EUROPEAN COMMISSION

Brussels, 25.11.2019
C(2019) D/8648

PUBLIC VERSION

In the published version of this decision, some information has been omitted pursuant to Article 17(2) of Council Regulation (EC) No 139/2004 concerning non-disclosure of business secrets and other confidential information. The omissions are shown thus […]. Where possible the information omitted has been replaced by ranges of figures or a general description.

To the notifying party

Subject: **Case M.9379 – Umicore / Cattierite Holdings Coöperatief**
Commission decision pursuant to Article 6(1)(b) of Council Regulation No 139/2004[1] and Article 57 of the Agreement on the European Economic Area[2]

Dear Sir or Madam,

(1) On 18 October 2019, the European Commission received notification of a proposed concentration pursuant to Article 4 of the Merger Regulation by which Umicore, S.A./N.V. (Belgium, 'Umicore') acquires within the meaning of Article 3(1)(b) of the Merger Regulation sole control of the whole of Cattierite Holdings Coöperatief U.A. (the Netherlands, 'Cattierite'), currently solely controlled by Koboltti Chemicals Holdings Limited (Bermuda, 'KCHL'), by way of purchase of shares (hereinafter, the 'Transaction').[3] Umicore is also designated hereinafter as the 'Notifying Party'.

1 OJ L 24, 29.1.2004, p. 1 (the 'Merger Regulation'). With effect from 1 December 2009, the Treaty on the Functioning of the European Union ('TFEU') has introduced certain changes, such as the replacement of 'Community' by 'Union' and 'common market' by 'internal market'. The terminology of the TFEU will be used throughout this decision.

2 OJ L 1, 3.1.1994, p. 3 (the 'EEA Agreement').

3 Publication in the Official Journal of the European Union No C 364, 29.10.2019, p. 28.

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1. THE PARTIES

(2) **Umicore** is a global metals technology and recycling group based in Belgium. Its business units primarily concerned by the concentration are (i) the rechargeable battery materials unit, which is a cathode material supplier for rechargeable lithium-ion batteries ('Li-ion batteries') used in portable electronics and electric vehicles ('EVs'), and (ii) the non-battery applications cobalt units (namely the tool materials and inorganics units).

(3) **Cattierite** is a holding company that indirectly (via its subsidiary Carollite Holdings B.V, the Netherlands) owns and controls Freeport Cobalt Oy (Finland, 'FCO'). FCO is active in the refining of input cobalt materials and the production of (i) refined cobalt materials for battery and non-battery applications and (ii) precursors. FCO controls the largest cobalt refinery outside of China in Kokkola, Finland.

2. THE OPERATION

(4) Pursuant to an agreement signed on 22 May 2019, Umicore will acquire sole control over Cattierite, including FCO's cobalt refinery and FCO's downstream production of refined cobalt materials for battery applications ('battery grade cobalt materials') and precursors (the 'Target'). Umicore and the Target are referred to as the 'Parties'.

(5) The seller, KCHL, will retain FCO's non-battery businesses and some sales for battery applications made by FCO's non-battery businesses (the 'Retained Businesses'). Additionally, until 2093, KCHL will have up to [...] tonnes (of cobalt) per calendar year of reserved refining capacity at the Target's refinery, with the right for KCHL to have the capacity operated for its benefit on a cost-plus basis, so that the Retained Businesses continue to operate.

3. UNION DIMENSION

(6) The notified operation has a Union dimension because the undertakings concerned have a combined aggregate worldwide turnover of more than EUR 5 000 million (Umicore: EUR 13 716 million; Cattierite: EUR […] million),[4] each of them has a Union-wide turnover in excess of EUR 250 million (Umicore: EUR […] million; Cattierite: EUR […] million)[5] and they do not achieve more than two-thirds of their aggregate Union-wide turnover within the same Member State.

4. RELEVANT MARKETS

4.1. Introduction to the industry and the cobalt supply chain

(7) Cobalt is present in various forms of cobalt-bearing ores in the earth's crust, which often also contain other metals, in particular nickel and copper. Cobalt is predominantly extracted as a by- or co-product of nickel or copper mining.

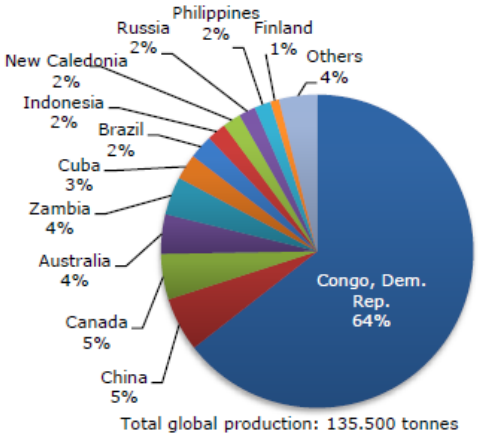
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4 Turnover calculated in accordance with Article 5 of the Merger Regulation.

5 Cattierite's revenues for FY 2018 in the EU were EUR […] million plus EUR […] million of sales to the Retained Businesses. The Retained Businesses' revenues are not included.

(8) Globally, cobalt is mined in 19 countries with the largest producers being the Democratic Republic of Congo (DRC), with around 64% of the global cobalt mining production, China (6%) and Canada (5%). With relevance to the Union, 2% of global production is covered by New Caledonia (a special collectivity of France) and 1% by Finland.[6]

Figure 1 Global cobalt mine production average (2010–2014)



Source: Commission Staff Working Document, Report on Raw Materials for Battery Applications, 22.11.2018.

(9) Cobalt-bearing ores typically undergo a first process of chemical transformation at or close to the mines in order to produce a cobalt concentrate or intermediate product (economically more attractive to transport than raw ores given the latter's relatively low concentration of cobalt), which is then transported from the mine site to a cobalt refinery. Cobalt concentrates/intermediates can take several forms, such as Cobalt Hydroxide Intermediate Product ('CHIP'), white alloys or other.

(10) Cobalt refineries refine cobalt input materials (CHIP or other) first into a cobalt compound solution, which is thereafter further processed into metallic cobalt (metal or powder) or cobalt chemicals (chemical solution).

(11) Refined cobalt materials (in metallic or chemical form) can be used in a wide range of different applications, including battery and non-battery applications.

(12) Battery grade cobalt materials are refined cobalt materials of a certain level of chemical purity, and which have the physical characteristics and consistency that make the materials suitable for use in battery applications. Battery grade cobalt materials can either be (i) transformed into a precursor, which is a combination of battery grade cobalt with other elements necessary for the production of the specific cathode material, or (ii) sold as such to a producer of cathode materials.

(13) Battery grade cobalt materials are used as input materials to produce cathode materials, which in turn are used in the production of Li-ion batteries. There are five main types of cathode materials for Li-ion batteries, as indicated below:

6 Commission Staff Working Document, Report on Raw Materials for Battery Applications, 22.11.2018.

Figure 2 Main types of cathode materials for Li-ion batteries and their composition

Cathode materials	Raw materials (composition)
NMC	Lithium, Nickel, Manganese, Cobalt
LMO	Lithium, Manganese, Oxide
LCO	Lithium, Cobalt, Oxide
LFP	Lithium, Iron, Phosphorus
NCA	Lithium, Nickel, Cobalt, Aluminium

Source: Form CO, paragraph 117.

(14) Depending on the type of cathode materials, battery grade cobalt materials are combined with other elements into an intermediate product, a precursor, which in turn is used in the production of cathode materials. For instance, for the production of NMC-type cathode materials, battery grade cobalt is combined with 'battery grade' nickel and manganese to form a NMC precursor. The production of some cathode materials, such as LCO-type cathode materials, does not require the use of a precursor and can be done by combining battery grade cobalt with lithium and oxide directly.

(15) The customers of cathode materials for Li-ion batteries are battery producers. The main end applications of Li-ion batteries are (i) portable electronics, (ii) energy storage systems and (iii) EVs.

(16) Refined cobalt materials can also be used for other (non-battery related) applications, which include, for example, (i) metal bonding powders and (ii) cobalt chemicals used in a range of end applications such as colouring, catalysts, tyres, animal feed, plating and coatings.

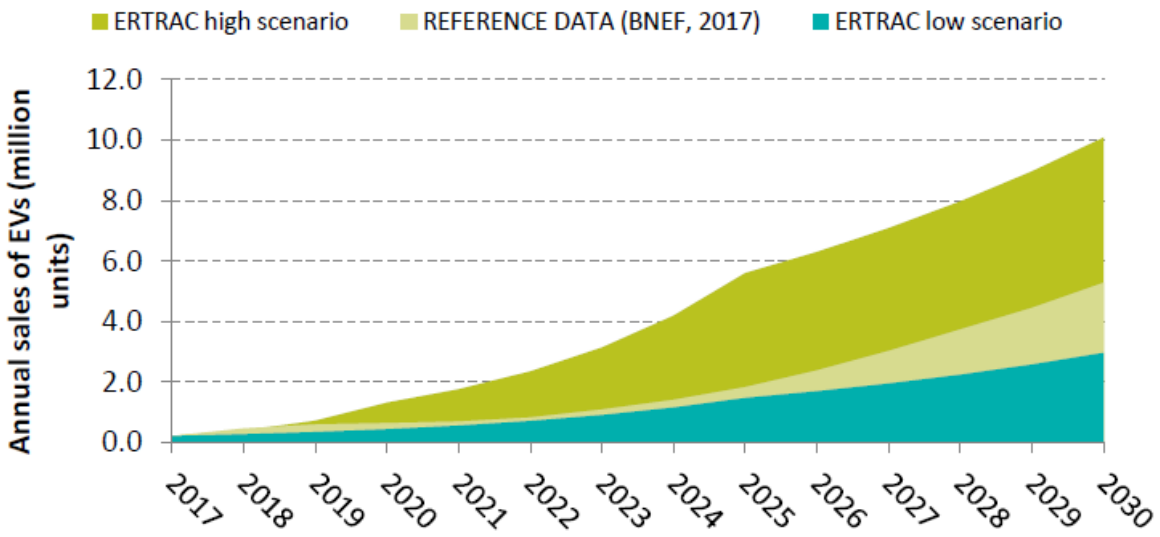
4.2. Industry trends

(17) Cobalt production has been steadily growing over the last 50 years and accelerating since the 2000's. In the past decades, the increase of cobalt input materials supply has partly originated from inflows of artisanal-mined cobalt from DRC. Artisanal-mined cobalt in DRC is cheaper than cobalt extracted by large multinational companies, but considered unethical by many Union market participants as it often involves child labour and poor standards of health and safety.

(18) According to the latest market outlooks, the market for rechargeable batteries and in particular for Li-ion batteries will grow dramatically in the next decade, both globally and in the EEA, as such batteries are a key enabling technology for low emission mobility and energy storage. The increasing use of EVs will be the main driving force for such growth. In the Union, some projections suggest that the sales of EVs will increase by an annual growth rate of 22% to 34% until 2030.[7] This could lead to an annual sales rate of up to ten million EVs per year by 2030, as shown in Figure 3.

[7] Joint Research Center, 'Cobalt: demand-suppy balances in the transition to electric mobility', 2018, page 23.

Figure 3 Projected increase in EV sales in the EU until 2030



Source: Joint Research Center, 'Cobalt: demand-suppy balances in the transition to electric mobility', 2018, page 23.

(19) It is expected that the supply of rechargeable battery cathode materials and Li-ion batteries will adapt to follow the demand mainly in Asia but also in Europe and the rest of the world. For instance, the Notifying Party has started the process to expand the capacity of its Chinese cobalt refinery to increase its production of rechargeable battery cathode materials and has constructed a new cathode materials plant in Poland.

(20) Currently, the vast majority of battery production, including of Li-ion batteries, takes place in Asia. However, in view of the expected demand increase for Li-ion batteries in Europe, a number of investment projects aiming at establishing a European Li-ion battery industry are underway. In addition to Umicore's announcement, BASF has announced plans to build a precursor plant in Harjavalta (Finland), Johnson Matthey ('JMBM') is currently developing a cathode materials plant in Billingham (UK) and Northvolt is developing two battery plants in Västerås and Skellefteå (Sweden).

(21) The expected significant increase in the demand for Li-ion batteries for EVs would have a subsequent effect on the entire upstream value chain, including the cobalt value chain. Worldwide, such demand increase would result in a significant increase in cobalt demand, from an annual demand of 6 650 tonnes in 2017 to between 300 000 – 400 000 tonnes in 2030. In Europe, on an annual basis, the demand for cobalt in EVs may increase from 970 tonnes in 2017 to between 36 370 and 123 200 tonnes in 2030.[8]

(22) Current estimates suggest that refined cobalt materials will be in surplus until 2021. However, the market balance is expected to turn in 2022, at which point demand

[8] Joint Research Center, 'Cobalt: demand-suppy balances in the transition to electric mobility', 2018, pages 22 and 24.

growth for refined cobalt materials is expected to outpace supply, with the market being structurally undersupplied for the remainder of the decade.[9]

(23) Consequently, the landscape of the cobalt value chain (demand and supply) will presumably change significantly in the coming years.

4.3. The Parties' activities in the cobalt supply chain

(24) Umicore is active in cobalt refining through its refineries in Olen (Belgium) and Ganzhou (China). Umicore's cobalt refining activities mainly feed captively its battery and non-battery related downstream activities.[10]

(25) With regard to battery related activities, Umicore is a cathode material (LCO and NMC types) supplier for Li-ion batteries used in portable electronics and EVs. Umicore currently produces all its battery cathode materials at sites in China and South Korea. Umicore plans to start production of cathode materials at a newly created site in Poland in 2020.

(26) Furthermore, Umicore supplies refined cobalt materials for a number of non-battery applications. These end applications include for example superalloys for aerospace, power generation gas turbines, medical/dental implants and others, metal bonding powders, catalysts, colouring, tyres, paint and ink, surface finishing, agro industry, electronics and magnets. In the EEA, Umicore produces cobalt materials for non-battery applications in its sites in Olen, Bruges (Belgium) and Grenoble (France).

(27) The Target is active in cobalt refining and the production of battery grade cobalt materials and NMC precursors[11], which are sold to third parties for the production of cathode materials. The Target's activities are carried out in Finland.

4.4. Refined cobalt materials for battery applications

4.4.1. Product market definition

(28) In the past,[12] the Commission has concluded that the supply of cobalt intermediate products and the supply of refined cobalt belong to different product markets in view of the lack of supply and demand-side substitutability. The Commission has also previously found that it appears appropriate to subdivide the refined cobalt product market by end application due to differences in the demand-structure and in technical and delivery requirements resulting in limited supply- and demand-side substitutability.[13] In particular, in the case M.4000 – *Inco*/*Falconbridge*, the Commission considered that there appear to be specific end applications of cobalt that require high purity cobalt products, such as super alloys or batteries. However, the precise delineation of the product market was ultimately left open with the

9 Darton Commodities Ltd. 'Cobalt Market Review 2018-2019', 2019.

10 Umicore has some limited sales of cobalt compound solutions from its Belgian refinery, mostly to one customer.

11 Umicore supplies no battery grade cobalt materials or precursors to third parties.

12 M.6541 – *Glencore*/*Xstrata*, paragraph 360.

13 M.4000 – *Inco*/*Falconbridge*, recital 167; and M.6541 – *Glencore*/*Xstrata*, paragraph 361.

exception of the high purity cobalt segment for the production of super alloys used in safety critical parts.[14]

4.4.1.1. Battery grade cobalt materials

(29) Battery grade cobalt materials are refined cobalt materials of a certain level of chemical purity, and which have the physical characteristics and consistency that make them suitable for use in battery applications. The Notifying Party has explained that the absence of certain impurities in battery grade cobalt materials is critically important, as the subsequent (downstream) production steps to produce the cathode materials do not contain any purification steps. In addition, all raw materials used in the supply chain for Li-ion batteries need to demonstrate very consistent purity and physical morphology in order to achieve high-quality and cost-competitive battery production. For these reasons, the Notifying Party submits that the relevant upstream product market is the market for the production and supply of battery grade cobalt materials.

(30) The results of the Commission's investigation support the Notifying Party's view that a segmentation of the market for refined cobalt materials per purity level (battery grade or other) is pertinent.

(31) Therefore, for the purposes of the present decision the Commission concludes that battery grade cobalt materials constitute a distinct product market separate from other cobalt materials.

4.4.1.2. NMC precursors

(32) Precursors are a combination of battery grade cobalt materials with other elements, depending on the final cathode material composition. Their production constitutes an intermediate step between the production of battery grade cobalt materials and the production of some cathode materials.

(33) Since precursors are alloys and thus not limited to cobalt, the Notifying Party submits that there is a market for NMC precursors containing battery grade (i) nickel, (ii) cobalt and (iii) manganese. NMC precursors are used for the production of (NMC-type) cathode materials. Neither of the Parties is active in the production or supply of other types of precursors.

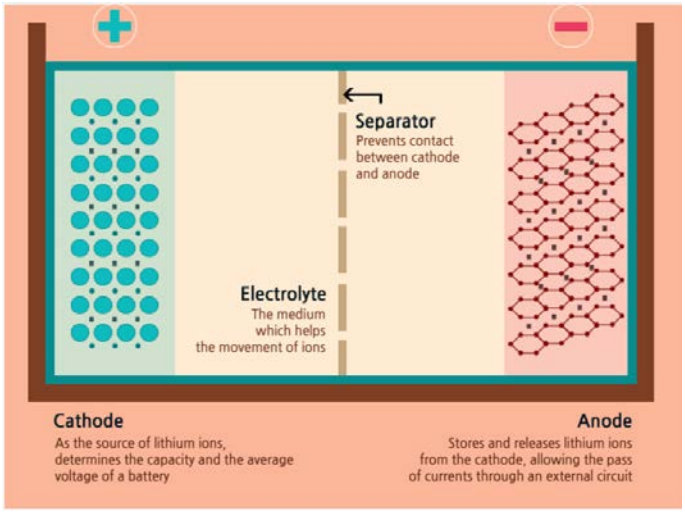
(34) The results of the Commission's investigation do not oppose the Notifying Party's view that a market for the production and supply of NMC precursors could be identified. However, for the purposes of the present decision the ultimate product market definition can be left open since the Transaction does not give rise to serious doubts as to its compatibility with the internal market or the EEA agreement irrespectively of the definition retained.

4.4.1.3. Cathode materials for Li-ion batteries

(35) Cathode materials are used in the production of Li-ion batteries. Li-ion batteries consist of four main components: a cathode, an anode, an electrolyte and a separator, as shown in Figure 4.

[14] M.4000 – *Inco/Falconbridge*, recital 168.

Figure 4 The four components of a Li-ion battery



Source: www.samsungsdi.com.

(36) According to the Notifying Party, the cathode is the main element dictating the performance characteristics of Li-ion batteries, for instance, energy density, load capacity, thermal stability or cycle life.

(37) Battery producers can choose from multiple cathode materials. Out of the five main types of cathode materials for Li-ion batteries (LCO, LFP, LMO, NCA and NMC)[15], three have a cathode formulation that includes cobalt (LCO, NCA and NMC). The exact proportion of cobalt against the other metals varies from cathode material to cathode material. Historically, the primary active component of the cathode in Li-ion batteries was cobalt. Today, the battery industry has been reducing cobalt content in cathode materials following cobalt price increases and nickel frequently substitutes cobalt. However, as higher nickel content makes the Li-ion battery less stable, cobalt is still needed to stabilise it. The Notifying Party submits that it expects strong growth in its production of NMC[…] and NMC[…] battery cathode materials.[16] The different numbers (e.g. […], […], etc.) indicate the relative parts of nickel, manganese and cobalt in the battery cathode material.[17] NMC[…]and NMC[…] contain comparatively less cobalt than NMC111, which the Notifying Party mainly produced in 2019 and contains nickel, manganese and cobalt in equal parts.

(38) According to the Notifying Party, there is (i) supply-side substitutability between LCO, NCA and NMC cathode materials from a know-how, process and technology perspective but (ii) no supply-side substitutability between LCO, NCA and NMC on the one hand, and LFP and LMO on the other hand.[18]

(39) As to demand-side substitutability, the Notifying Party submits that battery producers select a specific cathode material depending on the final application requirements (durability, temperature performance, safety requirements, etc.) for the Li-ion battery and that it is easy for them to change the type of cathode materials as

15 See Figure 2.

16 Form CO, paragraph 19.

17 For instance, NMC […] means […]% nickel, […]% manganese and […]% cobalt in terms of proportion of each respective metal in the compound.

18 Form CO, paragraph 120.

batteries are designed and qualified by customers on a continuous basis. According to Umicore, EVs can use all five types of cathode materials with NMC, NCA, LFP representing the majority of the demand. In terms of technical performance, Umicore submits that the newest NMC and NCA are so similar that for most applications they can be exchanged when a new battery is developed.[19]

(40) For those reasons, the Notifying Party submits that the relevant (downstream) product market is the market for the production and supply of all types of cathode materials (LCO, LFP, LMO, NCA and NMC) for Li-ion batteries.

(41) However, the results of the market investigation suggest that, from a supply-side perspective, even for the cobalt containing cathode materials (LCO, NCA and NMC) producers cannot easily switch the production of one type of cathode material to another.[20] The results of the market investigation further suggest that producers cannot easily switch the production of one type of NMC cathode material to another (e.g. from NMC532 to NMC811).[21]

(42) From a demand-side perspective, it appears that Li-ion battery producers prefer one type of cathode material or the other depending on the specific characteristics desired for the battery and that, ultimately, their customers' requirements (carmakers or others) drive demand towards their preferred type of cathode material. In this regard, a producer of cathode materials for Li-ion batteries explained that '*the cathode material preferred by the carmakers depends on which generation of batteries they are utilizing, but the entire value chain must be aligned to be able to produce the desired cathode materials based on the battery technology*'.[22] A producer of Li-ion batteries explained that '*some cathode material grades are offering specific properties which can be unique*'.[23] A producer of precursors expressed that '*[c]hanging the type of cathode material in the lithium-ion rechargeable battery that a carmaker requires can take from three to five years (including a qualification process) and could only be used in a new car model'*.[24]

(43) The Commission therefore considers that a market for the production and supply of at least each type of cathode material (LCO, LFP, LMO, NCA and NMC) could be identified. However, for the purposes of the present decision the ultimate product market definition can be left open since the Transaction does not give rise to serious doubts as to its compatibility with the internal market or the EEA agreement irrespectively of the definition retained.

4.4.1.4. Ethical and sustainable cobalt containing materials

(44) The results of the market investigation indicate that the markets for refined cobalt containing materials could be further segmented along the cobalt value chain by the

19 Form CO, paragraph 121.

20 Replies to question 20 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries.

21 Replies to question 22 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries.

22 Replies to question 24 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries.

23 Replies to question 18 of Q2 – Questionnaire to customers in the Li-ion battery value chain.

24 Minutes of a call with a competitor on 17.10.2019.

origin of the cobalt between sustainable and 'ethical' or unsustainable and 'unethical' (i.e. whether the cobalt mining and processing involves any child labour and/or lax health and safety practices). The ethical and sustainable origin of cobalt materials is defined at the time of the mining operations, where neither of the Parties is active. Certain customers of cobalt containing products (i.e. battery grade cobalt materials, precursors, battery cathode materials, or Li-ion batteries) however require producers along the cobalt value chain (such as cobalt refiners like the Parties) to guarantee that their cobalt-bearing products do not contain any unsustainable or unethical cobalt.

(45) To monitor compliance with such standards, certain companies along the cobalt value chain have internal auditing processes in place.[25] In this context it is also to be noted that the Notifying Party considers its focus on '*building a sustainable and clean battery materials, an integrated battery materials value chain in Europe*' to be a '*competitive differentiator*'.[26] However the Notifying Party also submits that while it hopes this will change in the future, '*reality today is that ethical and sustainable sourcing is not a decisive buying criteria for the lithium-ion battery manufacturers. Pragmatism prevails with price, performance and quality considerations remaining the key factors in sourcing decisions*'.[27]

(46) For the purposes of the present decision, the ultimate product market definition with regard to sustainable and ethical refined cobalt materials can be left open since the Transaction does not give rise to serious doubts as to its compatibility with the internal market or the EEA agreement irrespectively of the definition retained.

4.4.2. Geographic market definition

(47) The Commission has previously found that the markets for the supply of refined cobalt products are most likely global in scope.[28] Although the market investigation in case M.4000 – *Inco*/*Falconbridge* suggested that the scope of such markets is global to a large extent, it also revealed some demand specificities in certain areas in the world.[29] However, the precise delineation of the geographic market was ultimately left open with the exception of the market for the supply of high purity cobalt for super alloys used in safety critical parts, which was considered worldwide in scope.[30]

(48) According to the Notifying Party, the markets for the production and supply of battery grade cobalt materials, precursors and cathode materials for Li-ion batteries are global in scope.[31]

(49) Umicore submits that producers of battery grade cobalt materials and NMC precursors typically supply customers around the world (but mainly in China, Japan and South Korea where more than 90% of the worldwide production of cathode

25 Minutes of a call with a competitor on 17.10.2019.

26 Umicore Half Year 1 2019 Investor Call Transcript, 31 July 2019.

27 Reply to pre-notification request for information 10, question 6, 15.10.2019.

28 M.4000 – *Inco*/*Falconbridge*, recitals 223 to 226 and M.6541 – *Glencore/Xstrata*, paragraphs 364 and 365.

29 M.4000 – *Inco*/*Falconbridge*, recital 224.

30 M.4000 – *Inco*/*Falconbridge*, recitals 225 and 226.

31 Form CO, paragraph 150.

materials is located). This also applies to the Target from its only production plant in Finland. Umicore further submits that producers of cathode materials in turn supply their customers (i.e. battery producers) worldwide from their plants in China, Japan and South Korea.

(50) According to the Notifying Party, the prices of battery grade cobalt materials, precursors and cathode materials in different regions in the world are largely aligned. As to tariffs or similar measures, in the EEA, battery grade cobalt materials in chemical form are subject to an import duty between 4.6 and 5.5%, precursors are subject to an import duty of 5.5% and cathode materials for Li-ion batteries are subject to an import duty of 5.5%.

(51) The results of the market investigation have confirmed that producers of battery grade cobalt materials, precursors and cathode materials for Li-ion batteries supply customers around the world and that such products can be transported worldwide in a cost effective way.[32] However, there is inconclusive evidence as to whether prices of battery grade cobalt materials, precursors and cathode materials for Li-ion batteries differ between countries or world regions.

(52) For those reasons, for the purposes of the present decision, the Commission considers that the markets for battery grade cobalt materials, precursors (including NMC precursors) and cathode materials for Li-ion batteries (including NMC and LCO cathode materials) are at least EEA-wide and potentially global in scope. The ultimate geographic market definitions can be left open since the Transaction does not give rise to serious doubts as to its compatibility with the internal market or the EEA agreement irrespectively of the definition retained.

4.5. Refined cobalt materials for non-battery applications

(53) In addition to the Li-ion battery applications, Umicore sells refined cobalt materials for a number of non-battery end applications, which post-Transaction will be sold by the Retained Businesses as well.

4.5.1. Product market definition

(54) As stated above in paragraph (28), the Commission has concluded in the past[33] that the supply of cobalt intermediate products and the supply of refined cobalt belong to different product markets in view of the lack of supply and demand-side substitutability. The Commission has also previously found that it appears appropriate to subdivide the refined cobalt product market by end application due to differences in the demand-structure and in technical and delivery requirements resulting in limited supply- and demand-side substitutability.[34] In particular, in case M.4000 – *Inco*/*Falconbridge*, the Commission considered that a distinction should be made between the chemical and the metallurgical end applications of cobalt, as metallurgical applications can only use metal cobalt. Furthermore, the Commission considered that there appear to be specific end applications of cobalt that require

[32] Replies to questions 28, 29 and 30 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries and questions 33 and 35 of Q2 – Questionnaire to customers in the Li-ion battery value chain.

[33] M.6541 – *Glencore*/*Xstrata*, paragraph 360.

[34] M.4000 – *Inco*/*Falconbridge*, recital 167 and M.6541 – *Glencore*/*Xstrata*, paragraph 361.

high purity cobalt products, such as super alloys or batteries. However, the precise delineation of the product market was ultimately left open but for the high purity cobalt segment for the production of super alloys.[35]

4.5.1.1. Cobalt bonding powders

(55) Refined cobalt in metallic form serves the production of bonding powders used as binders in the production of diamond tools and hard metals.

(56) From a demand-side perspective, substitution appears to be limited between bonding powders and refined cobalt materials (in metallic or chemical forms) for other end applications. Furthermore, from a supply-side perspective, the results of the market investigation show that several cobalt refiners are not able to produce bonding powders.[36]

(57) However, for the purposes of the present decision, the ultimate definition of the relevant product market can be left open since the Transaction does not give rise to serious doubts as to its compatibility with the internal market or the EEA agreement irrespectively of the definition retained.

4.5.1.2. Cobalt chemicals for non-battery applications

(58) According to the information available to the Commission, refined cobalt in chemical form can be used in a number of different end applications such as catalysts (as cobalt salts for oxidation in petrochemical production, to remove sulphur moieties from natural gas and refined petroleum products, as synthesis of polyester precursors or for other industrial reactions); colouring (for pigment production or for colouring glass and ceramic materials); tyres (as rubber adhesion promotor); paint and ink (as drying agent); surface finishing to the plating industry; agro-industry (as animal feed, fertiliser or for water treatment); and electronics and magnets (for wear resistance and electrical resistivity).

(59) From a demand-side perspective, substitution appears to be limited within the different types of non-battery end applications for refined cobalt materials. However, from a supply-side perspective, the results of the market investigation suggest that several cobalt refiners could technically start producing cobalt chemicals for catalysts, colouring, tyres, paint and ink, surface finishing and agro-industry.[37] Nonetheless, there is inconclusive evidence of the cost and time that they would require to do so.

(60) For the purposes of the present decision, the exact definition of the relevant product markets can be left open since the Transaction does not give rise to serious doubts as to its compatibility with the internal market or the EEA agreement irrespectively of the definitions retained.

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35 M.4000 – *Inco*/*Falconbridge*, recital 168.

36 Replies to question 11 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries.

37 Replies to questions 113 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries.

4.5.2. Geographic market definition

(61) As stated above in paragraph (47), the Commission has previously found that the markets for the supply of refined cobalt products are most likely global in scope.[38]

(62) The results of the market investigation suggest that at least for bonding powders, colouring and the agro industry, there are some global trade flows.[39] The results of the market investigation further suggest that bonding powders and refined cobalt materials for catalysts, colouring, tyres, paint and ink, plating industry, agro-industry and electronics and magnets can be transported worldwide in a cost-effective way.[40] The Commission considers that such markets are at least EEA-wide and potentially global in scope.

(63) However, for the purposes of the present decision, the exact geographic market definition with regard to those markets can be left open since the Transaction does not give rise to serious doubts as to its compatibility with the internal market or the EEA agreement irrespectively of the definition retained.

5. COMPETITIVE ASSESSMENT

5.1. Legal framework of the assessment

(64) Under Article 2(2) and (3) of the Merger Regulation, the Commission must assess whether a proposed concentration would significantly impede effective competition in the internal market or in a substantial part of it, in particular through the creation or strengthening of a dominant position. In this respect, a merger can entail horizontal and/or non-horizontal effects.

(65) As regards horizontal effects, the Commission guidelines on the assessment of horizontal mergers under the Merger Regulation (the 'Horizontal Mergers Guidelines') distinguish between two main ways in which mergers between actual or potential competitors on the same relevant market may significantly impede competition, namely non-coordinated or coordinated effects. Non-coordinated effects may significantly impede effective competition by eliminating important competitive constraints on one or more firms, which consequently would have increased market power, without resorting to coordinated behaviour. Coordinated effects may significantly impede effective competition by increasing the likelihood that firms coordinate their behaviour and raise prices, or make coordination easier, more stable or more effective for firms that were already coordinating before the merger.

(66) As regards non-horizontal effects, the Commission guidelines on the assessment of non-horizontal mergers under the Merger Regulation (the 'Non-horizontal Mergers Guidelines') distinguish between two types of non-horizontal mergers, namely

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38 M.4000 – *Inco/Falconbridge*, recitals 223 to 226 and M.6541 – *Glencore/Xstrata*, paragraphs 364 and 365.

39 Replies to question 29 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries, to question 9 of Q3 – Questionnaire to customers of refined cobalt materials for various end applications and minutes of a call with a competitor on 31.10.2019.

40 Replies to question 30 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries.

vertical mergers and conglomerate mergers. Vertical mergers may significantly impede effective competition when actual or potential rivals' access to supplies (through input foreclosure) or markets (through customer foreclosure) is hampered or eliminated as a result of the merger, thereby reducing these companies' ability and/or incentive to compete.

5.2. Refined cobalt materials for battery applications

5.2.1. The Notifying Party's view

(67) According to the Notifying Party, the Transaction does not give rise to any horizontal or vertical affected markets or any competitive concerns with regard to refined cobalt materials for battery applications.

(68) In particular, the Notifying Party submits that the Transaction does not raise any foreclosure concerns, as the Target is not a major delivery source for battery grade cobalt materials and there is a wide supplier base to which producers of cathode materials for Li-ion batteries could turn to in order to substitute supply. Furthermore, the Notifying Party submits that it is already today one of the main customers of the Target for battery grade cobalt materials and precursors. For those reasons, according to the Notifying Party, the Transaction does not create the incentive and ability to reduce or terminate supplies to downstream competitors and undermine their ability to compete.[41]

5.2.2. The Commission's assessment

5.2.2.1. Horizontal assessment

(69) The Transaction does not give rise to any horizontal overlaps between the activities of the Parties in the supply of battery grade cobalt materials, as Umicore is not active in the supply of such materials, neither globally nor in the EEA. All of Umicore's production of battery grade cobalt materials is used captively for its downstream production of cathode materials for Li-ion batteries.

(70) The Parties have provided the following market share information (relating to both value and volume figures) regarding worldwide sales of battery grade cobalt materials.

Table 1 Worldwide market shares in the supply of battery grade cobalt materials, 2018

The Notifying Party	**Target**	**Combined**	**Huayou**	**GEM**	**Jinchuan**
0%	[10-20]%	**[10-20]%**	[10-20]%	[10-20]%	[5-10]%

*Source: the Parties' estimates***.**

(71) Likewise, the Transaction does not give rise to any horizontal overlaps between the activities of the Parties in the supply of NMC precursors (or battery precursors overall), as Umicore is not active in the supply of such product, neither globally nor

41 Form CO, paragraphs 189 to 191.

in the EEA. All of Umicore's production of precursors is used captively for its downstream production of cathode materials for Li-ion batteries.

(72) The Parties have provided the following market share information (relating to both value and volume figures) regarding worldwide sales of NMC precursors.

Table 2 Worldwide market shares in the supply of NMC precursors, 2018

The Notifying Party	Target	Combined	Huayou	GEM	Xiamen Tungsten
0%	[0-5]%	**[0-5]%**	[10-20]%	[30-40]%	[10-20]%

Source: the Parties' estimates.

(73) Lastly, there are no horizontal overlaps between the activities of the Parties in the supply of cathode materials for Li-ion batteries, as the Target is not active in these products, neither globally nor in the EEA.

(74) The Notifying Party has provided the following market share information (volume) regarding worldwide sales of NMC and LCO cathode materials.

Table 3 Worldwide market shares in the supply of NMC cathode materials, 2018

The Notifying Party	Target	Combined	Hunan ShanShan	Nichia	Xiamen Tungsten
[10-20]%	0%	**[10-20]%**	[5-10]%	[5-10]%	[5-10]%

Source: the Notifying Party's estimates.

Table 4 Worldwide market shares in the supply of LCO cathode materials, 2018

The Notifying Party	Target	Combined	Hunan ShanShan	Nichia	Xiamen Tungsten
[10-20]%	0%	**[10-20]%**	[10-20]%	[5-10]%	[20-30]%

Source: the Notifying Party's estimates.

5.2.2.2. Vertical links

(75) The Transaction gives rise to a number of vertical links between the activities of the Parties.

(76) First, the Transaction gives rise to a vertical relationship between the (upstream) activities of the Target in the supply of battery grade cobalt materials and Umicore's (downstream) production of NMC precursors.

(77) Second, the Transaction gives rise to a vertical relationship between the (upstream) activities of the Target in the supply of (NMC) precursors and Umicore's (downstream) production and supply of (NMC) cathode materials for Li-ion batteries.

(78) Third, the Transaction gives rise to a vertical relationship between the (upstream) activities of the Target in the supply of battery grade cobalt materials and Umicore's (downstream) production and supply of (LCO) cathode materials for Li-ion batteries.

(79) Based on submissions by the Parties, none of the vertical links results in affected markets in that the market shares of the Parties are below 30% in all upstream and downstream markets and regardless of whether global or EEA scope is considered.

(80) Although the Commission is unlikely to find concerns related to vertical links where the market share of the new entity post-merger in each of the markets concerned is below 30%, it may investigate such mergers where special circumstances are present.[42]

(81) As already explained in Section 4.2 above, according to the latest market outlooks, the market for rechargeable batteries and in particular for Li-ion batteries are expected to grow dramatically in the next decade, both globally and in the EEA, mainly because such batteries are a key enabling technology for EVs. The dramatic increase in the demand for Li-ion batteries for EVs would lead to a subsequent increase of the demand of battery grade cobalt materials.

(82) In this context, the rationale for the Transaction is directly linked to the future development of a Li-ion battery supply chain in Europe (which aims at supplying the European manufacture of EVs) and Umicore's construction of a cathode material plant in Poland to address the projected demand increase for cathode materials for Li-ion batteries. According to the Notifying Party, with the Transaction, it wants to secure supplies of battery grade cobalt materials.[43]

(83) In that respect, some respondents to the market investigation that are active in the Li-ion batteries value chain have expressed some concerns about an anticompetitive input foreclosure scenario deriving from the Transaction with regard to battery grade cobalt materials.[44] A respondent that has announced plans to build a precursor plant in the EEA explained[45] that '*when the Company heard of the proposed acquisition of Freeport Cobalt Oy's cobalt refinery in Kokkola and downstream battery grade cobalt materials and precursors business by Umicore, S.A./N.V., it raised internal concerns immediately due to the lack of enough alternative suppliers of ethical cobalt battery grade materials*' and that '*[t]he Company believes that Umicore will likely use all of the available capacity in Kokkola for its internal production and the Company will have to look for alternative sources*'.

(84) Consequently, the Commission has investigated whether any input foreclosure anti-competitive effects arise from the Transaction with respect to the supply of battery grade cobalt materials.

(85) An input foreclosure arises where, post-merger, the new entity would be likely to restrict access to the products or services that it would have otherwise supplied absent the merger, by making it harder for its downstream rivals to obtain supplies of the input under similar prices and conditions as absent the merger. In assessing the likelihood of an anticompetitive input foreclosure scenario, the Commission examines (i) whether the merged entity would have, post-merger, the ability to

42 Non-horizontal Mergers Guidelines, paragraphs 25 and 26.

43 Form CO, paragraph 18.

44 Replies to question 46 of Q1 – Questionnaire to competitors in refined cobalt and cathode materials for Li-ion batteries; replies to question 51 of Q2 – Questionnaire to customers in the Li-ion battery value chain; and minutes of a call with a competitor on 17.10.2019.

45 Minutes of a call with a competitor on 17.10.2019.

substantially foreclose access to inputs, (ii) whether it would have the incentive to do so, and (iii) whether a foreclosure strategy would have a significant detrimental effect on competition downstream. In practice, the Commission often examines these factors together since they are closely related.[46]

(86) The Notifying Party is today one of the Target's main customers for battery grade cobalt materials, which are ultimately used by the Notifying Party in its production of cathode materials in its plant outside the EEA in South Korea. In 2018, around one third of the Target's sales of battery grade cobalt materials (in value) worldwide, amounting to […] tonnes of battery grade cobalt materials, were made to the Notifying Party. In the same year, more than half of the Target's sales of battery grade cobalt materials (in value) worldwide, amounting to approximately […] tonnes were made to […], a […] producer of cathode materials for Li-ion batteries.

(87) Umicore plans to produce around […] tonnes of NMC-type cathode materials at its newly created site in Poland in 2020. Depending on the future needs of the battery industry, production could reach […] tonnes in 2021 and […] tonnes in 2022. To feed the plant, Umicore estimates that it would need […] tonnes of battery grade cobalt materials in 2020, […] tonnes in 2021 and […] tonnes in 2022. In order to do so, Umicore submits that it intends to increase the precursor production capacity of the Target, in addition to imports from Asia. Depending on the future needs of the battery industry, Umicore submits that it considers building a […] facility. To supply this new facility, Umicore could increase refining capacity at its Chinese refinery from 5 000 tonnes to […] tonnes and is considering the possibility to increase the Target's refining capacity from 15 000 tonnes to […] tonnes.

(88) In view of the future needs of the Notifying Party's newly created site in Poland, the Commission has assessed whether Umicore would have the ability to foreclose access to battery grade cobalt materials to its competitors downstream. For the following reasons, the Commission concludes that the Notifying Party would not have such ability.

(89) First, the worldwide market share of the Target in the supply of battery grade cobalt materials amounts to approximately [10-20]% in both volume and value (Umicore is not active), and even lower in capacity. In the EEA, according to the Notifying Party, the Target would have a market share far below 30% in the supply of battery grade cobalt materials. It is noted that there are currently very limited sales of these products by any supplier in the EEA as there is no or very limited demand in the EEA.[47]

(90) Second, Umicore is already a major customer of the Target and approximately one third of the Target's total production of battery grade cobalt materials is supplied to Umicore today.

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46 Non-horizontal Mergers Guidelines, paragraphs 31 and 32.

47 According to the Notifying Party, in 2018, the Target sold […] tonnes of battery grade cobalt materials for EUR […] million in the EEA. Out of the […] tonnes, […] tonnes were sold to […] for non-battery related applications and […] tonnes were sold to […], a commodity trading company that, according to the Notifying Party, purchases battery grade cobalt materials to include them in its product portfolio, mainly for exports outside of the EEA.

(91) Third, other significant cobalt refiners, in particular in Asia but also in the EEA and elsewhere, are active in the production and supply of battery grade cobalt materials.

(92) According to the Notifying Party, other suppliers of battery grade cobalt materials include Huayou (China, with a worldwide market share of [10-20]% in the supply of battery grade cobalt materials), GEM (China, with a worldwide market share of [10-20]% in the supply of battery grade cobalt materials), Jiana (China, with a worldwide market share of [5-10]% in the supply of battery grade cobalt materials) and Ambatovy (Madagascar, with a worldwide market share of [0-5]% in the supply of battery grade cobalt materials), among others.

(93) As to EEA-based suppliers, the Notifying Party submits that actual or potential suppliers include at least Norilsk Nickel (Finland) and Terrafame (Finland). Norilsk Nickel currently supplies battery grade cobalt materials and has a worldwide market share of [0-5]% in the supply of battery grade cobalt materials. According to the Notifying Party, Terrafame (Finland) is setting up production and will have capacity to produce around […] tonnes of batter grade cobalt materials per year as of 2021.[48] Furthermore, […], therefore creating an additional supplier of such products in the EEA.[49]

(94) As to supplying sustainable and ethical cobalt products, the results of the market investigation suggest that Terrafame and Norilsk Nickel, which are easier to trace by European customers for their geographical location, supply sustainable and ethical cobalt products. Moreover, a respondent that has announced plans to build a precursor plant in the EEA expressed that '*some Chinese suppliers of battery grade cobalt materials (eg. Huayou) have understood the importance of ethical supply for European customers and are trying to secure ethical cobalt units*'.[50] Ultimately, to ensure that the battery grade cobalt materials are sustainable and ethical, producers downstream could trace the cobalt that goes into a refinery. For instance, a carmaker active in the production of Li-ion batteries for its production of EVs indicated that it '*often sources cobalt input materials from cobalt miners directly*'.[51]

(95) Fourth, in view of the foreseen demand increase for battery grade cobalt materials, it is expected that cobalt refiners expand their capacities for battery grade cobalt materials, although it is yet to be seen to what extent. In this regard, a competitor of the Notifying Party has expressed that '*there will be a lot of activity in the value chain for rechargeable lithium-ion batteries as mining companies are developing capabilities downstream (to enter into markets with higher margins) and carmakers are developing capabilities upstream (to employ current workers now dedicated to declining products)*'.[52] An example of such capacity increases is Terrafame (Finland) that is expected to come online with cobalt refining capacity in 2021.

(96) Thus, it appears possible for producers of any type of cobalt containing battery precursors (or cathode materials for Li-ion batteries) currently sourcing battery grade

48 Form CO, paragraph 95.

49 Reply to question 4 of the Commission's request for information of 31 October 2019.

50 Minutes of a call with a competitor on 17.10.2019.

51 Minutes of a call with a carmaker on 25.10.2019.

52 Minutes of a call with a competitor on 17.10.2019.

cobalt materials from the Target to turn to other sources of supply for such quantities.

(97) In view of the lack of ability of the Notifying Party to foreclose access to battery grade cobalt materials to its competitors downstream, risks of anticompetitive effects as a result of input foreclosure post-Transaction appear limited.

(98) Further, the Commission has for completeness considered whether an input foreclosure situation could arise with respect to NMC-type precursors (as input material) and cathode materials. In the supply of NMC-type precursors the Target's market share is even lower than in battery grade cobalt materials, that is [0-5]% globally (with [10-20]% capacity share) and Umicore has no sales. Therefore, input foreclosure concerns related to (NMC) precursors can be excluded.

5.2.3. Conclusion

(99) For the reasons set out in Section 5.2.2 above, the Commission considers that the Transaction would not significantly impede effective competition in the internal market with respect to refined cobalt materials for battery applications.

5.3. Refined cobalt materials for non-battery applications

5.3.1. The Notifying Party's view

(100) According to the Notifying Party, the Transaction does not give rise to any horizontal or vertical affected market or any competitive concern with regard to refined cobalt materials for non-battery applications.

5.3.2. The Commission's assessment

(101) The Transaction does not give rise to horizontal overlaps between the activities of the Parties with regard to refined cobalt materials for non-battery applications.

(102) However, the Transaction creates a vertical link between certain upstream input materials (liquid cobalt compounds) produced by the Target and Umicore's production of cobalt bonding powders and cobalt chemicals for some non-battery applications.

(103) For that reason, the Commission has investigated whether any input foreclosure anti-competitive effects arise from the Transaction with respect to the supply of refined cobalt for non-battery applications (including cobalt bonding powders and cobalt chemicals). For the following reasons, the Commission has concluded that the proposed transaction would likely not raise significant anticompetitive effects in this respect.

(104) First, the Notifying Party explains that there is no merchant market for the upstream liquid cobalt compounds. In line with that, the Target currently only supplies the liquid cobalt compounds internally to the downstream production in the battery and non-battery value chains, the latter constituting the Retained Businesses. Based on information provided by the Notifying Party, the transportability of the liquid cobalt compounds concerned are limited and there are no third-party customers of these products that the refinery in Kokkola could supply.

(105) Following the Transaction, supplies to the Retained Businesses would no longer be captive as the Retained Businesses enjoy a reserved capacity equivalent of up to […] tonnes of cobalt per calendar year at the merged entity's production site (Kokkola refinery) with the possibility of deciding the purpose for which the capacity is used. The Retained Businesses would also be the only likely customer for such products for the refinery in Kokkola, whether in terms of product supply or capacity reservation.[53]

(106) Second, based on information available to the Commission, there are adequate safeguards in place so that the merged entity would likely not be in a position to terminate the arrangement made in favour of the Retained Businesses.[54] The arrangement is in place until 2093, which is the same year when the lease on the land on which the Target's facilities stand terminates.

(107) Third, the arrangements in place between Umicore and the Retained Businesses are essentially based on production costs (plus a mark-up), allowing the Retained Businesses to benefit from the reserved capacity akin to its own capacity in terms of costs. Overall, based on the information available to the Commission, it appears that such arrangements will not have any negative impact on the Retained Businesses' cost base post-Transaction and, in fact, provide the Retained Businesses with several advantages compared to the costs that FCO currently bears through its operation of the refinery.

(108) Fourth, as an alternative to the feed of cobalt compound solutions from the Target's refinery, according to the Notifying Party, it would also be possible for the Retained Businesses to source already refined cobalt from other sources and to dissolve it into liquid cobalt compounds for transformation into downstream cobalt products. According to the Notifying Party, the Retained Businesses have existing technical installations for the use of dissolution and in any case it is estimated that the capital cost of installing further cobalt dissolution equipment would be around EUR […] to […] million for 1 000 tonnes per year.[55]

(109) Fifth, in terms of incentives, information available to the Commission suggests that there are no obvious other immediate outlets for the production of the capacity reserved for the Retained Businesses at the Kokkola refinery if not used for the benefit of the Retained Business.

(110) Sixth, the majority of respondents to the market investigation sourcing refined cobalt materials for non-battery applications indicated that they do not expect the transaction to have an impact on their businesses.[56] While some of the respondents indicated that they expect prices of refined cobalt materials for some non-battery

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53 Umicore makes limited supplies of such liquid cobalt compounds to third parties from its Belgian refinery. However, due to limits on the transportability of the materials, the production in Kokkola is not an alternative for such customers. This relationship is also pre-existing the Transaction and, given that Umicore is not acquiring any non-battery downstream activities as part of the Transaction, Umicore's incentives to continue supplies from the Belgian refinery would likely remain largely unchanged.

54 The arrangements made between the Notifying Party and the Retained Businesses for the reservation of capacity at the Target's refinery can only be terminated in the event of […].

55 Form CO, paragraph 195.

56 Replies to question 25 of Q3 – Questionnaire to customers of refined cobalt materials for various end applications.

applications to increase, the explanations provided suggest that they may have not understood the structure of the Transaction. In general, no duly substantiated concerns were expressed in the market investigation.

(111) Consequently, the Commission finds that the merged entity would likely not have the ability or incentives to effectively foreclose the Retained Businesses from its upstream inputs.

(112) As to customer foreclosure, the Target is currently not a customer of the liquid cobalt compounds and, consequently, there is no risk of customer foreclosure in this respect. Moreover, based on the information the Notifying Party has provided on the (non-) transportability of the liquid cobalt compounds produced by the Kokkola refinery, it is not feasible that the merged entity could transport them to their Belgian production site and replace supplies from any third party even if such thid-party supplies took place.

(113) Consequently, the Commission finds that the merged entity would likely not have the ability to engage in customer foreclosure.

(114) Furthermore, based on information available to the Commission it appears that, through the arrangements relating to the Transaction, or more generally, through the running of the Target's refinery, Umicore will not be able to deduce any information about the production volumes of the various downstream cobalt products produced by the Retained Businesses. Cobalt compound solutions will flow into a mainstream pipeline that will then enter the Retained Businesses' premises for further processing and transformation into the large variety of downstream products sold to many different applications.

5.3.3. Conclusion

(115) For the reasons set out in Section 5.3.2 above, the Commission considers that the Transaction would not significantly impede effective competition in the internal market with respect to refined cobalt materials for non-battery applications.

6. CONCLUSION

(116) For the above reasons, the European Commission has decided not to oppose the notified operation and to declare it compatible with the internal market and with the EEA Agreement. This decision is adopted in application of Article 6(1)(b) of the Merger Regulation and Article 57 of the EEA Agreement.

For the Commission

(Signed)
Margrethe VESTAGER
Member of the Commission