

COUNTRY REPORT

SPAIN

Prepared for
European Nickel Group

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1. SUMMARY OF KEY FINDINGS

Spain is a major user of nickel. Total Spanish use in 2002 was 84 kte (primary and recycled nickel units) which represented around 12% of EU demand. This demand is satisfied through a combination of imports of refined nickel and recycling of existing nickel.

Whilst the nickel industry itself is relatively small, it has a significant impact on the Spanish economy through its value-chain. Through its critical use in nickel-containing alloys, it has a major impact on leading Spanish industries such as stainless steel. In turn, the use of nickel-containing alloys in many important products manufactured in Spain means that the impact of nickel is substantial in many end-use markets.

As a consequence, the total value-added in Spain by nickel and its value-chain is estimated to be close to Euro 3 billion.

	Value-Added (Euro Million)	Total Employment
Direct nickel industry/recycling	300	1,500
“First Use”	1,000	12,000
Intermediaries	350	7,500
“End Use”	1,150	24,000
Total	2,800	45,000

Table 1: Value Chain Summary

Spanish companies add relatively more value in the “First Use” sector, particularly in stainless steel, than companies in other countries: 48% in Spain compared with 30% in the rest of the EU. They add relatively less value in “End Use” industries than companies in other countries: 42% in Spain compared with 64% in the remainder of the EU.

Moreover, the direct nickel industry and the industries in its value-chain that are critically dependent upon it, employ a substantial number of people. Total employment in Spain in the direct nickel industry, “First Use” industries and Intermediaries, and “End Use” industries that are critically dependent on nickel is around 30,000. Another 15,000 jobs have been created in the economy through income and supplier “multiplier” effects, and capital expenditure effects. This means in Spain, around 45,000 jobs are “critically dependent” on nickel.

The industry and its value-chain also contribute significantly to the Spanish economy through high levels of investment. Total research and development by the direct nickel industry and industries critically dependent on nickel is estimated at Euro 50 million. Annual capital expenditure by these sectors is near to Euro 150 million and total capital employed is approximately Euro 3 billion.



The nickel industry and its value-chain also account for substantial tax revenues. Total taxes (on employment and sales) paid by the direct nickel industry and nickel critically dependent industries is estimated at Euro 1.0 billion per annum. This excludes corporate taxes.

2. INTRODUCTION

The value chain for nickel is complex. It involves three distinct tiers. These are the "Direct Nickel Industry", "First Use Sectors", and "End Use Applications".

The "**direct nickel industry**" comprises nickel mines, smelters and refineries. It also includes the transport and logistical activities associated with the movement of nickel within the EU and the activities associated with the importation of raw materials for refining (ore concentrates, nickel matte and nickel oxides) and refined nickel. The direct nickel industry also includes all activities associated with the recycling of nickel-containing products.

However, only a small amount of nickel is used as a product in its own right. Most often, it is usually combined with other materials to produce nickel-containing alloys (such as stainless steel) with distinct performance characteristics. Nickel is also used as a plating material, and to produce special chemical products for batteries and catalysts. These are known as "**First Use**" applications.

The nickel-containing alloys produced during the "First Use" stage are sold to product manufacturers both directly and indirectly. Those that are sold indirectly go via "**Intermediaries**". These include distributors who serve smaller customers and fabricators, metal formers and surface engineering companies who undertake specialist services such as metal shaping, forming and sub-assembly.

Product manufacturers use the nickel-containing alloys as part of their manufacturing process. This group comprises a large number of manufacturers of components, sub-assemblies, and other products that are then used in the manufacture of further products. Collectively, they are known as "**End Use applications**".

This report summarises the key findings from the analysis we have undertaken of the nickel value chain in Spain. In particular, it quantifies key indicators of socio-economic impact, specifically: value-added, employment, capital expenditure, capital employed, R&D and taxes. For a detailed explanation of the methodology, please refer to the report on the European Union.

3. DIRECT INDUSTRY

- Over the last 20 years, the Spanish market has expanded substantially as many new uses of nickel have developed. It is currently growing at around 10% per annum.
- Total Spanish use of nickel reached 84 kte in 2002, representing 12% of total EU use.



- Demand is satisfied in Spain through a combination of imports of refined nickel and recycling of existing nickel. Recycled nickel comes from the recycling of end of life products and through the re-use of waste produced during the First Use manufacturing and fabrication process.
- Primary nickel is not produced in Spain. Around 44 kte of refined nickel was imported in 2002, mainly from outside the EU.
- The remainder of Spanish demand is satisfied through recycling of scrap (particularly stainless steel) to produce re-usable nickel. The majority of this recycled nickel is derived from scrap collected from within Spain. Around 25kte (Nickel Units) of recycled nickel was collected in Spain in 2002.
- The nickel industry produces around Euro 300 million in value-added in Spain, principally through recycling activities.
- Employment in the nickel industry and nickel recycling activities in Spain was nearly 1,000 in 2002. This includes people employed directly in recycling activities and people employed in support activities such as importation and logistics.

Additionally, nickel-related activities created a further 500 jobs in the economy through income and supplier “multiplier” effects, and capital expenditure effects. (Each Euro of expenditure on goods and services by companies and employees in the nickel industry generates additional employment in other sectors, especially services.)

4. FIRST USE

- The main primary uses of nickel are in the production of nickel-containing alloys (stainless steel, alloy steels, non-ferrous alloys, and foundry products), nickel plating, and “other” products such as nickel cadmium batteries, chemicals, and catalysts¹.
- In Spain, over 90% of all nickel sales are concentrated in one sector – stainless steel, where nickel is a critical “enabling technology” facilitating a number of important benefits for stainless steel producers, such as corrosion resistance, formability and “weldability”.
- Approximately 0.8 million tonnes of stainless steel and other alloys produced in Spain are *critically dependent on* nickel. These have a sales value of Euro 1.7 billion.
 - Acerinox is a leading global player in the stainless steel industry. It is one of the largest producers of stainless steel in Europe (1.1million tonnes capacity at Palmones, Ponferrada and Iqualada) and in the world

¹ “Other” uses have been excluded from our analysis



(2.5million tonnes). The Palmones plant manufactures flat and long products. The other plants manufacture long products.

Aceria de Alava (at Amurrio) and Aceros Inoxidables Llodio (at Loiu) also produce stainless steel in Spain.

- The University of Seville (CSIC) is a leading research centre in stainless steel.
- Ames in Barcelona is a specialist in powder metallurgy.
- There are some 200 plating companies in Spain, all of which are SMEs. Barcelona is the major producing centre. They account for 8% of nickel used in this segment in the European Union.
- The locations of the main Spanish plants associated with the “First Use” industries are included in the map in the Attachment.
- “First Use” industries that are critically dependent on nickel, produce nearly Euro 1 billion in value-added at this stage in the value chain.
- Employment in “First Use” industries and intermediaries that are critically dependent on nickel is estimated at 13,000 people. This includes both the people employed directly by the “First Use” industries and those employed indirectly in activities that have now been outsourced to third party suppliers.

In addition, “First Use” industries created a further 6, 500 jobs in the economy through income and supplier “multiplier” affects, and capital expenditure effects.

5. END USE

- Nickel-containing alloys are used in a wide range of products, but our analysis is confined to those that are critically dependent on nickel.
- There are a number of critical applications of nickel where nickel-containing alloys significantly transform either the production process or the end product being manufactured. Moreover, in a number of these applications, this transformation cannot be achieved by any other means, except through a substantial reduction in the performance of the product or the production process. These products can be called “critically dependent” on nickel. They include, for example:
 - **Jet engines.** Nickel-containing super-alloys are used in the parts of the engine that are exposed to extremely high temperatures. Additionally, many of the steels used in shafts, for example, incorporate nickel to cope with elevated temperatures and to minimise corrosion. A Spanish



subsidiary of Rolls Royce accounts for 2% of the nickel used in this segment in the European Union.

- **Industrial and marine gas turbines.** Nickel-based super alloys are essential to the successful operation of the gas turbine. Spanish companies make up less than 2% of this segment.
- **Process plant equipment** manufacturers (for industries such as food and drink processing, oil and gas production, petroleum refining, chemicals and pharmaceuticals) also use nickel extensively. The principal use is as an alloying element of stainless steel but, in special cases such as high temperature or corrosive environments, nickel alloys are applied instead of stainless steel. Spanish companies account for 10% of this segment. They have a larger-than-average share of the food and drink processing segment.
- **Commercial catering equipment market.** The properties of stainless steel that are most valued by purchasers of commercial catering equipment include corrosion resistance, heat resistance and ease of cleaning. Spanish suppliers account for one-eighth of this sector.
- **Medical and dental instruments market.** These include stainless steel products such as injection needles, pincers, drills and surgical instruments, and specialist furniture. Companies based in Spain account for almost 10% of the use of this sector in the European Union.
- **The CD/DVD pressing market.** Electroformed nickel is used in the production of “stampers”, which are used to manufacture of CDs and DVDs. Plated nickel is also used in the final stages of preparing the “glass master” from which the stampers are produced. There are 17 CD/DVD pressing plants in Spain, accounting for around 4% of the segment in the European Union.

End Use Segments	Sales Value Euro Million
Automotive Diesel Turbo Chargers	0
Aerospace – Jet Engines	150
Gas Turbines	100
Process Plant	550
Commercial Catering Equipment	350
Medical and Dental Instruments	150
High Precision Replication – CD/DVD Pressing	100
Other	30
Total	1,450

Table 2: Nickel critically dependent Segments - End Use

- These “nickel dependent” markets account for more than Euro 1 billion in value-added in Spain.



- These industries employ 16,500 people. Additionally, they create a further 7,500 jobs in the economy through income, supplier “multiplier” and capital expenditure effects.



ANNEXES

Summary of the Nickel Value Chain in Spain

	Value Added	Jobs	Jobs Multiplier Effect	Total Jobs	
	Euro M				
Direct Nickel Industry	300	1,000	500	1,500	Annex 1
First Use	1,000	8,000	3,000	11,000	Annex 2
Intermediaries	350	5,000	2,000	7,000	Annex 2
Product Manufacturers	1,150	16,000	6,000	22,000	Annex 3
Total	2,800	30,000	11,500	41,500	

ANNEX 1

DIRECT NICKEL INDUSTRY

Nickel: Direct Industry in Spain

Annex 1

	(1) Sales Volume	(2) Sales Value	(3) Value Added	(4) Jobs	(5) Jobs Multiplier Effect	(6) Total Jobs	Basis of Sales Value	Basis of Added Value	Basis of Employment
	kte	Euro M	Euro M						
Mining	0.0	0	0	0	0	0	75% of LME = Eur 4750	All of sales value	See separate sheet (att 1.1)
Import of Raw Materials for Refining									
Ore concentrate	0.0	0	0	na			75% of LME= Eur 4750	No added value in Europe	No jobs created in Europe
Nickel matte and nickel oxides	0.0	0	0	na			85% of LME = Eur 5400	No added value in Europe	No jobs created in Europe
Importers Margin	0.0	0	0	0	0	0	1-2% of LME + say Eur100/te	Importers margin only	Sales per employee = Eur 200k
Smelting/Refining	0.0	0	0	0	0	0	LME = Eur 6,340/te	Sales value less mining & imports	See separate sheet (Att 1.1)
Trading and Importation									
Margin on Imports of Nickel	44.0	4	4	22	9	31	Importers Margin = 1-2% of LME	All of sales value	Sales per employee = Eur 200k
Paper trading/broking on LME	na	na	0	0	0	0			
Transport & Logistics									
Primary Nickel	44.0	4	4	44	18	62	1-2% of LME = Eur 100/te	All of sales value	Sales per employee = Eur100k
Recycled Nickel (Processors)	26.6	3	3	27	11	37	Eur 100/te for Processors+Imports	All of sales value	Sales per employee = Eur100k
Recycling (7)	39.5	387	270	985	394	1379	See separate sheet	See separate sheet	See separate sheet (Att 1.2)
TOTAL			281	1078	431	1509			
<i>Nickel Units</i>	84								

Notes

General: For the final report, all figures will be rounded

(1) Sales Volumes based on published data and NiDI "Nickel Flows analysis

(2) Sales Value = Volume *selling price (see separate column for individual assumptions)

(3) Value-added in Europe = Sales Value less sales value of previous stage in chain

(4) Jobs (Direct and Sub-Contractors) - mix of specific data (see separate sheets) and calculations based on average sales per employee data.

(5) Jobs Multiplier effect - based on an average ratio of 0.4

(6) Jobs (Direct & Sub Contracted) + Multiplier Effect

(7) Recycling sales value = value of stainless steel scrap

Mining and Refining in Spain

Annex 1.1.

Country	Company	Location	(1) Annual Production 2002 kte	(2) Direct Jobs	(3) Sub-Contracted Jobs	Total Jobs
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Mining

No Mining in Spain

Smelting/Refining

No refining in Spain

Notes

(1) Annual production based on published data (World Nickel Statistics April 2003)

(2) Direct Job estimates based on published sources and company information

(3) Sub contracted jobs: Study estimates

Recycling in Spain

Annex 1.2.

	(1) Sales Volume (Ni units) kte	(2) Sales Volume Ni based St Steel Scrap	(3) Sell-Out Price Achieved Euro/te	(4) Sales Value Euro M	(5) Value Added Euro M	(6) Labour Costs Euro/te	(7) Total Labour Costs Euro M	(8) Labour Cost per person Euro K	(9) Jobs
Collectors	5.0	56	704	39	39	170	9	25	378
Dismantlers	2.4	27	704	19	19	135	4	25	144
Fabricators & Service Centres Scrap	4.2	47	704	33	33	30	1	30	47
[Middlemen]	11.6	129	774	100	9	5	1	35	18
Imported Scrap	15.0	167	704	117	na	na			0
[Scrap Processors]	26.6	296	882	261	44	30	9	35	253
Mill Home Scrap	12.9	143	882	126	126	30	4	30	143
Total EU	39.5	439		387	270		28		984

Notes

- (1) Based on NiDI "Nickel Flows" analysis and study estimates
- (2) Assumes nickel content of 9%
- (3) Estimates based on BHP Billiton study
- (4) Sales Volume of Nickel based Stainless steel scrap * sell-out price achieved (Column 2 * Col 3)
- (5) Sales value less previous stage in the value chain
- (6) Labour cost per tonne = study estimate
- (7) Sales Volume of Nickel based Stainless steel scrap * labour cost per tonne (Col 2 * Col 6)
- (8) Labour cost per person = study estimate based on EU Average Production Worker rates
- (9) Total labour costs / labour cost per person (Col 7 / Col 8)

ANNEX 2

**FIRST USE
&
INTERMEDIARIES**

"First Use" in Spain

Annex 2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	Notes
<i>Nickel</i>	<i>Cost of</i>	<i>Average</i>	<i>Total</i>	<i>Average</i>	<i>Value of</i>	<i>Value</i>	<i>Value</i>	<i>Value</i>	<i>Direct Jobs</i>	<i>Contracted out</i>	<i>Jobs</i>	<i>Total</i>	
<i>Units</i>	<i>Nickel</i>	<i>Nickel</i>	<i>of Metal</i>	<i>Sell-out</i>	<i>Ni-based</i>	<i>of</i>	<i>Added</i>	<i>Dependent</i>	<i>Jobs dependent</i>	<i>Multiplier</i>	<i>Dependent</i>		
<i>kte</i>	<i>Input</i>	<i>Content</i>	<i>Based on Ni</i>	<i>Price</i>	<i>Sales</i>	<i>Imports</i>	<i>to users</i>	<i>on Nickel</i>	<i>on Nickel</i>	<i>Effect</i>	<i>on Nickel</i>		
	<i>Eur M</i>	<i>%</i>	<i>kte</i>	<i>Eur/te</i>	<i>Eur M</i>	<i>Eur M</i>	<i>Eur/te</i>	<i>Eur M</i>					
Stainless Steel	78.4	497	10.5	747	2000	1493	75	922	4978	1493	2588	9060	(13)
Alloy Steels	0.6	4	1.5	40	600	24	1	19	80	24	42	146	(14)
Non-Ferrous Alloys													
Nickel Based	1.0	6	50.0	2	5000	10	1	3	33	10	17	61	(15)
Copper Based	0.2	1	15.0	1	3000	4	1	2	13	4	7	24	
Foundry	1.5	10	5.0	30	1000	30	2	18	100	30	52	182	(16)
Plating	1.5	10	na	na	na	100	10	80	1200	180	552	1932	(17)
[Other]	0.8	na	na	na	na	na	na	na	na	na		na	(18)
TOTAL	84.0	527		820		1661	90	1044	6404	1741	3258	11404	
[Intermediaries]	na	na	na	na	na	na	na	350	4430	665	2038	7132	(19)
GRAND TOTAL	84.0	527		820		1661	90	1394	10834	2406	5296	18536	

Notes

General - all data will be rounded in final report

(1) As per published data

(2) Volume x LME (Euro 6340)

(3) NiDI broad estimates

(4) Nickel units/nickel content x 100

(5) NiDI broad estimate

(6) Total volume based on nickel x average sell out price of metal to its users

(7) Estimated value of other (non-nickel) imports e.g. chrome

(8) Value of nickel based sales less cost of nickel input less cost of other imported inputs

(9) Value of nickel based sales/sales per employee

(10) Assumes ratio of direct to indirect jobs of 0.5 (BSSA estimate)

(11) Assumes overall average multiplier of 0.4

(12) Direct jobs + contracted out jobs+ Multiplier effect

(13) Total Volume of Stainless Steel = published figure. Sales per employee based on review of major Stainless companies

(14) Estimated Sales per employee

(15) Estimated Sales per employee

(16) Estimated Sales per employee

(17) Plating - see separate sheet

(18) Other = not part of Phase One review

(19) Intermediates - see separate sheet

Stainless Steel and Alloy Intermediaries in Spain: Summary

Annex 2.1.1.

	Direct Jobs	Value-Added (Eur M)
Stainless Steel		
Distributors	2460	220
Fabricators	1120	80
Metal Formers	575	26
Surface Engineering	240	24
<i>Sub-total</i>	4395	350
Alloy Steels		
Distributors	35	3
<i>Sub-total</i>	35	3
Non-Ferrous Alloys	0	0
<i>Sub-total</i>	0	0
Total	4430	353

Intermediaries in Spain - Distributors

Annex 2.1.1.

	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
	<i>Indirect Sales</i>	<i>Purchase Cost</i>	<i>Purchase Cost</i>	<i>Gross Margin</i>	<i>Sell-out Price</i>	<i>Sales Value</i>	<i>Value Added</i>	<i>Employment</i>	<i>Employment</i>
	<i>(kte)</i>	<i>(Euro te)</i>	<i>(Euro M)</i>	<i>(% sales)</i>	<i>(Euro te)</i>	<i>(Euro M)</i>	<i>(Euro M)</i>	<i>Sales per man</i>	<i>Direct Jobs</i>
								<i>(Euro '000)</i>	
Stainless Steel	259	2000	517	30	2857	739	222	300	2463
Alloy Steels	10	700	7	30	1000	10	3	300	33
Non-Ferrous Alloys	0	N/A	0	N/A	N/A	0	0	300	0
TOTAL	269		524		3857	749	225		2496
<i>Indirect Sales (1)</i>	<i>Consumption</i>	<i>Indirect Sales</i>	<i>Indirect Sales</i>						
	<i>(kte) (2)</i>	<i>(%)</i>	<i>(kte)</i>						
<u>Stainless Steel</u>									
France	477	60	286						
Germany	1350	50	675						
Italy	1376	50	688						
Spain	431	60	259						
UK	289	75	217						
Other Europe	900	80	720						
Total	4823	60	2845						
<u>Alloy Steels</u>									
France	360	25	90						
Germany	1240	25	310						
Italy	613	25	153						
Spain	40	25	10						
UK	100	25	25						
Other Europe	177	25	44						
Total EU	2530	25	633						
<u>Non-Ferrous Alloys</u>									
EU		0	0						

Notes

General - all data will be rounded in the final report

Valuation - Stainless steel distributors serve smaller customers, providing product availability, break of bulk and inventory services. They are specialist businesses - C. 85-90% of sales are stainless steel. Although not all stainless steel includes nickel, the specialist nature of these businesses and their dependency on stainless steel means that the overall economics of the business depends on nickel. The valuation is based on a whole-business approach. Similar arguments apply to distributors of alloy steels

(1) Figures for indirect sales by country and for each main metals sector are BSSA broad estimates

(2) INCO data and NiDI estimate

(3) NiDI broad estimates

(4) Indirect sales x purchase cost per te (col 2 x col 3)

(5) BSSA broad estimate

(6) Based on estimated gross margin (raw material cost is purchase cost of metal - distributors take ownership) and purchase cost

(7) Indirect sales x sales price per te (col 2 x col 6)

(8) Sales value minus metal cos. Metal costs are sell-out prices from stainless steel and alloy producers. Value added by these sales has been accounted for elsewhere in the value chain.

(9) Study estimate based on discussions with BSSA and assessment of activities, gross margin and relative importance of different key inputs (labour, capital, ideas)

(10) Sales divided by revenues per man (col 7 / col 9)

Intermediaries in Spain - Fabricators, Metal Formers & Surface Engineering companies (1)

Annex 2.1.2.

	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intermediary Type	Market Size	Market Size	Purchase	Gross	Engineering	Sell-out	Sales	Value	Sales	Employment
	<i>(% SSteel Consumption)</i>	<i>(kte)</i>	<i>Cost (Euro M)</i>	<i>Margin (%)</i>	<i>Charge (% metal cost)</i>	<i>(Euro te)</i>	<i>(Euro M)</i>	<i>(Euro M)</i>	<i>per employee (Euro '000)</i>	<i>Direct Jobs</i>
Fabricators	10	43	121	40	N/A	4667	201	80	180	1117
Metal Formers	5	22	60	30	N/A	4000	86	26	150	575
Surface Engineering (2)	10	43	0	N/A	20	N/A	24	24	100	241
Total	25	108	2026				311	130		1933

Stainless Steel Consumption (kte)

France	477
Germany	1350
Italy	1376
Spain	431
UK	289
Other Europe	900
Total	4823

Purchase cost from distributors (Euro/te) 2800

Notes

General - all data will be rounded in the final report

Valuation - all employment and value-added is based on an income-stream basis because these types of business tend to be multi-material and stainless steel is not the dominant part of their business. It is assumed that non-nickel based stainless steel use in these sectors is not material

(1) These sectors are assumed to be limited to stainless steel only

(2) These business do not take ownership of the metal. They charge for a service, including material costs. Charges are based on a % of metal value

(3) BSSA broad estimate

(4) EU stainless steel consumption x % penetration

(5) All materials are supplied from distributors. Purchase costs equals market size (kte) x distributor sell out price (Euro 2,800)

(6) BSSA broad estimate

(7) BSSA broad estimate

(8) Based on gross margin (%) and purchase cost

(9) Market size (kte) x sell out price for Fabricators and Metal Formers (col 3 x col 7). Engineering charge rate x distributor supply price x market size (kte) for Surface Engineering

(10) Sales value less purchase cost of metal (col 8 - col 4)

(11) Study estimate based on discussions with BSSA, activities performed, margins, and relative importance of key inputs (labour, capital, and ideas).

(12) Sales value divided by sales per employee

Nickel Use in the Plating Sector in Spain

Annex 2.2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Plating Sectors	<i>Nickel Units (kte)</i>	<i>Cost of Nickel Input (Euro M)</i>	<i>Plating Charge (% of nickel input cost)</i>	<i>Nickel Plating Revenues (Euro M)</i>	<i>Non-EU Costs (Eur M)</i>	<i>Value Added (Eur M)</i>	<i>Sales per employee Euro '000s</i>	<i>Employment Direct Jobs</i>
Engineering	0.3	2	5	38	4	32	85	448
Decorative	1.2	8	12	64	6	50	85	747
TOTAL	1.5	10		102	10	82		1195
<i>Nickel Price (Euro te)</i>	6,350							

Notes

General - all data will be rounded in the final report

Plating sector - NiDI estimate that there are c. 6,000 independent plating companies in the EU (4,000 'formal' - members of trade associations; and 2,000 'informal'). Of these businesses only 1,500 carry out some form of nickel plating: 750 'formal' and 750 'informal'. Nickel plating is carried out by independents and in-house plating shops. 80% of nickel plating shops are independents and 20% in-house. If this is taken into account then there are c. 1,875 nickel plating shops in the EU - 1,500 independent, and 375 in-house

Valuation basis - for plating shops that carry out nickel plating it represents 30-50% of sales. We have valued only the nickel-based revenues and jobs linked to them i.e. an income stream approach rather than a whole-business approach

(1) NiDI estimate of sector consumption x use by sector

(2) Nickel price per te x consumption of nickel

(3) Plating companies do not take ownership of metal parts: they charge for a service, including costs of raw materials consumed. NiDI broad estimate of relationship between costs of nickel and final plating charge. These are point estimates derived from ranges: engineering 2-10%; and decorative 10-15%

(4) Grossed up from cost of nickel as % of total revenues

(5) Study estimate of costs from non-nickel costs from suppliers outside the EU. Estimate is 10% of revenues

(6) Sales revenues less nickel cost and non-EU costs

(7) Study estimate based on relative use of critical resources (capital, labour, ideas) to add value within typical plating shops

(8) Plating revenues divided by sales per person i.e. an income stream approach rather than a whole-business valuation

ANNEX 3

END USE

Product Manufacturers in Spain that are Nickel Dependent

Annex 3

	(1) Total End-User Sales Value	(2) Sales Per Employee	(3) Direct Employment in Product Manufacturers	(4) Contracted out Jobs	(5) Employment Multiplier Effect	(6) Total Employment
	Euro M	Euro K				
<i>Nickel Dependent Segments</i>						
Automotive Diesel Turbo Chargers	0	120	0	0	0	0
Aerospace - Jet Engines	150	220	682	341	409	1432
Gas Turbines	100	220	455	227	273	955
Process Plant in Food and Drink Industry	300	100	3000	900	1560	5460
Process Plant in Oil and Gas Production	30	150	200	60	104	364
Process Plant in Petroleum Refining	35	150	233	70	121	425
Process Plant in Chemicals	100	150	667	200	347	1213
Process Plant in Pharmaceuticals	70	100	700	210	364	1274
Commercial Catering Equipment *	365	85	4294	1288	2233	7815
Beer Kegs	15	100	150	45	78	273
Medical & Dental Instruments and Hospital Equipment	160	200	800	240	416	1456
High Precision replication - CD & DVD pressing	100	130	769	231	400	1400
High precision replication - textile & wallpaper printing	5	150	33	10	17	61
Computer Modems (Service/distributors)	10	150	67	20	35	121
TOTAL	1440		12050	3842	6357	22249

Value-Added Analysis

Total End User Market Value	1440
less Ni Stainless Steel/alloy value & other imported raw materials	288
equals Value-added by Product Manufacturers	1152

Notes

- General - All numbers will be rounded for final report
 (1) Derived from wide variety of sources (see separate sheet)
 (2) Based on review of relevant company accounts plus study estimates
 (3) Total End User market value / sales per employee
 (4) Study Estimate
 (5) Assumed to be 0.4 average income and supplier multiplier
 (6) Direct employment + Contracted out activities + Multiplier effect

ANNEX 4

MAP OF SPAIN



