Mining Institute of Spain or with the University.

From the technological viewpoint, a start was announced to the first stage of the pilot phase

of a study to evaluate the flotation of zinc concentrates from the treatment of ore at plants active in the IPB by means of leaching with ferric sulphate. Involved in this undertaking are IGME, Nueva Tharsis, Boliden-Apirsa and Almagrera.

Minas de Almaden continued with its programme of geological and mineral exploration, conducting geochemical sampling and 1,200 m of drilling, which intersected mineralisation but none of economic interest.