CONVERSION OF ALUMINIUM EXTRACTION PLANT USING ELECTROLYSIS TO A GREEN ALUMINIUM PLANT BASED ON THE CIRCULAR ECONOMY

XUNTA DE GALICIA | VICEPRESIDENCIA SEGUNDA E CONSELLERÍA DE ECONOMÍA, EMPRESA E INNOVACIÓN

PLANT POTENTIAL FOR DEVELOPING NEW BUSINESS OPPORTUNITIES

Jan-2021

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Document goal

Overview of the investment opportunity

The opportunity. Industrial plant in operation

Market: Primary and processed aluminium

Key decision factors

Feasibility analysis of an industrial project

Document purpose and scope

Main purpose

This document has been prepared in order to present the features and potential of the aluminium plant currently operated by Alu Iberica in A Coruña (Spain). It is intended to provide a basis for attracting potential investors to maintain the current activity.

Limitations and scope

- This document has been prepared based on information provided by different sources. No technical or financial audit process has been carried out on the information received.
- The document contains opinions and estimates that do not necessarily match those of the selling company or the various parties involved.
- The use of this document is intended for preliminary information and presentation of the asset for sale. Potential investors will therefore need to conduct their own analysis and estimates. The information contained here is not binding, and in the event of any conflict or dispute with the information provided in the confidential information packages, the latter will prevail.
- This document does not constitute an invitation to submit a firm offer for the plant under consideration. This is an informative document that may or may not lead to inclusion in the process, depending on the procedures defined by the vendor.
- Although the information received is believed to be reliable, recipients of this document should make their own analysis and the drafters accept no liability for any expectations or assumptions that may arise from this document.

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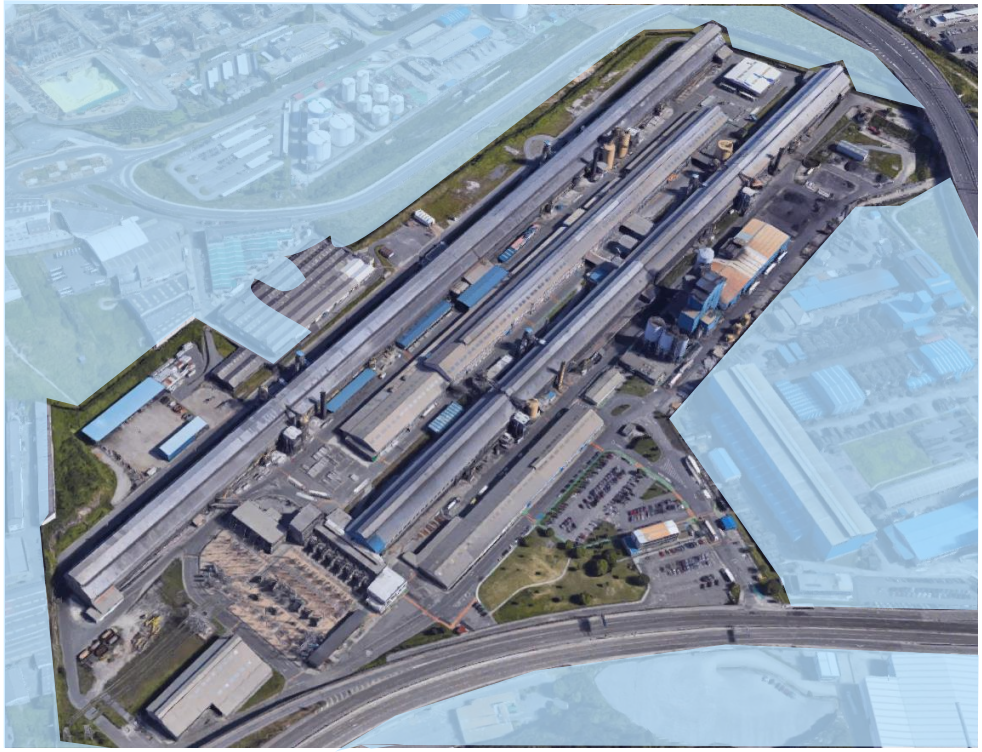
A primary aluminium production and smelting plant, located in Spain and close to the only alumina production plant on the Iberian Peninsula



- 25.1 hectares of land in production plant
- Concession of land area of more than 4,000 m2 and 19,000 m2 area of water in the Outer Harbour*.

Products

Billets

Rolling Slabs

T-ingots

Production capacity:	▪ Primary aluminium plant (Soderberg): 87,000t/yr
	▪ Foundry:
	  ▪ Rolling slabs: 36,000 t/yr, 1xxx and 8xxx series compatible
	  ▪ Billets: 58,000 t/yr, 6xxx series
	  ▪ T-Ingots: 36,000 t/yr (only to complete production)
	  ▪ Wire rod: **Inactive.** Capacity: 21,000t/yr
	▪ Paste plant (anodes): 45,000t/yr

Market position	▪ Near the only alumina plant on the Iberian Peninsula ▪ There are only 2 plants with primary aluminium production capacity in Spain** and around 16 recycling plants ▪ Production directed at the market in the north-west of the Iberian Peninsula with the competitive advantage of proximity
Infrastructure and resources	▪ Direct connection to high-capacity roads and proximity to the outer harbour of A Coruña ▪ Recently modernised facilities ▪ Qualified, experienced staff, about 280 employees
Institutional climate	▪ Receptiveness of the authorities to implementing incentive packages aimed at the modernisation and optimisation of the plant

* Outer Harbour; 50-year concession obtained and works started

** Not including aluminium recycling plants

The plant has the capacity to process primary aluminium into billets, slabs and ingots, working with 3 series of alloys

It targets the main downstream uses in Europe

Rolling Slabs

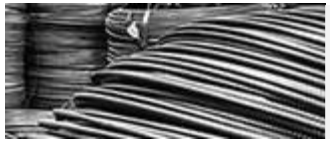
- Productive capacity: Theoretical level of 36,000 t/yr . 39,600 t/yr maximum has been reached
- Series:
  - **1xxx:** high purity aluminium, 99% or more. Used for cold lamination. Used particularly in the chemical and electrical industry.
  - **8xxx:** alloy usually containing tin. Generally used in electrical conductors.

Billets

- Productive capacity: Theoretical level of 55,000 t/yr. Peak levels of 60,969 t/yr have been reached.
- **Series: 6xxxx**. The 6xxxx series is mainly used in extrusion. Obtained by alloying magnesium and silicon, making it heat-treatable. Suitable for profiles and structures, very versatile, and also used in transport equipment among other things.

T-ingots

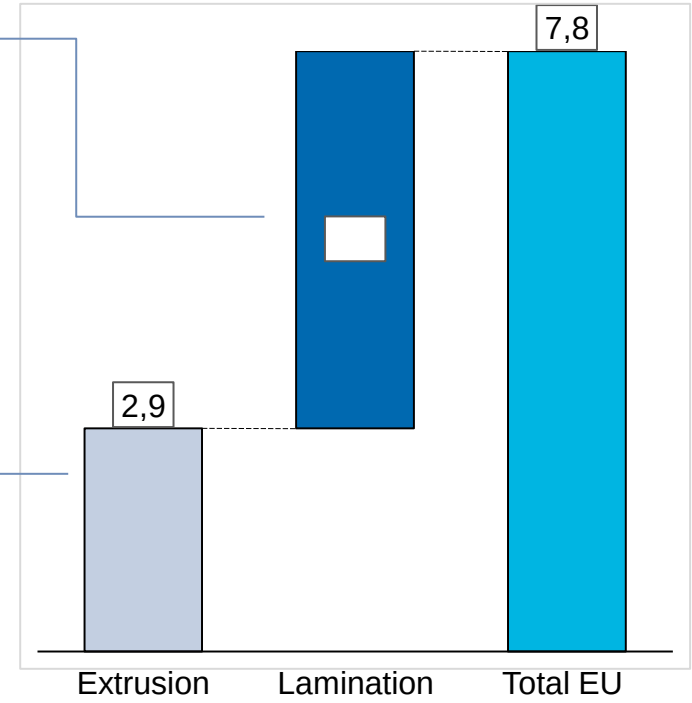
- Productive capacity: 36,000t/yr
- Only used to complete production. Main use: foundry



Wire rod

- Facility shut down since 2010
- Theoretical capacity: 20,173 t/yr; maximum: 21,484

Extrusion vs lamination production, EU
(2015, in million tonnes; source: European Aluminum)



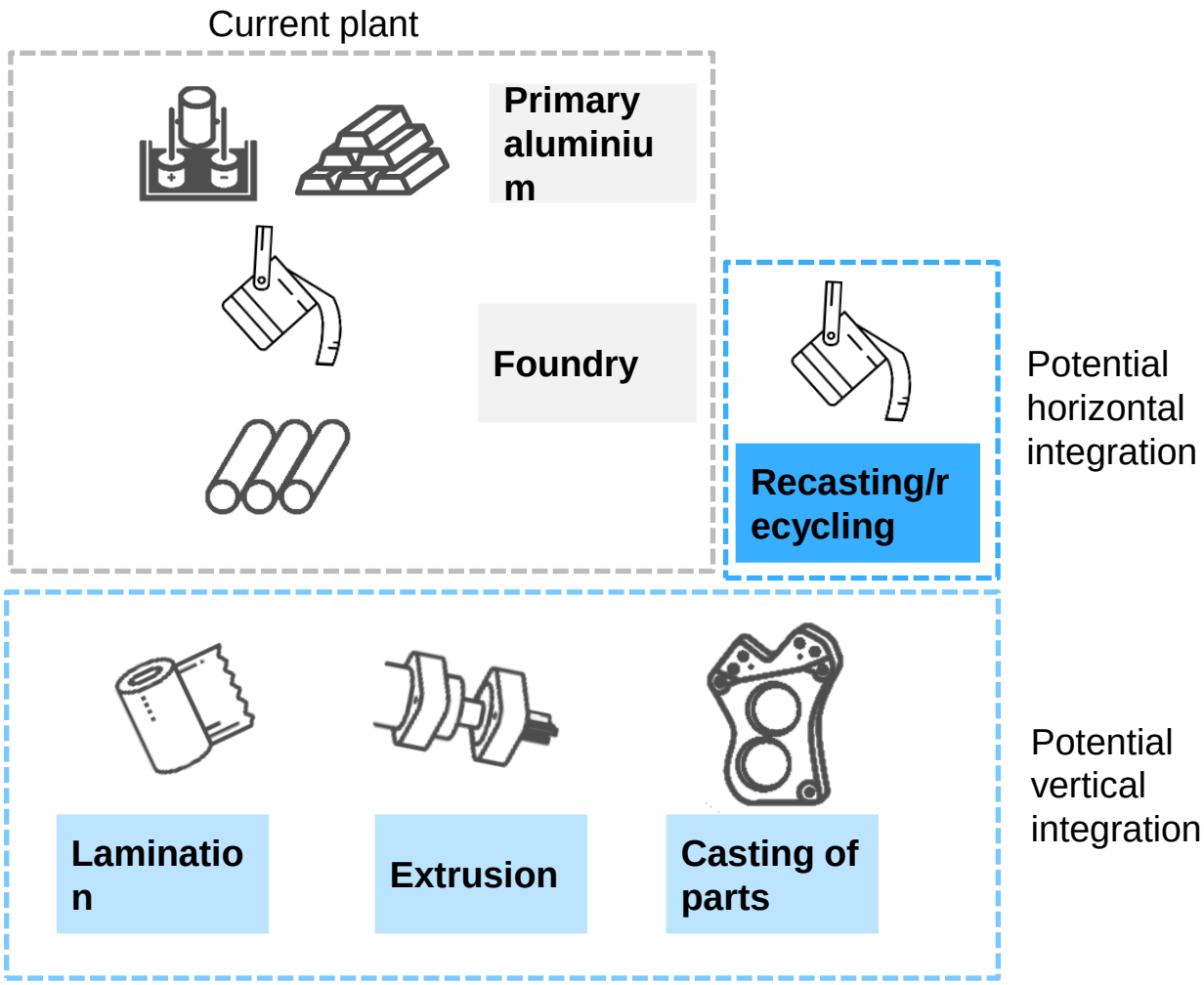
Sources: Compiled by authors based on various sources, including Alcoa, Integrated Environmental Authorisation, and others

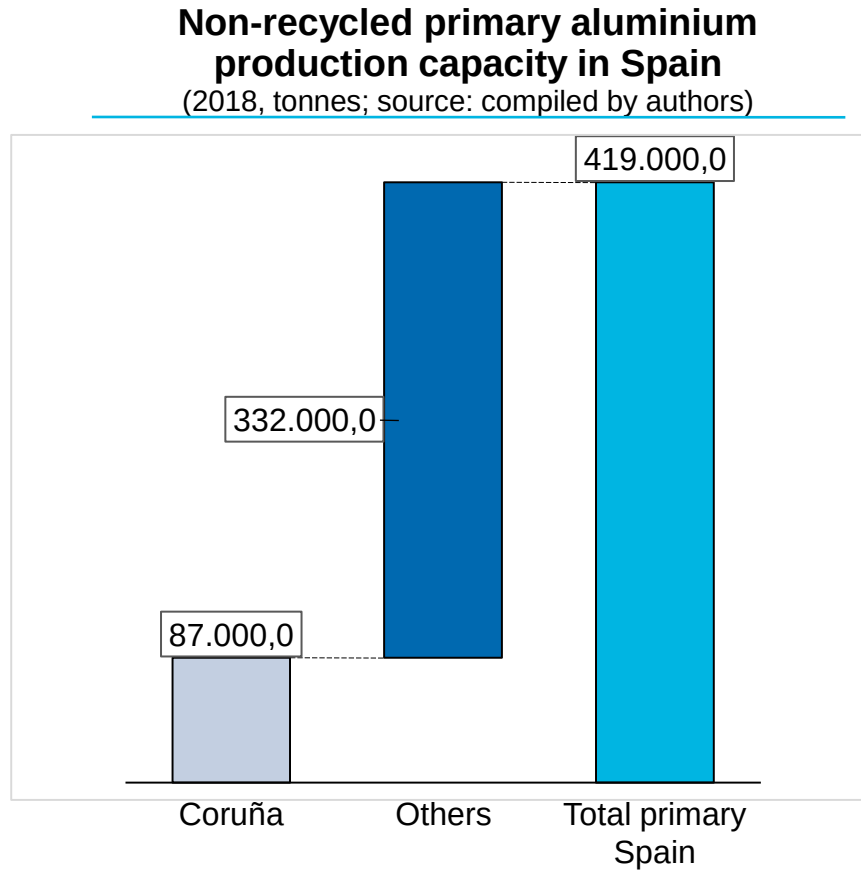
The main facilities are built around 2 electrolysis plants, a smelting and paste plant

		Equipment	Description
Electrolysis-primary aluminium		▪ Electrolysis line 1 (VSS Pechiney): 128 electrolytic cells at 116kA ▪ Electrolysis line 2 (VSS Pechiney): 144 electrolytic cells at 128kA ▪ Alcoa QLC control system ▪ Two 66kV power lines ▪ 9 substations	▪ Primary aluminium: 87,000t/yr ▪ Electrolysis line 1: 85 cells in operation ▪ Electrolysis line 2: 115 cells in operation ▪ Technology upgrade in 2010
Foundry (Cast house)		▪ 6 holding furnaces, 12-20 t capacity ▪ 3 VDC casting machines: (slabs, cylinders and ingots) ▪ 4 homogenizing furnaces (20-27 t) ▪ 2 semi-automatic circular saws for cylinders ▪ 1 semi-automatic slab saw ▪ Wire rod rolling mill (idle since 2010)	▪ Rolling slabs: 36,000 t/yr, open-mould technology, 1xxx and 8xxx series compatible ▪ Billets: 58,000 t/yr, open-mould technology, series 6xxx series ▪ T. Ingots: 36,000 t/yr (only to complete production)
Paste plant		▪ Three production mixers ▪ Storage facilities ▪ Various crushers, mixers and mills to prepare the raw materials for the paste	▪ Batch production of dry type anode paste for internal use and carbon paste for third parties ▪ Total plant capacity is approximately 45,000 tonnes/year

The plant represents a great opportunity for vertical integration and entry into the European market, with the possibility of supplying alumina at a guaranteed price

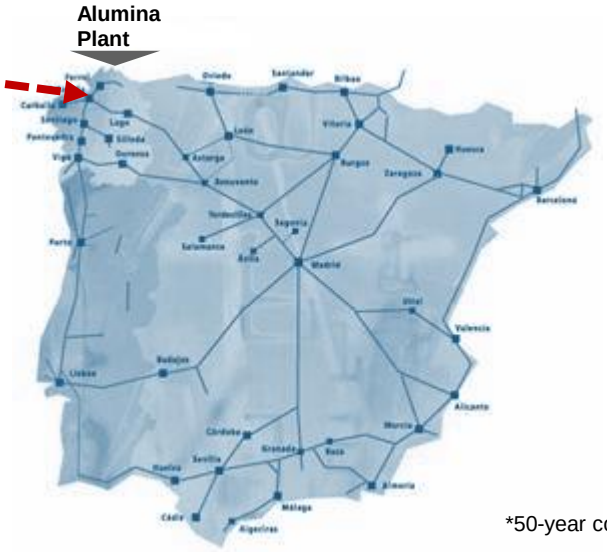
Its production capacity represents 20% of the total non-recycled primary aluminium production capacity in Spain





The plant is located in an industrial area of A Coruña, close to customers in the Autonomous Community, with direct connection to the outer harbour and high-capacity roads

- Proximity to main customers located in the Autonomous Community and with competitive advantages in terms of logistics and the recovery of leftovers from the extrusion process.
- Direct access to high-capacity roads giving access to the Atlantic axis, Portugal and the Meseta Central. Connection to the rest of Europe via high-capacity roads.
- Proximity to the Outer Harbour.
- Harbour Concession, including a 95 m quay and over 4,000 m2 of manoeuvring and industrial area in the Outer Harbour*.
- Proximity to airport and railway.
- Proximity to the only Alumina plant on the Iberian Peninsula.



*50-year concession

Source map: IGAPE website

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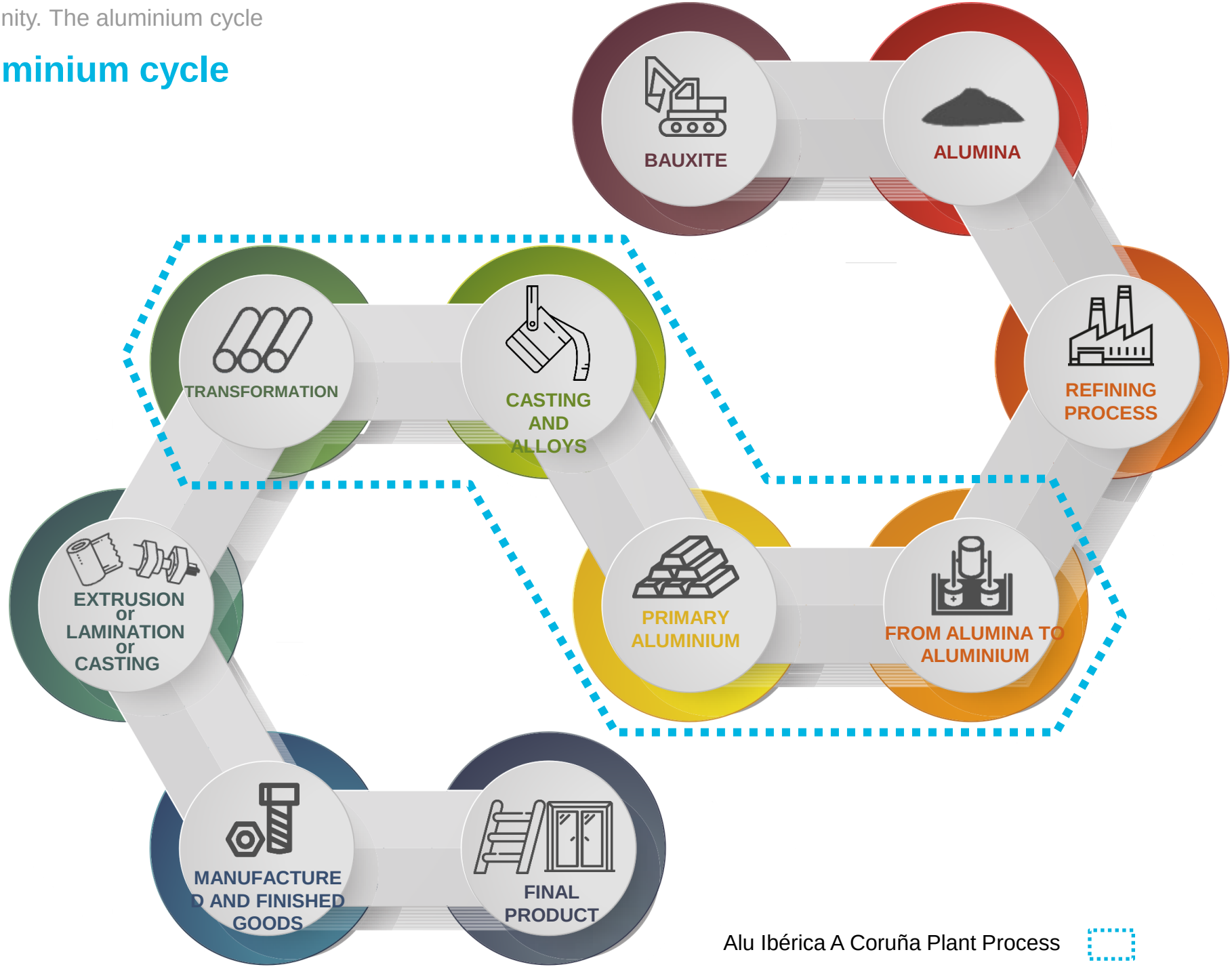
The aluminium cycle



The activity undertaken at the facility consists of obtaining aluminium by alumina electrolysis using Söderberg technology

Description of the production process

Electrolysis process

- The industrial reduction of alumina to aluminium metal is carried out using the Hall-Heroult electrolytic process, based on the separation of alumina into aluminium and oxygen by electric current. Cryolite is used as a solvent for the alumina, and the main additives in the process are aluminium fluoride.
- The centre of the process is the electrolytic cell or tank, which consists of two distinct parts, the anode and the cathode.
- The Söderberg anode consists of a paste mixed with coke and pitch.
- The cathode, the lower part of the tank, consists of an iron box on which several layers of insulating, reflecting bricks are placed.
- The molten aluminium deposited on the cathode is regularly extracted in casting bags.

Casting process

- This consists of transforming the electrolytic aluminium produced, in-house offcuts and solid metal from external sources, and shaping it into commercial products.
- The liquid metal extracted from the electrolysis tanks is transported to the foundry and deposited in the furnaces, together with solid aluminium metal.
- The furnaces are fuelled with fuel oil.

Paste process

- The paste workshop is dedicated to the production of different types of paste, for in-house consumption and for third parties.
- The types of paste produced are: paste for electrolysis vat anodes (Söderberg), paste for furnace linings and paste for electric furnace electrodes.
- All pastes are manufactured following the same process, varying raw materials, their proportion and, in the case of coke and anthracite, their particle size.

The complex produces aluminium extracted using electrolysis which is subsequently processed in the foundry

The historical maximum capacity of the foundry was 114,372 tonnes.

Primary aluminium

- 87,000 t/yr capacity
- Two production series

Rolling Slabs

- Produced in the **vertical V5** installation. The vertical V1 can be adapted to complement Slab production.
- Productive capacity: Theoretical level of 36,000 t/yr. 39,600 t/yr maximum has been reached.
- Series:
  - **1xxx:** high purity aluminium, 99% or more. Used for cold lamination. Used particularly in the chemical, electrical and construction industry.
  - **8xxx:** alloy usually containing tin. Generally used in electrical conductors.
- Formats: Multiple. 900 mm by 575 mm, up to 1450 mm by 575 mm, in 6 metre lengths.

Billets

- Produced in the **vertical casting plant V1** facility. This facility can occasionally manufacture slabs.
- Productive capacity: Theoretical level of 55,000 t/yr. Peak levels of 60,969 t/yr have been reached.
- **Series: 6xxxx**. The 6xxxx series is mainly used in extrusion. Obtained by alloying magnesium and silicon, making it heat-treatable. Suitable for profiles and structures, very versatile, also used in transport equipment, among other things.
- Diameters: 203mm, 178mm, 153mm and 166 mm, length: 6 metres. Possibility of manufacturing 144 mm and 203 in Vertical V4.

Sources: Compiled by authors based on various sources, including Alcoa, Integrated Environmental Authorisation, and others

In addition to the main lines (slabs and billets), the plant has the capacity to produce t-ingots and wire rods

It has its own paste plant

Wire rod

- Properzi rolling mill. Facility out of operation since 2010.
- Theoretical capacity: 20,173 t/yr; maximum: 21,484.
- Formats: 9 mm, 12 mm and 15 mm, 2,200 kg reels.

T-ingots

- Produced in the vertical V4 installation. This installation can also produce 203 mm and 144 mm billets, in 6 m lengths. Can also be used for aluminium scrap recycling.
- Productive capacity: 36,000t/year.
- Only to complete production, it absorbs liquid aluminium that cannot be processed in other facilities on a one-off basis. Main use: cast house.

Paste

- Paste plant in the complex
- Productive capacity: 170 t/day average production
- Products:
  - Electrolysis paste
  - Paste for iron alloy furnaces in bulk or in cylinders
  - Brazing paste and linings for furnaces and casting bags
  - Possibility of melting solid pitch to sell as liquid pitch

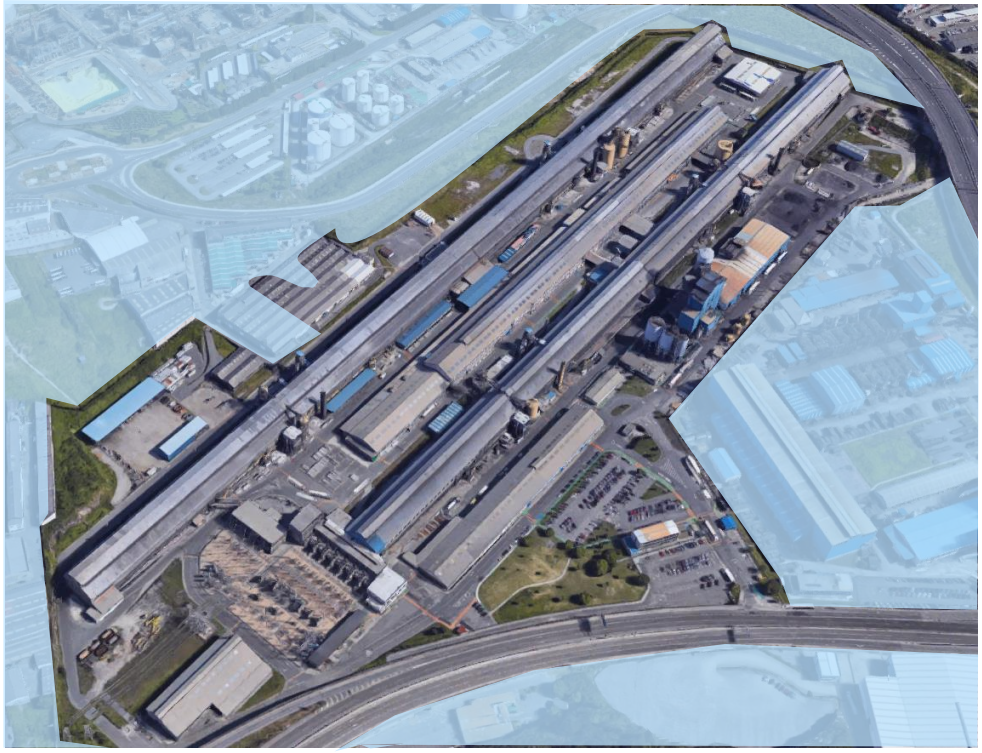
Sources: Compiled by authors based on various sources, including Alcoa, Integrated Environmental Authorisation, and others

The industrial complex comprises two electrolysis lines, a foundry, a paste plant and various ancillary facilities

The main facilities are detailed on the following pages

Electrolyte series	▪ 2 electrolyte series ▪ 2 66 kV power lines ▪ 9 substations
Cast house	▪ 1 vertical billet casting machine ▪ 1 wire rod rolling mill (no longer in use) ▪ 1 vertical plant for slabs ▪ 1 vertical plant for T-ingots
Paste factory	▪ 8-level tower with intermediate silos for daily consumption and sieves for material calibration ▪ 5 silos
Auxiliary installations	▪ Central workshop ▪ Attachment hall ▪ Cupola ▪ Waste hall
Port concession	▪ 5,000 m2 of land area and 19,000 m2 area of water in the Outer Harbour*. Two 3,500 t capacity silos for alumina unloading under construction.
Other equipment	▪ Nearby water reservoir with exploitation rights for the plant

37.8 hectares of own industrial land and **9.1** under concession contract in the area around A Coruña



* Indirect sources. Actual conditions may differ

The electrolysis plant uses Soderberg technology

It has two series of electrolytic cells

Electrolysis plant

Equipment

- Alcoa QLC control system
- Two 66kV power lines
- 9 substations
- Upgraded in 2010
- 2 electrolysis lines:
  - Electrolysis line 1 (VSS Pechiney): 128 electrolytic cells at 116kA. Until the shutdown, only 85 cells or vats were functional
  - Electrolysis line 2 (VSS Pechiney): 144 electrolytic cells at 128kA. Until the shutdown, 115 cells or vats were operating

The foundry has several facilities, mainly with capacity for slabs and billets

Can also produce T-ingots and wire rod (facility shut down since 2010)

Cast house

Equipment

- 2 semi-automatic circular billet saws. 1 of them (imisa) with automatic bundle strapping machines.
- 1 semi-automatic band saw (Guinot) for slabs
- 4 homogenising furnaces (2 with 20 t, 2 with 27 t)
- 2 cooling furnaces
- 1 wire rod annealing furnace
- 3 spectrometers for pre-analysis and final analysis
  - 1 automatic robot spectrometer annexed to the foundry
  - 2 semi-automatic spectrometers in the factory's Lab building
- 4 Production facilities:
  - **Vertical casting V1**: Main production: Billet. It can occasionally be adapted to slabs. It has **2 processing furnaces, each with a capacity of 32 t.**
  - **Vertical V5**: Main production: Slabs. In 2018 it was adapted to allow it to manufacture billet and a new water box was added for the manufacture of T-ingot. It has **2 furnaces with a capacity of 24 t and 32 t.**
  - **Vertical V4:** Main production: T-ingot. Occasionally billet. It can recycle aluminium scrap. **2 processing furnaces with a capacity of 10 t and 12 t**
  - **Properzi rolling mill:** main production: wire rod. **Shut down since 2010. 2 processing furnaces with a capacity of 27 t and 22 t**

The electrolysis technology used requires the use of electrolysis paste, with its own factory

Has production capacity for other sectors

Paste factory

Equipment

- 8-level tower with intermediate silos for daily consumption and sieves for material calibration
- 3 mixers for paste production
  - Two 5 MT mixers.
  - One 3 MT mixer.
- 2 anthracite calcination furnaces with 30 MT per day
- Products:
  - Production of electrolysis paste
  - Production of paste for iron alloy furnaces in bulk or in cylinders
  - Production of brazing paste and linings for furnaces and casting bags
  - Possibility of melting solid pitch to sell as liquid pitch
- 3 paste storage silos
- 2 Coke storage silos
- Average production of 170 MT per day

The plant is complemented by ancillary facilities on site and a concession on harbour land

Other facilities

- CENTRAL WORKSHOP: hall adapted for vehicle repairs (pits) and other maintenance tasks
- ANNEXES HALL: facility prepared for cleaning, changing and heating casting bags and transport trolleys. Machines for needle cleaning, etc.
- CUPOLA: one cupola furnace, 3 t bridge
- WASTE HALL: roofed for special waste storage, park for troughs, fibre tanks with pumps and containment for oil transfer

Harbour facilities

- 50-yr concession in the outer harbour of A Coruña, including land and area of water.
- 5,000 m2 of land area and 19,000 m2 area of water*
- Two 3,500 t capacity silos for alumina unloading under construction

* Indirect sources. Actual conditions may differ

The main raw material used is alumina

At full capacity, the electrolytic vats would consume more than 1.3 million MWh per year, and the smelter would require 5,000 tonnes of fuel oil per year.

Raw materials

Materias primas principales	Consumo anual (t)
Alumina	165.197
Fluoruros	1.654
Coque	26.590
Brea	12.814
Antracita	4.389
Alcatrán	289
Recortes de aluminio	21.272
Lingotes de aluminio	6.810
Metales adición	752

Natural resources

Recursos	Cantidad anual	Unidad
Fuel óleo	5.020	t
Gasóleo	280	m3
Energía eléctrica	1.318.340	MWh
Agua para uso industrial	100.649	m3

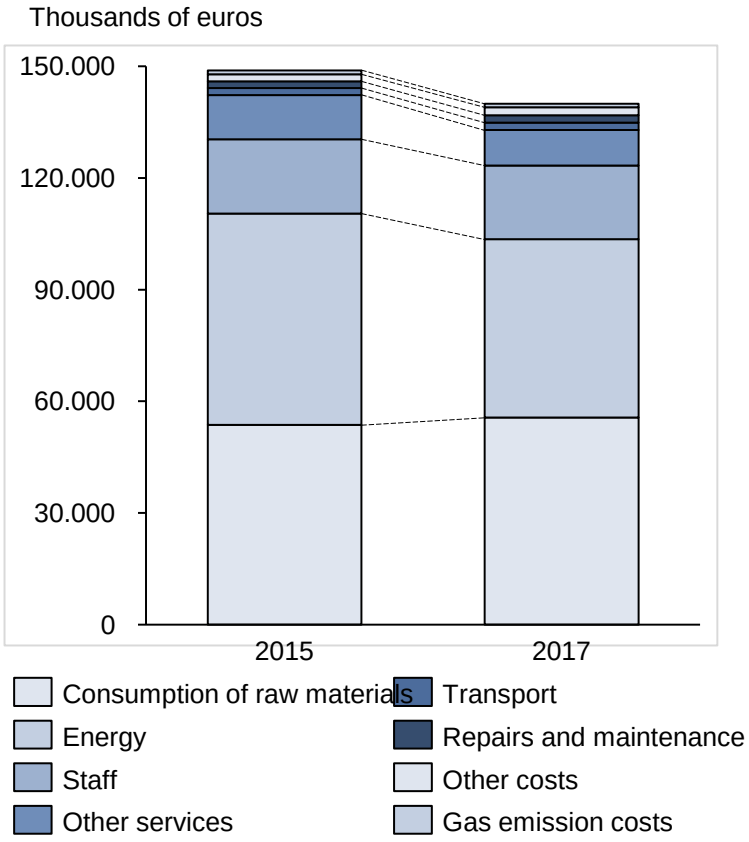
Sources: Compiled by authors based on data from the plant's Integrated Environmental Authorisation

The main fixed costs are linked to staff

They have increased in recent years, despite the reduction in activity, although the total fixed cost is under 20% of the total.

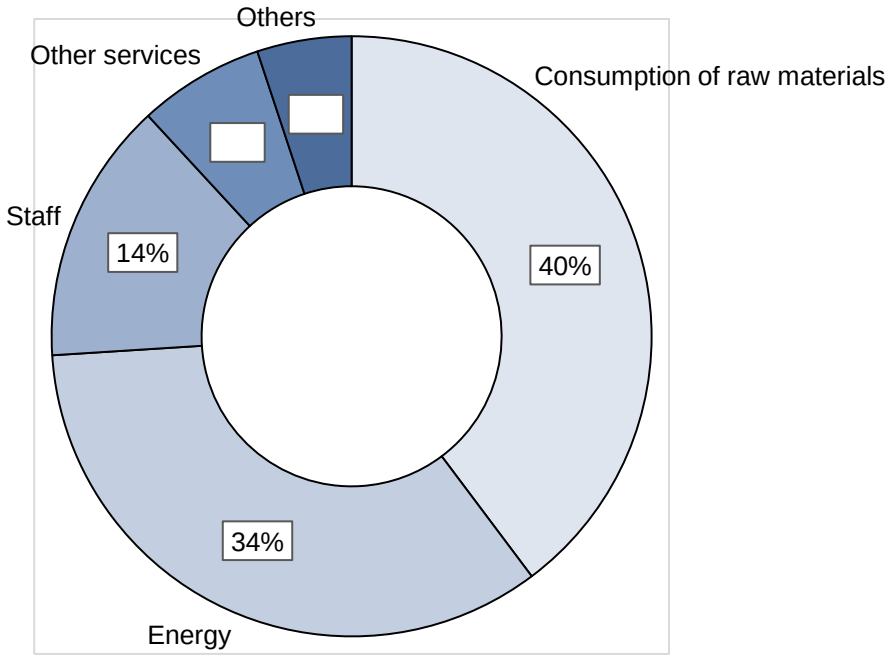
Main costs at A Coruña plant

(Sources: Compiled by authors based on data from annual accounts)



Weight of expenditure items above 2% of the total

(Sources: Compiled by authors based on the annual accounts)



Excluding depreciation, raw materials and energy consumption account for more than 70% of total costs

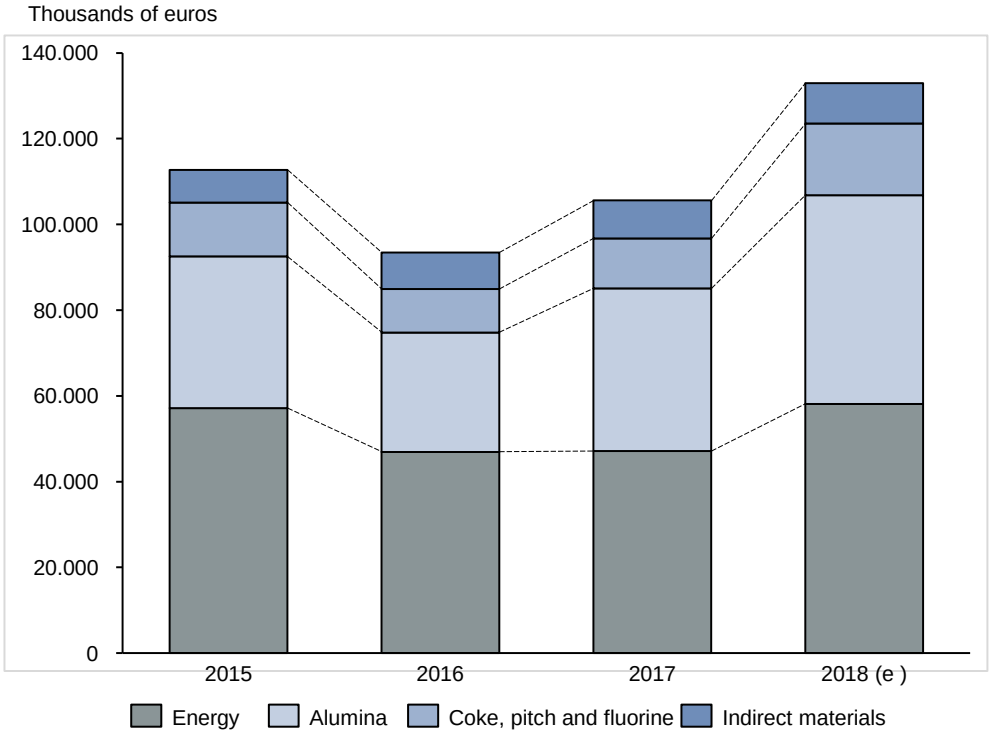
Note: 2016 is omitted as it was subject to a change of accounting year. The 2016 report only covers 10 months

The main consumption is energy and alumina

The cost of both factors has risen sharply over the last few years

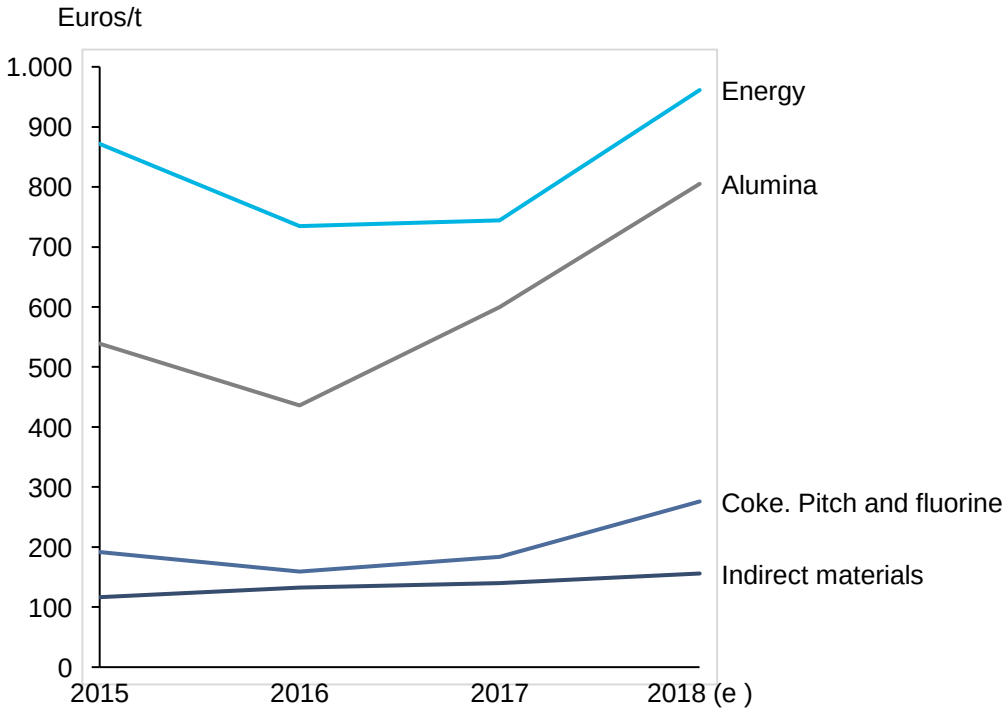
Evolution of energy costs and main raw materials at Coruña plant

(Sources: Compiled by authors based on data from the Syndex report)



Energy and raw material costs per tonne produced

(Sources: Compiled by authors based on data from the Syndex report)



By analysing the unit costs per tonne produced, it can be seen that although energy continues to be the main cost in the total, the cost of alumina in recent years has increased its weight in total costs, in line with the evolution of the price of this raw material, which experienced a sharp rise in 2018 due to cyclical factors. A change in the long-term trend in alumina prices would significantly ease the plant's costs.

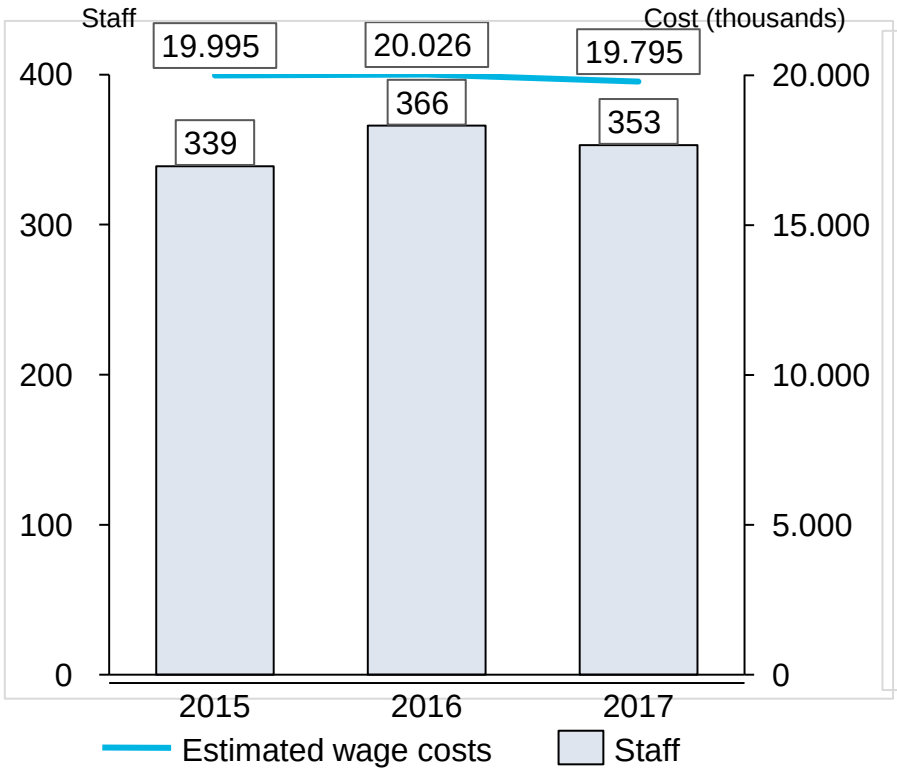
Note: Estimate based on several sources. 2018 corresponds to third-party estimates. No data are available to estimate the accuracy of the data.

Staff costs were relatively stable

The average number of staff members over the last few years has been between 340 and 370 employees and is currently in the order of 280 people.

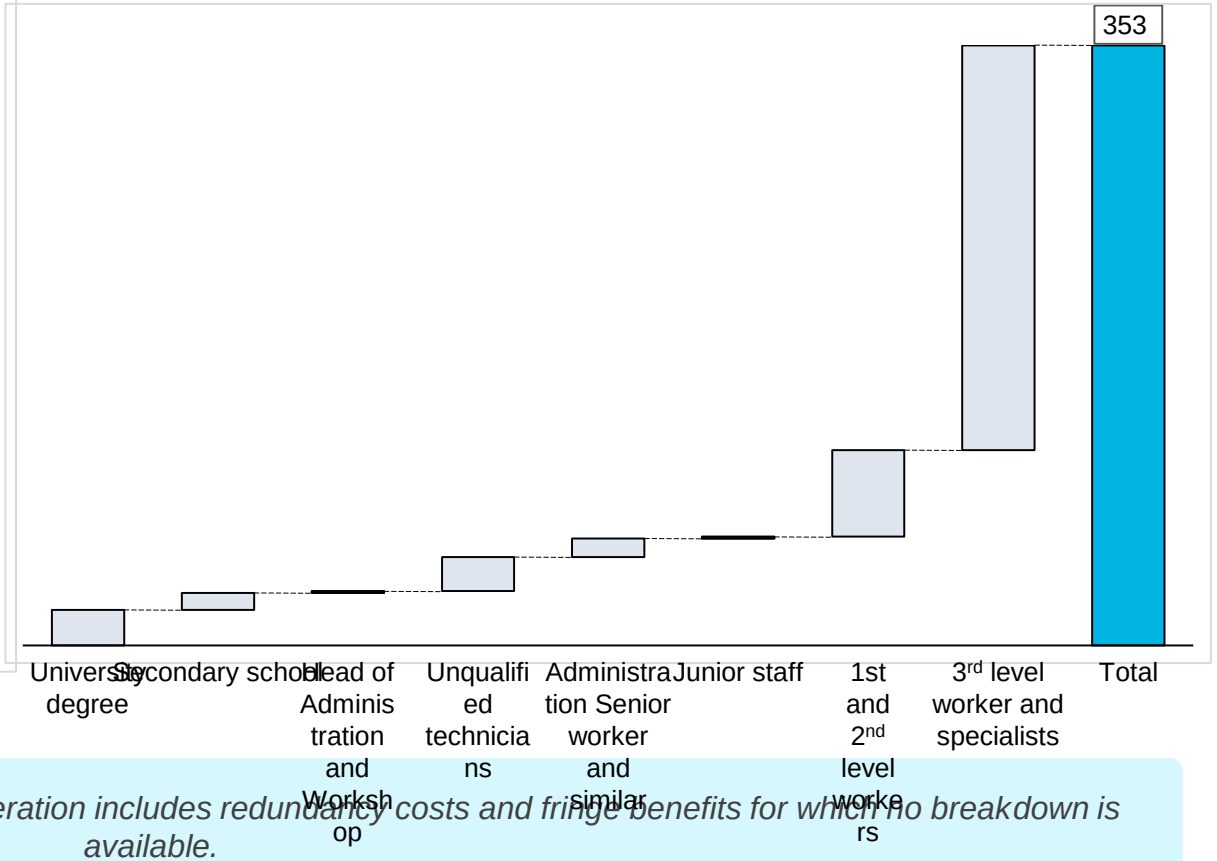
Evolution of average staff and costs at the A Coruña plant

(Sources: Compiled by authors based on data from annual accounts and others.)



Average staff structure 2017

(Sources: Compiled by authors based on data from annual statement.)



Staff were relatively stable. It should be noted that remuneration includes redundancy costs and fringe benefits for which no breakdown is available.

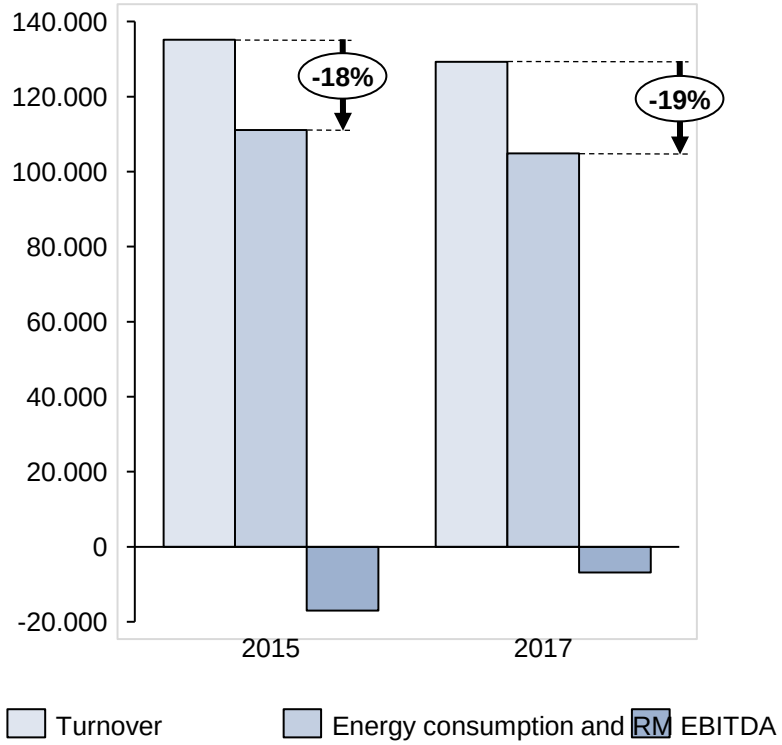
Note: *Staff costs estimated based on Alcoa's accounts and extrapolations, as the accounts for 2016 only cover 10 months due to the change of accounting year.*

EBITDA has remained negative in recent years

It is highly conditional on the rise of alumina and energy costs, together with the reduced activity, with stable fixed costs.

EBITDA evolution and revenue-energy and raw material cost ratio

(Sources: Compiled by authors based on data from annual statement and others)



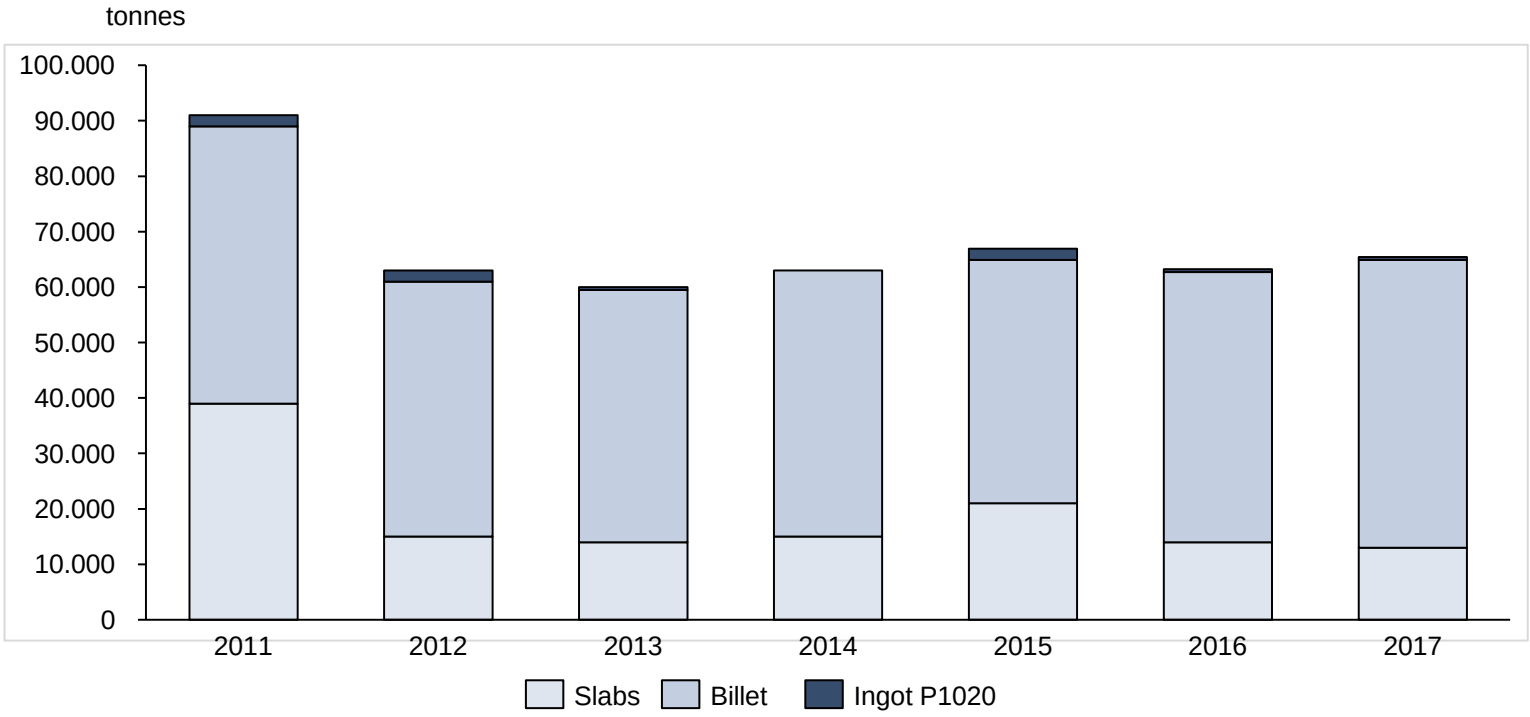
The increase in variable costs has limited the plant's capacity to cover them, although it has improved its EBITDA in a context of capped production and high input cost growth.

According to sources consulted, from 2012 to the sale to Alu Ibérica, production was limited to around 69,000 t/r, shifting towards billet (extrusion)

No management information is available from Alu Ibérica

A Coruña plant production evolution

(Sources: Compiled by authors based on data from the Syndex report)

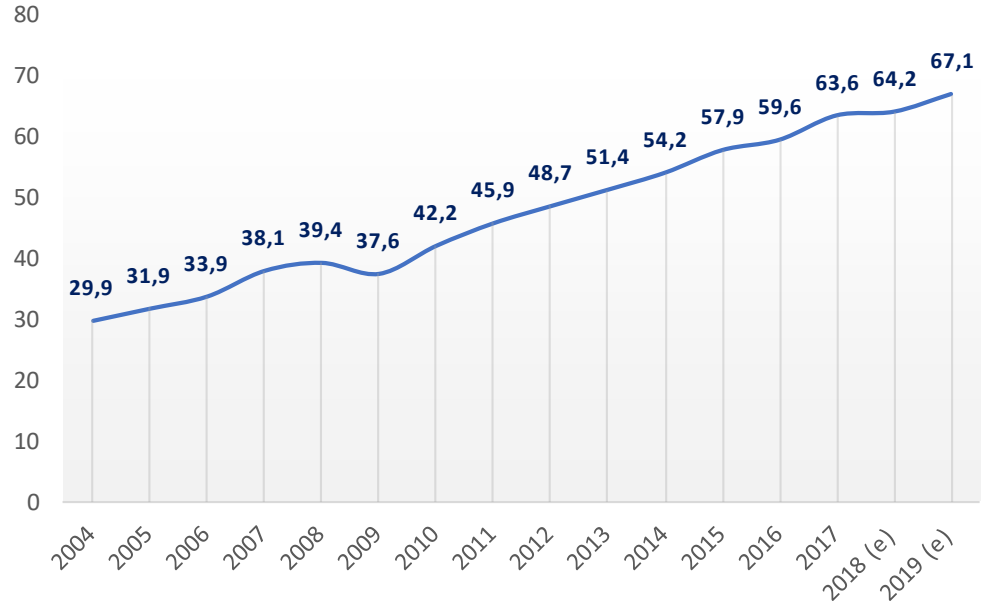


Note: *Estimates based on indirect sources. No primary data available*

Aluminium production is growing steadily and is expected to continue to do so in the short term

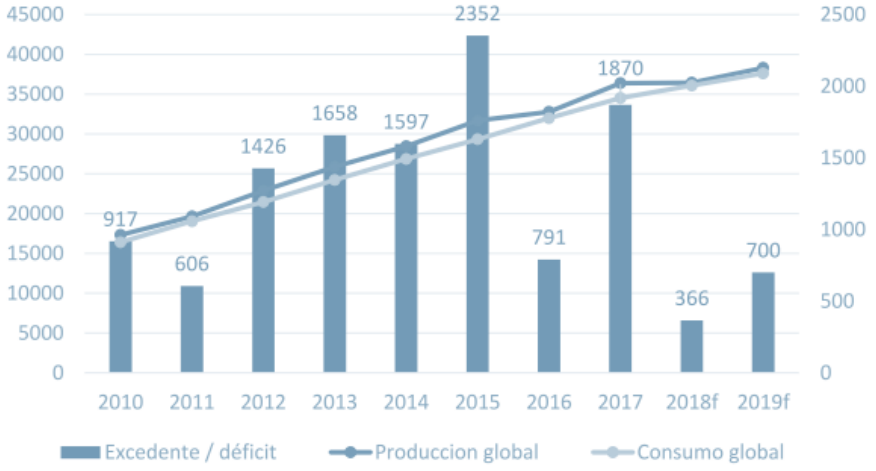
China (the world's largest producer) is expected to see a slowdown in its production growth rates, but not in its consumption, so that China's overproduction will be significantly reduced.

World aluminium production (million tonnes)



Source: Metal Bulletin

Aluminium production and consumption, China balance (kt/yr)



Source: Metal Bulletin

Start-up of shut down factories in the US and construction of new capacity outside China is forecast

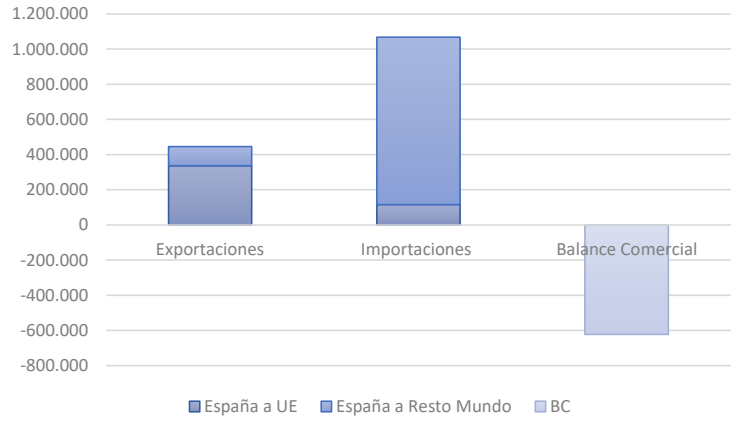
The capacity increase through expansions is estimated at 3.8 million tonnes between 2017 and 2022

- In recent years, global aluminium production growth has been driven mainly by China and, to a lesser extent, by the Middle East
- China's strong growth took the form of dumping, and unsustainable due to the consumption of electrical energy from polluting sources (90% from coal)
- These events led to a halt in investments in the rest of the world in new capacity or even the closure of plants
- The context of stock consumption, reduction of China's production surplus and the trade protection measures applied to China, especially by the US, has led to the planned start-up of factories in the US that had shut down and the construction of new capacity outside China
- Capacity increase through expansions and greenfield projects totalling 3.8 million tonnes between 2017 and 2022

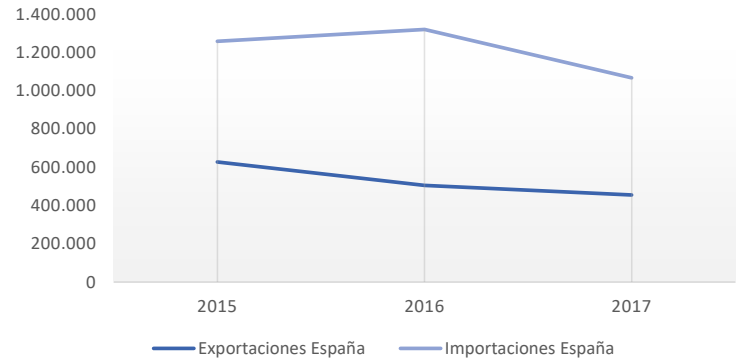
The plant's production focuses on the European market, a net importer of raw aluminium

Spain has a negative trade balance, being a net importer of raw aluminium, so there is a production deficit

Spain's exports/imports of raw aluminium 2020 (thousands of euros)

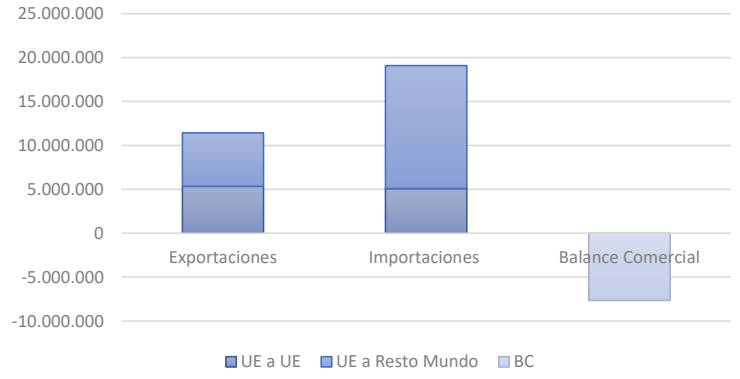


Evolution of Spain's raw Aluminium Exports (thousands of euros)



Source: Trademap.org website

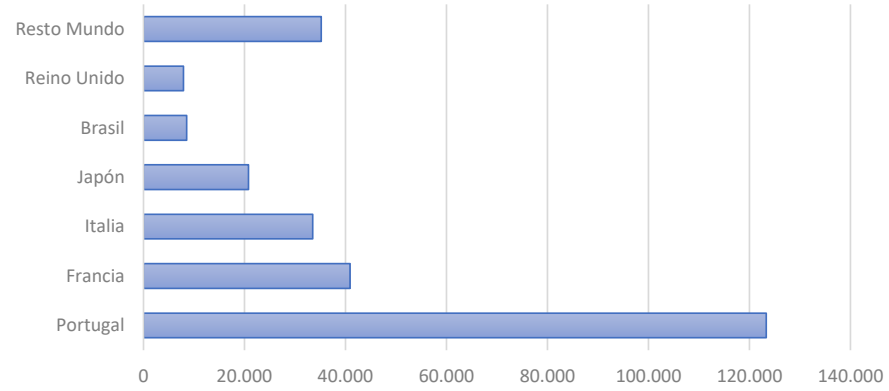
EU 27's exports/imports of raw aluminium 2020 (thousands of euros)



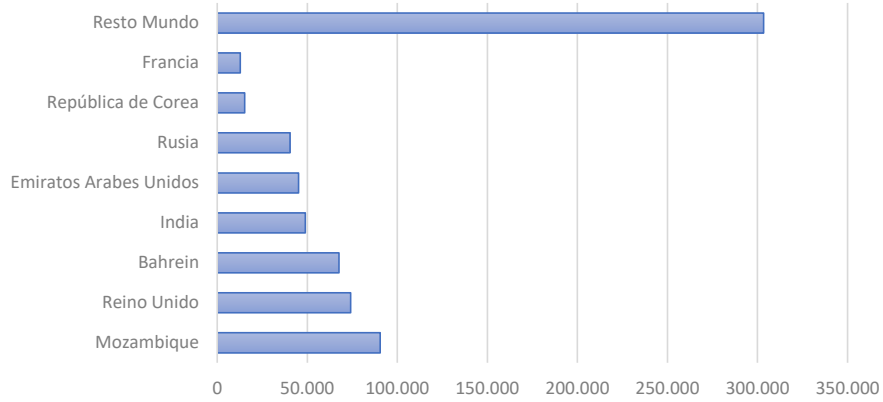
Spain mainly exports raw aluminium to the EU (around 75% of its total exports in 2019), with Portugal (35.6%), France (15.1%) and Italy (12.4%) standing out.

As for Spain's imports in 2019, the main country Spain buys raw aluminium from is Mozambique (13.0%), followed by the United Kingdom (10.6%), Bahrain (9.7%), India (7.0%) and the United Arab Emirates (6.5%).

Destination for Spain's exports of Raw Aluminium 2019 (in tonnes)



Countries from which Spain imports Raw Aluminium in 2019 (tonnes)

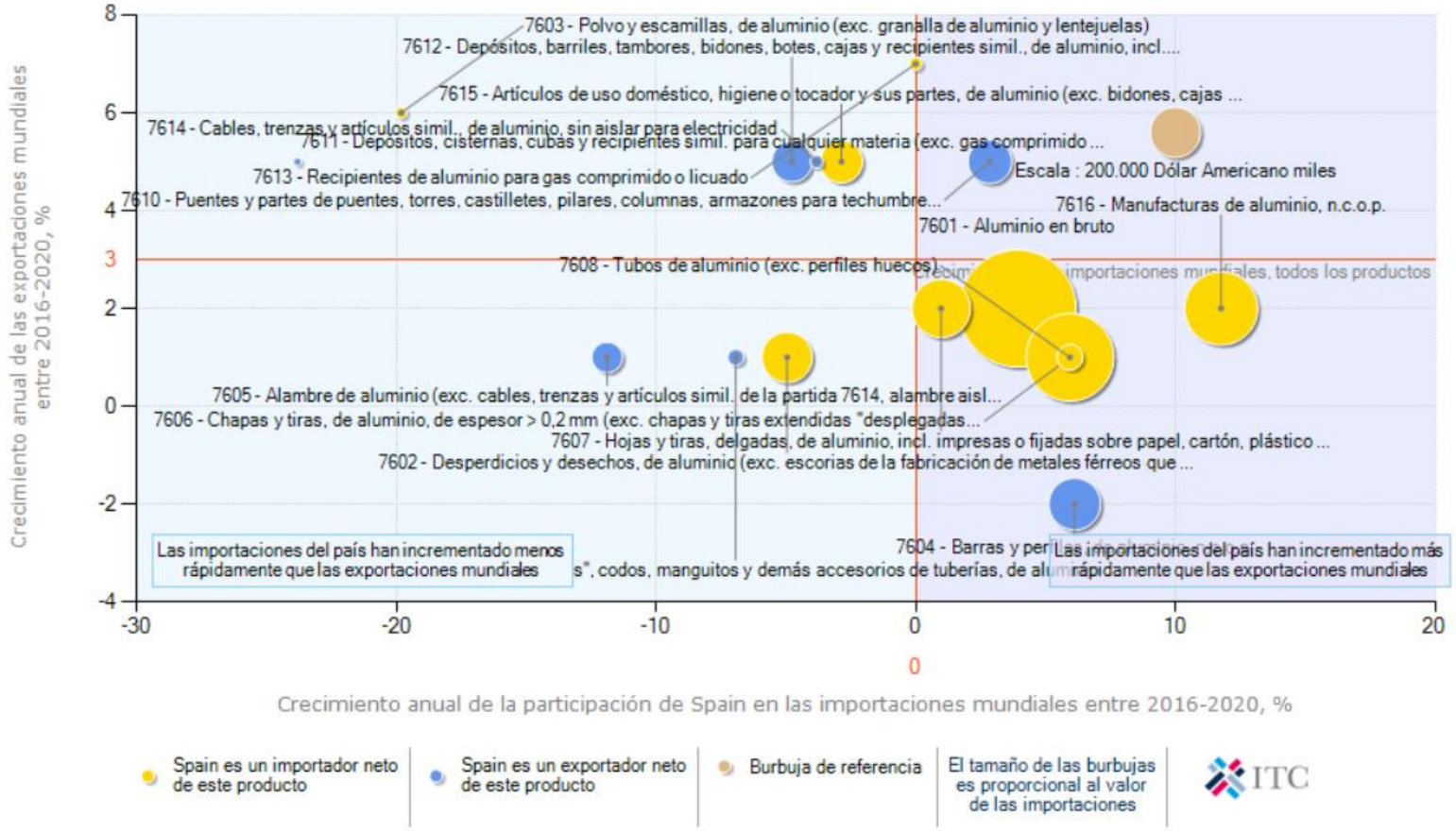


Source: Trademap.org website

Raw aluminium is the main aluminium product by volume in the market, where Spain is a net importer.

The main aluminium-related products for which Spain is a net exporter are: Aluminium bars, rods and profiles, Building structures and Aluminium tanks, barrels and similar structures.

Growth in domestic demand and international supply for products imported by Spain in 2020

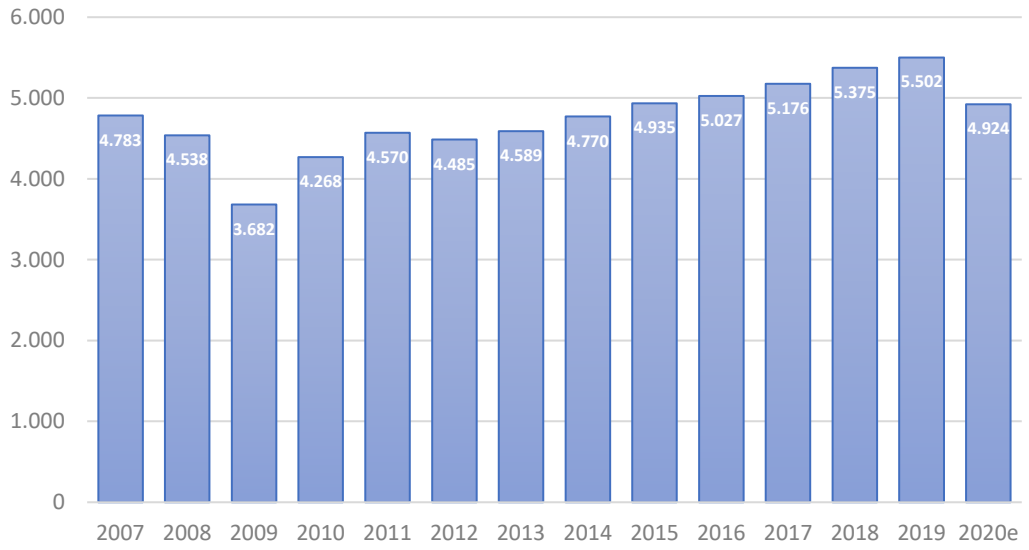


Source: Trademap.org website

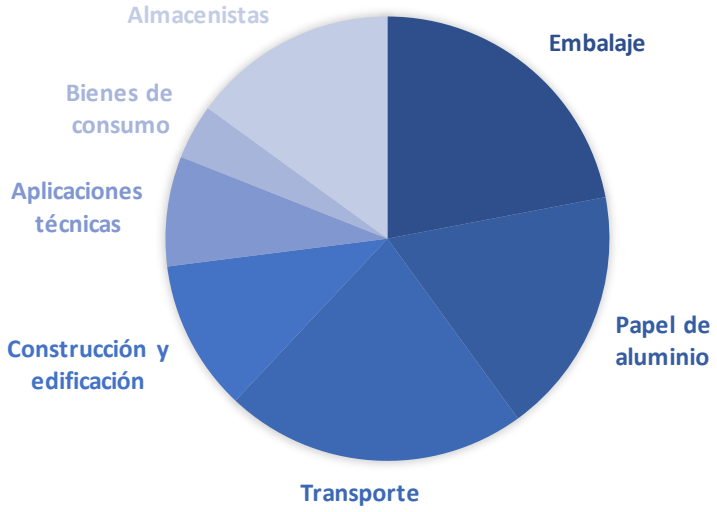
There has been a steady increase (about 3% per year) in demand for rolled products in Europe, excluding the COVID effect in 2020

This demand is mainly driven by the transport and packaging sectors

Evolution of aluminium demand for rolling mills in Europe (thousands of tonnes)



Destination for rolled products in Europe (2020)

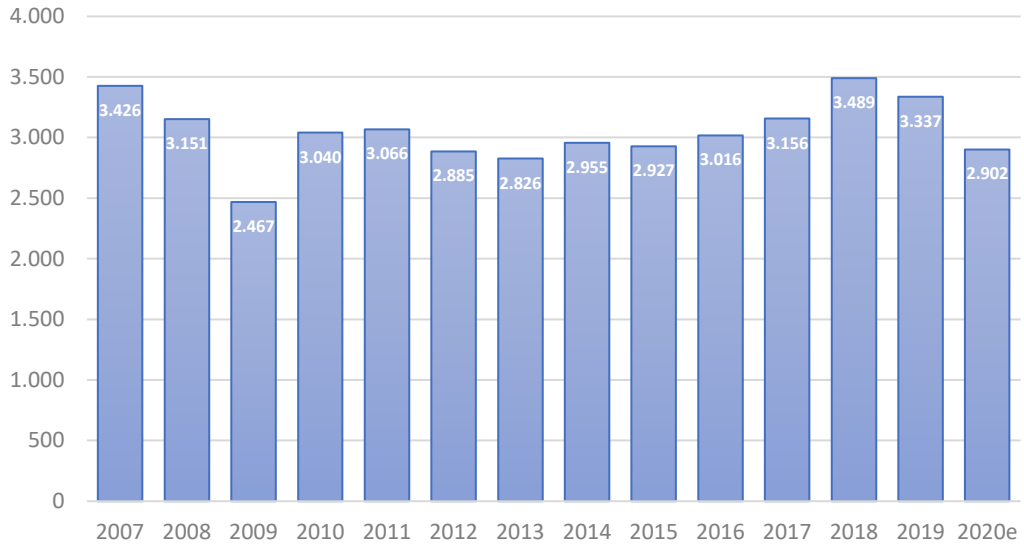


Source: www.european-aluminium.eu

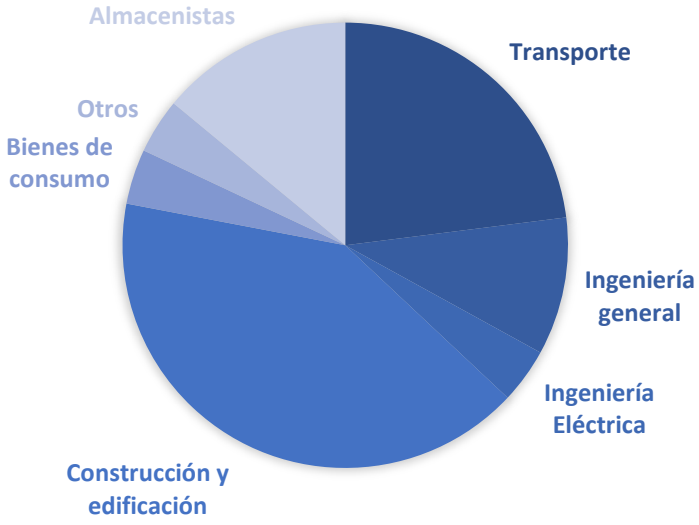
There is a positive trend and outlook for extrusion in Europe, excluding the COVID effect.

Growth is driven by a strong transport sector and a recovery in the construction and building sectors.

Evolution of aluminium demand for extrusion in Europe (thousands of tonnes)



Destination for extrusion products in Europe (2020)

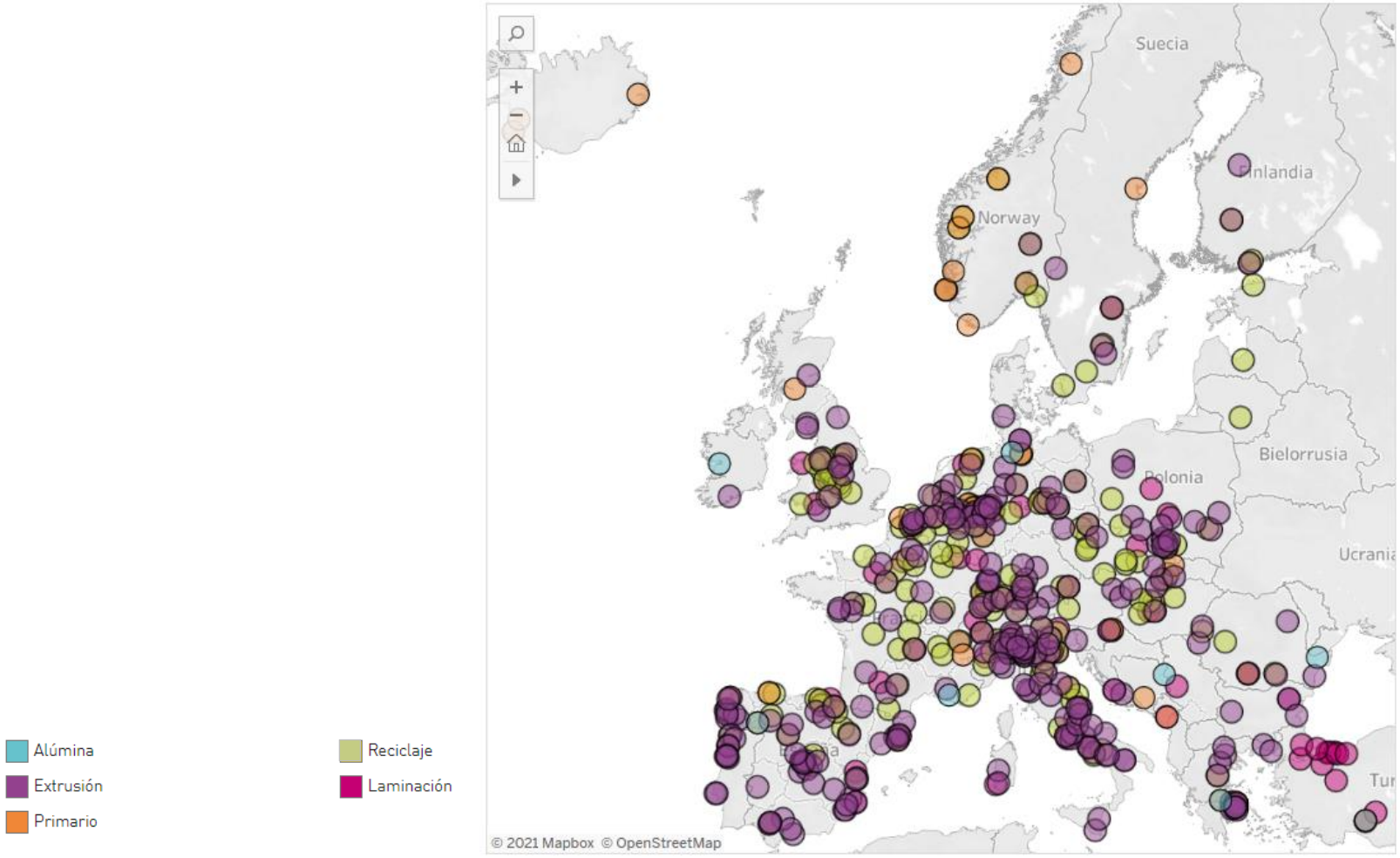


Source: www.european-aluminium.eu

There are about 600 plants in Europe for alumina, primary aluminium, intermediate consumption (extrusion and rolling) and aluminium recycling

Primary aluminium plants are mainly concentrated in Norway and Iceland

Plants in the aluminium value chain in Europe

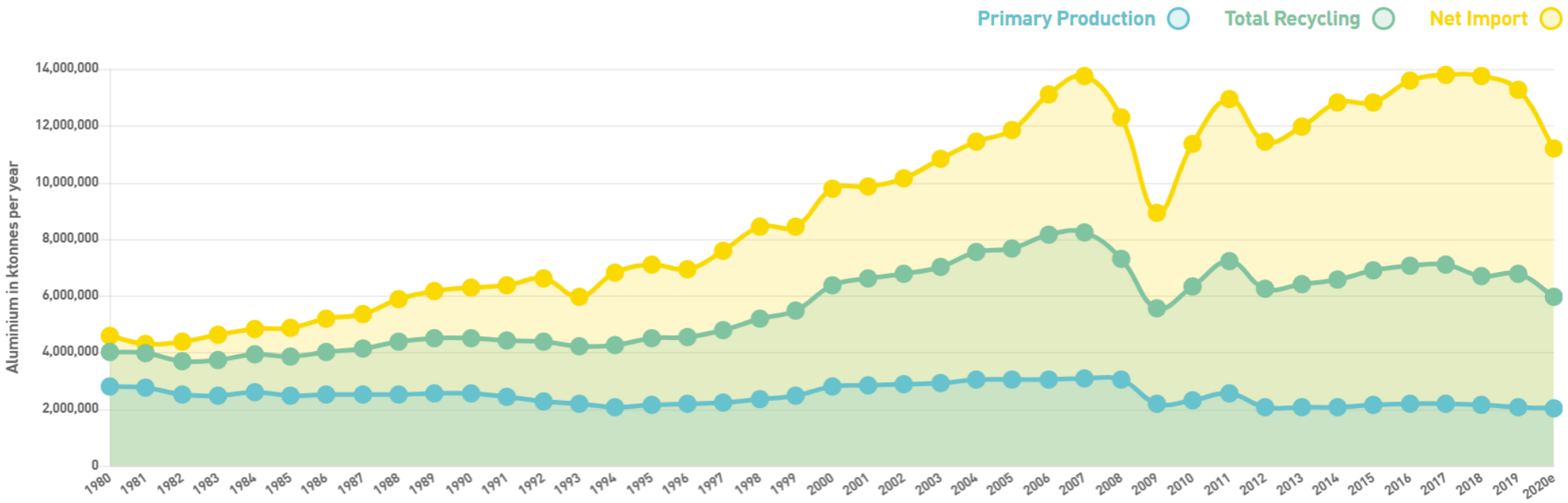


Source: www.european-aluminium.eu

EU import dependency was reduced in 2019 and 2020 compared to previous years

In the EU, secondary aluminium accounts for more than 65% of aluminium production and grew at an average rate of 5% between 2012-2017

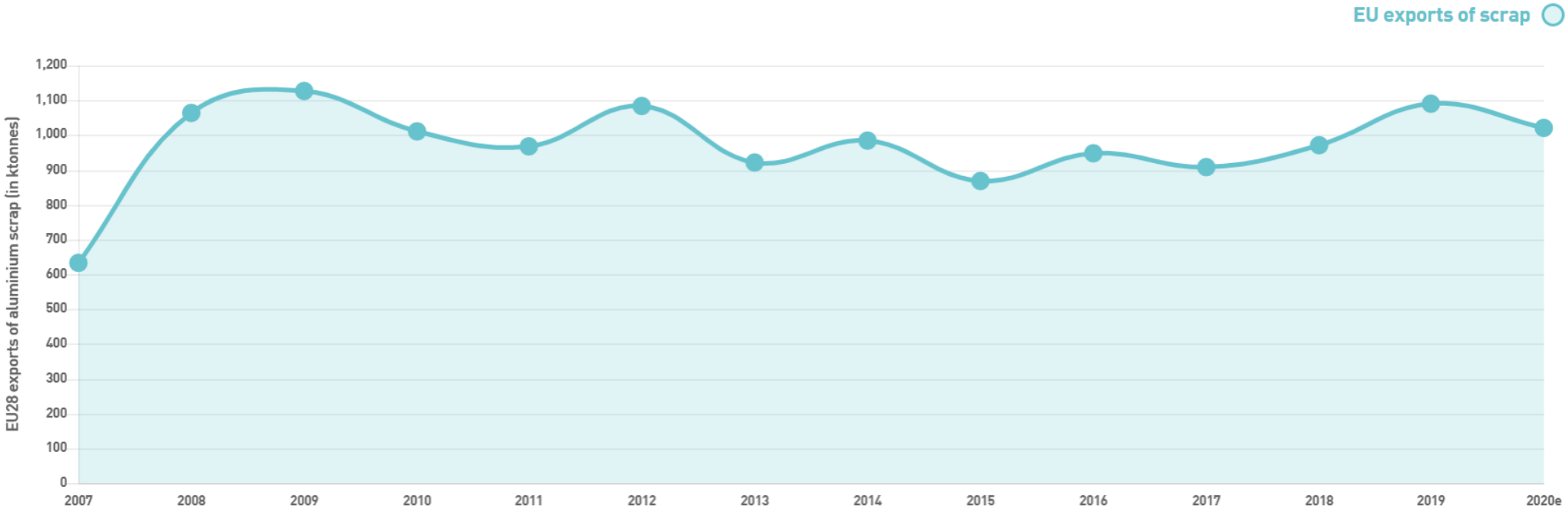
Aluminium consumption in EU (thousands of tonnes)



Source: European Aluminium

The EU exports around 1 million tonnes per year of aluminium scrap, 80% of which is destined for Asia

EU aluminium scrap exports (thousand tonnes)



Source: European Aluminium

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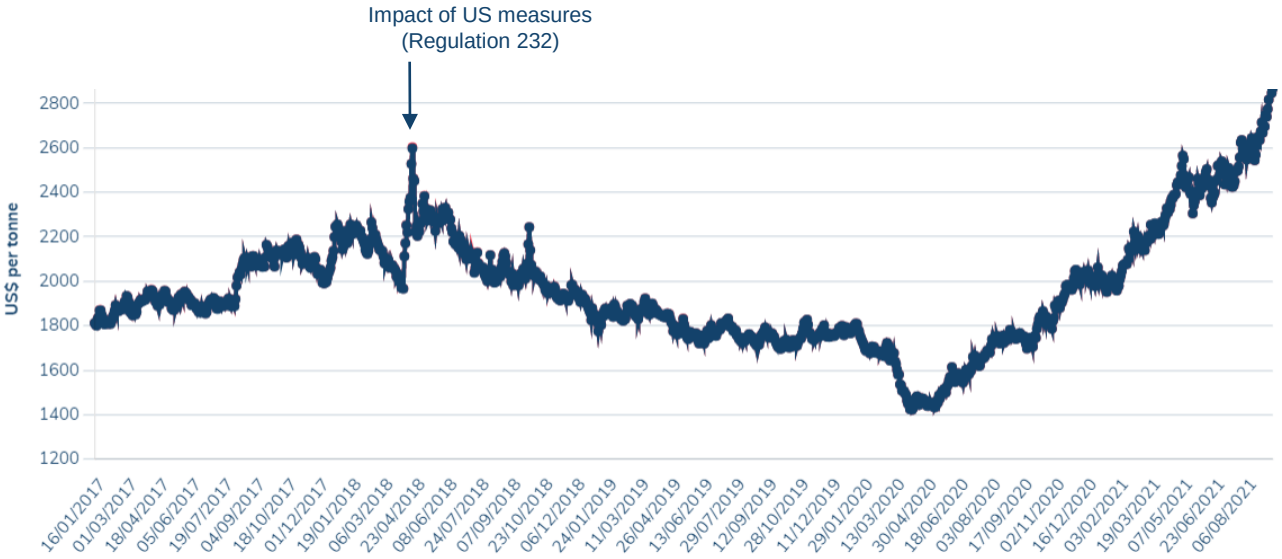
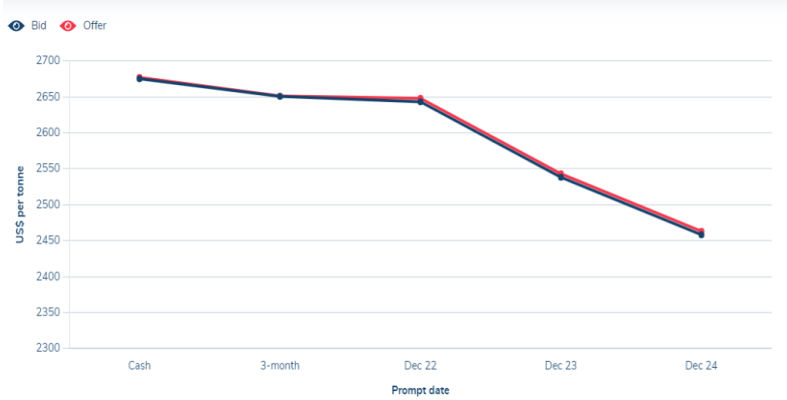
The aluminium price refers to the price on the London Metal Exchange, where, the its value has increased since May 2020, almost doubling in price from $1,400/t to over $2,800/t

Futures show the price containment at $2,460/t by December 2024

Aluminium price changes on the London Metal Exchange (US $/t)



Aluminium futures price on the London Metal Exchange (US $/t)

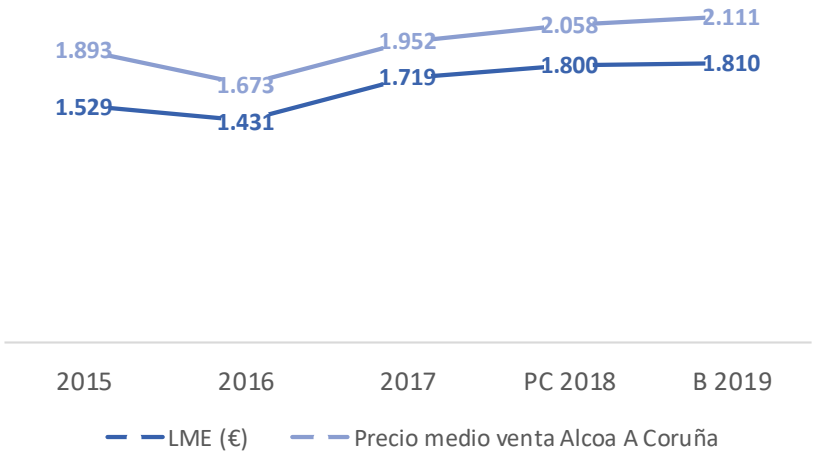


Source: www.lme.com

The activity mix at the A Coruña plant (approximately 80% billets and 20% slabs) has been above the LME* price

The average price of Alcoa's (former owner) business in A Coruña per tonne was 17% higher than the LME price

Comparison of LME aluminium price changes and turnover at Alcoa A Coruña (€/t)



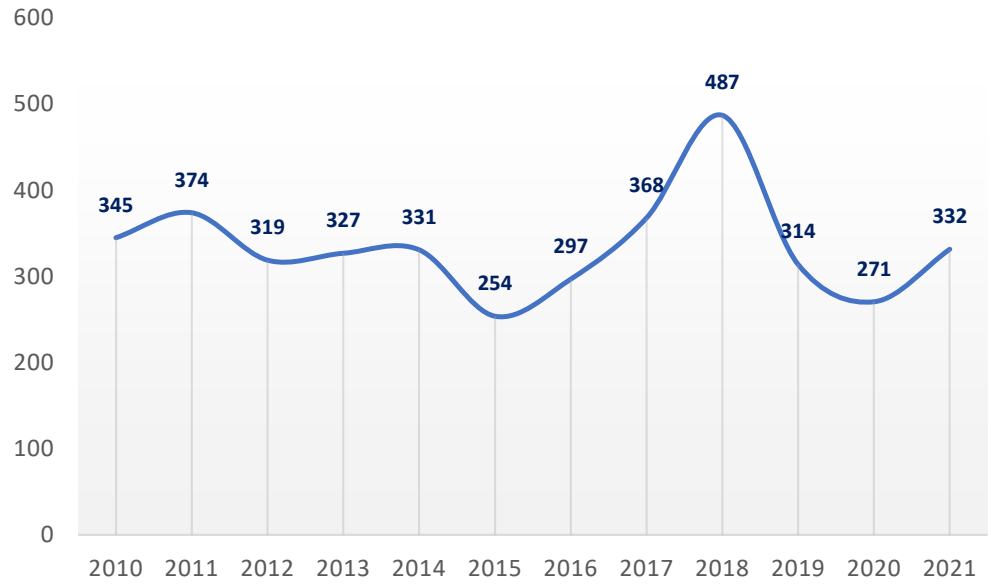
Source: Syndex report Dec 18

Note*: London Metal Exchange

The price of alumina in 2018 increased due to both supply reductions and sanctions

The price of alumina price has decreased since 2019 but increased above $450/t in the last months of 2021

Alumina price history (US $/t)



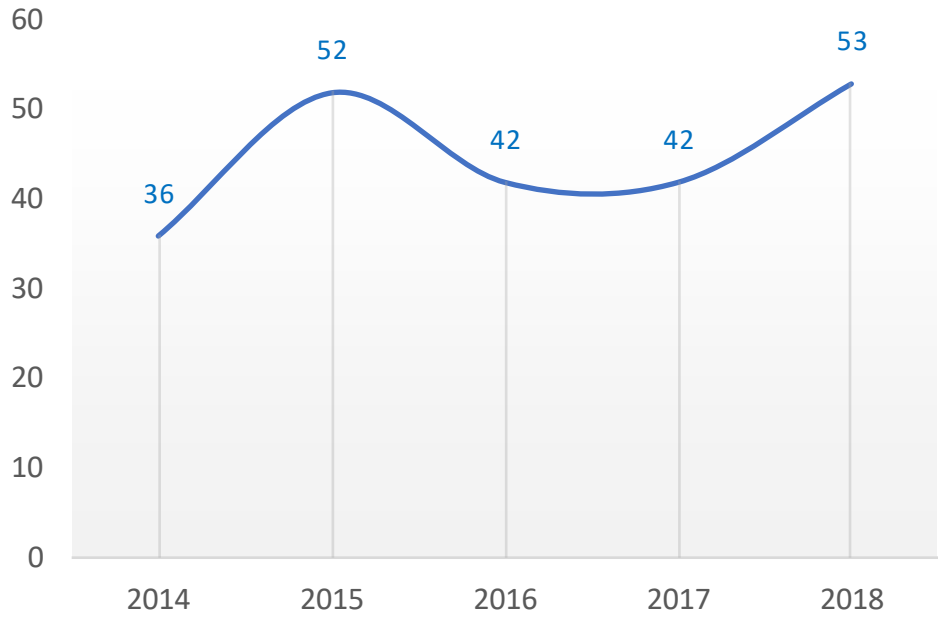
Source: Metal Bulletin Research & www.investing.com

- There has been a shortfall in global alumina production in recent years due to demand from China
- Alumina price volatility was triggered by cyclical factors: supply-side disruption (Alunorte 50% reduction, Alcoa strike in Australia) and by US sanctions on the Rusal group
- A very significant rise in the price of alumina took place in the last months of 2021.

During the last few years of the former Alcoa's production, the net cost of electrical energy ranged from €36 to €53/MWh

This price includes compensation for interrupted supply

Trend in net cost of electricity at A Coruña plant (€/MWh)



Source: Syndex report 18-Dec

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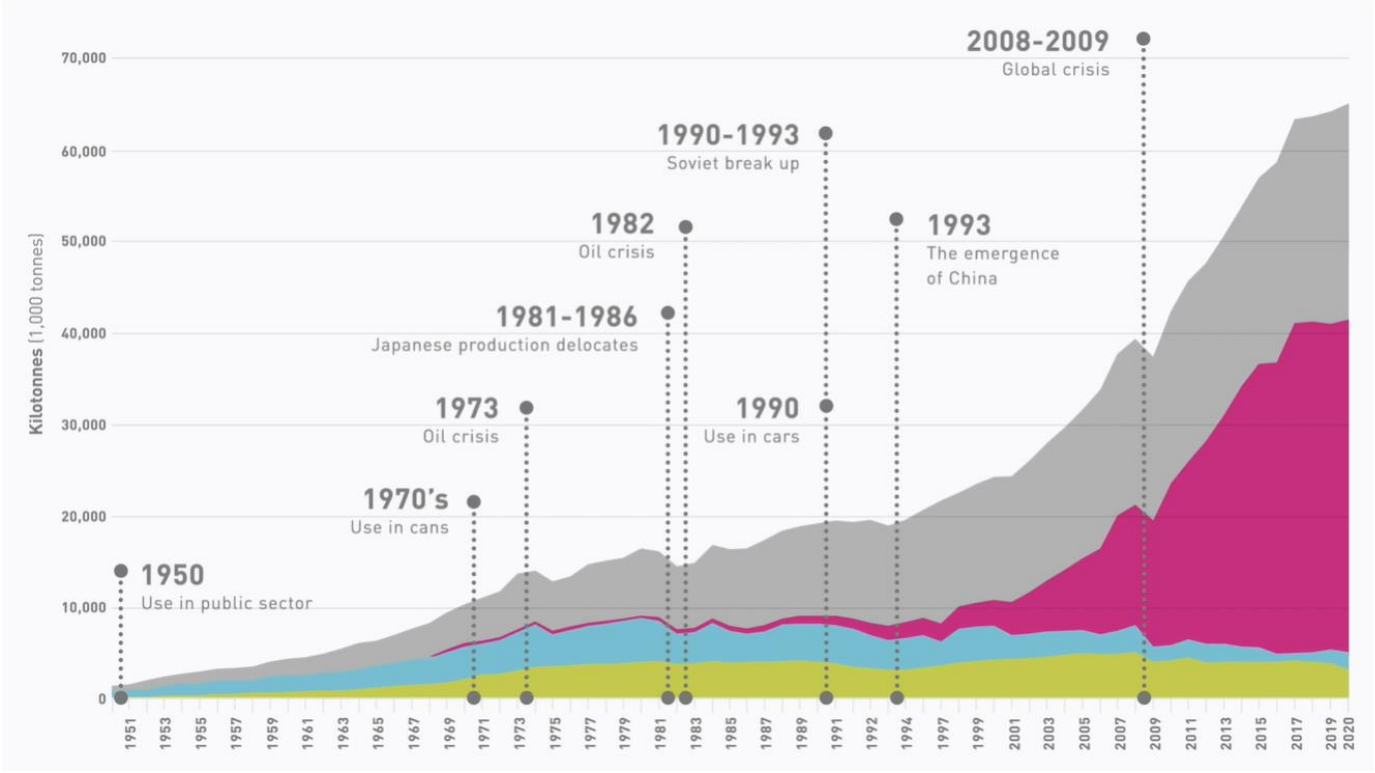
Europe's production has stabilised in recent years

China has become the world's largest producer, now accounting for about half of global production. The US, on the other hand, has reduced its production in recent years.

History of world primary aluminium production (thousands of tonnes)

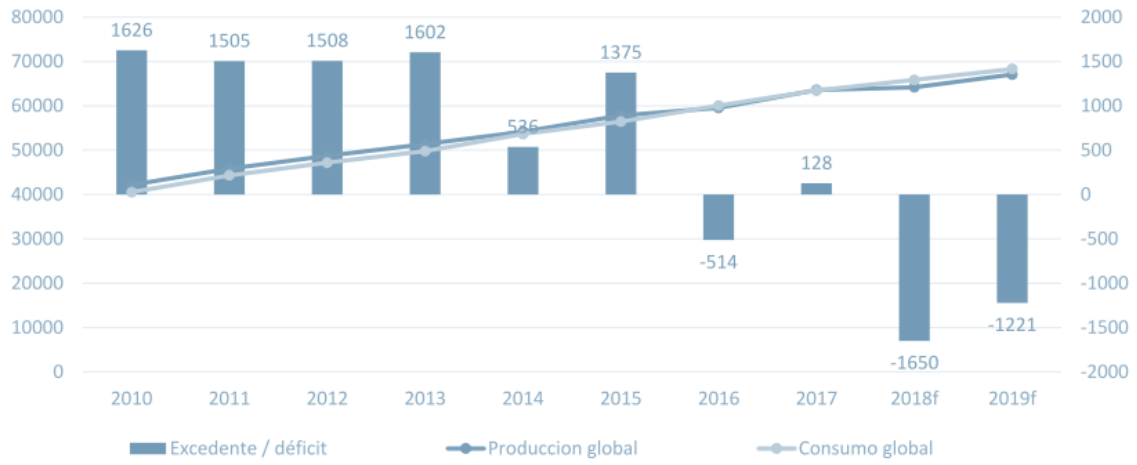


Source: European Aluminium

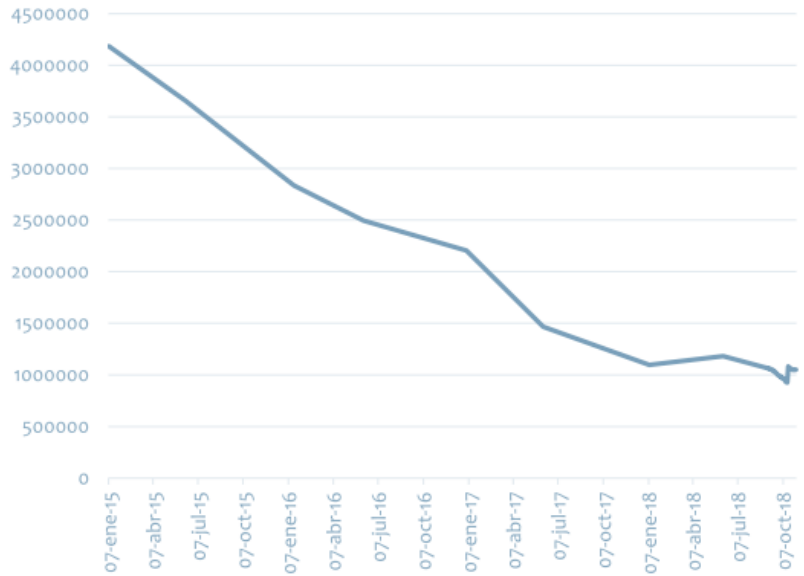
Since 2016 there has been a global production shortfall

The higher increase in demand compared to production led to the consumption of stocks and their sharp reduction

Aluminium production and consumption, world balance (kt/year)



Aluminium stock history (t)

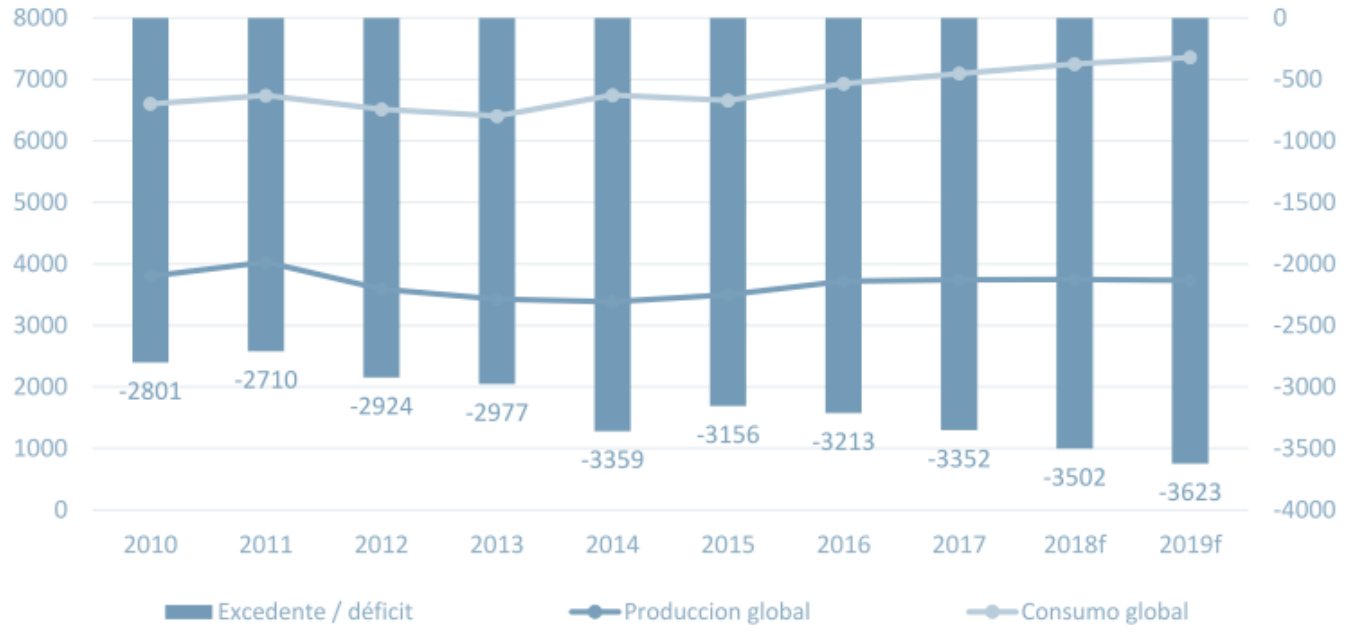


Source: Metal Bulletin

Stabilising production in Western Europe and rising demand will lead to an increase in the trade deficit

There is a market opportunity in Europe to increase production in Europe

Aluminium production and consumption, balance in Western Europe (kt/year)



Source: Metal Bulletin

Imports grew at an average annual rate of over 6% from 2015-2018 but have fallen to pre-2016 levels in 2019 and 2020

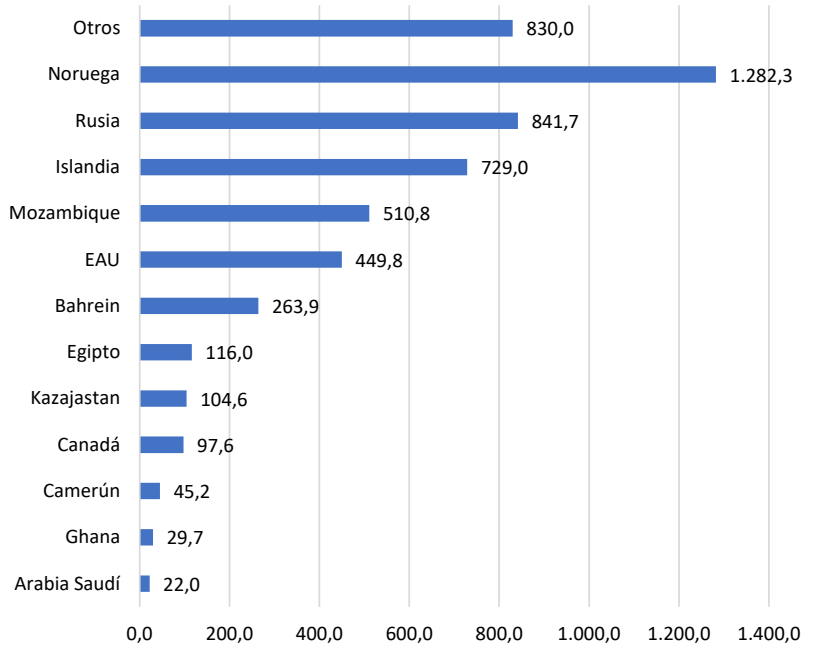
The main countries importing raw aluminium into the EU are Russia, Norway, Iceland, Mozambique and the UAE

History of EU imports of raw aluminium by country (kt)

	2015	2016	2017	2018	2019	2020
Total importaciones	5.222,0	5.764,4	5.970,9	6.363,4	5.782,8	5.322,6
Noruega	1.208,7	1.303,0	1.321,7	1.341,6	1.288,1	1.282,3
Rusia	1.228,5	1.396,8	1.405,6	1.259,4	1.189,4	841,7
Islandia	304,0	688,5	816,4	775,7	627,9	729,0
Mozambique	488,0	519,5	511,3	520,1	519,5	510,8
EAU	563,6	615,2	612,7	693,7	671,7	449,8
Bahrein	59,1	76,1	131,8	188,2	200,1	263,9
Egipto	90,7	109,0	115,7	120,2	93,4	116,0
Kazajastan	7,0	82,1	88,8	45,4	120,9	104,6
Canadá	129,2	71,5	41,0	236,5	109,1	97,6
Camerún	58,4	59,8	63,0	68,9	45,6	45,2
Ghana	25,5	30,0	27,4	44,7	50,0	29,7
Arabia Saudí	62,5	81,0	43,9	84,2	52,1	22,0
Bosnia	72,2	104,2	94,4	95,3	52,9	4,8
China	6,8	3,9	2,9	11,3	6,2	3,7
Brasil	36,2	126,0	42,8	18,7	4,4	3,0

Source: Eurostat

EU 2020 imports of raw aluminium (kt)



Source: Eurostat

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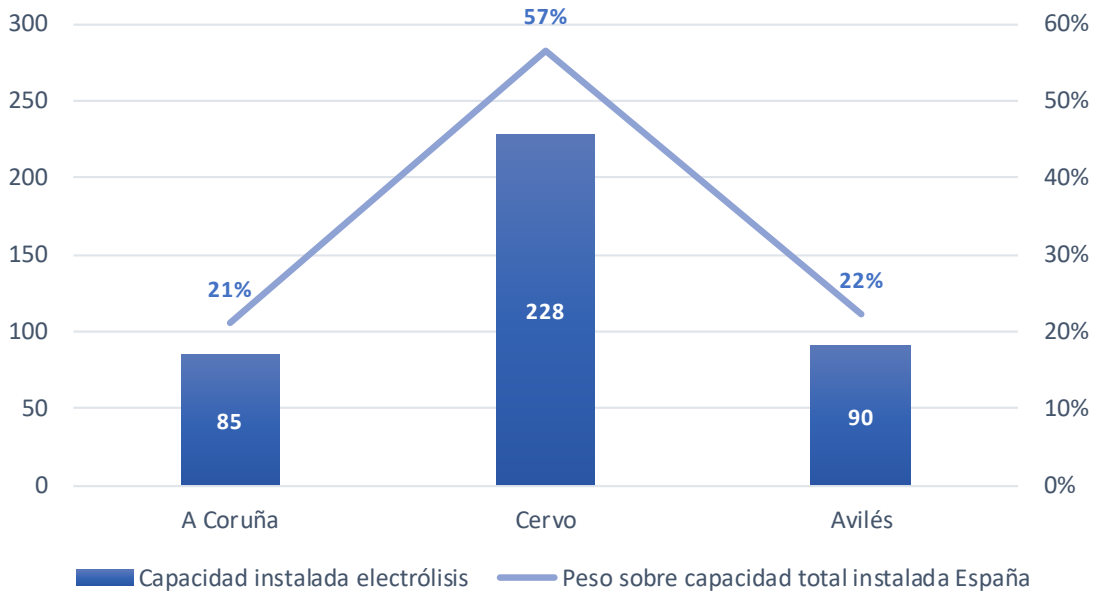
Spain has a primary aluminium production capacity of 403,000 tonnes per year

The plant in A Coruña represents 21% of the total installed capacity in Spain

Installed production capacity of aluminium extracted by electrolysis in Spain (in thousands of tonnes per year)



Source: Data compiled by authors from the Integrated Environmental Authorisation

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Value chain. Potential integrating activities: vertical vs. horizontal

Feasibility analysis of an industrial project

There are 9 alumina production plants in Europe producing close to their installed capacity, except Rusal's Ireland plant, as a result of US sanctions on the Russian group

The A Coruña plant is less than 150 km from Spain's only alumina production plant

Alumina plants in Europe

Source: AEA

	Capacidad instakada (Mt)	Producción 2016 (Mt)	Capacidad (%)
Ucrania	1,6	1,5	94,4%
España	1,5	1,4	96,6%
Irlanda	2,0	1,3	64,3%
Alemania	1,0	1,0	100,0%
Grecia	0,8	0,7	83,8%
Rumanía	0,5	0,5	94,0%
Francia	0,6	0,5	78,1%
Turquía	0,2	0,2	95,0%
	8,2	**7,0**	**85,8%**

Source: British Geological Survey

EU imposes anti-dumping duties against Chinese and Russian imports

The EU has also imposed duties on a number of US products* as a counterbalance to the Trump administration's 25% measures

Product	Country of origin	Anti-dumping duties	Status
Aluminium foil	China	30% (except Alcoa, Shandong Loften and Zhenjiang Dingheng, which benefit from lower rates – 6.4%, 20.3% and 24.2% respectively)	Final from December 2015 until 19 December 2020, a complementary investigation has extended the scope of application to certain products in order to avoid fraud
Aluminium foil	Russia	34%	Final from December 2015 until 19 December 2020
Aluminium foil in small rolls	China	45.6 % (except for certain companies for which the rates range from 30.6% to 37.4%)	Applicable since 2013, re-examination ongoing
Aluminium radiators	China	61.4% (except for certain companies for which the rates range from 12.6% to 56.2%)	Applicable since 2013; re-examination ongoing
Aluminium wheel rims for motor vehicles	China	22.3%	Final from January 2017 to January 2022

Source: Syndex report 18-Dec

Note*: - Aluminium or aluminium alloy sheet and strip, with a thickness exceeding 0.2 mm, rectangular or square, painted, varnished or coated with plastic (codes 76061110, 76061220)
- Aluminium or aluminium alloy sheet and strip, square or rectangular, with a thickness exceeding 0.2 mm but less than 6 mm (codes 76061191, 76061292, 76061293)

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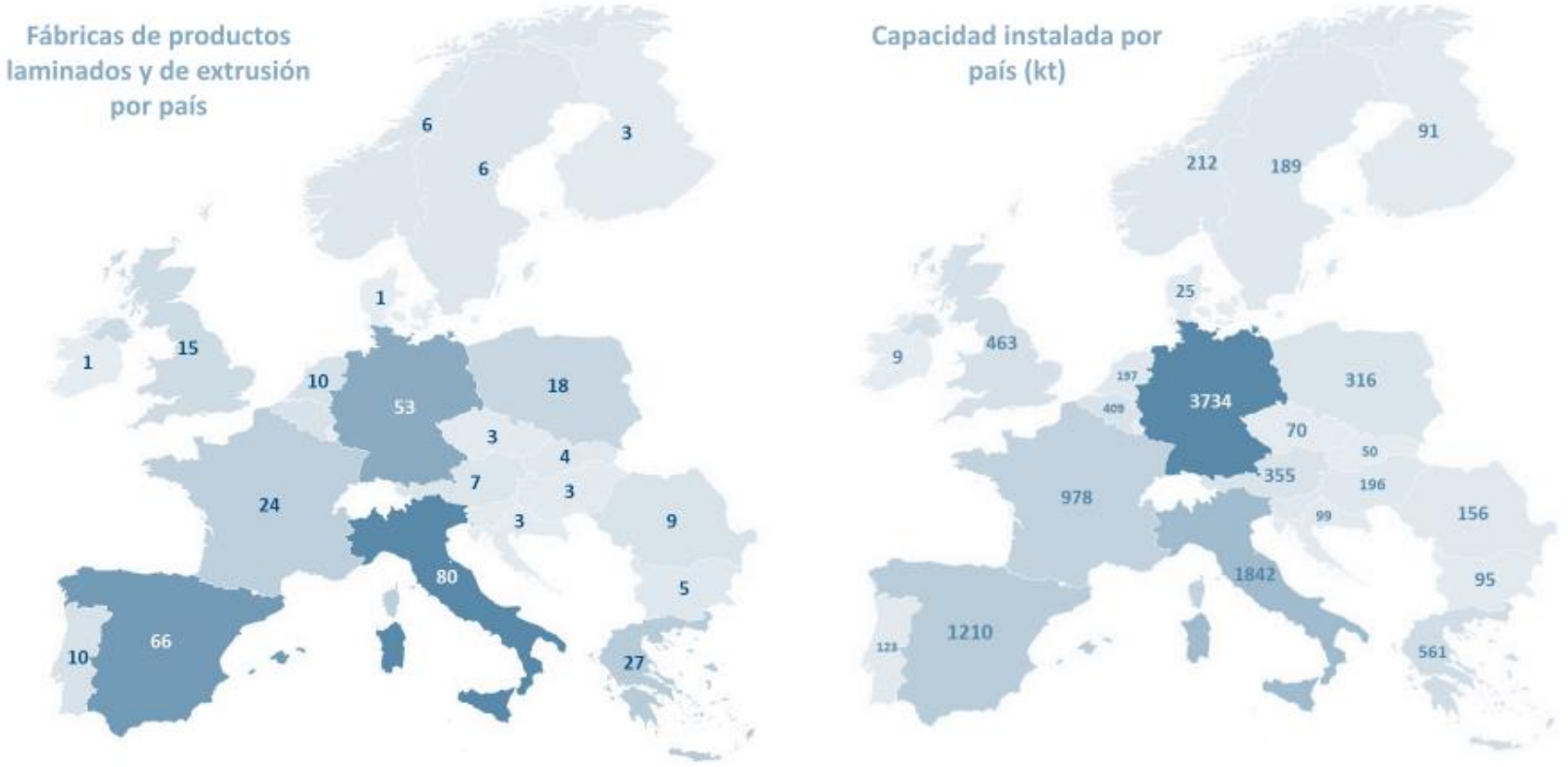
Feasibility analysis of an industrial project

There is a potential market of more than 11 million tonnes in Europe alone, and great installed capacity for rolled and extrusion products

On the Spanish mainland, installed capacity exceeds 1.3 million tonnes per year

Plants and capacity for rolled products and extrusion in Europe

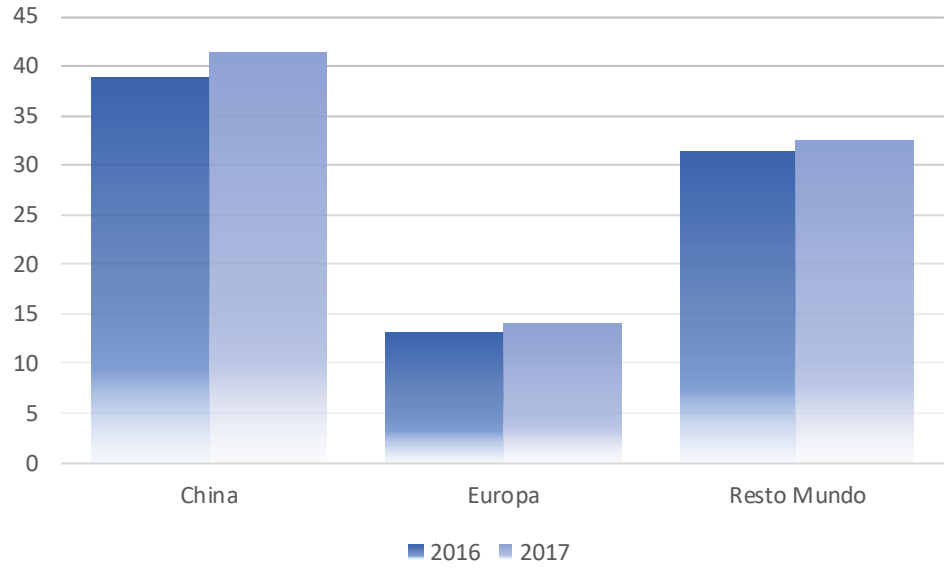


Source: European Aluminium

Consumption of aluminium semi-finished products is growing globally and also in Europe

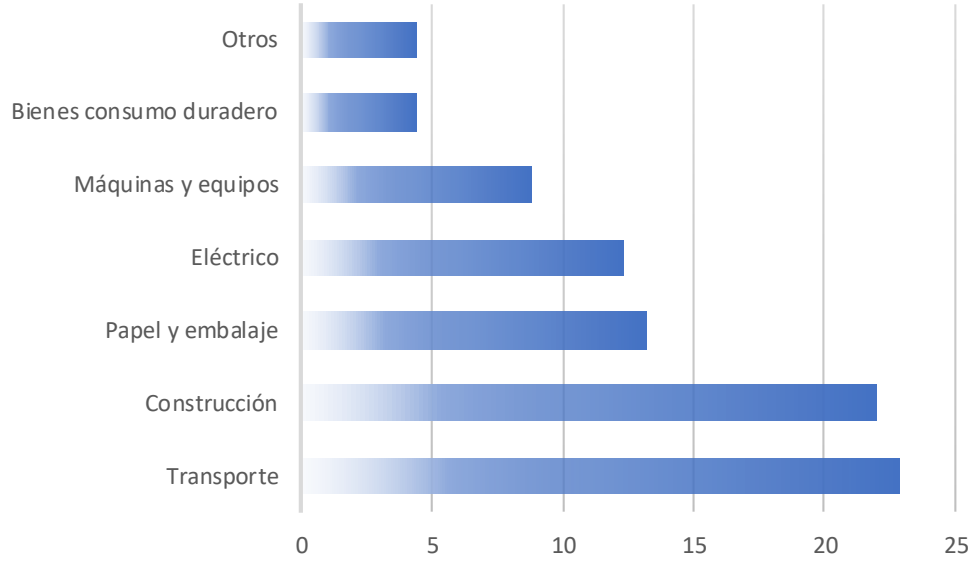
By industry, the most important industries are transport and construction, accounting for more than 50% of the market

Consumption of aluminium semi-finished products by region (million tonnes)



Source: Syndex report 18-Dec

Consumption of aluminium semi-finished products by industry in 2017 (million tonnes)

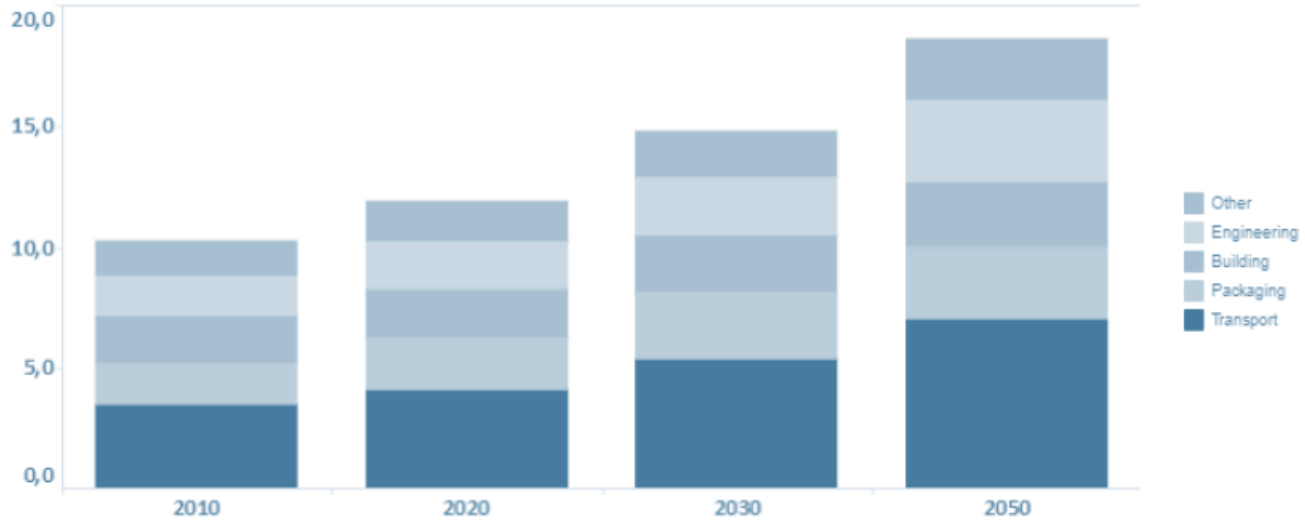


Source: Syndex report 18-Dec

European demand will grow in the medium to long-term, driven by the transport, infrastructure and electronics sectors

The aluminium production deficit in Europe will therefore increase in the coming years if no new projects are created

European aluminium consumption by market (estimated, in MT)



Source: AEA

Aluminium consumption is expected to increase from 64.2 million tonnes in 2021 to 78.4 million tonnes in 2029, growing at an average rate of 2.6%. Source: Mining Weekly

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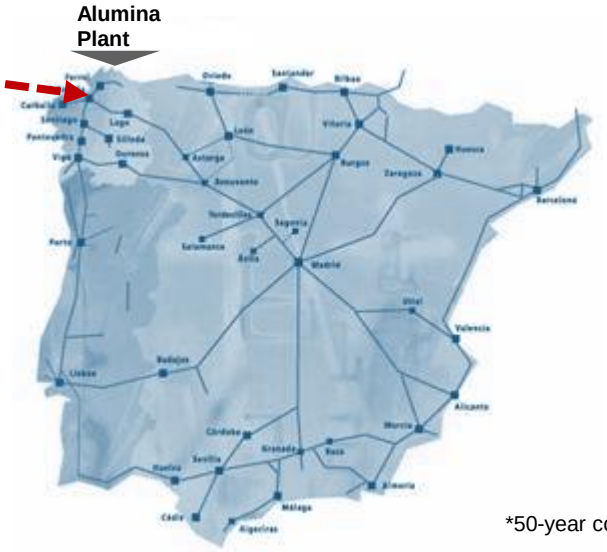
Value chain. Potential integrating activities: vertical vs. horizontal

Feasibility analysis of an industrial project

The plant is located in the industrial area of A Coruña, close to customers in the Autonomous Community, with direct connection to the outer harbour and high-capacity roads.

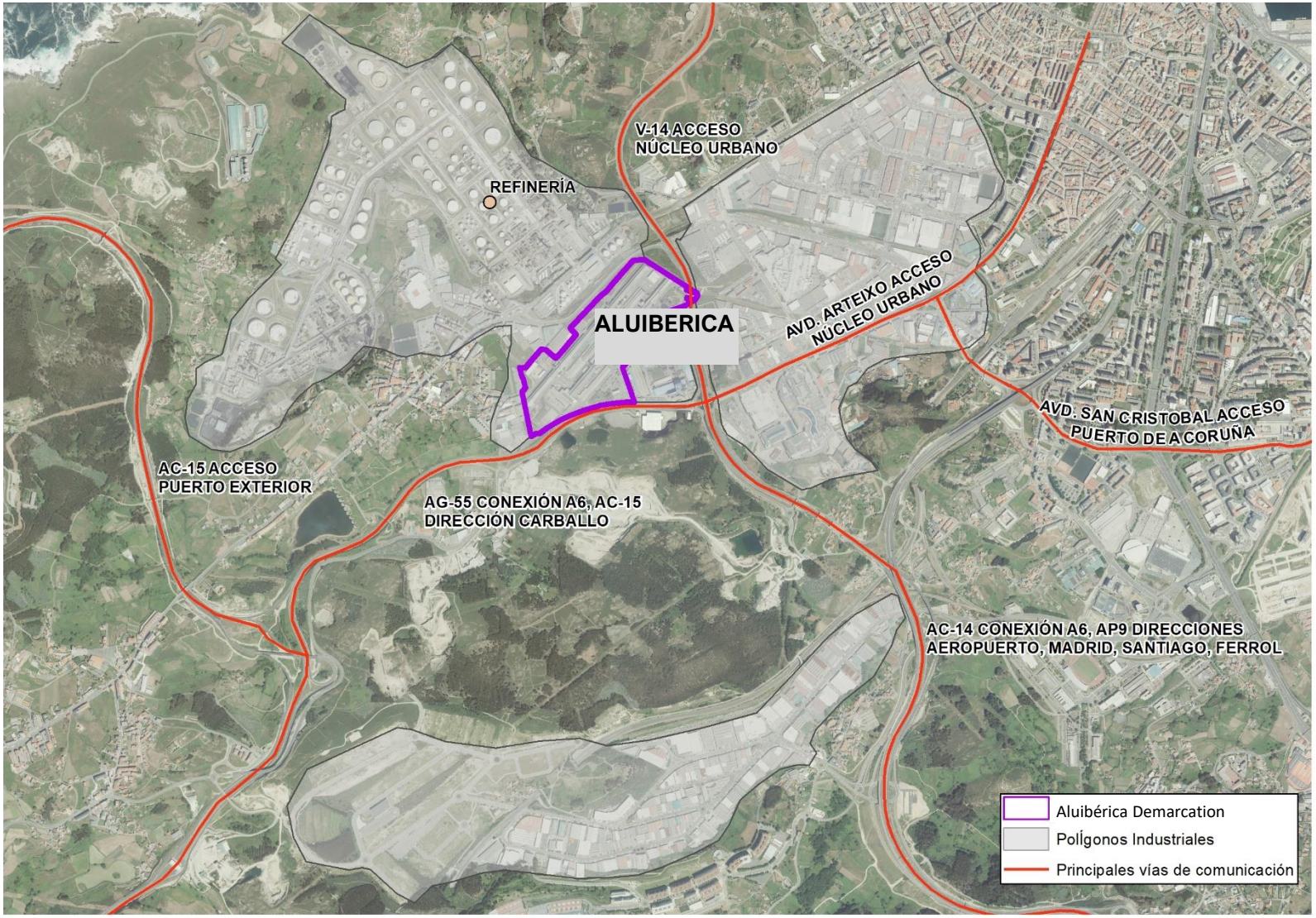
- Proximity to main customers located in the Autonomous Community and with competitive advantages in terms of logistics and the recovery of leftovers from the extrusion process.
- Direct access to high-capacity roads giving access to the Atlantic axis, Portugal and the Meseta Central. Connection to the rest of Europe via high-capacity roads.
- Proximity to the Outer Harbour.
- Harbour Concession, including a 95 m quay and over 4,000 m2 of manoeuvring and industrial area in the Outer Harbour*.
- Proximity to airport and railway.
- Proximity to the only Alumina plant on the Iberian Peninsula.



*50-year concession

Source map: IGAPE website

The plant is located in the industrial area of A Coruña, with connections to high-capacity roads to Portugal, Madrid and the rest of the Iberian Peninsula



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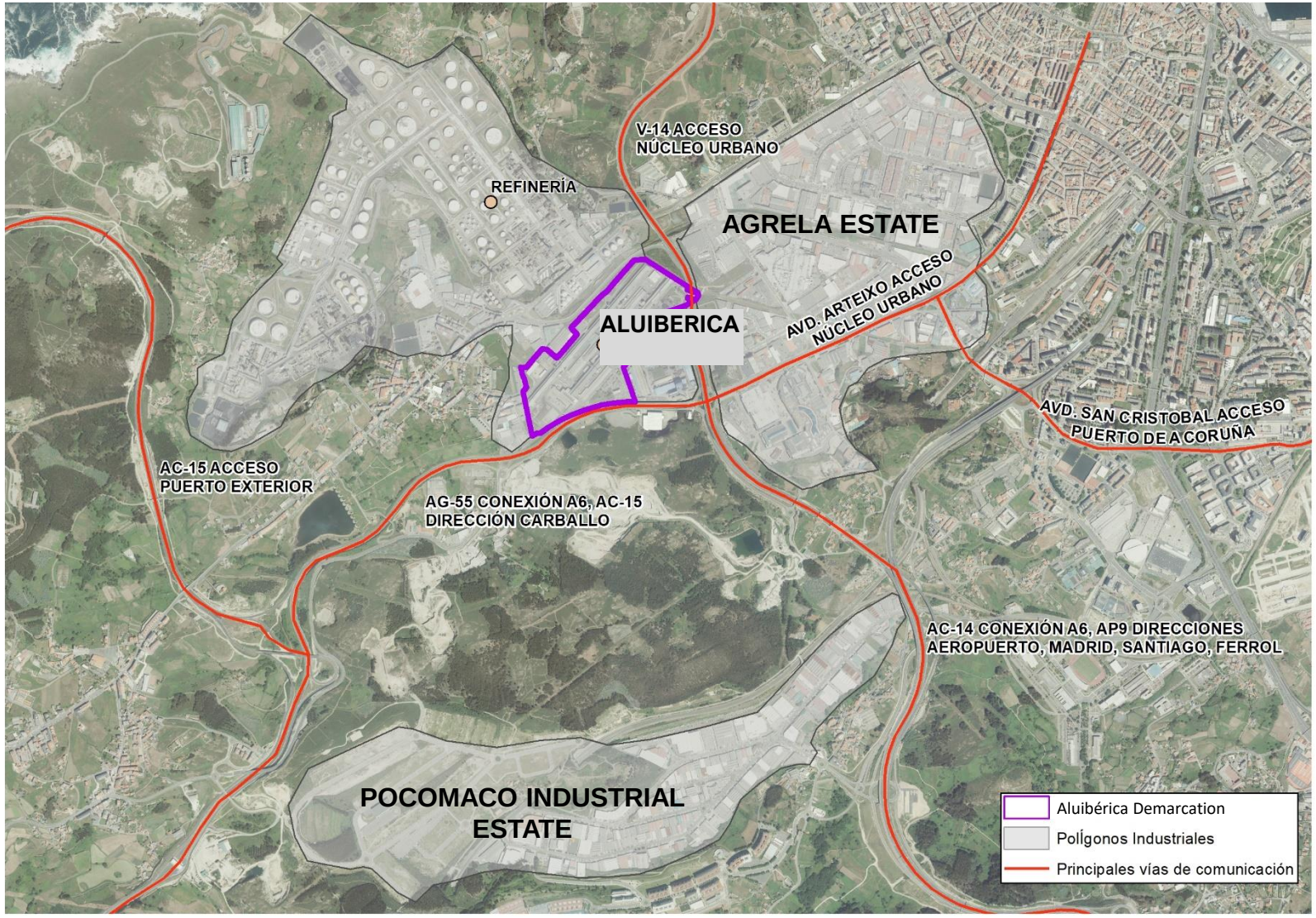
Feasibility analysis of an industrial project

The plant is located between the refinery and the Agrela Industrial Estate

The Pocomaco Industrial Estate is also less than 3 km away



Agrela Industrial Estate

Year of creation: 1963
Surface area: 1,422,000 m2
No. of companies: over 550
Direct employment: 20,000
Nature: commercial activities, warehouses and services

Refinery

Year of creation: 1961
Surface area: 1,500,000 m2
Direct employment: 650

Pocomaco Industrial Estate

Year of creation: 1974
Surface area: 760,000 m2
No. of companies: over 550
Direct employment: 5,000
Nature: distribution

There is a specialist training network in the surrounding area, with more than 30 vocational training centres and 3 university campuses

Proximity to high-level engineering and technical training institutions

Vocational training	▪ There are some 30 public and private centres offering vocational training courses at A Coruña City Council

University	▪ There are 3 university campuses less than 1 hour away
	  ▪ A Coruña
	  ▪ Ferrol
	  ▪ Santiago

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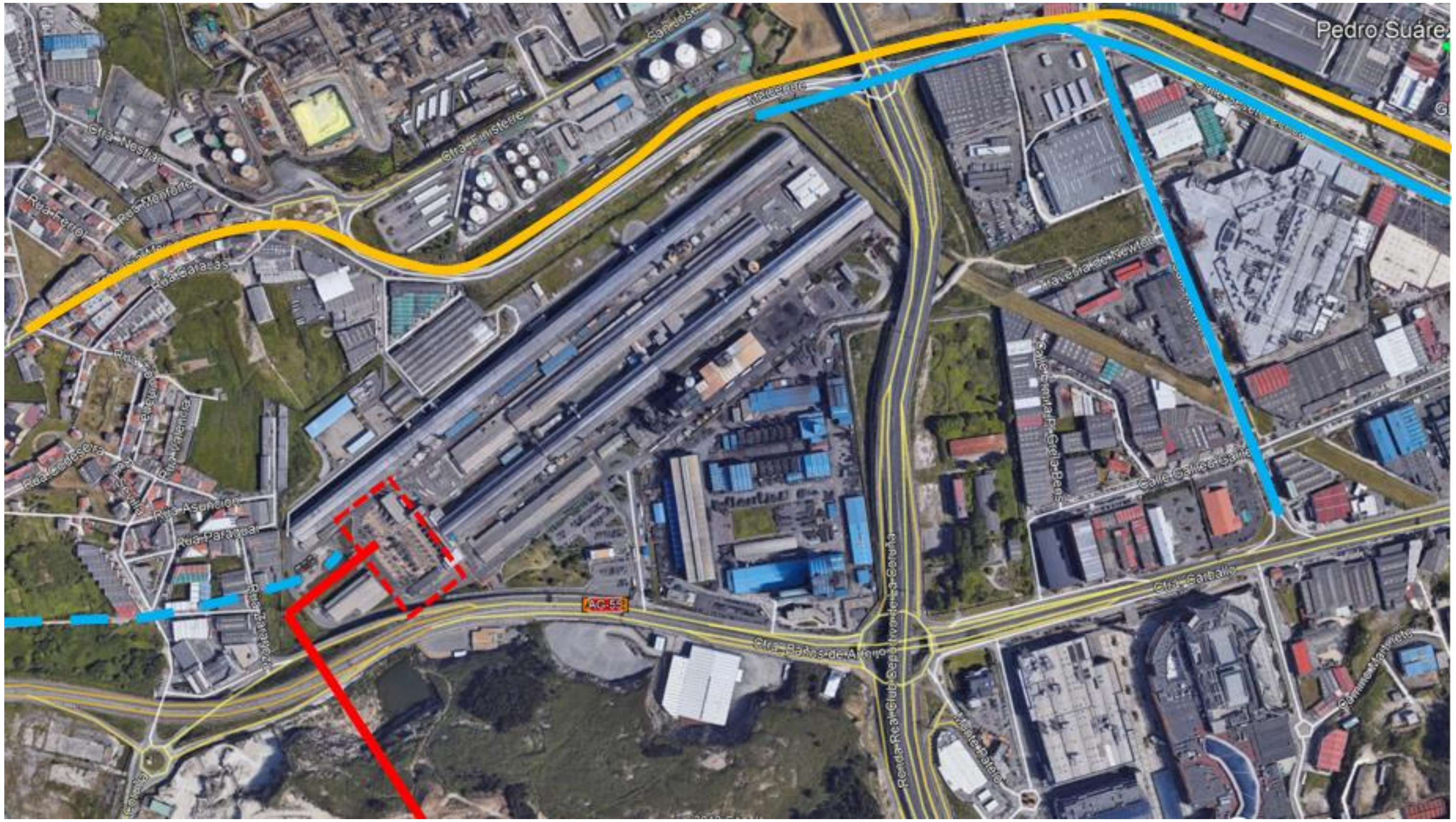
The plot has a sub-station with connection to the high voltage grid and gas network in the immediate vicinity

It is connected to the city water supply network, with water replenishment from the Meicende reservoir



High-voltage network connection

City supply network

Connection to the Meicende Reservoir

Existing gas network

Source: Infrastructure network plans of the current General City Development Plan

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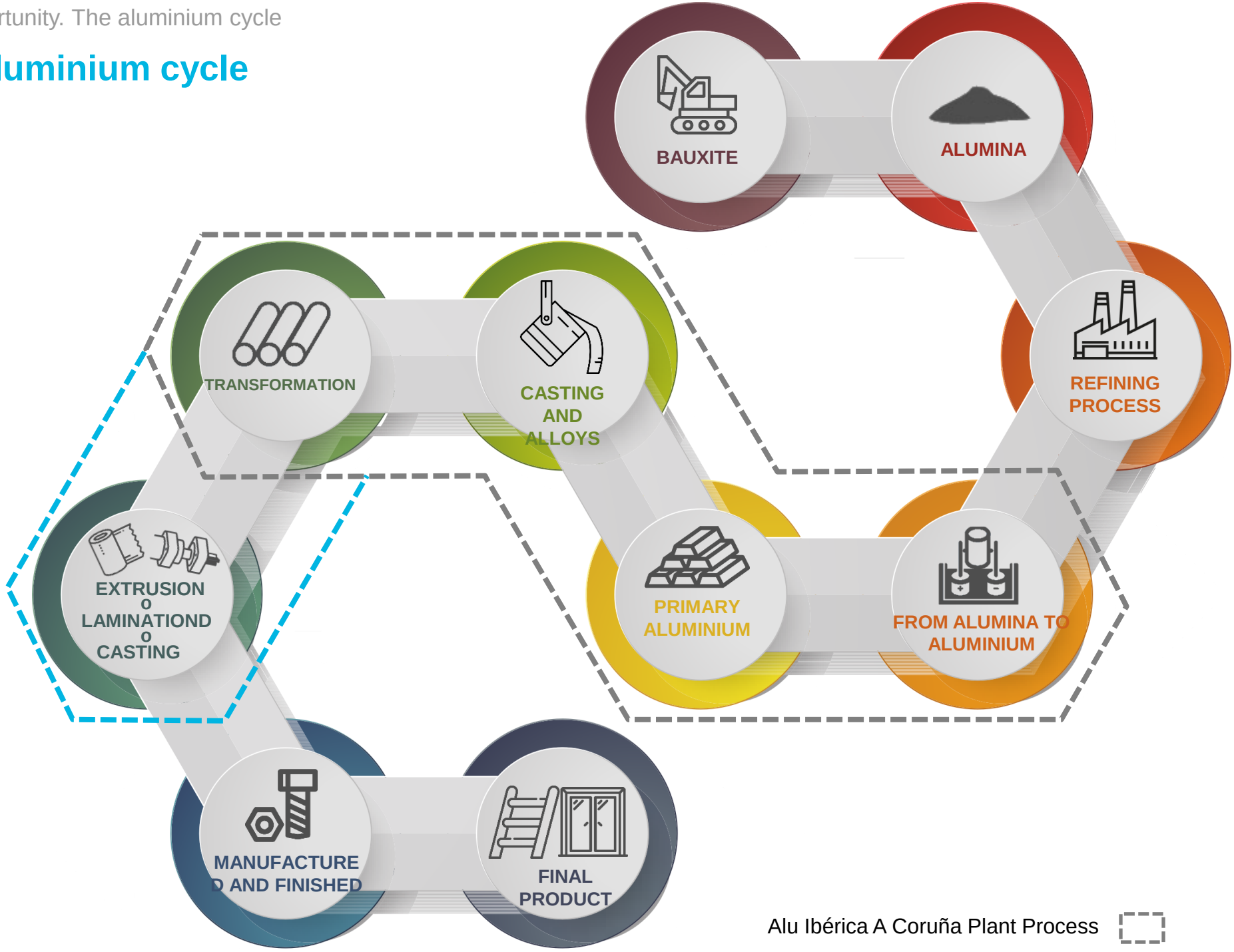
The environment. Business and training fabric in the area

The plot. Connectivity and networks; energy supply

Value chain. Potential integrating activities: vertical vs. horizontal

Feasibility analysis of an industrial project

The aluminium cycle



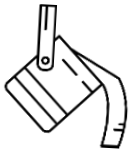
The plant represents a great opportunity for horizontal integration and entry into the European market

Its production capacity represents 20% of the total non-recycled primary aluminium production capacity in Spain

Current plant

Primary aluminium

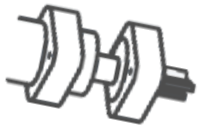
Cast house



Recasting/recycling

High potential horizontal integration

Laminatio n



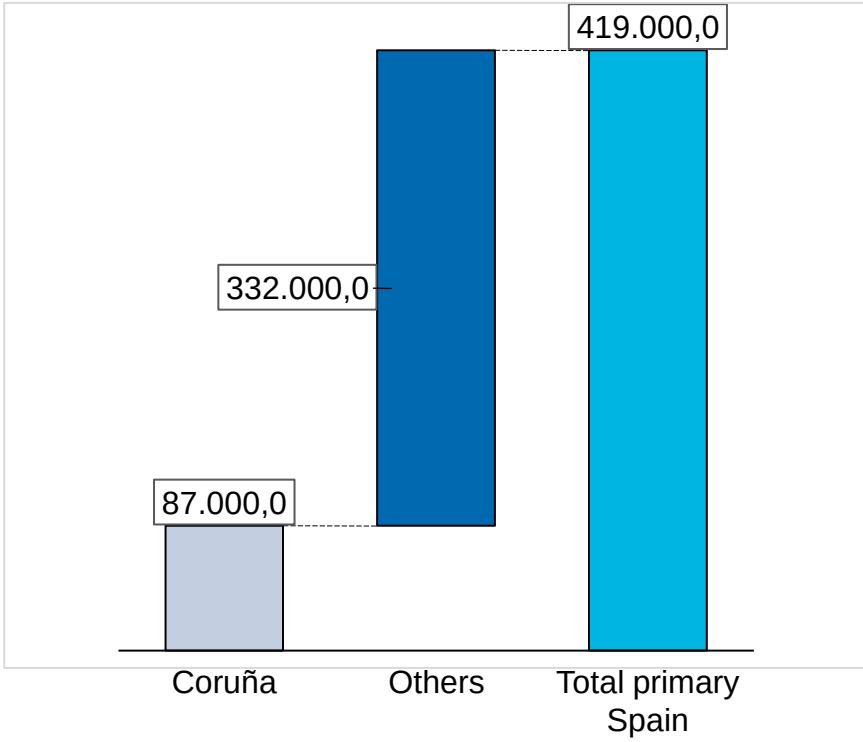
Extrusion

Casting of parts

Low potential vertical integration

Non-recycled primary aluminium production capacity in Spain

(2018, tonnes; source: compiled by authors)



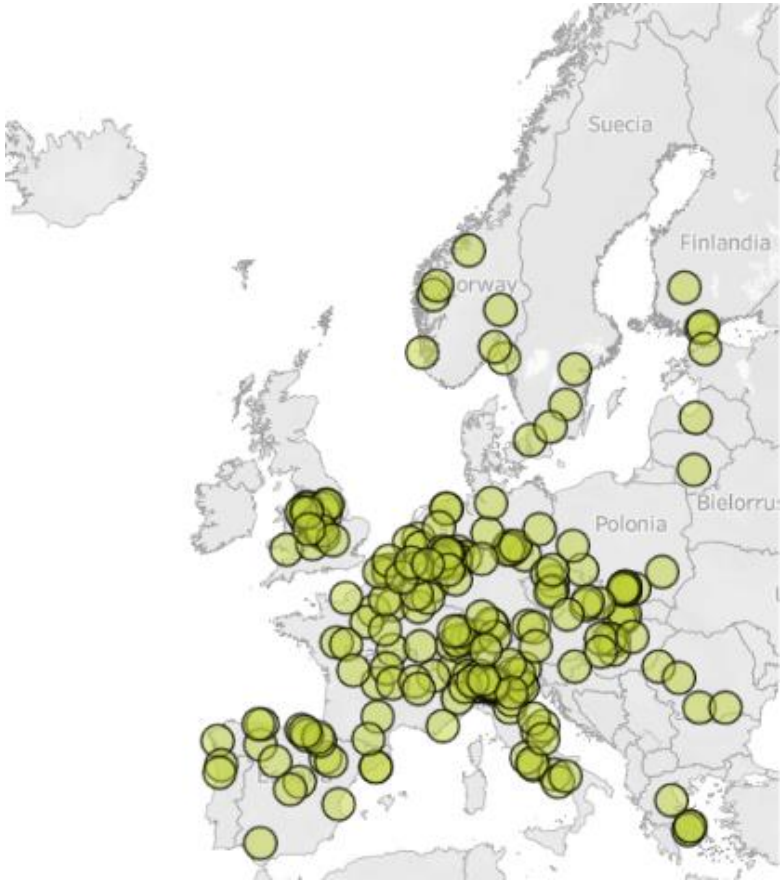
The industrial complex would allow the integration of new activities that require secondary aluminium as an input

Aluminium is 100% recycled and the second smelting only needs 5% of the energy needed to extract it from bauxite

Recycling

- Re-smelting aluminium into new products requires much less energy
- The EU is the region with the highest per capita aluminium recycling rate in the world
- Estimated monthly secondary aluminium ingot production in the EU27 is more than 225 thousand tonnes
- Europe exports around 20% of recovered aluminium scrap, so there is significant potential for increased production
- High atomisation in Europe: about 220 aluminium recycling factories have been identified, most of them SMEs

Aluminium recycling plants in Europe



* Source: European Aluminium

The industrial complex would allow the integration of new activities that require aluminium as an input

Depending on the activity, it would require the development of new facilities, and the acquisition of land in the region, so the potential is lower

Extruded	▪ Processing of extrusion billets by hot forming from hydraulic presses represents more than 50% of the European market for aluminium products. ▪ The plant provides 6xxx series billets (alloys with silicon and magnesium, which makes them heat mouldable), alloys that account for the majority of the extrusion market. ▪ High atomisation in Spain: over 40 active companies with a production capacity of around 600,000 tonnes per year*.
Laminated	▪ Processing of rolling slabs by combining hot and cold rolling. ▪ Final product: aluminium coils and sheets with different characteristics and alloys. Complex process where metal composition and thermo-mechanical transformation are key factors. ▪ The Alcoa plant provides rolling slabs in the 1xxx series (high purity aluminium, 99% or more, particularly employed in the chemical and electrical sectors) and 8xxx (alloy with tin, generally used in electrical conductors).
New series of alloys-modifications required	▪ The plant currently produces 1xxx, 6xxx and 8xxx series, focusing on chemical and electrical extrusion. ▪ Not producing series such as 7xxx (mixed with zinc, used in aeronautical structures, among others) or other series linked to nautical uses, structures, etc. ▪ Changing the types would require a modification of the process.

* Source: AEA

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The opportunity. Industrial plant in operation

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Feasibility analysis of an industrial project

- Scenario A
- Scenario B

2 scenarios are established along with a subsequent feasibility analysis:

- ❑ Scenario A: Recycled Aluminium + Primary Aluminium
- ❑ Scenario B: Recycled aluminium is enhanced and the electrolytic process is NOT put into operation

Scenario A

- The investment is spread out in phases in line with the energy price scenario
- Phase 1: Production of recycled aluminium from clean scrap metal begins
- Phase 2: Investments are made for processing dirty scrap metal
- Phase 3: Series 2 electrolytic vats are put into operation and investments are made to increase the foundry's production capacity and improve productivity

Scenario B

- Phase 1: Production of recycled aluminium from clean scrap metal begins
- Phase 2: Investments are made for the processing of dirty scrap metal
- Phase 3: Investments are made to increase the foundry's production capacity and improve productivity, boosting scrap metal recycling

The electrolytic process is NOT put into operation

The purchase price of the industrial facilities is initially estimated at a minimum amount equivalent to the Company's current debts

The following are a series of preliminary considerations related to the development of industrial projects

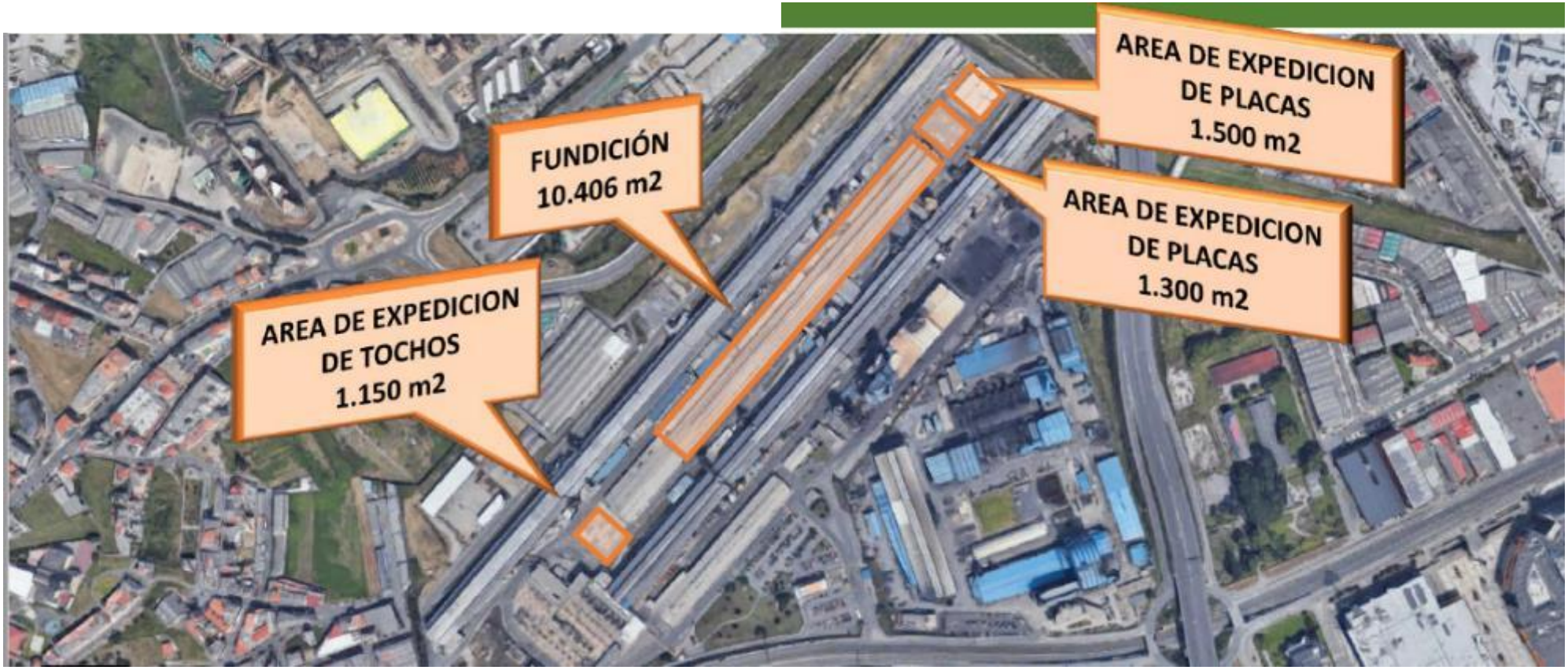
- 20 million euros is considered to be the minimum purchase price.
- The value of land and facilities is not considered in the analysis. The purpose of industrial plans is to maximise the use of the infrastructure.
- The analysis does not consider potential grants that could be provided by public authorities in the process. In case of being a net recipient of grants, the profitability of the industrial project would be higher.
- An interim analysis is carried out for 15 years. Given the current levels of uncertainty, no residual value of the facilities or the operating business is considered.
- Calculations are made in constant terms without taking into account the effect of inflation.
- The development of an industrial project does not require the use of all existing industrial facilities. This could free up space for possible sale and provide additional profitability, as well as reduce structural costs. It would be necessary to regulate these hypothetical situations in the sale agreement.
- The current production capacity of the billet plant (higher value-added product) is limited to a sawing capacity of 60,000 t/yr.
- Possible compensation costs to adjust staffing needs to the industrial project under analysis have not been considered in the analysis.

The following images show the location and estimated surface areas of the different parts of the industrial complex (i/iv)

Halls associated with the electrolysis process

The following images show the location and estimated surface areas of the different parts of the industrial complex (ii/iv)

Halls and areas associated with the casting process



The following images show the location and estimated surface areas of the different parts of the industrial complex (iii/iv)

Other services

The following images show the location and estimated surface areas of the different parts of the industrial complex (iv/iv)

Areas associated with electrometallurgical paste production

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Feasibility analysis of an industrial project

- Scenario A
- Scenario B

Scenario A

The traditional activity of primary aluminium production in the current situation is not viable (high energy prices). An industrial project is proposed, for which a preliminary financial feasibility analysis is carried out, which would be developed in 3 phases:

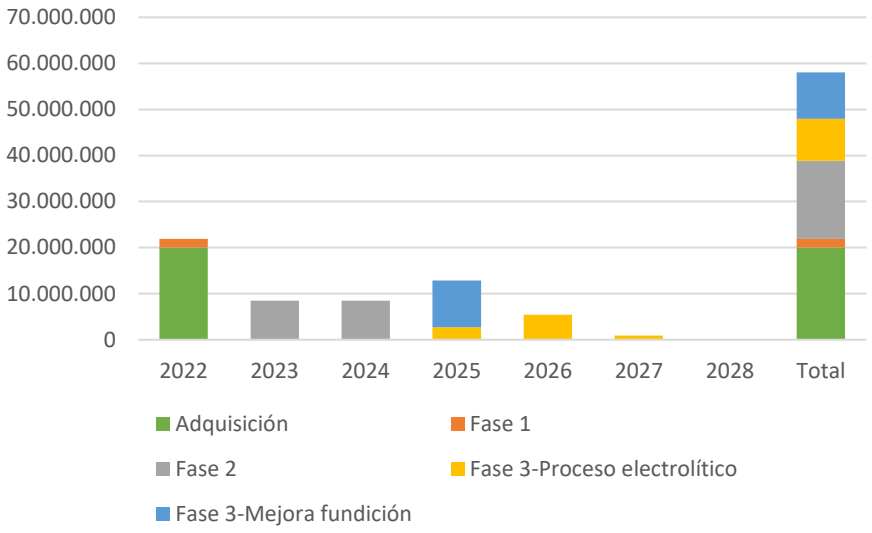
- ❑ Phase 1: Investments in foundry upgrading (switch to gas) and recycling of clean aluminium scrap and ingot for billet production (with higher added value)
- ❑ Phase 2: Investments in a pre-treatment and pre-sorting plant for dirty aluminium scrap and a tandem furnace-re-melting unit (40,000 t/yr)
- ❑ Phase 3: Primary aluminium production (with competitive and stable electricity prices) and commissioning of a continuous casting and automatic sawing tunnel (increased productivity and billet processing capacity up to 100,000t/yr)

	PHASE 1	PHASE 2	PHASE 3
Activity	Smelting of recycled aluminium from clean scrap and ingot	Pre-treatment and pre-sorting plant for dirty scrap metal	Primary aluminium production in Series 2
Production	40 kt/year secondary aluminium	60 kt/year: 40 kt/year dirty scrap and 20 kt/year clean scrap	80 kt/year: 42 kt/year scrap, 31.5 kt/year prim. al. and 6.5 kt of ingot
Investment	€1.9 M	€16.9 M	▪ Electrolysis: €9.1 M ▪ Cont. tunnel and automatic sawing: €10.1 M
Time Scale	2022-2023	2024-2025	2026-

Scenario A

Investments, including the estimated minimum acquisition cost of €20m, are estimated at around €58m to be carried out in 3 phases

The investment amount is a preliminary estimate, based on broad ratios, and no detailed project has been carried out

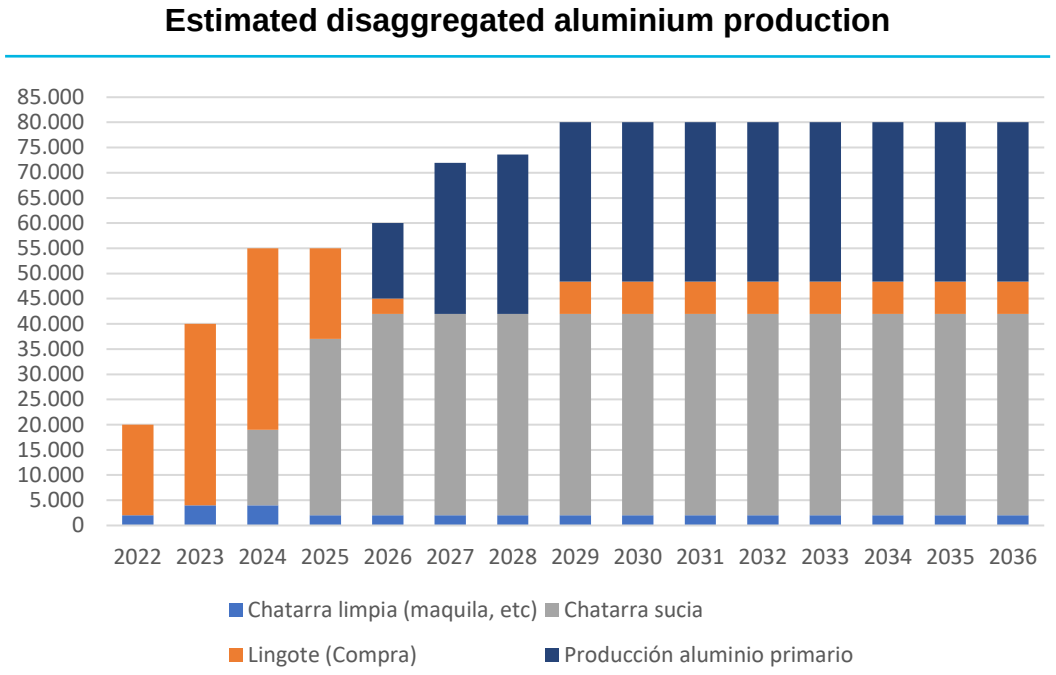


PHASE 1	PHASE 2	PHASE 3
		Electrolysis: €9.1 M
Gas pipes and burners: €1.4m	Slider and melting furnace: €5m	Repair of roofs on Series 2 hall: €1m
Roof repairs: €0.1m	Additional costs in smelting hall: €1.9m	Electrolytic process start-up: €1.5m
Safety checks: €0.25m	Pre-sorting and pre-treatment plant for dirty scrap: €6m	Construction of silos in the Harbour for alumina €3.5m
Contingencies: €0.18m	Warehouse and civil works: €2.5m	Repair of overhead cranes: €2m
	Contingencies: €1.5m	Security checks: €0.25m
		Contingencies: €0.82m
		Improved foundry: €10.1m
		Continuous homogenising tunnel and automatic sawing: €9.2m
		Contingencies: €0.9m
€1.92m	**€16.95m**	**€19.2m**

Scenario A

Production at full operation is estimated at 80,000 t/yr of aluminium billet, with the following phase distribution

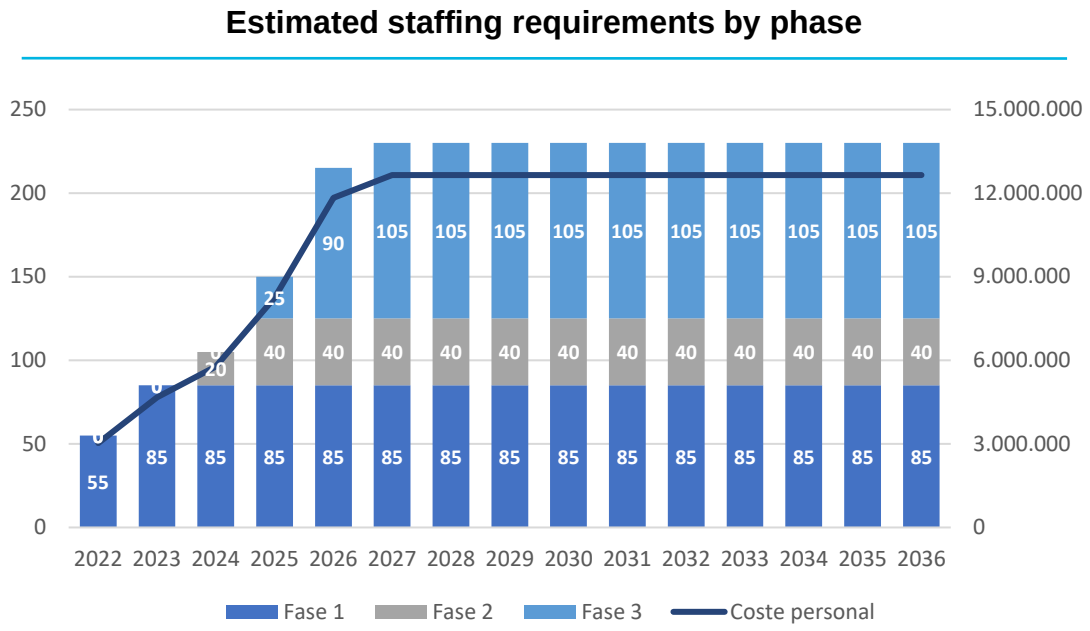
- Phase 1 would produce 40,000 tonnes of secondary aluminium
- Phase 2 would reach 60,000 tonnes of secondary aluminium
- Phase 3, the purchase of ingot would not be necessary with the production of primary aluminium and production would reach 73,500 t/yr
- Production would be increased to 80,000 t/yr with the purchase of ingot by using the increased capacity of the foundry for billet production



Scenario A

Full staffing requirements are estimated at 230 people, at an estimated cost of €12.7m, with the following breakdown by phases

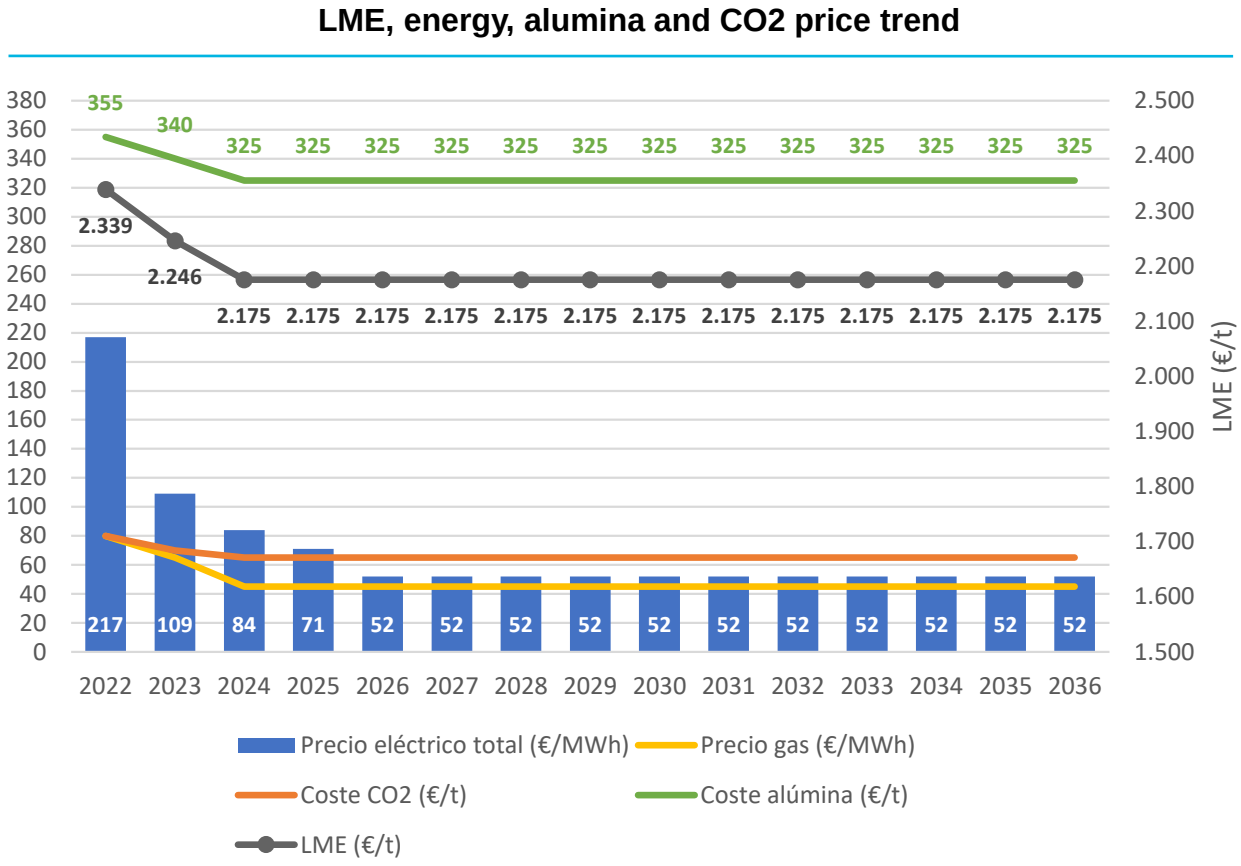
- Phase 1 would require around 85 people between structure (15) and foundry (70)
- Phase 2 would require about 40 people. 10 would be linked to the scrap pre-treatment and pre-sorting plant, and 30 new people for the foundry
- In phase 3, with the start-up of electrolysis, annexes and new structural staffing requirements, the number of staff members is estimated at 105



Note: Preliminary estimate without detailed analysis of productivity in terms of investments made

Scenario A

There are price tensions in energy and raw materials that are expected to stabilise in the coming years. The following graph shows the estimated price trend of the main items.



Note: The price of electricity includes the costs of tolls, charges and taxes (estimated at €17/MWh) + POOL price, with PPA for 2026 estimated at €35/MWh

The main assumptions for the analysis of the industrial project are broken down below:

INCOME

- LME: 2022 - $2,643; 2023 - $2,538; 2024 and onwards - $2,458
- Billet sale price: LME + 16% prime
- Exchange rate: $/€1.13

OVERHEADS

- Corporate income tax: 25%
- Administrative and commercial costs: €1.4m/year
- Repair and maintenance: €1.2m/year
- Insurance, taxes, leases and royalties, other: €3.1m/year
- Transport: €50/tonne sold

OTHER SPECIFIC COSTS

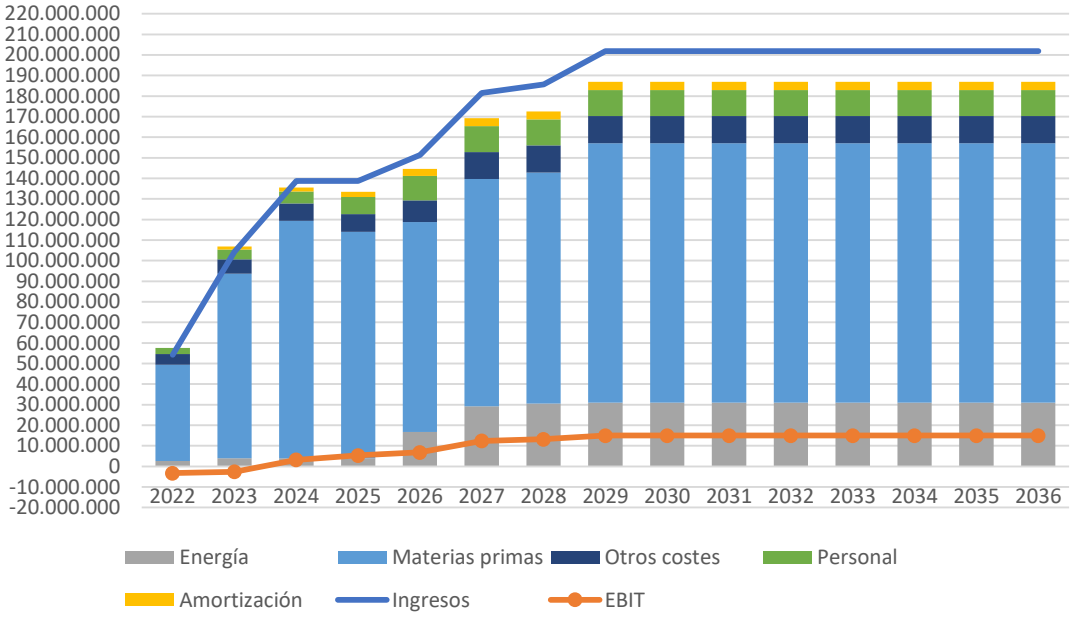
- Electricity consumption in electrolytic process: 16 MWh/t of primary aluminium
- 1.9t alumina per 1t of primary aluminium
- Cost of handling alumina: €10/t
- Unallocated CO2 emissions: 1t CO2 per 1t of primary aluminium production
- Other indirect materials for primary aluminium production: €70/t
- Annual costs of €0.9m per year for maintenance of electrolytic tanks
- Foundry gas consumption: 1.45 MWh/t of secondary aluminium
- Procurement of clean scrap: 99.5% LME
- Procurement of dirty scrap metal: 85.0% LME
- Cost of transport and handling of dirty scrap: €50/t
- Other electricity consumption: 7,125 MWh/year (foundry, paste mill, pre-treatment and sorting plant)
- Paste production: 0.51t of paste per 1t of primary aluminium
- Other pre-treatment and sorting plant costs: €0.35m/year (maintenance, water, etc.)

Scenario A

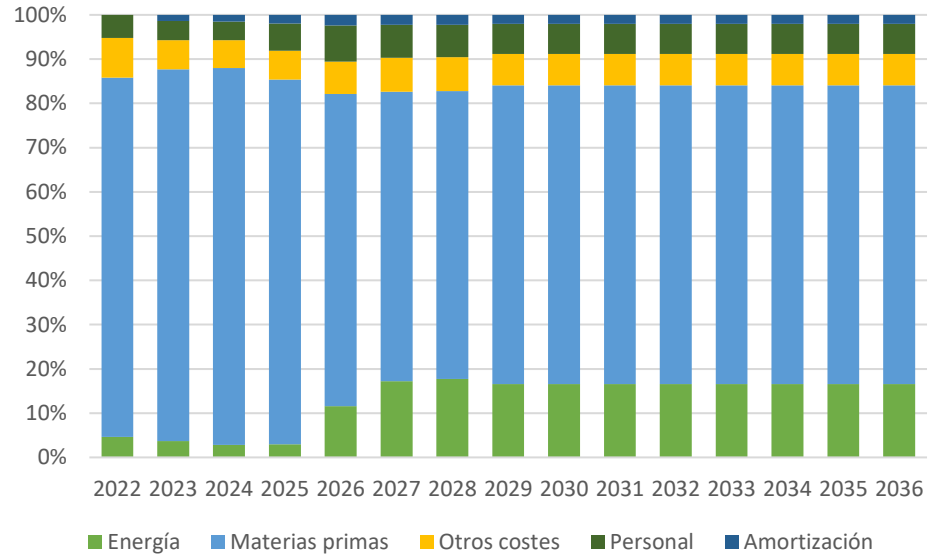
The industrial project shows positive flows from year 3 of operation

The main cost is raw materials, as the cost of scrap is included

Analysis of revenues, expenses and EBIT

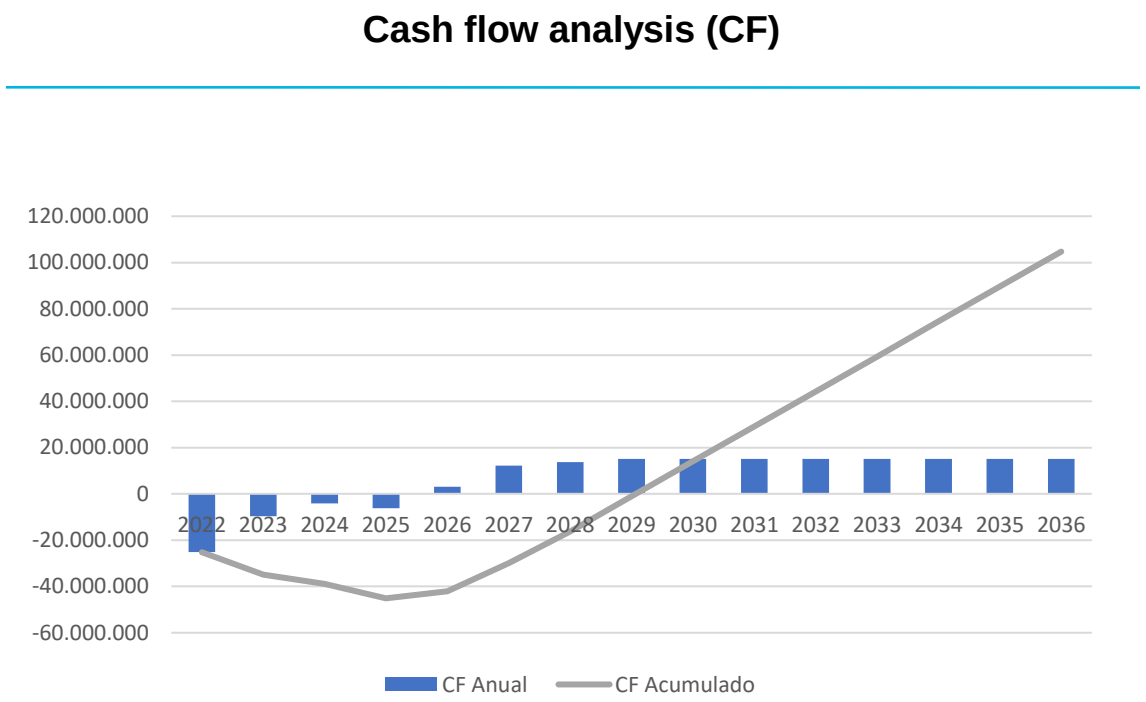


Percentage distribution of costs by item



Scenario A

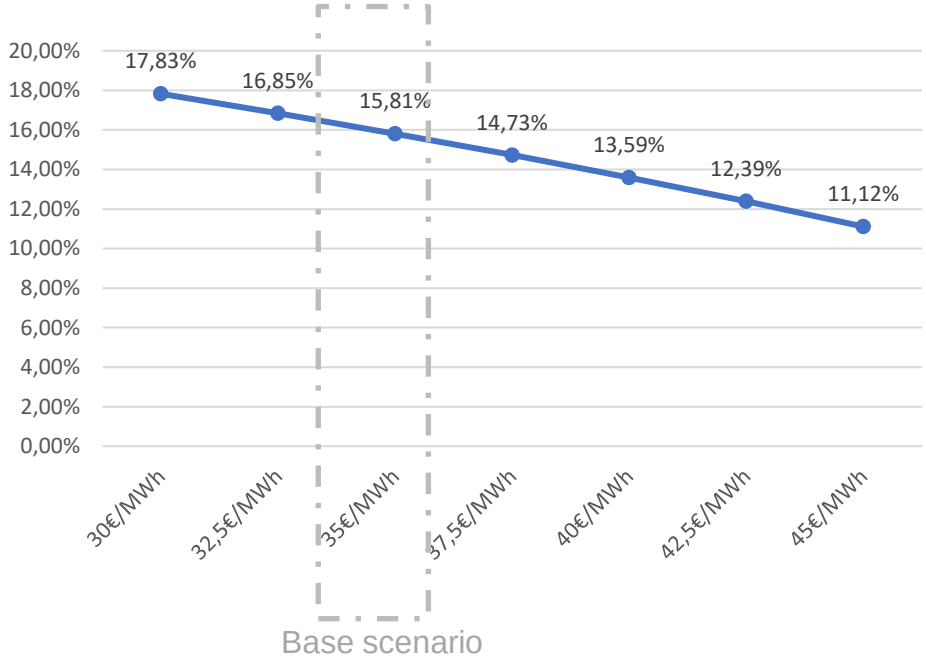
The proposed industrial project would have an IRR of 15.8% over 15 years



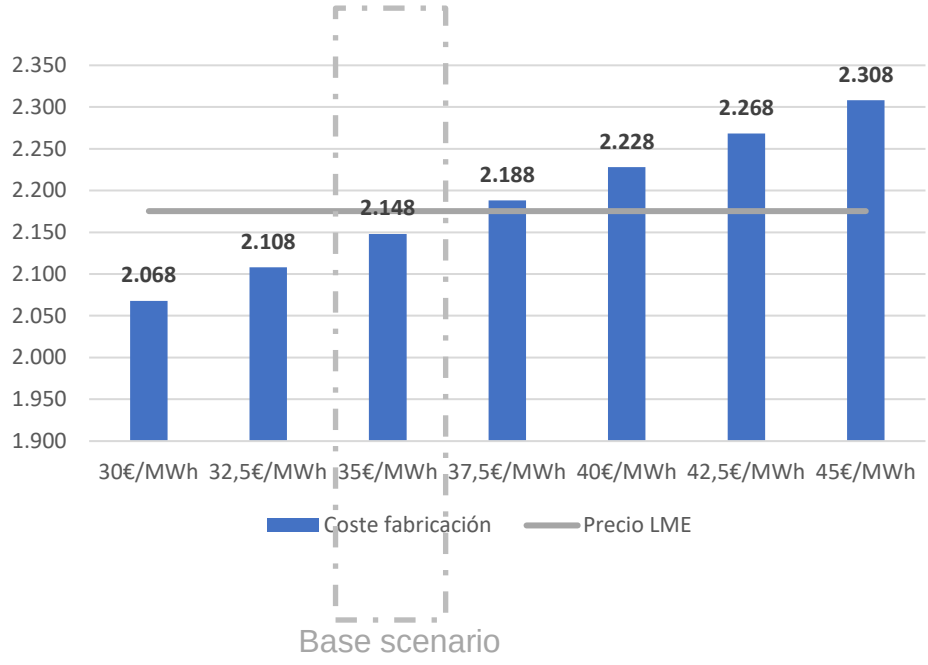
Scenario A

In a sensitivity analysis carried out into the price of electricity, it can be observed that primary aluminium production would become unprofitable at prices above €37.5/MWh and the IRR of the project would drop from 15.8% to 14.7%.

Sensitivity of the industrial project's IRR to the PPA price



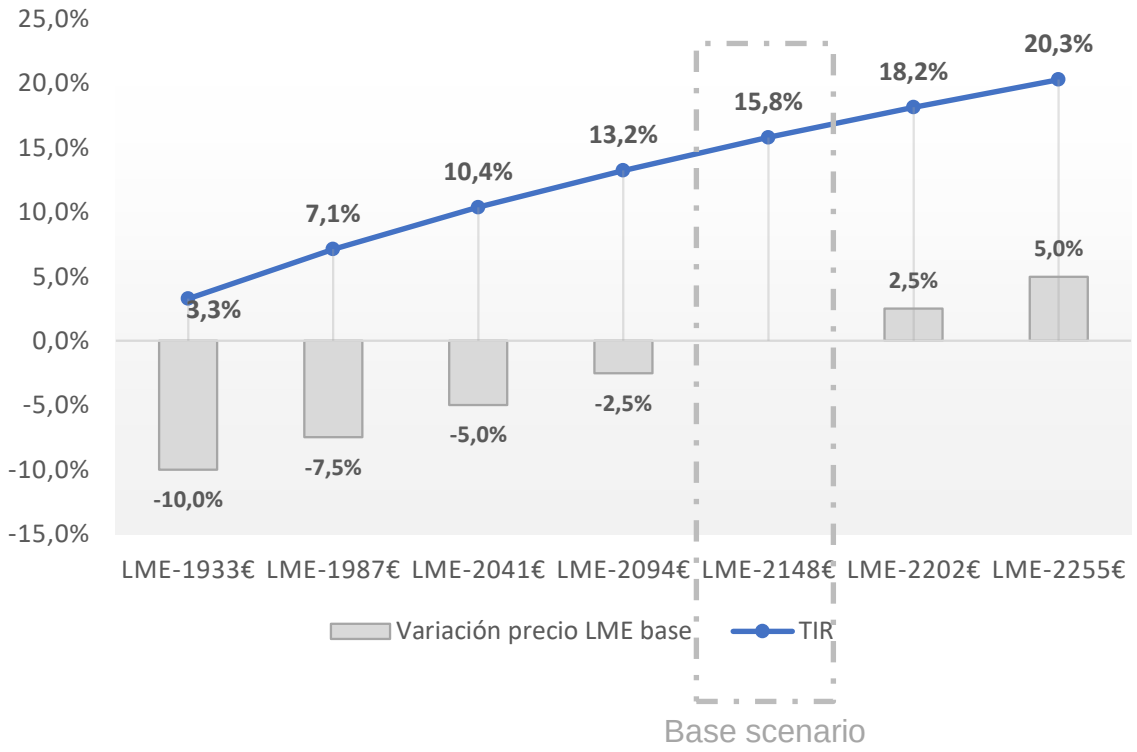
Sensitivity of primary aluminium price to PPA price



Scenario A

In a sensitivity analysis to changes in the LME price from 2025 onwards, it can be noted that the industrial project is very sensitive to the LME aluminium price. A reduction in the LME price of 5% would lead to a considerable reduction in the profitability of the project, lowering the IRR of the project from 15.8% to 10.4%

Sensitivity of the industrial project's IRR to the LME price



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Scenario B

The industrial project would focus on the production of secondary aluminium. In a preliminary financial feasibility analysis carried out, it would be implemented in 3 phases:

- ❑ Phase 1: Investments in foundry upgrading (switch to gas) and recycling of clean aluminium scrap and ingot for billet production (with a price above LME).
- ❑ Phase 2: Investments in a pre-treatment and pre-sorting plant for dirty aluminium scrap, a larger capacity (50,000 t/yr) remelting furnace-slitter and a new 20 kV underground power supply line and 2,000 kVA transformer centre.
- ❑ Phase 3: Investments to improve productivity and capacity of the foundry (homogenisation tunnel and automatic sawing to improve foundry productivity and reach 100,000 t/yr in billet production) and increase recycling of dirty scrap.

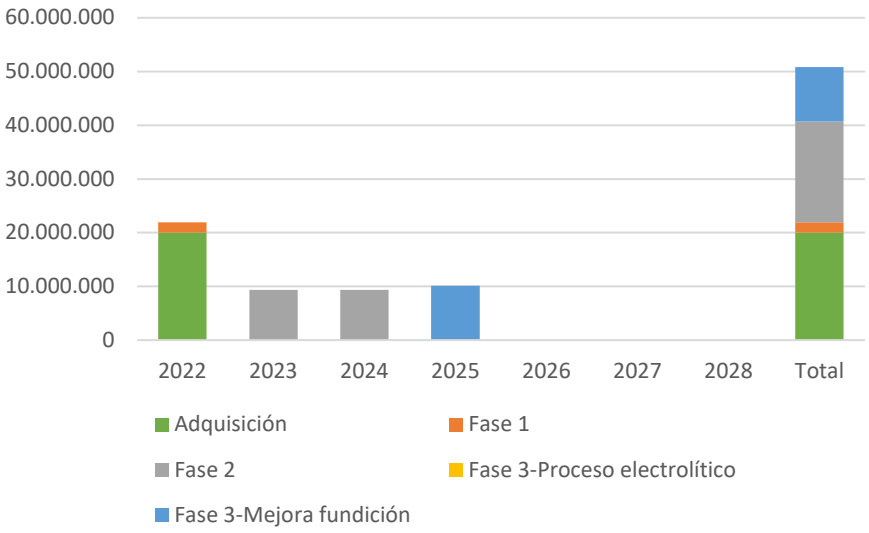
	PHASE 1	PHASE 2	PHASE 3
Activity	Smelting of recycled aluminium from clean scrap and ingot	Pre-treatment and pre-sorting plant for dirty scrap metal	Promote the recycling of dirty scrap metal
Production	40 kt/yr secondary aluminium	60 kt/yr: 40 kt/year dirty scrap and 20 kt/year clean scrap	75 t/yr: 50 kt/yr dirty scrap and 25 kt/yr ingot and clean scrap
Investment	€1.9m	€18.8m*	Continuous tunnel and automatic sawing: €10.2m
Time scale	2022-2023	2024-2025	2026-

Note *: Includes a larger capacity furnace and new power supply line

Scenario B

Investments, including the estimated minimum acquisition cost of €20m, are estimated at around €50.8m, to be carried out in 3 phases

The amount of investment is preliminary, based on broad ratios, and no detailed project has been carried out



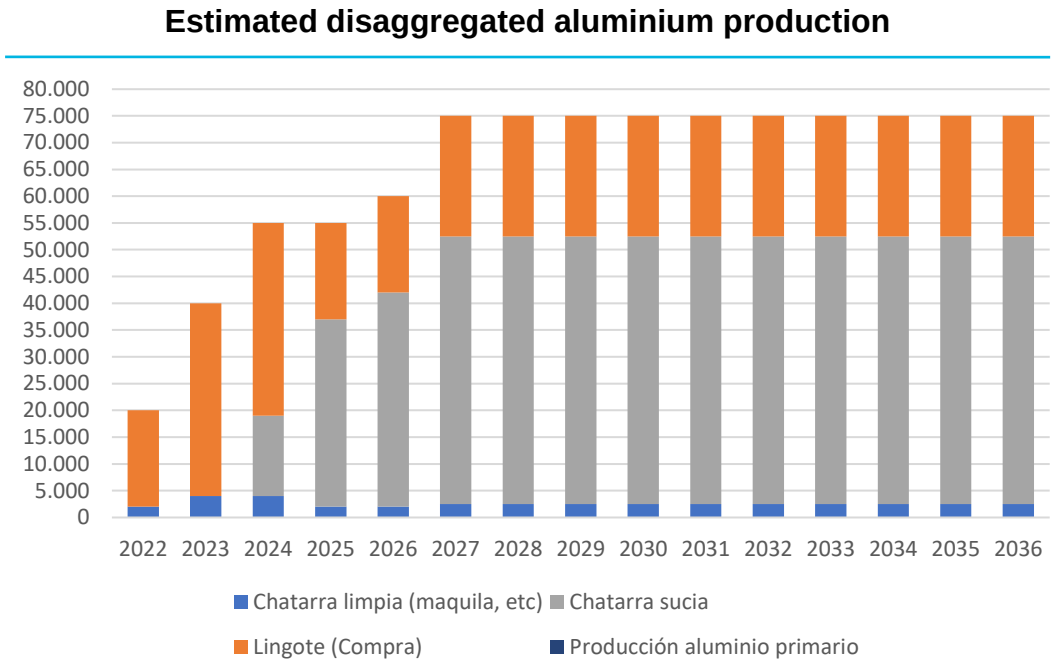
PHASE 1	PHASE 2	PHASE 3
Gas pipes and burners: €1.4m	Slider and melting furnace: €6.25m	Homogenising tunnel and automatic sawing: €9.2m
Roof repairs: €0.1m	Additional costs in smelting hall: €1.9m	Contingencies: €0.9m
Security checks: €0.25m	Pre-sorting and pre-treatment plant for dirty scrap: €6m	
Contingencies: €0.18m	Warehouse and civil engineering: €2.5m	
	New 20kV power line and TC* 2,000 kVA: €0.4m	
	Contingencies: €1.7m	
€1.92m	**€18.76m**	**€10.12m**

*TC: Transformer Centre

Scenario B

Production at full operation is estimated at 75,000 t/yr of aluminium billet, with the following phase distribution

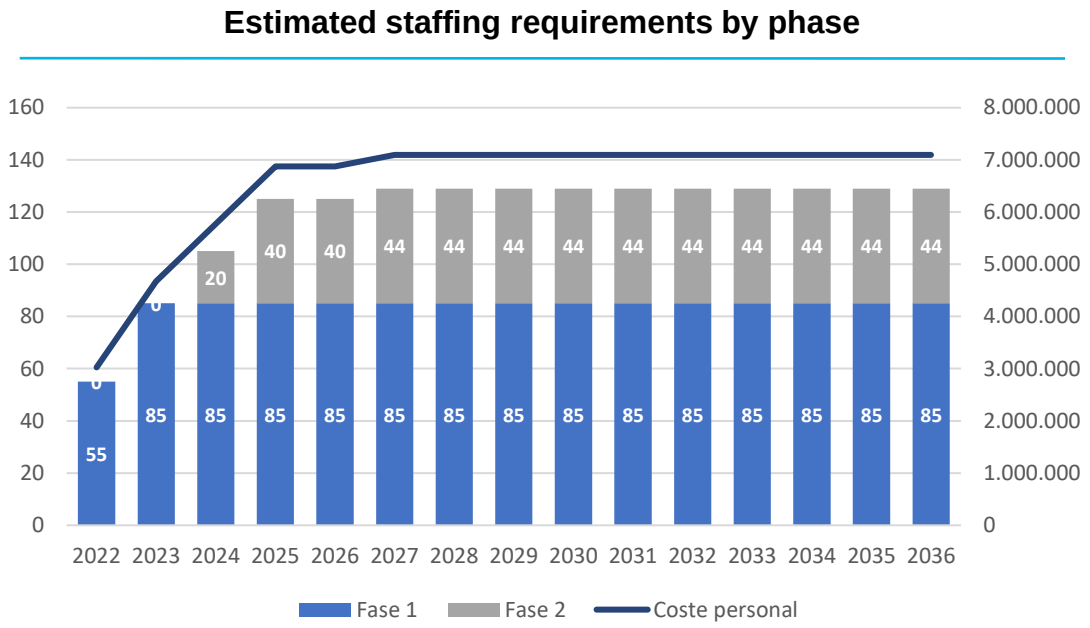
- Phase 1 would produce 40,000 tonnes of secondary aluminium from clean scrap and ingot
- Phase 2 would reach 60,000 tonnes, 40,000 tonnes of which would be from dirty scrap
- Phase 3 would reach 75,000 tonnes, 50,000 tonnes of which would be from dirty scrap



Scenario B

Full staffing requirements are estimated at 129 people, at an estimated cost of €7.1m, with the following breakdown by phases

- ❑ Phase 1 would require around 85 people between the structure (15) and cast house (70)
- ❑ Phase 2.a would require about 40 people. 10 would be linked to the scrap pre-treatment and pre-sorting plant and 30 new people for the foundry
- ❑ In phase 2.b the production capacity of the pre-sorting plant would be increased with the need for 4 people



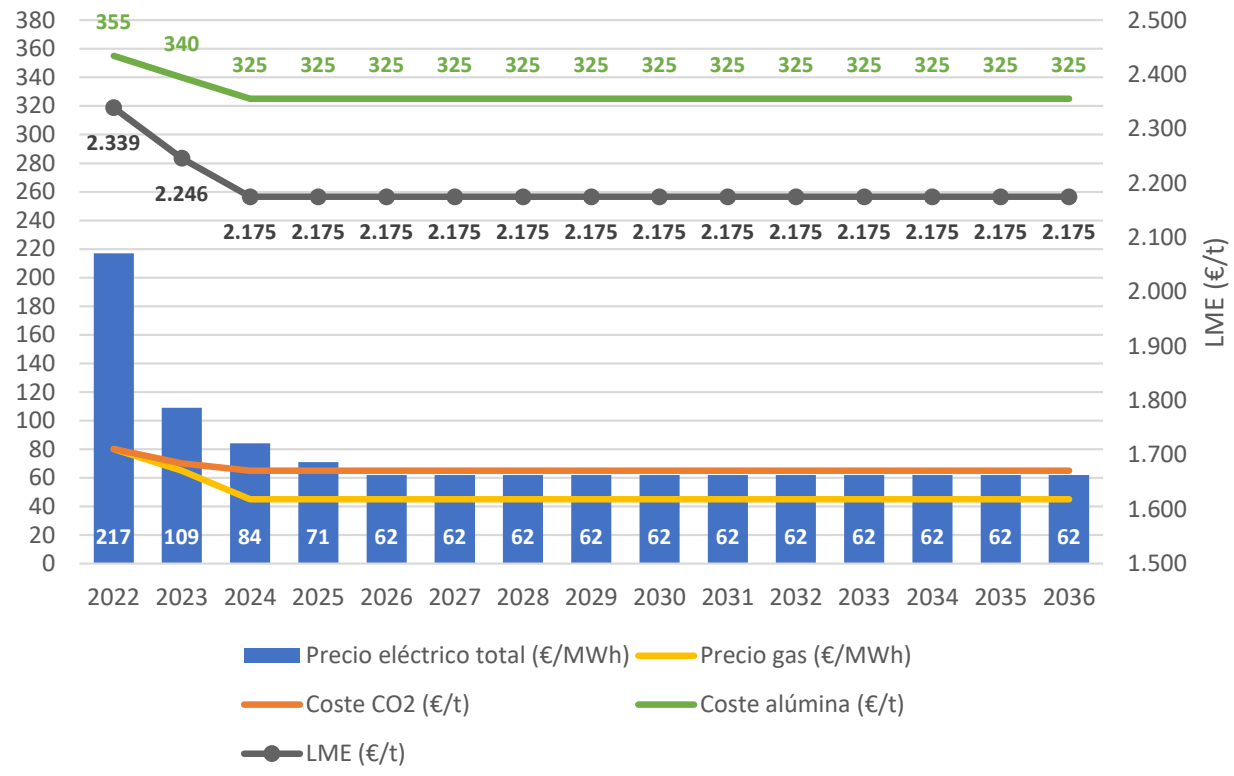
Note: Preliminary estimate without detailed analysis of productivity in terms of investments made

Scenario B

There are price tensions in energy and raw materials that are expected to stabilise in the coming years. The following graph shows the estimated development in the prices of the main aggregates.

It is not so relevant to reach a competitive PPA agreement in this scenario. For this reason, an electricity price in line with current futures of €45/MWh is considered.

LME, energy, alumina and estimated CO2 price trend



Note: The price of electricity includes the costs of tolls, charges and taxes (estimated at €17/MWh) + POOL price, an average price of €45/MWh being estimated for 2026 onwards

Scenario B

The main assumptions for the analysis of the industrial project are broken down below

INCOME

- LME: 2022 - $2,643; 2023 - $2,538; 2024 and onwards - $2,458
- Billet Sale price : LME + 16% prime
- Exchange rate: €/$1.13

OVERHEADS

- Corporate income tax: 25%
- Administrative and commercial costs: €1.4m/year
- Repair and maintenance: €1.2m/year
- Insurance, taxes, leases and royalties, other: €3.1m/year
- Transport: €50/tonne sold

OTHER SPECIFIC COSTS

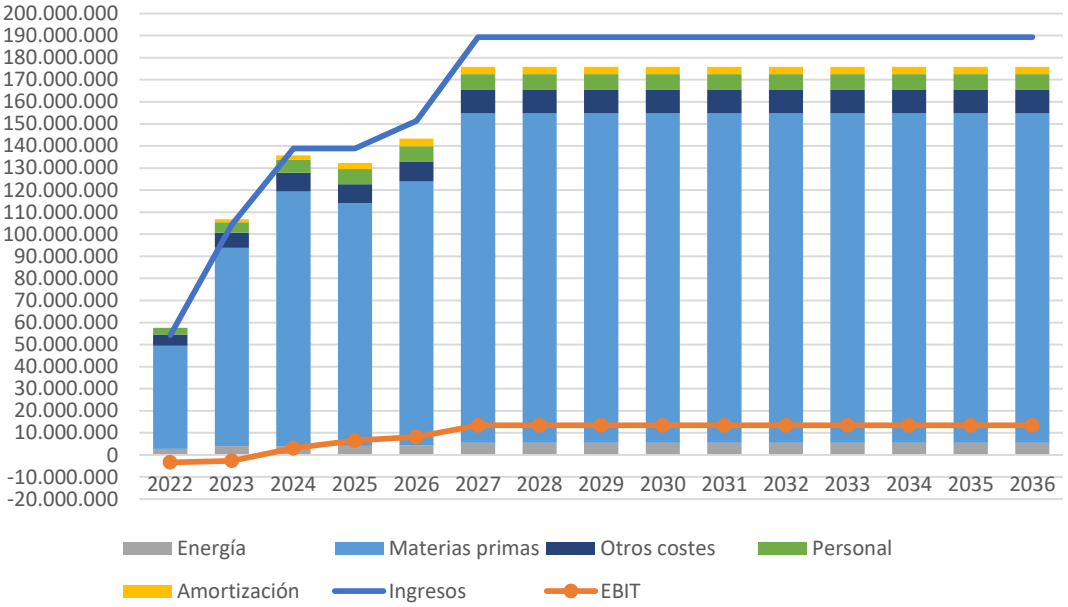
- Cast house gas consumption: 1.45 MWh/t of secondary aluminium
- Procurement of clean scrap: 99.5% LME
- Procurement of dirty scrap metal: 85.0% LME
- Cost of transport and handling of dirty scrap: €50/t
- Other electricity consumption: 8.281 MWh/year (foundry, pre-treatment and sorting plant)
- Other pre-treatment and sorting plant costs: €0.44 M/year (maintenance, water, etc.)

Scenario B

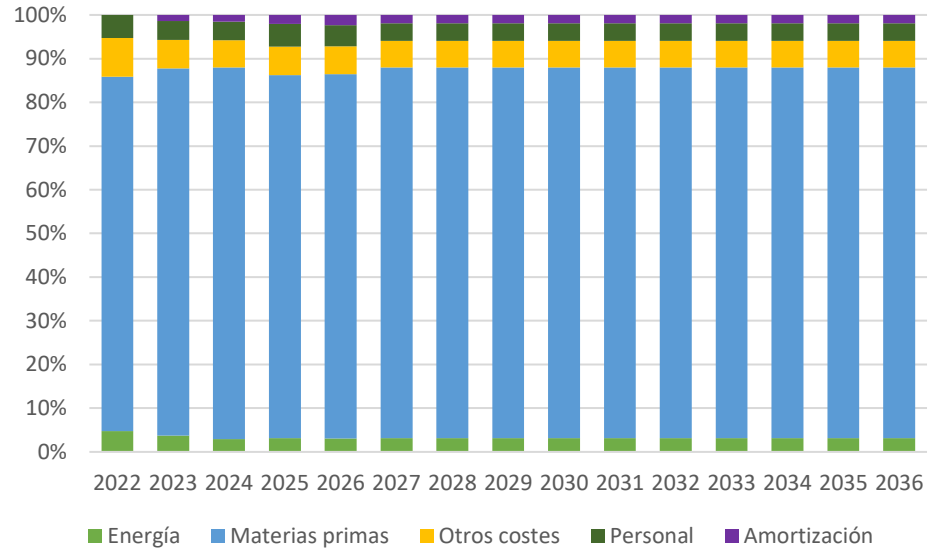
The industrial project shows positive flows from year 3 of operation

The main cost is raw materials, as the cost of scrap is included

Analysis of revenues, expenses and EBIT



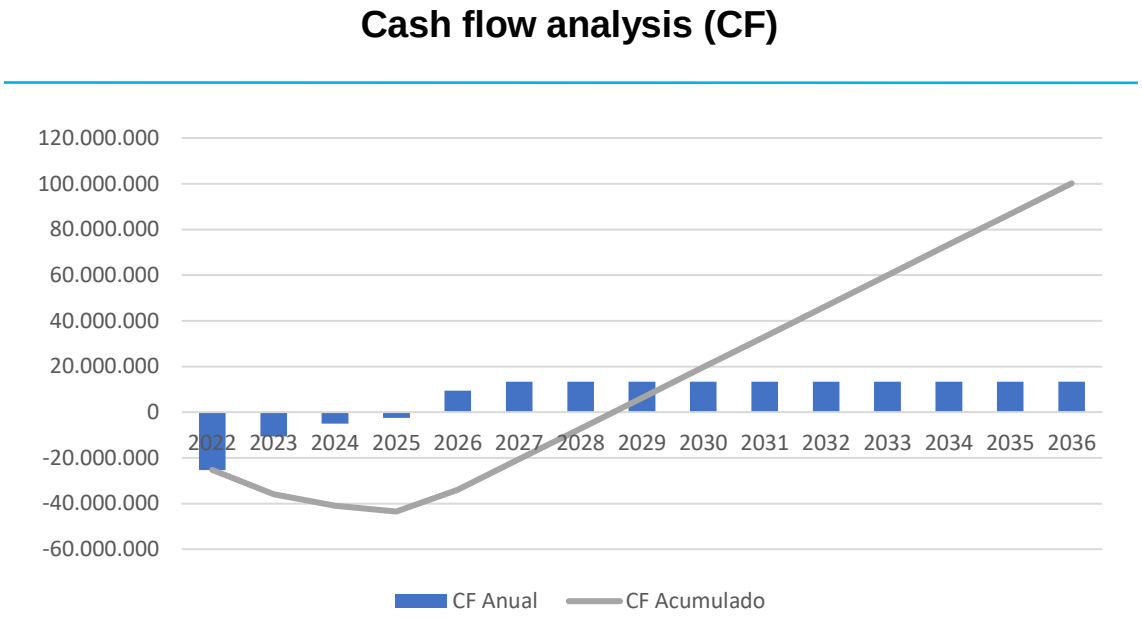
Percentage distribution of costs by item



Scenario B

The proposed industrial project would have an IRR of 16.5% over 15 years

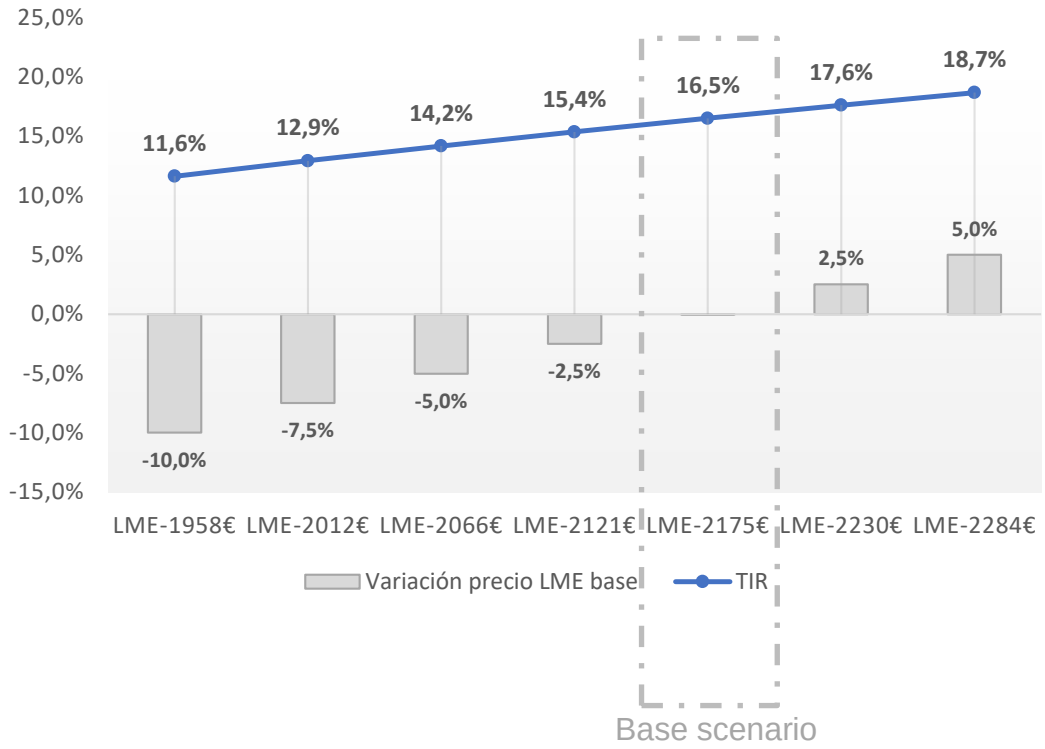
This scenario is more profitable due to the lower investment required and the fact that the electrolysis business has lower margins than aluminium recycling



Scenario B

In a sensitivity analysis of changes in the LME price from 2025 onwards, it can be observed that the industrial project is sensitive to the LME aluminium price but less so than in Scenario A. A reduction in the LME price of 10% would lead to a reduction in the profitability of the project, lowering the project IRR from 16.5% to 11.6%

Sensitivity of the industrial project's IRR to LME prices



Scenario B has higher profitability with lower investment, better environmental indicators and lower energy and raw material dependency

	SCENARIO A	SCENARIO B
Investment	€58 M	€50.8 M
Maximum yearly production	▪ 31.6 kt electrolytic aluminium ▪ 40 kt dirty scrap ▪ 8.4 kt clean scrap and ingot	▪ 50 kt dirty scrap ▪ 25 kt clean scrap and ingot
Employment	230 employees	129 employees
IRR	15.8%	16.5%
Environmental Sustainability	↓	↑
Electrical dependence	↓	↑
Raw material dependence	↓	→
Technological obsolescence	↓	↑
Surface area free	→	↑

Both industrial scenarios would be viable, with an attractive IRR, but linked to a competitive, stable electricity price in the case of scenario A with primary aluminium production

The calculation assumes an initial plant acquisition cost of €20 million

Considerations

- The project is calculated for a time frame of 15 years.
- The effect of inflation has not been taken into account, the model being in constant euros.
- Viability is conditional on an acquisition of the plant at an initial cost of €20m.
- The whole project does not take into account possible grants from public authorities for the investment, so the payback periods could be reduced and the IRR of the project could be higher.
- Payback on the investment would be between 7 and 8 years (depending on the scenario), although the value of the plant's current assets needs to be taken into account. The construction and start-up of a completely new factory would require millions of euros in investments and new licences and authorisations that would possibly make the project unfeasible.
- In both scenarios, the plant would be running at a loss in the first few years because the structural costs of the whole factory are very high for comparatively small production, which are not compensated until new processes are incorporated: the pre-sorting plant and pre-treatment of dirty scrap, and/or subsequent manufacture of electrolytic aluminium.

The proposed industrial project would have positive impacts on the economy of Galicia and the industrial area of A Coruña, as follows

Positive impacts of the proposed industrial project

- This industrial project would boost a new area of the aluminium recycling business in Galicia
- It would strengthen the aluminium value chain in the Autonomous Community:
  - Creation of new companies related to the aluminium circular economy
  - New logistics operators
  - Business opportunities for the Outer Harbour of A Coruña
- The proposed project is aligned with current European guidelines based on the circular economy and the use of renewable energy.
- Best available techniques would be used for aluminium recycling
- In scenario A, the production of secondary aluminium is more important, complemented by green electrolytic aluminium, resulting in a more sustainable, flexible plant in the face of possible energy and raw material price crises (alumina and coal derivatives)
- Scenario B focuses entirely on the production of secondary aluminium from the circular economy and is less dependent on external factors (energy and alumina prices).
- The project would give continuity to industrial activity, reducing the negative socio-economic impact of a possible total cessation of activity
- The IRR of the project would be between 15.8% (scenario A) and 16.5% (scenario B) for 15 years